

Product Portfolio
2013-2014



Power Matters.™

Microsemi Corporation is a leading provider of semiconductor solutions differentiated by power, security, reliability and performance. The company concentrates on providing solutions for applications where power matters, security is non-negotiable and reliability is vital. These solutions include high-performance, radiation-hardened and highly reliable analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Power-over-Ethernet (PoE) ICs and midspans; as well as custom design capabilities and services.

From a market perspective, Microsemi is focused on communications, defense & security, aerospace and industrial markets including medical.

In aerospace, Microsemi's high-performance solutions are used in commercial airliners including the Boeing 787 Dreamliner and Airbus A380. The company's high-reliability products are also used in most satellites and a wide range of commercial and military avionics systems.

In the defense and security sector, Microsemi's solutions are used by all Tier 1 prime contractors in a variety of homeland and offshore security applications. The company's defense and security solutions are also used in products such as unmanned aerial vehicles, and radio and guidance systems.

In communications, Microsemi is a key supplier to top-tier companies focused on wired and wireless communications products. These products are deployed in applications ranging from the central office to the enterprise and the home, and to a broad array of network devices. Microsemi also pioneered the concept and development of PoE technology. The company offers ICs and midspans based on this increasingly popular power transmission solution.

In the industrial segment, Microsemi delivers robust and highly reliable solutions for applications ranging from industrial control to machine-to-machine (M2M) and products



Microsemi is headquartered in Aliso Viejo, CA

such as semiconductor capital equipment. The company is also a leading supplier of ultra low-power wireless solutions used in medical devices including implantable defibrillators and pacemakers, MRI machines, and portable medical equipment.

Microsemi is a publicly held company that trades on the Nasdaq exchange under the ticker symbol MSCC.

OUR VISION

Leading-edge system solutions, solving the most difficult problems, where performance matters, reliability is vital, and security is non-negotiable.

OUR MISSION

Strengthen and leverage the industry's most comprehensive product technology portfolio, differentiated by power, security, reliability and performance to expand our leadership position in high-value, high-barrier-to-entry markets.

Develop innovative leading-edge system solutions that provide our customers with an unparalleled competitive edge, and deliver best-in-class technical service and support.

Power Matters.™

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Microsemi offers analog and mixed-signal ASICs, FPGAs and ARM®-based SoC FPGAs for critical industrial, defense, space, commercial aviation, communications and medical markets. In addition to providing custom and semi-custom mixed-signal integrated circuit designs, development and manufacturing, Microsemi also offers custom package design and development services to support high-current requirements, thermal-dissipation and other complex board-level design constraints. These devices can operate under stringent environment conditions such as radiation and extreme temperature.

Whether you're designing at the board or system level, Microsemi's FPGAs and SoC FPGAs are the only solutions that address fundamental requirements for advanced security, high reliability and low power in the most demanding applications. Microsemi's newly announced IGLOO®2 FPGAs continue the company's focus on addressing the needs of today's cost optimized FPGA market by providing the most integrated FPGA solution in the industry with leading-edge peripherals. These highly customized devices are designed and developed for rapidly growing markets that require industry-leading levels of security, reliability and low power.

Only Microsemi can meet customers' power, size, performance, security, and reliability targets that reduce their overall time-to-market and enable long-term profitability. Now more than ever security, reliability and power matter.

Microsemi offers custom and semi-custom mixed-signal integrated circuit development and manufacturing to customers specializing in high reliability applications such as military, space and extreme environment, automotive, industrial and consumer. Microsemi also provides custom package design and development services to support high-current requirements, thermal-dissipation and other board-level constraints as needed. The company's custom analog and mixed-signal ASIC capabilities include:

Full custom designs, from specification to production.

- System integration;
- Standard product customization;
- New designs and second sourcing to replace obsolete parts.

Capabilities

- Mixed-signal solutions integrating complex analog functions with up to 200K gates, including DFT & SCAN Insertion;
- Microprocessor Integration (RISC 32-bit), RAM, ROM, and EEPROM for automotive and consumer applications;
- Precision analog blocks including low-offset amp, D/A, A/D, regulators, references, Sigma Delta converters, and decimation filter; and
- OTP for post packaging consumer programming;

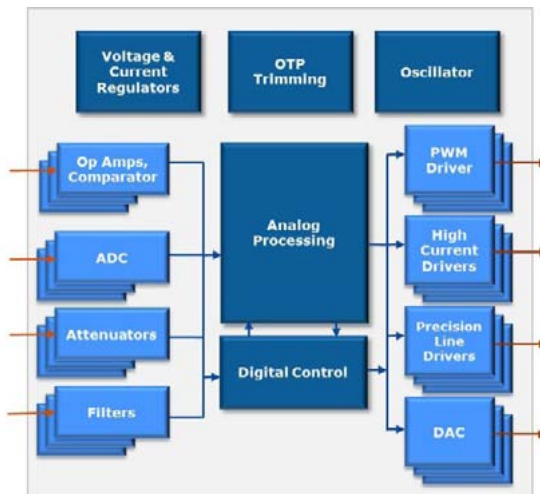
Challenging operating conditions

- Extreme temperature environment (225°C);
- Cold-sparing on I/Os for redundant applications;
- High-voltage designs 40V, 60V, and 100V to 600V;
- SEL/SEU immunity and SETI mitigation; and
- Radiation-tolerance by design for 100kRad TID minimum up to 300kRad;

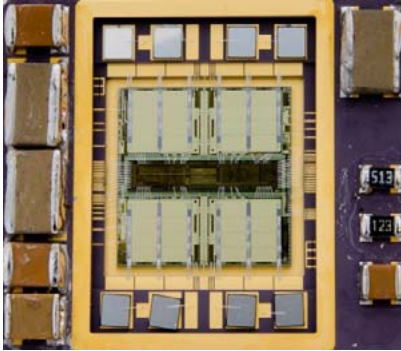
10-year minimum process life guarantee and obsolescence management;

Packaging optimization, analysis and multi-die options; and

Screening to MIL-PRF-38535 Class B, and Class V or MIL-PRF-38534 Class H and Class K;



Typical Mixed Signal ASIC



Markets and Products:

Hi-Rel products: military, aerospace and high-temperature

• Radiation tolerant ICs

- o Telemetry
- o Motor drivers
- o Transceivers
- o High-side relay drivers

• Circuit breakers controllers

• High-temperature circuits for instrumentation and oil prospection

Automotive

- LVDT IC for pedal position sensing and throttle sensor
- Non-contact rotation sensor for drive by wire
- DC motor controllers

Industrial

- Photoelectric sensors
- Servo controllers
- IGBT & power MOSFET high-side drivers

Consumer

- Ultra-low noise microphone preamplifiers
- Wireless charging for inductive charging of cellular phones

Microsemi's IGLOO[®]2 FPGAs integrate a highly reliable, flash-based FPGA fabric and high performance communications interfaces on a single chip. IGLOO2 devices feature low static current with Flash*Freeze power management, built-in and easy to use design security, and an instant-on FPGA fabric that requires no configuration at power-up. A unique hardened memory subsystem allows the independent transfer of data within the FPGA as well as to and from the on-chip communications interfaces. IGLOO2 FPGAs offer up to 5X more logic density and 3X more fabric performance than its predecessors and offer the highest number of general purpose I/O, 5G SERDES interfaces and PCI Express end points when compared to other products in its class.

	Features	M2GL005	M2GL010	M2GL025	M2GL050	M2GL090	M2GL100	M2GL150	
Logic / DSP	Maximum Logic Elements (4LUT + DFF)*	6,060	12,084	27,696	56,340	86,316	99,512	146,124	
	Math Blocks (18x18)	11	22	34	72	84	160	240	
	PLLs and CCCs	2		6			8		
Security	SPI/HPDMA/ PDMA	1 each							
	AES256, SHA256, RNG	1 each				1 each			
	ECC, PUF	-					1 each		
Memory	eNVM (K Bytes)	128	256			512			
	LSRAM 18K Blocks	10	21	31	69	109	160	236	
	uSRAM 1K Blocks	11	22	34	72	112	160	240	
	eSRAM (K Bytes)	64							
	Total RAM (K bits)	703	912	1,104	1,826	2,586	3,552	5,000	
High Speed I/O	DDR Controllers	1x18			2x36	1x18	2x36		
	SERDES Lanes	0	4		8	4	8	16	
	PCIe End Points	0	1		2			4	
User I/Os	DDR Controllers (Count x Width)	115	123	157	139	306	292	292	
	MSIOD (2.5V)	28	40	40	62	40	106	106	
	DDRIO (2.5V)	66	70	70	176	66	176	176	
	Total User I/O	209	233	267	377	412	574	574	

* Total logic may vary based on utilization of DSP and memories in your design.

Please see the IGLOO2 Fabric UG for details.

Packaging and I/Os

Type	VF400		FG484		FG676		FG896		FC1152	
Pitch (mm)	0.8		1		1		1		1	
Length x Width (mm)	17x17		23x23		27x27		31x31		35x35	
Device	I/O	Lanes	I/O	Lanes	I/O	Lanes	I/O	Lanes	I/O	Lanes
M2GL005	169*	-	209	-	-	-	-	-	-	-
M2GL010(T)	195	4	233	4	-	-	-	-	-	-
M2GL025(T)	195	4	267	4	-	-	-	-	-	-
M2GL050(T)	207	4	267	4	-	-	377	8	-	-
M2GL090(T)	-	-	267	4	412*	4*	-	-	-	-
M2GL100(T)	-	-	-	-	-	-	-	-	574	8
M2GL150(T)	-	-	-	-	-	-	-	-	574	16

* Preliminary

SmartFusion2 System-on-Chip (SoC) FPGAs integrate a mix of hard IP blocks and FPGA on a single die. The Hard IP blocks include a microprocessor subsystem (mss), high speed serial I/Os and dedicated high speed memory and memory controllers. Within the advanced FPGA fabric there are dedicated math blocks and embedded memories as well as interfaces to the high speed I/Os and the microprocessor subsystem. The mss is based around a 166MHz ARM[®] Cortex™-M3 processor core and AMBA bus architecture for peripheral interconnects both in the FPGA fabric and of the hard instantiations (such as CAN and USB) included in the mss. The high speed I/O blocks include SERDES circuitry (capable of 5 Gbps operation) and are PCIe Gen2 compatible. SmartFusion2 SoC FPGAs are built on Microsemi's flash memory architecture, making the devices "instant-on", whilst also containing embedded non volatile memory and highly secure.

	Features	M2S005	M2S010	M2S025	M2S050	M2S090	M2S100	M2S150
Logic/DSP	Maximum Logic Elements (4LUT + DFF)*	6,060	12,084	27,696	56,340	86,316	99,512	146,124
	Math Blocks (18x18)	11	22	34	72	84	160	240
	PLLs and CCCs	2		6		8		
Security	AES256, SHA256, RNG	1 each				1 each		
	ECC, PUF	-				1 each		
MSS	Cortex-M3 + Instruction cache	Yes						
	eNVM (K Bytes)	128	256		512			
	eSRAM (K Bytes)	64						
	eSRAM (K Bytes) Non SECDED	80						
	CAN, 10/100/1000 Ethernet, HS USB	1 each						
	Multi-Mode UART, SPI, I2C, Timer	2 each						
Fabric Memory	LSRAM 18K Blocks	10	21	31	69	109	160	236
	uSRAM1K Blocks	11	22	34	72	112	160	240
	Total RAM (K bits)	191	400	592	1314	2074	3040	4488
High Speed	DDR Controllers (Count x Width)	1x18			2x36	1x18	2x36	
	SERDES Lanes	0	4		8	4	8	16
	PCIe End Points	0	1		2		4	
User I/Os	MSIO (3.3V)	115	123	157	139	306	292	292
	MSIOD (2.5V)	28	40	40	62	40	106	106
	DDRIO (2.5V)	66	70	70	176	66	176	176
	Total User I/O	209	233	267	377	412	574	574

* Total logic may vary based on utilization of DSP and memories in your design.
Please see the SmartFusion2 Fabric UG for details

Packaging and I/Os

Type	VF400		FG484		FG676		FG896		FC1152	
Pitch (mm)	0.8		1		1		1		1	
Length x Width (mm)	17x17		23x23		27x27		31x31		35x35	
Device	I/O	Lanes	I/O	Lanes	I/O	Lanes	I/O	Lanes	I/O	Lanes
M2S005	169*	-	209	-	-	-	-	-	-	-
M2S010(T)	195	4	233	4	-	-	-	-	-	-
M2S025(T)	195	4	267	4	-	-	-	-	-	-
M2S050(T)	207	4	267	4	-	-	377	8	-	-
M2S090(T)	-	-	267	4	412*	4*	-	-	-	-
M2S100(T)	-	-	-	-	-	-	-	-	574	8
M2S150(T)	-	-	-	-	-	-	-	-	574	16

* Preliminary

SmartFusion System-on-Chip FPGAs are the only devices to integrate an FPGA fabric, an ARM® Cortex™-M3 processor and programmable analog, offering full customization, IP protection and ease-of-use. Based on Microsemi's proprietary flash process, SmartFusion SoCs are ideal for hardware and embedded designers who need a true system-on-chip that gives more flexibility than traditional fixed-function microcontrollers without the excessive cost of soft processor cores on traditional FPGAs. By integrating analog circuitry they allow the reduction of external components, saving both BOM costs and board real estate.

FPGA Fabric	A2F060			A2F200				A2F500				
	TQ144	CS288	FG256	PQ208	CS288	FG256	FG484	PQ208	CS288	FG256	FG484	
System Gates	60,000			200,000				500,000				
Tiles (D-Flip-Flops)	1,536			4,608				11,520				
RAM Blocks (4,608 bits)	8			8				24				
Microcontroller Subsystem (MSS)	A2F060			A2F200				A2F500				
	TQ144	CS288	FG256	PQ208	CS288	FG256	FG484	PQ208	CS288	FG256	FG484	
Flash (K Bytes)	128			256				512				
SRAM (K Bytes)	16			64				64				
Cortex-M3 processor with MPU	Yes			Yes				Yes				
10/100 Ethernet MAC	No			Yes				Yes				
External Memory Controller (EMC)	-	26- bit address / 16- bit data		26- bit address / 16- bit data				-	26- bit address / 16- bit data			
DMA	8 Ch			8 Ch				8 Ch				
I²C	2			2				2				
SPI	1	2		1	2			1	2			
16550 UART	2			2				2				
32-Bit Timer	2			2				2				
PLL	1			1				1	2	1	2	
32 KHz Low-Power Oscillator	1			1				1				
100 MHz On-Chip RC Oscillator	1			1				1				
Main Oscillator (32 KHz to 20 MHz)	1			1				1				

Programmable Analog	A2F060			A2F200				A2F500				
	TQ144	CS288	FG256	PQ208	CS288	FG256	FG484	PQ208	CS288	FG256	FG484	
ADCs(8-/10-/12-bit SAR)	1			2				2				3
DACs (8-/16-/24-bit sigma-delta)	1			2				2				3
Signal Conditioning Blocks SCBs)	1			4				4				5
Comparators ¹	2			8				8				10
Current Monitors ¹	1			4				4				5
Temperature Monitors ¹	1			4				4				5
Bipolar High Voltage Monitors ¹	2			8				8				10
Temperature Grade	C, I, M ²			C, I				C, I, M ²				

1. These functions share I/O pins and may not all be available at the same time. See the "Analog Front-End Overview"

Device	A2F060			A2F200				A2F500				
	TQ144	CS288	FG256	PQ208	CS288	FG256	FG484	PQ208	CS288	FG256	FG484	
Direct Analog Inputs	11			8				8				12
Shared Analog Inputs	4			16				16				20
Total Analog Inputs	15			24				24				32
Total Analog Outputs	1			1	2			1	2		3	
MSS I/Os ^{2,3}	21 ³	28 ³	26 ³	22	31	25	41	22	31	25	41	
FPGA I/Os	33	68	66	66	78	66	94	66 ⁴	78	66	128	
Total I/Os	70	112	108	113	135	117	161	113	135	117	204	

Notes:

These pins are shared between direct analog inputs to the ADCs and voltage/current/temperature monitors.

- 16 MSS I/Os are multiplexed and can be used as FPGA I/Os, if not needed for MSS. These I/Os support Schmitt triggers and support only LVTTTL and LVCMOS (1.5 / 1.8 / 2.5, 3.3 V) standards.
- 9 MSS I/Os are primarily for 10/100 Ethernet MAC and are also multiplexed and can be used as FPGA I/Os if Ethernet MAC is not used in a design. These I/Os support Schmitt triggers and support only LVTTTL and LVCMOS (1.5 / 1.8 / 2.5, 3.3 V) standards.
- 10/100 Ethernet MAC is not available on A2F060.
- EMC is not available on the A2F500 PQ208 package.

IGLOO Devices	AGL015 ¹	AGL030	AGL060	AGL125	AGL250
Cortex-M1 Devices	–	–	–	–	M1AGL250
System Gates	15,000	30,000	60,000	125,000	250,000
Typical Equivalent Macrocells	128	256	512	1,024	2,048
VersaTiles (D-Flip-Flops)	384	768	1,536	3,072	6,144
Quiescent Current (typical) in Flash*Freeze Mode (μW)	5	5	10	16	24
RAM kbits (1,024 bits)	-	-	18	36	36
4,608-Bit Blocks	-	-	4	8	8
FlashROM Bits	1,024	1,024	1,024	1,024	1,024
Secure (AES) ISP²	-	-	Yes	Yes	Yes
Integrated PLLs in CCCs³	-	-	1	1	1
VersaNet Globals⁴	6	6	18	18	18
I/O Standards	Std., Hot-Swap	Std., Hot-Swap	Std.+	Std.+	Std. +/- LVDS
I/O Banks (+JTAG)	2	2	2	2	4
Maximum User I/Os	49	81	96	133	143
Speed Grades	Std.	Std.	Std.	Std.	Std.
Temperature Grades	C, I	C, I	C, I	C, I	C, I
Single-Ended I/Os / Differential I/O Pairs					
QN48 (6 x 6 mm)	-	34	-	-	-
QN68 (8 x 8 mm)	49	49	-	-	-
UC81 (4 x 4 mm)	-	66	-	-	-
CS81 (5 x 5 mm)	-	66	-	-	-
CS121 (6 x 6 mm)	-	-	963	-	-
VQ100 (14 x 14 mm)	-	77	71	71	68/13
QN132 (8 x 8 mm)	-	81	80	84	87/19 ^{5,6}
FG144 (13 x 13 mm)	-	-	966	97	97/24

1. AGL015 is not recommended for new designs.

2. AES is not available for Cortex-M1 IGLOO devices.

3. AGL060 in CS121 does not support the PLL.

4. Six chip (main) and twelve quadrant global networks are available for AGL060 and above.

5. The M1AGL250 device does not support this package.

6. Device/package support TBD.

IGLOO Devices	AGL400	AGL600	AGL1000
Cortex-M1 Devices	–	M1AGL600	M1AGL1000
System Gates	400,000	600,000	1,000,000
Typical Equivalent Macrocells	-	-	-
VersaTiles (D-Flip-Flops)	9,216	13,824	24,576
Quiescent Current (typical) in Flash*Freeze Mode (µW)	32	36	53
RAM kbits (1,024 bits)	54	108	144
4,608-Bit Blocks	12	24	32
FlashROM Bits	1,024	1,024	1,024
Secure (AES) ISP²	Yes	Yes	Yes
Integrated PLLs in CCCs³	1	1	1
VersaNet Globals⁴	18	18	18
I/O Standards	Std.+/ LVDS	Std.+/ LVDS	Std.+/ LVDS
I/O Banks (+JTAG)	4	4	4
Maximum User I/Os	194	235	300
Speed Grades	Std.	Std.	Std.
Temperature Grades	C, I	C, I	C, I
Single-Ended I/Os / Differential I/O Pairs			
CS196 (8 x 8 mm)	143/35 ⁵	-∅	-∅
FG144 (13 x 13 mm)	97/25	97/25	97/25

1. AGL015 is not recommended for new designs.
2. AES is not available for Cortex-M1 IGLOO devices.
3. AGL060 in CS121 does not support the PLL.
4. Six chip (main) and twelve quadrant global networks are available for AGL060 and above.
5. The M1AGL250 device does not support this package.
6. Device/package support TBD.

The Microsemi IGLOO low-power FPGA family of reprogrammable, full-featured flash FPGAs is designed to meet the demanding power, area, and cost requirements of today's portable electronics. Based on the Microsemi nonvolatile flash technology and single-chip ProASIC3 FPGA architecture, the 1.2 V to 1.5 V operating voltage family offers the industry's lowest power consumption—as low as 5 μ W. The IGLOO family supports up to 3 million system gates with up to 504 kbits of true dual-port SRAM, up to 6 embedded PLLs, and up to 620 user I/Os. Low-power applications that require 32-bit processing can use the ARM Cortex-M1 processor without license fee or royalties in M1 IGLOO devices. Developed specifically for implementation in FPGAs, Cortex-M1 offers an optimal balance between performance and size to minimize power consumption.

IGLOO Devices	AGLE600	AGLE3000
Cortex-M1 Devices	–	M1AGLE3000
System Gates	600,000	3,000,000
VersaTiles (D-Flip-Flops)	13,824	75,264
Quiescent Current (typical) in Flash*Freeze Mode (μW)	49	137
RAM kbits (1,024 bits)	108	504
4,608-Bit Blocks	24	112
FlashROM Bits	1,024	1,024
Secure (AES) ISP	Yes	Yes
Integrated PLLs in CCCs	6	6
VersaNet Globals	18	18
I/O Standards	Pro	Pro
I/O Banks (+JTAG)	8	8
Maximum User I/Os	270	620
Speed Grades	Std.	Std.
Temperature Grades	C, I	C, I
Single-Ended I/Os / Differential I/O Pairs		
FG256	165/79	–
FG484	270/135	341/168
FG896	–	620/310

Microsemi's IGLOO nano low-power FPGAs offer groundbreaking possibilities in power, size, lead-times, operating temperature, and cost. Available in logic densities from 10,000 to 250,000 gates, the 1.2 V to 1.5 V IGLOO nano devices have been designed for high-volume applications where power and size are key decision criteria. Priced competitively in the market, IGLOO nano devices are perfect ASIC or ASSP replacements, yet retain the historical FPGA advantages of flexibility and quick time-to-market in low-power and small footprint profiles.

IGLOO nano Devices	AGLN010	AGLN015 ¹	AGLN020		AGLN060	AGLN125	AGLN250
IGLOO nano-Z Devices¹	–	–	–	AGLN030Z¹	AGLN060Z¹	AGLN125Z¹	AGLN250Z¹
System Gates	10,000	15,000	20,000	30,000	60,000	125,000	250,000
Typical Equivalent Macrocells	86	128	172	256	512	1,024	2,048
VersaTiles (D-flip-flops)	260	384	520	768	1,536	3,072	6,144
Flash*Freeze Mode (typical, μW)	2	4	4	5	10	16	24
RAM kbits (1,024 bits)²	–	–	–	–	18	36	36
4,608-Bit Blocks²	–	–	–	–	4	8	8
FlashROM Bits	1,024	1,024	1,024	1,024	1,024	1,024	1,024
Secure (AES) ISP²	–	–	–	–	Yes	Yes	Yes
Integrated PLLs in CCCs^{2,3}	–	–	–	–	1	1	1
VersaNet Globals	4	4	4	6	18	18	18
I/O Standards	Std. Hot-Swap	Std. Hot-Swap	Std. Hot-Swap	Std. Hot-Swap	Std. Hot-Swap	Std. Hot-Swap	Std. Hot-Swap
I/O Banks	2	3	3	2	2	2	4
Maximum User I/Os	34	49	52	77	71	71	68
Speed Grades	Std.	Std.	Std.	Std.	Std.	Std.	Std.
Temperature Grades	C, I	C, I	C, I	C, I	C, I	C, I	C, I
Single-Ended I/Os							
Known Good Die	34	–	52	83	71	71	68
UC36 (3x3 mm)	23	–	–	–	–	–	–
QN48 (6x6 mm)	34	–	–	34	–	–	–
QN68 (8x8 mm)	–	49	49	49	–	–	–
UC81 (4x4 mm)	–	–	52	66	–	–	–
CS81 (5x5 mm)	–	–	52	66	60	60	60
VQ100 (14x14 mm)	–	–	–	77	71	71	68

1. Not recommended for new designs

1. AGLN030 nano devices and smaller do not support this feature.

2. AGLN060, AGLN125, and AGLN250 in the CS81 package do not support PLL.

Microsemi's IGLOO PLUS low-power FPGA family delivers unrivaled low-power and I/O features in a feature-rich programmable device, offering up to 64% more I/Os than the award-winning IGLOO family and supporting independent Schmitt trigger inputs, hot-swapping, and Flash*Freezebus hold. Ranging from 30,000 to 125,000 gates, the 1.2 V to 1.5 V IGLOO PLUS devices have been optimized to meet the needs of I/O-intensive, power-conscious applications that require exceptional features.

IGLOO PLUS Devices	AGLP030	AGLP060	AGLP125
System Gates	30,000	60,000	125,000
Typical Equivalent Macrocells	256	512	1,024
VersaTiles (D-Flip-Flops)	792	1,584	3,120
Quiescent Current (typical) in Flash*Freeze Mode (μW)	5	10	16
RAM kbits (1,024 bits)	–	18	36
4,608-Bit Blocks	–	4	8
FlashROM Bits	1,024	1,024	1,024
Secure (AES) ISP	–	Yes	Yes
Integrated PLLs in CCCs¹	–	1	1
VersaNet Globals²	6	18	18
I/O Standards	IGLOO PLUS	IGLOO PLUS	IGLOO PLUS
I/O Banks (+JTAG)	4	4	4
Maximum User I/Os	120	157	212
Speed Grades	Std.	Std.	Std.
Temperature Grades	C, I	C, I	C, I
Single-Ended I/Os³	–	–	–
CS201 (8x8 mm)	120	157	–
CS281 (10x10 mm)	–	–	212
CS289 (14x14 mm)	120	157	212
VQ128 (14x14 mm)	101	–	–
VQ176 (20x20 mm)	–	137	–

1. AGLP060 in CS201 does not support the PLL.

2. Six chip (main) and twelve quadrant global networks are available for AGLP060 and AGLP125.

3. When the Flash*Freeze pin is used to directly enable Flash*Freeze mode and not used as a regular I/O, the number of single-ended user I/Os available is reduced by one.

The ProASIC3 low-cost, low-power FPGA family offers a breakthrough in power, price, performance, density, and features for today's most demanding high-volume applications. ProASIC3 devices support the ARM® Cortex™-M1 soft processor IP cores, offering the benefits of programmability and time-to-market. The ProASIC3 low-cost, low-power FPGAs are based on nonvolatile flash technology and support 15,000 to 1,000,000 gates and up to 300 high-performance I/Os. In addition to supporting portable, consumer, industrial, communications and medical applications with commercial and industrial temperature devices, Microsemi also offers ProASIC3 FPGAs with specialized screening for automotive and military systems.

ProASIC3 Devices	A3P015 ¹	A3P030	A3P060	A3P125	A3P250	A3P400	A3P600	A3P1000
Cortex-M1 Devices	–	–	–	–	M1A3P250	M1A3P400	M1A3P600	M1A3P1000
System Gates	15,000	30,000	60,000	125,000	250,000	400,000	600,000	1,000,000
Typical Equivalent Macrocells	128	256	512	1,024	2,048	–	–	–
VersaTiles (D-Flip-Flop)	384	768	1,536	3,072	6,144	9,216	13,824	24,576
RAM kbits (1,024 bits)	–	–	18	36	36	54	108	144
4,608-Bit Blocks	–	–	4	8	8	12	24	32
FlashROM Bits	1,024	1,024	1,024	1,024	1,024	1,024	1,024	1,024
Secure (AES) ISP²	–	–	Yes	Yes	Yes	Yes	Yes	Yes
PLLs	–	–	1	1	1	1	1	1
VersaNet Globals³	6	6	18	18	18	18	18	18
I/O Standards	Std. & Hot Swap	Std. & Hot Swap	Std.+	Std.+	Std.+/ LVDS	Std.+/ LVDS	Std.+/ LVDS	Std.+/ LVDS
I/O Banks (+JTAG)	2	2	2	2	4	4	4	4
Maximum User I/Os	49	81	96	133	157	194	235	300
Speed Grades	Std.	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2
Temperature Grades	C, I	C, I	C, I, T	C, I, T	C, I, T, M	C, I	C, I	C, I, T, M
Single-Ended I/Os / Differential I/O Pairs								
QN48	–	34	–	–	–	–	–	–
QN68	49	49	–	–	–	–	–	–
QN132	–	81	80	84	87/19 ⁴	–	–	–
CS121	–	–	96	–	–	–	–	–
VQ100	–	77	71	71	68/13	–	–	–
TQ144	–	–	91	100	–	–	–	–
PQ208	–	–	–	133	151/34	151/34	154/35	154/35
FG144	–	–	96	97	97/24	97/25	97/25	97/25
FG256	–	–	–	–	157/38 ⁴	178/38	177/43	177/44
FG484	–	–	–	–	–	194/38	235/60	300/74

1. A3P015 is not recommended for new designs.

2. AES not available for Cortex-M1 ProASIC3 devices.

3. Six chip (main) and twelve quadrant global networks are available for A3P060 and above.

4. The M1A3P250 device does not support this package.

The ProASIC3e FPGA family offers a breakthrough in power, price, performance, density, and features for today's most demanding applications. ProASIC3e devices support the ARM® Cortex™-M1 soft processor IP cores, offering the benefits of programmability and time-to-market. The ProASIC3eFPGAs are based on nonvolatile flash technology and support 600,000 to 3,000,000 gates and up to 620 high-performance I/Os. In addition to supporting portable, consumer, industrial, communications and medical applications with commercial and industrial temperature devices.

Product Family ProASIC3e

ProASIC3E Devices	A3PE600	A3PE1500	A3PE3000
Cortex-M1 Devices	–	M1A3PE1500	M1A3PE3000
System Gates	600,000	1,500,000	3,000,000
VersaTiles (D-Flip-Flop)	13,824	38,400	75,264
RAM kbits (1,024 bits)	108	270	504
4,608-Bit Blocks	24	60	112
FlashROM Bits	1,024	1,024	1,024
Secure (AES) ISP	Yes	Yes	Yes
Integrated PLL in CCCs¹	6	6	6
VersaNet Globals²	18	18	18
I/O Standards	Pro	Pro	Pro
I/O Banks (+JTAG)	8	8	8
Maximum User I/Os	270	444	620
Speed Grades	Std., -1, -2	Std., -1, -2	Std., -1, -2
Temperature Grades	C, I	C, I	C, I

Single-Ended I/O / Differential I/O Pairs

PQ208	147/65	147/65	147/65
FG256	165/79	–	–
FG324	–	–	221/110
FG484	270/135	280/139	341/168
FG676	–	444/222	–
FG896	–	–	620/310

1. The PQ208 package has six CCCs and two PLLs.

2. Six chip (main) and twelve quadrant global networks are available for A3P060 and above.

Microsemi's innovative ProASIC3 nano low-cost, low-power FPGAs bring a new level of value and flexibility to high volume markets. When measured against the typical project metrics of performance, cost, flexibility and time to market, the ProASIC3 nano devices provide an attractive alternative to ASICs and application-specific standard products (ASSPs) in fast moving or highly competitive markets. Customer driven total system cost reduction was a key design criteria for the ProASIC3 nano program. Reduced device cost, availability of Known Good Die, a single chip implementation, and a broad selection of small-footprint packages, all contribute to lower total system costs.

ProASIC3 nano Devices	A3PN010	A3PN015 ¹	A3PN020		A3PN060	A3PN125	A3PN250
ProASIC3 nano-Z Devices¹	–	–	–	A3PN030Z ¹	A3PN060Z ¹	A3PN125Z ¹	A3PN250Z ¹
System Gates	10,000	15,000	20,000	30,000	60,000	125,000	250,000
Typical Equivalent Macrocells	86	128	172	256	512	1,024	2,048
VersaTiles (D-Flip-Flops)	260	384	520	768	1,536	3,072	6,144
RAM kbits (1,024 bits)²	–	–	–	–	18	36	36
4,608-Bit Blocks²	–	–	–	–	4	8	8
FlashROM Bits	1,024	1,024	1,024	1,024	1,024	1,024	1,024
Secure (AES) ISP²	–	–	–	–	Yes	Yes	Yes
Integrated PLLs in CCCs²	–	–	–	–	1	1	1
VersaNet Globals	4	4	4	6	18	18	18
I/O Standards	Std., Hot Swap	Std., Hot Swap	Std., Hot Swap	Std., Hot Swap	Std., Hot Swap	Std., Hot Swap	Std., Hot Swap
I/O Banks (+JTAG)	2	3	3	2	2	2	4
Maximum User I/Os	34	49	49	77	71	71	68
Speed Grades	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2
Temperature Grades	C, I	C, I	C, I	C, I	C, I	C, I	C, I
Single-Ended I/O							
Known Good Die	34	–	52	83	71	71	68
QN48 (6x6 mm)	34	–	–	34	–	–	–
QN68 (8x8 mm)	–	49	49	49	–	–	–
VQ100 (14x14 mm)	–	–	–	77	71	71	68

1. Certain devices not recommended for new designs.

2. A3PN030 and smaller devices do not support this feature.

ProASIC3L low-cost, low-power FPGAs feature 40 percent lower dynamic power and 90 percent lower static power than the previous generation ProASIC3 FPGAs and orders of magnitude lower power than SRAM competitors, combining dramatically reduced power consumption with up to 350 MHz operation. The ProASIC3L family also supports the free implementation of an FPGA-optimized 32-bit ARM® Cortex™-M1 processor, allowing system designers to select the Microsemi flash FPGA solution that best meets their speed and power design requirements, regardless of application or volume. Combined with optimized software tools using Power-Driven Layout (PDL), this provides instant power reduction capabilities. In addition to supporting portable, consumer, industrial, communications, and medical applications with commercial and industrial temperature devices, Microsemi also offers ProASIC3EL FPGAs with specialized screening for military systems.

ProASIC3L Devices	A3P250L	A3P600L	A3P1000L	A3PE600L ¹	A3PE3000L
Cortex-M1 Devices	–	M1A3P600L	M1A3P1000L	–	M1A3PE3000L
System Gates	250,000	600,000	1,000,000	600,000	3,000,000
VersaTiles (D-Flip-Flop)	6,144	13,824	24,576	13,824	75,264
RAM kbits (1,024 bits)	36	108	144	108	504
4,608-Bit Blocks	8	24	32	24	112
FlashROM Bits	1,024	1,024	1,024	1,024	1,024
Secure (AES) ISP²	Yes	Yes	Yes	Yes	Yes
Integrated PLLs in CCCs³	1	1	1	6	6
VersaNet Globals	18	18	18	18	18
I/O Standards	Std.+LVDS	Std.+LVDS	Std.+LVDS	Pro	Pro
I/O Banks (+JTAG)	4	4	4	8	8
Maximum User I/Os	157	235	300	270	620
Typical Static / Flash*Freeze Power (mW) at V_{CC}=1.2 V	0.33	0.66	1.06	TBA	3.3
Speed Grades	Std., -1	Std., -1	Std., -1	Std., -1	Std., -1
Temperature Grades	C, I	C, I	C, I	M	C, I, M
Single-Ended I/Os / Differential I/O Pairs					
VQ100	68/13	–	–	–	–
PQ208	151/34	154/35	154/35	–	147/65 ³
FG144	97/24	97/25	97/25	–	–
FG256	157/38	177/43	177/44	–	–
FG324	–	–	–	–	221/110
FG484	–	235/60	300/74	270/135	341/168
FG896	–	–	–	–	620/310

1. A3PE600L is only offered in military grade. Refer to the Military ProASIC3/EL Low-Power Datasheet.

2. AES is not available for Cortex-M1 ProASIC3L devices.

3. For the A3PE3000L, the PQ208 package has six CCCs and two PLLs.

Fusion integrates configurable analog, large flash memory blocks, comprehensive clock generation and management circuitry, and high-performance, flash-based programmable logic in a monolithic device. Microsemi's innovative Fusion architecture can be used with the Microsemi soft microcontroller (MCU) core as well as the performance-maximized 32-bit ARM® Cortex™-M1 cores. Pigeon Point devices (P1-prefixed devices) are used in conjunction with Pigeon Point ATCA IP cores and firmware. MicroBlade devices (U1-prefixed devices), designed in partnership with MicroBlade, are targeted to Advanced Mezzanine Card designs. Fusion is the world's first mixed signal FPGA platform. In addition to supporting commercial and industrial temperature devices, Microsemi now offers Fusion FPGAs with specialized screening for extended temperature military type applications.

Fusion Devices	AFS090	AFS250	AFS600 ⁵	AFS1500 ⁵
ARM Cortex-M1¹ Devices	–	AFS250	M1AFS600	M1AFS1500
Pigeon Point Devices²	–	–	P1AFS600 ⁴	P1AFS1500 ⁴
MicroBlade Devices²	–	U1AFS250 ³	U1AFS600 ³	U1AFS1500 ³
General				
System Gates	90,000	250,000	600,000	1,500,000
Tiles (D-Flip-Flops)	2,304	6,144	13,824	38,400
Secure (AES) ISP	Yes	Yes	Yes	Yes
PLLs	1	1	2	2
Globals	18	18	18	18
Memory				
Flash Memory Blocks (2 Mbits)	1	1	2	4
Total Flash Memory Bits	2M	2M	4M	8M
FlashROM Bits	1,024	1,024	1,024	1,024
RAM Blocks (4,608 bits)	6	8	24	60
RAM (kbits)	27	36	108	270

1. Refer to the Cortex-M1 product brief for more information.

2. MicroBlade and Pigeon Point devices are not offered on extended temp range.

3. MicroBlade devices are only offered in FG256.

4. Pigeon Point devices are only offered in FG484 and FG256

5. Extended temperature supported devices

Fusion Devices	AFS090	AFS250	AFS600 ³	AFS1500 ³
Analog and I/Os				
Analog Quads	5	6	10	10
Analog Input Channels	15	18	30	30
Gate Driver Outputs	5	6	10	10
I/O Banks (+ JTAG)	4	4	5	5
Maximum Digital I/Os	75	114	172	252 / 223 (K Temp)
Analog I/Os	20	24	40	40
Temperature Grades	C, I	C, I	C, I, K ¹	C, I, K ¹
I/Os: Single-/Double-Ended (Analog)				
QN108	37/9 (16)	–	–	–
QN180	60/16 (20)	65/15 (24)	–	–
PQ208 ²	–	93/26 (24)	95/46 (40)	–
FG256	75/22 (20)	114/37 (24)	119/58 (40)	119/58 (40)
FG484	–	–	172/86 (40)	223/109 (40)
FG676	–	–	–	252/126 (40)

1. Extended Military temperature range supported from -55C to 100C

2. Fusion devices in the same package are pin compatible with the exception of the PQ208 package (AFS250 and AFS600).

3. Extended temperature supported devices

Microsemi Fusion mixed signal FPGAs integrate configurable analog, large flash memory blocks, comprehensive clock generation and management circuitry and high-performance, flash-based reprogrammable logic in a monolithic device. Innovative Fusion architecture can be used with Microsemi's soft microcontroller (MCU) core as well as the performance-maximized 32-bit ARM Cortex-M1 cores. Extended temperature Fusion devices operate at temperatures from 100°C to as low as -55°C.

Extended Temp Fusion Devices	AFS600	AFS1500
ARM Cortex-M1 ¹ Devices	M1AFS600	M1AFS1500
General		
System Gates	600,000	1,500,000
Tiles (D-Flip-Flops)	13,824	38,400
Secure (AES) ISP	Yes	Yes
PLLs	2	2
Globals	18	18
Memory		
Flash Memory Blocks (2 Mbits)	2	4
Total Flash Memory Bits	4M	8M
FlashROM Bits	1,024	1,024
RAM Blocks (4,608 bits)	24	60
RAM (kbits)	108	270
Analog and I/Os		
Analog Quads	10	10
Analog Input Channels	30	30
Gate Driver Outputs	10	10
I/O Banks (+ JTAG)	5	5
Maximum Digital I/Os	172	252 / 223 (K Temp)
Analog I/Os	40	40
Temperature Grades	K ²	K ²
I/Os: Single-/Double-Ended (Analog)		
FG256	119/58 (40)	119/58 (40)
FG484	172/86 (40)	223/109 (40)

1. Refer to the Cortex-M1 product brief for more information.

2. K denotes Extended Temperature Devices, available in C and I grades in standard Fusion devices.

RTAX-S radiation-tolerant FPGAs offer industry-leading advantages for designers of space-flight systems. High performance and low-power consumption, true single-chip form factor, and live-at-power-up operation all combine to make RTAX-S the FPGA of choice for space designers. From concept to final integration and flight, Microsemi provides the tools and support to help you successfully integrate your space-flight application into RTAX-S radiation-tolerant FPGAs. Additionally, for space applications that have a need for a lower standby current, Microsemi offers RTAX-SL, the low-power grade option that has half the standby current of the standard product at worst-case conditions.

Device	RTAX250S/SL	RTAX1000S/SL	RTAX2000S/SL	RTAX4000S/SL
Capacity				
Equivalent System Gates	250,000	1,000,000	2,000,000	4,000,000
ASIC Gates	30,000	125,000	250,000	500,000
Modules				
Register (R-cells)	1,408	6,048	10,752	20,160
Combinatorial (C-cells)	2,816	12,096	21,504	40,320
Embedded RAM/FIFO (without EDAC)				
Core RAM Blocks	12	36	64	120
Core RAM Bits (k=1,024)	54 k	162 k	288 k	540 k
Clocks (segmentable)				
Hardwired	4	4	4	4
Routed	4	4	4	4
I/Os				
I/O Banks	8	8	8	8
User I/Os (maximum)	198	418	684	840
I/O Registers	744	1,548	2,052	2,520
Speed Grades	Std., -1	Std., -1	Std., -1	Std., -1
Temperature Grades	E, B, V	E, B, V	E, B, V	E, B, V
Package				
CCGA/LGA	624	624	624, 1152	1272
CQFP	208, 352	352	256, 352	352

RTAX-DSP space-flight FPGAs add embedded radiation-tolerant multiply-accumulate blocks to the tried-and-trusted industry-standard RTAX-S product family. The result is efficient utilization when implementing arithmetic functions, such as those encountered in DSP algorithms, without sacrificing reliability or radiation tolerance. RTAX-DSP integrates complex DSP functions into a single device without any external components for code storage and without multiple-chip implementations for radiation mitigation. This gives RTAX-DSP a significant advantage in power consumption and heat dissipation relative to SRAM-based FPGAs.

Device	RTAX2000D	RTAX4000D
Capacity		
System Gates	2,000,000	4,000,000
ASIC Gates	250,000	500,000
Modules		
Register (R-cells)	9,856	18,480
Combinatorial (C-cells)	19,712	36,960
Embedded RAM/FIFO (without EDAC)		
Core RAM Blocks	64	120
Core RAM kbits (1,024 bits)	288	540
Digital Signal Processing		
DSP Mathblocks	64	120
Clocks (segmentable)		
Hardwired	4	4
Routed	4	4
I/Os		
I/O Banks	8	8
User I/Os (maximum)	684	840
I/O Registers	2,052	2,520
Speed Grades	Std.	Std.
Screening Levels*	E, B, V, PROTO	E, B, V, PROTO
Package		
CCGDA/LGDA	1272	1272
CQFP	352	352

*PROTO refers to prototype Unit, not for space flight or qualification of space-flight hardware.

RT ProASIC[®]3 FPGAs are the first to offer designers of space-flight hardware a Radiation-Tolerant (RT), reprogrammable, nonvolatile logic integration vehicle. They are intended for low-power space applications requiring up to 350 MHz operation and up to 3 million system gates. Unlike all of Microsemi's other radiation-tolerant, space-flight FPGAs, which use antifuse programming technology, devices in the RT ProASIC3 family use flash cells to store configuration information. Positive or negative charge stored on floating-gate transistors is used to hold pass transistors in either the "on" or "off" states, thereby opening or closing connections between routing tracks and logic resources. This use of flash-based interconnects present some unique opportunities and advantages to designers of space-flight electronic hardware.

Device	RT3PE600L	RT3PE3000L
Capacity		
System Gates	600,000	3,000,000
Modules		
Logic Tiles	13,824	75,264
Embedded RAM/FIFO (without EDAC)		
Core RAM Blocks	24	112
Core RAM kbits (1,024 bits)	108	504
Embedded FlashROM		
FlashROM Bits	1,000	1,000
Globals		
Routed	18	18
PLLs	6	6
I/Os		
I/O Banks	8	8
User I/Os (maximum)	270	620
I/O Registers	810	1,860
Speed Grades	Std., -1	Std., -1
Screening Level	B, E	B, E
Package		
CCGA/LGA	484	484, 896
CQFP	256	256

RTSX-SU RadTolerant FPGAs specifically designed for enhanced radiation performance are enhanced versions of Microsemi's commercial SX-A family of devices. Featuring SEU-hardened D-type flip-flops that offer the benefits of Triple Module Redundancy (TMR) without the associated overhead, the RTSX-SU family is a unique product offering for space applications. Manufactured using 0.25 μm technology at the United Microelectronics Corporation (UMC) facility in Taiwan, RTSX-SU offers levels of radiation survivability far in excess of typical CMOS devices.

Devices	RTSX32SU	RTSX72SU
Capacity		
Typical Gates	32,000	72,000
System Gates	48,000	108,000
Logic Modules	2,880	6,036
Combinatorial Cells	1,800	4,024
SEU-Hardened Register Cells (Dedicated Flip-Flops)	1,080	2,012
Maximum Flip-Flops	1,980	4,024
Maximum User I/Os	227	360
Clocks	3	3
Quadrant Clocks	0	4
Speed Grades	Std., -1	Std., -1
Temperature Grades	B, E, M	B, E
Package (by pin count)		
CQFP	84, 208, 256	208, 256
CCGA	–	624
CCLG	256	–

The latest antifuse FPGA family offered by Microsemi, Axcelerator offers high performance and unprecedented design security at densities of up to 2 million equivalent system gates.

Utilizing the Microsemi AX architecture, Axcelerator devices have several system-level features, such as embedded SRAM (with embedded FIFO control logic), PLLs, segmentable clocks, chip-wide highway routing, and carry logic.

Based upon 0.15 μm , seven-layers-of-metal CMOS antifuse process technology, Axcelerator devices offer a level of performance previously only available in ASIC technology.

Device	AX125	AX250	AX500	AX1000	AX2000
Capacity (in Equivalent System Gates)	125,000	250,000	500,000	1,000,000	2,000,000
Typical Gates	82,000	154,000	286,000	612,000	1,060,000
Modules					
Register (R-cells)	672	1,408	2,688	6,048	10,752
Combinatorial (C-cells)	1,344	2,816	5,376	12,096	21,504
Maximum Flip-Flops	1,344	2,816	5,376	12,096	21,504
Embedded RAM/FIFO					
Number of Core RAM Blocks	4	12	16	36	64
Total Bits of Core RAM	18,432	55,296	73,728	165,888	294,912
Clocks (Segmentable)					
Hardwired	4	4	4	4	4
Routed	4	4	4	4	4
PLLs	8	8	8	8	8
I/Os					
I/O Banks	8	8	8	8	8
Maximum User I/Os	168	248	336	516	684
Maximum LVDS Channels	84	124	168	258	342
Total I/O Registers	504	744	1,008	1,548	2,052
Speed Grades	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2	Std., -1, -2
Temperature Grades	C, I	C, I, M	C, I, M	C, I, M	C, I, M
Package					
PQFP	–	208	208	–	–
BGA	–	–	–	729	–
FBGA	256, 324	256, 484	484, 676	484, 676, 896	896, 1152
CQFP	–	208, 352	208, 352	352	256, 352
CCGA/LGA	–	–	–	624	624

Microsemi's SX-A devices can match the speed and performance of an ASIC. SX-A devices can be used to generate system-wide savings by integrating multiple functions into a low cost, single-chip solution. Providing a combination of performance, security, and low power, SX-A decreases the premium for performance while providing a solution highly secure from reverse engineering.

Device	A54SX08A	A54SX16A	A54SX32A	A54SX72A
Capacity				
Typical Gates	8,000	16,000	32,000	72,000
System Gates	12,000	24,000	48,000	108,000
Logic Modules	768	1,452	2,880	6,036
Combinatorial Cells	512	924	1,800	4,024
Dedicated Flip-Flops	256	528	1,080	2,012
Maximum Flip-Flops	512 *	990	1,980	4,024
Maximum User I/Os	130	180	249	360
Global Clocks	3	3	3	3
Quadrant Clocks	0	0	0	4
Boundary Scan Testing	Yes	Yes	Yes	Yes
JTAG				
3.3 V / 5 V PCI	Yes	Yes	Yes	Yes
Clock-to-Out	–	–	–	–
Input Set-Up (External)	0 ns	0 ns	0 ns	0 ns
Speed Grades	-F, Std.,	-F, Std.,	-F, Std.,	-F, Std.,
	-1, -2	-1, -2	-1, -2	-1, -2
Temperature Grades	C, I, A, M	C, I, A, M	C, I, A, M, B	C, I, A, M, B
Package (by pin count)				
PQFP	208	208	208	208
TQFP	100, 144	100, 144	100, 144, 176	–
PBGA	–	–	329	–
FBGA	144	144, 256	144, 256, 484	256, 484
CQFP	–	–	84, 208, 256	208, 256

* A maximum of 512 registers is possible if all 512 C-cells are used to build an additional 256 registers.

With a focused combination of features, eX can meet all of your power, speed, package, and price requirements. Optimized for wired and mobile e-appliances, eX enables designers to use a flexible single-chip FPGA for their traditional low-density ASIC requirements without the long lead times and costly NRE charges.

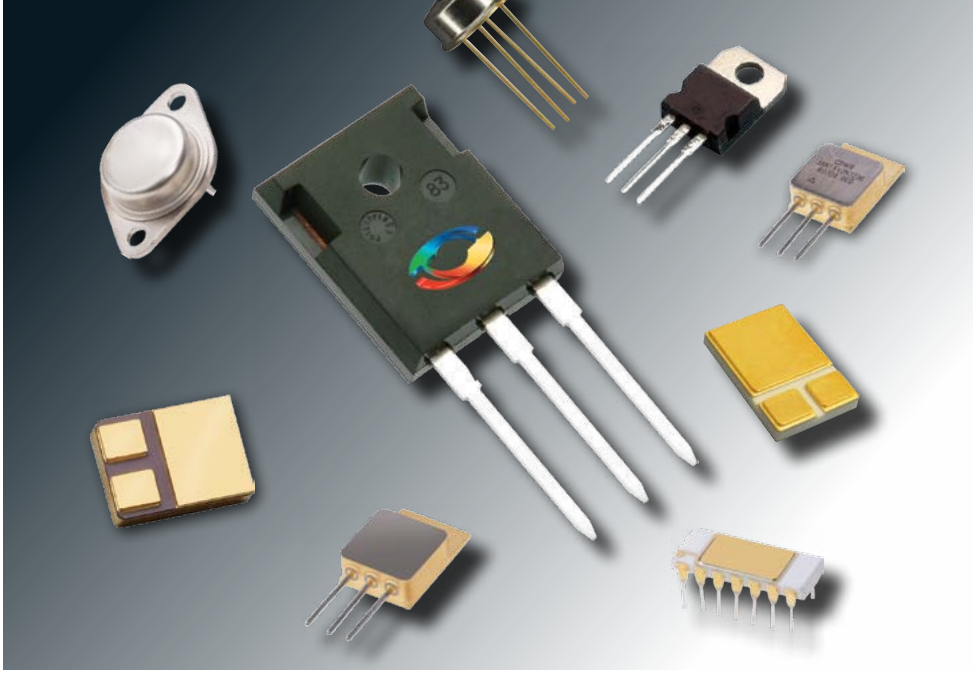
Device	eX64	eX128	eX256
Capacity			
System Gates	3,000	6,000	12,000
Typical Gates	2,000	4,000	8,000
Register Cells			
Dedicated Flip-Flops	64	128	256
Maximum Flip-Flops	128	256	512
Combinatorial Cells	128	256	512
Maximum User I/Os	84	100	132
Global Clocks			
Hardwired	1	1	1
Routed	2	2	2
Speed Grades	-F, Std., -P	-F, Std., -P	-F, Std., -P
Temperature Grades¹	C, I, A	C, I, A	C, I, A
Package (by pin count)			
TQFP	64, 100	64, 100	100
CSP²	49, 128	49, 128	128, 180

1. Refer to the eX Automotive Family FPGAs datasheet for details on automotive temperature offerings.

2. CS Package is only available with eX Automotive Family FPGAs.

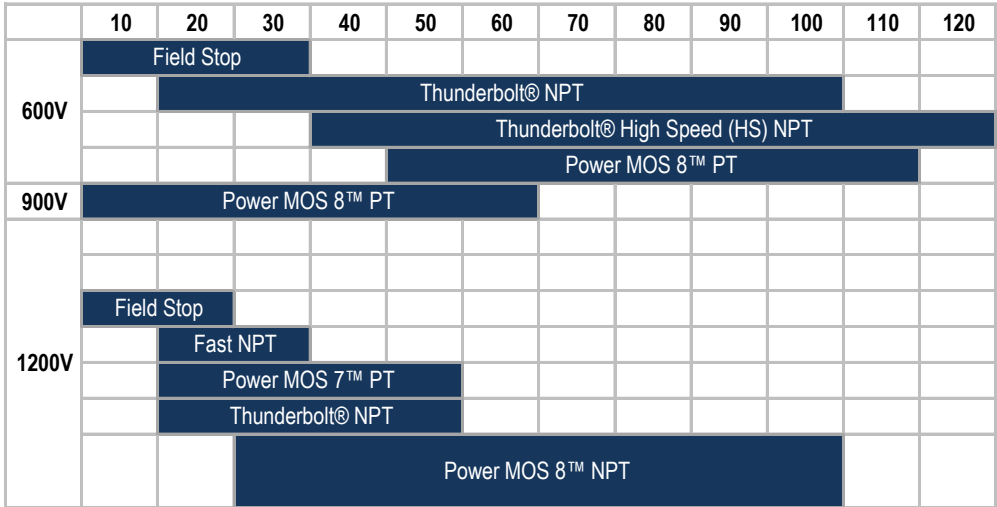
Featuring very low power consumption and the industry's highest design security, MX FPGAs offer designers a reliable, single-chip ASIC alternative. Providing an efficient, flexible 5.0 V architecture, MX is an ideal platform for integrating your legacy PLDs into a single, low cost device. MX is a high-volume platform that enables solutions without compromising on cost and time.

Device	A40MX02	A40MX04	A42MX09	A42MX16	A42MX24	A42MX36
Capacity						
System Gates	3,000	6,000	14,000	24,000	36,000	54,000
SRAM Bits	–	–	–	–	–	2,560
Logic Modules						
Sequential	–	–	348	624	954	1,230
Combinatorial	295	547	336	608	912	1,184
Decode	–	–	–	–	24	24
Clock-to-Out	9.5 ns	9.5 ns	5.6 ns	6.1 ns	6.1 ns	6.3 ns
SRAM Modules (64x4 or 32x8)	–	–	–	–	–	10
Dedicated Flip-Flops	–	–	348	624	954	1,230
Clocks	1	1	2	2	2	6
Maximum Flip-Flops	147	273	516	928	1,410	1,822
User I/O (maximum)	57	69	104	140	176	202
PCI	–	–	–	–	Yes	Yes
Boundary Scan Test (BST)	–	–	–	–	Yes	Yes
Speed Grades	-F, Std.,	-F, Std.,	-F, Std.,	-F, Std.,	-F, Std.,	-F, Std.,
	-1, -2, -3	-1, -2, -3	-1, -2, -3	-1, -2, -3	-1, -2, -3	-1, -2, -3
Temperature Grades	C, I, M, A	C, I, M, A	C, I, M, A	C, I, M, A	C, I, M, A	C, I, M, A, B
Packages (by pin count)						
PLCC	44, 68	44, 68, 84	84	84	84	–
PQFP	100	100	100, 160	100, 160, 208	160, 208	208, 240
VQFP	80	80	100	100	–	–
TQFP	–	–	176	176	176	–
CQFP	–	–	–	–	–	208, 256
PBGA	–	–	–	–	–	272



IGBT products from Microsemi provide high quality solutions for a wide range of high voltage, high power applications. The switching frequency range spans from DC for minimal conduction loss to over 100kHz for very high power density SMPS applications. The frequency range for each product type is shown in the graph below. Each IGBT product represents the latest in IGBT technology, providing the best possible performance/cost combination for the targeted application. There are six product series that utilize three different IGBT technologies: Non-Punch-Through (NPT), Punch-Through (PT) and Field Stop.

IGBT Switches Frequency Ranges (kHz, hard switched)



Note: Frequency ranges shown are typical for a 50A IGBT. Refer to product data sheet max frequency vs current graph for more information.

Standard Series	Voltage Ratings(V)	Technology	Easy to Parallel	Short Circuit SOA	Comments
Thunderbolt®	600, 1200	NPT	X	X	General purpose, high speed
Thunderbolt® High Speed	600	NPT	X	X	Highest speed
FAST	1200	NPT	X	X	General purpose, medium speed
MOS 7™	1200	PT	–	–	Ultra-low gate charge
MOS 8™	600, 900, 1200	PT, NPT	–	–	Highest efficiency
Field Stop Trench Gate	600, 1200	Field Stop	X	X	Lowest conduction loss

Product Options

All standard IGBT products are available as a single IGBT or as a Combi product packaged with an anti-parallel DQ series diode. Package options include TO-220, TO-247, T-MAX®, TO-264, and SOT-227. Customized products are available; contact factory for details.

V_{CES} Volts	$V_{CE(ON)}$ Type 25°C	I_{C2} 100°C	Maximum I_C at Frequency		Part Number	Package Style	
Single			50 kHz	80 kHz			
1200	2.5	25	25	21	APT25GR120B	TO-247	
	2.5	25	25	21	APT25GR120S	D3	
	2.5	40	38	28	APT40GR120B	TO-247	
	2.5	40	38	28	APT40GR120S	D3	
	2.5	50	48	36	APT50GR120B2	T-MAX®	
	2.5	50	48	36	APT50GR120L	TO-264	
				25 kHz	50 kHz		
	2.5	70	66	42	APT70GR120B2	T-MAX®	
	2.5	70	66	42	APT70GR120L	TO-264	
	2.5	70	42	30	APT70GR120J	ISOTOP®	
	2.5	85	72	46	APT85GR120B2	T-MAX®	
	2.5	85	72	46	APT85GR120L	TO-264	
2.5	85*	46	31	APT85GR120J	ISOTOP®		
Combi (IGBT & Diode)							
			50 kHz	80 kHz			
1200	2.5	25	25	21	APT25GR120BD15	TO-247 (DQ)	
	2.5	25	25	21	APT25GR120SD15	D3 (DQ)	
	2.5	25	25	21	APT25GR120BSCD10	TO-247 (SiC SBD)	
	2.5	25	25	21	APT25GR120SSCD10	D3 (SiC SBD)	
	2.5	40	38	28	APT40GR120B2D30	T-MAX® (DQ)	
	2.5	40	38	28	APT40GR120B2SCD10	T-MAX® (SiC SBD)	
				25 kHz	50 kHz		
	2.5	50*	42	32	APT50GR120JD30	ISOTOP® (DQ)	
	2.5	70*	42	30	APT70GR120JD60	ISOTOP® (DQ)	
2.5	85*	46	31	APT85GR120JD60	ISOTOP® (DQ)		
Single			50 kHz	80 kHz			
600	2.0	36	21	17	APT36GA60B	TO-247	
	2.0	44	26	20	APT44GA60B	TO-247	
	2.0	54	30	23	APT54GA60B	TO-247	
	2.0	68	35	27	APT68GA60B	TO-247	
	2.0	80	40	31	APT80GA60B	TO-247	
	2.0	102	51	39	APT102GA60B2	T-MAX® or TO-264	
			25 kHz	50 kHz			
900	2.5	35	17	10	APT35GA90B	TO-247	
	2.5	43	21	13	APT43GA90B	TO-247	
	2.5	64	29	19	APT64GA90B	TO-247	
	2.5	80	34	23	APT80GA90B	TO-247 or D3	

V_{CES} Volts	$V_{CE(ON)}$ Type 25°C	I_{C2} 100°C	Maximum I_C at Frequency		Part Number	Package Style
Combi (IGBT & "DQ" FRED)						
			50 kHz	80 kHz		
600	2.0	36	21	17	APT36GA60BD15	TO-247
	2.0	44	26	20	APT44GA60BD30	TO-247
	2.0	54	30	23	APT54GA60BD30	TO-247
	2.0	60	48	36	APT60GA60JD60	ISOTOP®
	2.0	68	35	27	APT68GA60B2D40	T-MAX® or TO-264
	2.0	80	40	31	APT80GA60LD40	TO-264
			25 kHz	50 kHz		
900	2.5	27	14	8	APT27GA90BD15	TO-247
	2.5	35	17	10	APT35GA90BD15	TO-247
	2.5	43	21	13	APT43GA90BD30	TO-247
	2.5	46	33	21	APT46GA90JD40	ISOTOP®
	2.5	64	29	19	APT64GA90B2D30	T-MAX® or TO-264
	2.5	80	34	23	APT80GA90LD40	TO-264
Single			15 kHz	30 kHz		
600	1.5	24	15	10	APT20GN60BG	TO-247
	1.5	37	20	14	APT30GN60BG	TO-247
	1.5	64	30	21	APT50GN60BG	TO-247
	1.5	93	42	30	APT75GN60BG	TO-247
	1.5	123	75	47	APT150GN60J	ISOTOP®
	1.5	135	54	39	APT100GN60B2G	T-MAX®
	1.5	190	79	57	APT150GN60B2G	T-MAX®
	1.5	230	103	75	APT200GN60B2G	T-MAX®
	1.5	158	100	66	APT200GN60J	ISOTOP®
			10 kHz	20 kHz		
1200	1.7	33	19	13	APT25GN120BG	TO-247 or D3
	1.7	46	24	17	APT35GN120BG	TO-247
	1.7	66	32	22	APT50GN120B2G	T-MAX®
	1.7	70	44	27	APT100GN120J	ISOTOP®
	1.7	99	45	30	APT75GN120B2G	T-MAX® or TO-264
	1.7	120	58	38	APT100GN120B2G	T-MAX®
	1.7	99	60	36	APT150GN120J	ISOTOP®

* I_{C2} for Isotop® packages measured at 70°C for 1200V NPT IGBTs

BV _{CES} Volts	V _{CE(ON)} Type 25°C	I _{C2} 100°C	Maximum I _C at Frequency		Part Number	Package Style
			15 kHz	30 kHz		
600	1.5	24	15	10	APT20GN60BDQ1G	TO-247
	1.5	37	20	14	APT30GN60BDQ2G	TO-247
	1.5	64	30	21	APT50GN60BDQ2G	TO-247
	1.5	93	42	30	APT75GN60LDQ3G	TO-264
	1.5	123	75	47	APT150GN60JDQ4	ISOTOP®
	1.5	135	54	39	APT100GN60LDQ4G	TO-264
	1.5	190	79	57	APT150GN60LDQ4G	TO-264
	1.5	158	100	66	APT200GN60JDQ4	ISOTOP®
1200			10 kHz	20 kHz		
	1.7	22	14	10	APT15GN120BDQ1G	TO-247 or D3
	1.7	33	19	13	APT25GN120B2DQ2G	T-MAX®
	1.7	46	24	17	APT35GN120L2DQ2G	264-MAX™
	1.7	57	36	22	APT75GN120JDQ3	ISOTOP®
	1.7	66	32	22	APT50GN120L2DQ2G	264-MAX™
	1.7	70	44	27	APT100GN120JDQ4	ISOTOP®
	1.7	99	60	36	APT150GN120JDQ4	ISOTOP®
	Single		20 kHz	40 kHz		
1200	3.3	33	19	12	APT25GP120BG	TO-247
	3.3	46	24	15	APT35GP120BG	TO-248
	3.3	54	29	18	APT45GP120BG	TO-249
	3.3	34	28	18	APT45GP120J	ISOTOP
	3.3	91	42	24	APT75GP120B2G	T-MAX™
	3.3	57	40	23	APT75GP120J	ISOTOP
Combi (IGBT & "DQ" FRED)						
			20 kHz	40 kHz		
1200	3.3	20	11	7	APT13GP120BDQ1G	TO-247
	3.3	33	19	12	APT25GP120BDQ1G	TO-247
	3.3	46	24	15	APT35GP120B2DQ2G	T-MAX™
	3.3	54	29	18	APT45GP120B2DQ2G	T-MAX™
	3.3	34	28	18	APT45GP120JDQ2	ISOTOP
	3.3	57	40	23	APT75GP120JDQ3	ISOTOP
	Single		30 kHz	60 kHz		
600	2.0	20	14	10	APT20GT60BRG	TO-247
	2.0	30	19	13	APT30GT60BRG	TO-247
	2.0	40	25	16	APT40GT60BRG	TO-247
	2.0	50	30	20	APT50GT60BRG	TO-247
	2.0	60	35	22	APT60GT60BRG	TO-247 or D3
	2.0	100	56	35	APT100GT60B2RG	T-MAX® or TO-264
	2.0	200	72	--	APT200GT60JR	ISOTOP®

BV _{CES} Volts	V _{CE(ON)} Type 25°C	I _{C2} 100°C	Maximum I _C at Frequency		Part Number	Package Style
			20 kHz	40 kHz		
1200			20 kHz	40 kHz		
	3.2	18	11	8	APT15GT120BRG	TO-247
	3.2	25	16	11	APT25GT120BRG	TO-247
	3.2	50	27	17	APT50GT120B2RG	T-MAX® or TO-264
	3.2	60	40	21	APT100GT120JR	ISOTOP®
3.2	90	52	25	APT150GT120JR	ISOTOP®	
Combi (IGBT & "DQ" FRED)						
			30 kHz	60 kHz		
600	2.0	15	11	8	APT15GT60BRDQ1G	TO-247
	2.0	20	14	10	APT20GT60BRDQ1G	TO-247
	2.0	30	19	13	APT30GT60BRDQ2G	TO-247
	2.0	50	30	20	APT50GT60BRDQ2G	TO-247 or D3
	2.0	100	37	22	APT100GT60JRDQ4	ISOTOP®
1200			20 kHz	40 kHz		
	3.2	18	11	8	APT15GT120BRDQ1G	TO-247
	3.2	25	16	11	APT25GT120BRDQ2G	TO-247
	3.2	50	27	17	APT50GT120B2RDQ2G	T-MAX® or TO-264
	3.2	42	34	19	APT75GT120JRDQ3	ISOTOP®
3.2	60	40	21	APT100GT120JRDQ4	ISOTOP®	
Single			50 kHz	80 kHz		
600	2.8	50	23	16	APT50GS60BRG	TO-247
Combi (IGBT & "DQ" FRED)						
			50 kHz	80 kHz		
600	2.8	30	14	9	APT30GS60BRDQ2G	TO-247
	2.8	50	23	16	APT50GS60BRDQ2G	TO-247
Single			15 kHz	30 kHz		
1200	2.5	14	8	5	APT11GF120kRG	TO-220
	2.5	20	11	7	APT20GF120kRG	TO-220
	2.5	35	16	10	APT33GF120BRG	TO-247
	2.5	75	27	17	APT50GF120B2RG	T-MAX®
	2.5	75	27	17	APT50GF120LRG	TO-264
Combi (IGBT & "DQ" FRED)						
			15 kHz	30 kHz		
1200	2.5	35	16	10	APT33GF120B2RDQ2G	T-MAX®
	2.5	64	33	17	APT50GF120JRDQ3	ISOTOP®
	2.5	80	42	20	APT60GF120JRDQ3	ISOTOP®

*I_{C2} for Isotop® packages measured at 70°C for 1200V NPT IGBTs

BV_{CES} Volts	$V_{CE(ON)}$ Type 25°C	I_{C2} 100°C	Maximum I_C at Frequency		Part Number	Package Style
Combi (IGBT & "DL" FRED)						
			50 kHz	80 kHz		
600	2.8	50	23	16	APT50GS60BRDLG	TO-247
	2.8	30	14	9	APT30GS60BRDLG	TO-247
	2.2	50	41	31	APT50GP60LDL	TO-264
	2.2	45	28	22	APT30GP60B2DL	T-MAX® or TO-264
	2.2	25	17	14	APT15GP60BDL	TO-247
1200			20 kHz	40 kHz		
	3.2	50	28	17	APT50GT120B2RDL	T-MAX®
	3.2	100	40	21	APT100GT120JRDL	ISOTOP®

* I_{C2} for Isotop® packages measured at 70°C for 1200V NPT IGBTs

Power MOS 8 MOSFETs/FREDFETs (Fast body diode)

Power MOS 8™ is Microsemi's latest family of high speed, high voltage (500-1200V) N-channel switch-mode power transistors with lower EMI characteristics and lower cost compared to previous generation devices. These new MOSFETs / FREDFETs have been optimized for both hard and soft switching in high frequency, high voltage applications rated above 500W. There are 2 product types in the Power MOS 8™ MOSFET family:

Features:

- Fast switching
- Low EMI
- Quiet switching
- Avalanche energy rated
- Low gate charge
- Lower cost

Applications:

- Power factor correction
- Plasma cutting
- Solar inverters
- Medical
- Induction heating
- Arc welding
- Server and telecom power systems
- Battery chargers
- Semiconductor capital equipment



Quiet Switching

The new Power MOS 8™ series is a result of extensive research into quiet switching. Input and reverse transfer capacitance values as well as their ratio were set at specific values to achieve quiet switching with minimal switching loss. The Power MOS 8™ series of devices are inherently quiet switching, stable when connected in parallel, very efficient, and lower cost than previous generations.

Body Diode Options

As with previous generation products, Power MOS 8™ MOSFETs and FREDFETs are available in all voltage ratings. A FREDFET is a MOSFET with a faster recovery intrinsic body diode. This results in improved reliability in ZVS circuits due to shorter minority carrier lifetime and increased commutation dv/dt ruggedness. If a fast recovery body diode is not needed, MOSFET versions are available.

Power MOS 8 MOSFETs / FREDFETs

$BV_{(DSS)}$ Volts	$R_{DS(ON)}$ Max	I_D	MOSFET Part #	I_D	FREDFET Part #	Package Style
1200	3.80	5	APT4M120k	–	–	TO-220
	4.20	–	–	4	APT4F120K	TO-220
	2.40	–	–	7	APT7F120B	TO-247 or D3
	2.10	8	APT7M120B	–	–	TO-247
	1.20	–	–	14	APT13F120B	TO-247 or D3
	1.10	14	APT14M120B			TO-247
	0.70	–	–	23	APT22F120B2	T-MAX® or TO-264
	0.63	24	APT24M120B2	–	–	T-MAX® or TO-264
	0.58	–	–	27	APT26F120B2	T-MAX® or TO-264
	0.58	–	–	18	APT17F120J	ISOTOP®
	0.53	29	APT28M120B2	–	–	T-MAX® or TO-264
	0.53	19	APT19M120J	–	–	ISOTOP®
	0.32	–	–	33	APT32F120J	ISOTOP®
	0.29	35	APT34M120J	–	–	ISOTOP®
1000	2.80	–	–	5	APT5F100K	TO-220
	2.50	6	APT6M100k	–	–	TO-220
	2.00	–	–	7	APT7F100B	TO-247
	1.80	8	APT8M100B	–	–	TO-247
	1.60	–	–	9	APT9F100B	TO-247 or D3
	1.40	9	APT9M100B	–	–	TO-247
	0.98	–	–	14	APT14F100B	TO-247 or D3
	0.88	14	APT14M100B	–	–	TO-247 or D3
	0.78	–	–	17	APT17F100B	TO-247 or D3
	0.70	18	APT18M100B	–	–	TO-247
	0.44	–	–	30	APT29F100B2	T-MAX® or TO-264
	0.44	–	–	20	APT19F100J	ISOTOP®
	0.38	32	APT31M100B2	35	APT34F100B2	T-MAX® or TO-264
	0.38	21	APT21M100J	23	APT22F100J	ISOTOP®
	0.33	37	APT37M100B2	–	–	T-MAX® or TO-264
	0.33	25	APT25M100J	–	–	ISOTOP®
0.20	–	–	42	APT41F100J	ISOTOP®	
0.18	45	APT45M100J	–	–	ISOTOP®	
800	1.50	–	–	7	APT7F80K	TO-220
	1.35	8	APT8M80k	–	–	TO-220
	0.90	–	–	12	APT11F80B	TO-247 or D3
	0.80	13	APT12M80B	–	–	TO-247
	0.58	–	–	18	APT17F80B	TO-247 or D3
	0.53	19	APT18M80B	–	–	TO-247 or D3

$BV_{(DSS)}$ Volts	$R_{DS(ON)}$ Max	I_D	MOSFET Part #	I_b	FREDFET Part #	Package Style
800	0.43	–	–	23	APT22F80B	TO-247 or D3
	0.39	25	APT24M80B	–	–	TO-247 or D3
	0.24	–	–	41	APT38F80B2	T-MAX® or TO-264
	0.21	43	APT41M80B2	47	APT44F80B2	T-MAX® or TO-264
	0.21	–	–	31	APT29F80J	ISOTOP®
	0.19	49	APT48M80B2	–	–	T-MAX® or TO-264
	0.19	33	APT32M80J	–	–	ISOTOP®
	0.11	–	–	57	APT53F80J	ISOTOP®
	0.10	60	APT58M80J	–	–	ISOTOP®
600	0.62	–	–	12	APT12F60K	TO-220
	0.43	–	–	16	APT15F60B	TO-247 or D3
	0.37	–	–	19	APT18F60B	TO-247 or D3
	0.29	–	–	24	APT23F60B	TO-247 or D3
	0.22	–	–	30	APT28F60B	TO-247 or D3
	0.19	36	APT34M60B	36	APT34F60B	TO-247
	0.15	45	APT43M60B2	45	APT43F60B2	T-MAX® or TO-264
	0.15	31	APT30M60J	31	APT30F60J	ISOTOP®
	0.11	60	APT56M60B2	60	APT56F60B2	T-MAX® or TO-264
	0.11	42	APT39M60J	42	APT39F60J	ISOTOP®
	0.09	70	APT66M60B2	70	APT66F60B2	T-MAX® or TO-264
	0.09	49	APT47M60J	49	APT47F60J	ISOTOP®
0.055	84	APT80M60J	84	APT80F60J	ISOTOP®	
500	0.39	–	–	15	APT15F50K	TO-220[k] or TO-220[kF]*
	0.30	–	–	20	APT20F50B	TO-247 or D3
	0.24	–	–	24	APT24F50B	TO-247 or D3
	0.19	–	–	30	APT30F50B	TO-247 or D3
	0.15	–	–	37	APT37F50B	TO-247 or D3
	0.13	–	–	43	APT42F50B	TO-247 or D3
	0.10	56	APT56M50B2	56	APT56F50B2	T-MAX® or TO-264
	0.10	38	APT38M50J	38	APT38F50J	ISOTOP®
	0.075	75	APT75M50B2	75	APT75F50B2	T-MAX® or TO-264
	0.075	51	APT51M50J	51	APT51F50J	ISOTOP®
	0.062	84	APT84M50B2	84	APT84F50B2	T-MAX® or TO-264
	0.062	58	APT58M50J	58	APT58F50J	ISOTOP®
0.036	103	APT100M50J	103	APT100F50J	ISOTOP®	

* Available on APT15F50K

Ultrafast, Low Gate Charge MOSFETs

$BV_{(DSS)}$ Volts	$R_{DS(ON)}$ Max	I_D	MOSFET Part #	FREDFET Part #	Package Style
1200	4.700	3.5	–	APT1204R7KFLG	TO-220
	4.700	3.5	–	APT1204R7BFLG	TO-247 or D3
	1.400	9	–	APT1201R4BFLG	TO-247
	0.670	18	APT12067B2LLG	–	T-MAX®
	0.670	17	APT12067JLL	–	ISOTOP®
	0.570	22	APT12057B2LLG	–	T-MAX®
	0.570	19	APT12057JLL	–	ISOTOP®
1000	0.900	12	APT10090BLLG	–	TO-247
	0.780	14	APT10078BLLG	–	TO-247 or D3
	0.450	23	APT10045B2LLG	–	T-MAX® or TO-264
	0.450	21	APT10045JLL	–	ISOTOP®
	0.350	28	APT10035B2LLG	–	T-MAX®
	0.350	25	APT10035JLL	–	ISOTOP®
	0.260	38	–	APT10026L2FLLG	TO-264 MAX
	0.260	30	APT10026JLL	APT10026JFLL	ISOTOP®
	0.210	37	APT10021JLL	APT10021JFLL	ISOTOP®
	0.140	52	APT8014L2LLL	APT8014L2FLLG	TO-264 MAX
800	0.110	51	APT8011JLL	APT8011JFLL	T-MAX™ or TO-264
	0.200	38	APT8020B2LL	–	T-MAX®
	0.200	33	APT8020JLL	–	ISOTOP® or D3 or T/R
500	0.140	35	APT5014BLLG	–	TO-247
	0.100	46	APT5010B2LLG	APT5010B2FLLG	T-MAX® or TO-264
	0.065	67	APT50M65B2LLG	APT50M65B2FLLG	T-MAX® or TO-264
	0.065	58	APT50M65JLLG	APT50M65JFLLG	ISOTOP®
	0.075	51	APT50M75JLL	APT50M75JFLL	ISOTOP®
	0.075	57	APT50M75B2LLG	–	T-MAX® or TO-264
	0.050	71	APT50M50JLL	–	ISOTOP®
0.038	88	APT50M38JLL	–	ISOTOP®	
Low Voltage Power MOS V MOSFETS/FREDFETs					
300	0.085	40	APT30M85BVRG	APT30M85BVFRG	TO-247
	0.070	48	APT30M70BVRG	APT30M70BVFRG	TO-247 or D3
	0.040	70	APT30M40JVRG	APT30M40JVFRG	ISOTOP®
	0.019	130	APT30M19JVR	APT30M19JVFR	ISOTOP®
200	0.045	56	APT20M45BVRG	APT20M45BVFRG	TO-247
	0.038	67	APT20M38BVRG	APT20M38BVFRG	TO-247 or D3 or T/R
	0.022	100	APT20M22B2VRG	APT20M22B2VFRG	T-MAX® or TO-264
	0.011	175	APT20M11JVR	APT20M11JVFR	ISOTOP®



V_{DSS} Volts	$R_{DS(ON)}$ Ohms	$I_{D(Cont)}$ Amps	Part Number	Package Style
900	C3 Technology			
	0.120	36	APT36N90BC3G	TO-247
800	0.450	11	APT11N80KC3G	TO-220
	0.450	11	APT11N80BC3G	TO-247
	0.145	34	APT34N80B2C3G	T-MAX® or TO-264
	0.145	34	APT34N80LC3G	TO-264
650	0.035	94	APT94N65B2C3G	T-MAX® or TO-264
	0.070	47	APT47N65BC3G	TO-247 or D3
600	0.070	47	APT47N60BC3G	TO-247 or D3
	0.035	77	APT77N60JC3	ISOTOP®
	0.042	94	APT94N60L2C3G	264-MAX™
	Server Series			
	0.045	60	APT60N60BCSG	TO-247 or D3 or T/R
600	NEW! C6 Technology			
	0.041	77	APT77N60BC6	TO-247 or D3
	0.070	53	APT53N60BC6	TO-247 or D3
	0.099	38	APT38N60BC6	TO-247 or D3
	0.125	30	APT30N60KC6	TO-220
	0.125	30	APT30N60BC6	TO-247 or D3
	0.035	106	APT106N60B2C6	T-MAX™ or TO-264
650	0.041	85	APT97N65B2C6	T-MAX™ or TO-264
	0.035	94	APT94N65B2C6	T-MAX™

Linear MOSFETs

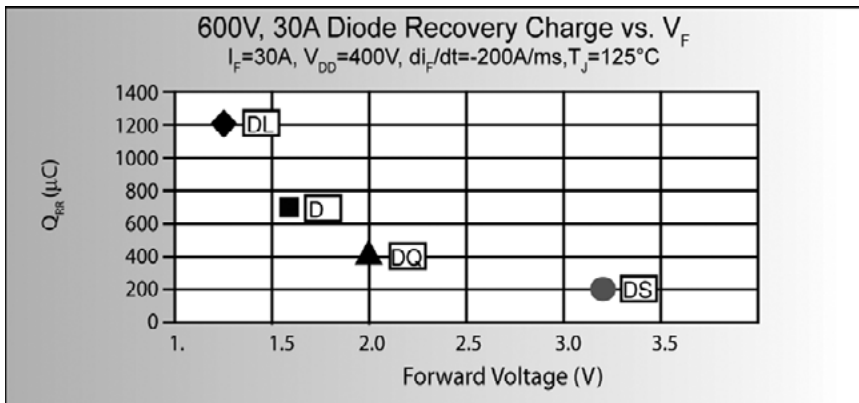
V_{DSS} Volts	$R_{DS(ON)}$ Ohms	$I_{D(Cont)}$ Amps	Part Number	SOA watts
1000	0.600	18	APL1001J	325
600	0.125	49	APL602B2G	325
	0.125	43	APL602J	325
500	0.090	58	APL502B2G	325
	0.090	52	APL502J	325

Part Numbers for TO-264 packages - replace "B2" with "L" in part number

Microsemi offers five series of discrete diode products: a new DL series low VF ultra-soft recovery, the medium speed medium VF D series, the high speed DQ series, the very high speed DS series, and the silicon Schottky S series. These series of diodes are designed to provide high quality solutions to a wide range of high voltage, high power application requirements, ranging from fast recovery for continuous conduction mode power factor correction to low conduction loss for output rectification. Distinguishing features, technology used, and applications for each product family are summarized in the table below.

Series	Voltage Ratings	Features	Applications	Comment
DL	600	Low VF Ultra-soft recovery Avalanche Rated	Output rectifier Resonant circuits	Ultra-soft recovery minimizes or eliminates snubber
D	200, 300, 400, 600, 1000, 1200	Medium VF Medium Speed	Freewheeling Diode Output rectifier DC-DC converter	Proprietary platinum process
DQ	600, 1000, 1200	High speed Avalanche Rated	PFC Freewheeling Diode DC-DC converter	Stepped epi improves softness Proprietary platinum process
DS	600	Very high speed	High frequency PFC	Proprietary platinum process
Schottky	200	Low VF Avalanche rated	Output rectifier Freewheeling Diode DC-DC converter	-

The graph below shows the relative recovery speed and forward voltage positions of 600V DL, D, DQ and DS series diodes.



Volts	$I_{F(avg)}$ Amps	V_F volts Typ 25° C	Diode Series	Part Number	Package Style
SINGLE					
1200	10	1.5	SCD	APT10SCD120B	TO-247
	10	1.5	SCD	APT10SCD120K	TO-220
	20	1.5	SCD	APT20SCD120B	TO-247
	20	1.5	SCD	APT20SCD120S	D3
	30	1.5	SCD	APT30SCD120B	TO-247
	30	1.5	SCD	APT30SCD120S	D3
DUAL					
1200	10	1.5	SCD	APT10SCD120BCT	TO-247

Volts	I_F (avg) Amps	V_F (volts) Type 25°C	t_{RR} (ns) Type 25°C	Q_{RR} (nC) Type 1 25°C at $I_F = I_F$ (avg)	Diode Series	Part Number	Package Style
Single	15	2.8	21	960	DQ	APT15DQ120BG	TO-247
1200	15	2.8	21	960	DQ	APT15DQ120KG	TO-220
	15	2.0	32	1300	D	APT15D120BG	TO-247
	15	2.0	32	1300	D	APT15D120KG	TO-220
	30	2.8	24	1800	DQ	APT30DQ120BG	TO-247
	30	2.8	24	1800	DQ	APT30DQ120KG	TO-220
	30	2.0	31	3450	D	APT30D120BG	TO-247
	40	2.8	26	2200	DQ	APT40DQ120BG	TO-247
	60	2.8	30	2800	DQ	APT60DQ120BG	TO-247
	60	2.0	38	4000	D	APT60D120BG	TO-247 or D ³
	75	2.8	32	3340	DQ	APT75DQ120BG	TO-247
1000	15	2.5	20	810	DQ	APT15DQ100BG	TO-247
	15	2.5	20	810	DQ	APT15DQ100KG	TO-220
	15	1.9	28	1550	D	APT15D100KG	TO-220
	30	2.5	22	1250	DQ	APT30DQ100BG	TO-247
	30	2.5	22	1250	DQ	APT30DQ100KG	TO-247
	30	1.9	29	2350	D	APT30D100BG	TO-247
	40	2.5	24	1430	DQ	APT40DQ100BG	TO-247
	60	2.5	29	2325	DQ	APT60DQ100BG	TO-247
	60	1.9	34	3600	D	APT60D100BG	TO-247 or D ³
75	2.5	33	2660	DQ	APT75DQ100BG	TO-247	
600	15	2.0	16	250	DQ	APT15DQ60BG	TO-247
	15	2.0	16	250	DQ	APT15DQ60KG	TO-220
	15	1.6	21	520	D	APT15D60BG	TO-247
	15	1.6	21	520	D	APT15D60KG	TO-220
	30	2.0	19	400	DQ	APT30DQ60BG	TO-247
	30	2.0	19	400	DQ	APT30DQ60KG	TO-220
	30	1.6	23	700	D	APT30D60BG	TO-247
	40	2.0	22	480	DQ	APT40DQ60BG	TO-247
	60	2.0	26	640	DQ	APT60DQ60BG	TO-247
	60	1.6	40	920	D	APT60D60BG	TO-247 or D ³
	75	2.0	29	650	DQ	APT75DQ60BG	TO-247
	100	1.25	45	3800	DL	APT100DL60BG	TO-247

Ultra Fast Recovery Diodes

Volts	I_F (avg) Amps	V_F (volts) Type 25°C	t_{RR} (ns) Type 25°C	Q_{RR} (nC) Type 1 25°C at $I_F = I_F$ (avg)	Diode Series	Part Number	Package Style
400	30	1.3	22	360	D	APT30D40BG	TO-247
	60	1.3	30	540	D	APT60D40BG	TO-247
200	30	1.1	21	150	D	APT30D20BG	TO-247
	30	0.83	25	448	Schottky	APT30S20BG	TO-247 or D ³
	60	1.1	30	250	D	APT60D20BG	TO-247
	60	0.83	35	490	Schottky	APT60S20BG	TO-247 or D ³ or T/R
	100	0.89	40	690	Schottky	APT100S20BG	TO-247
	Tandem, DS Diodes for PFC Boost Applications						
600	15	3.2	13	85	DS	APT15DS60BG	TO-247
	30	3.2	17	180	DS	APT30DS60BG	TO-247

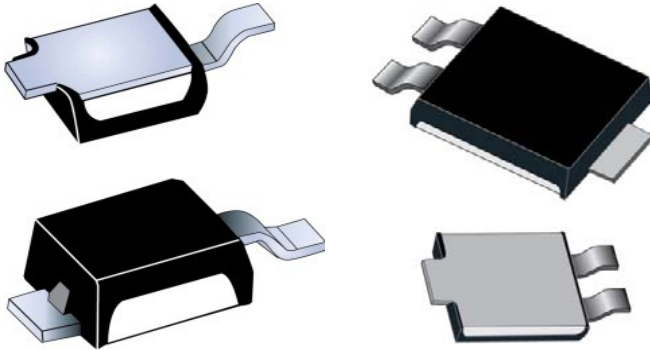
(2, 300V Diodes Connected In Series)

Ultra Fast Recovery Diodes

Volts	I_F (avg) Amps	V_F (volts) Type 25°C	t_{RR} (ns) Type 25°C	Q_{RR} (nC) Type 125°C at $I_F = I_F$ (avg)	Diode Series	Part Number	Package Style
Dual	2x27	2.0	31	3450	D	APT2X30D120J	ISOTOP®
1200	2x30	2.6	25	1800	DQ	APT2X30DQ120J	
	2x53	2.0	38	4000	D	APT2X60D120J	
	2x60	2.5	30	2890	DQ	APT2X60DQ120J	
	2x93	2.0	47	5350	D	APT2X100D120J	
	2x100	2.4	45	5240	DQ	APT2X100DQ120J	
	1000	2x28	1.9	29	2350	D	
2x55		1.9	34	3600	D	APT2X60D100J	
2x60		2.2	30	2350	DQ	APT2X60DQ100J	
2x95		1.9	43	4050	D	APT2X100D100J	
2x100		2.1	45	3645	DQ	APT2X100DQ100J	
600	2x30	1.8	20	400	DQ	APT2X30DQ60J	
	2x30	1.6	23	700	D	APT2X30D60J	
	2x60	1.7	27	650	DQ	APT2X60DQ60J	
	2x60	1.6	40	920	D	APT2X60D60J	
	2x100	1.6	30	980	DQ	APT2X100DQ60J	
	2x100	1.6	34	1450	D	APT2X100D60J	
	2x150	1.25	53	3800	DL	APT2X150DL60J	

Volts	I_F (avg) Amps	V_F (volts) Type 25°C	t_{RR} (ns) Type 25°C	Q_{RR} (nC) Type 125°C at $I_F = I_F$ (avg)	Diode Series	Part Number	Package Style
400	2x30	1.3	22	360	D	APT2X30D40J	ISOTOP®
	2x60	1.3	30	540	D	APT2X60D40J	
	2x100	1.3	37	1050	D	APT2X100D40J	
	2x100	1.0	40	3550	DL	APT2X101DL40J++	
300	2x100	1.2	36	650	D	APT2X101D30J	
200	2x30	0.80	25	448	Schottky	APT2X31S20J	
	2x60	0.83	35	490	Schottky	APT2X61S20J	
	2x100	1.1	39	840	D	APT2X100D20J	
	2x100	0.89	40	690	Schottky	APT2X101S20J	
1200	2x30	2.8	26	2100	DQ	APT30DQ120BCTG	
1000	2x15	2.5	20	810	DQ	APT15DQ100BCTG	TO-247 [BCT]
	2x15	1.9	28	1550	D	APT15D100BCTG	TO-247 [BHB]
	2x30	1.9	29	2360	D	APT30D100BCTG	TO-247 [BHB]
	2x30	1.9	30	2350	D	APT30D100BHBG	TO-247 [BCA]
	2x60	2.5	29	2325	DQ	APT60DQ100LCTG	TO-264 [LCT]
	2x60	1.9	35	3600	D	APT60D100LCTG	TO-264 [LCT]
600	2x15	1.6	21	520	D	APT15D60BCTG	TO-247
	2x15	2.0	15	250	DQ	APT15DQ60BCTG	TO-247 [BCT]
	2x15	1.6	20	520	D	APT15D60BCAG	TO-247 [BCA]
	2x30	2.0	22	480	DQ	APT30DQ60BHBG	TO-247 [BHB]
	2x30	2.0	19	400	DQ	APT30DQ60BCTG	TO-247 [BCT]
	2x30	1.6	23	700	D	APT30D60BCTG	TO-247 [BCT]
	2x30	1.6	25	700	D	APT30D60BHBG	TO-247 [BHB]
	2x30	1.6	25	700	D	APT30D60BCAG	TO-247 [BCA]
	2x40	2.0	22	480	DQ	APT40DQ60BCTG	TO-247 [BCT]
	2x60	2.0	26	640	DQ	APT60DQ60BCTG	TO-247 [BCT]
2x60	1.6	30	920	D	APT60D60LCTG	TO-264 [LCT]	
400	2x30	1.3	22	360	D	APT30D40BCTG	TO-247 [BCT]
	2x60	1.3	30	540	D	APT60D40LCTG	TO-264 [LCT]
300	2x30	1.2	25	1300	D	APT30D30BCTG	TO-247 [BCT]
200	2x30	1.1	21	150	D	APT30D20BCTG	TO-247 [kCT]
	2x30	1.1	21	150	D	APT30D20BCAG	TO-247 [BCA]
	2x30	0.80	25	448	Schottky	APT30S20BCTG	TO-247 [BCT]
	2x60	0.83	35	490	Schottky	APT60S20B2CTG	T-MAX®B2CT]
	2x100	0.89	40	690	Schottky	APT100S20LCTG	TO-264[LCT]

Microsemi's surface mount Powermite packages provide high power handling capability in thermally enhanced packages with very small footprints: Powermite 1 = 0.16 x 0.10 inches (4.07 x 2.54 mm) Powermite 3 = 0.26 x 0.161 inches (6.61 x 4.09 mm). The bottom side is full metal, which combined with a unique internal locking tab on the die provides a low resistance thermal path for heat out of the device. It also eliminates the possibility of flux entrapment during assembly. They are fully compatible with automatic insertion equipment.



This family of Powermite 1 packaged, 1 watt Zener diodes offers voltage selections from 1.8 to 100 volts plus low noise density and low leakage current. Solder dipped (non-RoHS compliant) versions are available by removing “e3” from the end of the part number.

Part Number	Rated Power (W)	Zener Voltage $V_{(Z)}$	Zener Voltage $V_{(Z)}$ (V) Tolerances	Package
1PMT4099(x)e3	1	6.8	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4100(x)e3	1	7.5	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4101(x)e3	1	8.2	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4102(x)e3	1	8.7	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4103(x)e3	1	9.1	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4104(x)e3	1	10	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4105(x)e3	1	11	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4106(x)e3	1	12	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4107(x)e3	1	13	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4108(x)e3	1	14	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4109(x)e3	1	15	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4110(x)e3	1	16	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4111(x)e3	1	17	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4112(x)e3	1	18	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4113(x)e3	1	19	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4114(x)e3	1	20	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4115(x)e3	1	22	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4116(x)e3	1	24	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4117(x)e3	1	25	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4118(x)e3	1	27	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4119(x)e3	1	28	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4120(x)e3	1	30	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4121(x)e3	1	33	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4122(x)e3	1	36	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4123(x)e3	1	39	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4124(x)e3	1	43	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4125(x)e3	1	47	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4126(x)e3	1	51	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4127(x)e3	1	56	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4128(x)e3	1	60	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4129(x)e3	1	62	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4130(x)e3	1	68	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4131(x)e3	1	75	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4132(x)e3	1	82	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)

Part Number	Rated Power (W)	Zener Voltage $V_{(Z)}$	Zener Voltage $V_{(Z)}$ (V) Tolerances	Package
1PMT4133(x)e3	1	87	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4134(x)e3	1	91	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4135(x)e3	1	100	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4614(x)e3	1	1.8	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4615(x)e3	1	2	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4616(x)e3	1	2.2	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4617(x)e3	1	2.4	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4618(x)e3	1	2.7	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4619(x)e3	1	3	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4620(x)e3	1	3.3	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4621(x)e3	1	3.6	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4622(x)e3	1	3.9	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4623(x)e3	1	4.3	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4624(x)e3	1	4.7	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4625(x)e3	1	5.1	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4626(x)e3	1	5.6	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT4627(x)e3	1	6.2	$\pm 2\%, \pm 5\%$	Powermite 1 (DO216-AA)
1PMT5914(x)e3	3	3.6	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5915(x)e3	3	3.9	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5916(x)e3	3	4.3	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5917(x)e3	3	4.7	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5918(x)e3	3	5.1	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5919(x)e3	3	5.6	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5920(x)e3	3	6.2	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5921(x)e3	3	6.8	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5922(x)e3	3	7.5	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)
1PMT5923(x)e3	3	8.2	$\pm 20\%, \pm 10\%, \pm 5\%, \pm 2\%$	Powermite 1 (DO216-AA)

Part Number	Rated Power (W)	Zener Voltage $V_{(Z)}$	Zener Voltage $V_{(Z)}$ (V) Tolerances	Package
1PMT5924(x)e3	3	9.1	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5925(x)e3	3	10	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5926(x)e3	3	11	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5927(x)e3	3	12	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5928(x)e3	3	13	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5929(x)e3	3	15	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5930(x)e3	3	16	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5931(x)e3	3	18	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5932(x)e3	3	20	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5933(x)e3	3	22	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5934(x)e3	3	24	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5935(x)e3	3	27	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5936(x)e3	3	30	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5937(x)e3	3	33	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5938(x)e3	3	36	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5939(x)e3	3	39	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5940(x)e3	3	43	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5941(x)e3	3	47	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5942(x)e3	3	51	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)

Part Number	Rated Power (W)	Zener Voltage $V_{(Z)}$	Zener Voltage $V_{(Z)}$ (V) Tolerances	Package
1PMT5943(x)e3	3	56	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5944(x)e3	3	62	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5945(x)e3	3	68	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5946(x)e3	3	75	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5947(x)e3	3	82	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5948(x)e3	3	91	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5949(x)e3	3	100	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5950(x)e3	3	110	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5952(x)e3	3	130	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5953(x)e3	3	150	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5954(x)e3	3	160	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5955(x)e3	3	180	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)
1PMT5956(x)e3	3	200	$\pm 20\%$, $\pm 10\%$, $\pm 5\%$, $\pm 2\%$	Powermite 1 (DO216-AA)

These Powermite Schottky barrier rectifiers offer blocking voltages from 15 to 200V. Solder dipped (non-RoHS compliant) versions are available by removing “e3” from the end of the part number.

Part Number	Forward Current $I_{(F)}$ (A)	Forward Voltage $V_{(F)}$ (V)	Max Reverse Voltage $V_{(BR)}$ (V)	Package
UPS10100e3	10	0.72	100	Powermite 3
UPS1040e3	10	0.47	40	Powermite 3
UPS1100e3	1	0.75	100	Powermite 1 (DO216-AA)
UPS115Ue3	1	0.22	15	Powermite 1 (DO216-AA)
UPS120e3	1	0.45	20	Powermite 1 (DO216-AA)
UPS120Ee3	1	0.53	20	Powermite 1 (DO216-AA)
UPS130Le3	1	0.38	30	Powermite 1 (DO216-AA)
UPS140e3	1	0.45	40	Powermite 1 (DO216-AA)
UPS160e3	1	0.6	60	Powermite 1 (DO216-AA)
UPS170e3	1	0.6	70	Powermite 1 (DO216-AA)
UPS180e3	1	0.75	80	Powermite 1 (DO216-AA)
UPS5817e3	1	0.45	20	Powermite 1 (DO216-AA)
UPS5819e3	1	0.55	40	Powermite 1 (DO216-AA)
UPS190e3	1	0.75	90	Powermite 1 (DO216-AA)
UPS3100e3	3	0.64	100	Powermite 3
UPS315e3	3	0.22	15	Powermite 3
UPS3200e3	3	0.78	200	Powermite 3
UPS340e3	3	0.44	40	Powermite 3
UPS360e3	3	0.57	60	Powermite 3
UPS5100e3	5	0.64	100	Powermite 3
UPS5100He3	5	0.63	100	Powermite 3
UPS540e3	5	0.45	40	Powermite 3
UPS560e3	5	0.6	60	Powermite 3
UPS6150e3	6	0.65	150	Powermite 3
UPS615e3	6	0.22	15	Powermite 3
UPS760e3	7	0.48	60	Powermite 3
UPS835Le3	8	0.41	35	Powermite 3
UPS840e3	8	0.42	40	Powermite 3

Part Number	Ave. Power Dissipation (W)	Max. Reverse Voltage (V)	Max. Forward Surge Current (A)	Max. trr (ns)	Forward Voltage $V_{(F)}$ (V)	Package
UPR5e3	2.5	50	25	25	0.975	Powermite 1 (DO216-AA)
UPR10e3	2.5	100	25	25	0.975	Powermite 1 (DO216-AA)
UPR15e3	2.5	150	25	25	0.975	Powermite 1 (DO216-AA)
UPR20e3	2.5	200	20	50	1.15	Powermite 1 (DO216-AA)
UPR30e3	2.5	300	20	50	1.15	Powermite 1 (DO216-AA)
UPR40e3	2.5	400	20	50	1.15	Powermite 1 (DO216-AA)
UPR60e3	2.5	600	20	30	1.6	Powermite 1 (DO216-AA)

Microsemi's unique Powermite packaged UPT series of transient voltage suppressors features oxide-passivated chips with high-temperature solder bonds for high surge capability with negligible electrical degradation after repeated surges. Standoff voltages from 5V to 48V, both uni-directional polarities ("R" and non-"R" part numbers), and bi-directional versions ("B" in the part number) are available. Solder dipped (non-RoHS compliant) versions are available by removing "e3" from the end of the part number.

Part Number	uni/bi Directional	Peak Power @ 8/20 usec (W)	Stand-off Voltage (V)	Package
UPT10e3	uni	1000	10	Powermite 1 (DO216-AA)
UPT10Re3	bi	1000	10	Powermite 1 (DO216-AA)
UPT12e3	uni	1000	12	Powermite 1 (DO216-AA)
UPT12Re3	bi	1000	12	Powermite 1 (DO216-AA)
UPT15e3	uni	1000	15	Powermite 1 (DO216-AA)
UPT15Re3	bi	1000	15	Powermite 1 (DO216-AA)
UPT17e3	uni	1000	17	Powermite 1 (DO216-AA)
UPT17Re3	bi	1000	17	Powermite 1 (DO216-AA)
UPT24e3	uni	1000	24	Powermite 1 (DO216-AA)
UPT24Re3	bi	1000	24	Powermite 1 (DO216-AA)
UPT28e3	uni	1000	28	Powermite 1 (DO216-AA)
UPT28Re3	bi	1000	28	Powermite 1 (DO216-AA)
UPT33e3	uni	1000	33	Powermite 1 (DO216-AA)
UPT33Re3	bi	1000	33	Powermite 1 (DO216-AA)
UPT48e3	uni	1000	48	Powermite 1 (DO216-AA)
UPT48Re3	bi	1000	48	Powermite 1 (DO216-AA)
UPT5e3	uni	1000	5	Powermite 1 (DO216-AA)
UPT8e3	uni	1000	8	Powermite 1 (DO216-AA)
UPT8Re3	bi	1000	8	Powermite 1 (DO216-AA)
UPTB10e3	bi	1000	10	Powermite 1 (DO216-AA)
UPTB12e3	bi	1000	12	Powermite 1 (DO216-AA)
UPTB15e3	bi	1000	15	Powermite 1 (DO216-AA)
UPTB17e3	bi	1000	17	Powermite 1 (DO216-AA)
UPTB24e3	bi	1000	24	Powermite 1 (DO216-AA)
UPTB28e3	bi	1000	28	Powermite 1 (DO216-AA)
UPTB33e3	bi	1000	33	Powermite 1 (DO216-AA)
UPTB48e3	bi	1000	48	Powermite 1 (DO216-AA)
UPTB5e3	bi	1000	10	Powermite 1 (DO216-AA)
UPTB8e3	bi	1000	8	Powermite 1 (DO216-AA)

Pin Diodes

Part Number	Ave. Power Dissipation (W)	Max. Reverse Voltage (V)	Package
UPP1001e3	2.5	100	Powermite 1 (DO216-AA)
UPP1002e3	2.5	200	Powermite 1 (DO216-AA)
UPP1004e3	2.5	400	Powermite 1 (DO216-AA)
UPP9401e3	2.5	50	Powermite 1 (DO216-AA)

Nano-second SCR Switch

Part Number	Peak On-State Current (50 ns max.) (A)	Repetitive Peak Off-State Voltage (V)	Max. Gate Trigger Current (μ A)	Package
UPGA301Ae3	100	100	200	Powermite 3

With the continual shrinking of integrated circuits has come increased sensitivity and vulnerability to voltage spikes. Microsemi has kept pace by expanding its offering of transient voltage suppressors in surface mount arrays. Today, 12 families of TVS array products are available in a range of packages including SOT-23, SOT-143, SO-8, SO-14, and QFN-143. These include uni-directional and bi-directional devices to protect from electrostatic discharge, inductive kick-back, and the secondary effects of lightning. Non-RoHS compliant (solder dipped) versions of these parts are available by removing the "e3" from the end of the part number.

Part Number	Low Capacitance	# Lines	uni/bi Directional	Peak Pulse Power @ 8/20 usec (W)	Stand-off Voltage (V)	Pkg.
SMDA03e3	-	4	uni	300	3.3	SO8
SMDA03-6e3	-	6	uni	300	3.3	SO8
SMDA03Ce3	-	4	bi	300	3.3	SO8
SMDA03C-4e3	-	4	bi	300	3.3	SO8
SMDA03C-5e3	-	5	bi	300	3.3	SO8
SMDA03C-7e3	-	7	bi	300	3.3	SO8
SMDA03C-8e3	-	8	bi	300	3.3	SO14
SMDA05e3	-	4	uni	300	5	SO8
SMDA05-6e3	-	6	uni	300	5	SO8
SMDA05Ce3	-	4	bi	300	5	SO8
SMDA05C-4e3	-	4	bi	300	5	SO8
SMDA05C-5e3	-	5	bi	300	5	SO8
SMDA05C-7e3	-	7	bi	300	5	SO8
SMDA05C-8e3	-	8	bi	300	5	SO14
SMDA12e3	-	4	uni	300	12	SO8
SMDA12-6e3	-	6	uni	300	12	SO8
SMDA12Ce3	-	4	bi	300	12	SO8
SMDA12C-4e3	-	4	bi	300	12	SO8
SMDA12C-5e3	-	5	bi	300	12	SO8
SMDA12C-7e3	-	7	bi	300	12	SO8
SMDA12C-8e3	-	8	bi	300	12	SO14
SMDA15e3	-	4	uni	300	15	SO8
SMDA15-6e3	-	6	uni	300	15	SO8
SMDA15Ce3	-	4	bi	300	15	SO8
SMDA15C-4e3	-	4	bi	300	15	SO8
SMDA15C-5e3	-	5	bi	300	15	SO8
SMDA15C-7e3	-	7	bi	300	15	SO8
SMDA15C-8e3	-	8	bi	300	15	SO14
SMDA24e3	-	4	uni	300	24	SO8
SMDA24-6e3	-	6	uni	300	24	SO8
SMDA24Ce3	-	4	bi	300	24	SO8
SMDA24C-4e3	-	4	bi	300	24	SO8
SMDA24C-5e3	-	5	bi	300	24	SO8
SMDA24C-7e3	-	7	bi	300	24	SO8

Part Number	Low Capacitance	# Lines	uni/bi Directional	Peak Pulse Power @ 8/20 usec (W)	Stand-off Voltage (V)	Pkg.
SMDA24C-8e3	-	8	bi	300	24	SO14
SMDB03e3	-	4	uni	500	3.3	SO8
SMDB03Ce3	-	4	bi	500	3.3	SO8
SMDB05e3	-	4	uni	500	5	SO8
SMDB05Ce3	-	4	bi	500	5	SO8
SMDB12e3	-	4	uni	500	12	SO8
SMDB12Ce3	-	4	bi	500	12	SO8
SMDB15e3	-	4	uni	500	15	SO8
SMDB15Ce3	-	4	bi	500	15	SO8
SMDB24e3	-	4	uni	500	24	SO8
SMDB24Ce3	-	4	bi	500	24	SO8
SL03e3	-	1	uni	300	3.3	SOT23
SL05e3	3 pf	1	uni	300	5	SOT23
SL12e3	3 pf	1	uni	300	12	SOT23
SL15e3	3 pf	1	uni	300	15	SOT23
SL24e3	3 pf	1	uni	300	24	SOT23
SM03e3	-	1	1 line bi 2 lines uni	300	3.3	SOT23
SM05e3	-	1	1 line bi 2 lines uni	300	5	SOT23
SM12e3	-	1	1 line bi 2 lines uni	300	12	SOT23
SM15e3	-	1	1 line bi 2 lines uni	300	15	SOT23
SM24e3	-	1	1 line bi 2 lines uni	300	24	SOT23
SM36e3	-	1	1 line bi 2 lines uni	300	36	SOT23
SM1603e3	-	8	uni	300	3.3	SO16
SM1603Ce3	-	8	bi	300	3.3	SO16
SM1605e3	-	8	uni	300	5	SO16
SM1605Ce3	-	8	bi	300	5	SO16
SM1612e3	-	8	uni	300	12	SO16
SM1612Ce3	-	8	bi	300	12	SO16
SM1615e3	-	8	uni	300	15	SO16
SM1615Ce3	-	8	bi	300	15	SO16
SM1624e3	-	8	uni	300	24	SO16
SM1624Ce3	-	8	bi	300	24	SO16
SM16LC03e3	25 pF	8	uni	300	3.3	SO16
SM16LC03Ce3	25 pF	8	bi	300	3.3	SO16

Part Number	Low Capacitance	# Lines	uni/bi Directional	Peak Pulse Power @ 8/20 usec (W)	Stand-off Voltage (V)	Pkg.
SM16LC05e3	25 pF	8	uni	300	5	SO16
SM16LC05Ce3	25 pF	8	bi	300	5	SO16
SM16LC08e3	25 pF	8	uni	300	8	SO16
SM16LC08Ce3	25 pF	8	bi	300	8	SO16
SM16LC12e3	25 pF	8	uni	300	12	SO16
SM16LC12Ce3	25 pF	8	bi	300	12	SO16
SM16LC15e3	25 pF	8	uni	300	15	SO16
SM16LC15Ce3	25 pF	8	bi	300	15	SO16
SM16LC24e3	25 pF	8	uni	300	24	SO16
SM16LC24Ce3	25 pF	8	bi	300	24	SO16
SM8LC03e3	25 pF	2	bi	500	3.3	SO8
SM8LC05e3	25 pF	2	bi	500	5	SO8
SM8LC12e3	25 pF	2	bi	500	12	SO8
SM8LC15e3	25 pF	2	bi	500	15	SO8
SM8LC24e3	25 pF	2	bi	500	24	SO8
USB50403e3	3 pF	1	uni	500	3.3	SOT143
USB50403Ce3	3 pF	1	bi	500	3.3	SOT143
USB50405e3	3 pF	1	uni	500	5	SOT143
USB50405Ce3	3 pF	1	bi	500	5	SOT143
USB50412e3	3 pF	1	uni	500	12	SOT143
USB50412Ce3	3 pF	1	bi	500	12	SOT143
USB50415e3	3 pF	1	uni	500	15	SOT143
USB50415Ce3	3 pF	1	bi	500	15	SOT143
USB50424e3	3 pF	1	uni	500	24	SOT143
USB50424Ce3	3 pF	1	bi	500	24	SOT143
USB50803e3	-	2	uni	300	3.3	SO8
USB50803Ce3	-	2	bi	300	3.3	SO8
USB50803C-Ae3*	-	2	bi	300	3.3	SO8
USB50805e3	-	2	uni	300	5	SO8
USB50805Ce3	-	2	bi	300	5	SO8
USB50805C-Ae3*	-	2	bi	300	5	SO8
USB50812e3	-	2	uni	300	12	SO8
USB50812Ce3	-	2	bi	300	12	SO8
USB50812C-Ae3*	-	2	bi	300	12	SO8
USB50815e3	-	2	uni	300	15	SO8
USB50815Ce3	-	2	bi	300	15	SO8
USB50815C-Ae3*	-	2	bi	300	15	SO8
USB50824e3	-	2	uni	300	24	SO8
USB50824Ce3	-	2	bi	300	24	SO8
USB50824C-Ae3*	-	2	bi	300	24	SO8

* -A version has the opposite polarity of the non-A version

Almost all commercial TVS protection products are made from semiconductor die assembled onto copper substrates plated with tin and over-molded with black plastic. However the industry standard substrate is not pure copper – it is a copper alloy called alloy A194. A small amount (2.35%) of iron is added in this alloy to make the leads stiffer. Even this small amount of magnetically active material is unacceptable in many harsh magnetic environments such as MRI machines, electric cars, automotive control unit near the alternator, high speed trains, and exercise equipment that uses magnetic braking.

Microsemi's non-magnetic TVS arrays use a non-ferrous alloy. While it is more flexible, we developed a leadless QFN package that meets all industry manufacturing and quality standards, and that has the same footprint as a SOT-143.

Non-RoHS compliant (solder dipped) versions of these parts are available by removing the "e3" from the end of the part number.

Part Number	# Lines	uni/bi Directional	Peak Pulse Power @ 8/20 usec (W)	Stand-off Voltage (V)	Pkg.
USBQNM50403e3	1	uni	500	3.3	QFN-143
USBQNM50403Ce3	1	bi	500	3.3	QFN-143
USBQNM50405e3	1	uni	500	5	QFN-143
USBQNM50405Ce3	1	bi	500	5	QFN-143
USBQNM50412e3	1	uni	500	12	QFN-143
USBQNM50412Ce3	1	bi	500	12	QFN-143
USBQNM50415e3	1	uni	500	15	QFN-143
USBQNM50415Ce3	1	bi	500	15	QFN-143
USBQNM50424e3	1	uni	500	24	QFN-143
USBQNM50424Ce3	1	bi	500	24	QFN-143

Non-RoHS compliant (solder dipped) versions of these parts are available by removing the "e3" from the end of the part number.

Part Number	# Diodes	# Lines	$I_{(F)}$ (mA)	$V_{(BR)}$ (V)	Pkg.
D16-4148e3	8	8	400	100	DIP16
D16-4150e3	8	8	400	75	DIP16
MAD1103e3	16	8	400	90	DIP14
MAD1105e3	8	8	400	90	DIP14
MAD1106e3	8	8	400	90	DIP14
MAD1107e3	16	8	400	90	DIP14
MAD1108e3	8	8	400	90	DIP16
MAD1109e3	7	7	400	90	DIP14
MMAD1103e3	16	8	400	90	SO14
MMAD1104e3	16	8	400	90	SO14
MMAD1105e3	8	8	400	90	SO14
MMAD1106e3	8	8	400	90	SO14
MMAD1108e3	8	8	400	90	SO16
MMAD1109e3	7	7	400	90	SO14
MMAD130e3	20	10	400	90	SO14
S16-4148e3	4	4	400	90	SO16
S16-4150e3	4	4	400	75	SO16
S8-4148e3	4	4	400	90	SO8
S8-4150e3	4	4	400	75	SO8

Zener Diode Array

Part Number	# Diodes	# Lines	$V_{(Z)}$ (V)	$I_{(ZM)}$ (mA)	Pkg.
SM16Z4689e3	8	8	5.1	55	SO16

Microsemi's Medical Discrete product line has been supporting implantable device designs for over 30 years and has proven reliability with hundreds of millions of hours in the field. Product offerings include protection, power conditioning, and power switching devices. The extensive product line provides numerous options with extensive product customization capabilities. Bare dies are available in wafer pack, and assembled parts are available in either tape and reel or wafer pack. Custom LGA or DFN packaging is available to minimize the form factor and reduce board space using die stacking technology. Full-service processing is available including electrical screening, visual inspection, lot acceptance testing, and 100% burn-in testing.



Our large product line can fulfill all discrete implantable product needs, with the ability to customize size, electrical performance, and packaging.

TVS Protection

- Zeners: Uni-directional, Bidirectional, 3 to 400V

Power Conditioning

- Schottky Rectifiers: Si 5 to 200V, SiC 600V or 1200V
- Fast Recovery Rectifiers: 75 to 1200V, T_{rr} as low as 22ns
- Standard Rectifiers: 75 to 1600V







Power Switches

- IGBTs – Insulated Gate: 300V to 1200 V, Up to 150A
- MOSFETs: 100 to 1200V, High voltage low $R_{DS(ON)}$
- Thyristors/Semiconductor Controlled Rectifier (SCR): 600 to 1600 V
- IGBT / SCR Driver: 300 to 50V AC input, 14 to 16V gate drive



Microsemi is a pioneer in products for displays and a leader in CCFL driving since 1997. Microsemi's product portfolio includes ICs, discrete components and modules that can be used in both LED Backlight and general solid state lighting (SSL) applications.

LED Driver Modules (Power Supplies) for LED Lighting Fixtures

	LXMG221W-0700034-D0	LXMG2203	LXMG221W-0700034-D1	LXMG221W-0350017-D0	LXMG221W-0700030-D0	LXMG221D-0700040-D2F
						
Input V Range	100-277V _{AC} (90-305V _{AC})	100-277V _{AC} (90-305V _{AC})	100-277V _{AC} (90-305V _{AC})	100-277V _{AC} (90-305V _{AC})	100-277V _{AC} (90-305V _{AC})	347-480V _{AC}
Output Strings	Single	Single	Single	Single	Single	Single
Output Current	700mA	700mA	700mA	350mA	700mA	700mA
Output Voltage	14-48V _{DC}	14-48V _{DC}	20-48V _{DC}	20-48V _{DC}	17-40V _{DC}	40-57V _{DC}
Max P_{OUT}	34W	34W	34W	17W	30W	40W
Package	IP66, Plastic	IP66, Plastic	IP66, Plastic	IP66, Plastic	IP66, Plastic	IP66, Metal
Peak Efficiency	90%	90%	85%	82%	90%	91%
Active Power Factor	>0.9 (0.99@120V)	>0.9 (0.99@120V)	>0.9 (0.98@120V)	See Datasheet	>0.9 (0.99@120V)	>0.9
Start up Time	~1 sec	~1 sec	1-2 sec	1-2 sec	150ms	200ms
Dimming	0-10V, Pot,	0-10V, Pot,	0-10V,	0-10V,	0-10V, Pot,	0-10V, Pot,
Minimum Dimming	10%		15%	15%	10%	10%
Protections	Over Voltage, Over Current, Over Temperature (Automatic Shutoff)					
Fault Management	No	Yes	No	No	No	Yes
UL1310	Class 2 Isolated Power Supplies, UL1310 E337545					

Part Number	Description	# LED Strings ¹	Input Voltage (VDC)	Output Voltage ¹ (VCC)	Output Current ¹ (mA)	Applications
LX27902/912	LED controller: LLC support for DC output regulation and LED lighting control	AD	8 ~ 27V (controller)	AD	AD	LED Backlit
LX27901	LED controller: LLC, PWM and Synch Mode operation, supports zero PWM dimming	AD	8 ~27V (controller)	AD	AD	D0 & D1 Edge lit BL, AD/DC
LX24232	32 port local dimming (2D) LED controller: independent duty and phase delay control	32	V _{cc} =5V, V _{IO} =3.3V or 5V	Up to 72V per LED String	70mA Typ (100%DC)	Local Dim, TVs/Monitors, RGB displays
LX24132A	32 port local dimming (2D) controller: 4 configurable LED off time, leading edge control	32	V _{cc} =5V, V _{IO} =3.3V or 5V	Up to 72V per LED String	70mA Typ (100%DC)	Local Dim, TV/Monitors, RGB displays
LX23224	LED Driver: DC-DC controller supports 4 LED strings	4	12V-250V	Up to 400V	250mA	D0 Edge Lit LED BL
LX23214	LED Driver: 2 independent DC controller supports 4 strings (2 strings per DC section)	4	12V-250V	Up to 400V	250mA	D0 Edge Lit LED BL
LX23203	LED Driver: 3 independent DC controller supports 3 strings (1 string per DC-DC section)	3	12V-250V	Up to 400V	350mA	D0 & D1 Edge Lit LED BL
LX23108AL	8 port LED Driver: 1% current setting, controlled by LX24132/A, LX24232	8	V _{cc} =5V, V _{IO} =3.3V	-	200mA (100% DC)	Local Dim, TV/Monitors, RGB displays
LX23108AH	8 port LED Driver: 1% current setting, controlled by LX24132/A, LX24232	8	V _{cc} =5V, V _{IO} =3.3V	-	100mA (100% DC)	Local Dim, TVs, Monitors, RGB displays
LX2273	4 Channel LED Driver: 1.5% mathing, 3% tolerance, StayLIT	4	8V ~ 28V	AD	500mA	LED Backlight
LX2260	4 Channel LED Driver: 1.5% mathing, 3% tolerance, StayLIT	4	8V ~ 28V	AD	500mA	LED Backlight
LX1996	6 string LED backlight controller	6	6V~28V	AD	20mA	LED Backlight
LX1995-2	Miniature LED Driver	1	1.6V ~ 5.5V	Up to 28V	30mA	LED Backlight
LX1995-1	Miniature LED Driver	1	1.6V ~ 5.5V	Up to 28V	20mA	LED Backlight
LX1994	High efficiency LED Driver	1	2.0V ~ 5.5V	AD	AD	LED Backlight
LX1993	High efficiency LED Driver	1	1.6V ~ 6.0V	25V	25mA	LED Backlight
LX1991	6 output programmable LED current sink	6	4.5V~ 5.5V	40V	30mA	LED Backlight



Microsemi is the world's leading supplier of high reliability semiconductors used in defense, aviation, space, and heavy duty industrial applications including down-hole drilling. The company's solutions include a wide variety of diodes, transistors, MOSFETs, power management devices, and regulators. Many of these devices are radiation-hardened and offered in various package options including hybrids, hermetically sealed, through-hole and surface mount solutions.

Microsemi was the first diode manufacturer selected by the U.S. military services as a source for product qualified to the highest specified reliability level—JANS. Today, Microsemi offers the largest selection of JANS-qualified products in the world. We also offer a broad range of high reliability non-hermetic/plastic products in various screened versions (M, MA, MXL, MX) that have been exposed to levels of additional testing (similar to those applied to JAN, JANTX, JANTXV, and JANS devices) to enhance reliability.

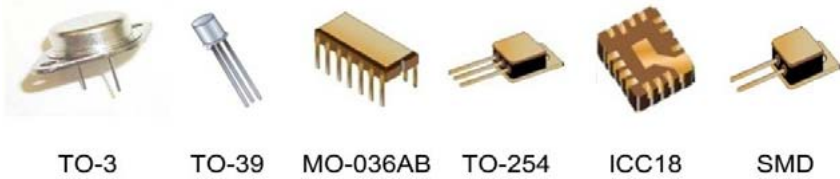
The company also has a 55-year heritage in semiconductor products for defense and space applications and has a larger selection of DLA qualified parts than any other manufacturer.



For the most up-to-date information, please visit: **High Reliability Products** on the Microsemi website.

Microsemi is a leader in military and commercial aerospace semiconductors, and we provide Power/Military MOSFETs in hermetic packaging to support the needs of our high reliability customers. These devices are DLA qualified and offer great value for mission critical applications. All these QPL listed devices come in JAN, JANTX, JANTXV qualification levels. Some are available in JANS space grade versions, and commercial grade versions are also available.

Package Illustrations



Part Number MSC/JEDEC	IR Cross Reference	Qualified Through	Polarity	Rated Voltage	Rds(on) max.	Rated Power @ 25°C	Package
2N6756	IRF130	JANTXV	N	100V	0.18Ω	75W	TO-3
2N6758	IRF230	JANTXV	N	200V	0.4Ω	75W	TO-3
2N6760	IRF330	JANTXV	N	400V	1.0Ω	75W	TO-3
2N6762	IRF430	JANTXV	N	500V	1.5Ω	75W	TO-3
2N6764	IRF150	JANTXV	N	100V	0.055Ω	150W	TO-3 (060)
2N6764T1	No IR Equivalent	JANTXV	N	100V	0.055Ω	150W	TO-254 (T1)
2N6766	IRF250	JANTXV	N	200V	0.085Ω	150W	TO-3 (060)
2N6766T1	IRF250	JANTXV	N	200V	0.085Ω	150W	TO-254 (T1)
2N6768	IRF350	JANTXV	N	400V	0.3Ω	150W	TO-3
2N6768T1	No IR Equivalent	JANTXV	N	400V	0.3Ω	150W	TO-254 (T1)
2N6770	IRF450	JANTXV	N	500V	0.4Ω	150W	TO-3
2N6770T1	No IR Equivalent	JANTXV	N	500V	0.4Ω	150W	TO-254 (T1)
2N6782	IRFF110	JANTXV	N	100V	0.6Ω	15W	TO-39
2N6782U	IRFE110	JANTXV	N	100V	0.6Ω	15W	LCC18
2N6784	IRFF210	JANTXV	N	200V	1.5Ω	15W	TO-39
2N6784U	IRFE210	JANTXV	N	200V	1.5Ω	15W	LCC18
2N6788	IRFF120	JANTXV	N	100V	0.3Ω	20W	TO-39
2N6788U	IRFE120	JANTXV	N	100V	0.3Ω	14W	LCC18
2N6790	IRFF220	JANTXV	N	200V	0.8Ω	20W	TO-39
2N6790U	IRFE220	JANTXV	N	200V	0.8Ω	14W	LCC18

Part Number MSC/JEDEC	IR Cross Reference	Qualified Through	Polarity	Rated Voltage	Rds(on) max.	Rated Power @ 25°C	Package
2N6796	IRFF130	JANTXV	N	100V	0.195Ω	25W	TO-39
2N6796U	IRFE130	JANTXV	N	100V	0.195Ω	25W	LCC18
2N6798	IRFF230	JANS	N	200V	0.42Ω	25W	TO-39
2N6798U	IRFE230	JANTXV	N	200V	0.42Ω	25W	LCC18
2N6800	IRFF330	JANTXV	N	400V	1.0Ω	25W	TO-39
2N6800U	IRFE330	JANTXV	N	400V	1.0Ω	25W	LCC18
2N6802	IRFF430	JANTXV	N	500V	1.5Ω	25W	TO-39
2N6802U	IRFE430	JANTXV	N	500V	1.5Ω	25W	LCC18
2N6804	IRF9130	JANTXV	P	-100V	0.3Ω	75W	TO-3
2N7227	IRFM350	JANTXV	N	400V	0.415Ω	150W	TO-254 (T1)
2N7227U	IRFN350	JANTXV	N	400V	0.415Ω	150W	SMD1
2N7228	IRFM450	JANTXV	N	500V	0.515Ω	150W	TO-254 (T1)
2N7228U	IRFN450	JANTXV	N	500V	0.515Ω	150W	SMD1
2N7236	IRFM9140	JANTXV	P	-100V	0.2Ω	125W	TO-254 (T1)
2N7236U	IRFN9140	JANTXV	P	-100V	0.2Ω	125W	SMD1
2N7334	IRFG110	JANTXV	N Quad	100V	0.7Ω	1.4W	MO-036AB
2N7335	IRFG9110	JANTXV	P Quad	100V	1.4Ω	1.4W	MO-036AB
2N6849	IRFF9130	JANS	P	-100V	0.3Ω	25W	TO-39
2N6849U	IRFE9130	JANS	P	-100V	0.3Ω	25W	LCC-18
2N6898*	No IR Equivalent	JANTXV	P	-100V	0.2Ω	150W	TO-3 (060)
2N6901	No IR Equivalent	JANTXV	N	100V	1.4Ω	8.33W	TO-39K
2N7224	IRFM150	JANTXV	N	100V	0.07Ω	150W	TO-254 (T1)
2N7224U	IRFN150	JANTXV	N	100V	0.07Ω	150W	SMD1
2N7225	IRFM250	JANTXV	N	200V	0.1Ω	150W	TO-254 (T1)
2N7225U	IRFN250	JANTXV	N	200V	0.1Ω	150W	SMD1
2N7227	IRFM350	JANTXV	N	400V	0.415Ω	150W	TO-254 (T1)
2N7227U	IRFN350	JANTXV	N	400V	0.415Ω	150W	SMD1
2N7228	IRFM450	JANTXV	N	500V	0.515Ω	150W	TO-254 (T1)
2N7228U	IRFN450	JANTXV	N	500V	0.515Ω	150W	SMD1
2N7236	IRFM9140	JANTXV	P	-100V	0.2Ω	125W	TO-254 (T1)
2N7236U	IRFN9140	JANTXV	P	-100V	0.2Ω	125W	SMD1
2N7334	IRFG110	JANTXV	N Quad	100V	0.7Ω	1.4W	MO-036AB
2N7335	IRFG9110	JANTXV	P Quad	100V	1.4Ω	1.4W	MO-036AB

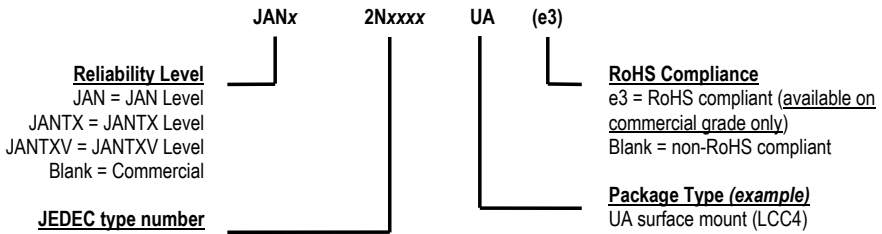
* In development. Expected in 2014

These military qualified bi-polar junction transistors offer higher transconductance than MOSFET's and don't require separate gate drivers. A particular strength is that they are current amplifiers capable of very high current densities. They can be used as amplifiers, switches, and oscillators and are capable of very high frequency operation. They can also be used as temperature sensors and logarithmic converters. Microsemi's broad offering of QPL qualified BJTs spans voltages from 10 V to 760 V, rated currents from 0.01 A to 50 A and power ratings from 0.15 W to 300 W. Maximum junction temperatures up to 200°C are available, as are many leaded and surface mount packing solutions. A few examples of the parts in this 449 root member family are shown below. A complete listing and parametric search capability can be found on our website at: <http://www.microsemi.com/products/products-directory>.

JEDEC Type Number	Transistor Type	Polarity	Rated Voltage	Rated Current @ 25C	Rated Power	Max Junction Temp.	Package
2N6383	Darlington	NPN	40V	10A	100W @ 25°C	175°C	TO-3 (TO-204AA)
2N6351	Darlington	NPN	150V	5A	1W @ 25°C	200°C	TO-33
2N6353	Darlington	NPN	150V	5A	25W @ 100°C	200°C	TO-66 (3-Pin)
2N6648	Darlington	PNP	40V	10A	85W @ 25°C	175°C	TO-3 (TO-204AA)
2N6299	Darlington	PNP	80V	8A	32W @ 100°C	200°C	TO-66
2N6287	Darlington	PNP	100V	20A	175W @ 25°C	200°C	TO-3 (TO-204AA)
2N4237	Power	NPN	40V	1A	1W @ 25°C	200°C	TO-39
2N3771	Power	NPN	40V	30A	150W @ 25°C	200°C	TO-3 (TO-204AA)
2N1714	Power	NPN	60V	0.75A	0.8W @ 25°C	175°C	TO-5
2N5685	Power	NPN	60V	50A	300W @ 25°C	200°C	TO-3 (060)
2N5015	Power	NPN	760V	0.2A	1W @ 25°C	200°C	TO-39
2N4234	Power	PNP	40V	1A	1W @ 25°C	200°C	TO-39
2N6213	Power	PNP	450V	2A	35W @ 25°C	200°C	TO-66

JEDEC Type Number	Transistor Type	Polarity	Rated Voltage	Rated Current @ 25°C	Rated Power	Max Junction Temp.	Package
2N5684	Power	PNP	80V	50A	300W @ 25°C	200°C	TO-3 (060)
2N2481	Small signal	NPN	15V	0.01A	0.6W @ 25°C	200°C	TO-18
2N3439UA	Small signal	NPN	350V	1A	0.8W @ 60°C	200°C	LCC4 UA
2N3507U4	Small signal	NPN	50V	3A	1W @ 25°C	200°C	SMD.22 (U4)
2N3440U4	Small signal	NPN	250V	1A	5W @ 60°C	200°C	SMD.22 (U4)
2N5793	Small signal	NPN Dual	40V	0.6A	0.6W @ 25°C	200°C	TO-78
2N5793A	Small signal	NPN Dual Matched	40V	0.6A	0.6W @ 25°C	200°C	TO-78
2N2060L	Small signal	NPN Dual Matched	60V	0.5A	0.6W @ 25°C	200°C	TO-78
2N2919	Small signal	NPN Dual Matched	60V	0.03A	0.6W @ 25°C	200°C	TO-78
2N6989	Small signal	NPN Quad	50V	0.8A	1.5W @ 25°C	200°C	DIP14 U (TO116)
2N4854	Small signal	NPN/PNP	40V	0.6A	0.6W @ 25°C	200°C	TO-78
2N2944A	Small signal	PNP	10V	0.1A	0.4W @ 25°C	200°C	TO-46
2N3743U4	Small signal	PNP	300V	0.2A	1W @ 25°C	200°C	SMD.22 (U4)
2N3763UA	Small signal	PNP	60V	1.5A	1W @ 25°C	200°C	LCC4 UA
2N4405	Small signal	PNP	80V	0.5A	5W @ 25°C	200°C	TO-39
2N2945A	Small signal	PNP Dual Matched	20V	0.1A	0.4W @ 25°C	200°C	TO-46
2N5796AUC	Small signal	PNP Dual Matched	60V	0.6A	0.6W @ 25°C	175°C	LCC6 U
2N3810	Small signal	PNP Dual Matched	60V	0.05A	0.3W @ 25°C	200°C	TO-78

JEDEC Type Number	Transistor Type	Polarity	Rated Voltage	Rated Current @ 25C	Rated Power	Max Junction Temp.	Package
2N6987	Small signal	PNP Quad	60V	0.6A	1.5W @ 25°C	200°C	DIP14 U (TO116)
2N3960	Small signal - RF	NPN	12V	0.03A	0.4W @ 25°C	200°C	TO-18
2N4957	Small signal - RF	PNP	30V	0.03A	0.2W @ 25°C	200°C	TO-72
2N3866	Small signal - RF	NPN	30V	0.4A	1W @ 25°C	200°C	TO-39



Power Management

Linear Voltage Regulators		I_{OUT}	V_{OUT}	Mil-Std-883	DESC / SMD	Mil-M38510 (JAN)
SG109	Positive, Fixed	1A	5V	X	–	X
SG117, SG117A	Positive, Adjustable	1.5A	–	X	X	X
SG120, SG120A	Negative, Fixed	1.5A	-5,-12,-15V	X	–	–
SG137, SG137A	Negative, Adjustable	1.5A	-1.2 to -37V	X	X	–
SG140, SG140A	Positive, Fixed	1.5A	5, 12, 15V	X	–	–
SG723	Precision, Positive or Negative Adjustable	1.5A	2 to 37V	X	–	X
SG1532	Precision, Positive or Negative Adjustable	150mA	2 to 38V	X	X	–
SG78xx, SG78xxA	Positive, Fixed	1.5A	5, 12, 15V	X	X	X
SG79xx, SG79xxA	Negative, Fixed	1.5A	-5,-12,-15V	X	X	X
Switching Regulators/PWM Controllers		Freq	V_{OUT}	Mil-Std-883	DESC / SMD	Mil-M38510 (JAN)
SG1524, SG1524B	Voltage Mode	100-400kHz	5V	X	X	X
SG1525A	Voltage Mode, Dual Sink/Source	100-500kHz	5.1V	X	X	X
SG1526, SG1526B	Voltage Mode, Dual Sink/Source	1-500kHz	5V	X	X	X
SG1527	Voltage Mode, Regulating, Dual Sink/Source	100-500kHz	5.1V	X	X	X
SG1529	Voltage Mode, Regulating	100-400kHz	5V	X	–	–
SG1731	DC Motor Controller	5k-350kHz	-	X	–	–
SG1825C	High Speed, Current Mode	1.5MHz	10 to 30V	X	X	–

Switching Regulators/PWM Controllers		Freq	V _{OUT}	Mil-Std-883	DESC / SMD	Mil-M38510 (JAN)
SG1842	Off-line, Current Mode, 16V UVLO, 100% Max Duty Cycle	500kHz	30V	X	X	-
SG1843	Off-line, Current Mode, 8V UVLO, 100% Max Duty Cycle	500kHz	30V	X	X	-
SG1844	Off-line, Current Mode, 16V UVLO, 50% Max Duty Cycle	500kHz	30V	X	X	-
SG1845	Off-line, Current Mode, 8V UVLO, 50% Max Duty Cycle	500kHz	30V	X	X	-
SG1846	Current Mode, Dual Sink/Source	500kHz	8 to 40V	X	X	-
Transistor Arrays		I _{CE(MAX)}	V _{CE(MAX)}	Mil-Std-883	DESC / SMD	Mil-M38510 (JAN)
SG2000 Series	Driver Array - 7 NPN	up to 600mA	50 to 95V	X	X	X
SG2800 Series	Driver Array - 8 NPN	up to 600mA	50 to 95V	X	X	X
FET Drivers, Low-side		Freq	V _{CC}	Mil-Std-883	DESC / SMD	Mil-M38510 (JAN)
SG1626	Dual High-Speed, Inverting	DC to 1.5MHz	4.5 to 20V	X	X	-
SG1644	Dual High-Speed, Non-inverting	DC to 1.5MHz	4.5 to 20V	X	X	-

Amplifiers

Op Amps		V _{INPUT} OFFSET	V _{SUPPLY}	Mil-Std-883	DESC / SMD	Mil- M38510 (JAN)
SG143	High-Voltage, Low-Current	2mV	28V	X	X	–
SG1436	High-Voltage, Low-Current	5mV	15V	X	–	–
SG1536	High-Voltage, Low-Current, Low-Offset	2mV	28V	X	X	–
SG2101	Dual, Compensated	3mV	5 to 20V	X	–	X

Supervisory Circuits and Voltage Reference

Voltage Reference		V _{IN}	V _{OUT}	Mil-Std-883	DESC / SMD	Mil- M38510 (JAN)
SG1503	Precision 2.5V Reference	4.5 to 40V	2.5V	X	X	–

Single Supply Monitors

SG1543	Power Supply Output Control Circuit	4.7 to 40V	2.5V	X	X	–
SG1544	Low-Voltage Power Supply Output Control Circuit	4.7 to 40V	2.5V	X	X	–

Quad Supply Monitors

SG1548	Quad Power Fault Monitor	4.5 to 40V	2.5V	X	X	–
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Current Sense Latch

SG1549	Current Sense Latch, 100mV Input Threshold, 180nS delay	–	–	X	X	–
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Power Management

Linear Voltage Regulators		I_{OUT}	V_{OUT}	QML-EV (equiv V)	Rad Tolerance		
					TID	ELDRS	SEL
SGR117, SGR117A	Positive, Adjustable, Rad Hard, $40V_{IN}$	1.5A	–	X	100kRad	50kRad	87MeV
SGR117HV, SGR117AHV	Positive, Adjustable, Rad Hard, $60V_{IN}$	1.5A	–	X	100kRad	50kRad	87MeV
SGR137, SGR137A	Negative, Adjustable	1.5A	-1.2 to -37V	X	100kRad	50kRad	87MeV
Switching Regulators/PWM Controllers		Freq	V_{OUT}	QML-EV (equiv V)	Rad Tolerance		
					TID	ELDRS	SEL
SGR1825C	High Speed, Current Mode	1.5MHz	10 to 30V	X	100kRad	50kRad	87MeV
SGR1845	Off-line, Current Mode, 8V UVLO, 50% Max Duty Cycle	500kHz	30V	X	100kRad	50kRad	87MeV
SGR1846	Current Mode, Dual Sink/Source	500kHz	8 to 40V	X	100kRad	50kRad	87MeV
High-side Driver		V_S	I_{OUT}	QML-EV (equiv V)	Rad Tolerance		
					TID	ELDRS	SEL
AAHS298B	8 Channel Source Driver	75V	700mA	X	100kRad	50kRad	87MeV

Microsemi's series of military qualified silicon power rectifiers are qualified up to the JANTXV level for high reliability applications. They are constructed with glass passivated die and feature glass to metal seal construction. They have a 500 amp surge rating and provide a VRWM up to 1000 volts. RoHS compliant versions are available for the commercial grade components only. "-1" version part numbers feature internal metallurgical bonds for enhanced reliability. "R" version parts have reverse polarity relative to the non-R version part numbers. Part numbers ending in "US" or "UR" are surface mount, MELF package options. Non-Ux options are axial leaded, hard, voidless glass packages.

JEDEC Type Number	V _r	V(f) @ I(f)		I(o)	Max T _j	Package
1N1124A	200V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1124RA	200V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1126A	400V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1126RA	400V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1128A	600V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1128RA	600V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N1184	100V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1184R	100V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1186	200V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1186R	200V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1188	400V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1188R	400V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1190	600V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1190R	600V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N1202A	200V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1202AR	200V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1204A	400V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1204AR	400V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1206A	600V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1206AR	600V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N1614	200V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N1614R	200V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N1615	400V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N1615R	400V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N1616	600V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N1616R	600V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N3164	200V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3164R	200V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3168	400V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3168R	400V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)

JEDEC Type Number	V _r	V(f) @ I(f)		I(o)	Max T _j	Package
1N3170	600V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3170R	600V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3172	800V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3172R	800V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3174	1000V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3174R	1000V	1.55V	940A	300 A @ 120 °C	200 °C	DO-9 (DO-205AB)
1N3611	200V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N3612	400V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N3613	600V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N3614	800V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N3649	800V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N3649R	800V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N3650	1000V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N3650R	1000V	2.2V	10A	3.3 A @ 50 °C	175 °C	DO-4
1N3671A	800V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N3671AR	800V	1.35V	38A	12 A @ 150 °C	200 °C	DO-4
1N3766	800V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N3766R	800V	1.4V	110A	35 A @ 150 °C	175 °C	DO-5
1N3957	1000V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N3957	1000V	0.6-1.1V	1A	1 A @ 100 °C	200 °C	DO-41
1N4245	200V	0.6-1.3V	3A	1 A @ 55 °C	175 °C	A-Pkg
1N4246	400V	0.6-1.3V	3A	1 A @ 55 °C	175 °C	A-Pkg
1N4247	600V	0.6-1.3V	3A	1 A @ 55 °C	175 °C	A-Pkg
1N4248	800V	0.6-1.3V	3A	1 A @ 55 °C	175 °C	A-Pkg
1N4249	1000V	0.6-1.3V	3A	1 A @ 55 °C	175 °C	A-Pkg
1N4458	800V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N4458R	800V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N4459	1000V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N4459R	1000V	1.5V	15A	10 A @ 25 °C	175 °C	DO-4
1N457	60V	1V	0.02A	0.225 A @ 25 °C	175 °C	DO-35
1N458	125V	1V	0.007A	0.165 A @ 25 °C	175 °C	DO-35
1N459	175V	1V	0.003A	0.12 A @ 25 °C	175 °C	DO-35
1N5550	200V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg
1N5550US	200V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg US
1N5551	400V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg
1N5551US	400V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg US
1N5552	600V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg
1N5552US	600V	0.6-1.2V	9A	5 A @ 55 °C	200 °C	B-Pkg US

JEDEC Type Number	Vr	V(f) @ I(f)		I(o)	Max Tj	Package
1N5553	800V	0.6-1.3V	9A	5 A @ 55 °C	200 °C	B-Pkg
1N5553US	800V	0.6-1.3V	9A	5 A @ 55 °C	200 °C	B-Pkg US
1N5554	1000V	0.6-1.3V	9A	5 A @ 55 °C	200 °C	B-Pkg
1N5554US	1000V	0.6-1.3V	9A	5 A @ 55 °C	200 °C	B-Pkg US
1N5614	200V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg
1N5614US	200V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg US
1N5616	400V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg
1N5616US	400V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg US
1N5618	600V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg
1N5618US	600V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg US
1N5620	800V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg
1N5620US	800V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg US
1N5622	1000V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg
1N5622US	1000V	0.8-1.3V	3A	1 A @ 55 °C	200 °C	A-Pkg US
1N645-1	225V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35
1N645UR-1	225V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35UR (DO213AA)
1N647-1	400V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35
1N647UR-1	400V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35UR (DO213AA)
1N649-1	600V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35
1N649UR-1	600V	1V	0.4A	0.4 A @ 25 °C	175 °C	DO-35UR (DO213AA)
1N6661	225V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg
1N6661US	225V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg US
1N6662	400V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg
1N6662US	400V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg US
1N6663	600V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg
1N6663US	600V	1V	0.4A	0.5 A @ 25 °C	175 °C	D-Pkg US

These military Schottky diodes provide very low forward voltage drop and therefore very fast switching speed. This makes them particularly useful as rectifiers in switching power supplies, blocking diodes for reverse current and discharge protection, voltage clamps, and for transistor saturation protection. Small-signal Schottky diodes are used in high-frequency applications such as mixers and detectors, and can be used for ESD protection of CMOS circuitry, laser diodes, and other opto-electric devices. Microsemi's military qualified Schottky diodes are available in JAN, JANTX, and JANTXV versions. Some are also available with JANS space grade qualification, and in qualified bare die form. These devices, along with hundreds of other Schottky diodes that are not military qualified at this time, are also available in commercial grade versions. A complete listing and parametric search capability can be found on our website at: <http://www.microsemi.com/products/products-directory>. Some non-mil Schottkys are available in 'up-screened' grades with enhanced reliability testing modeled on the MIL-PRF-19500 procedures.

JEDEC Type Number	Reverse Breakdown Voltage	Forward Voltage @ Current	Forward Current @ T	Max Tj (°C)	RHA Level	Qualified Through	Package
1N6391	45V	0.5V @ 5A	5A @ 125°C	175	300 kRad	JANS	DO-4
1N6392	45V	0.51V @ 10A	10A @ 115°C	175	300 kRad	JANTXV	DO-5
1N6492	45V	0.68V @ 4A	4A @ 100°C	175	300 kRad	JANTXV	TO-205
1N5819-1	45V	0.49V @ 1A	1A @ 55°C	125	300 kRad	JANS, HKC2	DO-41
1N5819UR-1	45V	0.49V @ 1A	1A @ 55°C	125	300 kRad	JANS, HKC2	DO-41UR (DO213AB)
1N6761-1	100V	0.61V @ 1A	1A @ 55°C	125	300 kRad	JANTXV	DO-41
1N6761UR-1	100V	0.61V @ 1A	1A @ 55°C	125	300 kRad	JANTXV	DO-41UR (DO213AB)
1N66601	45V	0.75V @ 15A	15A @ 100°C	150	300 kRad	JANTXV	TO-254 (T1)
1N6660R1	45V	0.75V @ 15A	15A @ 100°C	150	300 kRad	JANTXV	TO-254 (T1)
1N6677-1	40V	0.5V @ 0.2A	0.2A @ 100°C	125	300 kRad	JANS	DO-35
1N6677UR-1	40V	0.5V @ 0.2A	0.2A @ 100°C	125	300 kRad	JANS	DO-35UR (DO213AA)
1N5822	40V	0.5V @ 3A	3A @ 55°C	125	300 kRad	JANS	B-Pkg
1N5822US	40V	0.5V @ 3A	3A @ 55°C	125	300 kRad	JANS	B-Pkg US
1N6864	80V	0.7V @ 3A	3A @ 55°C	125	300 kRad	JANS	B-Pkg
1N6864US	80V	0.7V @ 3A	3A @ 55°C	125	300 kRad	JANS	B-Pkg US
1N68401	35V	0.75V @ 10A	10A @ 100°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N68411	45V	0.75V @ 10A	10A @ 100°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N6844U3	100V	1V @ 20A	20A @ 125°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N6842U31	60V	0.78V @ 10A	10A @ 100°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N6843CCU31	100V	0.83V @ 5A	5A @ 25°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N6845U3	45V	0.86V @ 40A	40A @ 100°C	150	300 kRad	JANTXV	SMD.5 (U3)
1N6910UTK2	15V	0.52V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6910UTK2AS	15V	0.52V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6910UTK2CS	15V	0.52V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6911UTK2	30V	0.54V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6911UTK2AS	30V	0.54V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)

JEDEC Type Number	Reverse Breakdown Voltage	Forward Voltage @ Current	Forward Current @ T	Max Tj (°C)	RHA Level	Qualified Through	Package
1N6911UTK2CS	30V	0.54V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6912UTK2	45V	0.64V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6912UTK2AS	45V	0.64V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6912UTK2CS	45V	0.64V @ 25A	25A @ 100°C	150	300 kRad	JANTXV	ThinKey2 (UTK2)
1N6940UTK3	15V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6940UTK3AS	15V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6940UTK3CS	15V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6941UTK3	30V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6941UTK3AS	30V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6941UTK3CS	30V	0.5V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6942UTK3	45V	0.59V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6942UTK3AS	45V	0.59V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)
1N6942UTK3CS	45V	0.59V @ 150A	150A @ 100°C	175	300 kRad	JANTXV	ThinKey3 (UTK3)

Microsemi has over 50 years' experience supplying space grade semiconductor products. Microsemi has Generation1 radhard MOSFETs qualified in accordance with MIL-PRF-19500. These devices are tested at Texas A&M University with heavy ions up to gold. Total Incident Dose (TID) testing is done at the University of Massachusetts/Lowell at levels up to 300 Krad. These parts are offered in 60V, 100V, and 200V versions in through-hole and surface mount packages. In addition, we have qualified P-channel equivalents in 100V and 200V versions. These products are specified on slash sheets /601, /603, /614, /615 and /630.

These products are also available in die form at JANHC and JANKC qualification levels. Please see our HiRel RadHard Semiconductors brochure on our website or contact your local Microsemi sales office for additional details.

QPL Part #	BVdss (V)	Ic (Max) (A)	Rds(on) (ohms)	Rated Power (W)	On-State Gate Charge (nC)	Rad Hard Rating	Package
JANSF2N7261	100	8	0.18	25	50	300 kRad	TO-39
JANSF2N7261U	100	8	0.18	25	50	300 kRad	LCC-18
JANSF2N7262	200	5.5	0.35	25	50	300 kRad	TO-39
JANSF2N7262U	200	5.5	0.35	25	50	300 kRad	LCC-18
JANSF2N7268	100	34	0.065	150	160	300 kRad	TO-254
JANSF2N7268U	100	34	0.065	150	160	300 kRad	SMD-1
JANSF2N7269	200	26	0.1	150	170	300 kRad	TO-254
JANSF2N7269U	200	26	0.1	150	170	300 kRad	SMD-1
JANSF2N7380	100	14.4	0.18	75	40	300 kRad	TO-257
JANSF2N7381	200	9.4	0.4	75	50	300 kRad	TO-257
JANSF2N7382	-100	-11	0.3	75	45	300 kRad	TO-257
JANSF2N7389	-100	-6.5	0.3	25	45	300 kRad	TO-39
JANSF2N7389U	-100	-6.5	0.3	25	45	300 kRad	LCC-18
JANSF2N7394	60	35	0.027	150	200	300 kRad	TO-254
JANSF2N7394U	60	35	0.027	150	200	300 kRad	SMD-1
JANSR2N7261	100	8	0.18	25	50	100 kRad	TO-39

QPL Part #	BVdss (V)	Ic (Max) (A)	Rds(on) (ohms)	Rated Power (W)	On-State Gate Charge (nC)	Rad Hard Rating	Package
JANSR2N7261U	100	8	0.18	25	50	100 kRad	LCC-18
JANSR2N7262	200	5.5	0.35	25	50	100 kRad	TO-39
JANSR2N7262U	200	5.5	0.35	25	50	100 kRad	LCC-18
JANSR2N7268	100	34	0.065	150	160	100 kRad	TO-254
JANSR2N7268U	100	34	0.065	150	160	100 kRad	SMD-1
JANSR2N7269	200	26	0.1	150	170	100 kRad	TO-254
JANSR2N7269U	200	26	0.1	150	170	100 kRad	SMD-1
JANSR2N7380	100	14.4	0.18	75	40	100 kRad	TO-257
JANSR2N7381	200	9.4	0.4	75	50	100 kRad	TO-257
JANSR2N7382	-100	-11	0.3	75	45	100 kRad	TO-257
JANSR2N7389	-100	-6.5	0.3	25	45	100 kRad	TO-39
JANSR2N7389U	-100	-6.5	0.3	25	45	100 kRad	LCC-18

Microsemi has a huge selection of radhard Bipolar Junction Transistors (BJTs) qualified in accordance with MIL-PRF-19500 and characterized for Total Incident Dose (TID) and Enhanced Low Dose Sensitivity (ELDRS) effects. Microsemi has the largest selection of radhard BJT slash sheets in the industry and has in-house ELDRS testing capabilities. Total dose testing is done at the University of Massachusetts/Lowell at levels up to 1 MRad. Please see our HiRel RadHard Semiconductors brochure on our website or contact your local Microsemi sales office for additional details.

Generic P/N	RHA Part Number	Vceo	Ic	Polarity	Available TID Ratings	MIL-PRF-19500	PKG
2N2218	JANSx2N2218	30V	0.8A	NPN	M through R	/251	TO-39
2N2218A	JANSx2N2218A	30V	0.8A	NPN	M through R	/251	TO-39
2N2218AL	JANSx2N2218AL	30V	0.8A	NPN	M through R	/251	TO-5
2N2219	JANSx2N2219	50V	0.8A	NPN	M through R	/251	TO-39
2N2219A	JANSx2N2219A	50V	0.8A	NPN	M through R	/251	TO-39
2N2219AL	JANSx2N2219AL	50V	0.8A	NPN	M through R	/251	TO-5
2N2221A	JANSx2N2221A	50V	0.8A	NPN	M through H	/255	TO-18
2N2221AL	JANSx2N2221AL	50V	0.8A	NPN	M through H	/255	TO-18
2N2221AUA	JANSx2N2221AUA	50V	0.8A	NPN	M through H	/255	UA
2N2221AUB	JANSx2N2221AUB	50V	0.8A	NPN	M through H	/255	UB
2N2221AUBC	JANSx2N2221AUBC	50V	0.8A	NPN	M through H	/255	UBC
2N2222A	JANSx2N2222A	50V	0.8A	NPN	M through H	/255	TO-18
2N2222AL	JANSx2N2222AL	50V	0.8A	NPN	M through H	/255	TO-18
2N2222AUA	JANSx2N2222AUA	50V	0.8A	NPN	M through H	/255	UA
2N2222AUB	JANSx2N2222AUB	50V	0.8A	NPN	M through H	/255	UB
2N2222AUBC	JANSx2N2222AUBC	50V	0.8A	NPN	M through H	/255	UBC
2N2369A	JANSx2N2369A	15V	0.1A	NPN	M through F	/317	TO-18
2N2369AUA	JANSx2N2369AUA	15V	0.1A	NPN	M through F	/317	UA
2N2369AUB	JANSx2N2369AUB	15V	0.1A	NPN	M through F	/317	UB
2N2369AUBC	JANSx2N2369AUBC	15V	0.1A	NPN	M through F	/317	UBC
2N2904	JANSx2N2904	40V	0.6A	PNP	M through R	/290	TO-39
2N2904AL	JANSx2N2904AL	60V	0.6A	NPN	M through R	/290	TO-5
2N2905	JANSx2N2905	40V	0.6A	NPN	M through R	/290	TO-39
2N2905AL	JANSx2N2905AL	60V	0.6A	NPN	M through R	/290	TO-5
2N2906A	JANSx2N2906A	60V	0.6A	PNP	M through F	/291	TO-39
2N2906AL	JANSx2N2906AL	60V	0.6A	PNP	M through F	/291	TO-5
2N2906AUA	JANSx2N2906AUA	60V	0.6A	PNP	M through F	/291	UA
2N2906AUB	JANSx2N2906AUB	60V	0.6A	PNP	M through F	/291	UB
2N2906AUBC	JANSx2N2906AUBC	60V	0.6A	PNP	M through F	/291	UBC
2N2907A	JANSx2N2907A	60V	0.6A	PNP	M through F	/291	TO-18

Generic P/N	RHA Part Number	V _{ceo}	I _c	Polarity	Available TID Ratings	MIL-PRF-19500	PKG
2N2907AL	JANSx2N2907AL	60V	0.6A	PNP	M through F	/291	TO-18
2N2907AUA	JANSx2N2907AUA	60V	0.6A	PNP	M through F	/291	UA
2N2907AUB	JANSx2N2907AUB	60V	0.6A	PNP	M through F	/291	UB
2N2907AUBC	JANSx2N2907AUBC	60V	0.6A	PNP	M through F	/291	UBC
2N3019	JANSx2N3019	80V	1.0A	NPN	M through F	/391	TO-5
2N3019S	JANSx2N3019S	80V	1.0A	NPN	M through F	/391	TO-39
2N3057A	JANSx2N3057A	80V	1.0A	NPN	M through F	/391	TO-46
2N3439	JANSx2N3439	350V	1.0A	NPN	M through R	/368	TO-39
2N3439L	JANSx2N3439L	350V	1.0A	NPN	M through R	/368	TO-5
2N3439UA	JANSx2N3439UA	350V	1.0A	NPN	M through R	/368	UA
2N3440	JANSx2N3440	250V	1.0A	NPN	M through R	/368	TO-39
2N3440L	JANSx2N3440L	250V	1.0A	NPN	M through R	/368	TO-5
2N3440UA	JANSx2N3440UA	250V	1.0A	NPN	M through R	/368	UA
2N3498	JANSx2N3498	100V	0.3A	NPN	M through R	/366	TO-39
2N3498L	JANSx2N3498L	100V	0.3A	NPN	M through R	/366	TO-5
2N3499	JANSx2N3499	100V	0.3A	NPN	M through R	/366	TO-39
2N3499L	JANSx2N3499L	100V	0.3A	NPN	M through R	/366	TO-5
2N3500	JANSx2N3500	150V	0.3A	NPN	M through R	/366	TO-39
2N3500L	JANSx2N3500L	150V	0.3A	NPN	M through R	/366	TO-5
2N3501	JANSx2N3501	150V	0.3A	NPN	M through R	/366	TO-39
2N3501L	JANSx2N3501L	150V	0.3A	NPN	M through R	/366	TO-5
2N3501UB	JANSx2N3501UB	150V	0.3A	NPN	M through R	/366	UB
2N3634	JANSx2N3634	140V	1.0A	PNP	M through R	/357	TO-39
2N3634L	JANSx2N3634L	140V	1.0A	PNP	M through R	/357	TO-5
2N3634UB	JANSx2N3634UB	140V	1.0A	PNP	M through R	/357	UB
2N3635	JANSx2N3635	140V	1.0A	PNP	M through R	/357	TO-39
2N3635L	JANSx2N3635L	140V	1.0A	PNP	M through R	/357	TO-5
2N3635UB	JANSx2N3635UB	140V	1.0A	PNP	M through R	/357	UB
2N3636	JANSx2N3636	175V	1.0A	PNP	M through R	/357	TO-39
2N3636L	JANSx2N3636L	175V	1.0A	PNP	M through R	/357	TO-5
2N3636UB	JANSx2N3636UB	175V	1.0A	PNP	M through R	/357	UB
2N3637	JANSx2N3637	175V	1.0A	PNP	M through R	/357	TO-39
2N3637L	JANSx2N3637L	175V	1.0A	PNP	M through R	/357	TO-5
2N3637UB	JANSx2N3637UB	175V	1.0A	PNP	M through R	/357	UB
2N3700	JANSx2N3700	80V	1.0A	NPN	M through F	/391	TO-18
2N3700UB	JANSx2N3700UB	80V	1.0A	NPN	M through F	/391	UB

Generic P/N	RHA Part Number	V _{ceo}	I _c	Polarity	Available TID Ratings	MIL-PRF-19500	PKG
2N3810	JANSx2N3810	60V	.005A	PNP	M through F	/336	TO-78
2N3810L	JANSx2N3810L	60V	.005A	PNP	M through F	/336	TO-78
2N3810U	JANSx2N3810U	60V	.005A	PNP	M through F	/336	U
2N3811	JANSx2N3811	60V	.005A	PNP	M through F	/336	TO-78
2N3811L	JANSx2N3811L	60V	.005A	PNP	M through F	/336	TO-78
2N3811U	JANSx2N3811U	60V	.005A	PNP	M through F	/336	U
2N4449	JANSx2N4449	15V	0.1A	NPN	M through F	/317	TO-46
2N5002	JANSx2N5002	80V	10A	NPN	M through F	/534	TO-59/I
2N5004	JANSx2N5004	80V	10A	NPN	M through F	/534	TO-59/I
2N5151	JANSx2N5151	80V	10A	PNP	M through F	/545	TO-39
2N5151L	JANSx2N5151L	80V	10A	PNP	M through F	/545	TO-5
2N5151U3	JANSx2N5151U3	80V	10A	PNP	M through F	/545	U3
2N5152	JANSx2N5152	80V	10A	NPN	M through F	/544	TO-39
2N5152L	JANSx2N5152L	80V	10A	NPN	M through F	/544	TO-5
2N5152U3	JANSx2N5152U3	80V	10A	NPN	M through F	/544	U3
2N5153	JANSx2N5153	80V	10A	PNP	M through F	/545	TO-39
2N5153L	JANSx2N5153L	80V	10A	PNP	M through F	/545	TO-5
2N5153U3	JANSx2N5153U3	80V	10A	PNP	M through F	/545	U3
2N5154	JANSx2N5154	80V	10A	NPN	M through F	/544	TO-39
2N5154L	JANSx2N5154L	80V	10A	NPN	M through F	/544	TO-5
2N5154U3	JANSx2N5154U3	80V	10A	NPN	M through F	/544	U3
2N5416	JANSx2N5416	300V	1A	PNP	M through F	/485	TO-5AA
2N5416S	JANSx2N5416S	300V	1A	PNP	M through F	/485	TO-5AA
2N5795	JANSx2N5795	60V	0.6A	PNP	M through F	/496	TO-78
2N5795A	JANSx2N5795A	60V	0.6A	PNP	M through F	/496	TO-78
2N5795AU	JANSx2N5795AU	60V	0.6A	PNP	M through F	/496	U
2N5795AUC	JANSx2N5795AUC	60V	0.6A	PNP	M through F	/496	UC
2N5796	JANSx2N5796	60V	0.6A	PNP	M through F	/496	TO-78
2N5796A	JANSx2N5796A	60V	0.6A	PNP	M through F	/496	TO-78
2N5796AU	JANSx2N5796AU	60V	0.6A	PNP	M through F	/496	U
2N5796AUC	JANSx2N5796AUC	60V	0.6A	PNP	M through F	/496	UC
2N6987	JANSx2N6987	60V	0.6A	PNP	M through F	/558	TO-116
2N6987U	JANSx2N6987U	60V	0.6A	PNP	M through F	/558	LCC-20
2N6988	JANSx2N6988	60V	0.6A	PNP	M through F	/558	TO-116
2N7373	JANSx2N7373	80V	10.0A	NPN	M through F	/613	TO-254

A Zener diode is a specially processed single PN junction that provides relatively constant voltage drop (the Zener voltage, V_z) across its two terminals despite changes in the current flowing through the device. Because of this unique characteristic, they can be placed in parallel across a load and used as a voltage regulator. In temperature compensated Zeners, a special multiple junction configuration is used to nearly eliminate the variation of the Zener voltage over temperature. Microsemi provides a very wide variety of military qualified Zener diodes targeted to be a voltage reference or a voltage regulator in a variety of through-hole and surface mount packages. The table below shows a few examples of our over 1375 high-reliability Zener diode offerings.

A complete listing and parametric search capability can be found on our website at <http://www.microsemi.com/products/productsdirectory>. Reference Micronote 050 for radiation capabilities.

Standard Zener Diode Examples

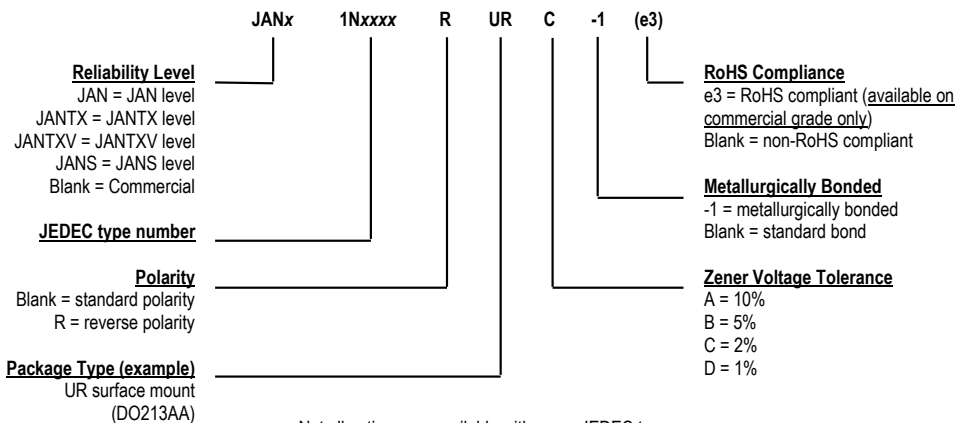
JEDEC Type Number	Rated Voltage	Spec Limit	Test I _z	Rated Current	Rated Power	Max T _j	Package
1N5520D-1	3.9V	±1%	0.02A	0.00125A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N4549B	3.9V	±5%	3.2A	12.4A @ 25°C	50W @ 75°C	175°C	DO-5 (small)
1N4614-1	1.8V	±5%	0.00025A	0.12A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N4996	390V	±5%	0.003A	0.012A @ 25°C	5W @ 25°C	175°C	B-Pkg
1N2846B	200V	±5%	0.065A	0.24A @ 30°C	50W @ 75°C	175°C	TO-3 (050)
1N4614D-1	1.8V	±1%	0.00025A	0.12A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N4495D	180V	±1%	0.0014A	0.0079A @ 25°C	1.5W @ 25°C	175°C	A-Pkg
1N4135DUR-1	100V	±1%	0.00025A	0.0038A @ 25°C	0.5W @ 125°C	175°C	DO-35UR (DO213AA)
1N3821D-1	3.3V	±1%	0.076A	0.276A @ 25°C	1W @ 95°C	175°C	DO-41
1N3016CUR-1	6.8V	±2%	0.037A	0.14A @ 25°C	1W @ 125°C	175°C	DO-41UR (DO213AB)
1N5546CUR-1	33V	±2%	0.001A	0.197A @ 25°C	0.5W @ 125°C	175°C	DO-35UR (DO213AA)
1N4134C-1	91V	±2%	0.00025A	0.0042A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N5518C-1	3.3V	±2%	0.02A	1.6A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N2804B	6.8V	±5%	1.85A	7A @ 30°C	50W @ 75°C	175°C	TO-3 (050)

Temperature Compensated Zener Diode Examples

JEDEC Type Number	Polarity	Rated Voltage (Vz)	Variation of Vz over Temperature		Rated Current @ 25°C	Max Tj	Package
1N1742A	PN	49.6V	200mV	4032ppm	0.0075A	100°C	DO-41
1N821-1	PN/NP	6.2V	96mV	15484ppm	0.0075A	175°C	DO-35
1N945BUR-1	PN/NP	11.7V	12mV	1026ppm	0.0075A	175°C	DO-35UR (DO213AA)
1N4565A-1	PN+NP	6.4V	100mV	15625ppm	0.0005A	175°C	DO-35
1N3157UR-1	PN/NP	8.4V	13mV	1548ppm	0.01A	175°C	DO-35UR (DO213AA)
1N4569A-1	PN+NP	6.4V	5mV	781ppm	0.0005A	175°C	DO-35
1N941BUR-1	PN/NP	11.7V	239mV	20427ppm	0.0075A	175°C	DO-35UR (DO213AA)

Voltage Regulator Zener Diode Examples

Part Number	Rated Voltage (Vz)	Spec Limit	Test Iz		Rated Power	Max Tj	Package
1N4996	390V	±5%	0.003A	0.012A @ 25°C	5W @ 25°C	175°C	B-Pkg
1N4614CUR-1	1.8V	±2%	0.0003A	0.12A @ 25°C	0.5W @ 125°C	175°C	DO-35UR (DO213AA)
1N4614D-1	1.8V	±1%	0.0003A	0.12A @ 25°C	0.5W @ 50°C	175°C	DO-35
1N2846B	200V	±5%	0.065A	0.24A @ 30°C	50W @ 75°C	175°C	TO-3 (050)
1N3350B	200V	±5%	0.065A	0.24A @ 25°C	50W @ 75°C	175°C	DO-5 (Small)
1N3996A	5.1V	±5%	0.49A	1.84A @ 30°C	10W @ 55°C	175°C	DO-4
1N4467C	12V	±2%	0.021A	0.119A @ 25°C	1.5W @ 25°C	175°C	A-Pkg



Microsemi has more than 40 years of experience in the design and manufacture of high-reliability micro-circuit assemblies incorporating multi-technology semiconductor components in a variety of hermetic packages. Radiation testing is done per MIL-STD-883 and all products are built to MIL-PRF-38534. Military and commercial screenings are also available.

Our products include linear and digital microcircuits, op-amps, logic arrays, analog control circuits and power hybrids. In addition to fast-turnaround custom manufacturing, Microsemi also produces standard product lines of linear & switching regulators for applications in ground-based military equipment, missiles, aircraft, and satellites.

Product Types:

- Linear & Digital Microcircuits
- Custom SCD Assemblies
- Linear Regulators
- Point-of-Load Switching Power Supplies

Applications:

- Rad-hard Power Supplies
- Rad-hard Satellite Heater Controls
- Launch Systems
- Avionics Power Control
- Booster Control
- Guidance System Power
- High-End Industrial Power Supplies
- Down-hole Drilling Power

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
Linear Regulators, Rad-Hard or Rad-Tolerant (all max. total ionizing dose = 300 Krads)							
MHL11740K-1	Adjustable Rad-Hard	40	1.5	±1%	1.2	Space	D- Pak
MHL11740K-2	Adjustable Rad-Hard	40	2	±1%	1	Space	D- Pak
MHL11740K-3	Adjustable Rad-Hard	40	1.5	±1%	1	Space	D- Pak
MHL11740K-4	Adjustable Rad-Hard	40	2	±1%	1	Space	D- Pak
MHL117A40K	Adjustable Rad-Hard	40	1.5	±1%	1.2	Space	D- Pak

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL117A40K-1	Adjustable Rad-Hard	40	1.5	±1%	1.2	Space	D- Pak
MHL117A40K-2	Adjustable Rad-Hard	40	1.5	±1%	1.2	Space	D- Pak
MHL117A40K-3	Adjustable Rad-Hard	40	2	±1%	1	Space	D- Pak
MHL117A40K-4	Adjustable Rad-Hard	40	1.5	±1%	1.2	Space	D- Pak
MHL117B40K	Adjustable Rad-Hard	40	1.5	±2%	1.2	Space	D- Pak
MHL117B40K-1	Adjustable Rad-Hard	40	1.5	±2%	1.2	Space	D- Pak
MHL117B40K-2	Adjustable Rad-Hard	40	1.5	±2%	1.2	Space	D- Pak
MHL117B40K-3	Adjustable Rad-Hard	40	1.5	±2%	1.2	Space	D- Pak
MHL117B40K-4	Adjustable Rad-Hard	40	1.5	±2%	1.2	Space	D- Pak
MHL8601A3C	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	3	±2%	0.4	Commercial	MO- 078
MHL8601A3C-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9 - 3.6	3	±2%	0.4	Commercial	MO- 078
MHL8601A3C-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9 - 3.6	3	±2%	0.4	Commercial	MO- 078
MHL8601A3M	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	3	±2%	0	Military	MO- 078
MHL8601A3M-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9 - 3.6	3	±2%	0	Military	MO- 078

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8601A3M-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9 - 3.6	3	±2%	0	Military	MO- 078
MHL8601A3S	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	3	±2%	0.4	Commercial	MO- 078
MHL8601A3S-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9 - 3.6	3	±2%	0	Commercial	MO- 078
MHL8601A3S-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9 - 3.6	3	±2%	0	Commercial	MO- 078
MHL8605A3C	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	5	±2%	1	Commercial	MO- 078
MHL8605A3C-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9 - 3.6	5	±2%	0.5	Commercial	MO- 078
MHL8605A3C-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9 - 3.6	5	±2%	0.5	Commercial	MO- 078
MHL8605A3M	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	5	±2%	0.5	Military	MO- 078
MHL8605A3M-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9 - 3.6	5	±2%	1	Military	MO- 078
MHL8605A3M-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9 - 3.6	5	±2%	0.5	Military	MO- 078

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8605A3M-3	Adjustable ULDO Rad-Tolerant Lead-form 3	2.9 - 3.6	5	±2%	0.5	Military	MO- 078
MHL8605A3S	Adjustable ULDO Rad-Tolerant	2.9 - 3.6	5	±2%	0.5	Space	MO- 078
MHL8605A3S-1	Adjustable ULDO Rad-Tolerant Lead-form 1	2.9- 3.6	5	±2%	0.5	Space	MO- 078
MHL8605A3S-2	Adjustable ULDO Rad-Tolerant Lead-form 2	2.9- 3.6	5	±2%	0.5	Space	MO- 078
MHL8605A3S-3	Adjustable ULDO Rad-Tolerant Lead-form 3	2.9- 3.6	5	±2%	0.5	Space	MO- 078
MHL8601A5C	Adjustable ULDO Rad-Tolerant	4.5- 5.5	3	±2%	0.4	Commercial	MO- 078
MHL8601A5C-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	3	±2%	0.4	Commercial	MO- 078
MHL8601A5C-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	3	±2%	0.4	Commercial	MO- 078
MHL8601A5M	Adjustable ULDO Rad-Tolerant	4.5- 5.5	3	±2%	0	Military	MO- 078
MHL8601A5M-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	3	±2%	0	Military	MO- 078

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8601A5M-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	3	±2%	0	Military	MO- 078
MHL8601A5M-3	Adjustable ULDO Rad-Tolerant Lead-form 3	4.5- 5.5	3	±2%	0.4	Military	MO- 078
MHL8601A5S	Adjustable ULDO Rad-Tolerant	4.5- 5.5	3	±2%	0	Space	MO- 078
MHL8601A5S-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	3	±2%	0	Space	MO- 078
MHL8601A5S-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	3	±2%	0	Space	MO- 078
MHL8601A5S-3	Adjustable ULDO Rad-Tolerant Lead-form 3	4.5- 5.6	3	±2%	0.4	Space	MO- 078
MHL8605A5C	Adjustable ULDO Rad-Tolerant	4.5- 5.5	5	±2%	0.4	Commercial	MO- 078
MHL8605A5C-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	5	±2%	0.5	Commercial	MO- 078
MHL8605A5C-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	5	±2%	1	Commercial	MO- 078
MHL8605A5M	Adjustable ULDO Rad-Tolerant	4.5- 5.5	5	±2%	0.5	Military	MO- 078

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8605A5M-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	5	±2%	1	Military	MO- 078
MHL8605A5M-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	5	±2%	1	Military	MO- 078
MHL8605A5M-3	Adjustable ULDO Rad-Tolerant Lead-form 3	4.5- 5.5	5	±2%	1	Military	MO- 078
MHL8605A5S	Adjustable ULDO Rad-Tolerant	4.5- 5.5	5	±2%	0.5	Space	MO- 078
MHL8605A5S-1	Adjustable ULDO Rad-Tolerant Lead-form 1	4.5- 5.5	5	±2%	0.5	Space	MO- 078
MHL8605A5S-2	Adjustable ULDO Rad-Tolerant Lead-form 2	4.5- 5.5	5	±2%	0.5	Space	MO- 078
MHL8605A5S-3	Adjustable ULDO Rad-Tolerant Lead-form 3	4.5- 5.5	5	±2%	1	Space	MO- 078
MHL8701A3C	Adjustable ULDO SEE Enhanced	2.9- 3.6	3	±2%	0.4	Commercial	7- Pin SIP
MHL8701A3C-1	Adjustable ULDO SEE Enhanced Lead-form 1	2.9- 3.6	3	±2%	0.4	Commercial	7- Pin SIP

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8701A3C-2	Adjustable ULDO SEE Enhanced Lead-form 2	2.9- 3.6	3	±2%	0.4	Commercial	7- Pin SIP
MHL8701A3C-3	Adjustable ULDO SEE Enhanced Lead-form 3	2.9- 3.6	3	±2%	0.4	Commercial	7- Pin SIP
MHL8701A3M	ULDO SEE Enhanced	2.9- 3.6	3	±2%	0.4	Military	7- Pin SIP
MHL8701A3M-1	ULDO SEE Enhanced Lead-form 1	2.9- 3.6	3	±2%	0.4	Military	7- Pin SIP
MHL8701A3M-2	ULDO SEE Enhanced Lead-form 2	2.9- 3.6	3	±2%	0.4	Military	7- Pin SIP
MHL8701A3M-3	ULDO SEE Enhanced Lead-form 3	2.9- 3.6	3	±2%	0.4	Military	7- Pin SIP
MHL8701A3S	ULDO SEE Enhanced	2.9- 3.6	3	±2%	0.4	Space	7- Pin SIP
MHL8701A3S-1	ULDO SEE Enhanced Lead-form 1	2.9- 3.6	3	±2%	0	Space	7- Pin SIP
MHL8701A3S-2	ULDO SEE Enhanced Lead-form 2	2.9- 3.6	3	±2%	0	Space	7- Pin SIP
MHL8701A3S-3	ULDO SEE Enhanced Lead-form 3	2.9- 3.6	3	±2%	0	Space	7- Pin SIP
MHL8701A5C	ULDO SEE Enhanced	4.5- 5.5	3	±2%	0	Commercial	7- Pin SIP
MHL8701A5C-1	ULDO SEE Enhanced Lead-form 1	4.5- 5.5	3	±2%	0	Commercial	7- Pin SIP
MHL8701A5C-2	ULDO SEE Enhanced Lead-form 2	4.5- 5.5	3	±2%	0.4	Commercial	7- Pin SIP

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHL8701A5C-3	ULDO SEE Enhanced Lead-form 3	4.5- 5.5	3	±2%	0.4	Commercial	7- Pin SIP
MHL8701A5M	ULDO SEE Enhanced	4.5- 5.5	3	±2%	0.4	Military	7- Pin SIP
MHL8701A5M-1	ULDO SEE Enhanced Lead-form 1	4.5- 5.5	3	±2%	0	Military	7- Pin SIP
MHL8701A5M-2	ULDO SEE Enhanced Lead-form 2	4.5- 5.5	3	±2%	0.4	Military	7- Pin SIP
MHL8701A5M-3	ULDO SEE Enhanced Lead-form 3	4.5- 5.5	3	±2%	0.4	Military	7- Pin SIP
MHL8701A5S	ULDO SEE Enhanced	4.5- 5.5	3	±2%	0.4	Space	7- Pin SIP
MHL8701A5S-1	ULDO SEE Enhanced Lead-form 1	4.5- 5.5	3	±2%	0.4	Space	7- Pin SIP
MHL8701A5S-2	ULDO SEE Enhanced Lead-form 2	4.5- 5.5	3	±2%	0.4	Space	7- Pin SIP
MHL8701A5S-3	ULDO SEE Enhanced Lead-form 3	4.5- 5.5	3	±2%	0.4	Space	7- Pin SIP
Switching Regulators, Rad-Tolerant (all max. total ionizing dose = 100 Krads)							
MHP8564AC	Adjustable Rad-Tolerant	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564AC-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564AC-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564AC-3	Adjustable Rad-Tolerant Lead-form 3	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHP8564SC	adj. Synchronous Rad-Tolerant	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564SC-1	adj. Synchronous Rad-Tolerant Lead-form 1	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564SC-2	adj. Synchronous Rad-Tolerant Lead-form 2	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564SC-3	adj. Synchronous Rad-Tolerant Lead-form 3	4.5 (Min)	4	±3%	N/A	Commercial	16- Pin SIP
MHP8564SM	adj. Synchronous Rad-Tolerant	4.5 (Min)	4	±3%	N/A	Military	16- Pin SIP
MHP8564SM-1	adj. Synchronous Rad-Tolerant Lead-form 1	4.5 (Min)	4	±3%	N/A	Military	16- Pin SIP
MHP8564SM-2	adj. Synchronous Rad-Tolerant Lead-form 2	4.5 (Min)	4	±3%	N/A	Military	16- Pin SIP
MHP8564SM-3	adj. Synchronous Rad-Tolerant Lead-form 3	4.5 (Min)	4	±3%	N/A	Military	16- Pin SIP
MHP8564SS	adj. Synchronous Rad-Tolerant	4.5 (Min)	4	±3%	N/A	Space	16- Pin SIP
MHP8564SS-1	adj. Synchronous Rad-Tolerant Lead-form 1	4.5 (Min)	4	±3%	N/A	Space	16- Pin SIP
MHP8564SS-2	adj. Synchronous Rad-Tolerant Lead-form 2	4.5 (Min)	4	±3%	N/A	Space	16- Pin SIP

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHP8564SS-3	adj. Synchronous Rad-Tolerant Lead-form 3	4.5 (Min)	4	±3%	N/A	Space	16- Pin SIP
MHP8565AC	Adjustable Rad-Tolerant	4.5 (Min)	3	±3%	N/A	Commercial	MO- 078
MHP8565AC-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	3	±3%	N/A	Commercial	MO- 078
MHP8565AC-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	3	±3%	N/A	Commercial	MO- 078
MHP8565AC-3	Adjustable Rad-Tolerant Lead-form 3	4.5 (Min)	3	±3%	N/A	Commercial	MO- 078
MHP8565AM	Adjustable Rad-Tolerant	4.5 (Min)	3	±3%	N/A	Military	MO- 078
MHP8565AM-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	3	±3%	N/A	Military	MO- 078
MHP8565AM-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	3	±3%	N/A	Military	MO- 078
MHP8565AM-3	Adjustable Rad-Tolerant Lead-form 3	4.5 (Min)	3	±3%	N/A	Military	MO- 078
MHP8565AS	Adjustable Rad-Tolerant	4.5 (Min)	3	±3%	N/A	Space	MO- 078
MHP8565AS-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	3	±3%	N/A	Space	MO- 078
MHP8565AS-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	3	±3%	N/A	Space	MO- 078
MHP8565AS-3	Adjustable Rad-Tolerant Lead-form 3	4.5 (Min)	3	±3%	N/A	Space	MO- 078
MHP8566AC	Adjustable Rad-Tolerant	4.5 (Min)	15	±3%	N/A	Commercial	42-Pin Flat Pak

Hybrid Part Number	Description	Input Voltage (V)	Max. Output Current (A)	Output Voltage Accuracy (%)	Max Dropout Voltage (V)	Quality Level	Package
MHP8566AC-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	15	±3%	N/A	Commercial	42-Pin Flat Pak
MHP8566AC-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	15	±3%	N/A	Commercial	42-Pin Flat Pak
MHP8566AM	Adjustable Rad-Tolerant	4.5 (Min)	15	±3%	N/A	Military	42-Pin Flat Pak
MHP8566AM-1	Adjustable Rad-Tolerant Lead-form 1	4.5 (Min)	15	±3%	N/A	Military	42-Pin Flat Pak
MHP8566AM-2	Adjustable Rad-Tolerant Lead-form 2	4.5 (Min)	15	±3%	N/A	Military	42-Pin Flat Pak
MHP8566AS	Adjustable Rad-Tolerant Lead-form 3	4.5 (Min)	15	±3%	N/A	Space	42-Pin Flat Pak
MHP8566AS-1	12A 5Vin Adjustable Synchronous Class K Lead-form 2	4.5 (Min)	15	±3%	N/A	Space	42-Pin Flat Pak
MHP8566AS-2	12A 5Vin Adjustable Synchronous Class K Lead-form 3	4.5 (Min)	15	±3%	N/A	Space	42-Pin Flat Pak

Microsemi's High Reliability Non-Hermetic TVS devices go through an "up-screening" program that uncovers cracked die, ionic contamination, and other defects that lead to early life failures and which commercial semiconductor testing don't detect. This screening program is modeled on JANxxx military qualification procedures and thereby offers enhanced product reliability. These HiRel devices also come with date coding, lot traceability and a full Certificate of Conformance. The devices are available in four screening levels: M, MA, MXL and MX depending on the additional screening tests to which they are exposed. Both RoHS compliant and SnPb plated options are available.

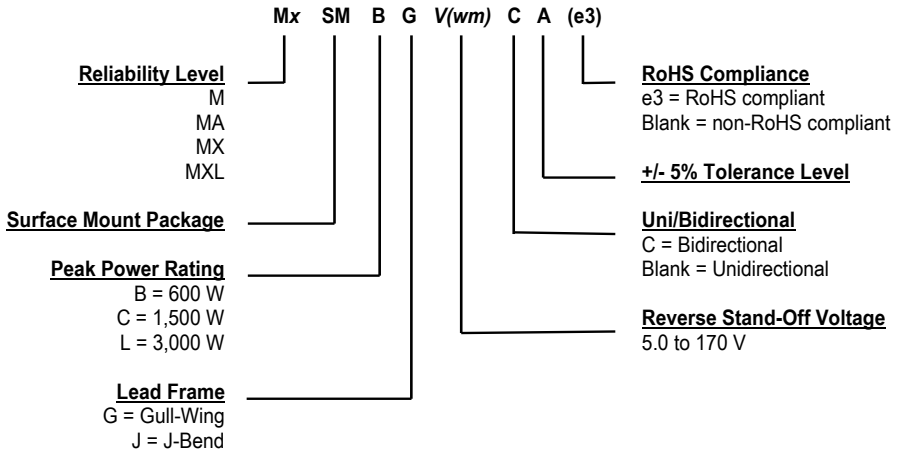
For the more details on the tests, screening levels, and a full product listing, please see our High Reliability Non-Hermetic Product Portfolio brochure on Microsemi website.

Overview Table:

Product Family	Standoff (Working) Voltage (V _{WM})	Minimum Breakdown Voltage (V _{BR})	Peak Pulse Power Rating (W)	SMD/Axial Packaging	Package	Notes
SMB	5.0 - 170	6.4 - 189	600	SMD	DO-214AA, DO-215AA	
SMC	5.0 - 170	6.4 - 189	1.5K	SMD	DO-214AB, DO-215AB	
SML	5.0 - 170	6.4 - 189	3K	SMD	DO-214AB, DO-215AB	
SMCxLCE	6.5 - 170	7.22 - 189	1.5K	SMD	DO-214AB, DO-215AB	low capacitance
PLAD6.5KP	10 - 48	11.1 - 53.3	6.5K	SMD	mini-PLAD	
PLAD7.5KP	10 - 48	11.1 - 53.3	6.5K	SMD	mini-PLAD	
PLAD15KP	7.0 - 200	7.78 - 222	15K	SMD	PLAD	
PLAD30KP	14 - 400	15.6 - 444	30K	SMD	PLAD	
P4KE	5.8 - 342	6.45 - 380	400	Axial	DO-41 [DO-204AL]	
P5KE	5.0 - 51	6.4 - 56.7	500	Axial	DO-41 [DO-204AL]	
P6KE	5.8 - 171	6.45 - 190	600	Axial	T-18	
1.5KE	5.8 - 324	6.45 - 380	1.5K	Axial	Case 1	
LCE	6.5 - 170	7.22 - 189	1.5K	Axial	Case 1	low capacitance
5KP	5 - 110	6.4 - 122	5K	Axial	Case 5A [DO-204AR]	
15KP	22 - 280	24.4 - 311	15K	Axial	Case 5A [DO-204AR]	
RT100KP	40 - 400	44.4 - 444	100K*	Axial	Case 5A [DO-204AR]	
SMBJSAC	5.0 - 75	7.6 - 83.3	500	SMD	DO-214AA	low capacitance
SMB/GJ2K	3.0 - 5.0	4.3 - 5.9	2K	SMD	DO-214AA, DO-215AA	

* rated for an 6.4/69 μsec test pulse per spec RTCA/DO-160E Section 22. All other ratings are for 10/1000 μsec pulses.

SMxJ/G Families



Packaging: J-Bend Gull-wing

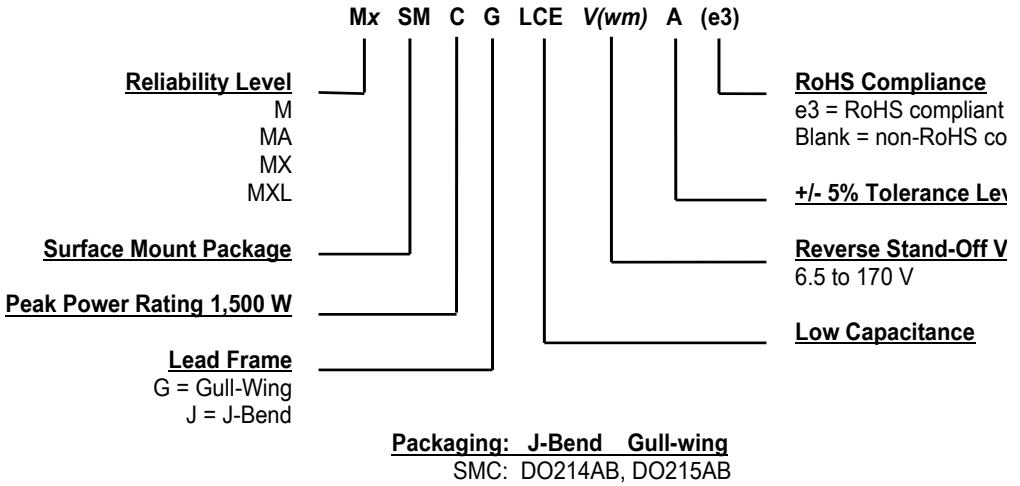
SMB: DO214AA, DO215AA

SMC: DO214AB, DO215AB

SML: DO214AB, DO215AB

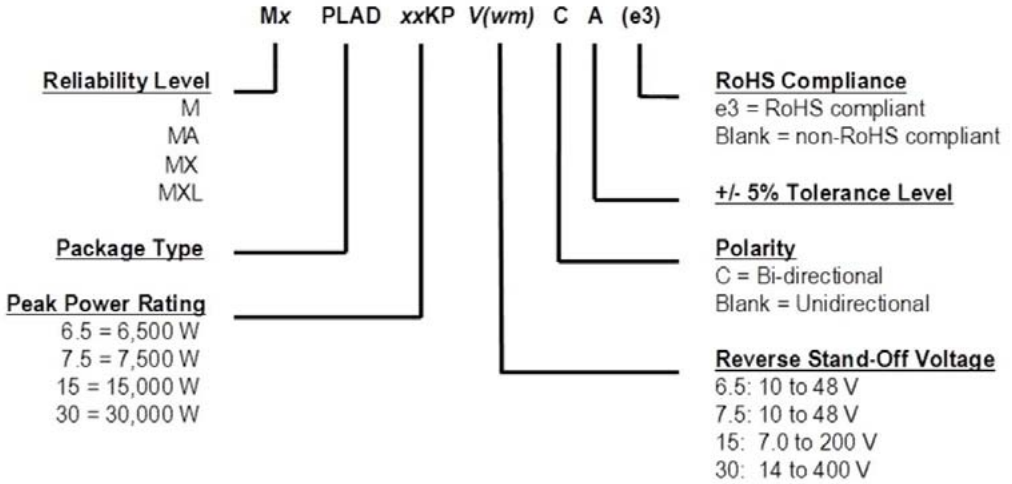
Available Standoff Voltages V(wm)			
5.0 V	14 V	36 V	78 V
6.0 V	15 V	40 V	85 V
6.5 V	16 V	43 V	90 V
7.0 V	17 V	45 V	100 V
7.5 V	18 V	48 V	110 V
8.0 V	20 V	51 V	120 V
8.5 V	22 V	54 V	130 V
9.0 V	24 V	58 V	150 V
10 V	26 V	60 V	160 V
11 V	28 V	64 V	170 V
12 V	30 V	70 V	-
13 V	33 V	75 V	-

SMCJ/GLCE Low Capacitance Family

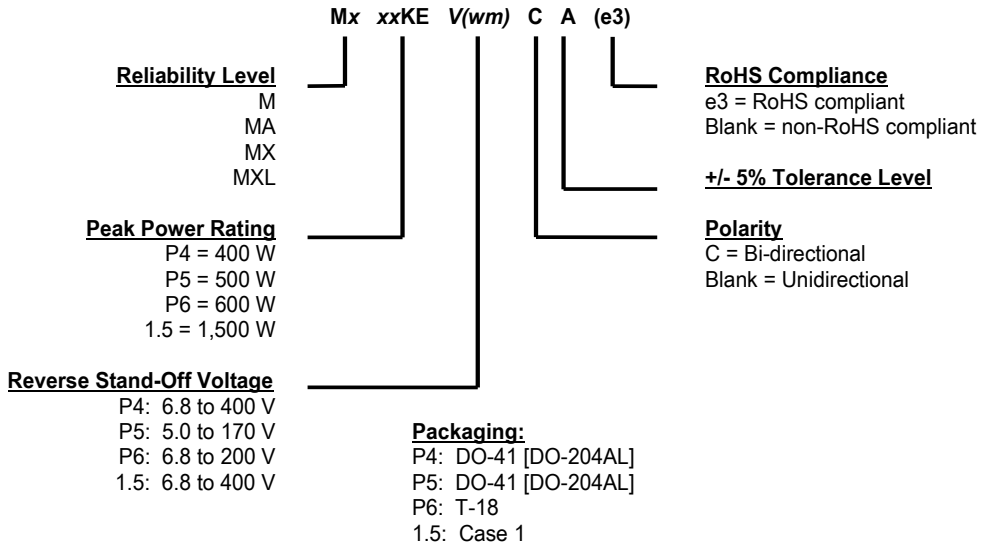


Available Standoff Voltages V(wm) & Maximum Capacitance (pF)							
6.5 V	100 pF	15 V	100 pF	36 V	100 pF	75 V	90 pF
7.0 V	100 pF	16 V	100 pF	40 V	100 pF	80 V	90 pF
7.5 V	100 pF	17 V	100 pF	43 V	100 pF	90 V	90 pF
8.0 V	100 pF	18 V	100 pF	45 V	100 pF	100 V	90 pF
8.5 V	100 pF	20 V	100 pF	48 V	100 pF	110 V	90 pF
9.0 V	100 pF	22 V	100 pF	51 V	100 pF	120 V	90 pF
10 V	100 pF	24 V	100 pF	54 V	100 pF	130 V	90 pF
11 V	100 pF	26 V	100 pF	58 V	100 pF	150 V	90 pF
12 V	100 pF	28 V	100 pF	60 V	90 pF	160 V	90 pF
13 V	100 pF	30 V	100 pF	64 V	90 pF	170 V	90 pF
14 V	100 pF	33 V	100 pF	70 V	90 pF	-	-

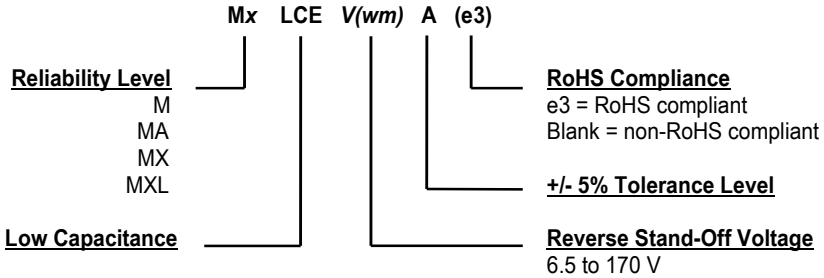
PLAD Families



xxKE Families

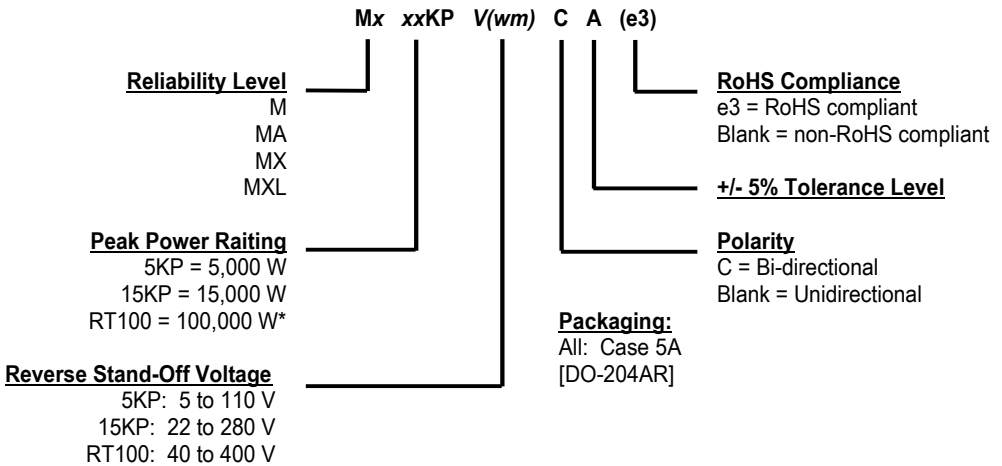


LCE Low Capacitance Family



Available Standoff Voltages V(wm) & Maximum Capacitance (pF)							
6.5 V	100 pF	15 V	100 pF	36 V	100 pF	75 V	90 pF
7.0 V	100 pF	16 V	100 pF	40 V	100 pF	80 V	90 pF
7.5 V	100 pF	17 V	100 pF	43 V	100 pF	90 V	90 pF
8.0 V	100 pF	18 V	100 pF	45 V	100 pF	100 V	90 pF
8.5 V	100 pF	20 V	100 pF	48 V	100 pF	110 V	90 pF
9.0 V	100 pF	22 V	100 pF	51 V	100 pF	120 V	90 pF
10 V	100 pF	24 V	100 pF	54 V	100 pF	130 V	90 pF
11 V	100 pF	26 V	100 pF	58 V	100 pF	150 V	90 pF
12 V	100 pF	28 V	100 pF	60 V	90 pF	160 V	90 pF
13 V	100 pF	30 V	100 pF	64 V	90 pF	170 V	90 pF
14 V	100 pF	33 V	100 pF	70 V	90 pF	-	-

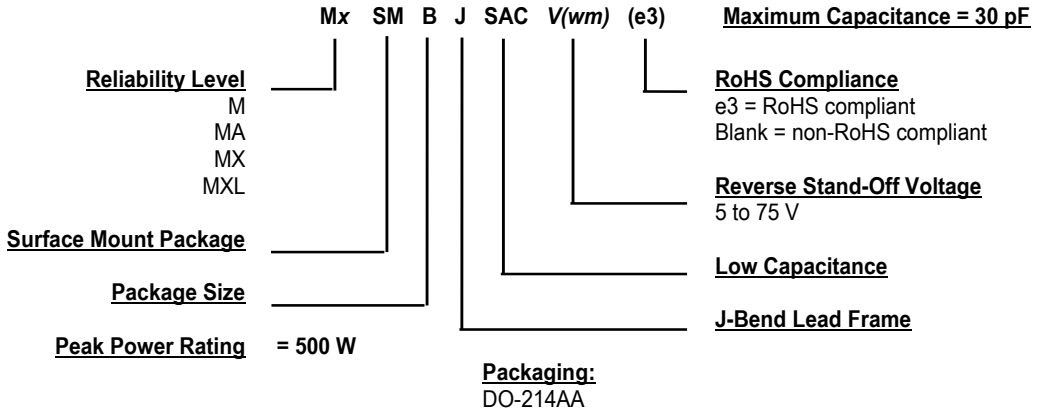
xxKP Families



* Rated for an 6.4/69 μ sec test pulse per spec RTCA/DO-160E Section 22.
All other ratings are for 10/1000 μ sec pulses.

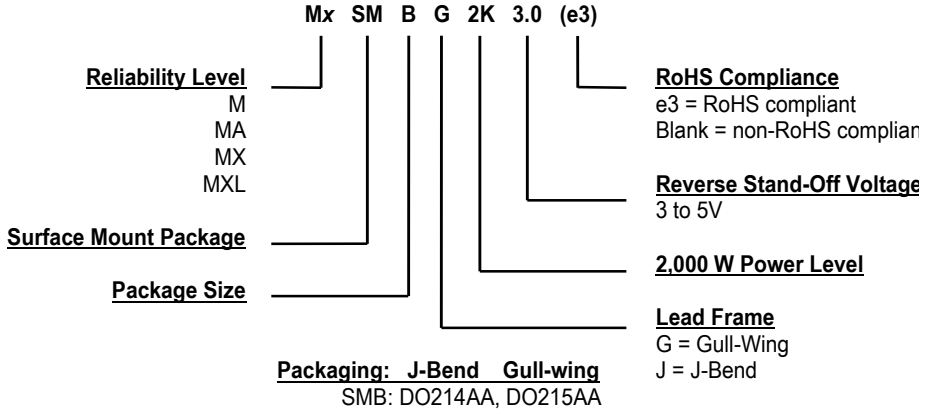
Available Standoff Voltages V(wm)								
5KP			15KP			RT100KP		
5.0 V	16 V	48 V	22 V	60 V	180 V	40 V	100 V	350 V
6.0 V	17 V	51 V	24 V	64 V	200 V	43 V	110 V	400 V
6.5 V	18 V	54 V	26 V	70 V	220 V	45 V	120 V	-
7.0 V	20 V	58 V	28 V	75 V	240 V	48 V	130 V	-
7.5 V	22 V	60 V	30 V	78 V	260 V	51 V	150 V	-
8.0 V	24 V	64 V	33 V	85 V	280 V	54 V	160 V	-
8.5 V	26 V	70 V	36 V	90 V	-	58 V	170 V	-
9.0 V	28 V	75 V	40 V	100 V	-	60 V	180 V	-
10 V	30 V	78 V	43 V	110 V	-	64 V	200 V	-
11 V	33 V	85 V	45 V	120 V	-	70 V	220 V	-
12 V	36 V	90 V	48 V	130 V	-	75 V	250 V	-
13 V	40 V	100 V	51 V	150 V	-	78 V	260 V	-
14 V	43 V	110 V	54 V	160 V	-	85 V	280 V	-
15 V	45 V	-	58 V	170 V	-	90 V	300 V	-

SMBJSAC Low-Capacitance Family



Available Standoff Voltages V(wm)			
5 V	8.5 V	22 V	50 V
6 V	12 V	26 V	75 V
7 V	15 V	36 V	-
8 V	18 V	45 V	-

SMBJ/G2K Family



Available Standoff Voltages V(wm)		
3.0 V	4.0 V	5.0 V
3.3 V	4.5 V	-

These series of single phase and three phase rectifier bridges and center tap and double rectifier assemblies offer the ultimate in high efficiency operation. The devices are built using an aluminium heat sink case which is electrically isolated. Only category 1 metallurgically bonded, hermetic, hard glass packaged rectifiers that have been quality screened are used in their construction.

DLA qualified single phase and three phase rectifier bridges (products denoted by an * below) are available up to the JANTX level – other part numbers can be screened as required.

Part Number	Function	Rated Voltage (V)	Device Speed (trr)	Max. Peak V(f) per leg @ I(f) & 25°C		Rated Current @ 55°C (A)	Package
SPD25	1Ø Bridge	600	2usec	1.4V	39A	25	MC
SPC25	1Ø Bridge	400	2usec	1.4V	39A	25	MC
SPB25	1Ø Bridge	200	2usec	1.4V	39A	25	MC
SPA25	1Ø Bridge	100	2usec	1.4V	39A	25	MC
M19500/483-04*	3Ø Bridge	800	2.5usec	1.3V	39A	25	ME
M19500/483-03*	3Ø Bridge	600	2.5usec	1.3V	39A	25	ME
M19500/483-02*	3Ø Bridge	400	2.5usec	1.3V	39A	25	ME
M19500/483-01*	3Ø Bridge	200	2.5usec	1.3V	39A	25	ME
803-4	3Ø Bridge	150	50nsec	0.95V	6A	20	MA
803-3	3Ø Bridge	125	50nsec	0.95V	6A	20	MA
803-2	3Ø Bridge	100	50nsec	0.95V	6A	20	MA
803-1	3Ø Bridge	50	50nsec	0.95V	6A	20	MA
802-4	3Ø Bridge	150	50nsec	0.95V	10A	35	MA
802-3	3Ø Bridge	125	50nsec	0.95V	10A	35	MA
802-2	3Ø Bridge	100	50nsec	0.95V	10A	35	MA
802-1	3Ø Bridge	50	50nsec	0.95V	10A	35	MA
801-4	3Ø Bridge	150	50nsec	0.95V	6A	20	ME
801-3	3Ø Bridge	125	50nsec	0.95V	6A	20	ME
801-2	3Ø Bridge	100	50nsec	0.95V	6A	20	ME
801-1	3Ø Bridge	50	50nsec	0.95V	6A	20	ME
800-4	3Ø Bridge	150	50nsec	0.95V	10A	40	ME
800-3	3Ø Bridge	125	50nsec	0.95V	10A	40	ME
800-2	3Ø Bridge	100	50nsec	0.95V	10A	40	ME
800-1	3Ø Bridge	50	50nsec	0.95V	10A	40	ME
696-6	3Ø Bridge	600	500nsec	1.2V	2A	15	NC
696-5	3Ø Bridge	500	500nsec	1.2V	2A	15	NC
696-4	3Ø Bridge	400	500nsec	1.2V	2A	15	NC

Part Number	Function	Rated Voltage (V)	Device Speed (trr)	Max. Peak V(f) per leg @ I(f) & 25°C		Rated Current @ 55°C (A)	Package
696-3	3Ø Bridge	300	500nsec	1.2V	2A	15	NC
696-2	3Ø Bridge	200	500nsec	1.2V	2A	15	NC
696-1	3Ø Bridge	100	500nsec	1.2V	2A	15	NC
695-6	3Ø Bridge	600	-	1.2V	2A	15	NC
695-5	3Ø Bridge	500	-	1.2V	2A	15	NC
695-4	3Ø Bridge	400	-	1.2V	2A	15	NC
695-3	3Ø Bridge	300	-	1.2V	2A	15	NC
695-2	3Ø Bridge	200	-	1.2V	2A	15	NC
695-1	3Ø Bridge	100	-	1.2V	2A	15	NC
682-6	3Ø Bridge	600	500nsec	1.2V	6A	20	NC
682-5	3Ø Bridge	500	500nsec	1.2V	6A	20	NC
682-4	3Ø Bridge	400	500nsec	1.2V	6A	20	NC
682-3	3Ø Bridge	300	500nsec	1.2V	6A	20	NC
682-2	3Ø Bridge	200	500nsec	1.2V	6A	20	NC
682-1	3Ø Bridge	100	500nsec	1.2V	6A	20	NC
678-6	3Ø Bridge	600	-	1.2V	10A	25	NC
678-5	3Ø Bridge	500	-	1.2V	10A	25	NC
678-4	3Ø Bridge	400	-	1.2V	10A	25	NC
678-3	3Ø Bridge	300	-	1.2V	10A	25	NC
678-2	3Ø Bridge	200	-	1.2V	10A	25	NC
678-1	3Ø Bridge	100	-	1.2V	10A	25	NC
469-05*	1Ø Bridge	1000	2usec	1.35V	15.7A	10	MD
469-04*	1Ø Bridge	800	2usec	1.35V	15.7A	10	MD
469-03*	1Ø Bridge	600	2usec	1.35V	15.7A	10	MD
469-02*	1Ø Bridge	400	2usec	1.35V	15.7A	10	MD
469-01*	1Ø Bridge	200	2usec	1.35V	15.7A	10	MD

Center Tap and Doubler Rectifier Assemblies

Part Number	Rated Voltage (V)	Device Speed	Max. Peak V(f) @ 10A & 25°C	Rated Current @ 55°C (A)	Max Tj (°C)	Terminal Orientation*
Standard Recovery						
681-1	100	-	1.1	15	150	P, N or D
681-2	200	-	1.1	15	150	P, N or D
681-3	300	-	1.1	15	150	P, N or D
681-4	400	-	1.1	15	150	P, N or D
681-5	500	-	1.1	15	150	P, N or D
681-6	600	-	1.1	15	150	P, N or D
Fast Recovery						
689-1	100	500nsec	1.1	15	150	P, N or D
689-2	200	500nsec	1.1	15	150	P, N or D
689-3	300	500nsec	1.1	15	150	P, N or D
689-4	400	500nsec	1.1	15	150	P, N or D
689-5	500	500nsec	1.1	15	150	P, N or D
689-6	600	500nsec	1.1	15	150	P, N or D

* terminal orientations:

D = center tapped, series configuration

P = center tapped, common cathode

N = center tapped, common anode

See datasheet for outline drawing

Transient Voltage Suppression Modules

These epoxy potted TVS modules in plastic cases come in both uni- and bi-directional versions. Working voltages from 12V to 708V and peak power levels from 7.5 kW to 90 kW (for a 1.2/50 usec test pulse) are available. They are frequently used where discrete TVS components do not have sufficient power ratings to protect against the potential high power surge threats. These modules can be screened as required to MIL-PRF-19500/507A paragraph 4.3, and the sub-assembly components can also be tested and/or screened to military standards prior to encapsulation.

Various of these modules families are designed to meet military standards such as MIL-STD-1399 section 300A (shipboard AC power systems), MIL-STD-704 (aircraft electric power), and a variety of high reliability commercial applications such as telecommunications, cable TV distribution, data processing centers, and mission critical computers and power supplies.

Part Number	Rated Standoff Voltage (V)	Uni or Bi Directional	Min Breakdown Voltage (V)	Max Clamping Voltage (V)	Rated Current @ 55°C (A)	Max Peak Pulse Power @ 25°C	Package
60KS200C	180	Bi	200	335	180	60kW	Case 11
90KS200C	200	Bi	200	280	270	90kW	Case 12
704-15K36	31.5	Uni	36	51	300	15kw	Case 8
704-15K36T	32	Uni	36	51	300	15kw	Case 9
PHP8.4	12	Bi	14	22	341	7.5kW	Case 11
PHP24	34	Bi	40	67	112	7.5kW	Case 11
PHP30	42.5	Bi	50	84	90	7.5kW	Case 11
PHP60	85	Bi	100	167	90	15kW	Case 11
PHP120	170	Bi	200	319	47	15kW	Case 11
PHP208	295	Bi	347	536	28	15kW	Case 11
PHP250	354	Bi	418	652	23	15kW	Case 11
PHP440	623	Bi	735	1138	13.2	15kW	Case 11
PHP500	708	Bi	835	1292	11.6	15kW	Case 11
PIP8.4	12	Bi	14	22	341	7.5kW	Case 11
PIP24	34	Bi	40	67	112	7.5kW	Case 11
PIP30	43	Bi	50	84	90	7.5kW	Case 11
PIP60	85	Bi	100	167	90	15kW	Case 11
PIP120	170	Bi	200	319	47	15kW	Case 11
PIP208	295	Bi	347	536	28	15kW	Case 11
PIP250	354	Bi	418	652	23	15kW	Case 11
PIP440	623	Bi	735	1138	13.2	15kW	Case 11
PIP500	708	Bi	835	1292	11.6	15kW	Case 11

Maximum junction temperature = 150 °C for all modules in this list



Microsemi provides innovative integrated circuits (ICs) and system solutions for communications, aerospace, defense and security, and industrial applications. These include high-performance, radiation-hardened and highly reliable analog mixed-signal ICs; field program gate arrays (FPGAs), system-on-chips (SoCs) and application specific integrated circuits (ASICs); power management products, timing and voice processing devices, RF chips, Power-over Ethernet ICs and discrete components.

Ambient Light Sensors detect the amount of light available and signal a processor to determine the amount of backlight or illumination needed in an application. Microsemi's Best Eye™ technology allows detection as close as possible to what a human eye would detect.

Part Number	Useful Light Range (Lux)	Light Output Function	Output Topology ¹	Input Supply Range	Output Current @100Lux	Highlights
LX1970	<1-12K	Linear	CSS	2V-5.5V	~38µA	General purpose illumination and display control
LX1971	<1-15K	Square Root	CSS	3V-5.5V	~10µA	Wide dynamic range, extreme sensitivity for low ambient light
LX1972	<1-5K	Linear	TS	2V-5.5V	~10µA	High performance "human eye" response, top package
LX1974	<1-5K	Linear	TS	2V-5.5V	~10µA	Same as LX1972 packaged for bottom light applications
LX1972A	<1-5K	Linear	TS	2V-5.5V	~10µA	Near perfect immunity to non visible light spectra
LX1973	0.01-500	Quarter Root	CS	4.5V-5.5V	380µA	High precision for ultra low light applications
LX1973A	0.005-500	Quarter Root	CS	4.5V-5.5V	360µA	High precision for ultra low light applications
LX1973B	0.005-400	Quarter Root	CS	4.5V-5.5V	410µA	Ultra low light, 60% better dark current cancellation
LX1977	0-500	Linear	I2C	3.0V-4.5V	N/A	Human eye spectral response, +/-5% accuracy
LX1980	10-1000	RGB Linear	V	3.0V-3.6V	N/A	High accuracy over temperature, fast response

1) CSS= current sink and current source vs. light,
 TS= two terminal current source vs light,
 CS= current source vs light,
 I2C= serial data, I2C compatible SMBus interface,
 V= output voltage for red, green, blue

Microsemi's family of specialty preamplifiers for microphone applications provides superior performance for ECM and MEMS microphone modules/assemblies. Our ECM preamplifier ICs are targeted to replace the conventional JFET, providing exceptionally better linearity and noise performance. The latest 2-wire ECM preamplifier is our 3rd generation platform targeted for high end consumer audio applications.

Through close partnership and communication with our customers, Microsemi provides microphone designers the opportunity to optimize their microphone systems for specific preamplifier gain, voltage range, PSRR, bias voltage, and distortion.

- Amplifier products provide 'Best-in-Class' performance (SNR, THD); SNR typically 3dB to 6dB better than competitive solution
- Low output impedance (25Ω)
- Up to 7kV (HBM) output ESD protection (product dependent)
- Demonstration systems available for purchase by qualified designers, see product literature for details
- Customizable options
- Gain programmable over a range of 6dB-30dB
- Supply voltage range 1.6V minimum to 3.6V maximum

Product	Mic	Type	Module	Package (mm)	Gain	Note
AAP661A	ECM	Analog	2-wire	0.93 x 0.58 CSP	16dB	Configurable HPF
AAP661B	ECM	Analog	2-wire	0.93 x 0.58 CSP	19dB	Configurable HPF
AAP662A	ECM	Analog	2-wire	0.93 x 0.58 CSP	6.5dB	Configurable HPF
AAP803A1	ECM	Analog	2-wire	0.82 x 0.55 CSP	11/16/19dB	Configurable Gain & HPF
AAP803A3	ECM	Analog	2-wire	0.82 x 0.55 CSP	16/26dB	Configurable Gain & HPF
LX3200	ECM	Analog	3-wire	0.6 x 0.6 CSP	6dB	-
AAP149	ECM	Digital	3-wire	1.20 x 0.81 CSP	20dBFS	-
AAP150	ECM	Digital	3-wire	0.95 x 0.75 bondable die	16dBFS	-
AAP250	MEMS	Digital	N/A	0.95 x 0.75 bondable die	16dBFS	11V Bias Voltage

PoE PSE Managers

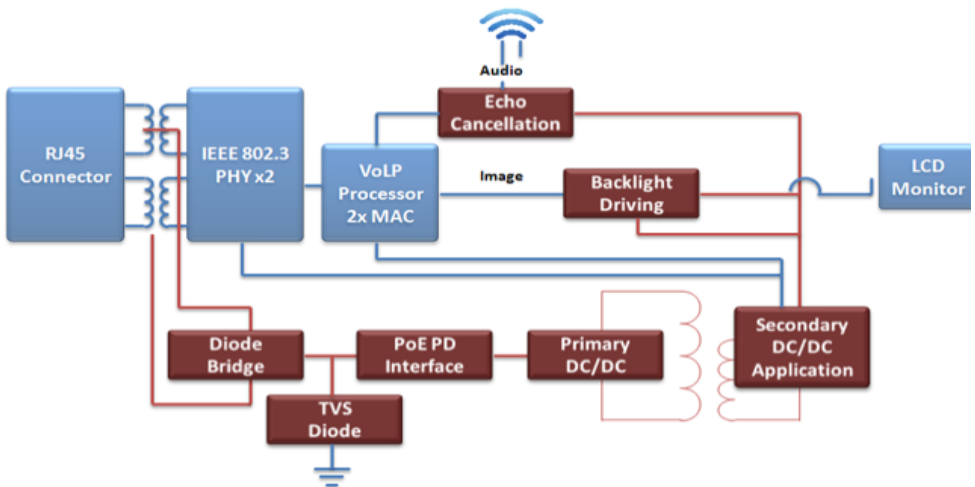
Microsemi's PoE PSE manager ICs can be used to develop a wide variety of power sourcing equipment including switches, routers and specialized platforms including PoE-enabled set-top boxes. These platforms can be used to cost-effectively provide higher levels of managed power to a broader range of Ethernet devices in small-office, home-office and residential applications including WiMAX transmitters, fiber-to-the-home optical network terminators and outdoor xDSL/cable modems.

Part Number	Ports	Auto Mode	Enhanced Mode MCU	xCAT Mode	FETs	Rsense
PD64001	1	Yes	N/A	No	External	0.5ohm
PD69101	1	Yes	N/A	No	0.3 ohm	0.5ohm
PD69008	8	Yes	PD69000	Yes	External	0.5ohm
PD69012	12	Yes	PD69000	Yes	External	0.5ohm
PD69104	4	No	PD69100	Yes	0.3 ohm	0.36ohm
PD69104B1	4	Yes	N/A	No	0.3 ohm	0.36ohm
PD69108	8	No	PD69100	Yes	0.3 ohm	0.36ohm
PD67124	24	Yes	Built-in	Yes	0.1ohm	0.5ohm
PD67112	12	Yes	Built-in	Yes	0.1ohm	0.5ohm
PD67108	8	Yes	Built-in	Yes	0.1ohm	0.5ohm

**PD69101 can be used for endspans only

Microsemi PSE Managers are IEEE802.3AF .AT and Power over HDBaseT compliant, and offer:

- Legacy Detection
- Backplane and Resilient PM
- Emergency PM – Supports few PSU and failure of PSU in the system
- Support dynamic PM for most efficient use of the switch's P
- 2-event Classification
- Up to 95W based on 4-pair solution



PoE PD System Block Diagram Example

Microsemi has introduced a new family of integrated PoE Powered Device solutions that are ideal for use in powered devices such as IP phones, WLAN access points, network cameras and 48VIN telecom/networks. Our solutions include Front End ICs and Controller solutions that support both IEEE 802.3AF and .AT Power over HDBaseT applications.

Part Number	Standard	Description	Package	Rdson	Diode Bridge
PD70100	IEEE 802.3AF	Front End	12-pin DFN	0.6 ohm	SDB207 or PD70222ILQ-TR
PD70200	IEEE 802.3AT	Front End	12-pin DFN	0.6 ohm	SDB207 or PD70222ILQ-TR
PD70101	IEEE 802.3AT	Front End + Controller	32-pin QFN	0.6 ohm	SDB207 or PD70222ILQ-TR
PD70201	IEEE 802.3AT	Front End + Controller	32-pin QFN	0.6 ohm	SDB207 or PD70222ILQ-TR
PD70210	PoH (up to 95W)	Front End	16-pin DFN	0.3 ohm	SDB207 or PD70222ILQ-TR

PoE Ideal Diode Bridge

The PD70222 is an integrated, dual pack full-bridge MOSFET-based regulator IC designed to support IEEE802.3af/at, UPOE and Power over HDBase-T (PoH) applications. PD70222 IdealBridge™ includes on-chip drive circuitry and utilizes low-RDS 0.15Ω N-channel MOSFETs to provide a high efficiency solution over a wide operating voltage range up to 57V.

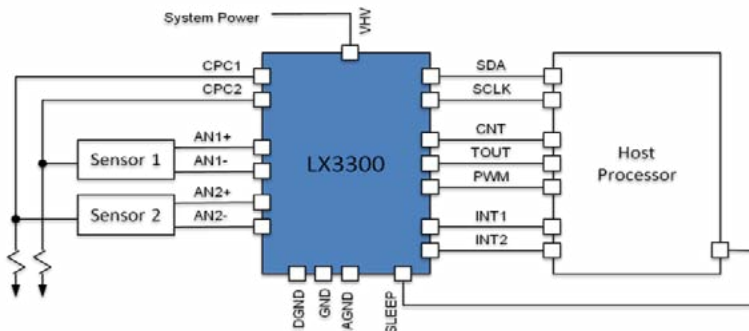
LX33xx family of advanced microcontroller-based sensor interface ICs for a wide variety of industrial/commercial/automotive applications

- Embedded 32-bit processing engine with 12kbyte program memory
- Two independent sensor input channels with true 12-bit resolution ADC
- Programmable sample rates to 2kHz
- Programmable gain amplifiers with differential inputs and EMI filters
- 32-byte user programmable configuration EEPROM with internal programming voltage
- Peripherals: I2C serial port; watch-dog timer; programmable analog output; timer/counter; GPIO

Sensor Interface IC's

	LX3300	LX3301
Sensor types	Most non-inductive	Inductive only
ADC (guaranteed resolution)	Dual 12-bit; 2ksps	Dual 12-bit; 2ksps
Input amps	Differential; PGA	Fixed gain
Comparators	Dual; 500nsec	No
I2C port	Yes	No
MCU	32-bit	32-bit
EEPROM	16 x 16-bit	16 x 16-bit
ROM	3k x 32-bit	3k x 32-bit
PSI5¹	Yes (read only)	Yes (read only)
SENT¹	Yes	Yes
Current sources	Dual	No
Temperature	-40C to 125C	-40C to 125C
Active power	30mW	30mW
Automotive	Optional	Yes

Serial interfaces specifically defined for sensors in automotive applications



The ultra-low-power ZL70102 RF transceiver chip supports a very high-data-rate RF link for medical implantable communication applications. The chip's unique design allows patient health and device performance data to be quickly transmitted, with little impact to the useful battery life of the implanted device. The ZL70102 IC is designed for use both in implanted medical devices and in base stations and operates in the MICS (Medical Implantable Communications Service) band. The ZL70102 is very flexible and supports several low-power wake-up options. The high level of integration includes a Media Access Controller (MAC) for coding and decoding RF messages, forward error correction, and CRC error detection to achieve an extremely reliable link. A standard serial peripheral interface (SPI) provides for easy access by the application.

The ZL70321 Standard Implant Module (SIM) is an easy-to-use RF module based on the ZL70102 for implantable applications. The ZL70120 Base Station Module (BSM) is a complete ZL70102-based RF module for nonimplantable applications. The ZLE70102 Application Development Kit (ADK) enables rapid evaluation, prototyping, and development of medical RF telemetry systems.

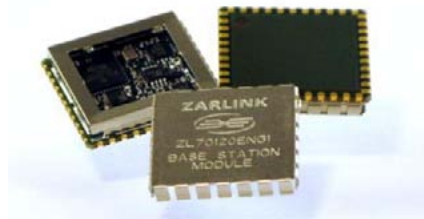
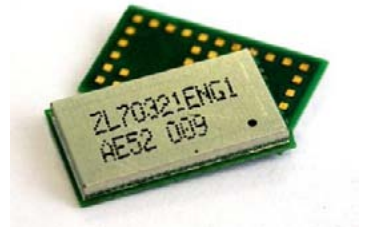
Part Number	Package	Type	Application
ZL70102UBJ	Wirebondable Die	Integrated Circuit	Implantable Device
ZL70102UEJ2	49-Pad CSP	Integrated Circuit	Nonimplantable Device
ZL70102LDG1	48-Pad QFN	Integrated Circuit	Implantable Device
ZL70321MNJ	43-Pad LGA	Module (SIM)	Implantable Device
ZL70120MNG	44-Pad LCC	Module (BSM)	Nonimplantable Device
ZLE70102BADA	Kit	ADK Kit	Application Development

Applications:

- Pacemakers
- Implantable cardioverter defibrillators (ICDs)
- Neurostimulators
- Drug pumps
- Short-range body area network applications using the 433-MHz ISM band

Key Features:

- Meets performance, power, and size requirements for implanted communication systems
- Operates in the 402- to 405-MHz (ten MICS channels) and 433- to 434-MHz (two ISM channels) frequency bands
- High data rates (400/200 kbit/s raw data rate) allow for short-duty-cycle, power-efficient bidirectional data transmission
- Ultralow power consumption (typically <5 mA average) TX/RX extends implanted device battery operating life
- System-on-Chip (SoC) design with integrated MAC
- Ultra-low-power RF wake-up receiver (typical 290 nA at 1-second strobe period)
- Compliant with MICS, FCC, ETSI, and IEC standards



The ZL70251 ultra-low-power RF transceiver provides a wireless link in applications where power consumption is of primary importance. The transceiver's ultralow power requirements allow battery miniaturization or the use of energy-harvesting methods, enabling devices with an extremely small form factor. The availability of the transceiver in a CSP form factor combined with the extremely low number of external components also contributes in minimizing the application footprint. The ultra-low-power device operates in unlicensed frequency bands between 779 and 965 MHz and offers data rates up to 186 kbit/s to support voice and data communication.

The device includes the RF transceiver as well as a Media Access Controller that performs most link support functions including Received Signal Strength Indication, Clear Channel Assessment, sniff, preamble and sync, packetization, and whitening. The device uses standard interfaces, enabling easy integration with a standard microcontroller or digital signal processor.

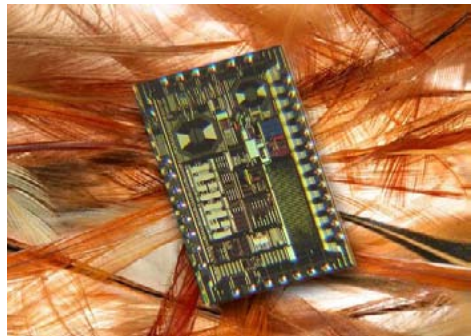
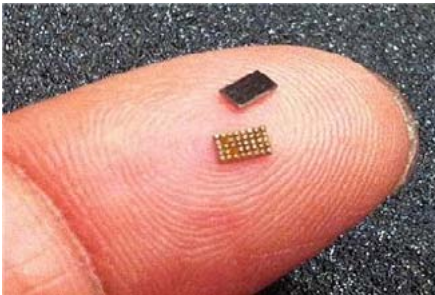
Part Number	Frequency Range	Operating Temp Range	Package Type	Pin Count	Plating
ZL70251UEJ2	779 to 965 MHz	-40°C to +85°C	CSP in Trays	36	SAC 405 Pb-Free
ZL70251UEB2	779 to 965 MHz	-40°C to +85°C	CSP in T&R	36	SAC 405 Pb-Free

Applications:

- Battery-powered wireless sensor network
- Applications relying on energy harvesting
- Wireless communication with very long battery life

Key Features:

- Ultralow TX/RX current (<2 mA) enables extremely long battery life
- Low supply voltage of 1.1 V to 1.9 V
- Operates between 779 and 965 MHz
- High data rate, up to 186 kbit/s raw
- Very few external components and CSP package enable end-devices with very small footprint
- Standard interfaces: SPIbus master for packet data and two-wire for status and control
- Integrated MAC performs all link layer basic functions, enabling low-power controller functions



Microsemi's surge protection devices protect implantable medical devices from damage resulting from an external defibrillation event. The ZL70571, ZL70572, ZL70573, ZL70574, ZL70584, and ZL70588 form a family of high-performance surge protection devices for implantable medical electronics and ECG/EKG instruments. Optimized for fast turn-on and extremely low leakage current, the ICs ensure high performance and reliability, as well as an easy route to compliance with industry standards. Microsemi's family of surge protection devices includes variants to support a range of application requirements for number of terminals and operating voltage.

Part Number	Terminals	Vfz min (V)	Vbo max (V)	Leakage typ (nA)	Application	Size (mm ²)	Package
ZL70571UDJ	5	9	12.2	10	Pacemaker	12.2	Solder Bumped Die
ZL70572UDJ	5	17	19.5	10	Neurostimulator	12.2	Solder Bumped Die
ZL70573UDJ	6	9	12	10	Pacemaker	7.6	Solder Bumped Die
ZL70574UDJ	7	9	12	10	Pacemaker	8.8	Solder Bumped Die
ZL70588UBJ	7	9	12	10	Pacemaker	8.8	Wirebondable Die
ZL70584UDJ2E	8	9	12	10	ECG / EKG	9.8	Solder Bumped Die

Key Features:

- Enhanced performance
- Extremely fast turn-on
- Extremely low leakage to allow terminals to be connected in parallel to the device being protected
- Medical quality
- QA procedures based on MIL-PRF-38535
- Wafer-level traceability
- Customer support
- Supported by a team of application design engineers with extensive medical system design experience



Precision Differential Fanout Buffers

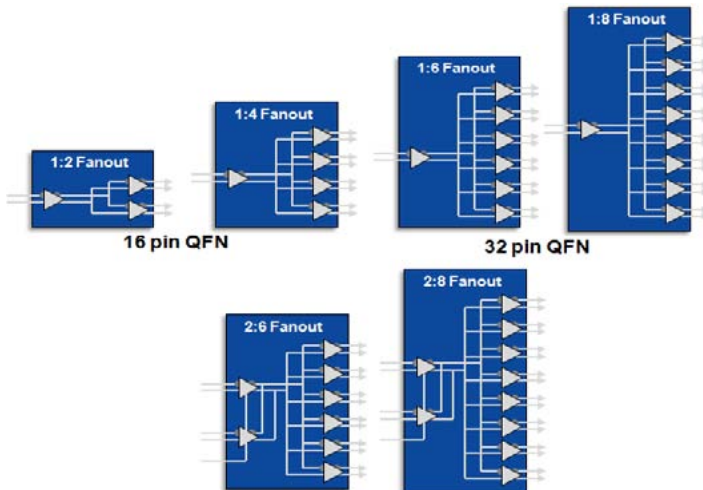
Microsemi's high performance buffers preserve signal integrity with ultra-low additive jitter and industry leading Power Supply Noise filtering performance. They ease board design with a flexible I/O structure and optional on-chip input terminations eliminating the need for peripheral circuitry. The family of fanout buffers is highly synergistic with Microsemi's industry leading timing portfolio, offering a complete and proven solution for timing clock tree designs in a variety of applications including communication boxes, enterprise routers and switches, storage and servers.

Product #	Input Termination	# Inputs	# Outputs	Output Type	Switching	750MHz Additive Jitter fs RMS, type	Package
ZL40200	External	1	2	LVPECL	N/A	30-40	QFN-16
ZL40201	Internal	1	2	LVPECL	N/A	30-40	QFN-16
ZL40202	External	1	4	LVPECL	N/A	30-40	QFN-16
ZL40203	Internal	1	4	LVPECL	N/A	30-40	QFN-16
ZL40204	External	1	6	LVPECL	N/A	30-40	QFN-32
ZL40205	Internal	1	6	LVPECL	N/A	30-40	QFN-32
ZL40206	External	1	8	LVPECL	N/A	30-40	QFN-32
ZL40207	Internal	1	8	LVPECL	N/A	30-40	QFN-32
ZL40224	External	2	8	LVPECL	SIMPLE	30-40	QFN-32
ZL40225	Internal	2	8	LVPECL	SIMPLE	30-40	QFN-32
ZL40208	External	2	6	LVPECL	GLITCH FREE	106-121	QFN-32
ZL40209	Internal	2	6	LVPECL	GLITCH FREE	106-121	QFN-32
ZL40210	External	2	8	LVPECL	GLITCH FREE	106-121	QFN-32
ZL40211	Internal	2	8	LVPECL	GLITCH FREE	106-121	QFN-32
ZL40212	External	1	2	LVDS	N/A	78-135	QFN-16
ZL40213	Internal	1	2	LVDS	N/A	78-135	QFN-16
ZL40214	External	1	4	LVDS	N/A	78-135	QFN-16
ZL40215	Internal	1	4	LVDS	N/A	78-135	QFN-16
ZL40216	External	1	6	LVDS	N/A	78-135	QFN-32

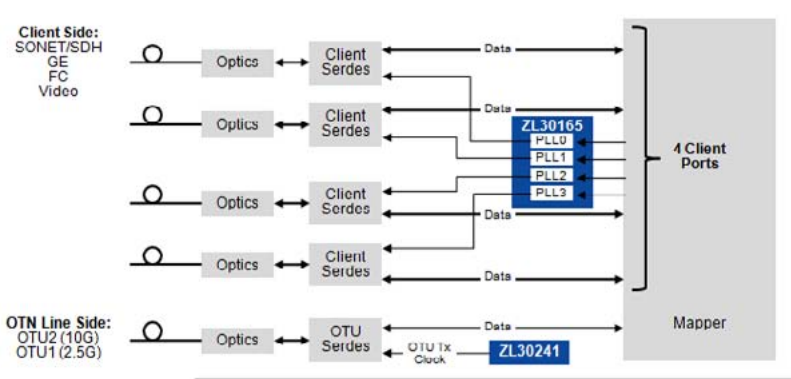
Product #	Input Termination	# Inputs	# Outputs	Output Type	Switching	750MHz Additive Jitter fs RMS, type	Package
ZL40217	Internal	1	6	LVDS	N/A	78-135	QFN-32
ZL40218	External	1	8	LVDS	N/A	78-135	QFN-32
ZL40219	Internal	1	8	LVDS	N/A	78-135	QFN-32
ZL40226	External	2	8	LVDS	SIMPLE	78-135	QFN-32
ZL40227	Internal	2	8	LVDS	SIMPLE	78-135	QFN-32
ZL40220	External	2	6	LVDS	GLITCH FREE	165-194	QFN-32
ZL40221	Internal	2	6	LVDS	GLITCH FREE	165-194	QFN-32
ZL40222	External	2	8	LVDS	GLITCH FREE	165-194	QFN-32
ZL40223	Internal	2	8	LVDS	GLITCH FREE	165-194	QFN-32

Key Features

- Additive jitter as low as 30 fs RMS
- PSNR as low as 48 fs RMS
- Small package size 3x3 mm or 5x5 mm
- Clock rates up to 750MHz
- LVPECL or LVDS outputs
- Universal input stage: LVPECL, LVDS, CML, HCSSL, LVCMOS
- 2.5V or 3.3V power supply
- AC or DC input coupling
- -40 to +85 °C operating temperature



OTN has emerged as the physical layer interface protocol of choice enabling carriers to bridge the transition from circuit-switched, legacy transmission of voice to Internet Protocol (IP) or packet-switched transmission of data over optical fibre. Because of the variety of services and provisioned, OTN timing solutions must be flexible and easily programmable to support multiple unique and independent channels frequencies. Microsemi offers the widest portfolio of single chip devices delivering “any rate, any port, all the time” performance for the Optical Transport Network.



Optical Transport Network Products – ZL30165

The ClockCenter™ Platform from Microsemi is based on a unique two stage architecture that supports any rate frequency translation from 1 Hz to 750 MHz. The product family offers wide integration portfolio up to four DPLLs in a single package.

MAX24705, MAX24710 – 5 or 10 Output Any-Rate Line Card Timing ICs

The MAX2470X products target ultra low jitter outputs. Both devices include a DPLL and two independent APLLs. When locked to one of two input clock signals, the device performs any-to-any frequency conversion with output jitter is typically 0.18 to 0.3ps RMS.

Key Features:

- Independent flexible rate conversion clock channels
- Programmable Bandwidth DPLLs
- Each clock channel can work as either PLL or NCO
- Continuous Input Clock Quality Monitoring and automatic state machine
- Hitless Reference Switching on Loss of Input
- Automatic hitless reference switching and digital holdover on reference fail
- Any Output Frequency: 1 kHz – 750 MHz
- Easy Configuration: field programmable via SPI/I²C interface
- Integer, Fractional or Ratio (FEC support) modes of operation
- Precision synthesizers generate any clock rate from 1 Hz-750 MHz with max jitter below 0.4ps RM

Microsemi OTN Products	Number of PLLs	Number of Synthesizers	Clocks Accepted & Generated	Jitter Performance
ZL30152	1	1 HP	1 kHz to 750 MHz	Up to 10G (max 0.7ps RMS)
ZL30155	2	2 HP	1 kHz to 750 MHz	Up to 10G (max 0.7ps RMS)
ZL30157	2	1 HP 1GP	1 kHz to 750 MHz	Up to 10G (max 0.7ps RMS)
ZL30159	1	1 HP	1 Hz to 177.5 MHz	Less than 1ps RMS on CMOS
MAX24705	1	2 HP	2 kHz to 750 MHz	Up to 40G (max 0.4ps RMS)
ZL30160	4	2 HP 2 GP	1 kHz to 750 MHz	Up to 10G (max 0.7ps RMS)
ZL30165	4	4 HP	1 kHz to 750 MHz	Up to 10G (max 0.65ps RMS)

Today's modern systems often require the generation and distribution of several clock frequencies to multiple loads. Clock generation devices from Microsemi help lower bill of material costs, reduce board space, simplify design and improve performance and reliability by replacing multiple external components traditionally used to time processors, memory chips, PHY chips and more with a fully integrated, single chip solution.

Rate Conversion / Jitter Attenuation Devices

Product #	# Independent Output Frequency Families	Typical Jitter fs RMS	# Diff Outputs	# CMOS Outputs	Output Freq. Range	NV Memory	Package
MAX24605	2	180*	0-5	0-10	<1Hz-750M	Ext EE	81-CSBGA
MAX24610	2	180*	0-10	0-20	<1Hz-750M	Ext EE	81-CSBGA
ZL30159	1	<1000	0	2	1Hz-177.5M	-	64-LBGA

Any-Rate Clock Synthesis Devices

Product #	# Independent Output Frequency Families	Typical Jitter fs RMS	# Diff Outputs	# CMOS Outputs	Output Freq. Range	NV Memory	Package
ZL30236	2	700	8	4	1k-750M	OTP	100-LBGA
ZL30237	2	700	8	4	1k-750M	OTP	100-LBGA
ZL30230	4	700	4-12	4-12	1k-750M	OTP	100-LBGA
MAX24405	2	180*	0-5	0-10	<1Hz-750M	Ext EE	81-CSBGA
MAX24505	2	180*	0-5	0-10	<1Hz-750M	Int EE	81-CSBGA
MAX24410	2	180*	0-10	0-20	<1Hz-750M	Ext EE	81-CSBGA
MAX24510	2	180*	0-10	0-20	<1Hz-750M	Int EE	81-CSBGA
ZL30240	2	260*	0-4	0-4	12MHz to 914MHz	OTP	48-QFN
ZL30241	1	260*	0-2	0-2	12MHz to 914MHz	OTP	48-QFN

Integer Multiply Clock Synthesis Devices

Product #	# Independent Output Frequency Families	Typical Jitter fs RMS	# Diff Outputs	# CMOS Outputs	Output Freq. Range	Host Bus	Package
MAX3636	1	340	9	1	15M-800M	Pin Cfg	48-TQFN-EP
MAX3637	1	340	9	1	15M-800M	Pin Cfg	48-TQFN-EP
MAX3638	1	340	9	1	15M-800M	Pin Cfg	48-TQFN-EP
MAX3639	1	340	9	1	15M-800M	Pin Cfg	48-TQFN-EP
MAX3671	1	300	9	0	62.5M-312.5M	Pin Cfg	56-TQFN-EP
MAX3673	1	300	9	0	61.44M-307.2M	Pin Cfg	56-TQFN-EP
MAX3678	1	300	9	0	66.67M-333M	Pin Cfg	56-TQFN-EP

*integer-mode APLL-only operation

Ext EE = external EEPROM

Int EE = internal EEPROM

OTP = one-time programmable

Pin Cfg = pin configured

Key Features

High Integration

Up to 4 independent programmable synthesizers replace competing multi-chip single channel solutions
 Integrated fanout buffers with up to 20 output clock signals in two frequency families

Industry Leading Ultra-low jitter

As low as 180fs jitter on all outputs provide spec-compliant timing for high-performance system components and multi-gigabit interfaces

Wide Frequency Range

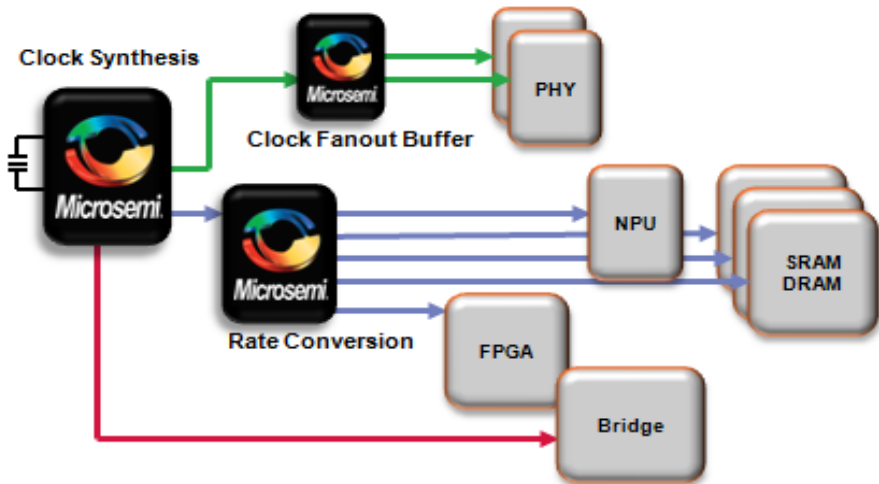
Output clock frequencies from 1Hz to 914MHz
 Fractional synthesizers support any-rate clock synthesis

Highly Programmable Outputs

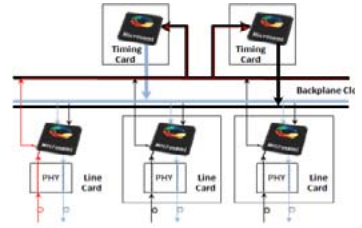
Control of each output clock's signal format, voltage, drive strength, frequency divider, and phase
 Replace external support components such as fanout buffers and format converters

Custom Configuration

Integrated EEPROM or OTP
 Clock signals available at power-up



Single-chip solutions for timing card and line card applications deliver critical end-to-end network timing performance while helping equipment manufacturers lower costs, reduce power consumption and speed time-to-market. Microsemi provides a full range of timing and line card products for SONET/SDH and PDH solutions.



Sonet/SDH/PDH Line Card Synchronizers

Product #	Jitter Compliance	# Digital PLLs	MAX Frequency	# Reference Inputs	# Outputs SONET/SDH, PDH	Programmable Synthesizers	Package
ZL30106	PDH, OC-3/STM-1	1	65.536 MHz	2	1, 7	-	10x10mm TQFP
ZL30108	OC-3/STM-1	1	19.44 MHz	3	1, 0	-	5x5mm TQFP
ZL30117	up to OC-192/STM-64	1	622.08 MHz	3	1, 1	1	9X9mm CABGA
ZL30119	up to OC-192/STM-64	2	622.08 MHz	8	2, 4	2	9X9mm CABGA
ZL30122	up to OC-12/STM-16	1	622.08 MHz	3	1, 1	1	9X9mm CABGA
ZL30123	up to OC-12/STM-16	2	622.08 MHz	8	2, 4	2	9X9mm CABGA

Sonet/SDH/PDH Timing Card Synchronizers

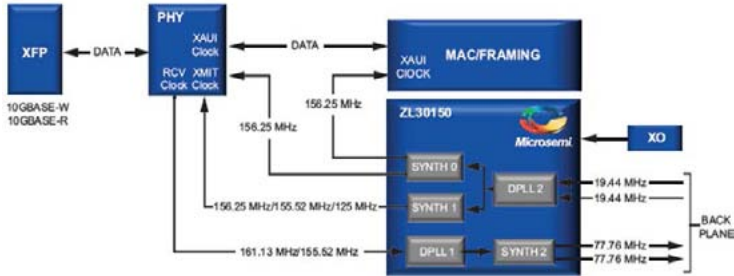
Product #	Jitter Compliance	# Digital PLLs	MAX Frequency	# Reference Inputs	# Outputs SONET/SDH, PDH	Programmable Synthesizers	Package
ZL30100	PDH Interfaces	1	65.536 kHz	2	0, 5	-	10x10mm TGFP
ZL30101	PDH Interfaces	1	65.536 kHz	2	0, 5	-	10x10mm TGFP
ZL30102	PDH Interfaces	1	65.536 kHz	3	0, 7	-	10x10mm TGFP
ZL30105	up to OC-3/STM-1	1	65.536 kHz	3	1, 7	-	10x10mm TGFP
ZL30109	up to OC-3/STM-1	1	65.536 kHz	2	1, 5	-	10x10mm TGFP
ZL30116	up to OC-192/STM-64	2	622.08 MHz	8	2, 4	2	9X9mm CABGA
ZL30121	up to OC-12/STM-16	2	622.08 MHz	8	2, 4	2	9X9mm CABGA
ZL30130	up to 1G/OC-12/STM-4	2	622.08 MHz	9	2, 4	2	9X9mm CABGA

Product #	Jitter Compliance	# Digital PLLs	MAX Frequency	# Reference Inputs	# Outputs SONET/SDH, PDH	Programmable Synthesizers	Package
ZL30138	up to 10G/OC-192/STM-64	2	622.08 MHz	9	2, 4	2	9X9mm CABGA
ZL30142	up to 10G/OC-48/STM-16	1	622.08 MHz	3	1, 1	1	9X9mm CABGA
ZL30143	up to 10G/OC-48/STM-16	2	622.08 MHz	9	2, 4	2	9X9mm CABGA

Key Features:

- Supports standards from Telecordia, ANSI, ETSI & ITU
- Generates standard SONET/SDH clock rates up to 622MHz
- Meets SONET/SDH jitter generation requirements up to 10G/OC-192/STM-64
- Accepts wide range of common telecom input frequencies
- Multiple PLLs per device for rate conversion
- Generates several styles of telecom frame pulses with selectable pulse width, polarity and frequency

Highly integrated feature-rich SyncE products from Microsemi allow manufacturers to create cost-effective network equipment designs that support accurate end-to-end transmission of voice, video, and data, over wired and wireless networks.



The market leader in SyncE timing devices, Microsemi was the first to introduce SyncE PLLs in 2006. Microsemi now offers the industry's most comprehensive portfolio of SyncE timing devices, providing G.8262 compliance and ultra-low jitter for 10G PHYs.

SyncE Timing Card Products	ZI30143	ZL30153	ZL30154	MAX24310	ZL30161	ZL30162	ZL30163
Number of PLLs	2	1	2	1	1	4	2
Accepts 1pps GPS Input Without Requiring Additional Clock Input	No	Yes	Yes	No	Yes	Yes	Yes
Number of Inputs	9	4	4	2	11	11	11
Alternative NCO	No	No	No	Yes	Yes	Yes	Yes
Sync Inputs	Yes	No	No	No	Yes	Yes	Yes

Key Features:

Timing Card Product Features

- Telcordia GR-1244 Stratum 3 and GR-253
- Low bandwidth loop filter from 0.1 mHz to 1 kHz
- Hitless reference switching up to 11 input references
- Holdover accuracy better than 1 ppb
- Accept and generate any frequency from 1 Hz to 750 MHz
- Compliance with ITU-T G.8262, G.813, G.871, G.8261, G.823, and G.824

Line Card Product Features

- Ultra low jitter as low as <400 fs RMS for line cards up to 100G
- Loop filter from 14 Hz to 896 Hz
- Hitless reference switching between up to 8 input references
- Frequency translation and jitter attenuation of any frequency between 1 Hz and 750 MHz
- Numerically controlled oscillator (NCO) capability

IEEE-1588™ solutions from Microsemi are the industry's first to fully support both IEEE 1588 and Synchronous Ethernet (SyncE). The highly flexible combined hardware/software platform minimizes both footprint and cost in a wide range of applications including wireless LTE-A infrastructure. The solution comprises three elements:

Advanced Clock Generation (ZL3036x) - Used to provide all the system synchronization features such as holdover, hitless reference switching, and required clock rates for the application. Multiple digital phase-locked loop (DPLL) and synthesizer combinations can provide a true 'Any-to-Any' frequency capability, un-matched in the industry while simultaneously providing ultra-low jitter required by SyncE capable PHYs.

Precision Time Protocol (PTP) (ZLS30390) - Includes telecom profile for frequency today and forthcoming telecom profile for phase (available mid-2013). Designed to be flexible for end-customer designs, the protocol supports centralized or distributed architectures. Synchronization Algorithm (ZLS30380) - Provides synchronization mask accuracy while providing phase alignment over aware and unaware networks. The software can also be integrated with customer developed or third-party PTP.

Synchronization Algorithm (ZLS30360) - Provides synchronization mask accuracy while providing phase alignment over ware and unaware networks. The software can also be integrated with customer developed or third-party FTP.

Key Features

Platform independent software can be embedded with a variety of OS and CPU

DPLL Filter Bandwidth: Programmable from 0.1 mHz up to 1 kHz

State Machine to automatically control mode of operation (free-run, locked, holdover)

Algorithm synchronizes the client to the server to meet a variety of specifications for frequency, phase and time over IP, MPLS and Ethernet Packet Networks

Inputs: 11 input references - 9 differential and 2 single-ended

Interfaces to a variety of IEEE 1588-capable PHYs and switches with integrated timestamping

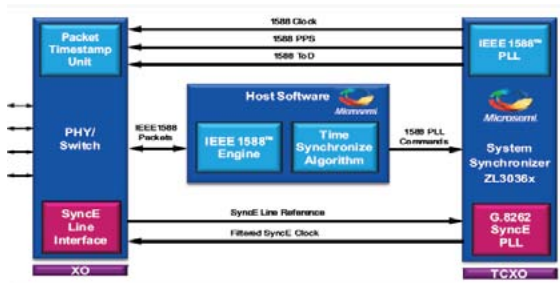
Two-stage Architecture for a true 'Any-to-Any' frequency capability

Automatic Hitless Reference Switching from Electrical to Packet to Electrical

IEEE 1588™ Device Types: IEEE 1588-2008 Ordinary Clock Server and Client or IEEE 1588 - 2008 Boundary Clock

Outputs: Up to 16 LVPECL/LVCMOS capable of synthesizing up to 750 MHz with ultra-low jitter

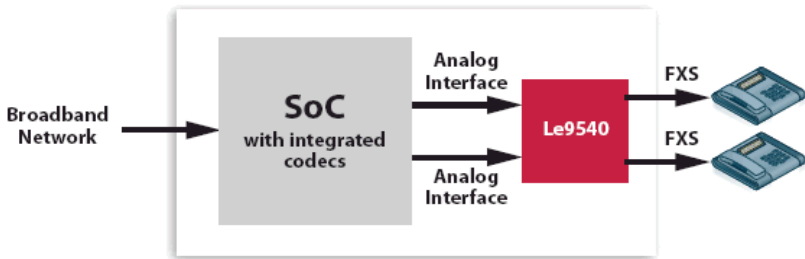
IEEE 1588™ Products	ZL30361	ZL30363	ZL30362	ZL30365
Standards compliant G.813, G.8262, Stratum 3/3E/4/4E	Yes	Yes	Yes	No
Number of DPLLs	1	2	4	4
Number of high performance synthesizes	3	4	4	4



Microsemi's VE950 Series offers high performance, voice over broadband SLIC devices with universal differential ringing and codec interfaces optimized for short loop, power-sensitive applications. Providing the complete functionality required for interfacing to a subscriber loop, the VE950 products maintain ultra low power dissipation. Differential ringing and receive inputs make the VE950 Series ideal for direct interface to data over cable service interface specification (DOCSIS) compliant cable modem gateways, multimedia adaptors, ONT/PON CPE and residential gateway products. This series is optimized to interface to Broadcom cable modem and PON SoCs.

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
Le9540 (C, D)	SLIC	2	100 V, 145 V	No	No	Serial	40 QFN
Le9541 (C, D)	SLIC	1	100 V, 145 V	No	No	Serial	40 QFN
Le9530 (C, D)	SLIC	2	100 V, 145 V	No	No	Parallel	48 QFN, 48 eTQFP
Le9531 (C, D)	SLIC	1	100 V, 145 V	No	No	Parallel	28 QFN, 48 eTQFP
Le9520 (A, B, C, D)	SLIC	2	75 V, 85 V, 100 V, 145 V	No	No	Parallel	64 eTQFP
Le9500 (A, B, C, D)	SLIC	2	75 V, 85 V, 100 V, 145 V	No	No	Parallel	28 PLCC

VE950 Application Diagram



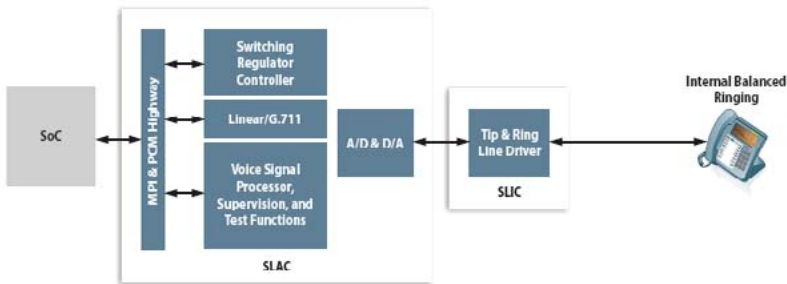
ZL880 Enhanced Dual Channel Wideband FXS Line Interfaces

The ZL880 VoicePort series features low power, dual-channel wideband foreign exchange service (FXS) voice solutions for broadband residential gateways, cable embedded multimedia terminal adapters (eMTAs) and fiber to the premise (FTTX) applications. The ZL880 series provides complete BORSCHT functions for two telephone line FXS ports. These devices feature enhanced functionality, lower BOM cost, and greater power efficiency, while maintaining software compatibility with the industry leading VE880 series. These devices are supported by the VoicePath™ API-II™ (VP API-II), which enables designers to offer a single hardware design that is software programmable for worldwide markets. In addition, this series is supported by the award winning VeriVoice Test Suite Software.

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
ZL88601	SLAC/SLIC	2	100 V	ABS	Wideband	PCM/SPI or ZSI	64 QFN (9x9)
ZL88602	SLAC/SLIC	2	120 V	ABS	Wideband	PCM/SPI or ZSI	64 QFN (9x9)
ZL88701	SLAC/SLIC	2	100 V	Shared	Wideband	PCM/SPI or ZSI	64 QFN (9x9)
ZL88702	SLAC/SLIC	2	150 V	Shared	Wideband	PCM/SPI or ZSI	64 QFN (9x9)
ZL88801	SLAC/SLIC	2	100 V	Shared	Wideband	PCM/SPI or ZSI	64 QFN (9x9)

ABS automatic battery switch

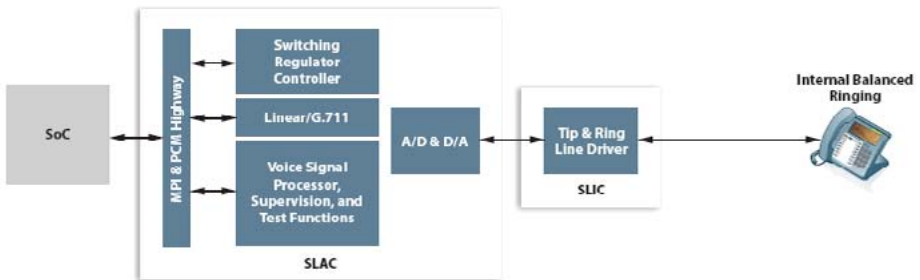
VE8910 or VE8910-HV Chipset—1 Channel FXS



The Le89156 and VE890 chipsets are highly integrated, cost-effective FXS, FXO and FXS + FXO chipsets that are optimized for residential VoIP access devices. These chipsets implement a complete BORSCHT functionality by providing the necessary voice interface functions to connect to, and power, one or more telephones and an isolated Direct Access Arrangement (DAA) for connection to the PSTN. The VE890 Series chipsets significantly increase design flexibility, improve system performance, and reduce BOM costs. These chipsets are supported by the VoicePath™ API-II™ (VP API-II), which enables designers to offer a single hardware design that is software programmable for worldwide markets. In addition, this series is supported by the award winning VeriVoice Test Suite Software.

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
Le89156	SLAC/SLIC	1	92 V	Tracking	Wideband	PCM/SPI	48 QFN
Le89810	SLIC	1	92 V	N/A	N/A	N/A	16 SOIC
Le89116	SLAC	1	N/A	Tracking	Wideband	PCM/SPI	48 LQFP
Le89316	HV SLAC	1 + FXO	N/A	Tracking	Wideband	PCM/SPI	48 LQFP
Le89830	HV SLIC	1	140 V	N/A	N/A	N/A	16 SOIC
Le89136	SLAC	1 + FXO	N/A	Tracking	Wideband	PCM/SPI	48 LQFP
Le89336	HV SLAC	1 + FXO	N/A	Tracking	Wideband	PCM/SPI	48 LQFP
Le89900	DAA	1	N/A	N/A	N/A	N/A	10 MSOP
Le89010	OLAC	1	N/A	N/A	Standard	PCM/SPI	48 LQFP

VE8910 or VE8910-HV Chipset—1 Channel FXS



VE880 Single and Dual Channel FXS and FXO Line Interfaces

The VE880 VoicePort Series is a two-channel FXS telephone line interface solution with complete BORSCHT functionality in a single device. These devices are supported by the VoicePath™ API-II™ (VP API-II), which enables designers to offer a single hardware design that is software programmable for worldwide markets. In addition, this series is supported by the award winning VeriVoice Test Suite Software.”

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
Le88506	SLAC	2	N/A	Tracking	Wideband	PCM/SPI	64 TQFP
Le88536	SLAC	2	N/A	Tracking	Wideband	ZSI	64 TQFP
Le88830	SLIC	2	150 V	N/A	N/A	N/A	24 QFN
Le88286	SLAC/SLIC	2	120 V	ABS	Wideband	PCM/SPI	64 QFN
Le88276	SLAC/SLIC	2	150 V	Tracking	Wideband	PCM/SPI	80 eLQFP
Le88266	SLAC/SLIC	2	100 V	ABS	Wideband	PCM/SPI	64 QFN
Le88264	SLAC/SLIC	2	90 V	ABS	Wideband	ZSI	64 QFN
Le88010	FXO	1	N/A	N/A	Standard	PCM/SPI	44 QFN

ABS automatic battery switch

In combination with Microsemi's ZL880, VE890, or VE880, the VeriVoice test suite provides the market's most cost-effective and reliable solution for VoIP line test and self-test, minimizing the cost of ownership for service providers. The VeriVoice Test Suite Software is a collection of functions and data types that abstract the line test capabilities of the ZL880, VE880, and VE890 series. The VeriVoice Test Suite Software is used in conjunction with the VoicePath API-II to provide line test and self-test for select devices from the VoicePort series.

Test	Auditor	Professional	Description
Outward Tests			
Line Voltage	✓	✓	Checks for hazardous and foreign AC and DC voltages on the drop
Receiver Off Hook	✓	✓	Tests for longitudinal fault, off hook restive fault, and receiver off hook
Ringer Equivalence Number (Regular)	✓	✓	Tests the impedance of the line and returns a fail if the T-R REN is too low or too high
Ringer Equivalence Number (Electronic)		✓	Tests the capacitance of the line and returns a fail if the T-R REN is too low or too high
Resistive Faults	✓	✓	Measures three element resistance
3 Element Capacitance		✓	Measures three element capacitance
Master Socket		✓	Detects the presence of an M-socket in the loop
Line Cross Connect		✓	Detects the presence of another FXS, PSTN, ethernet line connected to the FXS line under test
Isolated FXS		✓	Performs power up sequence and periodic monitoring of the line
All Outward Tests	✓	✓	Performs all outward tests in correct sequence
Inward Self Tests			
Loopback		✓	Enables receive-to-transmit signal loopback by two different methods
Read Loop Conditions		✓	Measures Battery, T-R, R-G, and T-G voltage and metallic and longitudinal current
Read Battery Conditions		✓	Reads the battery voltages connected to the line circuit
DC Voltage		✓	Verifies that the line circuit has the ability to drive the voltage ranges required for the normal operation of the line circuit
DC Feed		✓	Measures the voltage and current across a known test load resistor using the DC feed profile that has been programmed
Ring		✓	Verifies ring signal generation, drive capability, and ring trip
On/Off Hook Self Test		✓	Creates on-hook and off-hook conditions on the line using the test termination and verifies that they are properly reported

VE792 Next Generation Carrier Chipset (NGCC)

The VE792 Next Generation Carrier Chipset series is a high-performance, highly programmable integrated voice chip set that performs all the functions necessary to create a 2-wire, twisted pair telephone interface from any broadband digital source. The VE792 includes an 8-channel programmable codec along with line interface circuit designed on proprietary 175V bipolar dielectrically isolated process technology along with complete system-level software including call control and integrated line test with lowest bill of material.

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
Le79234	Voice Control Processor (VCP)	32	N/A	N/A	No	PCM/SPI	128 TQFP, 144 BGA
Le79124	Voice Control Processor (VCP)	72	N/A	N/A	No	PCM/SPI	128 TQFP, 144 BGA
Le79128	Voice Control Processor (VCP)	128	N/A	N/A	No	PCM/SPI	128 TQFP, 144 BGA
Le79238	SLAC	8	N/A	N/A	Wideband	PCM/SPI	164 QFN, 176 LQFP, 196 BGA
ZL79258	SLAC	8	N/A	N/A	Wideband	PCM/SPI	196 BGA
Le79271	SLIC	1	120 V	ABS	N/A	Parallel	28 QFN
Le79271A	SLIC	1	120 V	ABS	N/A	Parallel	28 QFN
Le79272	SLIC	2	120 V	ABS	N/A	Parallel	48 QFN

ABS automatic battery switch

VE790 High Performance Programmable Chipset with Line Test

Part Number	Voice Function	Voice Channels	Ringing Voltage	Power Supply	Integrated Codec	Interface	Package
Le792231	SLAC	2	N/A	No	Standard	PCM/SPI	64 TQFP
Le792288	SLAC	8	N/A	No	Standard	PCM/SPI	144 LBGA
Le79Q2281	SLAC	4	N/A	No	Standard	PCM/SPI	64 TQFP
Le79Q2284	SLAC	4	N/A	No	Standard	PCM/SPI	80 LQFP
Le79112	Voice Control Processor (VCP)	32	N/A	N/A	N/A	PCM/SPI	128 TQFP
Le79114	Voice Control Processor (VCP)	32	N/A	N/A	N/A	PCM/SPI	128 TQFP
Le79232	SLIC	2	External	ABS	N/A	Parallel	44 eTQFP
Le79242	SLIC	2	115 V	ABS	N/A	Parallel	44 eTQFP
Le79252	SLIC	2	120 V	ABS	N/A	Parallel	44 eTQFP
Le79R241	SLIC	1	Internal	ABS	N/A	Parallel	32 PLCC

ABS automatic battery switch

LineCare is Microsemi's carrier-grade line diagnostic software for access infrastructure equipment. With the VE792 series chipset, including the Le79124/8 Voice Control Processor (VCP2), LineCare implements critical line test, self test and real-time call control with signaling and monitoring functions to improve the service provider's ability to remotely diagnose problems within the voice network while eliminating the need for an external testhead. As a highly integrated, feature-rich interface solution, LineCare can cost-effectively eliminate the need for expensive network monitoring with test head equipment. This integration also allows for a faster design cycle, reducing the final cost to the customer by minimizing the software development time.

Basic Test Package - Product number Le79124SLBT

▶ Coverage for GR-909 & equipment self tests	▶ ROH Verses Line Short
▶ On/Off Hook Self Test	▶ Receiver Off Hook
▶ Ringer Equivalency	▶ Foreign DC Voltages: 3-element insulation resistance
▶ 3-Element Insulation Resistance	▶ Transmission Self Test
▶ Trans-Hybrid Loss	▶ DC Feed Self Test
▶ Read Loop & Battery Conditions	▶ DC Loop Resistance: forward or reverse polarity & offset
▶ Ring Monitoring Test	▶ C-msg Noise Measurement
▶ Foreign Voltages DC & AC	▶ Ringing Self Test

Advanced Test (Basic Test plus the following features) - Product number Le79124SLAT

▶ Foreign AC Voltage	▶ Differential AC Foreign Voltage
▶ Register Recall	▶ Foreign AC and DC Currents
▶ DTMF Receiver with Measurement	▶ DTMF & Pulse Dial Measurement
▶ Flat Active/Passive Noise	▶ 15kHz Active/Passive Noise Measurement
▶ 3-Element Capacitance	▶ 3-kHz Active/Passive Noise Measurement
▶ C-msg Active Noise Measurement	▶ D-Filter Active/Passive Noise Measurement
▶ Tone Generation (Up to 4 Tones)	▶ GR-909 QuickTest
▶ Inward Draw and Break Dial Tone	▶ Metering Self Test
▶ Howler Test	▶ 3.4kHz Active/Passive Noise Measurement
▶ Distance to Open	▶ Psophometric Active/Passive Noise Measurement
▶ Dialing Self Test	▶ Draw and Break Dial Tone
▶ Single, Dual, Quad Tone Generation	▶ Active & Passive Noise Measurements with various filter
▶ Coverage for GR-844	

Advanced Test Plus (*All of the above plus the following features) - Product number Le79124SLATP

▶ In-Service Calibration Support to increase accuracy	▶ Support for inward cross tests of other lines
▶ Signal to Noise Ratio and Quantization Distortion	▶ Arbitrary single Tone Resistance Measurement
▶ In-Service Calibration Support	▶ Non-intrusive Current and Voltage Measurements
▶ Inward Current Self Test	▶ 4 Element Insulation Resistance Measurement
▶ M-Socket-Detection Test	▶ D-D Transmission Test
▶ Inward Current Self Test	▶ Four Element Voltage Measurements
▶ 5 Element Insulation Resistance	▶ Measurement
▶ Fuse Test	

Microsemi® Hands-Free Voice Processing solutions integrate industry leading enhanced features, including wideband and narrowband ADC/DACs, on-chip memory, and application-specific firmware, to improve voice quality, minimize background noise, and reduce system design complexity and cost.

In complex noise environments, such as car kits and conference rooms, the Microsemi voice processing solution cancels echo, maintains a constant background noise and converges during double-talk situations. The chip delivers excellent performance in double-talk situations. The Microsemi algorithm is able to continuously converge even during double talk to track changes in the echo path to support full duplex operation.

Part Number	Audio Processing	Integrated Codec	AEC / LEC	Echo Tail	Gain	Noise Reduction	Package
MT93L16	Narrowband	No	1 Ch / 1 Ch	AEC (112 ms) LEC (16 ms)	User Gain (-24 to +21 dB)	No	36 SSOP
ZL38001	Narrowband	No	1 Ch / 1 Ch	AEC (112 ms) LEC (16 ms)	User Gain (-24 to +48 dB) Sout (18 dB)	No	36 SSOP 48 TQFP
ZL38002	Narrowband	No	1 Ch / None	AEC (112 ms)	User Gain (-24 to +21 dB)	Yes	36 SSOP 48 TQFP
ZL38003	Narrowband	Dual Channel	1 Ch / None	AEC (127 ms)	User Gain (-24 to +21 dB)	Yes	81 CABGA
ZL38004	Wideband	Dual Channel	1 Ch / 1 Ch	Max 256 ms	User Gain (-21 to +24 dB)	Yes	96 FBGA 100 LQFP
ZL38005	Narrowband	Dual Channel	1 Ch / 1 Ch	Max 256 ms	User Gain (-21 to +24 dB)	Yes	96 FBGA 100 LQFP
ZL38012	Narrowband	Dual Channel	1 Ch / 1 Ch	Max 256 ms	User Gain (-21 to +24 dB)	Yes	56 QFN

Key Features:

The ZL38004 chip with ZLS38502 can cancel up to 128 ms echo tail in wideband, maintain a constant background noise and converge during double-talk situations and can reduce noise of up to 30 dB.

The ZL38005 & ZL38012 platforms include narrowband ADC/DACs with input/output sampling of 8 KHz. The ZLS38501/507 firmware supports AEC and LEC with programmable echo tail up to 256 ms and noise reduction up to 30 dB.

The Microsemi voice processor platform is supported by evaluation boards, auto tuner board, reference designs, a full firmware package and the Microsemi network of in-house field application and design engineers.

Microsemi Hands-Free Voice Processing solutions are ideal for communication applications, including:

- Hands-free car kits
- Video conferencing
- Intercom and security systems
- IP phones
- Wideband residential phone
- Home automation

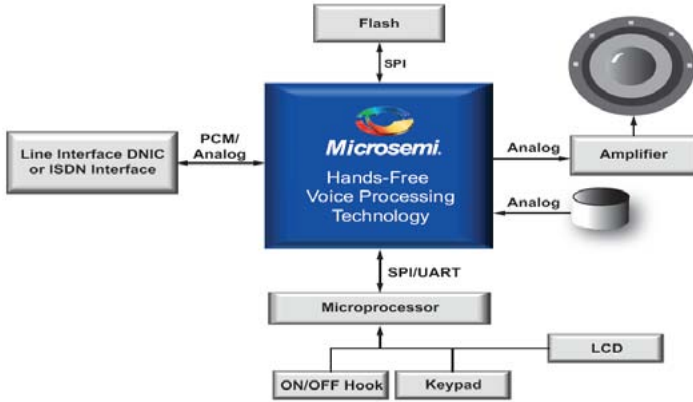


Figure 1 Speakerphone Application

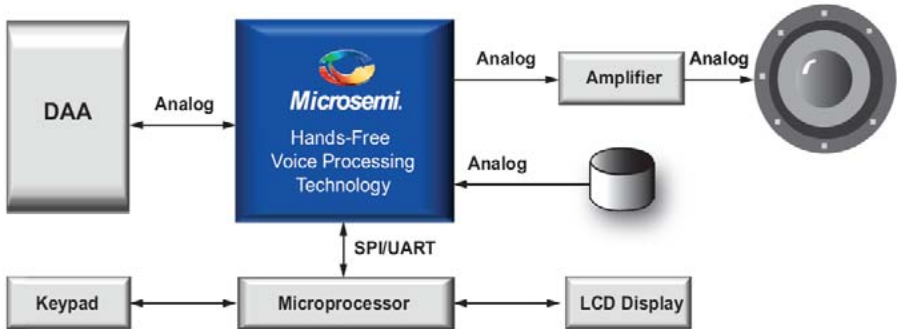


Figure 2 Home Automation Application

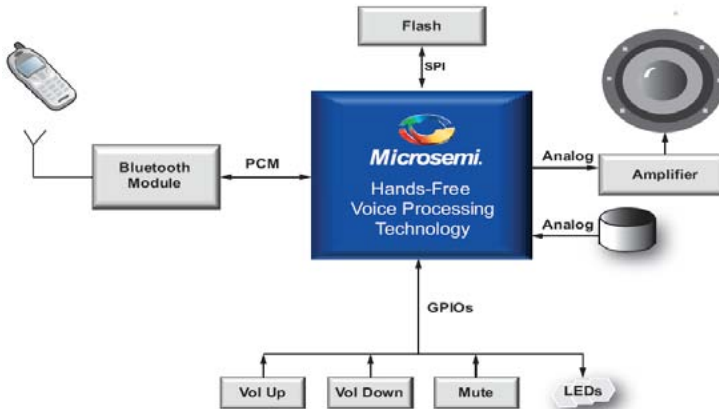


Figure 3 Hands-Free Car Kit Application

Adaptive Differential Pulse Code Modulation (ADPCM)

The Quad-channel ADPCM Transcoder is a low power, CMOS device capable of four encode and four decode operations per frame. Four 64 kbps channels (PCM octets) are compressed into four 32, 24 or 16 kbps ADPCM channels (ADPCM words), and four 32, 24 or 16 kbps ADPCM channels (ADPCM words) are expanded into four 64 kbps PCM channels (PCM octets). The ADPCM transcoding algorithm utilized conforms to ITU-T recommendation G.726 (excluding 40 kbps), and ANSI T1.303 - 1989. Switching on-the-fly between 32 and 24 kbps transcoding is possible by toggling the appropriate mode select pins (supports T1 robbed-bit signalling).

Microsemi's signal processing product is ideal for telecommunication applications, including:

- Pair gain
- Voice mail systems
- Wireless telephony systems

Part Number	# of Channels	Compliance	Master Clock	Bus	Power Consumption	Power Supply	Package
MT9126	4	ITU-T G.726 ANSI T1.303-1989	4.096 MHz	ST-BUS SSI	25 mW	5V	28 PDIP 28 SOIC
ZL38010	4	ITU-T G.726 ANSI T1.303-1989	4.096 MHz	ST-BUS SSI	6.5 mW	3.3V	28 SOIC

Microsemi's high-performance analog crosspoint switches are used in a variety of telecom, medical and video applications. The switch arrays range from 8x4 and 8x16 and can be cascaded to increase the matrix size. Performance characteristics include fast hold and setup times, minimum feedthrough, low crosstalk and maximum on-stage resistance of 65 ohms at 12 V. For added flexibility, the switches are designed to operate over a wide range of voltages, typically from 4.5 V to 14.5 V.

Microsemi analog crosspoint switches are ideal for telecommunication applications, including:

- Key systems
- PBX systems
- Mobile radio
- Test equipment/instrumentation
- Analog/digital multiplexers
- Audio/video switching

Part Number	Array	Supply Voltage VDC	Max Freq MHz	Analog Input Vp-p	Max Ron (Ohm)	Max ΔRon (Ohm)	Package
MT093	8x12	4.5 - 14.5	45	3.5	65	10	40 PDIP 44PLCC
MT8806	8x4	4.5 - 13.2	45	+/-12	65	10	24 PDIP 28 PLCC
MT8808	8x8	4.5 - 13.2	45	+/-12	65	10	28 PDIP 28 PLCC
MT8809	8x8	4.5 - 13.2	45	12	65	10	28 PDIP 28 PLCC
MT8812	8x12	4.5 - 14.5	45	14	65	10	40 PDIP 44PLCC
MT8814	8x12	4.5 - 13.2	45	+/-12	65	10	40 PDIP 44PLCC
MT8815	8x12	4.5 - 13.2	45	+/-12	65	10	40 PDIP 44PLCC
MT8816	8x16	4.5 - 13.2	45	+/-12	65	10	40 PDIP 44PLCC

Key Features:

The analog cross-point family is fabricated in ISO-CMOS technology, providing low power dissipation and high reliability. It contains an array of crosspoint switches along with line decoder and latch circuits. Any switches can be addressed by selecting the appropriate seven address bits. The selected switch can be turned on or off by applying a logical one or zero to the data input.

Analog Switch Array from Microsemi including the MT8816 meets all the application requirements for low bandwidth analog video switching, when used together with any readily available video amplifiers, could provide a practical and cost effective solutions for a Low Bandwidth Video Surveillance System.

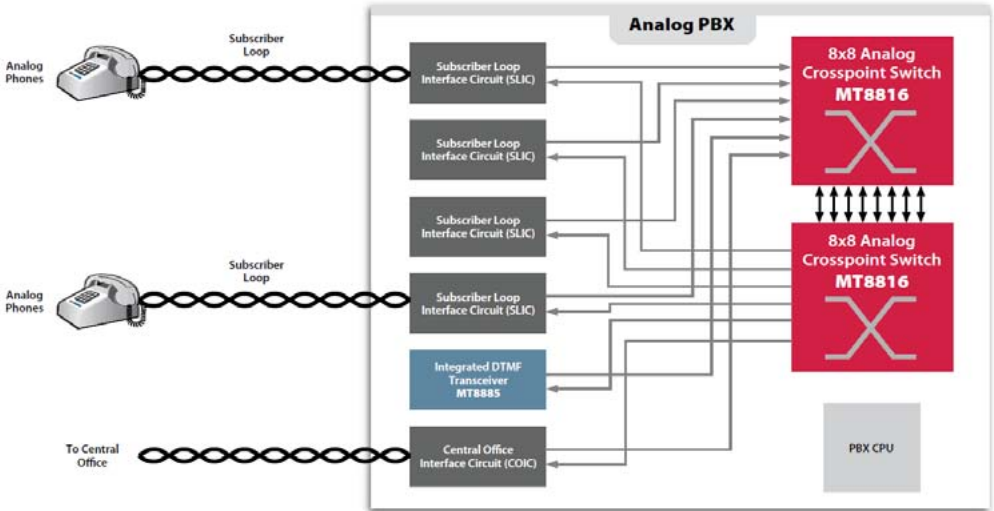


Figure 1 PBX System Application

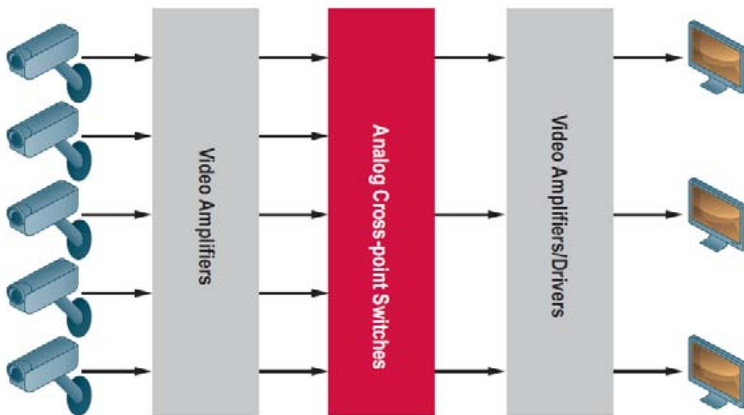


Figure 2 Video Surveillance Application

Microsemi TDM/TSI switch family supply the industry's largest portfolio of low-, medium-, and high-density devices with advanced features including on-board Stratum 3 timing and per-stream rate selection with rate conversion. Microsemi's TDM/TSI devices are designed to minimize the cost while boosting the performance of a wide range of voice and data systems. Widely adopted by leading datacom and telecom manufacturers, Microsemi TDM switches are the technology at the heart of telecommunications networks.

Microsemi's TDM/TSI family is ideal for telecommunication applications, including:

- PBX and IP-PBX
- Small and medium digital switching platforms
- Wireless base stations and controllers
- Multi-service access platforms
- CTI applications/cPCI platform
- Carrier-grade VoIP Gateways
- Integrated access services
- H.110, H.100, ST-BUS and Proprietary Backplane Interface applications
- Remote Access Concentrators
- Multi-service switching platforms (MSSPs)
- Media gateways
- Class 4 and Class 5 Central Office switches

Part Number	Switching Matrix	Input/Output Stream	DPLL	Rate Selection	Rate Conversion	Backplane	Package
MT8980	256 x 256	4/4	No	N/A	No	N/A	40 PDIP 44 PLCC
MT8981	128 x 128	8/8	No	N/A	No	N/A	40 PDIP 44 PLCC
MT8985	256 x 256	8/8	No	N/A	No	N/A	40 PDIP 44 PLCC 44 MQFP
MT89L80	256 x 256	8/8	No	N/A	No	N/A	44 PLCC 48 SSOP
MT89L85	256 x 256	8/8	No	N/A	No	N/A	44 PLCC 48 SSOP
ZL50012	512 x 512	16/16	No	Per-Stream	Yes	N/A	160 LQFP 144 LBGA
ZL50016	1K x 1K	16/16	No	Per-Stream	Yes	N/A	256 BGA 256 PQFP
ZL50017	1K x 1k	16/16	No	Per-Stream	No	N/A	256 BGA 256 PQFP
MT90820	2K x 2K	16/16	No	Single I/O	No	N/A	84 PLCC 100 MQFP
MT90823	2K x 2K	16/16	No	Single I/O	No	N/A	84 PLCC 100 MQFP

Part Number	Switching Matrix	Input/Output Stream	DPLL	Rate Selection	Rate Conversion	Backplane	Package
ZL50020	2K x 2K	32/32	No	Per-Stream	No	N/A	256 BGA 256 PQFP
MT90826	4K x 4K	32/32	No	Single I/O	No	N/A	160 MQFP 160 PBGA
ZL50023	4K x 4K	32/32	No	Per-Stream	No	N/A	256 BGA 256 PQFP
MT90871	8K x 8K	32/32	No	Per-Stream	Yes	N/A	196 PBGA
ZL50050	8K x 8K	32/32	No	Per-Stream	Yes	N/A	196 PBGA
ZL50051	8K x 8K	64/64	No	Single I/O	No	N/A	256 PBGA
ZL50052	8K x 8K	16/16	No	Single I/O	No	N/A	196 PBGA
ZL50053	8K x 8K	64/64	No	Single I/O	No	N/A	256 LQFP
MT90870	12K x 12K	48/48	No	Per-Stream	Yes	N/A	272 PBGA
ZL50057	12K x 12K	48/48	No	Per-Stream	Yes	N/A	272 PBGA
ZL50058	12x X 12K	48/48	No	Per-Stream	Yes	N/A	256 PBGA
MT90869	16K x 16K	64/64	No	Per-Stream	Yes	N/A	272 PBGA
ZL50060	16K x 16K	64/64	No	Per-Stream	Yes	N/A	256 PBGA
ZL50061	16K x 16K	64/64	No	Per-Stream	Yes	N/A	272 PBGA
ZL50062	16K x 16K	64/64	No	Single I/O	No	N/A	256 PBGA
ZL50063	16K x 16K	32/32	No	N/A	No	N/A	196 PBGA
ZL50064	16K x 16K	64/64	No	Single I/O	No	N/A	256 LQFP
ZL50070	24K x 24K	96/96	No	Per Group (4 Stream)	Yes	N/A	484 PBGA
ZL50073	32K x 32K	128/128	No	Per Group (4 Stream)	Yes	N/A	484 PBGA
ZL50074	32K x 32K	128/128	No	Single I/O	No	N/A	484 PBGA
ZL50075	32K 32K	64/64	No	Per Group (2 Stream)	Yes	N/A	324 PBGA
ZL50010	512 x 512	16/16	Stratum 4E	Per-Stream	Yes	N/A	160 LQFP 144 LBGA
ZL50011	512 x 512	16/16	Stratum 4	Per-Stream	Yes	N/A	160 LQFP 144 LBGA
ZL50015	1K x 1 K	16/16	Stratum 4E	Per-Stream	Yes	N/A	256 BGA 256 PQFP

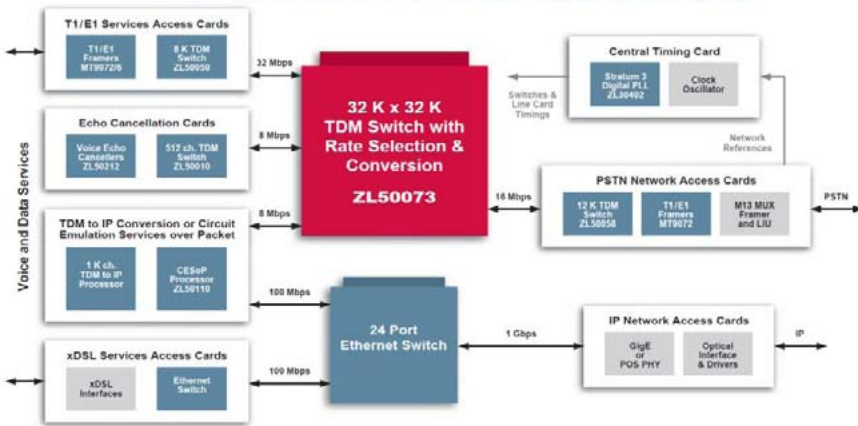
Part Number	Switching Matrix	Input/Output Stream	DPLL	Rate Selection	Rate Conversion	Backplane	Package
ZL50018	2K x 2 K	32/32	Stratum 3	Per-Stream	Yes	N/A	256 BGA 256 PQFP
ZL50019	2K x 2 K	32/32	Stratum 4E	Per-Stream	Yes	N/A	256 BGA 256 PQFP
ZL50021	4K x 4 K	32/32	Stratum 3	Per-Stream	Yes	N/A	256 BGA 256 PQFP
ZL50022	4K x 4 K	32/32	Stratum 4E	Per-Stream	Yes	N/A	256 BGA 256 PQFP
MT8986	512 x 256	16/10	No	N/A	Yes	ST-Bus, MVIP	40 PDIP 44 PLCC 44 MQFP
MT89L86	512 x 256	16/10	No	N/A	Yes	ST-Bus, MVIP	44 PLCC 48 SSOP
MT90863	2K x 512	16L,32B	No	N/A	Yes	H.100, H.MVIP	144 PBGA 128 MQFP
ZL50030	4K x 2K	16L,32B	No	N/A	Yes	H.110, H.100, H.MVIP	220 PBGA
ZL50031	4K x 2K	16L,32B	No	N/A	Yes	H.110, H.100, H.MVIP	256 MQFP
MT90866	4K x 2.4K	28L,32B	No	N/A	Yes	H.110, H.100, H.MVIP	344 PBGA
MT90868	32K x 8K	64L,64B	No	N/A	Yes	ST-Bus, MVIP	466 PBGA
MT90812	64 X 64	3/3	No	N/A	Yes	N/A	64 MQFP 68 PLCC

Microsemi's enhanced TDM/TSI switching family with integrated Stratum DPLL meets the density and flexibility requirements of low-bandwidth converged and wireless networking equipment. By combining advanced TDM switching and high-performance DPLL functions in a monolithic IC, i.e. ZL50021, saves design and component costs while boosting the performance and reliability of low-bandwidth voice and data equipment.

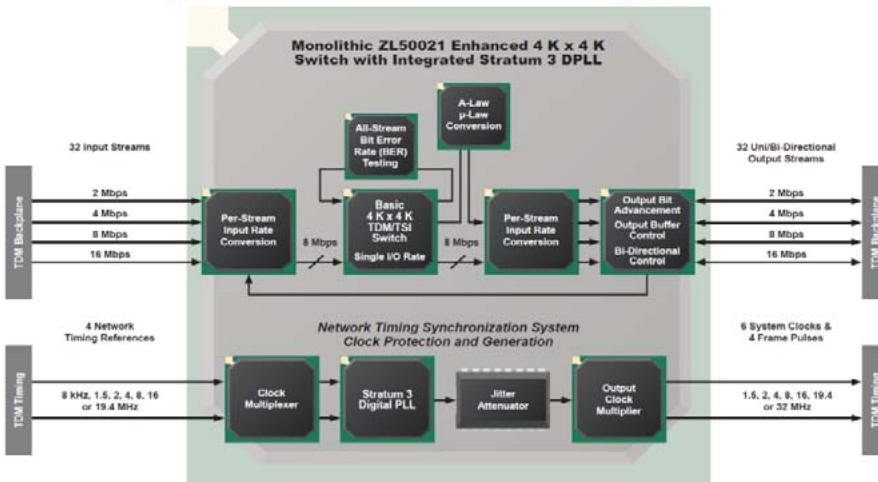
The ZL50070/3/4/5 is Microsemi's series of high density, feature-rich TDM switching ICs. The family includes 24 K and 32 K channel devices offering 128

input and 128 output streams with data rates up to 64 Mbps. Featuring the industry's widest range of flexible features, including per group rate selection and conversion, fully integrated A-Law/ μ -Law conversion and BER testing, as well as exceptional jitter tolerance, Microsemi's switching ICs are ideal for the next-generation of high-bandwidth voice and data equipment.

Media Gateway with Redundant Centralized Switching Configuration (STAR)



Typical Feature-Rich 4 K x 4 K Centralized Switching Application



A single ZL50021 replaces over 5 components and programmable logic devices

Microsemi's primary rate transmission product offer superior performance and value to customers for meeting and exceeding the rigorous network certification requirements of the T1/E1/J1 and CEPT market.

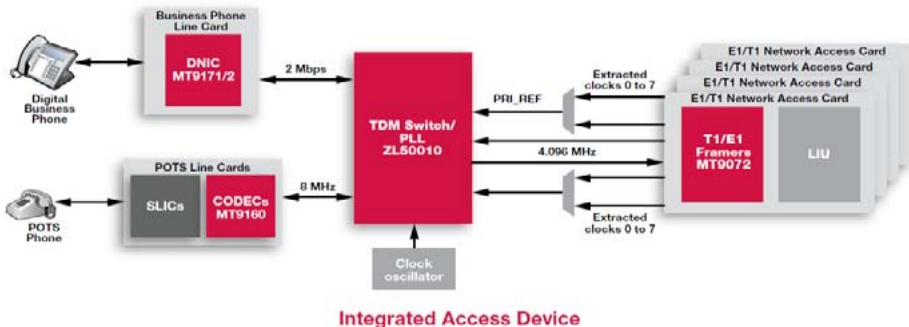
Microsemi's primary rate transmission is ideal for telecommunication applications, including:

- T1/E1/J1 add/drop multiplexers
- Access networks
- Wireless base stations
- CO and CPE equipment interfaces
- Primary rate ISDN nodes
- Digital Cross-connect Systems (DCS)

Part Number	Transmission	LIU	# of Framer	# of HDLC	Asynchronous Backplane	Power	Package
MT8952	N/A	No	N/A	1ppm	No	5V	28 PDIP 28 PLCC 28 SOIC
MT8979	CEPT	No	N/A	N/A	No	5V	29 PDIP 44 PLCC
MT9072	T1/E1/J1	No	8mV	1 per Framer	Yes	3.3V	220 PBGA
MT9074	T1/E1/J1	Yes	1mV	2ppm	No	5V	68 PLCC 100 MQFP
MT9075	E1	Yes	1mV	2ppm	No	5V	68 PLCC 100 MQFP
MT9076	T1/E1/J1	Yes	1mV	3 (Floating)	Yes	3.3V	68 PLCC 80 LQFP

Key Features:

The MT9076 is well suited for applications requiring a small form factor, low-cost solution for terminating T1/E1/J1 trunks. This single-port device integrates a long-haul LIU, an advanced framer, a high-performance PLL, and three HDLCs with low-jitter digital PLL (intrinsic jitter < 0.02UI). In T1/J1 mode the LIU can recover attenuated signals up to 36 dB (at 772 KHz). In E1 mode the LIU can recover attenuated signals up to 40 dB (at 1.024 MHz).



Microsemi's line of CNIC (Calling Number Identification Circuit) devices support Type-1 and Type-2 CPE features, including VMWI (Visual Message Waiting Indicator), CND (Calling Number Delivery), CNAM (Calling Name Delivery), CIDCW (Calling Identity Delivery on Call Waiting) and ADSI (Analog Display Services Interface). Applications include full feature POTs and VoIP phones, faxes, answering machines, caller ID adjuncts, and DECT systems.

Microsemi's Caller ID is ideal for telecommunication applications, including:

- Feature phones, including Analog Display Services Interface (ADSI) phones
- Phone set adjunct boxes
- FAX and answering machines
- Database query and Computer Telephony Integration (CTI) systems

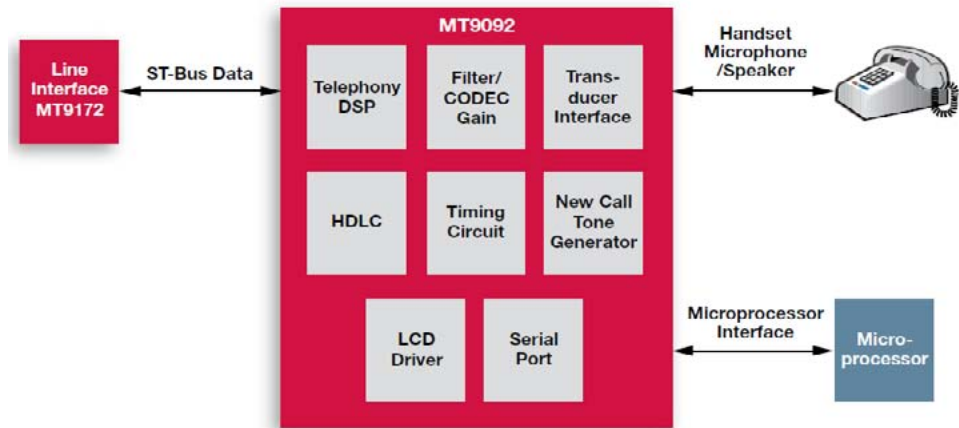
Part Number	System	Compliant Standard	Carrier Detect Status	Crystal	Input Gain Adjustable Amp	Power	Package
MT88E39	CLIP CID (Type 1)	Bellcore ETSI NTT	Yes	3.579545 MHz	Yes	3 to 5V	16 SOIC
MT88E43B	CLIP CID CIDCW (Type 2)	Bellcore	Yes	3.579545 MHz	Yes	3 to 5V	24 SOIC
MT88E45B	CLIP CID CIDCW (Type 2)	Bellcore ETSI BT	Yes	3.579545 MHz	Yes	3 to 5V	20 SOIC 20 SSOP
MT88E46	CID CIDCW CWD (Type 2 & 2.5)	Bellcore	Yes	3.579545 MHz	Yes	3 to 5V	20 SOIC

Microsemi offer fully featured integrated digital telephone circuit which includes HDLC data formatter, auxillary input/ output, SSI/GCI interface and LCD driver options. Voice band signals are converted to digital PCM and vice versa by a switched capacitor Filter/Codec. The Filter/Codec uses a differential architecture to achieve low noise operation over a wide dynamic range with a single 5 V supply. A Digital Signal Processor provides handsfree speaker-phone operation. The DSP is also used to generate tones (DTMF, Ringer and Call Progress) and control audio gains. Internal registers are accessed through a serial microport conforming to INTEL MCS-51 specifications.

Microsemi's integrated digital phone circuit is ideal for telephony applications, including:

- Digital telephone sets
- Wireless telephones
- Local area communications stations

Part Number	HDLC	DSP Hands-Free Operation	Auxillary Input/Output	SSI/GCI Interface	LCD Driver	Power	Package
MT9092	Yes	Yes	No	No	Yes	5V	44 PLCC
MT9094	No	Yes	No	No	Yes	5V	44 PLCC
MT9196	No	No	Yes	Yes	No	5V	28 PDIP 28 PLCC 28 SOIC



Microsemi's complete line of DTMF products offer 3 V or 5 V operation, power-down modes, call progress tone detection, parallel and serial microcontroller interface, adjustable tone guard-time and tone detect dynamic range options. Wide dynamic range DTMF receivers utilizing a lower cost and commonly available color burst oscillator that enable customers to decrease their overall BoM costs. Microsemi's DTMF devices are well-designed for telephone answering machines, fax machines and security systems.

DTMF Receivers

Part Number	Clock Freq	Power Down	2 Pin Osc	Early Steering	Delay Steering	Power	Package
MT3171B	4.194304 MHz	Yes	No	No	Yes	5V	8 PDIP
MT3270B	4.194304 MHz	No	Yes	Yes	No	5V	8 PDIP
MT3271B	4.194304 MHz	No	Yes	No	Yes	5V	8 PDIP
MT3370B	4.194304 MHz	Yes	Yes	Yes	No	5V	18 SOIC 20 SSOP
MT3371B	4.194304 MHz	Yes	Yes	No	Yes	5V	18 SOIC 20 SSOP
MT8870D	3.579545 MHz	Yes	Yes	Yes	Yes	5V	18 PDIP 18 SOIC 20 SSOP
MT88L70	3.579545 MHz	Yes	Yes	Yes	Yes	3V	18 PDIP 18 SOIC 20 SSOP
ZL49010	3.579 MHz	Yes	No	Yes	No	5V	8 PDIP
ZL49020	3.579 MHz	No	Yes	Yes	No	5V	8 PDIP
ZL49021	3.579 MHz	No	Yes	No	Yes	5V	8 PDIP
ZL49031	3.579 MHz	Yes	Yes	No	Yes	5V	18 SOIC 20 SSOP

DTMF Transceivers

Part Number	Clock Freq	Interface	Power Down	Guard Time	Tone Burst Mode	Power	Package
MT8880C	3.579545 MHz	Motorola Compatible	No	Yes	Yes	5V	20 PDIP 20 SOIC 24 SSOP 28 PLCC
MT8885	3.579545 MHz	Adaptive micro interface	Yes	Yes	Yes	5V	24 PDIP 24 SSOP
MT8888C	3.579545 MHz	Intel micro	No	Yes	Yes	5V	20 PDIP 20 SOIC 24 SSOP 28 PLCC
MT8889C	3.579545 MHz	Adaptive micro interface	No	Yes	Yes	5V	20 PDIP 20 SOIC 24 SSOP
MT88L85	3.579545 MHz	Adaptive micro interface	Yes	Yes	Yes	3V	24 PDIP 24 SSOP
MT88L89	3.579545 MHz	Adaptive micro interface	No	Yes	Yes	3V	20 SOIC 24 SSOP

Microsemi's digital subscriber line devices (DNIC) offer ISDN-like features capable of providing high speed, full duplex digital transmission up to 160 kbps over a twisted wire pair. It use adaptive echo-cancelling techniques and transfer data in (2B+D) format compatible to the ISDN basic rate. Several modes of operation allow for an easy interface to digital telecommunication networks including as a modem with data rates up to 160 kbps. The DNIC is also ideal for high noise environments for use in manufacturing and industrial applications.

Microsemi's DNIC offer proprietary full duplex interfaces using biphasic line code for cost effective digital phone, intercom and PHS/DECT wireless base station applications, including:

- Digital subscriber lines
- High speed data transmission over twisted wires
- Digital PABX line cards and telephone sets
- 80 or 160 kbps single chip modem
- TDD Digital PCS (DECT, CT2, PHS) base stations requiring cell synchronization
- Remote POS terminals
- Elevator systems
- Train communication networks

Part Number	Data Format	Range	Loop Length Measurement	Transparent Modem	Frame Synchronization	Power	Package
MT9171	2B+D	3 Km	No	Yes	Yes	5V	24 SSOP 28 PLCC
MT9172	2B+D	4 Km	No	Yes	Yes	5V	24 SSOP 28 PLCC
MT9173	2B+D	3 Km	Yes	Yes	Yes	5V	24 PDIP 24 SSOP 28 PLCC
MT9174	2B+D	4 Km	Yes	Yes	Yes	5V	24 SSOP 28 PLCC

Microsemi's portfolio of highly integrated VECs (voice echo cancellers) optimize call quality in a wide range of low- to mid-density wireless and telephony equipment. Microsemi's off-the-shelf VECs support from 2 to 288 voice channels while cancelling echo tails of 64 milliseconds (ms) or 128 ms.

Microsemi VECs help ensure carrier-grade voice connections and improve subjective voice quality by removing echoes, clicks and hisses caused by user environment, network conditions, and round-trip delays. The devices use an efficient architecture that reduces board space and development resource requirements.

Microsemi's VEC family is ideal for telecommunication applications, including:

- Voice over IP network gateways
- Voice over ATM, Frame Relay
- T1/E1/J1 multichannel echo cancellation
- Wireless base stations
- Echo Canceller pools
- DCME, satellite and multiplexer system

Part Number	# of Channels	Compliant	Advance Near-End Echo Suppression	Advance Noise Matching	Power Consumption	Power Supply	Package
MT9122	2	G.165	No	No	0.35 W	5 V	28 PDIP 28 PLCC
MT9123	2	G.165	No	No	0.25 W	5 V	28 PDIP 28 PLCC
ZL38015	4	G.165 G.168 (2000) G.168 (2002)	No	No	80 mW	1.2V Core 3.3 I/O	100 LQFP
ZL50233	4	G.165 G.168 (2000) G.168 (2002)	Yes	No	40 mW	1.8V Core 3.3 I/O	100 LQFP 208 LBGA
ZL50234	8	G.165 G.168 (2000) G.168 (2002)	Yes	No	56 mW	1.8V Core 3.3 I/O	100 LQFP 208 LBGA
ZL50235	16	G.165 G.168 (2000) G.168 (2002)	Yes	No	88 mW	1.8V Core 3.3 I/O	100 LQFP 208 LBGA
MT93L00A	32	G.165 G.168	No	No	0.15 W	1.8V Core 3.3 I/O	208 PBGA
ZL50232	32	G.165 G.168 (2000) G.168 (2002)	Yes	No	0.15 W	1.8V Core 3.3 I/O	100 LQFP 208 LBGA
ZL38065	32	G.165 G.168 (2000) G.168 (2002)	Yes	Yes	0.15 W	1.8V Core 3.3 I/O	100 LQFP 208 LBGA
MT93L04A	128	G.165 G.168	No	No	0,6 W	1.8V Core 3.3 I/O	365 BGA

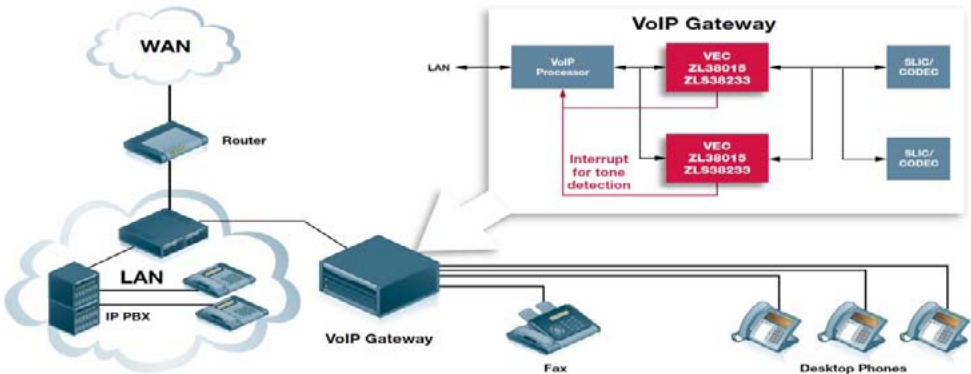
Part Number	# of Channels	Compliant	Advance Near-End Echo Suppression	Advance Noise Matching	Power Consumption	Power Supply	Package
ZL38070	256	G.165 G.168 (2000) G.168 (2002)	Yes	Yes	1.2 W	1.8V Core 3.3 I/O	535 BGA
ZL50211	256	G.165 G.168 (2000) G.168 (2002)	Yes	No	1.2 W	1.8V Core 3.3 I/O	535 BGA
ZL50212	288	G.165 G.168 (2000) G.168 (2002)	Yes	No	1.35 W	1.8V Core 3.3 I/O	535 BGA

Key Features:

Competitors' software-based solutions use a windowing technique that may not detect a signal with multiple echo paths, resulting in incomplete echo cancellation. Microsemi's VEC family offers full band echo cancellation that eliminates echo up to 128 ms without compromise, capable of meeting stringent NTT requirement. Other key features include custom NLP that offer superior noise matching (up to -25 dBm0) and comfort noise injection that spectrally matches the background noise.

The ZL38015 supports full-band echo cancellation and advanced algorithms, it is a four-channel VEC with echo tail programmable up to 64 ms per channel.

The ZLS38233 firmware also integrates a range of features, including DTMF (Tx), DTMF (Rx) and ALC (automatic level control) to support superior voice quality and reduce bill-of-materials costs. Firmware is fully field-upgradeable.



Microsemi is a leading provider of cost effective highly efficient Power Management solutions for powering today's advanced SOC, FPGA, and CPLD loads. Microsemi's power management products range from ultra fast transient response DC-DC regulators and controllers, to advanced and efficient AC-DC converters and LDOs. One of our differentiating technologies is our patented hysteretic control for our family of DC-DC regulators and controllers. This technology provides excellent voltage reference accuracy with better component integration and high efficiency when providing power compared to other techniques.

Step Down Regulators/Controllers/LDOs Selection Guide

Output Current	Input Voltage			
	2.5V to 5.5V	4.5V to 18V	4.5V to 22V	4.5V to 24V
≤1A	NX4108 (2.8V) ¹	LX8211A-00 (3V-13V) ³		SG29055P (26V) ³
	NX4110 (2.8V) ¹	LX13043 (10V) ³		SG29055AP (26V) ³
	LX7172 ¹			
	LX8213-00 (6V) ³			
	LX8213-12 (6V) ³			
	LX8213-33 (6V) ³			
	LX8240 (3.3V) ³			
≤2A	LX7172 ¹	LX7104 ¹		
		NX7101 (4.75V) ¹		
	LX7167 (3.0V) ¹			
	LX7186A ¹			
≤3A	LX7169 (3.0V) ¹	NX7102 (4.75V) ¹	NX9415 (8V) ¹	NX9415 (8V) ¹
	LX7175 (3.0V) ¹	NX9415 (8V) ¹		
	LX7176 (4V) ¹			
≤5A	LX7165 (3.0V) ¹	NX9415 (8V) ¹	NX9415 (8V) ¹	NX9415 (8V) ¹
>5A		NX9548 (20V) ¹	NX9548 (20V) ¹	
≥10A		LX9610 (8V) ⁴	LX9610 (8V) ⁴	NX2124/A ²
		NX2423 ²	NX2423 ²	
		NX2147 ²	NX2147 ²	
		NX2155H (8V) ²	NX2155H (8V) ²	
		NX2124/A ²	NX2124/A ²	
≥20A		LX1752 ²	LX1752 ²	LX1675 ²
		NX2837 (9V) ²	NX2837 (9V) ²	NX2139A ²
		LX1675 ²	LX1675 ²	NX2838 (32V) ²
		NX2139A ²	NX2139A ²	LX7302 ²
		LX7302 ²	LX7302 ²	

Note: 1) Regulators, 2) Controllers, 3) LDOs, 4) Power Modules
Output voltage from 0.9V to 3.3V for all above listed devices

Step Down Regulators with V_{IN} up to 5.5V

Part Number	Max Output Current (A)	Input Voltage Range (V)	Output Voltage Range (V)	No Load Current (mA)	Switching Frequency Range (kHz)	Max Duty Cycle (%)	Control Method ¹	Operating Temp (°C)	Package
NX4108	1	2.8-5.5	0.6-3.3	4	1000	78	C	-40 to 85	SOT23-5
NX4108-12	1	2.8-5.5	1.2	15	1000	78	C	-40 to 85	SOT23-5
NX4108-15	1	2.8-5.5	1.5	8.5	1000	85	C	-40 to 85	SOT23-5
NX4108-18	1	2.8-5.5	1.8	8.5	1000	85	C	-40 to 85	SOT23-5
NX4108-33	1	4.5-5.5	3.3	20	1000	78	C	-40 to 85	SOT23-5
NX4110	1	2.8-5.5	0.6-3.3	4	1000	78	C	-40 to 85	SOT23-5
LX7172	1.2	2.5-5.5	0.6-3.3	0.062	1400	100	C	-40 to 85	SOT23-5
LX7186A	1.2	2.5-5.5	0.6-3.3	0.062	1400	100	C	-40 to 85	SOT23-5
LX7167	2	3.0-5.5	0.6-3.3	0.35	3000	100	H	-10 to 85	MLPD-8 (2x2)
LX7169	3	3.0-5.5	0.8-3.3	12	3000	100	H	-10 to 85	DFN-12 (3x3.5)
LX7165	5	3.0-5.5	0.6-3.3	0.44	1875	100	H	0 to 85	WLCSP-20 (0.4 pitch)
LX7175	3	3.0-5.5	0.8-3.3	0.2	1400	70	H	-10 to 85	DFN-10 (3x3)
LX7176	3	4.0-5.5	0.6-3.3	0.6	1650	100	H	0 to 85	QFN-12 (2x2)

¹ C = Current, H = Hysteretic

**Step Down Regulators with V_{IN} up to 25V**

Part Number	Output Current Range (A)	Input Voltage Range (V)	Output Voltage Range (V)	No Load Current (mA)	Switching Frequency Range (kHz)	Max Duty Cycle (%)	Control Method ¹	Operating Temp (°C)	Package
LX7104	1.5	4.5-18	0.81-15	0.8	1400	90	C	-40 to 85	SOT23-6
NX7101	2	4.75-18	0.925-0.83V _{IN}	1	340	83	C	-40 to 85	SOIC-8
LX3005	2	4.75-25	0.8-21	1.3	420	100	C	0 to 85	SOIC-8
NX7102	3	4.75-18	0.925-0.83V _{IN}	1	340	83	C	-40 to 85	SOIC-8 EP
NX9415	5	8-22	0.8-5	4.8	Up to 1000	62	V	0 to 70	MCM-24 (4x4)
NX9548	7	4.5-20	0.75-5	1.8	ADJ	80	COT	0 to 70	MCM-32 (5x5)
LX9610 ²	10	8-20	0.8-5	75	600-1000	89.5	V	-40 to 85	QFN EP (15x15)

1) C = Current, V = Voltage, COT = Adaptive Constant On Time

2) LX9610 is a power module

Step Down Controllers with Single Output

Part Number	OCP Type	Input Voltage Range (V)	Output Voltage Range (V)	No Load Current (mA)	Switching Frequency Range (kHz)	Max Duty Cycle (%)	Control Method ¹	Operating Temp (°C)	Package
NX2124	Fixed	2-25	0.8-5	3	300	84	V	0 to 70	SOIC-8
NX2124A	Fixed	2-25	0.8-5	3	300	84	V	0 to 70	SOIC-8
NX2423	ADJ	4.5-22	0.6-5	6.7	50-500 ADJ	97	V	0 to 70	MLPQ-24 (4x4)
NX2138	ADJ	4.5-22	0.75-3.3	1.6	ADJ	84	COT	-10 to 100	MLPQ-16 (4x4)
NX2147	ADJ	4.5-22	0.75-3.3	1.6	ADJ	84	COT	-10 to 100	MLPQ-16 (3x3)
LX7302	ADJ	5-26	0.6-2.5	1.8	200-1000	91	H	0 to 85	MLPQ-20 (3x3)
NX2155H	ADJ	8-22	0.8-5	4.8	Up to 2000 ADJ	62	V	0 to 70	MSOP-EP-10L

1) V = Voltage, COT = Adaptive Constant On Time, H = Hysteretic

Step Down Controllers with Multiple Outputs

Part Number	Outputs / LDO ¹	Input Voltage Range (V)	Output Voltage Range (V)	No Load Current (mA)	Switching Frequency Range (kHz)	Max Duty Cycle (%)	Control Method ²	Operating Temp (°C)	Package
LX1752	2 / N	4.5-22	0.7-0.88V _{IN}	6	200-1500	88	V	0 to 85	MLPQ-28 (5x4)
LX1675	4 / Y	4.5-24	0.8-0.85V _{IN}	6	300	85	V	0 to 85	MLPQ-38 (7x5)
			0.8-0.74V _{IN}		600	74		-40 to 85	
NX2139A	2 / Y	4.5-22	0.75-3.3	1.8	ADJ	84	COT	-10 to 100	MLPQ-16 (3x3)
NX2838	2 / F	8-32	0.8-5	3.9	200-1000	68	V	0 to 70	MLPQ-16 (3x3)
NX2837	2 / F	9-22	5	3.9	350	78	V	0 to 70	MSOP-EP-10L

1) N = NO, Y = YES: EXT FET, F = Fixed: 3.3V / 700mA

2) V = Voltage, COT = Adaptive Constant On Time

Low Dropout Regulators

Part Number	Outputs	Max Output Current (A)	Input Voltage Range (V)	Output Voltage Range (V)	No Load Current (mA)	Max Voltage Dropout (V)	Control Method ¹	Operating Temp (°C)	Package
LX8213-00	1	0.3	2.5-6	1.2-5.5	0.06	0.3	V	-40 to 85	SOT23-5
LX8213-12	1	0.3	2.5-6	1.2V Fixed	0.06	0.3	V	-40 to 85	SOT23-5
LX8213-33	1	0.3	2.5-6	3.3V Fixed	0.06	0.3	V	-40 to 85	SOT23-5
LX8211A-00	1	0.15	3-13	2.3-12	–	0.35	V	-40 to 85	SOT23-5
LX13043	1	1	4.5-10	3.3	2.6	1.3	V	0 to 85	MO-229 6Pin
SG29055P	2	1 / 0.05	6-26	5	2 for 1A output	1.2	V	-40 to 85	TO-220
					1.2 for 0.05A output				
SG29055AF	2	1 / 0.05	6-26	5	2 for 1A output	1.2	V	-40 to 85	TO-220
					1.2 for 0.05A output				

1) V = Voltage

Microsemi offers a wide range of solutions for the bypass function ranging from low cost to state of the art, high technology solutions for module and junction box manufacturers. See Microsemi's Solar Solutions guide for more information. A Solar Bypass Total Cost of Ownership whitepaper and its companion Solar Bypass TCO Calculator Spreadsheet is also available, for an economic comparison between the multiple methods of solar bypass is also available.

Product Category	Application: Junction Box	Application: Under the glass
Standard axial	Currents up to 4A	N/A
Custom surface mount and thru-hole	Currents up to 6A	Currents up to 3A
Flex SFSD series	Mini junction box, currents up to 20A w/correct heat sinking	Designed for use "under the glass"
		Reduced cost assembly process
		Currents up to 10A
Active Bypass LX2400	Micro junction box, currents up to 20A	For heights >= 1.48mm
	NO heat sinking	Currents up to 20A
	Cool run => low failure rate	Cool run => NO hot spots, low failure rate

The LX2400 IDEAL™ Solar Bypass device with Microsemi's patented CoolRUN™ technology provides a bypass path in PV module applications. The LX2400 IDEAL™ Solar Bypass demonstrates very low forward voltage drop and reverse leakage current, resulting in negligible heat generation and temperature rise during operation.

Key Features

20A is supported for IEC testing

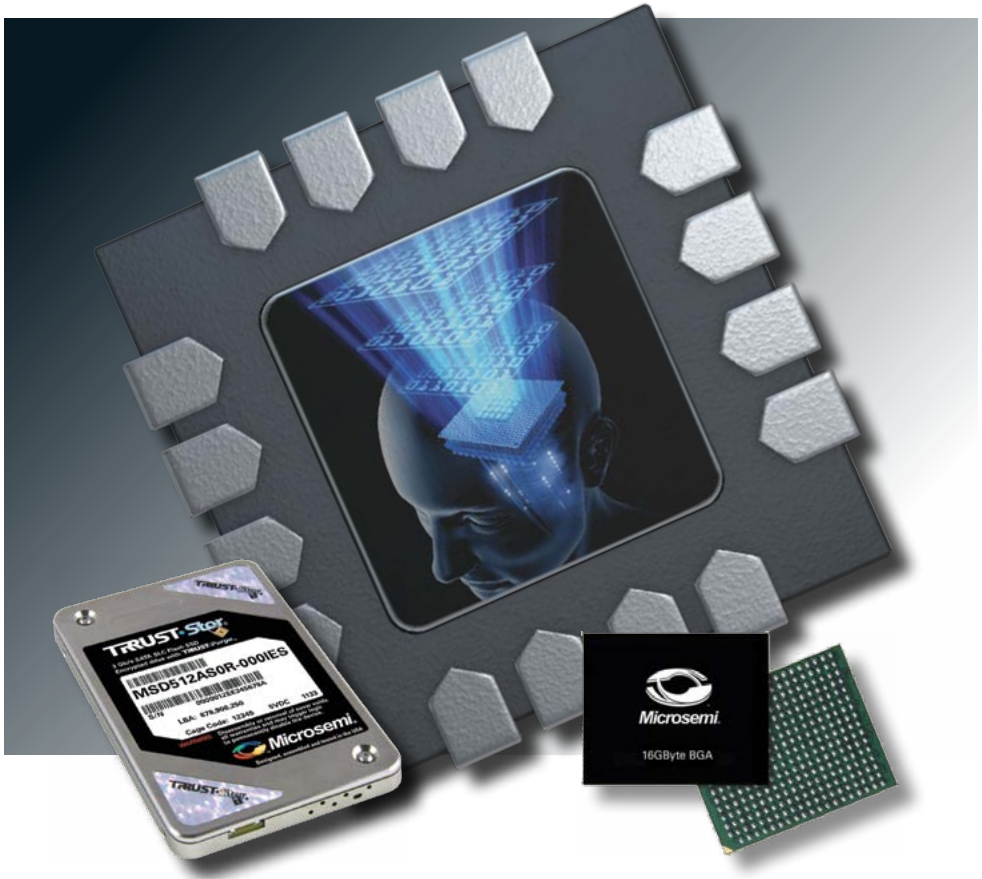
Low forward voltage drop: $V_F=65\text{ mV @ }I_F=10\text{ A, }T_A=90\text{ °C}$

Low reverse leakage current: $I_R=250\text{ uA @ }V_R=20\text{ V, }T_A=90\text{ °C}$

Bidirectional Lightning Survivability per IEC 61000-4-5, part 6.1

Operating Junction Temperature Range $-55\text{ °C to }225\text{ °C}$

The SFDS1045Le3 is a single Schottky rectifier assembled in a thin flexible package. The device is designed specifically for use as a photovoltaic bypass diode for solar panels. Its low 0.81 mm (0.032 inch) height allows it to be assembled under the glass of the panel, if desired. Customized configurations are available for high volume applications.



Microsemi offers a broad range of memory products, which can be ruggedized and processed for tamper resistance, or processed as Class K compliant.

The company's highly reliable storage solutions include highly secure, encrypted SSDs offered in a compact BGA package or a 2.5" SATA format. Built in the company's Defense Microelectronics Activity (DMEA) accredited facility, these products can also be ruggedized and processed for optimum information assurance.

Microsemi processor portfolio includes 68000 and PowerPC based processors for use in high reliability and rugged environment applications and SoC processors used in the company's flash- and antifuse-based FPGAs.

Microsemi's memory, storage and processor products are particularly well-suited for demanding defense, security, aviation and communications applications.

Microsemi's family of DDR SDRAM based Multi-Chip Packages (MCPs) is designed to give our customers a high density memory solution that also meets the wide data widths necessary for their applications. These high speed memories use a 2ns-prefetch architecture with an interface that allows two data words to be transmitted per clock cycle. Starting at a density of 128MB (1Gb) in x16, x64 and x72 data width configurations these DDR memories provide many benefits, such as: space savings versus single die packages including CSPs, reduced I/O routing, reduced component count and placements, and extended temperature range testing including industrial and military.

Part Number	Density	Organization	Speed	Volt	Package
W3E16M64S-XBX	128MB	16Mx64	200-266 Mb/s	2.5	219 PBGA
W3E32M64SA-XBX	256MB	32Mx64	200-333 Mb/s	2.5	219 PBGA
W3E32M64S-XBX	256MB	32Mx64	200-333 Mb/s	2.5	219 PBGA
W3E32M64S-XSBX	256MB	32Mx64	200-333 Mb/s	2.5	208 PBGA
W3E16M72S-XBX	128MB	16Mx72	200-266 Mb/s	2.5	219 PBGA
W3E32M72S-XBX	256MB	32Mx72	200-333 Mb/s	2.5	219 PBGA
W3E32M72S-XSBX	256MB	32Mx72	200-333 Mb/s	2.5	208 PBGA
W3E64M72S-XSBX	512MB	64Mx72	200-333 Mb/s	2.5	219 PBGA
Registered DDR SDRAM MCP					
W3E16M72SR-XBX	128MB	16Mx72	200-250 Mb/s	2.5	219 PBGA
W3E32M72SR-XSBX	256MB	32Mx72	200-266 Mb/s	2.5	208 PBGA

Microsemi's family of COTS DDR2 SDRAM is designed to give our customers a high density memory solution that also meets the wide data widths necessary for their applications. These high speed memories use a 4ns-prefetch architecture with an interface that allows two data words to be transmitted per clock cycle. With densities up to 1GByte in x64 and x72 data width configurations, these DDR2 memories provide many benefits, such as: space savings versus single die packages, including CSPs; reduced I/O routing; superior signal integrity; reduced component count and placements; and extended temperature range testing, including industrial and military.

Part Number	Density	Organization	Speed	Volt	Package
W3H32M64E-XSBX	256MB	32Mx64	400-667 Mbs	1.8	208 PBGA
W3H32M72E-XSB2X	256MB	32Mx72	400-667 Mbs	1.8	208 PBGA
W3H64M16E-XBX	256MB	64Mx16	400-667 Mbs	1.8	79 PBGA
W3H264M16E-XBX	512MB	2x64Mx16	400-667 Mbs	1.8	79 PBGA
W3H64M64E-XSBX	512MB	64Mx64	400-667 Mbs	1.8	208 PBGA
W3H64M72E-XSBX	512MB	64Mx72	400-667 Mbs	1.8	208 PBGA
W3H128M72E-XSBX	1GB	128Mx72	400-667 Mbs	1.8	208 PBGA
DDR2 SDRAM Single-Rank					
W3H32M64EA-XSBX	256MB	32Mx64	400-667 Mbs	1.8	208 PBGA
Registered DDR2 SDRAM					
W3H128M72ER-XNBX	1GB	128Mx72	400-667 Mbs	1.8	255 PBGA

Microsemi's family of COTS DDR3 SDRAM is designed to give our customers a high density memory solution that also meets the wide data widths necessary for their applications. These high speed memories use a 4ns-prefetch architecture with an interface that allows two data words to be transmitted per clock cycle. With densities up to 4GByte in 512Mx72 and 512Mx64 configurations, these DDR3 memories provide many benefits, such as: space savings versus single die packages, including CSPs; reduced I/O routing; superior signal integrity; reduced component count and placements; and extended temperature range testing, including industrial and military.

Part Number	Density	Organization	Speed	Volt	Package
W3J128M64G-XPBX	1GB	128Mx64	800, 1066, 1333, 1600*** Mb/s	1.5	375 PBGA***
W3J128M64K-XPBX	1GB	128Mx64	800, 1066, 1333, 1600*** Mb/s	1.35	375 PBGA***
W3J128M72G-XPBX	1GB	128Mx72	800, 1066, 1333, 1600*** Mb/s	1.5	375 PBGA
W3J128M72K-XPBX	1GB	128Mx72	800, 1066, 1333, 1600*** Mb/s	1.35	375 PBGA
W3J128M72G-XLBX	1GB	128Mx72	800, 1066, 1333, 1600*** Mb/s	1.5	375 PBGA - Low Profile
W3J128M64G-XLBX	1GB	128Mx64	800, 1066, 1333, 1600*** Mb/s	1.5	375 PBGA - Low Profile***
W3J128M64K-XLBX	1GB	128Mx64	800, 1066, 1333, 1600*** Mb/s	1.35	375 PBGA - Low Profile
W3J128M72K-XLBX	1GB	128Mx72	800, 1066, 1333, 1600*** Mb/s	1.35	375 PBGA - Low Profile
W3J512M72G-XPBX	4GB	512Mx72	800, 1066, 1333, 1600*** Mb/s	1.5	543 PBGA***
W3J512M64G-XPBX	4GB	512Mx64	800, 1066, 1333, 1600*** Mb/s	1.5	543 PBGA
W3J512M64K-XPBX	4GB	512Mx64	800, 1066, 1333, 1600*** Mb/s	1.35	543 PBGA
W3J512M72K-XPBX	4GB	512Mx72	800, 1066, 1333, 1600*** Mb/s	1.35	543 PBGA
W3J512M64G-XLBX	4GB	512Mx64	800, 1066, 1333, 1600*** Mb/s	1.5	543 PBGA - Low Profile
W3J512M64K-XLBX	4GB	512Mx64	800, 1066, 1333, 1600*** Mb/s	1.35	543 PBGA - Low Profile
W3J512M72G-XLBX	4GB	512Mx72	800, 1066, 1333, 1600*** Mb/s	1.5	543 PBGA - Low Profile
W3J512M72K-XLBX	4GB	512Mx72	800, 1066, 1333, 1600*** Mb/s	1.35	543 PBGA - Low Profile

*** Contact factory for availability.

Microsemi's suite of non-volatile EEPROM based single and multi chip modules (MCMs) provide a highly reliable and high density memory solution. Our EEPROM is also provided in various densities and form factors as to meet the data widths necessary for end-user applications. Starting at a density of 128MB (1Mb) in x8, x16 and x32 data width configurations these EEPROM memories provide many benefits such as; high density, hermetic and non-hermetic packaging, surface mount and through-hole attachment types, space savings, and extended temperature range testing including industrial and military.

Part Number	Organization	Speed	Volt	Temp	Package
EEPROM QML					
WME128K8-XCX	128Kx8	140-300 ns	5	C,I,M,Q	32 DIP
WME128K8-XDEX	128Kx8	140-300 ns	5	C,I,M,Q	32 CSOJ
EEPROM MCP					
WE128K8-XCX	128Kx8	150-300 ns	5	C,I,M	32 DIP
WE256K8-XCX	256Kx8	150-300 ns	5	C,I,M	32 DIP
WE512K8-XCX	512Kx8	150-300 ns	5	C,I,M	32 DIP
WE512K16-XG4X	512Kx16	150-300 ns	5	C,I,M	68 CQFP
WE32K32-XH1X	32Kx32	80-150 ns	5	C,I,M,Q	66 HIP PGA
WE32K32-XG2UX	32Kx32	80-150 ns	5	C,I,M,Q	68 CQFP
WE128K32-XH1X	128Kx32	125-300 ns	5	C,I,M,Q	66 HIP PGA

Microsemi's family of COTS non-volatile flash provides a high-density memory solution for military applications. In densities of 8 and 75 GBytes, these military flash memories provide many benefits, including: high density, hermetic and non-hermetic packaging; surface mount and through-hole attachment types; space savings, and extended military temperature testing.

NOR Flash						
1Mb	128Kx8	WMF128K8-XCX5	60-150 ns	5	C, I, M, Q	32 DIP
1Mb	128Kx8	WMF128K8-XCLX5	60-150 ns	5	C, I, M	32 CLCC
1Mb	128Kx8	WMF128K8-XDEX5	60-150 ns	5	C, I, M, Q	32 CSOJ
1Mb	128Kx8	WMF128K8-XFEX5	70-150 ns	5	C, I, M, Q	32 Fltpck
1Mb	128Kx8	WMF128K8-XFFX5	60-150 ns	5	C, I, M, Q	32 Fltpck
4Mb	512Kx8	WMF512K8-XCX5	60-150 ns	5	C, I, M, Q	32 DIP
4Mb	512Kx8	WMF512K8-XCLX5	60-150 ns	5	C,I,M	32 CLCC
4Mb	512Kx8	WMF512K8-XDEX5	60-150 ns	5	C,I,M,Q	32 CSOJ
4Mb	512Kx8	WMF512K8-XFEX5	70-150 ns	5	C,I,M,Q	32 Fltpck
16Mb	2Mx8	WMF2M8-XDAX5	90-150 ns	5	C,I,M,Q	56 CSOP
16Mb	2Mx8	WMF2M8-XLX5	90-150 ns	5	C,I,M	44 CLCC
NOR Flash PBGA						
32MByte	8Mx32	W78M32VP-XBX	110-120 ns	3.3	C,I,M	159 PBGA
64MByte	8Mx64	W78M64VP-XSBX	110-120 ns	3.3	C,I,M	159 PBGA
128MByte	2x16Mx32	W732M32E-XPBX	100-120 ns	1.8	C, I, M	119 PBGA
256MByte	64Mx32	W764M32V1-XBX	110-120 ns	3.3	C,I,M	107 PBGA
512MByte	2x64Mx32	W7264M32V1-XSBX	110-120 ns	3.3	C,I,M	107 PBGA
1GByte	4x64Mx32	W7464M32V1-XSBX	110-120 ns	3.3	C,I,M	107 PBGA

Microsemi provides sophisticated multi-chip modules and semiconductor packages, high reliability memory devices and compact flash memory cards, and complete electromechanical assemblies that meet time, cost and quality requirements for technology creators in the defense electronics market.

SRAM/EEPROM MCP

Part Number	Type	Organization	Speed	Density
WSE128K16-XH1X	SRAM/ EEPROM MCP	128Kx16	35-150,70-300 ns	2Mb
WSE128K16-XG2TX	SRAM/ EEPROM MCP	128Kx16	35-150,70-300 ns	2Mb
SRAM/Flash MCP				
WSF128K16-XH1X	SRAM/ Flash MCP	128Kx16	35-70,70-120 ns	2Mb
WSF128K16-XG1UX	SRAM/ Flash MCP	128Kx16	35-70,70-120 ns	2Mb
WSF2816-39H1X	SRAM/ Flash MCP	128Kx16/512x16	35,90 ns	2Mb/8Mb
WSF2816-39G2UX	SRAM/ Flash MCP	128Kx16/512x16	35,90 ns	2Mb/8Mb
WSF512K16-XH2X	SRAM/ Flash MCP	512Kx16	35-90,70-120 ns	8Mb
WSF512K16-XG2X	SRAM/ Flash MCP	512Kx16	35-90,70-120 ns	8Mb
WSF128K32-XH2X	SRAM/ Flash MCP	128Kx32	25-90,25-120 ns	4Mb
WSF41632-22H2X	SRAM/ Flash MCP	128Kx32/512Kx32	25,120 ns	4Mb/ 16Mb
WSF512K32-XH2X	SRAM/ Flash MCP	512Kx32	25-70,25-90 ns	16Mb
SSRAM/SDRAM MCP				
WED9LC6816V-BC	SSRAM/ SDRAM MCP	256Kx32/4Mx32	133-200/100-125 Mb/s	136Mb

Microsemi's premier product suite of SDRAM based multi chip modules (MCMs) delivers a high density memory solution that also meets the wide data widths necessary for high reliability defense/aerospace applications. These high-speed memories use a 2n-prefetch architecture with an interface that allows one data word to be transmitted per clock cycle.

Starting at a density of 32MB (256Mb) in x64 and x72 data width configurations, these SDRAM memories provide many benefits such as; space savings versus single die packages including CSPs, reduced I/O routing, reduced component count and placements, and extended temperature range testing including industrial and military.

Part Number	Density	Organization	Speed	Volt	Temp	Package
EDI416S4030A-SI	64MB	1Mx16x4	83-100 Mb/s	3.3	C,I	54 TSOP II
WED48S8030E	64MB	2Mx8x4	100-125 Mb/s	3.3	C,I	54 TSOP II
WED416S8030A-SI	128MB	2Mx16x4	83-100 Mb/s	3.3	C,I	54 TSOP II
Registered SDRAM MCP						
WEDPN16M64VR-XB2X	128MB	16Mx64	100-133 Mb/s	3.3	C,I,M	219 PBGA
WEDPN16M72VR-XB2X	128MB	16Mx72	100-133 Mb/s	3.3	C,I,M	219 PBGA
SDRAM MCP						
WEDPN4M64V-XBX	32MB	4Mx64	100-133 MHz	3.3	-	219 BGA
WEDPN8M64V-XB2X	64MB	8Mx64	100-133 MHz	3.3	-	219 BGA
WEDPN16M64V-XB2X	128MB	16Mx64	100-133 MHz	3.3	-	219 PBGA
W332M64V-XBX	256MB	32Mx64	100-133 MHz	3.3	-	219 PBGA
W332M64V-XSBX	256MB	32Mx64	100-133 MHz	3.3	-	208 PBGA
WEDPN4M72V-XB2X	32MB	4Mx72	100-133 MHz	3.3	-	219 PBGA
WEDPN8M72V-XB2X	64MB	8Mx72	100-133 MHz	3.3	-	219 BGA
WEDPN16M72V-XB2X	128MB	16Mx72	100-133 MHz	3.3	-	219 BGA
W332M72V-XBX	256MB	32Mx72	100-133 MHz	3.3	-	219 PBGA
W332M72V-XSBX	256MB	32Mx72	100-133 MHz	3.3	-	208 PBGA
W364M72V-XSBX	512MB	64Mx72	100-133 MHz	3.3	-	219 PBGA

SSRAM

Microsemi's family of SSRAM based Multi-Chip Packages (MCPs) are designed to give our customers a high density memory solution that also meets the wide data widths necessary for their applications. These high speed memories use synchronous inputs controlled by a positive-edge-triggered single-clock input including addresses, data and control. Starting at a density of 2MB (16Mb) in x32 and x72 data width configurations these SSRAM memories provide many benefits such as space savings versus single die packages, reduced I/O routing, reduced component count and placements, and extended temperature range testing including industrial and military.

NBL SSRAM MCP

Part Number	Density	Organization	Speed	Volt	Temp	Package
WEDPZ512K72V-XBX	4MB	512Kx72	100-150 MHz	3.3	C,I,M	152 PBGA
SSRAM MCP						
WED2DL32512V	16Mb	512Kx32	133-200 MHz	3.3	C, I	119 PBGA
WEDPY256K72V-XBX	16Mb	256Kx72	100-200 MHz	3.3	C,I,M	159 BGA

Microsemi's family of SRAM based Single and Multi-Chip Packages (MCPs) are designed to give customers a high density memory solution that also meets the wide data widths necessary for their applications. These high speed memories use parallel addresses, data and control lines. Starting at a density of 128k8 configurations these SRAM memories provide many benefits such as space savings versus single die packages, reduced I/O routing, reduced component count and placements, and industrial and military temperature ranges, qualified to DSCC requirements.

Part Number	Density	Organization	Speed	Volt	Temp	Package
WMS256K16-XFGX	4Mb	256Kx16	17-35 ns	5	C,I,M,Q	44 Fltpck
WMS256K16-XFLX	4Mb	256Kx16	17-35 ns	5	C,I,M,Q	44 Fltpck
EDI816256CA/LPA-F44	4Mb	256Kx16	17-35 ns	5	C,I,M,B	44 Fltpck
WMS256K16-XDLX	4Mb	256Kx16	17-35 ns	5	C,I,M,Q	44 CSOJ
EDI816256CA_LPA-N44	4Mb	256Kx16	17-55 ns	5	C,I,M,B	44 CSOJ
EDI816256CA-LPA-M44	4Mb	256Kx16	15-55 ns	5	C,I,M,B	44 PSOJ
WPS512K8X-XRJXG	4Mb	512Kx8	15-55 ns	5	I, M	36 PSOJ
WMS512K8-XDEX	4Mb	512Kx8	70-120 ns	5	C,I,M,Q	32 CSOJ
EDI88512C/LP-N	4Mb	512Kx8	70-120 ns	5	C,I,M	32 CSOJ
WMS512K8-XCX	4Mb	512Kx8	70-120 ns	5	C,I,M,Q	32 DIP
EDI88512C/LP-C	4Mb	512Kx8	70-120 ns	5	C,I,M	32 DIP
WMS512K8-XFX	4Mb	512Kx8	15-55 ns	5	C,I,M,Q	36 Fltpck
EDI88512CA/LPA-F36	4Mb	512Kx8	17-55 ns	5	C,I,M,B	36 Fltpck
WMS512K8-XFFX	4Mb	512Kx8	15-55 ns	5	C,I,M	32 Fltpck
EDI88512CA/LPA-B32	4Mb	512Kx8	17-55 ns	5	C,I,M,B	32 Fltpck
EDI88512CA-LPA-F32	4Mb	512Kx8	17-55 ns	5	C,I,M,B	32 Fltpck
WMS512K8-XDJX	4Mb	512Kx8	15-55 ns	5	C,I,M,Q	36 CSOJ
EDI88512CA/LPA-N36	4Mb	512Kx8	17-55 ns	5	C,I,M,B	36 CSOJ
WMS512K8-XDEX	4Mb	512Kx8	15-55 ns	5	C,I,M,Q	32 CSOJ
EDI88512CA/LPA-N	4Mb	512Kx8	17-55 ns	5	C,I,M,B	32 CSOJ
EDI88512CA/LPA-K	4Mb	512Kx8	17-55 ns	5	C,I,M,B	36 CLCC
WMS512K8-XCLX	4Mb	512Kx8	15-55 ns	5	C,I,M	32 CLCC
WMS512K8-XCLX	4Mb	512Kx8	15-55 ns	5	C,I,M,Q	32 DIP
EDI88512CA/LPA-C	4Mb	512Kx8	17-55 ns	5	C,I,M,B	32 DIP
EDI88512CA/LPA-T	4Mb	512Kx8	17-55 ns	5	C,I,M,B	32 DIP
EDI88512CA-XMXG	4Mb	512Kx8	17-25 ns	5	C,I,M	36 PSOJ
WMS512K8V-XCLX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	32 CLCC
WMS512K8V-XFX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	36 Fltpck
WMS512K8V-XFFX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	32 Fltpck
WMS512K8V-XDJX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	36 CSOJ
WMS512K8V-XDEX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	32 CSOJ
WMS512K8V-XCX	4Mb	512Kx8	15-20 ns	3.3	C,I,M	32 DIP
WPS256K16-XLJXG	4Mb	256Kx16	15-25 ns	5	I, M	44 PSOJ
EDI88257CA_LPC	2Mb	256Kx8	70-100 ns	5	C,I,M,B	32 DIP
EDI88257C_LP-C	2Mb	256Kx8	17-55 ns	5	C,I,M,B	32 DIP

Part Number	Density	Organization	Speed	Volt	Temp	Package
EDI88130CS_LPS-F	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 Fltpck
EDI88130CS_LPS-N	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 CSOJ
EDI88130CS_LPS-T	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 DIP
EDI88130CS_LPS-C	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 DIP
EDI88130CS_LPS-L	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 CLCC
WMS128K8-XCLX	1Mb	128Kx8	15-55 ns	5	C,I,M	32 CLCC
WMS128K8-XFX	1Mb	128Kx8	15-55 ns	5	C,I,M,Q	36 Fltpck
WMS128K8-XFEX	1Mb	128Kx8	15-55 ns	5	C,I,M	32 Fltpck
EDI88128CS_LPS-F	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 Fltpck
WMS128K8-XDRX	1Mb	128Kx8	15-55 ns	5	C,I,M,Q	32 CSOJ
WMS128K8-XDEX	1Mb	128Kx8	15-55 ns	5	C,I,M,Q	32 CSOJ
EDI88128CS_LPS-N	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 CSOJ
WMS128K8-XCX	1Mb	128Kx8	15-55 ns	5	C,I,M,Q	32 DIP
EDI88128CS/LPS-C	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 DIP
EDI88128CS/LPS-T	1Mb	128Kx8	15-55 ns	5	C,I,M,B	32 DIP
WPS64K16-XLJXG	1Mb	64Kx16	10-20 ns	5	I, M	44 PSOJ
SRAM MCP						
W82M32V-XBX	64Mb	2Mx32	12-20 ns	3.3	C,I,M	255 PBGA
WS1M32V-XG3X	32Mb	1Mx32	17-25 ns	3.3	C,I,M	84 CQFP
WS1M32-XH2X	32Mb	1Mx32	20-25	5	C,I,M	66 PGA
WS1M32-XG3X (Fast)	32Mb	1Mx32	17-25 ns	5	C,I,M	84 CQFP
WS1M32-XG3X (Slow)	32Mb	1Mx32	70-120 ns	5	C,I,M	84 CQFP
WS512K32-XG2LX (Fast)	16Mb	512Kx32	15-55 ns	5	C,I,M,Q	68 CQFP

Microsemi's microprocessor products include 68000 and PowerPC based processors for use in high reliability and rugged environment applications. The PowerPC MCPs are integrated with SSRAM for L2 Cache to give substantial space savings, with optimized performance capabilities.

68000 Processors Introduction

Microsemi is helping to mitigate EOL concerns and continues to offer 68000-family processors in ceramic hermetic packages for legacy programs concerned with obsolescence.

Microprocessors

Part Number	Processor	Speed	Temp	Package
WC32P040-XQ4M	68040	25,33 Mb/s	M	184 CQFP
WC32P040-XP4M	68040	25,33 Mb/s	M	179 CPGA
WC16P332-16GX	68332	16 Mb/s	C, I, M	132 CQFP

Power PC Introduction

Microsemi's families of PowerPC with integrated SSRAM for L2 Cache are designed to give our customers an optimized high speed processor with a maximized L2 Cache density solution.

Utilizing the 755 and 7410 processors with between 1-2MB of SSRAM, these MCPs provide a great deal of space savings versus the individually packaged parts, while providing reduced I/O count, reduced part and placement quantity and extended temperature availability at industrial and military temperature ranges.

PowerPC™ System Solutions

Part Number	Speed	Volt	Package
WED3C755E8MC-XBX	300-350 MHz	2	255 CBGA
WED3C755E8MC-XBHX	300-350 MHz	2	255 HBGA
WED3C7410E16MC-XBHX	400-450 MHz	1.8	255 HBGA

TI-Sitara-OMAP-DaVinci

Microsemi's Extended Life Program (ELP) supports the TI (Sitara, OMAP, DaVinci) memory family with extended life availability for devices that are EOL. Providing both LPDDR and LPDDR + flash, Microsemi serves this market with components compatible with PoP OMAP processors. For more information or a datasheet, please contact our factory.

ELP MCP for OMAP

Part Number	NAND Density	NAND Width	LPDDR Density	LPDDR Width	Volt	Temp	Package
MS29C2G24MAKLA1-XX	2Gb	X16	1Gb	X32	1.8	I,C	152 PBGA, 14mm x 14mm
MS29C4G48MAZAKC1-XX	4Gb	X16	2Gb	X32	1.8	I,C	152 PBGA, 14mm x 14mm
MS46H64M32L2SB-XX	-	-	2Gb	X32	1.8	I,C	152 PBGA, 14mm x 14mm

Whether in a compact BGA package or in a 2.5" SATA drive, our solid state storage devices provide highly reliable data storage for embedded computing such as that used in aircraft, communications and missiles. These products can also be ruggedized and processed for optimum information assurance. Our new TRRUST-Stor™ drive offers unparalleled security and performance features, including hardware-based encryption and loss prevention. When failure is not an option, Microsemi solid state storage is the answer.

NAND BGA SSD Introduction

Microsemi BGA SSDs provide secure solid state storage for applications where a full-size 2.5-inch device is too large. Our NAND flash high-density BGA product is a surface mountable solid state data storage device that is specifically designed for use in the rugged and demanding embedded environments of defence and aerospace applications. The product is available in two form factors and both PATA and SATA interfaces. The 8GByte and 16GByte PATA devices are manufactured in a 22mm x 27mm 224 plastic ball grid array (PBGA) package that supports various PATA interface protocols; the 48GByte and 96GByte SATA devices come in a 28mm x 32mm 524 PBGA with a SATA interface. These products provide highly reliable, high-density data storage for embedded computing applications, including C4ISR, navigation, robotics and avionics. Advanced security features are available.

SLC NAND Flash - PBGA (SATA)

Speed	Density	Part Number	Interface	Volt	Temp	Package
1.5-3 Gb/s	48GByte	MSM048	SATA	-	I	524 PBGA
1.5-3 Gb/s	96GByte	MSM096	SATA	-	I	524 PBGA
SLC NAND Flash - PBGA (PATA)						
45/30 MB/s	8GB	W7N8GVHxxBI	PATA	-	I	224 PBGA
45/30 MB/s	16GB	W7N16GVHxxBI	PATA	-	I	224 PBGA

TRRUST-Stor[®] SSD Introduction

Microsemi's new TRRUST-Stor military-grade solid state disk drive protects sensitive data from environmental and human threats. Engineered specifically for defense applications, this 2.5" SATA SSD drive with SLC NAND flash transcends limitations inherent in the memory media. Manufactured and designed in our secure, trusted U.S. facility, the TRRUST-Stor™ high-reliability encrypted secure storage device provides unparalleled performance where data integrity, security and extended environment performance are mission requirements. The TRRUST-Stor SSD also contains key management features that can be customized for encryption applications. TRRUST-Stor solid state drives are the industry's first SSDs to pass zero-failure testing at vibration levels that are consistent with the industry's most severe environments. Suitable for military applications, including data recorders, avionics, ruggedized mobile systems and digital maps, fighter aircraft, unmanned aerial vehicles, helicopters, mobile man-pack and ground vehicle applications.

TRRUST-Stor 2.5 in. SATA Secure Storage Device

Part Number	Density	Speed	Interface	Temp	Package
MSD064AS0R	64G	100/100 MB/s	SATA	I	2.5" (9.5mm thick)
MSD128AS0R	128G	100/100 MB/s	SATA	I	2.5" (9.5mm thick)
MSD256AM2R	256G	200/200 MB/s	SATA	I	2.5" (9.5mm thick)
MSD512AM2R	512G	200/200 MB/s	SATA	I	2.5" (9.5mm thick)
-	32-400G	-	-	I	Custom Form Factor

SECURRE-Stor[™] SSD Introduction

The SECURRE-Stor is uniquely designed for applications where data protection is extremely important. AES-256 encryption, authentication and other security features in Microsemi's technology provides ultimate protection of sensitive data. The SECURRE-Stor is ideal for applications where HDDs need to be physically destroyed to prevent loss of data. The data key can be erased in less than 10 ms, followed by full hardware erase in less than 10 seconds. This leaves data forensically unrecoverable without physically destroying the drive. Microsemi's proprietary design provides superior data integrity and endurance by focusing on error correction, wear leveling, and eliminating drive corruption. This failure prevention methodology protects data from catastrophic failures in critical applications. The management processor provides the SECURRE-Stor with feature-rich capabilities and the flexibility required to serve the many operating requirements. By having control and ownership of the management processor, Microsemi eliminates any dependence on third party controllers, thus protecting customers from costly changes and/or end-of-life problems.

SECURRE-Stor Encrypted 2.5 in. SATA Secure Storage Device

Part Number	Density	Speed	Interface	Temp	Package
FSD064	64G	100/100 MB/s	SATA	C	2.5" (9.5mm thick)
FSD128	128G	100/100 MB/s	SATA	C	2.5" (9.5mm thick)
FSD256	256G	200/200 MB/s	SATA	C	2.5" (9.5mm thick)
FSD512	512G	200/200 MB/s	SATA	C	2.5" (9.5mm thick)



Power electronics systems are always targeting higher performance and reliability with minimum size. The unique solution to address all of these requirements is to implement power modules solution. Microsemi combines a formidable array of technologies in semiconductors, packaging and automated manufacturing to produce a wide range of high quality modules optimized for:

- Reliability
- Efficiency and electrical performance
- Space savings
- Reduced assembly time
- Reduced time-to-market

The readily available standard module product line spans a wide selection of circuit topologies and packages. If you need even more flexibility in terms of intellectual property protection, semiconductor types (such as Silicon Carbide), voltage or current ratings, Microsemi can often customize standard modules with low set up costs and a short lead time. Unique requirements can be met with Application Specific Power Modules (ASPM®). Microsemi's Power Module will always prove that Power Matters.

Microsemi PMP offers a wide range of standard electrical configurations housed in various packages that are capable to respond to multiple power conversion demands asking for high power density and performance. Same topology can be offered with different semiconductors type.

Electrical Topology	IGBT 600V to 1700V	MOSFET 75V to 1200V	Diode 30V to 1700V	Mix Si-SiC 600 & 1200V	Full SiC 600 & 1200V
Asymmetrical Bridge	X	X			
Boost Buck	X	X			
Boost & Buck Chopper	X	X		X	X
Common Anode			X		
Common Cathode			X		
Dual Boost & Buck Chopper	X	X		X	
Dual Common Source	X	X			
Dual Diode					X
Full Bridge	X	X	X		X
Full Bridge + PFC	X	X		X	
Full Bridge + Secondary Fast Rectifier Bridge	X	X		X	
Full Bridge + Series and Parallel Diodes		X		X	
Interleaved PFC	X	X			
Linear single and Dual switch		X			
Phase Leg	X	X	X		X
Phase Leg Intelligent	X				
Phase Leg + PFC		X		X	
Phase Leg + Series and Parallel Diodes		X		X	
Single Switch	X	X	X		
Single Switch + Series and Parallel Diodes		X		X	
Single Switch + Series Diodes	X	X			
3-Level NPC Inverter	X				X
3-Level T-Type Inverter	X			X	
3-Phase Bridge	X		X		
Triple Dual Common Source	X	X			
Triple Phase Leg	X	X		X	

Application Specific Power Module

Microsemi has created the Application Specific Power Module (ASPM) concept after offering customized power modules since 1983. Microsemi offers a complete engineered solution with mix and match capabilities in term of package, configuration, performance and cost. Microsemi power modules are made of different sub-elements. Most of them are standard and can be reused to build infinite solutions for the end user. Microsemi offers optimum development cost and cycle time thanks to longterm experience and wide range of available technologies.

Power Modules Features

- High power density
- Isolated and highly thermal conductive substrate
- Internal wiring
- Minimum parasitics
- Minimum output terminals
- Mix and match components
- Full engineered solutions

Customer Benefits

- Size and cost reduction
- Excellent thermal management
- Reduced external hardware
- Improved performance
- Reduced assembly time
- Optimizes losses
- Easy upgrade/less parts counts/short time to market/IP protection

Internal printed circuit board

Used to route gate signal tracks to small signal terminals. Used to mount gate circuit and provides protection in case of intelligent power modules. Not available in all modules.

Terminals

Screw on or solder pins provide the user with power and signal connections with minimum parasitic resistance and inductance.

Substrates

Al₂O₃, AlN and Si₃N₄ provide isolation and good heat

Package

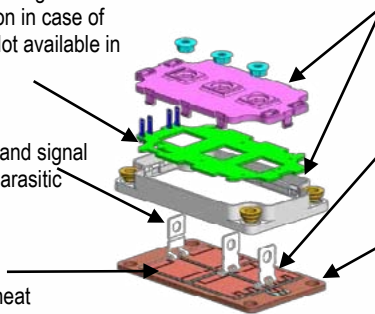
Standard or custom ensure environmental protection and mechanical robustness.

Power semiconductor die

IGBT, mosfet, diode, siC, thyristor and switching devices soldered to the substrates and connected by ultrasonic Al wire

Base plate

Improve the heat transfer to the heat sink copper for good thermal transfer. AlSiC, CuW and CuMoCu for improved reliability.



FLEXIBILITY

- Great level of integration
- mix of silicon within the same package.
- No quantity limitation.

PACKAGING CAPABILITY

- Standard and Custom packages,
- standard and Custom terminals, and
- various substrate technologies.

TECHNOLOGY

- Application oriented,
- strong technical support and
- state of the art assembly processes.

RELIABILITY

- Coefficient of thermal expansion matching
- proven field high life time.
- Extended temperature range capabilities.

Applications

Solar - Welding - Plasma cutting - Semicap - MRI & Xray - EV/HEV
 Induction Heating - UPS - Motor control - Data Communication

Microsemi has acquired a great experience and know-how in module customization to address rugged and wide temperature range application and offers solution to meet with next generation integrated power systems expectation in terms of:

Improved reliability

Higher power

Lower weight & size

Wider operating temperatures

Higher efficiency

Lower cost

Test capabilities

- X-rays inspection
- Dielectric test (up to 6KV)
- Electrical testing at specified temp
- Burn-in
- Acoustic imaging

Reliability testing capabilities

- Power cycling
- Hermetic sealing
- Moisture
- Salt atmosphere
- HTGB
- Temperature shock
- HAST
- H3TRB
- Altitude
- Mechanical shock, vibration

Expertise capabilities

- Cross-sectioning
- structural analysis

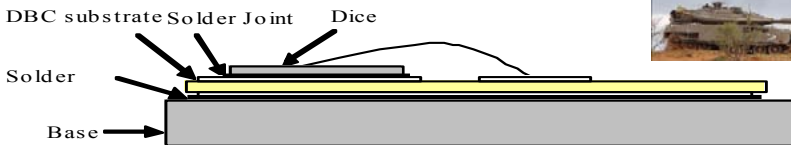
All tests can be conducted upon demand by sampling or at 100%. Tests performed in house or with external labs.

Closely matched materials TCE's increase the module life time by reducing the stress at the interface of the materials and inside the materials.

The higher the thermal conductivity, the lower is the junction to case thermal resistance and the lower will be the delta of junction temperature of the device during operation such that the effect of power cycling on the dice will be minimized.

Another important feature is the material density, particularly for the baseplate.

Taking copper as the reference, AlSiC has a density of 1/3 while CuW has twice the density. Therefore AlSiC will provide substantial weight reduction at the same time as reliability increase.

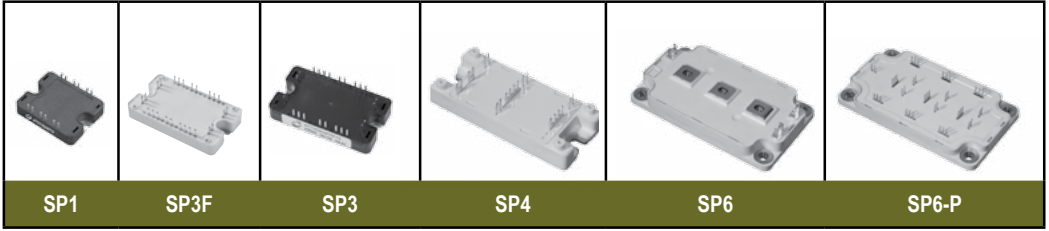


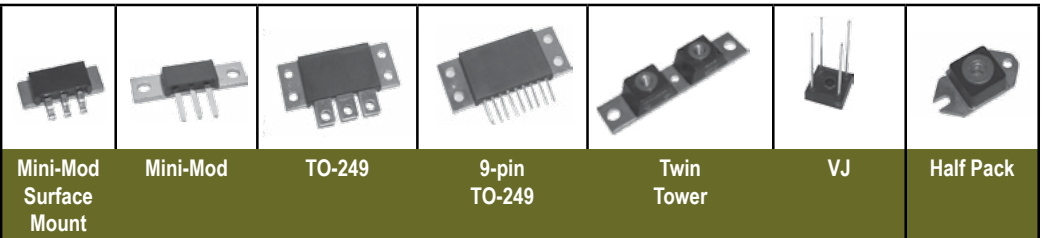
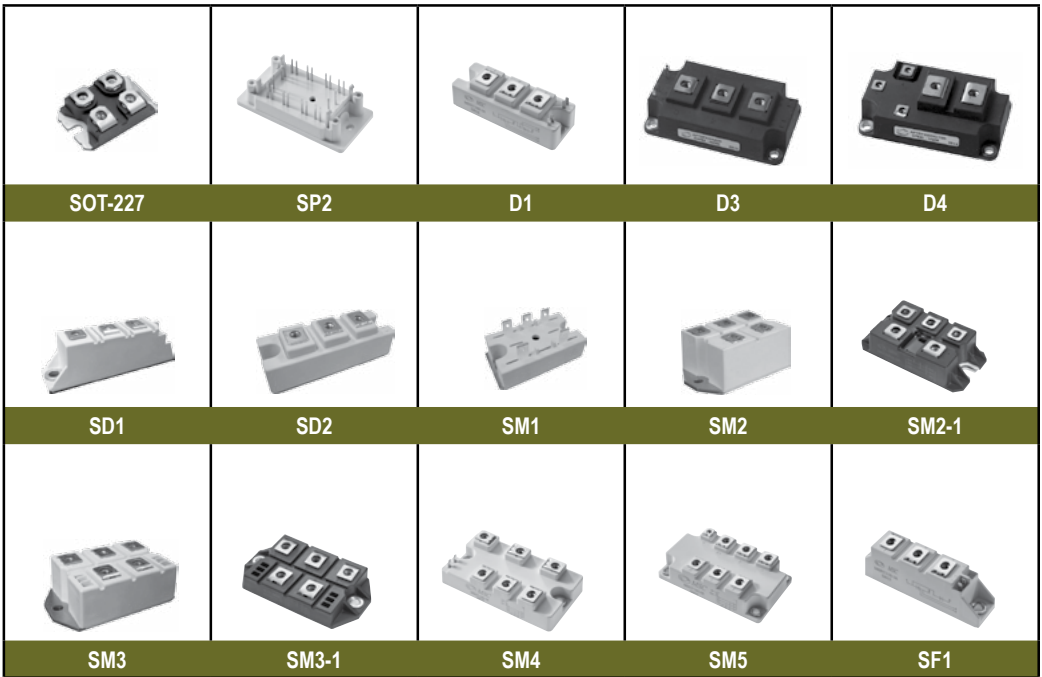
Our Core Competencies

- Extensive experience of rugged solutions for harsh environment
- Wide range of silicon technologies
- Wafer fab capabilities
- Mix of assembly technologies
- Hermetic and robust plastic packages
- Custom test & burn-in solutions
- ISO9001 certified
- End-of-life (obsolescence) management
- Thermal management
- Product life management associated to risks analysis

Improved Low Profile Packages

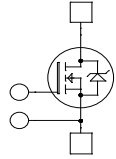
SP1 (12mm) SP3 (12mm) SP4 (17mm) SP6 (17mm) SP6-P (12mm)


Industry Standard Packages

 SOT-227 (Isotop®) D1 (34 mm Wide) D4 (62 mm Wide)
 SP2 (17mm) D3 (62 mm Wide)


Microsemi provides MOSFET and CoolMOS POWER MODULES in various electrical topologies to address industrial applications looking for fast and quiet switching.

Ranking from 75V to 1200V, Microsemi's MOSFET & CoolMOS Power Modules offers in low profile packages: low EMI, low gate charge, Avalanche energy rated semiconductors from few Amps up to more than 600A per switch.



Several types of MOSFET and CoolMOS are available offering different switching characteristics and cost.

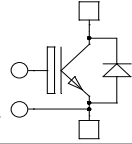
Part Number	Configuration	VDS VCE VRRM (V)	Silicon Type	Current (A) I _C =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
APTM50DHM65T3G	Asymmetrical bridge	500	MOS 8	32	65	YES	SP3
APT20M22JVUR2	Boost chopper	200	MOSFET	71	22	NO	SOT-227
APT33N90JCU2	Boost chopper	900	CoolMOS	25	120	NO	SOT-227
APT40N60JCU2	Boost chopper	600	CoolMOS	40	70	NO	SOT-227
APTC60DAM24T1G	Boost chopper	600	CoolMOS	70	24	YES	SP1
APTM100DA33T1G	Boost chopper	1000	MOS 8	17	330	YES	SP1
APTM50SKM19G	Buck chopper	500	MOSFET	125	19	OPT.	SP6
APTC60DDAM24T3G	Dual boost chopper	600	CoolMOS	70	24	YES	SP3
APTC90DSK12T1G	Dual buck chopper	900	CoolMOS	23	120	YES	SP1
APTM50DUM17G	Dual common source	500	MOSFET	140	17	OPT.	SP6
APTML1002U60R020T3AG	Dual Linear switch	1000	MOSFET	-	600	YES	SP3
APTML202UM18R010T3AG	Dual Linear switch	200	MOSFET	-	18	YES	SP3
APTC60HM83FT2G	Full bridge	600	CoolMOS	21	83	YES	SP2
APTM100H18FG	Full bridge	1000	FREDFET	33	180	NO	SP6
APTM50H15FT1G	Full bridge	500	FREDFET 8	19	150	YES	SP1
APTCV50H60T3G	Full bridge	600	CoolMOS/ TRENCH	50	45 / 1.5	YES	SP3
APTM100H45STG	Full bridge + series and parallel diodes	1000	MOSFET	13	450	YES	SP4
APTC60VDAM45T1G	Interleaved PFC	600	CoolMOS/ TRENCH	38	45	YES	SP1
APTV50H60BT3G	PFC + Bypass + Full bridge	600	CoolMOS/ TRENCH	50	1.7 / 3.2	YES	SP3F
APTM100A40FT1G	Phase leg	1000	FREDFET 8	16	400	YES	SP1
APTM20AM05FG	Phase leg	200	FREDFET	250	5	OPT.	SP6
APTM50AM24SG	Phase leg + series and parallel diodes	500	MOSFET	110	24	OPT.	SP6
APTCV60HM45RT3G	Secondary fast rectifier + full bridge	600	CoolMOS/ TRENCH	38	45 / 1.5	YES	SP3F
APTML10UM09R004T1AG	Single Linear switch	100	MOSFET	-	9	YES	SP1
APTML20UM18R010T1AG	Single Linear switch	200	MOSFET	-	18	YES	SP1

OPT. - Option

Part Number	Configuration	VDS VCE VRRM (V)	Silicon Type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
APTM10UM02FAG	Single switch	100	FREDFET	430	2.25	OPT.	SP6
APTM120UM70FAG	Single switch	1200	FREDFET	126	70	OPT.	SP6
APTM100UM65SAG	Single switch + series and parallel diodes	1000	MOSFET	110	65	OPT.	SP6
APTCV60TLM24T3G	Three level inverter	600	CoolMos/ TRENCH	75	24/ 1.5	YES	SP3
APTM120TDU57PG	Triple Dual common source	1200	MOSFET	13	570	OPT.	SP6-P
APTC90TAM60TPG	Triple Phase leg	900	CoolMOS	44	60	YES	SP6-P
APTM20TAM16FPG	Triple Phase leg	200	FREDFET	74	16	OPT.	SP6-P

OPT. - Option

Microsemi provides IGBT Power Modules in various electrical topologies to address industrial applications looking for high power, high voltage and high efficiency. Ranking from 600V to 1700V, Microsemi's IGBT Power Modules offer low EMI, low gate charge, low voltage drop, low tail current semiconductors from 15A up to 750A per switch. Two technologies of IGBT are available with Non Punch-Through (BPT) and Trench & Field stop offering improved switching or conduction characteristics. Microsemi's wide range of standard and low profile packages with very low stray inductance and high level of integration, brings all the benefits of such semiconductors to the end user.



Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
APTGF150DH120G	Asymmetrical bridge	1200	NPT IGBT	150	3.2	NO	SP6
APTGL60DH120T3G	Asymmetrical bridge	1200	TRENCH 4 IGBT	60	1.85	YES	SP3
APTGT50DH170TG	Asymmetrical bridge	1700	TRENCH IGBT	50	2.0	YES	SP4
APTGT75DH60T1G	Asymmetrical bridge	600	TRENCH IGBT	75	1.5	YES	SP1
APT30GF60JU2	Boost chopper	600	NPT IGBT	30	2.1	NO	SOT-227
APTGF100DA120T1G	Boost chopper	1200	NPT IGBT	100	3.2	YES	SP1
APTGF165DA60D1G	Boost chopper	600	NPT IGBT	165	2.0	NO	D1
APTGT450DA60G	Boost chopper	600	TRENCH IGBT	450	1.4	OPT.	SP6
APTGL700SK120D3G	Boost chopper	1200	TRENCH 4 IGBT	700	1.85	OPT.	D3
APTGT75DA120TG	Boost chopper	1200	TRENCH IGBT	75	1.7	YES	SP4
APTGT75DA170T1G	Boost chopper	1700	TRENCH IGBT	75	2.0	YES	SP1
APTV50H60BG	Boost chopper + Full bridge	600	NPT/TRENCH IGBT	50	2.1 / 1.5	OPT.	SP4
APT100GF60JU3	Buck chopper	600	NPT IGBT	100	2.1	NO	SOT-227
APT50GF60JU3	Buck chopper	600	NPT IGBT	50	2.1	NO	SOT-227
APTGT200SK60T3AG	Buck chopper	600	TRENCH IGBT	200	1.5	YES	SP3
APTGT75SK60T1G	Buck chopper	600	TRENCH IGBT	75	1.5	YES	SP1
APTGL475SK120D3G	Buck chopper	1200	TRENCH 4 IGBT	475	1.85	OPT.	D3

OPT. - Option

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
APTGT150SK120D1G	Buck chopper	1200	TRENCH IGBT	150	1.7	NO	D1
APTGT300SK170G	Buck chopper	1700	TRENCH IGBT	300	2.0	OPT.	SP6
APTGF50DDA120T3G	Dual boost chopper	1200	NPT IGBT	50	3.2	YES	SP3
APTGF100A1202G	Phase leg	1200	NPT IGBT	100	3.2	NO	SP2
APTGF15A120T1G	Phase leg	1200	NPT IGBT	15	3.2	YES	SP1
APTGT150A60T3AG	Phase leg	600	TRENCH IGBT	150	1.5	YES	SP3
APTGL180A1202G	Phase leg	1200	TRENCH 4 IGBT	180	1.85	NO	SP2
APTGL475A120D3G	Phase leg	1200	TRENCH 4 IGBT	475	1.85	OPT.	D3
APTGT150A120D1G	Phase leg	1200	TRENCH IGBT	150	1.7	NO	D1
APTGT50A170TG	Phase leg	1700	TRENCH IGBT	50	2.0	YES	SP4
APTGLQ600A60T6G	Phase leg	600	TRENCH 4 FAST IGBT	600	1.85	YES	SP6
APTGLQ100A120T3AG	Phase leg	1200	TRENCH 4 FAST IGBT	100	2.05	YES	SP3F
APTGLQ400A120T6G	Phase leg	1200	TRENCH 4 FAST IGBT	400	2.05	YES	SP6
APTGT400U170D4G	Single switch	1700	TRENCH IGBT	400	2.0	NO	D4
APTGT750U60D4G	Single switch	600	TRENCH IGBT	750	1.5	NO	D4
APTGT100TL60T3G	Three level inverter	600	TRENCH IGBT	100	1.5	YES	SP3
APTGT300TL60G	Three level inverter	600	TRENCH IGBT	300	1.5	NO	SP6
APTGL40X120T3G	Three Phase bridge	1200	TRENCH 4 IGBT	40	1.85	YES	SP3
APTGT50X60T3G	Three Phase bridge	600	TRENCH IGBT	50	1.5	YES	SP3
APTGT50TDU170PG	Triple Dual common source	1700	TRENCH IGBT	50	2.0	OPT.	SP6-P
APTGL120TA120TPG	Triple Phase leg	1200	TRENCH 4 IGBT	120	1.85	YES	SP6-P
APTGLQ200HR120G	T-Type	1200	TRENCH 4 FAST IGBT	200	2.05	NO	SP6

OPT. - Option

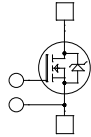
Microsemi's Silicon Carbide (SiC) Power Modules offer superior dynamic and thermal performance over conventional Silicon power devices. The main advantages of the SiC are:

- Essentially zero forward and reverse recovery = Reduced switch and diode switching losses
- Temperature independent switching behavior = stable high temperature performance
- Positive temperature coefficient of VF = ease of parallel operation
- Usable 175°C Junction Temperature = safely operate at higher temperatures

Extremely fast switching of Microsemi's SiC Power Modules enables:

- Improved System Efficiency
- Higher Reliability
- Lower System Switching Losses
- Reduced System Size
- Lower System Cost

Microsemi's SiC power modules product line includes SiC Schottky diodes and SiC Mosfet used in various electrical configurations either alone or with mixed-semiconductors as MOSFETs, CoolMos or IGBTs.



Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C	RDson (mΩ) VCEsat (V) VF (V)	NTC	PKG
APT25GF120JCU2	Boost chopper	1200	NPT IGBT + SiC	25	3.2	NO	SOT-227
APT50GF60JCU2	Boost chopper	600	NPT IGBT + SiC	50	2.1	NO	SOT-227
APTGF90DA60CT1G	Boost chopper	600	NPT IGBT + SiC	90	2.1	YES	SP1
APT26M100JCU2	Boost chopper	1000	MOS 8 + SiC	20	330	NO	SOT-227
APT58M50JCU2	Boost chopper	500	MOS 8 + SiC	43	65	NO	SOT-227
APTC60DAM24CT1G	Boost chopper	600	CoolMos + SiC	70	24	YES	SP1
APT40GLQ120JCU2	Boost chopper	1200	TRENCH 4 FAST IGBT + SiC	40	2.05	NO	SOT-227
APT100MC120JCU2	Boost chopper	1200	SiC MOSFET	100	20	NO	SOT-227
APT20M120JCU3	Buck chopper	1200	MOS 8 + SiC	15	560	NO	SOT-227
APTGLQ40DDA120CT3G	Dual boost chopper	1200	TRENCH 4 FAST IGBT + SiC	40	2.05	YES	SP3F

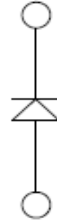
Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
APTC60DSKM45CT1G	Dual buck chopper	600	CoolMos + SiC	38	45	YES	SP1
APT2X40DC120J	Dual diode	1200	SiC diode	40	1.6	NO	SOT-227
APT2X61DC60J	Dual diode	600	SiC diode	60	1.6	NO	SOT-227
APTDC902U601G	Dual diode	600	SiC diode	90	1.6	NO	SP1
APT40DC120HJ	Full bridge	1200	SiC diode	40	1.6	NO	SOT-227
APTDC40H1201G	Full bridge	1200	SiC diode	40	1.6	NO	SP1
APTC60HM45SCTG	Full bridge + series FRED and SiC parallel diodes	600	CoolMos + SiC	38	45	YES	SP4
APTCV60HM45BC20T3G	PFC + Bypass + Full bridge	600	CoolMos/ TRENCH + SiC	38	45 / 1.5	YES	SP3F
APTMC120AM55CT1AG	Phase Leg	1200	SiC MOSFET	40	55	YES	SP1
APTMC120AM08CD3AG	Phase Leg	1200	SiC MOSFET	185	8	OPT.	D3
APTM100A13SCG	Phase leg + series FRED and SiC parallel diodes	1000	MOSFET + SiC	49	130	OPT.	SP6
APTCV60HM45RCT3G	Secondary fast rectifier + full bridge	600	CoolMos/ TRENCH + SiC	38	45 / 1.5	YES	SP3F
APTMC60TLM20CT3AG	Three level inverter	600	SiC MOSFET	110	20	YES	SP3F
APTMC60TLM14CAG	Three level inverter	600	SiC MOSFET	160	14	NO	SP6
APTM100TA35SCTPG	Triple Phase leg	1000	MOSFET + SiC	50	350	YES	SP6-P
APTGLQ80HR120CT3G	T-Type	1200	TRENCH 4 FAST IGBT + SiC	80	2.05	YES	SP3F
APTMC120HR11CT3G	T-Type	1200	SiC MOSFET	20	110	YES	SP3F

OPT. - Option

Microsemi provides DIODE Power Modules in various electrical topologies to address industrial applications looking for high power density solutions.

Ranking from 30V to 1800V and 10A to 500A, Microsemi's Diode Power Modules offer a full product line of standard recovery, Schottky and Fast Recovery (FRED) diodes.

Microsemi's Diode Power Modules offer a wide range of isolated and non-isolated packages with low stray inductance and high level of integration.



Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
MSAD120-16	Dual Common Anode	1600	Rectifier diode	120	1.15	NO	SD1
MSAD200-08	Dual Common Anode	800	Rectifier diode	200	1.2	NO	SD2
MSAD70-12	Dual Common Anode	1200	Rectifier diode	70	1.15	NO	SD1
APTDF400AA120G	Dual Common Cathode	1200	FRED diode	400	2.4	NO	SP6
APTDF400KK170G	Dual Common Cathode	1700	FRED diode	400	2.2	NO	SP6
CPT30045	Dual Common Cathode	45	Schottky diode	150	0.77	NO	Twin Tower
FST160100	Dual Common Cathode	100	Schottky diode	80	0.96	NO	TO-249
FST80100	Dual Common Cathode	100	Schottky diode	40	0.82	NO	Mini-Mod
MSKD100-18	Dual Common Cathode	1800	Rectifier diode	100	1.15	NO	SD1
MSKD200-18	Dual Common Cathode	1800	Rectifier diode	200	1.2	NO	SD2
MSKD36-08	Dual Common Cathode	800	Rectifier diode	36	1.15	NO	SD1
UFT7260SM1A	Dual Common Cathode	600	Rectifier diode	35	1.35	NO	Mini-Mod SM
APT30DS20HJ	Full bridge	200	Schottky diode	30	0.9	NO	SOT-227
APT75DF170HJ	Full bridge	1700	FRED diode	75	1.8	NO	SOT-227
VJ447M	Full Bridge	450	Rectifier diode	10	1.30	NO	VJ
APTDF400AK120G	Phase Leg	1200	FRED diode	400	2.4	NO	SP6
MSCD120-18	Phase Leg	1800	Rectifier diode	120	1.15	NO	SD1
MSCD200-12	Phase Leg	1200	Rectifier diode	200	1.2	NO	SD2
APTDF450U60G	Single diode	600	FRED diode	450	1.8	NO	LP4
HS12045	Single diode	45	Schottky diode	120	0.55	NO	Half Pack
SDM30004	Single diode	400	Rectifier diode	300	1.10	NO	SDM
APTDR90X1601G	Three Phase bridge	600	Rectifier diode	90	1.30	NO	SP1
MSD200-18	Three Phase bridge	1800	Rectifier diode	200	1.2	NO	SM3
MSD30-08	Three Phase bridge	800	Rectifier diode	30	1.15	NO	SM1
MSD75-16	Three Phase bridge	1600	Rectifier diode	75	1.15	NO	SM2
MSDM200-12	Three Phase bridge	1200	Rectifier diode	200	1.31	NO	SM3-1
MSDM50-08	Three Phase bridge	800	Rectifier diode	50	1.45	NO	SM2-1

Microsemi provides Diode Power Modules in various electrical topologies to address industrial applications looking for high power density solutions.

Ranking from 30V to 1800V and 10A to 500A, Microsemi's Diode Power Module offers a full product line of standard recovery, Schottky and Fast Recovery (FRED) diodes.

Microsemi's Diode Power Module offer a wide range of isolated and non-isolated packages with low stray inductance and high level of integration.

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
MSAD100-08	DCA*	800	Rectifier diode	100	1.15	SD1
MSAD100-12	DCA	1200	Rectifier diode	100	1.15	SD1
MSAD100-16	DCA	1600	Rectifier diode	100	1.15	SD1
MSAD100-18	DCA	1800	Rectifier diode	100	1.15	SD1
MSAD120-08	DCA	800	Rectifier diode	120	1.15	SD1
MSAD120-12	DCA	1200	Rectifier diode	120	1.15	SD1
MSAD120-16	DCA	1600	Rectifier diode	120	1.15	SD1
MSAD120-18	DCA	1800	Rectifier diode	120	1.15	SD1
MSAD165-08	DCA	800	Rectifier diode	165	1.15	SD2
MSAD165-12	DCA	1200	Rectifier diode	165	1.15	SD2
MSAD165-16	DCA	1600	Rectifier diode	165	1.15	SD2
MSAD165-18	DCA	1800	Rectifier diode	165	1.15	SD2
MSAD200-08	DCA	800	Rectifier diode	200	1.2	SD2
MSAD200-12	DCA	1200	Rectifier diode	200	1.2	SD2
MSAD200-16	DCA	1600	Rectifier diode	190	1.15	SD2
MSAD200-18	DCA	1800	Rectifier diode	200	1.2	SD2
MSAD36-08	DCA	800	Rectifier diode	36	1.15	SD1
MSAD36-12	DCA	1200	Rectifier diode	36	1.15	SD1
MSAD36-16	DCA	1600	Rectifier diode	36	1.15	SD1
MSAD36-18	DCA	1800	Rectifier diode	60	1.15	SD1
MSAD60-08	DCA	800	Rectifier diode	60	1.15	SD1
MSAD60-12	DCA	1200	Rectifier diode	70	1.15	SD1
MSAD60-16	DCA	1600	Rectifier diode	60	1.15	SD1
MSAD60-18	DCA	1800	Rectifier diode	70	1.15	SD1
MSAD70-08	DCA	800	Rectifier diode	70	1.15	SD1
MSAD70-12	DCA	1200	Rectifier diode	70	1.15	SD1
MSAD70-16	DCA	1600	Rectifier diode	70	1.15	SD1
MSAD70-18	DCA	1800	Rectifier diode	70	1.15	SD1

Dual Common Anode - DCA

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
APTDF400AA100G	DCC*	1000	FRED diode	400	2.1	SP6
APTDF400AA120G	DCC	1200	FRED diode	400	2.4	SP6
APTDF400AA170G	DCC	1700	FRED diode	400	2.2	SP6
APTDF400AA20G	DCC	200	FRED diode	400	1.0	SP6
APTDF400AA60G	DCC	600	FRED diode	400	1.6	SP6
APTDF400KK100G	DCC	1000	FRED diode	400	2.1	SP6
APTDF400KK120G	DCC	1200	FRED diode	400	2.4	SP6
APTDF400KK170G	DCC	1700	FRED diode	400	2.2	SP6
APTDF400KK20G	DCC	200	FRED diode	400	1.0	SP6
APTDF400KK60G	DCC	600	FRED diode	400	1.6	SP6
CPT12050	DCC	50	Schottky diode	60	0.80	Twin Tower
CPT12050A	DCC	50	Schottky diode	60	0.80	Twin Tower
CPT12050D	DCC	50	Schottky diode	60	0.80	Twin Tower
CPT20145	DCC	45	Schottky diode	100	0.68	Twin Tower
CPT20145A	DCC	45	Schottky diode	100	0.68	Twin Tower
CPT20145D	DCC	45	Schottky diode	100	0.68	Twin Tower
CPT300100	DCC	100	Schottky diode	150	0.98	Twin Tower
CPT300100A	DCC	100	Schottky diode	150	0.98	Twin Tower
CPT300100D	DCC	100	Schottky diode	150	0.98	Twin Tower
CPT30040	DCC	40	Schottky diode	150	0.76	Twin Tower
CPT30040A	DCC	40	Schottky diode	150	0.76	Twin Tower
CPT30040D	DCC	40	Schottky diode	150	0.76	Twin Tower
CPT30045	DCC	45	Schottky diode	150	0.77	Twin Tower
CPT30045A	DCC	45	Schottky diode	150	0.77	Twin Tower
CPT30045D	DCC	45	Schottky diode	150	0.77	Twin Tower
CPT30050	DCC	50	Schottky diode	150	0.78	Twin Tower
CPT30050A	DCC	50	Schottky diode	150	0.78	Twin Tower
CPT30050D	DCC	50	Schottky diode	150	0.78	Twin Tower
CPT30060	DCC	60	Schottky diode	150	0.82	Twin Tower
CPT30060A	DCC	60	Schottky diode	150	0.82	Twin Tower
CPT30060D	DCC	60	Schottky diode	150	0.82	Twin Tower
CPT30090	DCC	90	Schottky diode	150	0.98	Twin Tower
CPT30090A	DCC	90	Schottky diode	150	0.98	Twin Tower
CPT30090D	DCC	90	Schottky diode	150	0.98	Twin Tower
CPT30145	DCC	45	Schottky diode	150	0.62	Twin Tower
CPT30145A	DCC	45	Schottky diode	150	0.62	Twin Tower
CPT30145D	DCC	45	Schottky diode	150	0.62	Twin Tower
CPT400100	DCC	100	Schottky diode	200	0.91	Twin Tower

Dual Common Cathode - DCC

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
CPT400100A	DCC*	100	Schottky diode	200	0.91	Twin Tower
CPT400100D	DCC	100	Schottky diode	200	0.91	Twin Tower
CPT40080	DCC	80	Schottky diode	200	0.89	Twin Tower
CPT40080A	DCC	80	Schottky diode	200	0.89	Twin Tower
CPT40080D	DCC	80	Schottky diode	200	0.89	Twin Tower
CPT40090	DCC	90	Schottky diode	200	0.90	Twin Tower
CPT40090A	DCC	90	Schottky diode	200	0.90	Twin Tower
CPT40090D	DCC	90	Schottky diode	200	0.90	Twin Tower
CPT40145	DCC	45	Schottky diode	200	0.57	Twin Tower
CPT40145A	DCC	45	Schottky diode	200	0.57	Twin Tower
CPT40145D	DCC	45	Schottky diode	200	0.57	Twin Tower
CPT500100	DCC	100	Schottky diode	250	0.90	Twin Tower
CPT500100A	DCC	100	Schottky diode	250	0.90	Twin Tower
CPT500100D	DCC	100	Schottky diode	250	0.90	Twin Tower
CPT50060	DCC	60	Schottky diode	250	0.73	Twin Tower
CPT50060A	DCC	60	Schottky diode	250	0.73	Twin Tower
CPT50060D	DCC	60	Schottky diode	250	0.73	Twin Tower
CPT50145	DCC	45	Schottky diode	250	0.55	Twin Tower
CPT50145A	DCC	45	Schottky diode	250	0.55	Twin Tower
CPT50145D	DCC	45	Schottky diode	250	0.55	Twin Tower
CPT50235	DCC	35	Schottky diode	250	0.55	Twin Tower
CPT50235A	DCC	35	Schottky diode	250	0.55	Twin Tower
CPT50235D	DCC	35	Schottky diode	250	0.55	Twin Tower
CPT600100	DCC	100	Schottky diode	300	0.85	Twin Tower
CPT600100A	DCC	100	Schottky diode	300	0.85	Twin Tower
CPT600100D	DCC	100	Schottky diode	300	0.85	Twin Tower
CPT600150	DCC	150	Schottky diode	300	0.85	Twin Tower
CPT600150A	DCC	150	Schottky diode	300	0.85	Twin Tower
CPT600150D	DCC	150	Schottky diode	300	0.85	Twin Tower
CPT60035	DCC	35	Schottky diode	300	0.65	Twin Tower
CPT60035A	DCC	35	Schottky diode	300	0.65	Twin Tower
CPT60035D	DCC	35	Schottky diode	300	0.65	Twin Tower
CPT60045	DCC	45	Schottky diode	300	0.65	Twin Tower
CPT60045A	DCC	45	Schottky diode	300	0.65	Twin Tower
CPT60045D	DCC	45	Schottky diode	300	0.65	Twin Tower
CPT60145	DCC	45	Schottky diode	300	0.55	Twin Tower
CPT60145A	DCC	45	Schottky diode	300	0.55	Twin Tower

Dual Common Cathode - DCC

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
CPT60145D	DCC*	45	Schottky diode	300	0.55	Twin Tower
FST153100	DCC	100	Schottky diode	75	0.94	TO-249 9pin
FST153100A	DCC	100	Schottky diode	75	0.94	TO-249 9pin
FST153100D	DCC	100	Schottky diode	75	0.94	TO-249 9pin
FST160100	DCC	100	Schottky diode	80	0.96	TO-249
FST160100A	DCC	100	Schottky diode	80	0.96	TO-249
FST16045	DCC	45	Schottky diode	80	0.74	TO-249
FST16045A	DCC	45	Schottky diode	80	0.74	TO-249
FST16045D	DCC	45	Schottky diode	80	0.74	TO-249
FST16050	DCC	50	Schottky diode	80	0.74	TO-249
FST16050A	DCC	50	Schottky diode	80	0.74	TO-249
FST16050D	DCC	50	Schottky diode	80	0.74	TO-249
FST16090	DCC	90	Schottky diode	80	0.96	TO-249
FST16090A	DCC	90	Schottky diode	80	0.96	TO-249
FST16090D	DCC	90	Schottky diode	80	0.96	TO-249
FST16145	DCC	45	Schottky diode	80	0.65	TO-249
FST16145A	DCC	45	Schottky diode	80	0.65	TO-249
FST16145D	DCC	45	Schottky diode	80	0.65	TO-249
FST16230	DCC	30	Schottky diode	30	0.47	TO-249
FST16230A	DCC	30	Schottky diode	30	0.47	TO-249
FST16230D	DCC	30	Schottky diode	30	0.47	TO-249
FST60100	DCC	60	Schottky diode	60	0.86	TO-249 9pin
FST60100A	DCC	60	Schottky diode	60	0.86	TO-249 9pin
FST60100D	DCC	60	Schottky diode	60	0.86	TO-249 9pin
FST80100	DCC	100	Schottky diode	40	0.82	Mini-Mod
FST80100A	DCC	100	Schottky diode	40	0.82	Mini-Mod
FST80100D	DCC	100	Schottky diode	40	0.82	Mini-Mod
FST8145	DCC	45	Schottky diode	40	0.53	Mini-Mod
FST8145A	DCC	45	Schottky diode	40	0.53	Mini-Mod
FST8145D	DCC	45	Schottky diode	40	0.53	Mini-Mod
MSKD100-08	DCC	800	Rectifier diode	100	1.15	SD1
MSKD100-12	DCC	1200	Rectifier diode	100	1.15	SD1
MSKD100-16	DCC	1600	Rectifier diode	100	1.15	SD1
MSKD100-18	DCC	1800	Rectifier diode	100	1.15	SD1
MSKD120-08	DCC	800	Rectifier diode	120	1.15	SD1

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
MSKD120-12	DCC*	1200	Rectifier diode	120	1.15	SD1
MSKD120-16	DCC	1600	Rectifier diode	120	1.15	SD1
MSKD120-18	DCC	1800	Rectifier diode	120	1.15	SD1
MSKD165-08	DCC	800	Rectifier diode	165	1.15	SD2
MSKD165-12	DCC	1200	Rectifier diode	165	1.15	SD2
MSKD165-16	DCC	1600	Rectifier diode	165	1.15	SD2
MSKD200-08	DCC	800	Rectifier diode	200	1.2	SD2
MSKD200-12	DCC	1200	Rectifier diode	200	1.2	SD2
MSKD200-16	DCC	1600	Rectifier diode	190	1.15	SD2
MSKD200-18	DCC	1800	Rectifier diode	200	1.2	SD2
MSKD36-08	DCC	800	Rectifier diode	36	1.15	SD1
MSKD36-12	DCC	1200	Rectifier diode	36	1.15	SD1
MSKD36-16	DCC	1600	Rectifier diode	36	1.15	SD1
MSKD36-18	DCC	1800	Rectifier diode	60	1.15	SD1
MSKD60-08	DCC	800	Rectifier diode	60	1.15	SD1
MSKD60-12	DCC	1200	Rectifier diode	70	1.15	SD1
MSKD60-16	DCC	1600	Rectifier diode	60	1.15	SD1
MSKD60-18	DCC	1800	Rectifier diode	70	1.15	SD1
MSKD70-08	DCC	800	Rectifier diode	70	1.15	SD1
MSKD70-12	DCC	1200	Rectifier diode	70	1.15	SD1
MSKD70-16	DCC	1600	Rectifier diode	70	1.15	SD1
MSKD70-18	DCC	1800	Rectifier diode	70	1.15	SD1
UFT12520	DCC	200	Rectifier diode	60	0.98	Twin Tower
UFT12520A	DCC	200	Rectifier diode	60	0.98	Twin Tower
UFT12520D	DCC	200	Rectifier diode	60	0.98	Twin Tower
UFT12780	DCC	800	Rectifier diode	60	1.35	Twin Tower
UFT12780A	DCC	800	Rectifier diode	60	1.35	Twin Tower
UFT14020	DCC	200	Rectifier diode	70	0.98	TO-249
UFT14020A	DCC	200	Rectifier diode	70	0.98	TO-249
UFT14020D	DCC	200	Rectifier diode	70	0.98	TO-249
UFT14140	DCC	400	Rectifier diode	70	1.25	TO-249
UFT14140A	DCC	400	Rectifier diode	70	1.25	TO-249
UFT14140D	DCC	400	Rectifier diode	70	1.25	TO-249
UFT14260	DCC	600	Rectifier diode	70	1.35	TO-249
UFT14260A	DCC	600	Rectifier diode	70	1.35	TO-249
UFT14260D	DCC	600	Rectifier diode	70	1.35	TO-249
UFT14280	DCC	800	Rectifier diode	70	1.35	TO-249
UFT14280A	DCC	800	Rectifier diode	70	1.35	TO-249

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
UFT14280D	DCC*	800	Rectifier diode	70	1.35	TO-249
UFT20020	DCC	200	Rectifier diode	100	0.98	Twin Tower
UFT20020A	DCC	200	Rectifier diode	100	0.98	Twin Tower
UFT20020D	DCC	200	Rectifier diode	100	0.98	Twin Tower
UFT20120	DCC	200	Rectifier diode	100	1.25	Twin Tower
UFT20120A	DCC	200	Rectifier diode	100	1.25	Twin Tower
UFT20120D	DCC	200	Rectifier diode	100	1.25	Twin Tower
UFT20140	DCC	400	Rectifier diode	100	1.25	Twin Tower
UFT20140A	DCC	400	Rectifier diode	100	1.25	Twin Tower
UFT20140D	DCC	400	Rectifier diode	100	1.25	Twin Tower
UFT40020	DCC	200	Rectifier diode	200	0.98	Twin Tower
UFT40020A	DCC	200	Rectifier diode	200	0.98	Twin Tower
UFT40020D	DCC	200	Rectifier diode	200	0.98	Twin Tower
UFT7020	DCC	200	Rectifier diode	35	0.95	Mini-Mod
UFT7020A	DCC	200	Rectifier diode	35	0.95	Mini-Mod
UFT7020D	DCC	200	Rectifier diode	35	0.95	Mini-Mod
UFT7130	DCC	300	Rectifier diode	35	1.20	Mini-Mod
UFT7130A	DCC	300	Rectifier diode	35	1.20	Mini-Mod
UFT7130D	DCC	300	Rectifier diode	35	1.20	Mini-Mod
UFT7150	DCC	500	Rectifier diode	35	1.20	Mini-Mod
UFT7150A	DCC	500	Rectifier diode	35	1.20	Mini-Mod
UFT7150D	DCC	500	Rectifier diode	35	1.20	Mini-Mod
UFT7260SM1A	DCC	600	Rectifier diode	35	1.35	M-M SM*
UFT7260SM1C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM1D	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM2A	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM2C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM2D	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM3A	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM3C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM3D	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM4A	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM4C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM4D	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM5A	DCC	600	Rectifier diode	35	1.35	M-M SM

Dual Common Cathode - DCC

Mini-Mod SM- M-M SM

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
UFT7260SM5C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM5D	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM6A	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM6C	DCC	600	Rectifier diode	35	1.35	M-M SM
UFT7260SM6D	DCC	600	Rectifier diode	35	1.35	M-M SM
APT100DL60HJ	Full bridge	600	FRED diode	100	1.6	SOT-227
APT30DF100HJ	Full bridge	1000	FRED diode	30	2.1	SOT-227
APT30DF120HJ	Full bridge	1200	FRED diode	30	2.6	SOT-227
APT30DF20HJ	Full bridge	200	FRED diode	30	1	SOT-227
APT30DF60HJ	Full bridge	600	FRED diode	30	1.8	SOT-227
APT30DL60HJ	Full bridge	600	FRED diode	30	1.6	SOT-227
APT30DS20HJ	Full bridge	200	Schottky diode	30	0.9	SOT-227
APT35DL120HJ	Full bridge	1200	FRED diode	35	1.6	SOT-227
APT40DR160HJ	Full bridge	1600	Rectifier diode	40	1.30	SOT-227
APT40DS04HJ	Full bridge	45	Schottky diode	40	0.9	SOT-227
APT40DS10HJ	Full bridge	100	Schottky diode	40	0.9	SOT-227
APT50DF170HJ	Full bridge	1700	FRED diode	50	1.8	SOT-227
APT50DL120HJ	Full bridge	1200	FRED diode	50	1.6	SOT-227
APT50DL60HJ	Full bridge	600	FRED diode	50	1.6	SOT-227
APT60DF100HJ	Full bridge	1000	FRED diode	60	2.1	SOT-227
APT60DF120HJ	Full bridge	1200	FRED diode	60	2.6	SOT-227
APT60DF20HJ	Full bridge	200	FRED diode	60	1	SOT-227
APT60DF60HJ	Full bridge	600	FRED diode	60	1.8	SOT-227
APT60DS04HJ	Full bridge	45	Schottky diode	60	0.9	SOT-227
APT60DS10HJ	Full bridge	100	Schottky diode	60	0.9	SOT-227
APT60DS20HJ	Full bridge	200	Schottky diode	60	0.9	SOT-227
APT75DF170HJ	Full bridge	1700	FRED diode	75	1.8	SOT-227
APT75DL120HJ	Full bridge	1200	FRED diode	75	1.6	SOT-227
APT75DL60HJ	Full bridge	600	FRED diode	75	1.6	SOT-227
APT90DR160HJ	Full bridge	1600	Rectifier diode	90	1.30	SOT-227
APTDF100H100G	Full bridge	1000	FRED diode	100	2.1	SP4
APTDF100H1201G	Full bridge	1200	FRED diode	100	2.4	SP1
APTDF100H170G	Full bridge	1700	FRED diode	100	2.2	SP4
APTDF100H20G	Full bridge	200	FRED diode	100	1.0	SP4
APTDF100H601G	Full bridge	600	FRED diode	100	1.6	SP1
APTDF200H100G	Full bridge	1000	FRED diode	200	2.1	SP6
APTDF200H120G	Full bridge	1200	FRED diode	200	2.4	SP6
APTDF200H170G	Full bridge	1700	FRED diode	200	2.2	SP6

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
APTDF200H20G	Full bridge	200	FRED diode	200	1.0	SP6
APTDF200H60G	Full bridge	600	FRED diode	200	1.6	SP6
APTDF30H1201G	Full bridge	1200	FRED diode	30	2.6	SP1
APTDF30H601G	Full bridge	600	FRED diode	30	1.80	SP1
APTDF60H1201G	Full bridge	1200	FRED diode	60	2.5	SP1
APTDF60H601G	Full bridge	600	FRED diode	60	1.7	SP1
VJ247M	Full Bridge	250	Rectifier diode	10	1.30	VJ
VJ248M	Full Bridge	200	Rectifier diode	10	1.30	VJ
VJ447M	Full Bridge	450	Rectifier diode	10	1.30	VJ
VJ448M	Full Bridge	400	Rectifier diode	10	1.30	VJ
VJ647M	Full Bridge	660	Rectifier diode	10	1.30	VJ
APTDF400AK100G	Phase Leg	1000	FRED diode	400	2.1	SP6
APTDF400AK120G	Phase Leg	1200	FRED diode	400	2.4	SP6
APTDF400AK170G	Phase Leg	1700	FRED diode	400	2.2	SP6
APTDF400AK20G	Phase Leg	200	FRED diode	400	1.0	SP6
APTDF400AK60G	Phase Leg	600	FRED diode	400	1.6	SP6
MSCD100-08	Phase Leg	800	Rectifier diode	100	1.15	SD1
MSCD100-12	Phase Leg	1200	Rectifier diode	100	1.15	SD1
MSCD100-16	Phase Leg	1600	Rectifier diode	100	1.15	SD1
MSCD100-18	Phase Leg	1800	Rectifier diode	100	1.15	SD1
MSCD120-08	Phase Leg	800	Rectifier diode	120	1.15	SD1
MSCD120-12	Phase Leg	1200	Rectifier diode	120	1.15	SD1
MSCD120-16	Phase Leg	1600	Rectifier diode	120	1.15	SD1
MSCD120-18	Phase Leg	1800	Rectifier diode	120	1.15	SD1
MSCD165-08	Phase Leg	800	Rectifier diode	165	1.15	SD2
MSCD165-12	Phase Leg	1200	Rectifier diode	165	1.15	SD2
MSCD165-16	Phase Leg	1600	Rectifier diode	165	1.15	SD2
MSCD165-18	Phase Leg	1800	Rectifier diode	165	1.15	SD2
MSCD200-08	Phase Leg	800	Rectifier diode	200	1.2	SD2
MSCD200-12	Phase Leg	1200	Rectifier diode	200	1.2	SD2
MSCD200-16	Phase Leg	1600	Rectifier diode	190	1.15	SD2
MSCD200-18	Phase Leg	1800	Rectifier diode	200	1.2	SD2
MSCD36-08	Phase Leg	800	Rectifier diode	36	1.15	SD1
MSCD36-12	Phase Leg	1200	Rectifier diode	36	1.15	SD1
MSCD36-16	Phase Leg	1600	Rectifier diode	36	1.15	SD1
MSCD36-18	Phase Leg	1800	Rectifier diode	60	1.15	SD1
MSCD60-08	Phase Leg	800	Rectifier diode	60	1.15	SD1
MSCD60-12	Phase Leg	1200	Rectifier diode	70	1.15	SD1

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
MSCD60-16	Phase Leg	1600	Rectifier diode	60	1.15	SD1
MSCD60-18	Phase Leg	1800	Rectifier diode	70	1.15	SD1
MSCD70-08	Phase Leg	800	Rectifier diode	70	1.15	SD1
MSCD70-12	Phase Leg	1200	Rectifier diode	70	1.15	SD1
MSCD70-16	Phase Leg	1600	Rectifier diode	70	1.15	SD1
MSCD70-18	Phase Leg	1800	Rectifier diode	70	1.15	SD1
APTF400U120G	Single diode	1200	FRED diode	400	2.5	LP4
APTF430U100G	Single diode	1000	FRED diode	430	2.3	LP4
APTF450U60G	Single diode	600	FRED diode	450	1.8	LP4
APTF500U20G	Single diode	200	FRED diode	500	1.1	LP4
APTF500U40G	Single diode	400	FRED diode	500	1.5	LP4
HS12045	Single diode	45	Schottky diode	120	0.55	Half Pack
HS12045R	Single diode	45	Schottky diode	120	0.55	Half Pack
HS123100	Single diode	100	Schottky diode	120	0.91	Half Pack
HS123100R	Single diode	100	Schottky diode	120	0.91	Half Pack
HS18135	Single diode	35	Schottky diode	180	0.70	Half Pack
HS18135R	Single diode	35	Schottky diode	180	0.70	Half Pack
HS18140	Single diode	40	Schottky diode	180	0.71	Half Pack
HS18140R	Single diode	40	Schottky diode	180	0.71	Half Pack
HS18145	Single diode	45	Schottky diode	180	0.72	Half Pack
HS18145R	Single diode	45	Schottky diode	180	0.72	Half Pack
HS18230	Single diode	30	Schottky diode	180	0.55	Half Pack
HS18230R	Single diode	30	Schottky diode	180	0.55	Half Pack
HS183100	Single diode	100	Schottky diode	180	0.91	Half Pack
HS183100R	Single diode	100	Schottky diode	180	0.91	Half Pack
HS24040	Single diode	40	Schottky diode	240	0.56	Half Pack
HS24040R	Single diode	40	Schottky diode	240	0.56	Half Pack
HS24045	Single diode	45	Schottky diode	240	0.57	Half Pack
HS24045R	Single diode	45	Schottky diode	240	0.57	Half Pack
HS24230	Single diode	30	Schottky diode	240	0.55	Half Pack
HS24230R	Single diode	30	Schottky diode	240	0.55	Half Pack
HS243100	Single diode	100	Schottky diode	240	0.86	Half Pack
HS243100R	Single diode	100	Schottky diode	240	0.86	Half Pack
HS246150	Single diode	150	Schottky diode	240	0.87	Half Pack
HS246150R	Single diode	150	Schottky diode	240	0.87	Half Pack
HS247180	Single diode	180	Schottky diode	240	0.88	Half Pack
HS247180R	Single diode	180	Schottky diode	240	0.88	Half Pack
HS247200	Single diode	200	Schottky diode	240	0.89	Half Pack

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
HS247200R	Single diode	200	Schottky diode	240	0.89	Half Pack
HU10260	Single diode	600	Rectifier diode	100	1.35	Half Pack
HU10260R	Single diode	600	Rectifier diode	100	1.35	Half Pack
HU20260	Single diode	600	Rectifier diode	200	1.35	Half Pack
HU20260R	Single diode	600	Rectifier diode	200	1.35	Half Pack
SDM30004	Single diode	400	Rectifier diode	300	1.10	SDM
SDM30004R	Single diode	400	Rectifier diode	300	1.10	SDM
APTDR40X1601G	TPB*	600	Rectifier diode	40	1.30	SP1
APTDR90X1601G	TPB	600	Rectifier diode	90	1.30	SP1
MSD100-08	TPB	800	Rectifier diode	100	1.15	SM3
MSD100-12	TPB	1200	Rectifier diode	100	1.15	SM3
MSD100-16	TPB	1600	Rectifier diode	100	1.15	SM3
MSD100-18	TPB	1800	Rectifier diode	100	1.15	SM3
MSD130-08	TPB	800	Rectifier diode	130	1.15	SM3
MSD130-12	TPB	1200	Rectifier diode	130	1.15	SM3
MSD130-16	TPB	1600	Rectifier diode	130	1.15	SM3
MSD130-18	TPB	1800	Rectifier diode	130	1.15	SM3
MSD160-08	TPB	800	Rectifier diode	160	1.15	SM3
MSD160-12	TPB	1200	Rectifier diode	160	1.15	SM3
MSD160-16	TPB	1600	Rectifier diode	160	1.15	SM3
MSD160-18	TPB	1800	Rectifier diode	160	1.15	SM3
MSD200-08	TPB	800	Rectifier diode	200	1.2	SM3
MSD200-12	TPB	1200	Rectifier diode	200	1.2	SM3
MSD200-16	TPB	1600	Rectifier diode	200	1.2	SM3
MSD200-18	TPB	1800	Rectifier diode	200	1.2	SM3
MSD30-08	TPB	800	Rectifier diode	30	1.15	SM1
MSD30-12	TPB	1200	Rectifier diode	30	1.15	SM1
MSD30-16	TPB	1600	Rectifier diode	30	1.15	SM1
MSD30-18	TPB	1800	Rectifier diode	30	1.15	SM1
MSD50-08	TPB	800	Rectifier diode	50	1.15	SM1
MSD50-12	TPB	1200	Rectifier diode	50	1.15	SM1
MSD50-16	TPB	1600	Rectifier diode	50	1.15	SM1
MSD50-18	TPB	1800	Rectifier diode	50	1.15	SM1
MSD52-08	TPB	800	Rectifier diode	52	1.15	SM2
MSD52-12	TPB	1200	Rectifier diode	52	1.15	SM2
MSD52-16	TPB	1600	Rectifier diode	52	1.15	SM2
MSD52-18	TPB	1800	Rectifier diode	52	1.15	SM2
MSD75-08	TPB	800	Rectifier diode	75	1.15	SM2

Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) Tc=80 C°	RDSon (mΩ) VCEsat (V) VF (V)	PKG
MSD75-12	TPB	1200	Rectifier diode	75	1.15	SM2
MSD75-16	TPB	1600	Rectifier diode	75	1.15	SM2
MSD75-18	TPB	1800	Rectifier diode	75	1.15	SM2
MSDM100-08	TPB	800	Rectifier diode	100	1.7	SM2-1
MSDM100-12	TPB	1200	Rectifier diode	100	1.7	SM2-1
MSDM100-16	TPB	1600	Rectifier diode	100	1.7	SM2-1
MSDM100-18	TPB	1800	Rectifier diode	100	1.7	SM2-1
MSDM150-08	TPB	800	Rectifier diode	150	1.28	SM3-1
MSDM150-12	TPB	1200	Rectifier diode	150	1.28	SM3-1
MSDM150-16	TPB	1600	Rectifier diode	150	1.28	SM3-1
MSDM150-18	TPB	1800	Rectifier diode	150	1.28	SM3-1
MSDM200-08	TPB	800	Rectifier diode	200	1.31	SM3-1
MSDM200-12	TPB*	1200	Rectifier diode	200	1.31	SM3-1
MSDM200-16	TPB	1600	Rectifier diode	200	1.31	SM3-1
MSDM200-18	TPB	1800	Rectifier diode	200	1.31	SM3-1
MSDM50-08	TPB	800	Rectifier diode	50	1.45	SM2-1
MSDM50-12	TPB	1200	Rectifier diode	50	1.45	SM2-1
MSDM50-16	TPB	1600	Rectifier diode	50	1.45	SM2-1
MSDM50-18	TPB	1800	Rectifier diode	50	1.45	SM2-1
MSDM75-08	TPB	800	Rectifier diode	75	1.38	SM2-1
MSDM75-12	TPB	1200	Rectifier diode	75	1.38	SM2-1
MSDM75-16	TPB	1600	Rectifier diode	75	1.38	SM2-1
MSDM75-18	TPB	1800	Rectifier diode	75	1.38	SM2-1

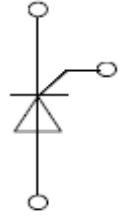
NO NTC

Three Phase Bridge - TPB

Microsemi provides Thyristor Power Modules in dual devices topologies, in combination with standard recovery diodes or as integrated softstart switch into 3-phase standard recovery diode bridge.

Ranking from 800V to 1600V and 25A to 200A, Microsemi's Thyristor Power Modules offer a wide range of isolated packages with low stray inductance and high level of integration.

Microsemi's Thyristor Power Modules are dedicated for applications as inverter for AC or DC motor control, current stabilized power supply, switching power supply, power converters, lighting control or heat and temperature control.



Part Number	Configuration	VDS VCE VRRM (V)	Silicon type	Current (A) T _c =80 C°	RDSon (mΩ) VCEsat (V) VF (V)	NTC	PKG
MSDT100-16	3 Phase bridge + Thyristor	1600	Thyristor	100	1.35	NO	SM4
MSDT200-16	3 Phase bridge + Thyristor	1600	Thyristor	200	1.35	NO	SM5
MSFC110-12	Thyristor & Diode doubler	1200	Thyristor	110	1.65	NO	SF1
MSFC130-16	Thyristor & Diode doubler	1600	Thyristor	130	1.80	NO	D1
MSFC160-08	Thyristor & Diode doubler	800	Thyristor	160	1.7	NO	D1
MSFC25-16	Thyristor & Diode doubler	1600	Thyristor	25	1.80	NO	SF1
MSFC40-12	Thyristor & Diode doubler	1200	Thyristor	40	1.95	NO	SF1
MSFC60-16	Thyristor & Diode doubler	1600	Thyristor	60	1.65	NO	SF1
MSFC90-08	Thyristor & Diode doubler	800	Thyristor	90	1.65	NO	SF1
MSTC110-08	Thyristor doubler	800	Thyristor	110	1.65	NO	SF1
MSTC110-12	Thyristor doubler	1200	Thyristor	110	1.65	NO	SF1
MSTC110-16	Thyristor doubler	1600	Thyristor	110	1.65	NO	SF1
MSTC130-08	Thyristor doubler	800	Thyristor	130	1.80	NO	D1
MSTC130-12	Thyristor doubler	1200	Thyristor	130	1.80	NO	D1
MSTC130-16	Thyristor doubler	1600	Thyristor	130	1.80	NO	D1
MSTC160-08	Thyristor doubler	800	Thyristor	160	1.7	NO	D1
MSTC160-12	Thyristor doubler	1200	Thyristor	160	1.7	NO	D1
MSTC160-16	Thyristor doubler	1600	Thyristor	160	1.7	NO	D1
MSTC25-08	Thyristor doubler	800	Thyristor	25	1.80	NO	SF1
MSTC25-12	Thyristor doubler	1200	Thyristor	25	1.80	NO	SF1
MSTC25-16	Thyristor doubler	1600	Thyristor	25	1.80	NO	SF1
MSTC40-08	Thyristor doubler	800	Thyristor	40	1.95	NO	SF1
MSTC40-12	Thyristor doubler	1200	Thyristor	40	1.95	NO	SF1
MSTC40-16	Thyristor doubler	1600	Thyristor	40	1.95	NO	SF1
MSTC60-08	Thyristor doubler	800	Thyristor	60	1.65	NO	SF1
MSTC60-12	Thyristor doubler	1200	Thyristor	60	1.65	NO	SF1
MSTC60-16	Thyristor doubler	1600	Thyristor	60	1.65	NO	SF1
MSTC90-08	Thyristor doubler	800	Thyristor	90	1.65	NO	SF1
MSTC90-12	Thyristor doubler	1200	Thyristor	90	1.65	NO	SF1
MSTC90-16	Thyristor doubler	1600	Thyristor	90	1.65	NO	SF1

Microsemi is well known in the space community for demonstrating performance in custom power supply designs resulting in fielded hardware supporting mission critical milestones. We are prepared to respond to a wide variety of customer requirements.

Experience in reliability analysis documentation:

- Reliability estimates
- Part stress analysis
- Failure modes and effects analysis, FMEA
- Worst case circuit analysis
- Thermal / stress analysis
- Radiation analysis



All of our space level DC-DC converters use radiation tolerant MOSFETs and semiconductors. Microsemi does extensive radiation testing on an ongoing basis to characterize the components within the design. To protect against gate rupture of the MOSFETs switch on the primary side of the DC-DC converter during SEE, the MOSFETs are de-rated to 80% of SEE pass voltage; in addition, series inductor is provided for current limiting.

We have a 100% mission success rate with many products on orbit for over 20 years. We have the expertise, heritage, and resources required to exceed customers' expectations.

Part number	Total Power (W)	Vin (V)	Vout 1 (V)	Vout 2 (V)	Vout 3 (V)	Vout 4 (V)	Vout 5 (V)	Vout 6 (V)
EM328	2.4	28	12	-12	-	-	-	-
EM297/386	4	30	250	750	2200	-	-	-
EM328	8	28	10	-10	-	-	-	-
EM297/386	14	28	8.5	-8.5	17	-	-	-
EM301	16	28	7	-10	10	-	-	-
EM316	18	28	5	-5	6	5	-5.9	11.8
EM317	25	28	5	5	-5	5	12	-
EM319	25	28	5.5	13.5	-13.5	-	-	-
EM320	28	28	5.05	-5.05	-	-	-	-
EM305-1	30	28	7.1	-7.1	-	-	-	-
EM315	35	28	5.3	-5.3	-	-	-	-
EM302	40	28	5.1	-5.25	-2	-	-	-
EM314	40	28	7	5	-	-	-	-
EM318	40	28	5.2	-	-	-	-	-
EM300	48	28	5	15	-15	-	-	-
EM303	100	28	5	-	-	-	-	-
EM305	100	28	29	-	-	-	-	-
EM274-2/3/4/5	100	28	46	-	-	-	-	-
EM274-6	100	28	120	-	-	-	-	-
EM274-7	100	120	29	-	-	-	-	-
EM274-8	150	28	5	-	-	-	-	-

The SA series of 50 watt DC-DC converters are designed for the rigors of space, characterized for Total Ionizing Dose and Single Event Effects. Operating at a fixed frequency of 220 kHz, these parts can be externally synced with other frequency sources. The SA50-120 contains an internal EMI filter making it compliant to Mil-Std-461 emissions and susceptibility. The SA50-120 Series of converters are designed for use in the International Space Station or direct connect to satellite solar panels.

The SB30 series of 30 watt DC-DC converters feature three independent, fully isolated regulators, each with its own PWM. This architecture supports FPGAs, DSPs and CPUs with dozens of simultaneous switching outputs. Both families use PWAs resulting in highly competitive lead times.

Custom input and output voltages are accommodated for a small NRE. Please contact Microsemi for a quote.

Part Number	Input Voltage	Output Voltage(s)	Total Output Power	Radiation	EMI Filter	Controls	Package
SA50-120-28S	120 V _{DC} ¹	28 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off, adj	2.05"x3.05" x0.475"
SA50-120-3R3-15T	120 V _{DC} ¹	3.3, +/- 15 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off	2.05"x3.05" x0.475"
SA50-120-3R3S	120 V _{DC} ¹	3.3 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off, adj	2.05"x3.05" x0.475"
SA50-120-5-12T	120 V _{DC} ¹	5, +/- 12 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off	2.05"x3.05" x0.475"
SA50-120-5-15T	120 V _{DC} ¹	5, +/- 15 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off	2.05"x3.05" x0.475"
SA50-120-5S	120 V _{DC} ¹	5 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off, adj	2.05"x3.05" x0.475"
SA50-28-3R3-15T	28 V _{DC}	3.3, +/- 15 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	External	sync, on/off	2.05"x3.05" x0.475"
SA50-28-3R3S	28 V _{DC}	3.3 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	External	sync, on/off, adj	2.05"x3.05" x0.475"
SA50-28-5-15T	28 V _{DC}	5, +/- 15 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	External	sync, on/off	2.05"x3.05" x0.475"
SA50-28-5S	28 V _{DC}	5 V _{DC}	50 watts	100 kRad TID, >80 MeV SEE ²	External	sync, on/off, adj	2.05"x3.05" x0.475"
SB30-100-2R5S-3R3-5T	100 V _{DC}	2.5, 3.3, 5 V _{DC}	30 watts	100 kRad TID, >80 MeV SEE ²	Internal	sync, on/off, adj	2.05"x3.05" x0.625"

1) Withstands 165V for 10 sec

Rad tolerant and Proto versions also available



Microsemi Power Management Group supports critical military and space missions with high quality electromechanical devices.

We design, test, and manufacture a wide range of standard and custom relays, remote power controllers (RPC), contactors, pressure sensors, and time delay relays. The markets served for these high reliability products include: space, military and commercial aerospace, general aviation, commercial aerospace and industrial markets including down-hole drilling.

Microsemi PMG relays are qualified to MIL-PRF-83536, MIL-PRF-39016, MIL-PRF-6106, and MIL-PRF-5757, RPCs are built to MIL-PRF-83383. Relays are hermetically sealed, all welded, miniature, standard or custom made with ratings from 1 to 200 amps.

Beginning with Atlas rockets in 1945, Microsemi PMG has supplied products wherever high-reliability electro-mechanical switching devices were required. Microsemi PMG relays were in every stage of the Apollo/Saturn, including the Lunar Excursion Model and the Lunar Rover as well as the Mars Lander and Curiosity.



Polaris
1960



Gemini
1965



Saturn V
1967



Apollo 11
1969



Apollo/Saturn Rover
1971



Maverick Missile
1972



Mars Observer
1992



Boeing C-17 Globemaster III
1993



International Space Station
1998



Mars Rovers
2003



Mars Science Lab
2011



Cygnus
2011



Series		BR5	BR44	BR8	BR16	BR17
Features		Transistor can Dry circuit to 1Amp All welded construction	1/6 Size crystal can Dry circuit to 1Amp all welded construction	Crystal can dry circuit to 2 Amp All welded construction	Half size crystal can dry circuit to 2 Amps All welded construction	Half size crystal can dry circuit to 2 Amps All welded construction Magnetic latching
Hermetically Sealed		Yes	Yes	Yes	Yes	Yes
Contacts	Form	1 Form C	2 Form C	2 Form C	2 Form C	2 Form C
	Rating (Resistive)	10ma @ 30mv 1A @ 28 VDC	10ma @ 30mv 1A @ 28 VDC	10-50 μ A @ 10-50 mV 2A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV 2A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV 2A @ 28 VDC or 115 VAC
Coil Voltage		12, 18, 26V (DC)	6, 12, 18, 26V (DC)	6, 12, 26, 115V (DC)	6, 12, 26, 48V (DC)	6, 12, 26V (DC)
Operating power at pick up voltage		100mW	100mW	250 mW or 150 mW	175 mW	175 mW or 90 mW
Dielectric strength		Between all Points: 500 Vrms Between Open Contacts: 300 Vrms	Between all Points: 500 Vrms Between Open Contacts: 350 Vrms	Between All Points: 1000 Vrms Between Open contacts: 750 Vrms	Between All Points: 1000 Vrms Between Open contacts: 500 Vrms	Between All Points: 1000 Vrms Between Open contacts: 500 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		.405 x .205 x .605	.500 x .235 x .405	.790 x .360 x .870 or 1.190	.810 x .400 x .410	.810 x .410 x .400
Terminals	Plug-in	-	X	-	X	-
	Solder Pin	X	X	X	X	X
	Solder Hook	X	X	X	X	X
MIL SPEC TYPE (reference)		MIL-R-5757	MIL-PRF-39016	MIL-R-5757	MIL-PRF-39016	MIL-PRF-39016

For detailed technical information consult the factory.



Series		BR19	BR20	BR23	BR250
Features		Crystal Can Dry circuit to 10 Amps All welded construction	Crystal Can Dry circuit to 10 Amps All welded construction Magnetic Latching	Crystal Can Dry circuit to 10 Amps All welded construction Magnetic Latching	Miniature 25 Amps All welded construction
Hermetically Sealed		Yes	Yes	Yes	Yes
Contacts	Form	2 Form C	2 Form C	4 Form C	1 Form C
	Rating (Resistive)	10ma @ 30mv 10A @ 28 VDC or 115 VAC 5A @ 28 VDC or 115 VAC	10ma @ 30mv 10A @ 28 VDC or 115 VAC	10ma @ 30mv 10A @ 28 VDC or 115 VAC	10ma @ 30mv 25A @ 28 VDC or 115 VAC
Coil Voltage		6, 12, 26, 48 115V (DC), 115 VAC	6, 12, 26,48 115V (DC)	6, 12, 26, 48 115V (DC)	6, 12, 28, 48V (DC) 115 VAC
Operating power at pick up voltage		500 mW or 175 mW	250 mW or 130 mW	500 mW or 250 mW	500 mW
Dielectric strength		Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		1.075 x .515 x 1.300	1.075 x .515 x 1.300	1.075 x 1.000 x 1.300	1.025 x .525 x 1.010 or 1.125
Terminals	Plug-in	-	-	-	X
	Solder Pin	X	X	X	X
	Solder Hook	X	X	X	X
MIL SPEC TYPE (reference)		MIL-PRF-39016	MIL-PRF-39016	MIL-PRF-39016	Qualified to MIL-PRF-6106

For detailed technical information consult the factory.



Series		BR26	BR42	BR13	BR15
Features		Half Size Crystal Can Dry Circuit to 2 Amps all welded construction	Half Size Crystal Can Dry circuit to 2 Amps All welded construction High Sensitivity	Crystal Can Dry circuit to 5 Amps All welded construction	Crystal Can Dry circuit to 10 Amps All welded construction
Hermetically Sealed		Yes	Yes	Yes	Yes
Contacts	Form	2 Form C	2 Form C	2 Form C	4 Form C
	Rating (Resistive)	10-50 μ A @ 10-50 mV 2A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV 2A @ 28 VDC or 115 VAC	5A @ 28 VDC or 115 VAC 3A @ 28 VDC or 115 VAC 2A @ 28 VDC or 115 VAC	10ma @ 30mv 10A @ 28 VDC or 115 VAC 7.5A @ 28 VDC or 115 VAC 5A @ 28 VDC or 115 VAC
Coil Voltage		6, 12, 26V (DC)	6, 12, 26V (DC)	6, 12, 26, 115V (DC)	6, 12, 26, 115V (DC), 115 VAC
Operating power at pick up voltage		250 mW	100 mW	250 mW, 100 mW or 40 mW	1000 mW, 500 mW or 400 mW
Dielectric strength		Between All Points: 1000 Vrms Between Open contacts: 500 Vrms	Between all Points: 1000 Vrms Between open Contacts: 500 Vrms	Between all Points: 1000 Vrms Between open Contacts: 750 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		.810 x .400 x .410	.810 x .400 x .410	.810 x .410 x .900 or 1.290	1.075 x 1.000 x 1.300
Terminals	Plug-in	X	X	-	-
	Solder Pin	X	X	X	X
	Solder Hook	X	X	X	X
MIL SPEC TYPE (reference)		MIL-PRF-39016	MIL-PRF-39016	MIL-PRF-39016	MIL-PRF-39016

For detailed technical information consult the factory.



Series		BR24	BR230	BR230D	BR231
Features		Crystal Can Dry circuit to 10 Amps All welded construction Suppressed coil available	Minature Low level to 10 Amps All welded construction	Minature 10 Amps All welded construction Magnetic Latching DC Suppressed Coils	Minature Low level to 10 Amps All welded construction Magnetic Latching
Hermetically Sealed		Yes	Yes	Yes	Yes
Contacts	Form	2 Form C	4 Form C	4 Form C	4 Form C
	Rating (Resistive)	10-50 μ A @ 10-50 mV 10A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV or 115 VAC	10A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV or 115 VAC
Coil Voltage		6, 12, 26V (DC)	6, 12, 28, 48V (DC) 115 VAC	6, 12, 28, 48V (DC)	6, 12, 28, 48V (DC) 115 VAC
Operating power at pick up voltage		400 mW	500 mW	500 mW	500 mW
Dielectric strength		Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		1.015 x .515 x .885	1.025 x 1.025 x 1.010	1.025 x 1.025 x 1.010	1.025 x 1.025 x 1.010
Terminals	Plug-in	-	X	X	X
	Solder Pin	X	X	X	X
	Solder Hook	X	X	X	X
MIL SPEC TYPE (reference)		MIL-PRF-39016	Qualified to MIL-PRF-83536	Qualified to MIL-PRF-83536	Qualified to MIL-PRF-83536

For detailed technical information consult the factory.



Series		BR231D	BR246	BR246D	BR247
Features		Minature 10 Amps All welded construction Magnetic Latching DC Suppressed Coils	Minature Low level to 10 Amps All welded construction	Minature 10 Amps All welded construction DC Suppressed Coils	Minature Low level to 10 Amps All welded construction Magnetic Latching
Hermetically Sealed		Yes	Yes	Yes	Yes
Contacts	Form	4 Form C	2 Form C	2 Form C	2 Form C
	Rating (Resistive)	10A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV or 115 VAC	10A @ 28 VDC or 115 VAC	10-50 μ A @ 10-50 mV or 115 VAC
Coil Voltage		6, 12, 28, 48V (DC)	6, 12, 28, 48V (DC) 115 VAC	6, 12, 28, 48V (DC)	6, 12, 28, 48V (DC) 115 VAC
Operating power at pick up voltage		500 mW	500 mW	500 mW	500 mW
Dielectric strength		Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)	100,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		1.025 x 1.025 x 1.010	1.025 x .525 x 1.010 or 1.125	1.025 x .525 x 1.010 or 1.125	1.025 x .525 x 1.010 or 1.125
Terminals	Plug-in	X	X	X	X
	Solder Pin	X	X	X	X
	Solder Hook	X	X	X	X
MIL SPEC TYPE (reference)		Qualified to MIL-PRF-83536	Qualified to MIL-PRF-83536	Qualified to MIL-PRF-83536	Qualified to MIL-PRF-83536

For detailed technical information consult the factory.



Series		BR247D	BR250D	612	613
Features		Miniature Low level to 10 Amps All welded Magnetic Latching DC Suppressed Coils	Miniature 25 Amps All welded construction DC Suppressed Coils	Contactors 100 Amps Gasket sealed construction Auxiliary contacts	Contactors 50 Amps Gasket sealed construction Auxiliary contacts 500mS Time delay
Hermetically Sealed		Yes	Yes	No	No
Contacts	Form	2 Form C	1 Form C	1 Form X	1 Form C
	Rating (Resistive)	10A @ 28 VDC or 115 VA	25A @ 28 VDC or 115 VAC	100A @ 28 VDC or 115 VAC	50A @ 28 VDC or 115 VAC
Coil Voltage		6, 12, 28, 48V (DC)	6, 12, 28, 48V (DC)	28 VDC	115 VAC
Operating power at pick up voltage		500 mW	500 mW	1.23 W	2.42 W
Dielectric strength		Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms
Typical Life Operations	Electrical	100,000 (at rated load)	50,000 (at rated load)	50,000 (at rated load)	50,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		1.025 x .525 x 1.010 or 1.125	1.025 x .525 x 1.010 or 1.125	3.290 x 1.600 x 2.700	3.300 x 1.600 x 2.390
Terminals	Plug-in	X	X	MS3470W10-6P Connector	MS3470W10-6P Connector
	Solder Pin	X	X	-	-
	Solder Hook	X	X	-	-
MIL SPEC TYPE (reference)		Qualified to MIL-PRF-83537	Qualified to MIL-PRF-6106	MIL-PRF-6106	MIL-PRF-6106

For detailed technical information consult the factory.



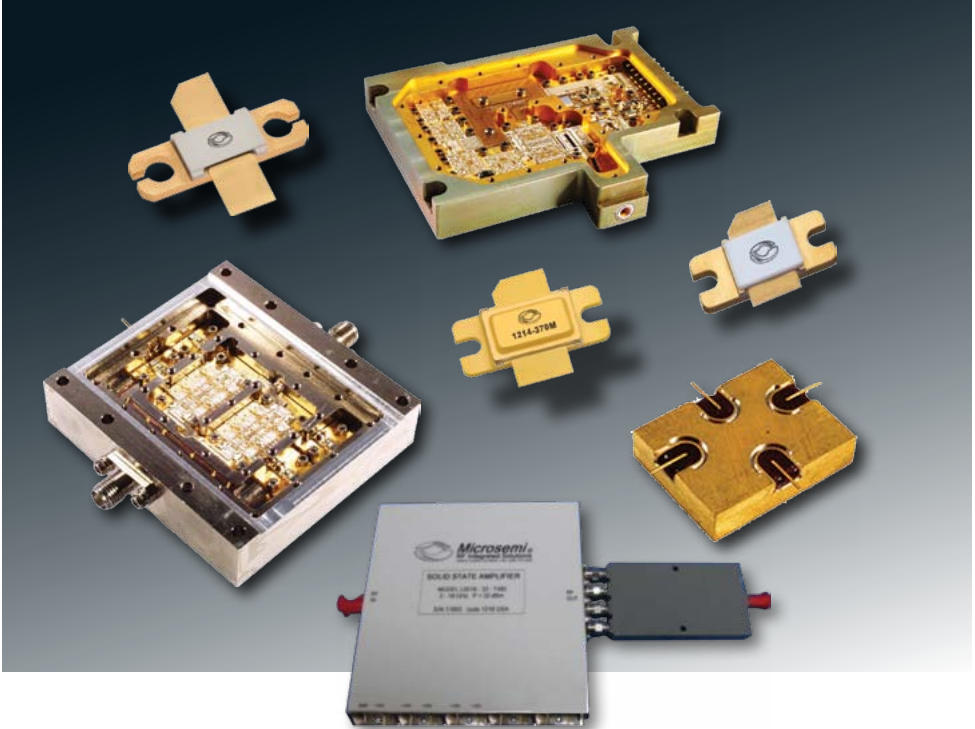
Series		614	630	708	710
Features		Contactors 50 Amps Gasket sealed construction Auxiliary contacts	Contactors 50 Amps Gasket sealed construction Auxiliary contacts	Current Sensor 10 Amps Sealed construction Auxiliary contacts	Current Sensor 200 Amps Gasket sealed construction Auxiliary contacts
Hermetically Sealed		No	No	No	No
Contacts	Form	1 Form C	1 Form C	2 Form C	1 Form X
	Rating (Resistive)	50A @ 28 VDC or 115 VAC	50A @ 28 VDC or 115 VAC	2A @ 28 VDC	200A @ 28 VDC or 115 VAC
Coil Voltage		28 VDC	115 VAC	N/A	28 VDC
Operating power at pick up voltage		1.23 W	2.42 W	N/a	1.5 W
Dielectric strength between:		Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	Between all Points: 1250 Vrms Between open Contacts: 1250 Vrms	All Points: 1000 Vrms Open Contacts: 500 Vrms	All Points: 1250 Vrms Open Contacts: 1250 Vrms
Typical Life Operations	Electrical	50,000 (at rated load)	50,000 (at rated load)	100,000 (at rated load)	50,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		3.300 x 1.600 x 2.690	3.300 x 1.600 x 2.390	2.130 x 1.600 x 3.250	3.800 x 3.250 x 4.230
Terminals	Plug-in	MS3470W10-6P Connector	MS3470W10-6P Connector	Screw Stud	MIL-C-39029 Connector
	Solder Pin	-	-	-	MIL-PRF-6106
	Solder Hook	-	-	-	-
MIL SPEC TYPE (reference)		MIL-PRF-6106	MIL-PRF-6106	-	-

For detailed technical information consult the factory.



Series		700	701	702	703
Features		Remote Power Controller To 200 Amps Auxiliary contacts available AC only Applications	Remote Power Controller To 200 Amps Auxiliary contacts available DC only Applications	Remote Power Controller To 200 Amps Auxiliary contacts available AC/DC Applications	Remote Power Controller To 100 Amps Auxiliary contacts available AC 3 Phase
Hermetically Sealed		No	No	No	No
Contacts	Form	1 Form X	1 Form X	1 Form X	3 Form X
	Rating (Resistive)	Up to 200 A @ 115 VAC	Up to 200 A @ 28 VDC	Up to 100 A @ 115 VAC	Up to 200 A @ 28 VDC or 115 VAC
Coil Voltage		115 VAC	28 VDC	28 VDC or 115 VAC	115 VAC
Operating power at pick up voltage		N/A	N/A	N/A	N/A
Dielectric strength between:		All Points: 1500 Vrms Open Contacts: 1350 Vrms	All Points: 1500 Vrms Open Contacts: 1350 Vrms	All Points: 1500 Vrms Open Contacts: 1350 Vrms	All Points: 1500 Vrms Open Contacts: 1350 Vrms
Typical Life Operations	Electrical	50,000 (at rated load)	50,000 (at rated load)	50,000 (at rated load)	50,000 (at rated load)
Maximum Size in Inches L x W x H (Less Mounting Brackets)		4.260 x 1.200 x 3.250	4.260 x 1.200 x 3.250	4.260 x 1.200 x 3.250	4.260 x 3.690 x 2.250
Terminals	Plug-in	MIL-C-39029 Connector	MIL-C-39029 Connector	MIL-C-39029 Connector	MIL-C-39029 Connector
MIL SPEC TYPE (reference)		MIL-PRF-83383	MIL-PRF-83383	MIL-PRF-83383	MIL-PRF-83383

For detailed technical information consult the factory



Microsemi Corporation offers a comprehensive portfolio of semiconductor and system solutions for defense and security, aerospace, communications and industrial markets. The company's high-performance RF, microwave and millimeter wave solutions includes high reliability diodes, power transistors, limiters, detectors, switches, low noise and power amplifiers and integrated multi-function modules based on advanced

semiconductor (SiC, SiGe, GaAs, GaN, InP) and packaging technologies. Microsemi's product portfolio also includes millimeter wave integrated circuits for passive and active imagers, ultra low-power RF radios, modules for medical and energy harvesting applications and RF components for wireless local area networking products.

Microsemi's surface mount amplifiers support the need for physically smaller systems by eliminating cable interconnects and increasing packing densities. Low noise and medium power gain blocks can be conveniently cascaded in a microstrip transmission line environment. We also offer a unique approach to manage higher power and high frequency (up to 12 GHz) applications with our "SMP Plug-in" modules. Please contact the factory for your custom surface mount amplifier requirements.

Model Number	Freq. Range (GHz)	Gain (dBm)	Flatness (\pm dB max)	Noise Figure (dB max)	P-1dB (dBm typ.)	Output IP3 (dBm typ.)	VSWR In/Out (nom)	DC Current (mA nom)	Outline
0.1 to 2.0 GHz									
AML012L1411-S	0.1 - 2.0	14	0.5	1.5**	13	23	2.0:1	5V/60mA	SMT08
AML012L2811-S	0.1 - 2.0	28	0.8	1.5**	14	24	2.0:1	5V/150mA	SMT-2
AML012P1211-S	0.1 - 2.0	12	1	2.8**	21	36	2.0:1	9V/150mA	SMT08
AML012P2611-S	0.1 - 2.0	26	1	1.5**	21	36	2.0:1	9V/215mA	SMT-2
0.1 to 3.0 GHz									
AML013P1011-S	0.1 - 3.0	11	1	4.5**	24	38	1.8:1	12V/200mA*	SMT08
AML013P1812-S	0.1 - 3.0	18	1	5.0**	27	39	1.8:1	12V/320mA*	SMT08
0.5 to 6.0 GHz									
AML052P2011-S	0.5 - 2.0	22	1	4	22	36	2.0:1	9V/250mA	SMT08
AML052P2411-S	0.5 - 2.0	24	1.5	5	24	34	2.0:1	9V/320mA	SMT08
AML053P1811-S	0.5 - 3.0	18	1	5	17	27	2.2:1	12V/100mA*	SMT08
AML053P1012-S	0.5 - 3.0	11	1	5	27	40	1.8:1	12V/330mA*	SMT08
AML056L2811-S	0.5 - 6.0	28	1.5	2.3	5	12	2.0:1	5V/150mA	SMT08
AML056L2812-S	0.5 - 6.0	28	1.5	1.6	5	12	2.0:1	5V/150mA	SMT08
1.0 to 5.0 GHz									
AML12P1111-S	1.0 - 2.5	11	1	4	22	31	1.8:1	9V/150mA	SMT08
AML12P1112-S	1.0 - 2.5	11	1	5	26	35	1.8:1	9V/280mA	SMT08
AML11L2511-S	1.4 - 1.7	25	0.5	0.8	10	20	1.6:1	5V/90mA	SMT08
AML22L2511-S	2.3 - 2.5	25	0.5	0.8	10	20	1.6:1	5V/90mA	SMT08
AML23L2511-S	2.8 - 3.1	24	0.5	0.9	10	20	1.6:1	5V/90mA	SMT08
AML33L2511-S	3.1 - 3.7	24	0.75	1	10	20	1.6:1	5V/90mA	SMT08
AML34L2511-S	3.7 - 4.2	24	0.75	1	10	20	1.6:1	5V/90mA	SMT08
AML45L2511-S	4.4 - 5.0	24	0.75	1	10	20	1.6:1	5V/90mA	SMT08
AML55L2511-S	5.4 - 5.9	23	0.75	1.1	10	20	1.6:1	5V/90mA	SMT08
2.0 to 6.0 GHz									
AML26L1411-S	2.0 - 6.0	14	1	2.5	10	20	1.6:1	5V/50mA	SMT-2
AML26L2811-S	2.0 - 6.0	27	1	2.5	10	20	1.6:1	5V/90mA	SMT08
AML26L1412-S	2.0 - 6.0	14	1	3	15	25	1.8:1	5V/70mA	SMT-2
AML26L2812-S	2.0 - 6.0	27	1	3	15	25	1.8:1	5V/100mA	SMT-2
AML26P1811-S	2.0 - 6.0	18	1	6	21	31	1.8:1	9V/350mA	SMT-2
AML26P1111-S	2.0 - 6.0	11	1	4	22	32	1.8:1	12V/120mA*	SMT-2
AML26P0811-S	2.0 - 6.0	8	1.5	6	23	32	1.8:1	9V/150mA	SMT08

Model Number	Freq. Range (GHz)	Gain (dBm)	Flatness (\pm dB max)	Noise Figure (dB max)	P-1dB (dBm typ.)	Output IP3 (dBm typ)	VSWR In/Out (nom)	DC Current (mA nom)	Outline
2.0 to 6.0 GHz									
AML26P1112-S	2.0 - 6.0	11	0.5	5	23	33	1.8:1	9V/150mA	SMT08
AML26P2411-S	2.0 - 6.0	24	1	3	24	33	1.8:1	9V/200mA	SMT-2
AML26P1711-S	2.0 - 6.0	17	1	6	25	33	1.8:1	9V/480mA	SMT-2
AML26P1211-S	2.0 - 6.0	11	1	6	26	36	1.8:1	12V/250mA*	SMT-2
6.0 to 12.0 GHz									
AML69L1212-S	6.0 - 9.0	10	0.5	2.5	15	25	1.8:1	5V/70mA	SMTH1
AML69P1011-S	6.0 - 9.0	10	0.5	5	25	35	1.8:1	9V/150mA	SMTH1
AML612L2211-S	6.0 - 12.0	22	1	3	10	20	1.8:1	5V/80mA	SMTH2
AML612L2212-S	6.0 - 12.0	20	1	3	15	25	1.8:1	5V/90mA	SMTH2
AML612P2211-S	6.0 - 12.0	21	1	3.5	20	30	1.8:1	9V/150mA	SMTH2
AML612P2311-S	6.0 - 12.0	20	1	3.5	25	35	1.8:1	9V/250mA	SMTH2
AML612P2011-S	6.0 - 12.0	18	1	5	27	37	1.8:1	9V/350mA	SMTH2
6.0 to 18.0 GHz									
AML618L1811-S	6.0 - 18.0	18	1	3	10	20	1.8:1	12V/120mA*	SMP2
AML618L1511-S	6.0 - 18.0	15	1	3.5	17	27	1.8:1	12V/150mA*	SMP2
AML618P1511-S	6.0 - 18.0	16	1	5.5	25	35	1.8:1	12V/230mA*	SMP2
AML618P1211-S	6.0 - 18.0	12	1	6.5	27	37	1.8:1	12V/450mA*	SMP2
AML618P1211-S	6.0 - 18.0	12	1	6.5	27	37	1.8:1	12V/450mA*	SMP2

*Above 500MHz

**Includes internal voltage regulator

Products listed above without ** require regulated DC Supply

Model	Frequency GHz	Gain (dB min)	Flatness +/- (dB max)	NF (dB max)	P-1dB (dBm min)	IP3 (dBm type)	VSWR type	DC Current (mA nom)	Outline
JCA01-2010	0.5 - 0.6	20	0.5	1	10	20	2.0:1	60	LCFB1
AML091L1701	0.95 - 1.25	17	0.5	0.6	10	20	1.5:1	75	SPN1
AML11L1705	1.2 - 1.4	17	0.5	0.7	10	20	1.5:1	75	LS2
JCA12-2052	1.0 - 1.5	24	0.5	0.9	10	20	2.0:1	60	LCFB1
JCA12-4044	1.4 - 1.6	44	0.5	0.8	10	20	2.0:1	120	FB2
AML11L2201	1.5 - 1.7	22	0.5	0.9	10	20	1.8:1	80	LS2
AML11L3405	1.6 - 1.7	34	0.5	1	10	20	1.8:1	80	L3
AML11L1703	1.6 - 1.8	16	0.5	0.9	10	20	1.8:1	50	L2
AML11L1704	1.85 - 1.95	16	0.5	0.9	10	20	1.5:1	50	L2
AML12L1501	1.4 - 2.4	15	0.5	1	10	20	1.8:1	50	L2
JCA23-3020	2.0 - 2.2	34	0.5	0.8	10	20	2.0:1	90	FB2
AML22L3101	2.3 - 2.5	29-31	0.5	1	5	15	1.5:1	100	SP3
AML22L1703	2.5 - 2.7	15	0.5	0.7	10	20	1.5:1	75	LS2
JCA23-3054	2.5 - 3.0	35	0.5	1.1	10	20	2.0:1	90	FB2
AML33L1601	3.1 - 3.4	16	1.25	0.6	8	18	2.2:1	100	C2
AML34L3001	3.4 - 4.2	30	0.75	0.8	10	20	1.5:1	120	LS2
AML34L1403	3.7 - 4.2	14	0.5	0.8	10	20	1.5:1	75	LS2
AML35L2002	3.0 - 5.0	20	1	2.2	10	20	2.0:1	100	modK3
AML45L1401	4.4 - 5.0	14	0.5	1.6	10	20	1.5:1	50	C2
AML45L2601	4.5 - 5.5	26	0.5	1.6	10	20	1.5:1	90	C3
AML55L2802	5.4 - 5.9	28	1	0.7	10	18	2.0:1	100	C3
AML56L1401	5.9 - 6.4	14	0.5	1.6	10	20	1.5:1	50	C2
AML67L4801	6.45 - 7.125	48	1	1	10	20	1.5:1	180	C4
AML77L1301	7.2 - 7.8	13	0.5	1.6	10	20	1.5:1	50	C2
AML713P2601	7.0 - 13.0	23	2	4	26	35	1.8:1	550	K6
AML88L2201	8.4 - 8.5	22-23	0.5	1.5	5	10	1.5:1	100	K3
AML910L1201	9.5 - 10.5	12	0.5	2.2	10	20	1.8:1	50	K2
AML1011L1201	10.7 - 11.7	12	0.5	2.2	10	20	1.8:1	50	K2
AML1112L1001	11.7 - 12.2	10	0.3	2	10	20	1.5:1	50	K2
AML1213L1001	12.2 - 13.2	10	0.3	2	10	20	1.5:1	50	K2
AML1012L2103	10.7-12.75	20	0.2*	1.5:1	10	20	1.5:1	190	K3
AML1013L0901	10.7 - 13.7	9	0.5	1.8	10	20	1.5:1	50	K2
AML1313L4501	13.0 - 13.25	45	1	1.3	10	20	1.5:1	250	K5

Specifications are at +25°C

Operating temperature range is -20 to +70°C

Operational range of -54 to +85°C is available

DC Voltage is +12 to +15VDC unless stated otherwise

Specifications are subject to change

Model	Frequency GHz	Gain (dB min)	Flatness +/- (dB max)	NF (dB max)	P-1dB (dBm min)	IP3 (dBm type)	VSWR type	DC Current (mA nom)	Outline
AML1416L2802	14.5 - 16.5	28	0.75	2	10	20	1.8:1	180	K4
AML1414L0801	14.0 - 14.5	8	0.5	1.5	10	20	1.5:1	50	K2
AML1015L1001	10.0 - 15.0	10-13	0.5	3	12	22	1.8:1	100	K2
AML1518L2801L	15.3-18.3	27-33	1.2	3.5	8	18	2.0:1	175	K4
AML1520L1601	15.0 - 20.0	16	1	3	10	20	2.0:1	100	K3
AML1617L1001	16.0 - 17.0	10	0.3	2	10	20	1.5:1	50	K2
AML1826L1601	18.0 - 26.5	16	1.5	3	9	17	2.0:1	110	B2
AML2424L1801	24.05 - 24.25	18	1	2.5	5	13	1.8:1	40	M1
AML2632L2001	26.0 - 32.0	19	2	3.5	7	15	2.0:1	80	M1
AML3740L2001	37.0 - 40.0	20	2	4	8	15	2.0:1	12V, 55	K2
ALS3050-40-08	30.0 - 50.0	40	2.5	8	8	18	2.5:1	525	STV-6
ALS4060-26-5	40.0 - 60.0	26	3	7	5	13	3.0:1	575	STV-6

Specifications are at +25°C

Operating temperature range is -20 to +70°C

Operational range of -54 to +85°C is available

DC Voltage is +12 to +15VDC unless stated otherwise

Specifications are subject to change

Microsemi's low phase noise amplifiers utilize MMICs and discrete transistors to provide the lowest phase noise available in the industry. Depending on the frequency and power, Microsemi uses a combination of Si Bipolar, InGaP, MESFET technologies to meet customer requirements. 100% testing and wafer selection are monitored to guarantee compliant performance. Applications include doppler radar, data communication links and multi-channel receivers.

Model Number	Freq. (GHz)	Gain (dB) min	Flatness (± dB) max	1KHz offset	10KHz offset	100KHz offset	1MHz offset	NF (dB) max	P1dB (dBm) min	VSWR (In/Out) nom	DC Power (V/mA) nom
AML052PNA1711	0.5 - 2.0	17	1	-155	-160	-165	-170	5.5	25	2.0:1	12V/350mA
AML052PNA1711-S	0.5 - 2.0	17	1	-155	-160	-165	-170	5.5	24	2.0:1	365
AML083PNA1801	0.8 - 3.0	18	1	-160	-166	-170	-173	5	17	2.5:1	12V/100mA
AML083PNA1801-S	0.8 - 3.0	18	1	-160	-166	-170	-173	5	17	2.2:1	100
AML12PNA1311	1.0 - 2.5	11	0.5	-155	-160	-165	-172	5	22	2.0:1	12V/120mA
AML12PNA1311-S	1.0 - 2.5	11	0.5	-155	-160	-165	-172	5	22	2.0:1	9V/120mA
AML12PNA1011	1.0 - 2.5	10	1	-155	-160	-165	-172	5	26	2.0:1	12V/300mA
AML12PNA1011-S	1.0 - 2.5	10	1	-155	-160	-165	-172	5	26	2.0:1	9V/300mA
AML13PNA1801	1.0 - 3.0	18	1	-158	-166	-172	-173	6	20	1.8:1	9V/200
AML13PNB1801	1.0 - 3.0	18	1	-161	-168	-173	-174	6	22	1.8:1	9V350
AML11PNA3201	1.2 - 1.4	32	0.75	-140	-155	-165	-170	1	20	1.8:1	120
AML22PNA1001	2.1 - 2.5	12	1	-158	-165	-170	-170	6.5	23	2.0:1	12V/160
AML23PNA1002	2.0 - 3.0	10	0.5	-157	-163	-168	-170	6	13	1.8:1	12V/150mA
AML23PNA1001	2.0 - 3.0	10	0.5	-155	-160	-165	-168	4	23	1.8:1	190
AML23PNA1501	2.0 - 3.0	15	1	-150	-160	-160	-163	3	23	1.8:1	160
AML23PNA2001	2.0 - 3.0	20	0.5	-152	-157	-162	-167	4	23	1.8:1	350
AML23PNA2003	2.0 - 3.0	20	0.5	-155	-163	-170	-171	6	23	1.8:1	12V/375
AML24PNA3002	2.0 - 4.0	30	1	-145	-155	-165	-170	2	27	2.0:1	380
AML26PNA1102	2.0 - 6.0	11	1	-154	-162	-164	-166	5	13	1.8:1	125
AML26PN1101	2.0 - 6.0	11	1	-154	-162	-165	-170	7	13	1.8:1	130
AML26PNA1101	2.0 - 6.0	11	1	-157	-165	-167	-170	6	14	1.5:1	120
AML26PNA2201	2.0 - 6.0	22	1.5	-152	-160	-163	-168	6	15	1.8:1	250
AML26PNA2001	2.0 - 6.0	20	2	-155	-163	-165	-168	7	15	1.5:1	240
AML26PNA1001	2.0 - 6.0	10.5	1	-160	-168	-174	-175	6	16.5	1.5:1	8V/115mA
AML26PNB1002	2.0 - 6.0	10	1	-159	-167	-169	-172	6.5	18	1.8:1	250
AML26PNB1001	2.0 - 6.0	10	1	-162	-170	-176	-176	7	18.5	1.5:1	8V/220mA
AML26PNB2001	2.0 - 6.0	20	2	-157	-165	-166	-170	7	18	1.5:1	440
AML26PNB1004	2.0 - 6.0	10	1	-158	-165	-169	-172	6.5	18	1.5:1	250
AML26PNA1103	2.0 - 6.0	11	0.75	-150	-155	-160	-165	4	21	1.8:1	120
AML26PNC1002	2.0 - 6.0	9.5	1.5	-165	-173	-178	-179	7.5	21	1.5:1	8V/450mA
AML26PNA1811	2.0 - 6.0	18	1	-155	-160	-165	-170	6	21	2.0:1	12V/350mA
AML26PNA2002	2.0 - 6.0	20	1.5	-145	-160	-165	-166	6.5	21	1.8:1	180
AML26PNC1001	2.0 - 6.0	9.5	1.5	-161	-169	-171	-173	7	21	1.5:1	440

Model Number	Freq. (GHz)	Gain (dB)	Flatness (± dB)	1KHz offset	10KHz offset	100KHz offset	1MHz offset	NF (dB)	P1dB (dBm)	VSWR (In/Out)	DC Power (V/mA)
		min	max					max	min	nom	nom
AML26PND0801	2.0 - 6.0	8	2	-165	-174	-179	-180	8	22	1.5:1	8V/960mA
AML26PNC2001	2.0 - 6.0	20	2	-158	-167	-168	-170	7	22	1.8:1	880
AML26PNA2202	2.0 - 6.0	22	1	-145	-160	-165	-166	6.5	22	1.8:1	210
AML26PNA0801	2.0 - 6.0	8	1.5	-155	-163	-168	-172	6	23	1.8:1	9V/200mA
AML26PNA0802	2.0 - 6.0	8	1	-155	-163	-168	-172	6	23	1.8:1	175
AML26PNA3202	2.0 - 6.0	29	2	-148	-156	-162	-165	6	23	1.8:1	420
AML26PNB2002	2.0 - 6.0	20	2	-147	-160	-167	-168	7	24	1.8:1	375
AML26PNB2003	2.0 - 6.0	20	1.5	-148.5	-157.5	-167	-170	7	24	1.8:1	275
AML26PNA1011	2.0 - 6.0	9	1	-150	-155	-165	-170	6	25	2.0:1	12V/230mA
AML26PNA1711	2.0 - 6.0	17	1	-150	-155	-165	-170	6	25	2.0:1	12V/475mA
AML26PNA1711-S	2.0 - 6.0	17	1	-150	-155	-165	-170	6	25	2.0:1	9V/475mA
AML26PNA3201	2.0 - 6.0	29	2	-152	-156	-162	-164	6	25	1.8:1	600
AML26PNA1002	2.0 - 6.0	9	1	-150	-155	-165	-170	6	27.5	2.0:1	12V/280mA
AML26PNC1511	2.0 - 6.0	15	2	-155	-160	-165	-170	7	34	1.5:1	12V/2.7A
AML218PNA3213	2.0 - 18.0	32	2.5	-140	-145	-155	-160	4	25	2.0:1	550
AML45L2611	4.0 - 5.0	26	1	-144	-150	-160	-170	1.5	20	1.8:1	250
AML45PNA2211	4.5 - 5.6	22	1	-155	-165	-167	-169	6	23	2.0:1	420
AML58PNC1601	5.0 - 8.0	16	0.5	-157	-165	-170	-172	7	18	1.8:1	12V/800mA
AML58PNC2401	5.0 - 8.0	16	0.5	-157	-165	-170	-172	7	18	1.8:1	12V/800mA
AML58PNA0801	5.0 - 8.0	8	0.5	-155	-160	-165	-169	6	23	1.8:1	215
AML58PNA1601	5.0 - 8.0	16	0.5	-150	-157	-162	-167	6	23	1.8:1	400
AML58PNA2401	5.0 - 8.0	24	0.75	-150	-155	-160	-165	6	23	1.8:1	490
AML58PNC0801	5.0 - 8.0	8	0.5	-157	-164	-170	-175	8	27	1.8:1	12V/1.1A
AML68PNB0701	6.0 - 8.0	7	1	-156	-165	-168	-170	6	25	2.0:1	500
AML68PNB2201	6.0 - 8.0	22	2	-155	-163	-167	-171	6	31	1.7:1	12V/2A
AML68PNB3201	6.0 - 8.0	32	2	-155	-162	-166	-170	6	31	1.7:1	12V/2A
AML69PNA0801	6.0 - 9.0	8	1	-153	-158	-163	-167	6.5	23	1.8:1	250
AML69PNA1601	6.0 - 9.0	16	1	-150	-155	-160	-165	6.5	23	1.8:1	450
AML69PNC1511	6.0 - 9.0	14	1	-155	-160	-165	-170	8	34	1.4:1	12V/2.3A
AML612PNA1001	6.0 - 12.0	10	1.5	-155	-162	-165	-168	7.5	15	1.8:1	9V/200
AML612PNB1001	6.0 - 12.0	10	1.5	-157	-165	-167	-171	7.5	17	1.8:1	9V350
AML612PNB1601	6.0 - 12.0	16	1.5	-155	-163	-165	-170	8	17	1.8:1	9V700
AML612PNA0811	6.0 - 12.0	8	1	-153	-160	-165	-170	6	21	2.0:1	12V/200mA
AML612PNA1611	6.0 - 12.0	16	1	-150	-155	-160	-168	6	21	2.0:1	12V/450mA
AML612PNA0711	6.0 - 12.0	7	1	-153	-160	-165	-170	6	25	2.0:1	12V/250mA
AML612PNA1411	6.0 - 12.0	14	1	-150	-155	-160	-167	6	25	2.0:1	12V/500mA
AML612PNA1511-S	6.0 - 12.0	15	1.5	-150	-155	-160	-167	7	24	2.0:1	9V/480 mA
AML612PNB0711	6.0 - 12.0	7	1	-155	-160	-165	-170	7	27	2.0:1	12V/500mA
AML612PNB1411	6.0 - 12.0	13	1	-150	-155	-160	-170	6.5	27	2.0:1	12V/1A
AML612PNA0511	6.0 - 12.0	5	0.75	-155	-160	-165	-168	6.5	28	2.0:1	12V/500mA

Model Number	Freq. (GHz)	Gain (dB) min	Flatness (± dB) max	1KHz offset	10KHz offset	100KHz offset	1MHz offset	NF (dB) max	P1dB (dBm) min	VSWR (In/Out) nom	DC Power (V/mA) nom
AML612PNA1211	6.0 - 12.0	12	1.25	-150	-160	-162	-165	6	28	2.0:1	12V/750
AML711PNA3401	7.0 - 11.0	32	1	-135	-145	-155	-160	3	22	1.5:1	12V/365mA
AML88PNC1502	7.9 - 8.1	15	1	-155	-165	-169	-172	8	26	1.5:1	12V/1.5A
AML811PN2001	8.5 - 11.0	18	2	-152	-160	-163	-168	-	9	1.5:1	235
AML811PN1001	8.5 - 11.0	9	1	-155	-160	-165	-168	6	10	1.5:1	115
AML811PN3002	8.5 - 11.0	28	3	-151	-158	-160	-161	-	10	1.8:1	350
AML811PNA5402	8.5 - 11.0	56	5.5	-152	-156	-162	-168	7.5	10	2.0:1	650
AML811PN1808	8.0 - 11.0	16	3	-160	-165	-167	-170	8	18	1.5:1	1800
AML811PNA3301	8.5 - 11.0	33	2	-147	-153	-158	-166	6.5	24	1.5:1	540
AML811PNA4501	8.5 - 11.0	42	2.5	-145	-151	-156	-164	7	25	1.5:1	800
AML812PNA0901	8.0 - 12.0	9	2	-160	-167	-168	-170	6	10	1.8:1	105
AML812PNA2001	8.0 - 12.0	20	2.75	-158	-160.5	-165	-168	6.5	10	1.8:1	220
AML812PNB1901	8.0 - 12.0	18	3	-158	-164	-165	-166	7	12	1.5:1	425
AML812PNB0801	8.0 - 12.0	8	2	-162	-168	-170	-172	7.5	13	1.5:1	220
AML812PNA0913	8.0 - 12.0	9	1	-165	-170	-173	-175	6.5	15	1.5:1	12V/60
AML812PNA1813	8.0 - 12.0	18	1.5	-160	-168	-172	-175	6.5	15	1.5:1	12V/120
AML812PNC1801	8.0 - 12.0	18	2	-160	-165	-167	-168	7	15	1.5:1	900
AML812PNC0801	8.0 - 12.0	8	2	-164	-170	-172	-174	6.5	16	1.8:1	450
AML812PNA1802	8.0 - 12.0	18	2	-145	-158	-160	-165	6.5	16	1.8:1	180
AML812PNB0913	8.0 - 12.0	8	1	-165	-170	-173	-175	7	17	1.5:1	12V/120
AML812PND0801	8.0 - 12.0	8	3	-166	-170	-172	-175	6.5	18	1.8:1	900
AML812PNB1813	8.0 - 12.0	18	2	-160	-168	-172	-175	7	17	1.5:1	12V/250
AML812PND1801	8.0 - 12.0	16	3	-162	-168	-169	-170	8	18	1.5:1	1800
AML812PNB1802	8.0 - 12.0	18	2	-147	-158	-162	-166	7	18	1.8:1	360
AML812PNA0802	8.0 - 12.0	8	1	-145	-158	-160	-165	6	20	1.8:1	100
AML812PNC1802	8.0 - 12.0	18	1.5	-149.5	-158.5	-163	-168	7	20	1.8:1	720
AML812PNA2202	8.0 - 12.0	22	0.25	-142	-151	-160	-167	3	21	1.5:1	300
AML812PNB0701	8.0 - 12.0	7	1	-147	-160	-162	-167	6.5	22	1.8:1	200
AML812PNA2003	8.0 - 12.0	20	2.5	-148	-155	-160	-168	7	22	1.8:1	600
AML812PNA2002	8.0 - 12.0	20	1	-135	-145	-150	-155	3.5	23	1.8:1	12V/275
AML812PNC0701	8.0 - 12.0	7	1	-150	-162	-165	-170	6.5	24	1.8:1	400
AML812PNA2401	8.0 - 12.0	24	1.5	-147	-155	-159	-165	6.5	24	1.8:1	600
AML812PNA0803	8.0 - 12.0	8	1.5	-153	-160	-165	-168	6	25	1.8:1	250
AML812PNA1601	8.0 - 12.0	16	1	-150	-156	-162	-167	7	25	1.8:1	400
AML812PND0701	8.0 - 12.0	7	1	-151	-164	-167	-172	7	26	1.8:1	800
AML812PNB2401	8.0 - 12.0	24	2	-153	-158	-162	-165	7	26	1.8:1	1150
AML812PNB0703	8.0 - 12.0	7	1.5	-155	-162	-165	-170	6	27	1.8:1	500
AML812PNB1501	8.0 - 12.0	15	1	-151	-158	-163	-169	7	27	1.8:1	800
AML812PNA2201	8.0 - 12.0	18	2	-145	-148	-153	-157	5.5	27	2.0:1	650
AML812PNA3501	8.0 - 12.0	35	2	-140	-148	-153	-154	3	28	2.0:1	1000

Model Number	Freq. (GHz)	Gain (dB) min	Flatness (± dB) max	1KHz offset	10KHz offset	100KHz offset	1MHz offset	NF (dB) max	P1dB (dBm) min	VSWR (In/Out) nom	DC Power (V/mA) nom
AML812PNC0703	8.0 - 12.0	7	1	-157	-164	-167	-172	7	29	1.8:1	1000
AML812PNC1501	8.0 - 12.0	14	1	-153	-160	-165	-170	8	29	1.8:1	1800
AML812PND0703	8.0 - 12.0	7	1	-159	-166	-169	-172	8	31	1.8:1	2000
AML911PNC0801	9.0 - 11.0	8	1	-161	-168	-170	-175	7.5	20	1.8:1	9V/600
AML911PNA2201	9.0 - 11.0	24	1	-150	-155	-160	-164	6.5	23	1.8:1	950
AML911PNA0702	9.0 - 11.0	7.5	0.5	-155	-162	-166	-170	6	25	1.5:1	450
AML911PNA2901	9.0 - 11.0	30	1	-147	-152	-157	-162	8	27	1.8:1	1300
AML911PNA2902	9.0 - 11.0	29	0.75*	-150	-158	-163	-165	8.5	25	1.8:1	12V/1.15A
AML911PNC2901	9.0-11.0	27	3	-155	-161	-165	-166	6	27	1.8:1	9V/2300
AML911PNB3201	9.0 - 11.0	32	1	-154	-160	-165	-168	7	27	1.8:1	1400
AML911PNB2801	9.0 - 11.0	28	2	-150	-157	-165	-167	7	30	1.8:1	12V/2.3A
AML913PNA0801	9.0 - 13.0	8	1	-143	-156	-158	-163	6	20	1.8:1	12V/100mA
AML1010PNA0801	10	8	1	-156	-163	-170	-171	7.5	17	1.8:1	9V/200
AML1010PNA2101	10.24	20	1	-151	-158	-163	-164	6.5	20	1.8:1	375
AML1011PNA3204	10.0 - 11.0	32	1.5	-148	-155	-159	-161	7	26	1.8:1	700
AML1010PND1801	10	18	-	-163	-169	-171	-175	8	20	1.5:1	12V/1.8A
AML1013PNB3001	10.0 - 13.0	30	2.5	-155	-160	-163	-165	8	31	1.5:1	12V/2.5A
AML1518PNA1711	15.0 - 18.0	14	0.5	-145	-155	-163	-167	6	26	1.8:1	12/500
AML1618PNA1001	16.0 - 18.0	10	0.5	-140	-145	-150	-155	8	14	2.0:1	12/160
AML4040PNA1001	40	10	-	-130	-135	-137	-142		19*		12V/320
AML3940PNA1001	39.0 - 40.0	10	2	-140	-145	-150	-155		23*	2.0:1	12V/750
AML3940PNA1501	39.0 - 40.0	15	2	-135	-140	-142	-145		23*	2.0:1	12V/350
AML4040PNB1511	40	15	2	-146	-150	-155	-160		24	2.0:1	6V/1200

† Gain specified as min to max

* Power specified as Psat

**Above 500 MHz

•Noise Figure up to 36.5GHz. 5.5dB max @ 40GHz

-Specifications are at +25°C

-Operating temperature range is -20 to +70°C

Specifications are subject to change

-Operational range of -54 to +85°C is available

-DC Voltage is +12 to +15 VDC unless stated otherwise

Features:

Frequency up to 40 GHz

Phase Noise X-Band -170dBc/Hz;

Q-Band -150dBc/Hz

Microsemi's limiting amplifiers offer excellent power flatness and signal suppression over a wide input power range. All designs employ thin film techniques for high performance and repeatability.

Model Number	Freq. (GHz)	Gain (dB) min	Input Power Range (dBm)	Output Power (dBm)	Noise Figure dB (@ 25°C max)	VSWR In/Out (nom)	DC Current (mA nom)	Outline
1.0 - 2.0 GHz								
AML12LM2201	1.0 - 2.0	23 - 25	-7 to 7	10 ± 1.0	5	2.0:1	150	L3
2.0 - 4.0 GHz								
AML24LM3001	2.0 - 4.0	30	-20 to 5	11 ± 1.0	3	2.0:1	150	C4
AML24LM4001	2.0 - 4.0	40	-20 to +10	17 ± 1.5	2.5	2.0:1	250	C4
AML24LM6001	2.0 - 4.0	60	-47 to -7	11 ± 1.0	3	2.0:1	220	C6
AML24LM9001	2.0 - 4.0	90	-60 to +10	17 ± 1.5	2.5	2.0:1	450	C4+C4
2.0 - 6.0 GHz								
AML26LM4001	2.0 - 6.0	40	-20 to +10	17 ± 1.5	2.5	2.0:1	250	SC3
AML26LM9001	2.0 - 6.0	90	-60 to +10	17 ± 1.5	2.5	2.0:1	450	SC3 + SC3
AML26LM4002	2.0 - 6.0	40	-20 to 10	20 ± 1.5	3	2.0:1	250	SC3
AML26LM9002	2.0 - 6.0	90	-60 to 10	20 ± 1.5	3	2.0:1	450	SC3 + SC3
2.0 - 8.0 GHz								
AML38LM6001	3.0 - 8.0	60	-70 to 10	-12 ± 1.5	3	2.0:1	225	modK5+ modK6
AML28LM4001	2.0 - 8.0	40	-20 to +10	17 ± 1.5	4.5	2.0:1	425	K6
AML28LM9001	2.0 - 8.0	90	-60 to +10	17 ± 1.5	4.5	2.0:1	750	K5 + K6
2.0 - 18.0 GHz								
AML218LM4001	2.0 - 18.0	40	-20 to +10	14.5 ± 1.5	5.5	2.0:1	375	B5
AML218LM7011	2.0 - 18.0	70	-50 to 10	16.5 ± 1.5	5	2.0:1	550	BL9
AML218LM8001	2.0 - 18.0	80	-60 to +10	14.5 ± 1.5	5.5	2.0:1	750	B5+B5
4.0 - 8.0 GHz								
AML48LM3501	4.0 - 8.0	35	-15 to +10	17 ± 1.5	3	2.0:1	250	C4
AML48LM9001	4.0 - 8.0	90	-60 to +10	17 ± 1.5	3	2.0:1	450	C4+C4
6.0 - 12.0 GHz								
AML612LM4001	6.0 - 12.0	40	-20 to +10	17 ± 1.5	4	2.0:1	425	K6
AML612LM9001	6.0 - 12.0	90	-60 to +10	17 ± 1.5	4	2.0:1	750	K5 + K6

Model Number	Freq. (GHz)	Gain (dB) min	Input Power Range (dBm)	Output Power (dBm)	Noise Figure dB (@ 25°C max)	VSWR In/Out (nom)	DC Current (mA nom)	Outline
6.0 - 18.0 GHz								
AML618LM4001	6.0 - 18.0	40	-20 to +10	17 ± 1.5	4.5	2.0:1	425	K6
AML618LM9001	6.0 - 18.0	90	-60 to +10	17 ± 1.5	4.5	2.0:1	750	K6+K6
8.0 - 18.0 GHz								
AML818LM4001	8.0 - 18.0	40	-20 to +10	17 ± 1.5	4.5	2.0:1	425	K6
AML818LM9001	8.0 - 18.0	90	-60 to +10	17 ± 1.5	4.5	2.0:1	750	K6+K6
2.0 - 20.0 GHz								
AML220LM3001	2.0 - 20.0	27	-5 to +5	22 ± 2.5	5	2.0:1	400	B4
10.0 to 20.0 GHz								
AML1018LM6001	10.0 - 18.0	60	-70 to 10	-12 ± 1.5	3	2.0:1	225	K6 + K5
AML1020LM2801	10.0 - 20.0	27	+6 to +10	31 ± 1	6	2.0:1	900	K6
8.0 - 18.0 GHz Limiting Amplifiers with Detectors								
AML816LM6011-DT	8.45 - 16.20	60	-32 to +1	25.5 ± 1	5	1.7:1	650	860
AML1218LM5011-DT	11.95 - 18.50	50	-32 to +1	14.5 ± 1.5	5	1.7:1	450	874

- Specifications are at +25°C
- Operating temperature range is -20 to +70°C
- Operational range of -54 to +85°C is available
- Noise Figure up to 36.5GHz. 5.5dB max @ 40GHz Signal
- DC Voltage is +12 to +15 VDC unless stated otherwise
- Operational range of -54 to +85°C is available

Features:

- Frequency up to 20 GHz
- Saturated Output Flatness +/- 1dB
- Suppression is greater than 10dB

Specifications are subject to change
 Consult factory for other equalizer slopes

Microsemi's integrated gain equalizers compensate for system gain slope. Equalizers are narrow or wide band lossy passive circuits, of negative slope, positive slope or of parabolic type attenuation. Fixed slope equalization can vary from 3dB/octave to more than 12 dB/octave, although other slope gradients can also be achieved. The parabolic type presents low attenuation at the ends of the amplifier frequency bandwidth, and large attenuation in the middle, or a portion of the band.

Model Number	Freq. (GHz)	Gain (dB) min	Gain Slope (dB)	Flatness (±) dB max	Noise Figure (dB max)	P-1 dB (dBm min)	Input VSWR (nom)	Output VSWR (nom)	DC (mA nom)
AML218LE1401	2.0 - 18.0	10dB @ 2GHz, 14dB @ 18GHz	4	1.5	3.6	9	2.0:1	2.0:1	150
AML218LE2301	2.0 - 18.0	14dB @ 2GHz, 23dB @ 18GHz	9	1.75	5.5dB @ 2GHz, 4.0dB @ 18GHz	10	2.0:1	250	250
AML218LE3101	2.0 - 18.0	22dB @ 2GHz, 31dB @ 18GHz	9	2.25	3.8dB @ 2GHz, 3.5dB @ 18GHz	10	2.0:1	280	280
AML218LE2702	2.0 - 18.0	18dB @ 2GHz, 27dB @ 18GHz	9	2.25	4.0dB @ 2GHz, 3.8dB @ 18GHz	18	2.0:1	350	350
AML218PE2702	2.0 - 18.0	18dB @ 2GHz, 27dB @ 18GHz	9	2.25	4.3dB @ 2GHz, 3.8dB @ 18GHz	20	2.0:1	375	375
AML48LE4001	4.0 - 8.0	36dB @ 4GHz, 40dB @ 8GHz	4	1.5	1.2	10	1.8:1	1.8:1	160
AML412LE2401	4.0 - 12.0	24dB @ 4GHz, 27dB @ 12GHz	3	1.5	1.8	10	1.8:1	225	160
AML412LE4001	4.0 - 12.0	22dB @ 4GHz, 34dB @ 12GHz	12	1	2.2	10	1.8:1	1.8:	250
AML418LE1801	4.0 - 18.0	6dB @ 4GHz, 18dB @ 18GHz	12	1.5	12dB @ 4GHz, 6dB @ 18GHz	15	2.0:1		250
AML418PE2601	4.0 - 18.0	14dB @ 4GHz, 26dB @ 18GHz	12	2	5.0dB @ 4GHz, 4.0dB @ 4GHz	20	2.0:1	375	225
AML514LE1401	5.8 - 14.5	7dB @ 5.8GHz, 10dB @ 14.5GHz	3	0.5	6	10	2.0:1	2.0:1	180
AML618LE1801	6.0 - 18.0	10dB @ 6GHz, 17dB @ 18 GHz	7	1.5	6.0dB @ 6GHz, 3.5dB @ 18GHz	10	1.8:1	130	180
AML618LE2401	6.0 - 18.0	19dB @ 6GHz, 24dB @ 18GHz	5	1	3.8dB @ 6GHz, 3.4dB @ 18GHz	18	2.0:1	2.0:1	220
AML618LE2601	6.0 - 18.0	20dB @ 6GHz, 27dB @ 18 GHz	7	1.75	3.5dB @ 6GHz, 3.0dB @ 18GHz	10	1.8:1	175	220
AML618PE2601	6.0 - 18.0	19dB @ 6GHz, 26dB @ 18 GHz	7	1.75	6.0dB @ 6GHz, 3.5dB @ 18GHz	20	1.8:1	250	250

-Specifications are at +25°C

- Operating temperature range is -20 to +70°C
- Operational range of -54 to +85°C is available
- Noise Figure up to 36.5GHz. 5.5dB max @ 40GHz
- DC Voltage is +12 to +15 VDC unless stated otherwise
- Operational range of -54 to +85°C is available

- Frequency up to 18 GHz
- Positive sloped and Parabolic shaped
- Low noise/high power over the full band
- Consult factory for other equalizer slopes

Microsemi's frequency multipliers scale up the operating signal frequency by an integer multiple, "N". Microsemi specializes in multipliers with minimal noise degradation, low spurious and harmonic output, with consistent performance over drive level and operating temperature. Base models include a comprehensive line of doublers (N = 2), triplers (N = 3), and quadruplers (N = 4), along with higher order multiplication schemes up to N = 10.

Model Number	Input Frequency (GHz)	Output Frequency (GHz)	RF Power In (dBm)	RF Power Out dBm (Psat)	Harmonics (dBc) typ	Current @ +12 to +15 VDC (mA)	Case Config.
ALMX2-0510-20	2.5-5	5-20	10	20	-10	375	STL-6
ALMX2-0810-20	4.25-5.25	8.5-10.5	10	20	-15	300	SLC-2
ALMX2-1020-20	5-10	10-20	10	20	-10	450	STL-6
FA-08151	6.35-7.75	12.7-15.5	10	20	-20	400	A6/SMA/SMA
ALMX2-1416-20	7-8	14-16	10	20	-10	350	SLC-3
FA-10201	8.85-9.85	17.7-19.7	10	20	-20	400	A6/SMA/SMA
ALMX2-1826-10	9-13	18-26	10	10	-10	300	STK-4
ALMX2-1826-20	9-13	18-26	10	20	-20	450	STK-6
FA-13263	9-13.3	18-26.5	10	15	-20	325	A6/K or WR42
FA-13264	9-13.3	18-26.5	10	20	-20	410	A6/K or WR42
FA-20403	10-20	20-40	10	10	-20	420	A8/K
FA-20404	10-20	20-40	10	15	-20	530	A8/K
FA-12241	10.6-11.8	21.2-23.6	10	20	-20	400	A6/SMA/SMA
ALMX2-2436-20	12-18	24-36	10	20	-10	550	STK-4
FA-13261	12.1-13	24.2-26	10	20	-20	400	A6/SMA/K
ALMX2-2640-18	13-20	26-40	10	18	-20	425	DBK-6
ALMX2-2640-20	13-20	26-40	10	20	-20	550	STK-8
FA-20405	13-20	26-40	10	15	-20	375	A6/K or WR42
FA-20406	13-20	26-40	10	20	-20	480	A6/K or WR42
FA-14281	13.75-14.25	27.5-28.5	10	20	-20	400	A6/SMA/K
FA-16321	14.55-15.65	29.1-31.3	10	20	-15	400	A6/SMA/K
ALMX2-3036-16	15-18	30-36	0	16	-20	500	STK-4
ALMX2-3350-13	16.5-25	33-50	10	13	-20	500	STV-8
FA-25504	16.5-25	33-50	10	7	-20	375	A6/K or WR22
FA-25505	16.5-25	33-50	10	12	-20	425	A6/K or WR22
ALMX2-4060-10	20-30	40-60	10	20	-20	650	STV-8
FA-30601	20-30	40-60	10	10	-20	475	A6/V WR19
FA-32651	19-32.5	38-65	10	10	-20	550	A8/V WR19
ALMX3-2640-20	8.66-13.33	26-40	10	20	-10	550	STK-6
ALMX3-3350-13	11-16.6	33-50	10	13	-20	650	STV-8
ALMX3-3740-15	12.33-13.33	37-40	10	15	-20	475	STK-6
FA-12401	12.33-13.33	37-40	15	19	-20	350	W3/WR-28/22
ALMX3-4043-15	13.33-14.33	40-43	10	15	-20	500	STK-6

Model Number	Input Frequency (GHz)	Output Frequency (GHz)	RF Power In (dBm)	RF Power Out dBm (P _{sat})	Harmonica (dBc) typ	Current @ +12 to +15 VDC (mA)	Case Config.
ALMX4-0810-20	2.125-2.625	8.5-10.5	10	20	-15	300	DBX-4
ALMX4-1416-20	3.5-4	14-16	10	20	-20	450	SLC-4
ALMX4-1020-20	3.75-5	15-20	10	20	-10	450	STL-8
FA-07263	4.5-6.6	18-26.5	10	15	-15	350	A8/K or WR42
FA-07264	4.5-6.6	18-26.5	10	20	-15	460	A8/K or WR42
FA-10403	5-10	20-40	10	10	-15	460	A10/K
FA-10404	5-10	20-40	10	15	-15	570	A10/K
ALMX4-2640-20	6.5-10	26-40	10	20	-10	550	STK-6
ALMX4-2640-15	6.5-10	26-40	10	15	-20	600	STK-8
FA-10405	6.6-10	26-40	10	15	-15	410	A8/K or WR42
FA-10406	6.6-10	26-40	10	20	-15	520	A8/K or WR42
ALMX4-3050-10	8.25-12.5	30-50	10	10	-10	600	STV-8
ALMX4-3350-10	8.25-12.5	33-50	10	10	-20	600	DBV-8
FA-12504	8.3-12.5	33-50	10	7	-15	420	A8/K or WR22
FA-12505	8.3-12.5	33-50	10	10	-15	540	A8/K or WR22
ALMX4-4-4052-8	10-13	40-52	10	8	-15	700	STV-6
ALMX4-4060-10	10-15	40-60	10	10	-20	750	STV-8
FA-15602	10-15	40-60	10	10	-20	875	A8/V WR19
FA-11451	10.8-11.4	43.5-45.5	10	10	-30	550	A8/K WR22
FA-13511	12.2-12.75	48.8-51	10	10	-30	525	A8/V WR22
FA-12501	12.28-12.55	49.1-50.2	15	17	-20	350	W3/WR-22
FA-15601	14-15	56-60	10	10	-30	650	A8/V WR19
FA-16641	14.75-16	59-64	10	10	-20	450	W5/WR-22
FA-16641	14.75-16	59-64	10	10	-20	450	W5/WR-22
ALMX4-9096-5	22.5-24	90-96	10	5	-20	600	SPECIAL
ALMX6-9096-05	15-16	90-96	5	5	-15	600	SPECIAL
ALMX6-9395-07	15.5-15.83	93-95	5	7	-15	600	SPECIAL
FA-05401	4.625-5	37-40	15	19	-20	350	W5/WR-28/22
FA-05501	4.91-5.02	49.1-50.2	15	17	-20	350	W5/WR-22

Amplifiers integrated into a system, such as a receiver front end, present stability concerns. Too much gain may cause instabilities or signal distortion in applications such as TWT transmitters. In such cases, it would be beneficial to implement an integrated analog or digital controlled attenuator into the amplifier. Microsemi offers a variety of amplifiers with variable gain control.

Model Number	Freq. Range (GHz)	Gain (dB) min	Flatness (\pm dB) max	NF (dB) max	P-1dB (dBm) min	OIP3 (dBm) typ	Attn Range	NF* (dB) max	P-1dB* (dBm) min	Input VSWR (nom)	Output VSWR (nom)	DC mA (nom)
AML33P2601-VG	3.1 - 3.7	26	0.2	1.5	25	35	0-12	6	15	1.5:1	1.5:1	220
AML34P2601-VG	3.8 - 4.4	26	0.2	2	25	35	0-12	7	13	1.5:1	1.5:1	220
AML44P2601-VG	4.1 - 4.7	26	0.2	2	25	35	0-12	7	13	1.5:1	1.5:1	220
AML45P2601-VG	4.8 - 5.4	26	0.2	2	25	35	0-12	7	13	1.5:1	1.5:1	220
AML67P2601-VG	6.8 - 7.4	26	0.2	2	25	35	0-12	7	13	1.5:1	1.5:1	220
AML24P2601-VG	2.0 - 4.0	26	1	1.8	25	35	0-12	6	13	1.8:1	1.8:1	220
AML48P2601-VG	4.0 - 8.0	24	1	2.5	25	35	0-12	7	13	1:08:01	1.8:1	220
AML612L1501-VG	6.0 - 12.0	15	1	3	15	25	0-12	3.8	2	1.8:1	1.8:1	200
AML612P2501-VG	6.0 - 12.0	25	1.5	3.2	25	35	0-12	5	14	1.8:1	1.8:1	300
AML714L2301-VG	7.0 - 14.0	23	3	4	5	15	0-10	5.5	-5	2.0:1	2.0:1	12V, 110
AML818P1501-VG	8.0 - 18.0	15	1	3	20	30	0-12	3	20	1.8:1	1.8:1	200
AML818P2301-VG	8.0 - 18.0	25	1.5	3	25	35	0-12	7	12	1.8:1	1.8:1	300
AML1015L3001-VG	10.0 - 15.0	30	2	6	15	25	0-30	10	-15	2.0:1	2.0:1	300
AML120P3201-VG	1.0 - 20.0	32	3.5	5	27	32	0-10	4.5	17	2.0:1	2.0:1	15V, 1500
AML218L1401-VG	2.0 - 18.0	14	2	4.5	10	18	0-10	5	5	2.0:1	2.0:1	180
AML220P3201-VG	2.0 - 20.0	32	3.5	5	21	30	0-15	6	14	2.0:1	2.0:1	12V, 650
AML0520L0501-VG	0.5 - 20.0	5	1.5	5.3	8	15	0-10	9	-2	2.0:1	2.0:1	150
AML0520L1401-VG	0.5 - 20.0	14	2	5	10	15	0-10	5.8	5	2.0:1	2.0:1	200

Notes:

Attenuation Control Voltage between 0 & +5 V

Attenuation Range up to 60 dB is available. Please contact factory for details

Control Voltage 0 to +15VDC is available

*at full attenuation

Features:

Frequency up to 20 GHz

Narrow and Wide-Band Designs

Attenuation Range up to 50dB

Analog or Digital Controlled

Monotonic Response

Low Noise Figure and High Power over the full range

Microsemi's high dynamic range amplifiers provide the system engineer with a wide range of frequency, gain, power and noise figure with low intermodulation distortion. They employ various cancellation techniques such as push-pull feedback.

Model Number	Frequency Range (MHz)	Gain (dB) typ	Noise Figure	P-dB (dBm min)	Output IP3 (dBm typ.)	Output IP2 (dBm typ.)	VSWR In/Out (nom)	DC Current (mA nom)	Vg	Outline
0.5-200MHz										
BR000520011	0.5 - 200	11	5.5	28*	46	74	2.0:1	250	15	OL2
2-32MHz										
AR01003252X	1-Feb	22	3.7	26	46	75	2.0:1	150	28	OL2
AR01003250X	Feb-32	22	4.5	30	49	80	2.0:1	240	28	OL2
AR01003251X	1-Feb	21	5.5	32	52	100	2.0:1	440	28	OL4
1-100MHz										
BR00110010	1 - 100	10	5.5	30	49	75	2.0:1	450	15	OL2
BR00110022	1 - 100	22	5	30	49	74	2.0:1	600	15	OL3
2-200MHz										
AR01020060X	2 - 200	22	5.5	30	48	78	2.0:1	220	28	OL2
AR01020061X	2 - 200	21	6.6	32	50	98	2.0:1	440	28	OL2
10-500MHz										
BR20050060X	10 - 500	16.5	2.3	15	30	41	2.0:1	30	15	OL2
BP20050080X	10 - 500	12	3	16	32	45	2.0:1	40	15	OL2
AR30050068X	10 - 500	14	3	17	34	63	2.0:1	60	28	OL2
BR20050070X	10 - 500	14	3	17	32	62	2.0:1	60	15	OL2
BP20050084X	10 - 500	10	3.8	18	34	62	2.0:1	80	15	OL2
BP20050087X	10 - 500	26	2.5	18	34	52	2.0:1	110	15	OL2
BP01050025	10 - 500	25	3	18	34	65	2.0:1	140	15	OL3
10-1000MHz										
BP10100030X	10 - 1000	12	3.8	16	33	45	2.0:1	40	15	OL2
BP10100031X	10 - 1000	10	5	18	35	67	2.0:1	80	15	OL2
20-500MHz										
BR02050011	20 - 500	11	4	17	32	44	2.0:1	60	15	OL2
AR30050040X	20 - 500	10	4.5	19	35	62	2.0:1	120	28	OL2
BP40050010X	20 - 500	11	3.8*	20	36	50	2.0:1	100	15	OL20
BP40050012X	20 - 500	22	3.8*	20	36	52	2.0:1	180	15	OL20
BP40050022X	20 - 500	23	3.8*	22	38	54	2.0:1	250	15	OL20
BP40050020X	20 - 500	13	3.8*	22	38	54	2.0:1	200	15	OL20
BR20050078X	20 - 500	18	5.6	25	38	70	2.0:1	210	15	OL2
BR02050017	20 - 500	17	6.2	27	40	90	2.0:1	420	15	OL4
BP40050030X	20 - 500	11	4.5*	28	41	51	2.0:1	350	15	OL35
BP40050036X	20 - 500	34	3.8*	28	40	51	2.0:1	600	15	OL39
BP20070022L	20 - 500	22	3.8*	31	43	60	2.0:1	950	15	OL37

Model Number	Frequency Range (MHz)	Gain (dB) typ	Noise Figure	P-dB (dBm min)	Output IP3 (dBm typ.)	Output IP2 (dBm typ.)	VSWR In/Out (nom)	DC Current (mA nom)	Vg	Outline
BP40050070X	20 - 500	9	6.0*	31	44	60	2.0:1	750	15	OL35
BP40050076X	20 - 500	33	3.8*	31	42	60	2.0:1	1100	15	OL39
AR30050073X	20 - 500	30	3.8*	32	46	60	2.0:1	600	28	OL3
AR30050070X	20 - 500	18	6.8	32	47	73	2.0:1	460	28	OL2
AR30050072X	20 - 500	16	8	34	49	90	2.0:1	960	28	OL4
BP20050097	20 - 500	18	9.5	32	51	80	2.5:1	580	15	OL2
BP20050098	20 - 500	17	11	11	53	100	2.5:1	1200	15	OL4
20-1000MHz										
BP10100058X	20 - 1000	11	4.2	17	30	44	2.0:1	60	15	OL2
BP10120058X	20 - 1000	9	5.6	19	33	62	2.0:1	120	15	OL2
AR10100054X	20 - 1000	10	5.5	19	33	60	2.0:1	120	28	OL2
BP50060010X	20 - 1000	11	3.8*	20	35	48	2.0:1	100	15	OL20
BP50060012X	20 - 1000	20	4.0*	21	35	48	2.0:1	180	15	OL20
BP50060020X	20 - 1000	13	3.8*	22	38	52	2.0:1	200	15	OL20
BP50060022X	20 - 1000	23	4.0*	22	38	52	2.0:1	300	15	OL20
BP50060036X	20 - 1000	34	4.0*	28	40	50	2.0:1	630	15	OL39
BP50060030X	20 - 1000	11	4.5*	28	40	50	2.0:1	350	15	OL35
BP10217042	20 - 1000	18	6.5*	27	40	60	2.0:1	240	28	OL2
AR10610005X	20 - 1000	28	4.5	27	40	60	2.0:1	500	28	OL3
AR10100047X	20 - 1000	29	4.8	27	40	56	2.0:1	300	28	OL2
BP10100085X	20 - 1000	11	3.5*	27	43	52	2.0:1	200	15	OL2
BP50070020X	20 - 1000	23	4.0*	30	43	62	2.0:1	950	15	OL20
BP50060060X	20 - 1000	9	6.0*	30	43	62	2.0:1	760	15	OL35
BP10100086X	20 - 1000	15	9.6	31	44	80	2.0:1	1500	15	OL4
BP10217049	20 - 1000	18	11	11	47	75	2.5:1	690	15	OL2
BP10217050	20 - 1000	16	12	12	49	92	3.0:1	1200	15	OL4
20-2000MHz										
BP60070010X	20 - 2000	10	4.3*	20	36	49	2.0:1	100	15	OL20
BP60070012X	20 - 2000	13	4.5*	22	38	54	2.0:1	180	15	OL20
BP10200060X	20 - 2000	24	4.6*	22	38	54	2.0:1	260	15	OL20
BP60070040X	20 - 2000	11	4.5*	28	40	49	2.0:1	380	15	OL35
BP60070023X	20 - 2000	34	4.6*	28	40	50	2.0:1	550	15	OL37
BP60070024X	20 - 2000	32	4.6*	30	43	62	2.0:1	1050	15	OL39
BP60070020X	20 - 2000	22	4.6*	30	43	62	2.0:1	950	15	OL37
BP60070048X	20 - 2000	9	8.5*	31	43	62	2.0:1	780	15	OL35

Model Number	Frequency Range (MHz)	Gain (dB) typ	Noise Figure	P-dB (dBm min)	Output IP3 (dBm typ.)	Output IP2 (dBm typ.)	VSWR In/Out (nom)	DC Current (mA nom)	Vg	Outline
20-3000MHz										
AML20M3P3301	20 - 3000	33	2.0**	17	32	42	2.0:1	190	15	modK4
AML20M3P1101	20 - 3000	11	4.5**	23	39	49	2.0:1	120	15	modK2
AML20M3P4201	20 - 3000	42	2.0**	23	37	47	2.0:1	375	15	modK5
AML20M3P1001	20 - 3000	10	5.5**	27	43	53	2.0:1	275	15	modK2

AML20M3P2101	20 - 3000	21	5.5**	27	43	53	2.0:1	400	15	modK3
AML20M3P4001	20 - 3000	40	2.0**	27	42	52	2.0:1	550	15	modK5
2000 - 18000MHz										
AML26P3501	2000-6000	35	3.5	29	39	62	1.8:1	1000	12	SCP5
AML618P3202	6000-18000	32	4	28	37	60	1.8:1	1200	12	KP8

- Specifications are at +25°C
- Operating temperature range is -20 to +70°C
- Operational range of -54 to +85°C is available
- DC Voltage is +12 to +15 VDC unless stated otherwise noted.
- Specifications are subject to change
- * Higher below 100 MHz
- ** Above 500 MHz

Features:

- Frequency up to 18 GHz
- Output IP2 100dBm up to 500MHz;
60dBm up to 18GHz

This family of amplifiers uses novel coaxial and waveguide combiners. These products are available in industry standard 19" enclosures. Typical applications are instrumentation and TWT replacement.

Model Number	Frequency Range (GHz)	Psat (dBm)	Psat (W)	P1dB (dBm)	Pac (kW)	Height (in)
C008010-51	0.8 - 1.0	51	125	48	1	5.25
C135155-47	1.35 - 1.55	47.5	56	46	0.5	5.25
C020027-50	2.0 - 2.7	50	100	49	0.6	8.75
C020027-53	2.0 - 2.7	53	200	52	1.2	10.25
C021022-52	2.1 - 2.2	52.5	180	51.5	0.8	8.75
C024025-51	2.4 - 2.5	51.5	150	50.5	1	8.75
C031035-44	3.1 - 3.5	44	25	43	0.2	5.25
C031035-46	3.1 - 3.5	46.5	44	45.5	0.5	8.75
C031035-49	3.1 - 3.5	49	80	48	0.9	8.75
C033036-46	3.3 - 3.6	46	40	45	0.3	5.25
C033036-48	3.3 - 3.6	48.5	70	47.5	0.5	8.75
C033036-51	3.3 - 3.6	51	120	50	1	8.75
C037042-46	3.7 - 4.2	46.5	44	45.5	0.3	5.25
C037042-49	3.7 - 4.2	49	80	48	0.6	8.75
C037042-51	3.7 - 4.2	51.5	140	50.5	1.2	8.75
C044050-46	4.4 - 5.0	46	40	45	0.3	5.25
C044050-48	4.4 - 5.0	48.5	70	47.5	0.5	8.75
C044050-51	4.4 - 5.0	51	120	50	1	8.75
C053059-46	5.3 - 5.9	46	40	45	0.3	5.25
C053059-48	5.3 - 5.9	48.5	70	47.5	0.5	8.75
C053059-51	5.3 - 5.9	51	120	50	1	8.75
C053059-53	5.3 - 5.9	53	200	52	2	8.75
C059064-46	5.9 - 6.4	46	40	45	0.3	5.25
C059064-48	5.9 - 6.4	48.5	70	47.5	0.5	8.75
C059064-51	5.9 - 6.4	51	120	50	1	8.75
C059064-53	5.9 - 6.4	53	200	52	2	10.25
C059064-55	5.9 - 6.4	55	300	52	3	10.25
C064072-46	6.4 - 7.2	46	40	45	0.3	5.25
C064072-48	6.4 - 7.2	48.5	70	47.5	0.5	8.75
C064072-51	6.4 - 7.2	51	120	50	1	8.75
C071077-47	7.1 - 7.7	47.5	56	46.5	0.5	8.75
C071077-50	7.1 - 7.7	50	100	49	0.9	8.75
C071077-52	7.1 - 7.7	52.5	170	51.5	1.8	10.25
C077085-46	7.7 - 8.5	46	40	45	0.3	5.25
C077085-48	7.7 - 8.5	48.5	70	47.5	0.5	8.75
C077085-51	7.7 - 8.5	51	120	50	1	8.75
C085096-43	8.5 - 9.6	43	20	42	0.3	5.25

Model Number	Frequency Range (GHz)	P _{sat} (dBm)	P _{sat} (W)	P _{1dB} (dBm)	P _{ac} (kW)	Height (in)
C085096-48	8.5 - 9.6	48	60	47.5	1	8.75
C085096-45	8.5 - 9.6	45.5	35	44	0.5	5.25
C090105-43	9.0 - 10.5	43	20	42	0.3	5.25
C090105-45	9.0 - 10.5	45.5	35	44.5	0.4	5.25
C090105-47	9.0 - 10.5	47	50	46	0.6	8.75
C090105-50	9.0 - 10.5	50	100	49	1	8.75
C090105-53	9.0 - 10.5	53	200	52	1.5	8.75
C107117-45	10.7 - 11.7	45.5	35	44.5	0.5	5.25
C107117-48	10.7 - 11.7	48	60	47	0.9	8.75
C107117-50	10.7 - 11.7	50.5	110	49.5	2	10.25
C127132-45	12.7 - 13.2	45.5	35	44.5	0.5	5.25
C127132-48	12.7 - 13.2	48	60	47	0.9	8.75
C127132-50	12.7 - 13.2	50.5	110	49.5	2	10.25
C140145-45	14.0 - 14.5	45.5	35	44.5	0.5	5.25
C140145-48	14.0 - 14.5	48	60	47	0.9	8.75
C140145-50	14.0 - 14.5	50.5	110	49.5	2	10.25
C144155-49	14.4 - 15.5	49	80	48.5	1.2	8.75
C005020-39	0.5 - 2.0	39	8	38	0.1	5.25
C0104-40	1.0 - 4.0	40	10	38.5	0.1	5.25
C0104-42	1.0 - 4.0	42	15	41	0.19	5.25
C0104-43	1.0 - 4.0	43	20	41.5	0.2	5.25
C008042-40	0.8 - 4.2	40	10	39	0.15	5.25
C008042-42	0.8 - 4.2	42	15	41	0.19	5.25
C008042-43	0.8 - 4.2	43	20	42	0.22	5.25
C0204-39	2.0 - 4.0	39	8	38.5	0.08	5.25
C0204-41	2.0 - 4.0	41	12.5	40	0.13	5.25
C0204-44	2.0 - 4.0	44	25	42.5	0.25	5.25
C0408-40	4.0 - 8.0	40	10	38.5	0.1	5.25
C0408-43	4.0 - 8.0	43	20	41.5	0.2	5.25
C0618-40	6.0 - 18.0	40	10	38.5	0.1	5.25
C0618-43	6.0 - 18.0	43	20	41.5	0.2	5.25
C0618-46	6.0 - 18.0	46	40	45	0.75	8.75
C0812-40	8.0 - 12.0	40	10	38.5	0.15	5.25
C0812-42	8.0 - 12.0	42	16	41.5	0.25	5.25
C0812-44	8.0 - 12.0	44	25	42.5	0.25	5.25
C0812-46	8.0 - 12.0	46	40	45	0.4	5.25
C0818-40	8.0 - 18.0	40	10	38.5	0.1	5.25
C0818-43	8.0 - 18.0	43	20	41.5	0.2	5.25
C0818-46	8.0 - 18.0	46	40	44.5	0.75	8.75
C1218-40	12.0 - 18.0	40	10	38.5	0.1	5.25

Model Number	Frequency Range (GHz)	Psat (dBm)	Psat (W)	P1dB (dBm)	Pac (kW)	Height (in)
C1820-40	18.0 - 20.0	40	10	38.5	0.15	5.25
C1820-43	18.0 - 20.0	43	20	41.5	0.25	5.25
C1520-42	15.0 - 20.0	42	15.8	41	0.3	5.25
C2326-40	23.5 - 26.0	40	10	39	0.18	5.25
C2630-40	26.5 - 30.5	40	10	39	0.25	5.25
C3236-40	32.0 - 36.0	40	10	39	0.32	5.25
C3640-39	36.0 - 40.0	39	8	38	0.12	5.25

Features:

- Power up to 300 Watts
- Frequency up to 40 GHz
- TTL Controlled Pulser
- Option with 50ns rise/fall

Standard Options:

- Gain
- Output Power
- Heatsink
- Fan
- Temperature Compensation
- Gain and Phase Matching
- Psat Control
- Hermetic Seal

Gallium Nitride (GaN) technology, coupled with Microsemi's chip and wire die level implementation maximize the high power added efficiency and high power density characteristics of GaN in small convenient packages. Multi-octave amplifiers and application specific narrow band amplifiers cover frequencies to 18 GHz. GaN amplifiers operate with voltages between +28VDC to +50VDC (design dependent). Catalog designs offer power levels up to 80 Watts; custom designs to 100 Watts are available.

Model Number	Frequency Range (GHz)	Gain (dBm min)	Psat (dBm min)	Psat (dBm typ)	Psat (Watts typ)	Voltage (V) Current (A)	PAE	Outline	ECCN
AML056P4013	0.5 - 6.0	40	35	36	4	28V/2A	10%	002-1022	EAR99
AML056P4014	0.5 - 6.0	40	37	38	6	48V/2.0A	20%	002-1022	EAR99
AML056P4511	0.5 - 6.0	45	40	41	10	40V/1.5A	25%	002-0997	EAR99
AML056P4512	0.5 - 6.0	45	43	44	25	50V/1.5A	23%	002-1022	EAR99
AML13P5013	1.0 - 3.0	50	46	47	50	28V/4.8A	25%	002-1022	EAR99
AML26P4011	2.0 - 6.0	40	41	42	16	28V/1.5A	35%	002-1022	EAR99
AML26P4012	2.0 - 6.0	45	43	44	25	28V/3.0A	30%	002-1022	EAR99
AML26P4013	2.0 - 6.0	50	45.5	46.5	44	28V/6.0A	25%	002-1022	EAR99
AML59P4512	5.5 - 9.0	45	44	44.5	28	28V/4.0A	25%	002-1023	3A001.b.4.b
AML59P4513	5.5 - 9.0	45	46	48	50	28V/8.0A	20%	002-1023	3A001.b.4.b
AML910P4213	9.9 - 10.7	43	37	38	6	32V/0.5A	30%	002-0992	EAR99
AML910P4214	9.9 - 10.7	43	39	40	10	32V/0.8A	30%	002-1006	EAR99
AML910P4215	9.9 - 10.7	46	42	43	20	32V/1.3A	25%	002-0923	EAR99
AML910P4216	9.9 - 10.7	46	42	43	20	32V/1.3A	30%	002-0992	3A001.b.4.b
AML811P5011	7.8 - 11.0	45	43	44	25	28V/2.8A	30%	002-1023	3A001.b.4.b
AML811P5012	7.8 - 11.0	50	45.5	46.5	44	28V/5.5A	23%	002-1023	3A001.b.4.b
AML811P5013	7.8 - 11.0	50	48	49	80	28V/11.5A	25%	002-1042	3A001.b.4.b
AML612P4501	6.0 - 12.0	45	41	43	20	22V/3A	15%	002-1023	3A001.b.4.b
AML1314P4511	13.75 - 14.50	45	42	43	20	30V/2.3A	20%	002-1078	ITAR
AML1314P4512	13.75 - 14.50	45	44.5	45	32	30V/4.6A	19%	002-1078	ITAR
AML1416P4511	14.0 - 16.0	45	41.5	42	16	35V/3.2A	20%	002-1023	ITAR
AML1416P4512	14.0 - 16.0	45	44	44.5	27	35V/6.2A	18%	002-1023	ITAR
AML618P4014	6.0 - 18.0	40	39	40	10	32V/2.8A	12%	002-0813	ITAR
AML618P4015	6.0 - 18.0	40	42	43	20	32V/4.9A	12%	002-1023	ITAR
AML218P4012	2.0 - 18.0	35	37	38	6	32V/1.5A	13%	002-0813	ITAR
AML218P4011	2.0 - 18.0	40	39	40	10	32V/2.8A	12%	002-0813	ITAR
AML218P4013	2.0 - 18.0	38	42	43	20	32V/4.9A	12%	002-1022	ITAR



Power Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vdd (V)	Pulse Width (μ s)	Duty Cycle (%)	Case Style
1030/1090 MHz Transponder/Interrogator Silicon Bipolar Class C Common Base	MS2393	150	25	7.8	50	10	1	M138
	TPR175	175	25	8.5	50	10	1	55CX-1
	TPR400	400	75	7.3	50	10	1	55CT-1

1090 MHz Transponder Silicon Bipolar Class A Common Emitter	MS2290	0.2	0.02	10	18	CW	--	M115
	MS2203	0.6	0.05	10.9	18	CW	--	M220
	MS2204	0.6	0.05	10.9	18	CW	--	M115

1090 MHz Transponder Silicon Bipolar Class C Common Base	MS2201	2	0.25	9	28	10	1	M220
	MS2206	4	0.4	10	28	10	1	M115
	MS2341	35	5.6	8	50	10	1	M115
	MS2361	75	13	7.6	50	10	1	M115
	MSC1100	95	10	9.7	40	10	1	M210
	MSC1350M	350	70	6.9	50	10	1	M218
	MSC1450M	450	90	7	50	10	1	M216
	TPR500	500	150	5.2	50	10	1	55CT-1
	TPR500A	500	150	5.2	50	10	1	55KT-1
	MS2473	600	150	6	50	10	1	M112
	TPR700	700	150	6.7	50	10	1	55KT-1
	TPR1000	1000	208	6.8	50	10	1	55KV-1

1030 MHz Interrogator Silicon Bipolar Class C Common Base	ITC1000	1000	158	8	50	1	1	55SW-1
	ITC1100	1000	100	10	50	1	1	55SW-1

1090 MHz TCAS Silicon Bipolar Class C Common Base	MS2207	400	63	8	50	32	2	M216
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1030 MHz TCAS Silicon Bipolar Class C Common Base	TCS450	450	100	6.5	45	32	2	55KT-1
	TCS800	800	100	9	45	32	1	55SM-1
	TCS1200	1200	150	9	50	32	2	55TU-1

Power Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vdd (V)	Pulse Width (μ s)	Duty Cycle (%)	Case Style
1030/1090 MHz Mode-S Silicon Bipolar Class C Common Base	MDS70	70	6.5	10.3	50	128†	1	55CX-1
	MS2228	75	9	9.2	50	32	2	M214
	MDS150	150	20	10	50	128†	1	55AW-1
	MDS400	400	90	6.5	45	32	1	55KT-1
	10500	500	70	8.5	50	32	2	55ST-1
	10502	500	70	8.5	50	32	2	55SM-1
	MDS800	800	100	9	50	128†	1	55ST-1
	MDS1100	1100	115	9.4	50	128†	1	55TU-1
	MDS1400	1400	170	9.1	52	32	2	55TU-1
1030/1090 MHz MODE S-ELM Silicon Bipolar Class C Common Base	MDS60L	60	6	10	50	ELM	6.4	55AW-1
	MDS140L	140	15.7	9.5	50	ELM	6.4	55AW
	MDS500L	500	70	8.5	50	ELM	6.4	55ST-1
1030 MHz Mode-S ELM GaN on SiC HEMT Class AB Common Source	1011GN-700ELM	700	5	21.5	65	ELM	6.4	55KR
1030/1090 MHz Mode-S ELM GaN on SiC HEMT Class AB Common Source	MDS-GN-650ELM	650	5	20.8	65	ELM	6.4	55KR
	MDSGN-750ELMV	750	14.1	17.2	50	ELM	6.4	55KR
1030 MHz Mode-S/TCAS/IFF GaN on SiC HEMT Class AB Common Source	1011GN-1000V	1000	17.8	17.5	50	32	2	55KR

Power Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vdd (V)	Pulse Width (μ s)	Duty Cycle (%)	Case Style
960-1215 MHz DME/TACAN Si Bipolar Class C Common Base	0912-7	7	1	8.5	50	10	1	55CT-1
	MS2321	15	1.5	10	50	10	1	M105
	0912-25	25	3.5	8.5	50	10	1	55CT-1
	0912-45	45	7	8.1	50	10	1	55CT-1

1025-1150 MHz Air DME Si Bipolar Class A CW Common Emitter	1000MP	0.6	0.05	10.8	18	CW	--	55FW-2
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1025-1150 MHz Air DME Si Bipolar Class C Common Base	1002MP	2	0.3	10	35	20	1	55FW-1
	MS2202	2	0.25	9	35	10	1	M115
	1004MP	4	0.5	9	35	10	1	55FW-1
	MS2205	4	0.5	9	28	10	1	M220
	SD1526-01	5	0.55	9.5	28	10	1	M115
	1015MP	15	1.5	10	50	10	1	55FW-1
	MSC1015MP	15	1.5	10	50	--	--	M115
	1035MP	35	3.5	10	50	10	1	55FW-1
	MS2553	35	3	10.6	50	10	1	M220
	MS2575	35	3	10.7	50	10	1	M115
	1075MP	75	12	7.8	50	10	1	55FW-1
	MSC1075MP	75	13	7.6	50	--	--	M115
	1090MP	90	14	8.1	50	10	1	55FW-1
	SD1536-03	90	13	8.4	50	10	1	M115
	SD1536-08	90	13	8.4	50	10	1	M105
	DME150	150	25	7.8	50	10	1	55AY-1
	MSC1175M	175	30	7.6	50	10	1	M218
	MS2554	250	60	6.2	50	10	1	M218
	MS2421	300	70	6.3	50	10	1	M103
	DME375A	375	85	6.4	50	10	1	55AT-1
	MS2441	400	90	6.5	50	10	1	M112
	MSC1400M	400	90	6.5	50	10	1	M216
	DME500	500	125	6	50	10	1	55KT-1
	MS2472	550	150	5.6	50	10	1	M112
DME800	800	100	9	50	10	1	55ST-1	

Power Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vdd (V)	Pulse Width (μs)	Duty Cycle (%)	Case Style
1025-1150 MHz Air DME GaN on SiC Class AB Common Source	DME-GN-700V	700	12.6	17.4	50	20	6	55KR
960-1215 MHz Data Link Si Bipolar Class C Common Base	MS2211	6	0.7	9.3	28	6.4	21	M222
	MS2212	15	2.3	8.1	28	10	21	M222
	JTDB25	25	5	7	36	10	40	55AT-1
	MS2213	30	5	7.8	35	6.4	21	M214
	JTDA50	50	10	7	36	10	22	55AT-1
	JTDB75	75	15	7	36	10	40	55AT-1
	MS2214	85	15	7.5	35	6.4	21	M218
	JTDA150A	145	25	7.6	36	7	22	55KT-1
MS2215	150	26.7	7.5	35	7	21	M216	
960-1215 MHz TACAN Si Bipolar Class C Common Base	TAN15	15	3	7	40	20	5	55LT-1
	TAN75A	75	12	8	50	20	5	55AZ-1
	MS2209	90	13	8.4	50	10	10	M218
	TAN150	150	30	7	50	20	5	55AT-1
	TAN250A	250	60	6.2	50	20	5	55AT-1
	MS2267	250	40	8	50	20	5	M214
	MS2210	300	60	7	50	10	10	M216
	TAN300	300	60	7	50	20	5	55KT-1
	MS2272	350	60	7.6	50	10	10	M216
	TAN350	350	70	7	50	10	10	55ST-1
TAN500	500	70	9	50	10	10	55ST-1	
960-1215 MHz HD Data Link GaN on SiC HEMT Class AB Common Source	0912GN-20V	20	0.4	17	50	128	10	55KR
	0912GN-100LV	100	2.5	16	50	3000	30	55KR
	0912GN-300	300	4	17.5	65	128	10	55KR
	0912GN-300V	300	6.3	16.8	50	128	10	55KR
	0912GN-600	600	8	18	65	128	10	55KR
	0912GN-650V	650	11.2	17.6	50	128	10	55KR

Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vdd (V)	Pulse Width (μ s)	Duty Cycle (%)	Case Style
VHF 150-160 MHz SiC SIT Class AB Common Gate	0150SC-1250M	1250	160	9.5	125	300	10	55KT-2

UHF 400-500 MHz Si Bipolar Class C Common Emitter	MS2176	300	33	9.6	40	250	10	M106
	MS2200	500	54	9.7	40	250	10	M102

UHF 406-450 MHz SiC SIT Class AB Common Gate	0405SC-100M	100	11	10	125	300	10	55KT-FET
	0405SC-500M	500	55	10	125	300	10	55KT-FET
	0405SC-1250M	1000	155	8.5	125	300	10	55ST-FET
	0405SC-1500M	1500	270	8	125	300	6	55ST-FET
	0405SC-2200M	2200	440	8	125	300	6	55TW-FET

P-Band 890-1000 MHz Si Bipolar Class C Common Base	0910-60M	60	9.5	8	40	150	5	55AW-1
	0910-150M	150	23	8.1	48	150	5	55KT-1
	0910-300M	300	33	9.6	50	150	5	55KT-1

L-Band 1200-1400 MHz Si Bipolar Class C Common Base	1014-2	2	0.35	7.5	28	CW	100	55LT
	1014-6A	6	1.2	7	28	CW	100	55LV
	1014-12	12	2.5	7.3	28	CW	100	55LT
	1214-30	30	6	7	28	2000	20	55AW-1
	1214-32L	32	5.3	7.8	36	5000	20	55AW-1
	1214-55	55	12.3	6.5	28	2000	20	55AW-1
	1214-110M	110	20	8	50	330	10	55KT-1
	1214-150L	140	27	7.1	36	5000	20	55ST-1
	1214-220M	220	40	7.4	40	150	10	55ST-1
	1214-300	270	42.7	8	50	100	10	55KT-1
	1214-300M	300	40	8.7	40	150	10	55ST-1
	1214-370M	370	50	8.7	50	330	10	55ST-1

Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vd (V)	Pulse Width (μs)	Duty Cycle (%)	Case Style
L-Band 1200-1400 MHz GaN on SiC HEMT Class AB Common Source	1214GN-20V	20	0.4	17	50	300	10	55KR
	1214GN-100LV	100	2.5	16	50	3000	30	55KR
	1214GN-280	280	5.5	17	60	300	10	55KR
	1214GN-280LV	280	6.3	16.7	50	200	20	55KR
	1214GN-500	500	8	18	60	300	10	55KR
	1214GN-550V	550	12	16.6	50	300	10	55KR

L-Band 1480-1650 MHz Si Bipolar Class C Common Base	1517-20M	20	3.5	8	36	200	10	55LV
	1517-110M	110	20.5	7.3	40	200	10	55AW-1
	1214GN-500	500	--	17	60	400	10	55KR

S-Band 2700-3500 MHz Si Bipolar Class C Common Base	3134-65M	65	11.5	7.5	36	120	10	55KS-1
	2731-100M	100	16	8	36	200	10	55KS-1
	2731-110M	110	16		36	200	10	
	2729-125	125	23	8	36	100	10	
	2931-150	150	21.7	8.3	38	50	4	55KS-1
	2729-170	170	24	8.5	36	100	10	55KS-1

S-Band 2700-2900 MHz GaN on SiC HEMT Common Source Class AB	2729GN-150V	150	10	11.76	50	100	10	55QP
	2729GN-150	150	8	12.7	60	100	10	55QP
	2729GN-270	270	12.6	13.3	60	100	10	55QP
	2729GN-270V	270	16	12.7	50	100	10	55QP
	2729GN-400	400	28.2	11	65	100	10	55KR
	2729GN-500	500	35.5	11.5	65	100	10	55KR
	2729GN-500V	500	36	11.4	50	100	10	55KR

S-Band 2700-3100 MHz GaN on SiC HEMT Common Source Class AB	2731GN-20V	20	0.5	16	50	200	10	55QP
	2731GN-100LV	100	8	11	50	3000	30	55QP
	2731GN-110V	110	8	11.4	50	200	10	55QP
	2731GN-110M	110	7.5	11.7	60	200	10	55QP
	2731GN-200M	200	12	12.2	60	200	10	55QP
	2731GN-220V	220	16	11.4	50	200	10	55QP
	2731GN-450V	450	36	11	50	200	10	55KR

Devices	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc/Vd (V)	Pulse Width (μs)	Duty Cycle (%)	Case Style
S-Band 2700-3500 MHz GaN on SiC HEMT Common Source Class AB	2735GN-35M	35	2	12.4	60	300	10	55QP
	2735GN-100M	100	8	11	60	300	10	55QP

S-Band 3100-3500 MHz GaN on SiC HEMT Common Source Class AB	3135GN-20V	20	1	13	50	300	10	55QP
	3135GN-110V	110	9	10.87	50	300	10	55QP
	3135GN-110M	110	9	10.8	60	300	10	55QP
	3135GN-170M	170	12	11.5	60	300	10	55QP
	3135GN-200V	200	16	11	50	300	10	55QP
	3135GN-400V	380	36	10	50	300	10	55KR

HF Si Bipolar Class AB	Part Number	Pout Min (W)	Pin Max (W)	Gain min (dB)	Vcc (V)	Case Style
2-30 MHz Common Emitter	MS1051	100	7.9	11	12.5	M174
	MS1078	130	8.2	12	28	M174
	MS1007	150	6	14	50	M174
	MS1008	150	6	14	50	M164
	MS1076	220	13.9	12	28	M174
	MS1079	220	11	13	50	M174
	MS1004	250	10	14	50	M177
	MS1011	250	10	14	50	M177

HF 2-50 MHz Common Emitter	MS1227	20	0.65	15	12.5	M113
	MS1226	30	0.48	18	28	M113
	MS1001	75	3.8	14	12.5	M174
	S200-50	200	12	12	50	55HX-2
	MS1004	250	9	14.5	50	M177

VHF 100-175 MHz Common Emitter	SRF4427	0.75	0.015	17	12.5	SO-8
	2N4427	1	0.1	10	12.5	TO-39
	MS1403	1.4	0.1	12	7.5	M123
	MRF607	1.75	0.125	12	12.5	TO-39
	MS1401	2.5	0.2	11.5	7.5	M123
	2N6255	3	0.5	8	12.5	TO-39
	SD1127	4	0.25	12	12.5	TO-39
	SD1143	10	0.1	10	12.5	M135
	SD1143-01	10	0.1	10	12.5	M113
	SD1013	10	1	10	28	M135
	SD1013-03	10	1	10	28	M113
	MS1261	15	1	12	12.5	M122
	SD1014-06	15	3.5	6.3	12.5	M113
	MS1408	20	3	8.2	28	M113
	MS1406	20	3	8.2	28	M135
	MS1504	30	3	10	13.5	M135
	MS1336	30	3	10	12.5	M135
	MS1337	30	3	10	12.5	M113
	SD1015	30	3	10	28	M135
	MS1505	30	3	10	13.5	M113
SD1224	40	7	7.6	28	M135	

HF/VHF/UHF Si Bipolar Class C	Part Number	Pout Min (W)	Pin Max (W)	Gain Min (dB)	Vcc (V)	Case Style
VHF 100-175 MHz Common Emitter	MS1506	40	5	9	13.6	M135
	MS1507	40	5	9	13.6	M113
	SD1018	40	14	4.5	12.5	M135
	SD1018-06	40	14	4.5	12.5	M113
	MS1329	60	12	7	28	M135
	VAM80	80	10	9	27	55HT-2
	MS1204	100	25	6	28	M174
	MS1003	100	25	6	12.5	M111
	VMIL100	100	20	7	28	55HV-2
	MS1281	150	18	9.5	28	M174
UHF 225-400 MHz Common Emitter	UMIL3	3	0.2	11.8	28	55FT-2
	MS1642P	10	0.65	12	28	M123
	UMIL10	10	1	10	28	55FT-2
	UMIL10P	10	1	10	28	55FU-2
	UMIL25	25	3.2	8.9	28	55HV-2
	UMIL60	60	8	8.8	28	55HW-2
	MS1511	70	10	8.5	28	M111
	UMIL80	80	10	9	28	55HV-2
	MS1503	100	20	7	28	M111
	UMIL100	100	19	7.2	28	55HV-2
	UMIL100A	100	16	8	28	55JU-2
	0204-125	125	25	8.5	28	55JT-2
UHF 100-500 MHz Common Emitter	0105-50	50	7	8.5	28	55JT-2
	MS1509	100	28.2	5.5	28	M168
UHF 470 MHz General Purpose	MS1402	2	0.2	10	--	M122
	SD1444	2	0.32	8	50	TO-39
	MS1649	3	0.34	9.5	50	TO-39
	MS1404	5	0.7	8.5	50	M122
	MS652S	5	0.5	10	60	M123
	MS1426	10	2	7	--	M122
	SD1146	10	2.5	6	--	M122
	MS1263	15	2.5	7.8	50	M142
	SD1429-03	15	2.7	7.5	--	M111
	SD1422	25	6	6.2	--	M111

BROADCAST / TV & LINEAR

BROADCAST / TV	Part Number	Freq (MHz)	Pout Min (W)	Gain Min (dB)	Vcc (V)	IMD Typ (dB)	Case Style
VHF TV 174-225 MHz Class A/AB Common Emitter	MS1277	225	14	14	28	-55	M111
	MS1279	225	20	8	25	-50	M130
	MS1280	225	20	7.5	28	-50	M164
	MS1278	225	100	11	28	-50	M168
	SD1485	225	200	11	32	-50	M175

UHF TV 470-860 MHz Class A Common Emitter	UTV005	860	0.5	10	20	-60	55FT-2
	UTV010	860	1	10	20	-60	55FT-2
	UTV020	860	2	10	25	-60	55FT-2
	UTV040	860	4	8.5	25	-60	55FT-2
	UTV080	860	8	9	26.5	-58	55JV-2
	UTV120	860	12	8.9	26.5	-52	55JT-2
	UTV200	860	20	8.5	26.5	-48	55JV-2

UHF TV 470-860 MHz Class AB Common Emitter	UTV8100B	860	100	8.5	28	--	55RT-2
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UHF 860-960 MHz Class A/AB Common Emitter	MS1502	860	0.5	9.5	20	-60	M122
	MS1512	860	1	10	20	-60	M122
	MS1501	860	2	8.5	25	-60	M122
	MS1581	860	4	7	25	-60	M122
	MS1579	860	14	8.5	25	-45	M156
	MS1582	860	25	9	25	-45	M173
	MS1454	860	30	7.5	24	-60	M142
	MS1533	860	150	6.5	28	--	M175
	SD1420-01	960	0.9	9.5	24	--	M123
	MS1453	960	30	--	--	--	M142

LINEAR & BIAS

Si Bipolar Class A Common Emmitter	Part Number	Freq (MHz)	Pout Min (W)	Pin Max (W)	Gain min (dB)	Vcc (V)	Case Style
100-500 MHz	MPA201	1-500	0.5	0.02	12	12.5	55AZ-2

500-1000MHz	1A5	1000	0.5	0.08	9	20	55ET-2
	10A015	1000	1.5	0.2	9.5	20	55FT-2
	10A030	1000	3	0.5	9	20	55FT-2
	10A060	1000	6	0.95	8.5	20	55FT-2

500-1000 MHz Internal Pre-match	10AM05	1000	5	0.5	10	20	55CT-2
	10AM20	1000	20	3	8	20	55AT-2
	0510-50A	1000	50	10	7	28	55AV-2

1.0-2.0 GHz (Operational from DC to 2.0 GHz)	MSC80064	2000	0.11	0.012	9	18	M210
	2A5	2000	0.5	0.1	7	20	55ET-2
	2A8	2000	0.8	0.15	7	20	55EU-2
	MS3011	2000	1	0.2	7	18	M210

2.0-2.3 GHz, Class A, Common Emmitter - (Operational from DC to 2.3 GHz)	23A003	2300	0.3	0.03	10	15	55BT-2
	23A005	2300	0.5	0.07	9.5	20	55BT-2
	23A008	2300	0.8	0.14	9.5	20	55BT-2
	23A017	2300	1.7	0.34	7.6	20	55BT-2
	23A025	2300	2.5	0.6	6.5	20	55BT-2
	80143	2300	1	0.16	10	15	55BT-2

BIAS DEVICES

Part Number	Bias Current (A)	Resistance (Ohm)	Case Style
BYI-1	0.35	1	55FV
BYI-1F	0.35	1	55GV
Z0-28F	TO 0.35	1	55GU
BYI-1Z	0.35	1	55FU
	0.35	1	55LU

Power Devices	Part Number	Pout (W)	Gain (dB)	Supply (V)	Packing	Case Style
Up to 1 GHz Si Bipolar Class A/B/C Common Emitter	2N4427	1	10	12.5	500 Units	TO-39
	SRF4427	1	17	12.5	500 Units	SO-8
	MRF607	1.75	11.5	12.5	500 Units	TO-39
	2N6255	3	7.8	12.5	500 Units	TO-39
	SD1127	4	12	12.5	500 Units	TO-39
	2N3866	1	10	28	500 Units	TO-39
	2N3866A	1	10	28	500 Units	TO-39
	MRF3866	1	10	28	500 Units	SO-8
	MS1649	3	10	12.5	500 Units	TO-39
	SD1444	2	8	12.5	500 Units	TO-39
	MRF837	0.75	8	12.5	500 Units	Pwr Macro
	MRF557	1.5	8	12.5	500 Units	Pwr Macro

Small Signal	Part Number	Freq (MHz)	GNF (MHz)	VCE (V)	Ic (mA)	Case Style
Up to 1 GHz Si Bipolar Class A Common Emitter	2N5179	1500	20	6	5	TO-72
	2N5109	1200	12	15	50	TO-39
	MMBR5179LT1	1400	-	6	1.5	SOT-23
	MRF545	1400	13.5	25	50	TO-39
	MRF544	1500	13.5	25	50	TO-39
	MRF586	3000	12	15	40	TO-39
	MRF517	3000	10	15	60	TO-39
	2N5031	1200	12	6	1	TO-72
	BFY90	1300	20	5	25	TO-72
	2N6304	1400	14	10	14	TO-72
	2N2857	1600	13	10	12	TO-72
	BFR92ALTI	4500	-	1.5	3	SOT-23
	MRF914	4500	15	10	15	TO-72
	BFR91	5000	16	5	30	Macro T
	BFR90	5000	18	5	14	Macro T
	MRF904	4000	7	10	15	TO-72
	MMBR911LT1	6000	11	10	10	SOT-23

Microwave	Part Number	Pout Min (W)	Gain min (dB)	Vcc (V)	Cob (pF)	Case Style
2.0 GHz Si Bipolar Class C Common Base	2001	1	9.5	28	4	55BT-1
	MS3022	1	7	28	3.2	M210
	2003	3	8.6	28	5	55BT-1
	MS2003	3	7.8	28	9.5	M210
2.3 GHz Si Bipolar Class C Common Base	2301	1.5	8.5	20	4	55BT-1
	2304	4	8.5	20	7	55BT-1
	2307	7	8.5	20	10	55BT-1

Microwave Broadband	Part Number	Pout Min (W)	Gain min (dB)	Vcc (V)	Cob (pF)	Case Style
1000 -1400 MHz Si Bipolar Class C Common Base	1014-6A	6	7	28	6.5	55LV-1
	1014-12	12	7.3	28	12	55LT-1
1700-2000 MHz Si Bipolar Class C Common Base	2223-1.7	1.7	8.5	22	--	55LV-1
	2224-6L	6	7	22	--	55LV-1
	2225-4L	3.5	8.5	24	7	55LV-1
	2424-25	25	7.5	24	--	55AP-1



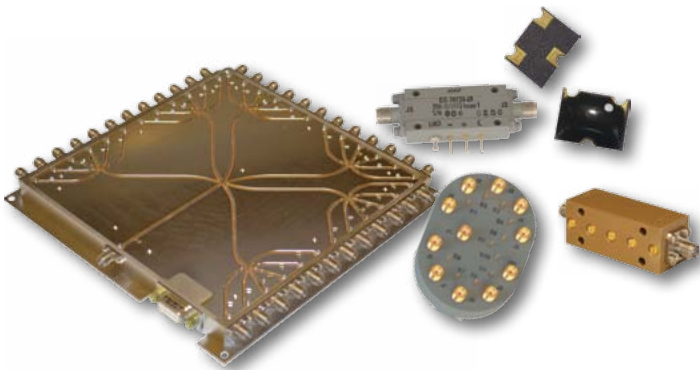
Microsemi's RF diode and control component operations, located in Lowell, Massachusetts, brings over 30 years experience in manufacturing of high reliability RF and microwave products. We supply a full range of Silicon and Gallium Arsenide diodes, including PIN and limiter diodes, tuning and multiplier varactors, noise diodes, Schottky-barrier diodes, MNS chip capacitors and Gunn Diodes. We are able to leverage these best in class products in our solid state control components and sensor products. Our extensive product base allows us to support frequencies from 100 Hz through millimeter wave.

With high volume wafer fabrication now in place to meet the competitive needs of our growing commercial and medical customer base, Microsemi's Lowell facility can deliver more cost-effective components faster than ever for our longstanding military customers as well. From our closely controlled RF/microwave diode inventory we can match characteristics precisely to maintain consistent component performance levels over the full life of your system designs.

Our Lowell operation builds RF and microwave PIN diode switches, limiters, comb generators, attenuators, phase shifters, and detectors in frequency ranges to 40 GHz. All can be hermetically sealed to meet the most stringent military or space requirements and can be combined to include several functions in a single high reliability package. Typical of these integrated packages are switch/limiters, limiter/detectors, switch matrices and switched filters.

Integrated packages can provide higher performance benefits at lower cost than by designing with individual components. To assure the engineering expertise that will attain your desired performance levels, Microsemi only provides assemblies where we can control the high-risk components. In that way, we're able to develop custom packaging that meets your most demanding specifications.

In addition, we are continuing to develop low cost surface mount PIN and Limiter solutions which offer performance more often associated with expensive chip and wire bonding assemblies. They are available in several reflow friendly configurations which allow the customer new opportunities for economical designs. Microsemi also can offer a significant number of existing configurations to minimize your NRE and provides many customers with microwave components no longer available from their original suppliers. Our extensive library of products and designs gives us the ability to respond quickly with solutions to meet your needs, quickly and cost effectively.



Pin Diode selector guide

- Microsemi has a wide variety of GaAs and Silicon PIN diodes to suit your requirements
- From ultra-low C_j , Beam Lead PIN diodes for broadband switching to high power PIN diodes
- Designed for low frequency, low intermod switching and attenuation.

		High Speed Microwave Switching: Chips & Beam Leaded					
Max Freq (GHz)	Typical C_j (@ V_{pi}) (pF)	40V	50V	70V/75V	100V	250V	250V
40	0.01	–	–	–	–	MP61001	GaAs Chip
24	0.03	MP6250	GC4946	–	GC4801	–	Beam Leads / GaAs Flip Chip
18	0.06	–	–	GC4270	GC4210	GC4220	Chips
12	0.1	–	–	GC4271	GC4211	GC4221	Chips
8	0.2	–	MPP4203	GC4272	GC4212	GC4222	Chips / MMSM™
4	0.50	–	–	GC4273	GC4213	GC4223	Chips
2	0.75	–	–	GC4275	GC4215	GC4225	Chips

		High Speed Microwave Switching: Packaged					
Max Freq (GHz)	Typical C_i (@ V_{pi}) (pF)	25V	40V/50V	70V/75V	100V	200V/250V	Pkg Type
40	0.02	–	MP6250	–	–	–	Flip Chip GaAs
24	0.03	–	–	–	–	MP61001	Ceramic GaAs
18	0.06	–	–	–	MP61004	–	Ceramic / GaAs
12	0.1	–	MPP4203	GC4270	GC4210	GC4220	Ceramic / MMSM™
8	0.2	MPP4204	–	GMP4201	GMP4211	GC4221	Ceramic / GigaMite
4	0.50	–	–	GMP4202	GMP4212	GC4222	Ceramic / GigaMite / EPSM
2	0.75	–	–	GC4273	GMP4215	GMP4235	Ceramic / GigaMite / EPSM
1	1.2	–	–	GC4275	GC4215	GC4225	Ceramic / GigaMite / EPSM

Medium- High Power RF Switching & Attenuation: Chips

Max Freq (GHz)	Typical Cj (@V _{pt}) (pF)	100V	300V	500V	750V	1500V	Outline
18	–	–	–	–	–	–	–
12	0.1	GC4410	GC4430	–	GC4490	–	Chips
8	0.2	GC4411	GC4431	–	GC4491	–	Chips
4	0.5	GC4412	GC4432	–	GC4492	–	Chips
2	1	GC4413	GC4433	–	GC4493	–	Chips
1	2	–	–	–	GC4494	GC4600	Chips
0.5	4.0	–	–	–	–	GC4601	Chips

Medium- High Power RF Switching & Attenuation: Packaged

Max Freq (GHz)	Typical C_t (@ V_{pt}) (pF)	100V	300V	500V	600V	750V	1000V	1500V	Pkg Type
12	–	–	–	–	–	–	–	–	–
8	0.2	GC4410	GC4430	–	–	GC4490	–	–	Ceramic
4	0.5	GC4411	GC4431	SM0502	UM6006	GC4491	–	–	Ceramic
2	1	GC4413	GC4433	SM0509	UM6606	GC4493	–	GC4600	Ceramic / MELF / Leaded / Stud
1	2	UM4301	–	–	UM4306	–	UM4310	GC4601	Ceramic / MELF / Leaded / Stud
0.5	4.0	–	–	–	–	–	HUM2010	HUM2015	Ceramic / MELF / Leaded / Stud

NIP Versions available for selected products.

Typical PIN Diode Power Handling (CW)

Frequency Band (GHz)								
	0.1-0.5	0.5-1.0	1.0-2.0	2.0- 4.0	4.0-12	12-18	18-40	> 40
PIN Family	HUM Series	UM / GC4600 Series	UM / GC4600 GC4700 Series	GC4400 GC4200 GC4700 Series	GC4400 GC4200 GC4700 Series	GC4200 GC4700 GC4900 Series	GC4800 / GaAs MP Series	GaAs MP Series
Typ. Junction Capacitance	4 pF	2 pF	1 pF	0.5 pF	0.2 pF	0.1 pF	0.05 pF	< 0.05 pF
Incident Power								
+60 dBm	OK	Marginal	NO	NO	NO	NO	NO	NO
+50 dBm	OK	OK	Marginal	Marginal	NO	NO	NO	NO
+40 dBm	OK	OK	OK	OK	Marginal	NO	NO	NO
+30 dBm	OK	OK	OK	OK	OK	Marginal	Marginal	NO
+20 dBm	OK	OK	OK	OK	OK	OK	OK	Marginal
+10 dBm	OK	OK	OK	OK	OK	OK	OK	OK

Packaging for Power Handling

Package Type	Lp	Cp	Rs	Thermal Performance (θ_P)	Cost	Max Frequency (GHz)	Hermetic	Comments
Ceramic	Excellent	Excellent	Excellent	Excellent	High	18	Yes	Most products available
MELF	Good	Fair	Excellent	Very Good	Moderate	2	Yes	Only select PIN diodes available
MMSM	Very Good	Very Good	Good	Good	Low	8	No	Only select PINs and varactors
Giga Mite	Good	Very Good	Good	Very Good	Low	6	No	Only select PINs, varactors and Schottkys
EPSM	Good	Good	Good	Good	Moderate	6	No	Most products available
Stripline	Good	Good	Good	Fair	Moderate	8	Yes or No	Most products available
Glass Axial	Fair	Good	Good	Poor	Moderate	1.5	Yes	Only select PINs, varactors, and Schottkys
Plastic	Poor	Fair	Fair	Poor	Low	2	No	Only select PINs, varactors, and Schottkys

GC4200 Series/Small Signal/High Speed Switching

Model Number	V_B @ 10 μ A (V) Min	C_J @ -10V ¹ (pF) Max	R_s @ 20mA ² (Ohms) Max	T_L ³ (nS) Typ	Thermal Resistance (MAX) (°C/W)
GC4270	70	0.06	1.5	100	80
GC4271	70	0.1	1	100	70
GC4272	70	0.2	0.8	100	70
GC4273	70	0.3	0.7	100	60
GC4274	70	0.4	0.6	100	50
GC4275	70	0.5	0.5	100	40
GC4210	100	0.06	1.5	200	80
GC4211	100	0.1	1	200	70
GC4212	100	0.2	0.75	200	70
GC4213	100	0.3	0.6	200	60
GC4214	100	0.4	0.5	200	50
GC4215	100	0.5	0.35	200	40
GC4220	250	0.06	2.5	500	80
GC4221	250	0.1	2	500	70
GC4222	250	0.2	1.5	500	70
GC4223	250	0.3	1	500	60
GC4224	250	0.4	0.8	500	50
GC4225	250	0.5	0.6	500	40

Notes:

1. Capacitance is measured at 1 MHz and -10 volts.
2. Resistance is measured using transmission loss techniques@ 1GHz.
3. TL Test conditions: $I_R=6$ mA, $I_F=10$ mA

These devices are not available in all case styles. Please consult the factory for package styles offered.

Chip Electrical Specifications: T_A 25°C

GC4400 Series/Large Signal Switching/Attenuator

Model Number	V _B @ 10uA (V) Min	C _J @ -50V ¹ (pF) Max	R _s @100mA ² (Ohms) Max	T _L ³ (uS) Typ	Thermal Resistance (Max) (°C/W)
GC4410	100	0.1	0.6	0.4	40
GC4411	100	0.25	0.5	0.6	25
GC4412	100	0.5	0.4	0.8	20
GC4413	100	0.75	0.3	1.2	10
GC4430	300	0.1	1.5	0.6	40
GC4431	300	0.25	1.2	1.2	30
GC4432	300	0.5	1	1.5	20
GC4433	300	0.75	0.8	2	10
GC4490	750	0.1	1.5	1	30
GC4491	750	0.25	1.2	2	25
GC4492	750	0.5	1	3	20
GC4493	750	0.75	0.8	4	10
GC4494	750	1.3	0.35	5	7
GC4495	750	2.5	0.3	6	5

Notes:

1. Capacitance is measured at 1 MHz and -50 volts
2. Resistance is measured using transmission loss techniques @ F=100 MHz.
3. TL Test conditions: I_R=6 mA, I_F=10 mA

These devices are not available in all case styles.

Please consult the factory for specific package styles offered.

Chip Electrical Specifications: T_A 25°C

GC4700 Series Limiter PIN Diodes

Model Number	V_B @10uA (V) Min	C_J @ 0V (pF) Type	C_J @ -6V (pF) Max	R_s @10mA ¹ (Ohms) Max	T_L ³ (nS) Typ	Thermal Resistance (Typ) (°C/W)
GC4701	20	0.2	0.15	1.5	5	20
GC4702	20	0.5	0.3	1.2	10	12
GC4711	45	0.2	0.15	1.5	10	15
GC4712	45	0.5	0.3	1.2	15	10
GC4713	45	0.7	0.5	1	20	6
GC4721	120	0.2	0.15	1.5	50	1.2
GC4722	120	0.6	0.3	1	50	0.5
GC4723	120	0.8	0.5	0.5	100	0.3
GC4731	15	0.12	0.1	20	5	30
GC4732	15	0.2	0.15	1.5	5	20
GC4741	30	0.12	0.1	2	7	20
GC4742	30	0.2	0.15	1.5	7	15
GC4750 ²	250	–	0.25 @ 50V	3.0 @50mA	300	4

Notes:

1. R_s Tested at $F=1$ GHzAs, in style 30 package.
 2. Supplied as -002 style, dual mesa.
 3. T_L Test conditions: $I_R=6$ mA, $I_F=10$ mA
- Chip Electrical Specifications: T_A 25°C

GC4800 Series Planar Beam Lead PINs

Model Number	V _B @ 10uA (V) Min	C _T @-10V (pF) Typ/Max	C _T @-50V (pF) Typ/Max	R _s @20mA ¹ (Ohms) Typ/Max	R _s @50mA ¹ (Ohms) Typ/Max	T _L ² (nS) Typ	Switching Speed T _s (Max) (nS)
GC4800A - 14	80	0.016 / 0.020	--	4.5 / 6.5	--	150	30
GC4801 - 14	80	--	0.018 / 0.020	--	3.5 / 4.0	150	30
GC4802 - 14	100	--	0.060 / 0.070	--	2.2 / 3.0	150	30
GC4810 - 16	150	--	0.025 / 0.035	--	3.0 / 4.0	300	50

Notes:

1. R_S and C_T are determined using Loss and Isolation measurements at F = 2.2 GHz.

2. T_L Test conditions: I_R=6 mA, I_F=10 mA

Chip Electrical Specifications: T_A 25°C

DC Performance						RF Performance ¹	
Model Number	V _B @ 10uA (V) Min	C _T @-10V (pF) Typ/Max	R _s @10mA ¹ (Ohms) Typ/Max	R _s @50mA ¹ (Ohms) Typ/Max	T _L ² (nS) Typ	Isol (dB) @VR=1 0V F=2.2	IL (dB) IF=10mA F=2.2 GHz
GC4902 - 12	100	0.025	--	3	80	--	--
GC4903 - 12	100	0.03	--	2.5	80	--	--
GC4941 - 12	50	0.06	1.5	--	50	22	0.14
GC4942 - 12	50	0.04	2	--	45	26	0.17
GC4943 - 12	50	0.03	3	--	40	27.5	0.27
GC4944 - 12	50	0.025	3.5	--	35	29	0.3
GC4945 - 12	50	0.022	5.5	--	40	30.5	0.45
GC4946 - 12	50	0.02	6.5	--	40	32	0.51

Notes:

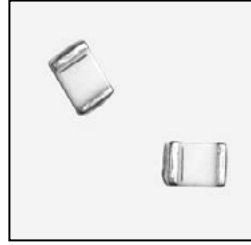
1. Insertion loss and Isolation are test at F = 2.2 GHz using transmission loss techniques.

2. T_L Test conditions: I_R=6 mA, I_F=10 mA

Chip Electrical Specifications: T_A 25°C

SM Series Ceramic MELF PINs

- Non-Magnetic* Versions Ideal for MRI Applications
- Very Low Inductance, Full Face Bonding
- Hi-Rel Hermetic Design
- Surface Mount Devices Available in Tape and Reel
- RoHS Compliant** Versions Available



Part Number	Case Style	V _B @ 10uA (V) Min	C _T @ -50V ¹ (pF) Max	R _s @100mA ² (Ohms) Max	R _s @200mA ² (Ohms) Max	T _L ³ (nS) Typ	Thermal Resistance (Typ) (°C/W)
SM0502	M1	500	0.50	0.70	0.55	1.0	35
SM0504	M1	500	0.60	0.60	0.45	1.5	20
SM0508	M1	500	0.90	0.40	0.25	2.0	15
SM0509	M1	500	1.20	0.35	0.20	2.5	15
SM0511	M1	500	1.25	0.30	0.15	3.0	15
SM0512	M1	500	1.50	0.25	0.12	3.5	15
SM0812	M1	700	1.30	0.40	0.25	4.0	15
SM1001	M1	700	1.30	0.35	0.20	4.5	15
SM1002	M1	50	1.20	.75 @ 50mA	0.20	4.0	15
SM1003	M1	35	1.2 @ 20V	.50 @ 10mA	0.10	0.6	25

Notes:

1. Total Capacitance measured at F=1 MHz.
2. Series Resistance measured at F=100 MHz.
3. TL Test conditions: IR=6 mA, IF=10 mA

Electrical Specifications at T_A = 25°C

*Non Magnetic refers to any products that are designed with low and ultra low magnetic materials for use in MRI systems.

**RoHS versions are supplied with a matte tin finish.

RoHS and MRI Models

Base Model	RoHS Compliant PN	Non-Mag. / RoHS PN
SM0502 – M1	SMX0502 – M1	SMX0502MR – M1
SM0504 – M1	SMX0504 – M1	SMX0504MR – M1
SM0508 – M1	SMX0508 – M1	SMX0508MR – M1
SM0509 – M1	SMX0509 – M1	SMX0509MR – M1
SM0511 – M1	SMX0511 – M1	SMX0511MR – M1
SM0512 – M1	SMX0512 – M1	SMX0512MR – M1
SM1002 – M1	SMX1002 – M1	SMX1002MR – M1
SM1003 – M1	SMX1003 – M1	SMX1003MR – M1

**Non Magnetic refers to any products that are designed with low and ultra low magnetic materials for use in MRI systems.*

***RoHS versions are supplied with a matte tin finish.*

Monolithic Microwave Surface Mount (MMSM) Micro-Pak PIN Diodes

This series of surface mount PIN diodes utilize new and unique monolithic MMSM technology. The technology is a package/device integration accomplished at the wafer fabrication level. Since the cathode and anode interconnections utilize precision photolithographic techniques rather than wire bonds, parasitic package inductance is tightly controlled. The package parasitics provide smooth non-resonant functionality through 12GHz.

KEY FEATURES:

Tape and Reeled for Automatic Assembly
 Low Series Inductance (<0.2nH typical)
 Low Parasitic Capacitance (0.06 pf typical)
 Meets All Commercial Qualification Requirements
 0204 Outline
 Low thermal resistance

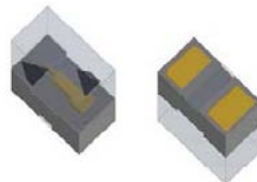
APPLICATIONS/BENEFITS:

2.4 GHz PCS communications
 5.7 GHz Wireless LANS
 Solid State Switches, Attenuators, Limiters
 Phase Shifters
 Widest bandwidth of any commercial surface mounted devices
 Ultra tight parametric distribution

PART NUMBER	OUTLINE	$V_B @$ 10 μ A (V) Min	$C_T @$ -10V ¹ (pF) Max	$R_s @$ 0.01mA ² (Ohms) Typ	$R_s @$ 10mA ² (Ohms) Max	T_L^3 (nS) Typ	APPLICATION
MPP4201	206	70	0.2	–	–	150	Attenuator
MPP4202	206	50	0.15	–	–	50	MRI
MPP4203	206	50	0.1	–	–	50	High Isolation Switch
MPP4204	206	25	0.15	–	2	20	High Speed Switch
MPP4205	206	70	0.15	250	5	150	Attenuator
MPP4206	206	200	0.15	–	2.5	500	Attenuator / switch
MPL4700	206	25	0.15	–	2.0 ^A	20	Receiver Protection
MPL4701	206	15	–	–	2.5 ^A	10	Receiver Protection
MPL4702	406	50 ^B	–	–	2	30	Anti-parallel Pair MRI Surface Coil Detune

Notes:

- 1 - Total Capacitance measured at F=1 MHz.
 - 2 - Series Resistance measured at F=100 MHz.
 3. T_L Test conditions: $I_R=6$ mA, $I_F=10$ mA
- Electrical Specifications at $T_A = 25^\circ\text{C}$



Volume/ Bird Cage Coils – Switching Diodes

(End ring resonant / anti-resonant Switching Diodes)

Model #	VBR	CT(pF)	Wi (um)	$\tau(\mu\text{s})$	$R_s(\Omega)^1$	@IF(mA)	Application
HUM2015	1500	3.5	275	20	0.1	500	Switching
HUM2020	2000	3.5	275	20	0.1	500	Switching

Surface Coils– Receive Array Pin Diodes

(Loop Array Or Strip Array – 4 Channels and Nx4 Channels)

Model #	VBR	CT(pF)	Wi (um)	$\tau(\mu\text{s})$	$R_s(\Omega)^1$	@IF(mA)	Application
UMX5601	100	2.5	175	5	0.75	50	ULTRA-Low Magnetic Receive Array
UM7201	100	2.2	50	1.5	0.25	100	Receive Array
UM9701	100	1.8	50	1.5	0.8	10	Receive Array
UM9995	100	1.2	100	2	0.6	100	ULTRA-Low Magnetic Recieve Array
UMX5101	100	1.2	125	2.5	0.8	50	ULTRA-Low Magnetic Recieva Array
UM9989AP ³	75	1.2 ²	–	0.004	2	100	Low Magnetic Recieve Array
MPL4702 ³	50	1.2 ²	–	0.03	2	10	Low Magnetic Recieve Array

Transmit/ Recieve Control Boards

Model #	VBR	CT(pF)	Wi (um)	$\tau(\mu\text{s})$	$R_s(\Omega)^1$	@IF(mA)	Application
UM4001	100	3	175	5	0.25	500	T/R Control
UM4301	100	2.2	325	6	1.5	100	T/R Control
UM7301	100	0.7	325	4	3	100	T/R Control
SMX0512MR	500	1.5	50	3.5	0.35	100	T/R Control
UM7101	100	1.2	100	2	0.6	100	T/R Control
UM6201	100	1.1	50	0.6	0.4	100	T/R Control
UM9415	50	3	175	5	0.75	50	T/R Control

Receiver Protection Circuits

Model #	VBR	CT(pF)	Wi (um)	$\tau(\mu\text{s})$	$R_s(\Omega)^1$	@IF(mA)	Application
UM9989	75	1.2	–	0.006	2	100	Receiver Protection
UM1089	75	1.5	–	0.015	0.8	100	Receiver Protection
UM7201	100	2.2	50	1.5	0.25	100	Receiver Protection
SMX0509MR	500	1.2	50	2.5	0.2	200	Receiver Protection
MPP4204	25	0.15	–	0.02	2	10	Receiver Protection
MPL4702 ³	50	1.22	–	0.03	2	10	Receiver Protection
UM9415	50	3	175	5	0.75	50	Receiver Protection

Notes:

- 1) Series Resistance (R_s) is measured at 100MHz.
- 2) Nominal Ct per Diode.
- 3) Antiparallel Pairs

Power PIN Diodes for Switching and Attenuation

Microsemi's fast switching products have High Power / Low IM for TR switching control. These power pin diodes feature extremely low susceptance, ideal for MRI applications. Ideal applications include in-bore switching and surface/body coil circuitry.



Category	C_T (pF) Type	R_p @100V (kOhms) Min	R_s @100mA (Ohms) Type	T_L (uS) Min/Type	V_B (V) Min	Part Number
High Power Pin Diodes Surface Mount Plastic up to 1000V	4.2 @100V	200	0.4	10 / 30	100 500 1000	USM2001* USM2005* HUM2010*
High Power Pin Diodes up to 2000V	3.4 @100V	200	0.3	10 / 30	200 500 1000 2000	HUM2002 HUM2005 HUM2010 HUM2020
Ultra Low Magnetic Diodes up to 1500V	2.6 @50V	100 @30V	0.5	5 / 15	100 500 1000 1500	UMX5601* UMX5605* UMX5610* UMX5515*
Medical Power Switching	2.2 @50V	200	1.5	6	100 200 600 1000	UM4301 UM4302 UM4306 UM4310
Medical Power Switching and Attenuation	0.7 @50V	150	3	4	100 200 600 1000	UM7301 UM7302 UM7306 UM7310

* Low Mag

Power PIN Diodes for Switching and Attenuation

Category	C_T @0V (pF) Typ	G @0V (μ A) Max	R_s @100mA (Ohms) Typ	TL (nS) Typ	Vb (Min) (V)	Part Number
Fast Turn On Receiver Protection	1.5	40	0.8	15	75	UM1089*
Fast Turn On Receiver Protection	1.2	40	2	6	75	UM9989*
Anti Parallel Configuration Fast Turn On	2.4	40/diode	2	6	75/diode	UM9989AP*

All listed are RoHs available

* Low Mag

Power PIN Diodes for LF / HF / VHF / UHF Switching & Attenuating

Part Number	V _{BR} (V) Min	Typ Power Dissipation (W) ¹	C _t (pF) Max	R _s (Ohms) Max	R _p (Ohms) Min	Tau (uS) Min
UM9301	75	1 (SM pkg)	0.8 @ 0V	1.7 @100mA(typ) 3K @.01mA (min)	–	4.0
UM6201	100	4	1.1 @100V	0.4 @ 100mA	350K @100V	0.6
UM6202	200					
UM6204	600					
UM9401	50	5.5	1.5 @ 0V	1.0 @50mA	5K @0V	1.0
UM6001	100	6	0.5 @100V	1.7 @ 100mA	300K @100V	1.0
UM6002	200					
UM6006	600					
UM6010	1000					
UM6601	100	6	0.4 @100V	2.5 @ 100mA	300K @100V	1.0
UM6602	200					
UM6606	600					
UM6610	1000					
UM7301	100	7.5	0.7 @100V	3.0 @100mA	150K @100V	4.0
UM7302	200					
UM7306	600					
UM7310	1000					
UM7001	100	10	0.9 @100V	1.0 @100mA	200K @100V	2.5
UM7002	200					
UM7006	600					
UM7010	1000					
UM7501	100	10	1.0 @ 100V	1.0 @50mA	100K @100V	2.5
UM7502	200					
UM7506	600					
UM7510	1000					
UM7514	1400					
UM7101	100	10	1.2 @100V	0.6 @100mA	150K @100V	2.0
UM7102	200					
UM7104	400					
UM7108	800					

¹ Average dissipation in C Stud style package

Power PIN Diodes for LF / HF / VHF / UHF Switching & Attenuating

Part Number	V _{BR} (V) Min	Typ Power Dissipation (W) ¹	C _t (pF) Max	R _s (Ohms) Max	R _p (Ohms) Min	Tau (uS) Min
UM7201	100	10	2.2 @100V	0.25 @100mA	70K @100V	1.5
UM7202	200					
UM7204	400					
UM9415	50	10	4.0 @ 0V	1.0 @50mA	1.0 @0V	5.0
HUM2010	1000	13	4 @100V	0.2 @500mA	200 @100V	30 Typ
HUM2015	1500					
HUM2020	2000					
UM4301	100	20	2.2 @ 100V	1.5 @100mA	200K @100V	6.0
UM4302	200					
UM4306	600					
UM4310	1000					
UM4901	100	37.5	3 @100V	0.5 @100mA	10K @100V	5.0
UM4902	200					
UM4906	600					
UM4001	100	25	3 @100V	0.5 @100mA	10K @100V	5.0
UM4002	200					
UM4006	600					
UM4010	1000					
UM2101	100	25	2.5 @100V	2.0 @100mA	-	25 Typ
UM2102	200					
UM2104	400					
UM2106	600					
UM2110	1000					

¹ Average dissipation in C Stud style package

Key Features

- Monolithic design for lowest parasitics
- Low Conversion Loss
- Suitable for applications to 26.5 GHz
- Excellent Noise Figure
- Can be supplied as monolithic or as packaged device
- Single, T & Quad configurations available
- RoHS Compliant

Part Number	Freq. Range	Barrier	$V_B @ 10\mu A$ (V) Min	$C_T @ 0V$ (pF) Max	$V_F @ 1mA$ (V) Max	$R_D @ 5mA$ (Ohms) Max	NF ssbs Typ (dB)
GC9901	Ku-Ka	ULTRA- LOW	2	0.10	310	18	6.5
GC9902	X			0.15	280	14	6
GC9903	C			0.3	270	12	5.5
GC9904	S			0.5	250	10	5.5
GC9911	Ku-Ka	LOW	2	0.10	360	18	6.5
GC9912	X			0.15	350	14	6
GC9913	C			0.3	340	12	5.5
GC9914	S			0.5	330	10	5.5
GC9921	Ku-Ka	LOW- MED	2	0.10	440	18	6.5
GC9922	X			0.15	430	14	6
GC9923	C			0.3	410	12	5.5
GC9924	S			0.5	390	10	5.5
GC9931	Ku-Ka	MEDIUM	3	0.10	540	18	6.75
GC9932	X			0.15	530	14	6.25
GC9933	C			0.3	520	12	5.75
GC9934	S			0.5	500	10	5.5
GC9941	Ku-Ka	HIGH	4	0.10	650	20	7
GC9942	X			0.15	630	16	6.25
GC9943	C			0.3	620	12	5.75
GC9944	S			0.5	600	10	5.75

Electrical Specifications at $T_A = 25^\circ C$

GaAs Schottky Barrier Diodes

Microsemi's MS8000 series of GaAs Schottky barrier diodes are available in packaged form and bondable chip and flip chip configurations. These Schottky devices have low series resistance and low junction capacitance. The resulting low noise figure makes these diodes suitable for sensitive mixer and detector applications from below X band to beyond Ka band frequencies.

Part Number	$C_J @ 0V$ (pF) Max	R_s (Ohms) Max	Typical LO Freq (GHz)	NF ssbs (dB) Typ	$V_B @ 10\mu A$ (V) Min
MS8001	0.12	6	9.375	5.6	5
MS8002	0.1	6	16	5.6	5
MS8003	0.07	6	24	6.5	5
MS8004	0.06	6	36	6.5	5



Electrical Specifications at $T_A = 25^\circ C$

Features:

Low-Noise Performance

High Cut-off Frequency

Passivated to Enhance Reliability

Packaged Diodes and Bondable Chips

Flip Chip Schottky Diodes



Flip Chip GaAs Schottky Diodes

The MS8151-P2613 is a GaAs flip chip Schottky diode designed for use as mixer and detector elements at microwave and millimeter wave frequencies. Their high cut-off frequency insures good performance at frequencies to 100 GHz. Applications include, transceivers, digital radios and automotive radar detectors.

Part Number	$C_J @ 0V$ (pF) Max	$R_s @ 10mA$ (Ohms) Max	$V_F @ 10mA$ (mV)	Delta V_F (mV) Max	$V_B @ 10\mu A$ (V) Min	Description
MS8150-P2613	0.08	7	650 - 750	na	3	Low R_s Flip Chip - Single
MS8151-P2613	0.06	9	600 - 800	na	3	Low C_t Flip Chip - Single
MS8250 - P2920	0.08	7	650 - 750	10	3	Low R_s Flip Chip - Antiparallel
MS8251 - P2920	0.06	9	600 - 800	10	3	Low C_t Flip Chip - Antiparallel

Electrical Specifications at $T_A = 25^\circ C$

Enhanced Performance Surface Mount (EPSM) Packaged Products

EPSM PIN Diodes for Switching & Attenuation

Part Number	$V_B @ 10\mu A$ (V) Min	$C_T @ V_R$ (pF) Max	$R_s @ I_F$ (Ohms) Max	T_L (nS) Typ	Application
LSP1000	35	0.28 @ 5V	2.5 @ 5mA	80	Switch
LSP1002	100	0.32 @ 50V	4.0 @ 100mA	1500	Attenuator
LSP1004	35	0.75 @ 20V	0.6 @ 10mA	150	Switch
LSP1011	200	0.35 @ 50V	2.0 @ 100mA	2000	Attenuator
LSP1012	20	0.35 @ 10V	1.8 @ 10mA	5	Limiter

EPSM Super Hyperabrupt 12V

Varactors for Low Voltage VCOs

Part Number	$C_T @ -1V^1$ (pF) Min	$C_T @ -2.5V$ (pF) Min -Max	$C_T @ -4V$ (pF) Max	$C_T @ -8V$ (pF) Max	Q (4V/50MHz) min
KV1913A	36	18 - 27	12	6.20	400
KV1953A	26	13 - 20	9	4.7	500
KV1923A	17	8.5 - 13	6	3.2	600
KV1933A	13	6.5 - 10	4.5	2.7	750
KV1943A	9	4.5 - 6.5	3	1.7	900
KV1963A	4	2.0 - 3.0	1.5	1	1200
KV1973A	1.8	1.1 - 1.5	0.8	0.55	1400
KV1983A	1.2	0.8 - 1.1	0.6	0.45	1600
KV1993A	0.6	0.5 - 0.8	0.4	0.35	1800

Varactor Category Performance Guide

Model Number or Family	Max Voltage	Typical Ratio*	Category	Mod Sens Linearity*	Relative Q or VCO Phase Noise	
MV20000	15V	3:1	Abrupt GaAs	Poor; Exponential	Best	
MV21000	30V	4:1				
GC1200; GC1300; GC1500; 1N5400	30V	4:1	Abrupt Silicon			
GC1600; 1N5400	45V	5:1				
GC1700; 1N5100	60V	6:1				
MV34000;	15V	6:1	Hyperabrupt	Good	Good - Excellent	
MV30000; MV31000	–	–				
MV32000	30V	11:1				
KV2100; MPV2100	22V	11:1	Hyperabrupt			
GMV2100						
KV2101						
KV2201						
KV2301						
KV2401						
KV2501						
KV2601						
KV2701						
KV2801						
KV3201; KV31S1	30V	11:1		Good	Very Good	
KV3901; KV38S2				(Mid-Range)	–	
GC15000	22V	6:1	Low "S" Linear FLTVARS	Excellent	Excellent	
GC15000	22V	11:1	High "S" Linear FLTVARS	Excellent	Excellent	
KV1905A	12V	3:1	Silicon Super Hyperabrupt	Good	Very Good	
KV1925A						
KV1935A						
KV1945A						
KV1965A; MPV1965					Good (Mid-Range)	Very Good
KV1975A	12V	4:1				
KV1911A-KV1991A	12V	6:1			Good	Very Good
KV1912A-KV1932A						
KV1913A-KV1993A						
KV1400 - KV1800	12V	13:1			Good	Good

Varactor Diode selector guide

Freq. Band	Hyper Chips** VB=22V Low Gamma	Hyper Chips** VB=22V Medium Gamma	Hyper Chips** VB=22V High Gamma	Hyper Chips** VB=15V Very High Gamma	Hyper Flip Chip Vb=18V Medium Gamma	Abrupt Chips** Vb=15V	Abrupt Chips** Vb=30V
Material	GaAs	GaAs	GaAs	GaAs	GaAs	GaAs	GaAs
Microwave to 40 GHz	MV32001	MV30011	MV31011	MV34001	–	MV20001	MV21001
	MV32002	MV30012	MV31012	MV34002	–	MV20002	MV21002
	MV32003	MV30013	MV31013	MV34003	–	MV20003	MV21003
	MV32004	MV30014	MV31014	MV34004	–	MV20004	MV21004
	MV32005	MV30015	MV31015	MV34005	–	MV20005	MV21005
	MV32006	MV30016	MV31016	MV34006	–	MV20006	MV21016
	MV32007	MV30017	MV31017	MV34007	–	MV20007	MV21007
	MV32008	MV30018	MV31018	MV34008	–	MV20008	MV21008
	MV32009	MV30019	MV31019	MV34009	–	MV20009	MV21009
	MV32010	MV30020	MV31020	MV34010	–	MV20010	MV21010
Microwave to 18 GHz	–	–	MV31021	–	MV39001	–	–
	–	–	MV31022	–	MV39002	–	–
	–	–	MV31023	–	MV39003	–	–
	–	–	MV31024	–	–	–	–
	–	–	MV31025	–	–	–	–
	–	–	MV31026	–	–	–	–

Some limitations apply

* Not all devices available in glass. Consult factory for details.

** Also available in select package styles. Consult factory for details.

Freq. Band	Super Hyper Vb=12V P/N Series	High "S" Linear Vb=22V P/N	Low "S" Linear Vb=22V P/N	Hyper Vb=22V P/N Series	Abrupt Vb=30V Chip Ceramic Glass*	Abrupt Vb=30V EPSM	Abrupt Vb=30V SOT-23
Material	Silicon	Silicon	Silicon	Silicon	Silicon	Silicon	Silicon
Microwave to 18 GHz	-	-	-	-	GC1500A	GC1300	-
	-	-	-	MPV2100	GC1500B	GC1301	-
	KV199x	-	-	KV211x	GC1500	GC1302	-
	KV198x	GC15006	GC15001	KV212x	GC1501	GC1303	-
	KV197x	GC15007	GC15002	KV213x	GC1502	GC1304	-
	KV196x	GC15008	GC15003	KV214x	GC1503	GC1305	GC1202
	KV194x	GC15009	GC15004	KV215x	GC1504	GC1306	GC1203
	KV193x	GC15010	GC15005	KV216x	GC1505	GC1307	GC1204
	-	GMV5007	-	GMV2114	GC1506	GC1308	GC1205
	-	-	-	GMV2134	GC1507	GC1309	GC1206
	-	-	-	GMV2154	GMV1542	GC1310	GC1207
UHF to 1.0 GHz	-	-	-	-	-	-	GC1208
	-	-	-	-	GC1508	-	GC1209
	-	-	-	KV2101	GC1509	-	GC1210
	KV192x	GC15011	GC15014	KV3201	GC1510	N/A	GC1211
	KV195x	GC15012	GC15015	KV3901	GC1511	-	GC1212
	KV191x	GC15013	GC15016	KV2801	GC1512	-	GC1213
	-	-	-	-	GC1513	-	GC1214
VHF to 250 MHz	-	-	-	KV2001	1N5441	-	GC1215
	KV1401	N/A	N/A	KV2201	Thru	N/A	GC1216
	KV1501	-	-	KV2301	1N5476	-	GC1217

x denotes package option: 1 = chip, glass, or ceramic; 2 = SOT-23; 3 = EPSM

Some limitations apply

* Not all devices available in glass. Consult factory for details.

** Also available in select package styles. Consult factory for details.

Monolithic Microwave Surface Mount (MMSM) Varactor Diodes

This series of surface mount PIN diodes utilizes new and unique monolithic MMSM technology. The technology is a package/device integration accomplished at the wafer fabrication level. Since the cathode and anode interconnections utilize precision photolithographic techniques rather than wire bonds, parasitic package inductance is tightly controlled. The package parasitics provide smooth non-resonant functionality through 12GHz.

Key Features:

- Tape and Reeled for Automatic Assembly
- Low Series Inductance (<0.2nH typical)
- Low Parasitic Capacitance (0.06 pf typical)
- Meets All Commercial Qualification Requirements
- 0204 Outline

Applications:

- 2.4 GHz PCS
- 5.7 GHz Wireless LANS
- VCO's (Voltage Controlled Oscillator)
- Tunable Filter
- widest bandwidth or any commercial surface mounted devices
- Ultra tight parametric distribution

Part Number	V _b @10uA (V) Min	C _T @ -1V (pF) Min - Max	RATIO C _T 1V/ C _T 3V	RATIO C _T 1V/ C _T 6V	Q (4V/50MHz) Min	Outline Dwg	Application
MPV1965	15	2.6-3.8	1.4 - 2.2	2.6 - 3.6	1500	206	Low Voltage VCO

Part Number	V _b @10uA (Min) (V)	C _T @ 0V (pF) Typ	C _T @ -4V (pF) Min - Max	C _T @ -20V (pF) Min - Max	Q (4V/50MHz) Min	Outline Dwg	Application
MPV2100	22	3.25	0.9 - 1.5	0.2 - 0.5	1500	206	Wide Bandwidth VCO

Electrical Specifications at T_A = 25°C

Microsemi's GaAs varactors are available as Abrupt Junction and Hyperabrupt Junction. Our computer controlled epitaxy provides the optimal C-V characteristics for your application. GaAs varactors feature extremely high Q and lowest phase noise for critical applications

GaAs Abrupt Junction Diodes

15 Volt Abrupt Junction Varactors, Gamma = 0.6

Part Number	$C_T @ -4V$ (pF) +/- 10%	Ratio $C_T 0V/C_T V_{BR}$	$V_b@10\mu A$ (V) Min	Q (4V/50MHz) Min
MV20001	0.3	2.4	15	8000
MV20002	0.4	2.6	15	7500
MV20003	0.5	2.8	15	7000
MV20004	0.6	2.9	15	6500
MV20005	0.8	3	15	6000
MV20006	1	3.1	15	5700
MV20007	1.2	3.2	15	5000
MV20008	1.5	3.3	15	5000
MV20009	1.8	3.4	15	5000
MV20010	2.2	3.4	15	4000

30 Volt Abrupt Junction Varactors, Gamma = 0.6

Part Number	$C_T @ -4V$ (pF) +/- 10%	Ratio $C_T 0V/C_T V_{BR}$	$V_b@10\mu A$ (V) Min	Q (4V/50MHz) (Min)
MV21001	0.3	2.8	30	8000
MV21002	0.4	3.1	30	7500
MV21003	0.5	3.4	30	7000
MV21004	0.6	3.6	30	6500
MV21005	0.8	3.8	30	6000
MV21006	1	4	30	5700
MV21007	1.2	4.2	30	5000
MV21008	1.5	4.3	30	5000
MV21009	1.8	4.5	30	5000
MV21010	2.2	4.6	30	4000

GaAs Hyperabrupt Junction Diodes
15 Volt Hyperabrupt Varactors, Gamma = 1.00

Part Number	C_T @ -4V (pF) +/- 10%	Ratio C_T 2V/ C_T 12V	V_b @10uA (V) Min	Q (4V/50MHz) Min
MV30001	0.6	2.5	15	4000
MV30002	1	3.1	15	3000
MV30003	1.2	3.2	15	3000
MV30004	1.5	3.4	15	3000
MV30005	1.8	3.5	15	3000
MV30006	2.2	3.6	15	3000
MV30007	2.5	3.7	15	2500
MV30008	3	3.8	15	2500
MV30009	3.6	3.8	15	2000
MV30010	4.5	3.9	15	1500

22 Volt Hyperabrupt Varactors, Gamma = 1.00

Part Number	C_T @ -4V (pF) +/- 10%	Ratio C_T 2V/ C_T 12V	V_b @10uA (V) Min	Q (4V/50MHz) (Min)
MV30011	0.6	3.1	22	4000
MV30012	1	4.1	22	3000
MV30013	1.2	4.3	22	3000
MV30014	1.5	4.8	22	3000
MV30015	1.8	5	22	3000
MV30016	2.2	5.3	22	3000
MV30017	2.5	5.5	22	2500
MV30018	3	5.7	22	2500
MV30019	3.6	5.9	22	2000
MV30020	4.5	6.1	22	1500

GaAs Hyperabrupt Junction Diodes
15 Volt Hyperabrupt Varactors, Gamma = 1.25

Part Number	C_T @ -4V (pF) +/- 10%	Ratio C_T 2V/ C_T 12V	V_b @10uA (V) Min	Q (4V/50MHz) (Min)
MV31001	0.6	3	15	4000
MV31002	1	3.7	15	3000
MV31003	1.2	3.9	15	3000
MV31004	1.5	4.2	15	3000
MV31005	1.8	4.4	15	3000
MV31006	2.2	4.6	15	3000
MV31007	2.5	4.7	15	2000
MV31008	3	4.8	15	2000
MV31009	3.6	4.9	15	2000
MV31010	4.5	5	15	1500

22 Volt Hyperabrupt Varactors, Gamma = 1.25

Part Number	C_T @ -4V (pF) +/- 10%	Ratio C_T 2V/ C_T 12V	V_b @10uA (V) Min	Q (4V/50MHz) (Min)
MV31011	0.5	3.2	22	4000
MV31012	0.7	4	22	4000
MV31013	1	5	22	3000
MV31014	1.2	5.4	22	3000
MV31015	1.5	6	22	3000
MV31016	1.8	6.4	22	3000
MV31017	2	6.6	22	3000
MV31018	2.2	6.8	22	3000
MV31019	2.7	7.2	22	2000
MV31020	3.3	7.6	22	2000



Comb Generators

Model Number		Input	Output level			
		Frequency	Up to 4.0 GHz	4.0 to 8.0 GHz	8.0 to 12.0 GHz	12.0 to 18.0 GHz
Module	Coaxial	(MHz)				
GG770140-01	GG770340-01	100	-10	-20	-	-
GG770140-02	GG770340-02	200	-5	-20	-	-
GG770140-03	GG770340-03	250	-5	-15	-20	-
GG770140-04	GG770340-04	500	0	-10	-20	-
GG770140-05	GG770340-05	1000	5	-5	-15	-15
GG770140-06	GG770340-06	1500	5	0	-10	-10
GG770140-07	GG770340-07	2000	5	0	-5	-10

Notes:

Minimum output power per line (dBm)

All specifications apply at 25°C with 0.5W incident RF power in a 50 ohm system (both source & load)

Performance above 12.0GHz is typical performance only.

Modular units require an external DC return at the output.

Internal or RF decoupled DC returns are available on special order.

VSWR is specified at 2.0:1 max (for all model numbers).

Modular package style is 210003; Coaxial package style is 210020

Drop In Limiter Modules

Frequency Range (GHz)	Insertion Loss	VSWR Max	Survival Peak	Power (Watts) CW	Flat Leakage (mW) Max	Model Number	Package Style
Standard Broadband Limiter Modules							
0.5 to 4.0	0.5	1.5:1	100	3	400	GG77012-01	210013
	0.7	1.5:1	200	3	200	GG77010-01	210001
	0.7	1.5:1	200	3	125	GG77011-01	210003
	0.8	1.5:1	1000	5	200	GG77013-01	210003
2.0 to 8.0	0.6	1.7:1	100	2	500	GG77012-02	210013
	0.7	1.7:1	200	2	125	GG77010-02	210001
	0.7	1.7:1	200	2	100	GG77011-02	210003
	1.2	1.7:1	1000	3	200	GG77013-02	210003
4.0 to 12.0	1.0	1.8:1	200	2	100	GG77010-03	210001
	1.0	1.8:1	200	2	60	GG77011-03	210003
	1.6	1.8:1	800	3	200	GG77013-03	210003
8.0 to 18.0	1.9	1.9:1	200	2	100	GG77010-04	210001
	1.9	1.9:1	200	2	60	GG77011-04	210003
	2.2	2.0:1	600	3	200	GG77013-04	210003
2.0 to 18.0	2.0	2.0:1	200	2	125	GG77010-05	210001
	2.0	2.0:1	200	2	100	GG77011-05	210003
	2.2	2.0:1	600	3	200	GG77013-05	210003
Low Leakage Broadband Limiter Modules							
2.0 to 8.0	1.4	1.8:1	10	1	20	GG77014-01	210003
4.0 to 12.4	1.9	2.0:1	10	1	20	GG77014-02	210003
8.0 to 18.0	2.2	2.0:1	10	1	35	GG77014-03	210003

Connectorized Limiters

Frequency Range (GHz)	Insertion Loss	VSWR (max)	Survival Peak	Power (Watts) CW	Flat Leakage (mW) Max	Model Number	Package Style
Standard Broadband Connectorized Limiters							
0.5 to 4.0	0.6	1.5:1	200	3	200	GG77310-01	210019
	0.7	1.5:1	200	3	100	GG77311-01	210019
	0.9	1.5:1	1000	5	200	GG77313-01	210019
2.0 to 8.0	1.0	1.7:1	200	2	125	GG77310-02	210019
	1.0	1.7:1	200	2	100	GG77311-02	210019
	1.5	1.7:1	1000	3	200	GG77313-02	210019

Frequency Range (GHz)	Insertion Loss	VSWR (max)	Survival Peak	Power (Watts) CW	Flat Leakage (mW Max)	Model Number	Package Style
4.0 to 12.0	1.5	1.8:1	200	2	100	GG77310-03	210019
	1.5	1.8:1	200	2	60	GG77311-03	210019
	2.1	1.8:1	800	3	200	GG77313-03	210019
8.0 to 18.0	2.2	1.9:1	200	2	100	GG77310-04	210019
	2.5	1.9:1	200	2	60	GG77311-04	210019
	2.5	2.0:1	600	3	200	GG77313-04	210019
2.0 to 18.0	2.2	2.0:1	200	2	125	GG77310-05	210019
	2.5	2.0:1	200	2	100	GG77311-05	210019
	2.5	2.0:1	600	3	200	GG77313-05	210019
Low Leakage Connectorized Limiters							
2.0 to 8.0	1.4	1.8:1	10	1	20	GG77314-04	210019
4.0 to 12.4	2.0	2.0:1	10	1	20	GG77314-05	210019
8.0 to 18.0	2.5	2.0:1	10	1	35	GG77314-06	210019
2.0 to 8.0	1.4	1.8:1	10	1	20	GG77314-07	210032
4.0 to 12.4	2.0	2.0:1	10	1	20	GG77314-08	210032
8.0 to 18.0	2.5	2.0:1	10	1	35	GG77314-09	210032
Low Frequency Connectorized Limiters							
0.01 to 0.1	0.7	1.5:1	100	1	200	GG77315-01	210019
0.1 to 0.5	0.7	1.5:1	100	1	200	GG77315-02	210019
0.5 to 1.0	1.0	1.5:1	100	1	200	GG77315-03	210019
0.01 to 0.1	0.7	1.5:1	100	1	200	GG77315-04	210093
0.1 to 0.5	0.7	1.5:1	100	1	200	GG77315-05	210093
0.5 to 1.0	1.0	1.5:1	100	1	200	GG77315-06	210093

Notes : All low level parameters specified at -10 dBm input power

All limiter modules require an external DC return of 1.0 ohm or less except the GG77014-XX series, which requires external DC blocks at both ends.

Model numbers GG77314-XX incorporate DC blocking capacitors and do not require either ground return or external DC blocks.

Peak power ratings apply @ 1.0μsec pulse width and 0.001 duty cycle.

Spike leakage is 0.2 ergs (max) based on the assumption that the pulse rise time of the high power pulse is greater than 20.0nsec.

Spike leakage for the low frequency limiters is specified at 0.1 ergs (max) Recovery time (3 dB) for all units except for the GG77014-XX, GG77314-XX and GG77315-XX series is 250nSec @ 100W pulsed input power. Series GG77314-XX and GG77014-XX recovers in 500nSec at rated pulsed power and series GG77315-XX recovers in 1.0μSec at rated pulsed power.

Limiting threshold (1 dB compression point) is 5mW (min) except for the GG77014-XX and GG77314-XX series which is 1.0mW (min) Leakage levels are specified at rated peak power

Surface Mount Limiter Modules



ELECTRICAL PARAMETERS @ 25°C

Model	Freq Range (MHz)	CW Power P_{CW} (W) Max	Peak Power ¹ P_P (W) Max	Ins. Loss ² IL(dB) Typ.	VSWR ² Typ.
GG77015-01	10 – 3000	4	20	0.5	1.5:1

Flat Leakage³ (dBm) Typ.

<= 1GHz	1.0-1.5GHz	1.5-1.85GHz	1.85-3.5GHz
15	18	20	23

Notes:

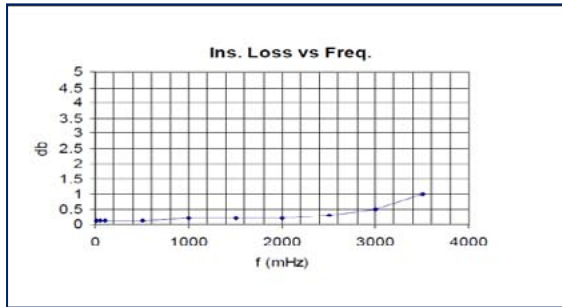
1 Pulse Width = 1usec, Duty Cycle = 0.001

2 P = -10dBm max

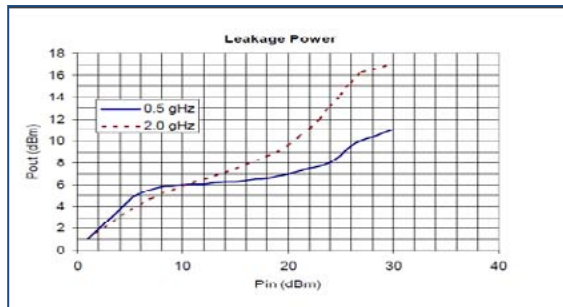
3 P = +30dBm, Pulse Width = 1usec, Duty Cycle = 0.001

*RF Power Handling is linearly derated from full power at +25°C to zero power at +150°C

INSERTION LOSS



FLAT LEAKAGE



	Reflective Switches					Absorptive Switches				
	Frequency Range	Outline	Model Number	Insertion Loss (dB) Max	Isolation (dB) Min	VSWR Max	Model Number	Insertion Loss (dB) Max	Isolation (dB) Min	VSWR Max
SPST	0.5 – 4.0	210059	GG71410-01	0.9	40	1.5:1	GG71420-01	1.7	55	1.5:1
	2.0 – 8.0	210059	GG71410-02	1.3	50	1.7:1	GG71420-02	2.1	50	1.7:1
	4.0 – 12.4	210059	GG71410-03	1.5	60	1.8:1	GG71420-03	2.4	45	1.8:1
	8.0 – 18.0	210059	GG71410-04	1.7	55	1.9:1	GG71420-04	2.9	45	1.9:1
	2.0 – 18.0	210059	GG71410-05	1.8	45	2.0:1	GG71420-05	2.9	45	2.0:1
SP2T	0.5 – 4.0	210047	GG72430-01	1	60	1.5:1	GG72420-01	1.7	60	1.5:1
	2.0 – 8.0	210047	GG72430-02	1.6	60	1.7:1	GG72420-02	2.1	55	1.7:1
	4.0 – 12.4	210047	GG72430-03	2.2	60	1.8:1	GG72420-03	2.4	50	1.8:1
	8.0 – 18.0	210047	GG72430-04	2.5	55	1.9:1	GG72420-04	2.9	45	1.9:1
	2.0 – 18.0	210047	GG72430-05	2.5	55	2.0:1	GG72420-05	2.9	45	2.0:1
SP3T	0.5 – 4.0	210079	GG73430-01	1.1	60	1.5:1	GG73420-01	1.7	60	1.5:1
	2.0 – 8.0	210079	GG73430-02	1.8	60	1.7:1	GG73420-02	2.2	55	1.7:1
	4.0 – 12.4	210079	GG73430-03	2.4	60	1.8:1	GG73420-03	2.5	50	1.8:1
	8.0 – 18.0	210079	GG73430-04	2.7	55	1.9:1	GG73420-04	3	45	1.9:1
	2.0 – 18.0	210079	GG73430-05	2.7	55	2.0:1	GG73420-05	3	45	2.0:1
SP4T	0.5 – 4.0	210049	GG74430-01	1.2	60	1.5:1	GG74420-01	1.8	60	1.5:1
	2.0 – 8.0	210049	GG74430-02	1.9	60	1.7:1	GG74420-02	2.3	55	1.7:1
	4.0 – 12.4	210049	GG74430-03	2.4	60	1.8:1	GG74420-03	2.7	50	1.8:1
	8.0 – 18.0	210049	GG74430-04	2.9	55	1.9:1	GG74420-04	3.2	45	1.9:1
	2.0 – 18.0	210049	GG74430-05	2.9	55	2.0:1	GG74420-05	3.2	45	2.0:1
SP5T	0.5 – 4.0	210050	GG75430-01	1.3	60	1.5:1	GG75420-01	1.6	45	1.5:1
	2.0 – 8.0	210050	GG75430-02	2.1	55	1.7:1	GG75420-02	2.1	40	1.7:1
	4.0 – 12.4	210050	GG75430-03	2.6	50	1.8:1	GG75420-03	2.6	40	1.8:1
	8.0 – 18.0	210050	GG75430-04	3.3	45	1.9:1	GG75420-04	3.2	35	1.9:1
	2.0 – 18.0	210050	GG75430-05	3.3	45	2.0:1	GG75420-05	3.2	35	2.0:1
SP6T	0.5 – 4.0	210051	GG75435-01	1.5	60	1.5:1	GG75425-01	1.8	45	1.5:1
	2.0 – 8.0	210051	GG75435-02	2.3	60	1.7:1	GG75425-02	2.2	40	1.7:1
	4.0 – 12.4	210051	GG75435-03	2.8	60	1.8:1	GG75425-03	2.9	40	1.8:1
	8.0 – 18.0	210051	GG75435-04	3.6	55	1.9:1	GG75425-04	3.6	35	1.9:1
	2.0 – 18.0	210051	GG75435-05	3.6	55	2.0:1	GG75425-05	3.6	35	2.0:1

Reflective Switches

Required D.C. Bias: +5V and -8 to -15V

Switching Speed: 50nsec maximum of -
-(50% TTL to 10/90% RF)

DC blocks incorporated on all RF ports

Absorptive Switches

Required D.C. Bias: +5V and -8 to -15V

Switching Speed: 1usec maximum (50% TTL to 10/90% RF)

Only the switched arms are matched in the isolated state

The common arm, J1, is matched only when one path is in the loss state

DC blocks incorporated on all RF ports

WLAN (Wi-Fi) Front-End Modules integrate multiple devices required to implement an RF front-end. Typically included are one or more power amplifiers with both input/output impedance matching, a switch and one or more low noise amplifiers. Microsemi's WLAN FEM's can be found at multiple IEEE802.11a/b/g/n/ac reference designs by the leading WLAN baseband SoC suppliers.

Part Number ^{1,2,3}	Iq (mA)	Match / PA Match ⁴	Gain / PA Gain (dB)	PA Pout (dBm) @3% EVM	LNA Noise (dB)	LNA IP3 (dBm)	LNA Switch	Package
LX5540LL	80	In / IO	28 / 14	20	1.5	4	No	QFN-16 3x3mm
LX5541LL	90	In / IO	27 / 13	19	2	5	No	QFN-16 3x3mm
LX5543LU	82	IO / NA	25 / NA	17	N/A	N/A	SP3T	QFN-16 3x3mm
LX5551LQ	90	IO / NA	26 / NA	18	N/A	N/A	SPDT	QFN-16 3x3mm
LX5552LU	80	IO / IO	26 / 12.5	17	2	5	SPDT	QFN-16 3x3mm
LX5553LU	82	IO / IO	25 / 13	17	2.1	5	SP3T	QFN-16 3x3mm
LX5586LQ	125	IO / IO	26 / 12.5	18	3.1	6.5	SPDT	QFN-16 2.5x2.5mm

1) Frequency (all FEMs) = 2.4GHz except for LX5586LQ (5GHz)

2) Vin = 3.3V (all FEMs)

3) PA Pout (dBm) @ 1.8% EVM = 17 for LX5586LQ

4) IO = In/Out

Low Noise Amplifiers are typically used in the receive path of WLAN radios. They tend to be linear and have lower gain than Power Amplifiers. Microsemi offers WLAN LNAs supporting the 2.4GHz (IEEE802.11b/g/n/ac) and 5GHz (IEEE802.11a/n/ac) bands.

Part Number	Freq (GHz)	Vin (V)	I _{dd} (mA)	Match	Gain (dB)	Noise (dB)	IP3 (dBm)	Bypass Mode	Package
LX5561LL	2.4	3.3	10.5	In/Out	13	1.5	6.5	No	QFN-12 2x2mm
LX5560LL	5	3.3	9.5	In/Out	12	1.7	6	No	QFN-12 2x2mm
LX5563LL	2.4	3.3	9	In/Out	14	1.3	7.5	Yes	DFN-6 1.5x1.5mm

WLAN Power Amplifiers (PAs)

WLAN Power Amplifiers (PAs)

The industry's most advanced RF Power amplifiers for IEEE802.11a/b/g/n/ac applications on the 2.4GHz and 5GHz bands.

Part Number	Freq (GHz)	Gain (dB)	Vin (V)	P _{out} (dBm) @ 3% EVM	P _{out} (dBm) @ 1.8% EVM	Current at 3% EVM (mA)	Matching	Package
LX5516LL	2.4	29	3.3	18 (2.5%)	N/A	130	In/Out	QFN-12 2x2mm
LX5514MLL	2.4	27	3.3	19	N/A	130	In	DFN-6 1.5x1.5mm
LX5511LQ	2.4	26	3.3	20	N/A	170	In	QFN-16 3x3mm
LX5514LL	2.4	28	3.3	20	N/A	145	In	QFN-12 2x2mm
LX5535LQ	2.4	32	3.3 - 5	22	N/A	275	In	QFN-16 3x3mm
LX5518LQ	2.4	32	3.3 - 5	26	N/A	390	In	QFN-16 3x3mm
LX5506MLQ	5	30	3.3	18	N/A	140	In	QFN-16 3x3mm
LX5509LQ	5	28	3.3	20	19.5	315	In/Out	QFN-20 4x4mm
LX5530LQ	5	28	3.3 - 5	23	NA	360	In	QFN-16 3x3mm

The ARF family of RF Power MOSFETs are optimized for applications requiring up to 400V operating voltage and up to 150MHz. Historically RF Power MOSFETs were limited to applications of 50V or less. This limitation has been eliminated by combining Microsemi's high voltage MOSFET technology with RF specific chip designs. Why higher voltage? Higher operating voltage gives higher load impedances. For example, at 50V operating, the output impedance of a Power MOSFET is 8 ohms, while at 125V operating, the output impedance is 50ohms. This higher impedance allows for simpler transformers and combiners. The increased operating voltage also lowers DC current required for any given output power which increases efficiency and reducing the size, weight and cost of other system components.

Part Number	Pout (W)	Frequency (MHz)	V _{DD} / BV _{DSS} (V)	Rthjc (°C/W)	Class of Operation	PKG
ARF1500	750	40	125 / 500	0.12	A-E	T1
ARF1501	750	40	250 / 1000	0.12	A-E	T1
ARF1505	750	40	300 / 1200	0.12	A-E	T1
ARF1510	750	40	400 / 1000	0.12	D	T1
ARF1511	750	40	380 / 500	0.12	D	T1
ARF1519	750	25	250 / 1000	0.13	A-E	T2
ARF446G	140	65	250 / 900	0.55	C-E	T0-247
ARF447G	140	65	250 / 900	0.55	C-E	T0-247
ARF448AG	140	65	150 / 450	0.55	C-E	T0-247
ARF448BG	140	65	150 / 450	0.55	C-E	T0-247
ARF449AG	90	120	150 / 450	0.76	C-E	T0-247
ARF449BG	90	120	150 / 450	0.76	C-E	T0-247
ARF460AG	150	65	125 / 500	0.5	A-E	T0-247
ARF460BG	150	65	125 / 500	0.5	A-E	T0-247
ARF461AG	150	65	250 / 1000	0.5	A-E	T0-247
ARF461BG	150	65	250 / 1000	0.5	A-E	T0-247
ARF463AG	100	100	125 / 500	0.7	A-E	T0-247
ARF463BG	100	100	125 / 500	0.7	A-E	T0-247
ARF4655BG	150	60	300 / 1200	0.5	A-E	T0-247
ARF465AG	150	60	300 / 1200	0.5	A-E	T0-247
ARF466AG	300	45	200 / 1000	0.35	A-E	T0-264
ARF466BG	300	45	200 / 1000	0.35	A-E	T0-264
ARF466FL	300	45	200 / 1000	0.13	A-E	T3
ARF475FL	300	150	165 / 500	0.31	A-E	T3A
ARF476GL	300	150	165 / 500	1.31	A-E	T3C
ARF477FL	400	65	165 / 500	0.18	A-E	T3C

RF MOSFET Hybrids with Driver IC's

The DRF family of products integrates IC drivers, bypass capacitors and RF MOSFETs into a single package. These integrations maximize amplifier performance by reducing transmission parasitics between the driver and the RF MOSFET. The DRF120x family is for single output MOSFETs while the DRF130x family is for two MOSFETs in push-pull. The DRF1400 is 2 MOSFETs in a half bridge configuration. DRF products are also available in reference designs which include the DRF component and a full set of circuitry to immediately operate the reference design as a 1, 2 or 2.5kW RF generator.

Part Number	Pout (W)	Frequency (MHz)	V _{DD} / BV _{DSS} (V)	R _{thjc} (°C/W)	Class of Operation	PKG
DRF1200	600	30	15 / 1000	0.13	D-E	T2B
DRF1201	1000	30	15 / 1000	0.10	D-E	T2B
DRF1202	1000	30	15 / 500	0.11	D-E	T2B
DRF1203	600	30	15 / 1000	0.15	D-E	T2B
DRF1300	2000	30	15 / 500	0.15	D-E	T4
DRF1301	2000	30	15 / 1000	0.13	D-E	T4
DRF1400	2500	30	15 / 500	0.15	D-E	T4

High Frequency RF MOSFETs

The VRF family of RF MOSFETs are improved replacements for the industry standard 50V RF transistors. They provide improved ruggedness by increasing the BVDSS from the industry standard of 125V to 170V. Low cost flangeless packages are another improvement that shows Microsemi's dedication to optimizing performance, reducing cost and improving reliability.

Part Number	Pout (W)	Frequency (MHz)	V _{DD} / BV _{DSS} (V)	R _{thjc} (°C/W)	Class of Operation	PKG
VRF148A	30	175	60 / 170	1.52	A-E	M113
VRF150	150	175	60 / 170	0.6	A-E	M174
VRF151	150	175	60 / 170	0.6	A-E	M174
VRF151G	300	175	60 / 170	0.35	A-E	M208
VRF152	150	175	50 / 130	0.6	A-E	M174
VRF154FL	600	30	60 / 170	0.13	A-E	T2
VRF157FL	600	30	60 / 170	0.13	A-E	T2
VRF2933	300	60	60 / 170	0.27	A-E	M177
VRF2944	400	60	60 / 170	0.22	A-E	M177
VRF3933	300	60	90 / 250	0.27	A-E	M177

Security Software

Custom Design Services

Microsemi offers an extensive range of customized design services to meet the unique needs of our customers. These services encompass analog/mixed-signal SoCs, SoC FPGA designs, innovative packaging techniques, subsystems and much more. To learn how our customized solutions can provide you with differentiated products that set you aside from the competition, please go online and complete the “Custom Design Services” form and describe your specific engineering needs. Our system experts will contact you shortly after the form is submitted.

Professional Engineering Services

Best-of-Breed Anti-tamper Solutions

Microsemi’s defense systems provide professional engineering services to government agencies and contractors to analyze and develop best-of-breed anti-tamper solutions across hardware and software platforms. Through Microsemi, government clients and contractors will receive our end-to-end support to create comprehensive solutions that include the development of anti-tamper plans, vulnerability assessments, technical training and product-specific protection schemes.

Our team is comprised of experienced, security-cleared engineers, with specific expertise in the anti-tamper (AT) market, including an in-depth knowledge of third party products. We deliver project-specific requirements that incorporate concept definition, product deployment and field support.

Red Teaming

Red teaming analysis is a blind security assessment performed by a skilled team of ethical hackers. A red team uses the same tactics that would be employed by malicious hackers to breach information systems. A “Black box” approach assumes that the attacker has no prior knowledge of the system and all exploitable system faults that are discovered during this process will be reported back to the organization for patching.

Red teaming can both complement and inform intelligence collection and analysis. Our objective is to reduce an organization’s risk and increase opportunities. Microsemi’s experts will conduct a comprehensive evaluation of protection schemes and can provide risk mitigation recommendations to ensure critical program information (CPI) is properly protected.

A detailed report is also provided to customers that includes a vulnerability assessment which outlines threats, vulnerabilities and attack scenarios. The report will also include methodology, key performance parameters and risk mitigation tools and techniques that address all threat vectors.

Blue Teaming

A blue teaming security analysis is similar to red teaming; however, blue teams work hand-in-hand with the targeted system’s engineers to do a vulnerability assessment. As such, the blue team has access to resources and information that are unavailable to a red team (or what an attacker would see in the field) and results can usually be achieved faster and cheaper than red teaming.

The collaborative approach of a Blue Team risk assessment using Microsemi’s professional expertise, partnered with customer knowledge and resources, benefits the customer by conducting an in-depth risk analysis and identifying vulnerabilities that can be exploited in an application.

A blue team analysis includes a design and architecture documentation review, along with source code analysis. For the most complete security analysis, a blue teaming effort can be supplemented in parallel or prior to red teaming.

Deliverables to Customers:

1. A detailed report that includes a vulnerability assessment which outlines threats, vulnerabilities and attack scenarios. The report will also include methodology, key performance parameters, and risk mitigation tools and techniques that address all threat vectors.
2. An attack package containing all attack tools developed by the blue/red team, references to all open source or commercial attack tools used by the blue/red team and all versions of customer-exploited software.

Government Liaison for Anti-tamper (AT) Plan Development

A complete AT plan is created, as required by the DoD directives 5000.2 and 5200.39, and aligned with the DoD acquisition process.

Deliverables to Customers:
1. Initial AT plan – program initiation

Microsemi professionals will provide the following:

- a. Identify CPI/critical technology
- b. Identify threats
- c. Conduct vulnerability assessment
- d. Attack tree creation
- e. Assess impact of exploitation
- f. Develop exploitation prevention timeline

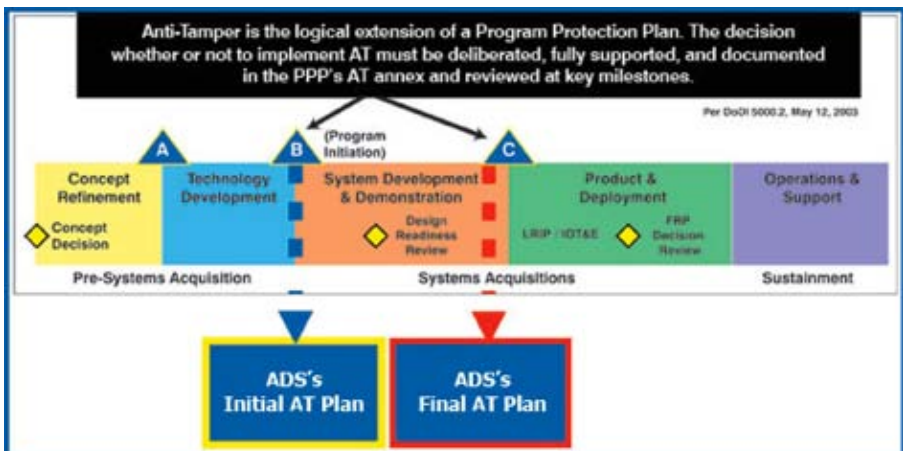
2. Final AT plan – prior to production and deployment

Microsemi professionals will:

- a. Identify optimal AT technologies
- b. Select potential solutions
- c. Conduct a decision analysis related to each AT solution
- d. Recommend an optimal final AT solution
- e. Verification and validation support

3. Verification plan – post development.

Microsemi professionals will work iteratively with DoD primes to complete the verification and validation process, organize CPI and finalize AT techniques.



Training

Microsemi provides training courses in the following areas:

1. Informational Overview: *Why AT?* An overview for government manager
2. Product Training: EnforcIT® – expert tool for automated protection of applications
3. Customized Training: Customized content for specific requirements defined by program management for on-time, on-budget delivery

Custom Solutions

We work with program managers and development teams to design customized protection that best leverages the characteristics of products, platforms and available hardware anti-tamper measures to build a robust protection network.

Examples include:

1. Design custom guards™ - guard development according to application-specific needs
2. Recommend best-of-breed solutions (hardware/software)
3. FPGA Anti-Tamper IP
4. System-on-chip (SoC) and application-specific integrated circuit (ASIC) support services
5. Advanced anti-tamper research and development
6. Turnkey protections – Microsemi protection engineers implement a custom protection plan for your application or system

Design a Product Protection Plan: EnforcIT

Microsemi's software protection arsenal, EnforcIT, intertwines physical and software layers to create best-of-breed protection in the overall product package.

Deliverables to Customers:

1. Turnkey services for end-to-end application protection
2. Customized, layered approach to create a solution that includes both software and hardware components
3. Complete plan development for creating a unique protection scheme
4. Advice on advanced protection-integration tools and technologies

MCP Design

Features:

- Customer defined SiP: design, assembly and test of processor, ASIC, gate array, PLD and memory-based multi-chip packages
- Customer defined ball count and pitch
- Multi-layer designs to 18 layers
- High via counts using ≤ 75 micron traces and spaces
- Internally developed test programs
- Flip chip attached, wire bond, SMT
- Interposer materials: Alumina (5-6)
- High-TCE (8-9) or laminate (14-18)
- 100% burn-in

Benefits:

- Incredible density enhancements over monolithic approach
- Gun hardening
- Quicker time to market than custom ASIC
- Reduced PCB layer count; reduced board I/O
- Controlled impedance, low inductance design
- Pb interconnect, wide pitch

Module & Hybrid Design

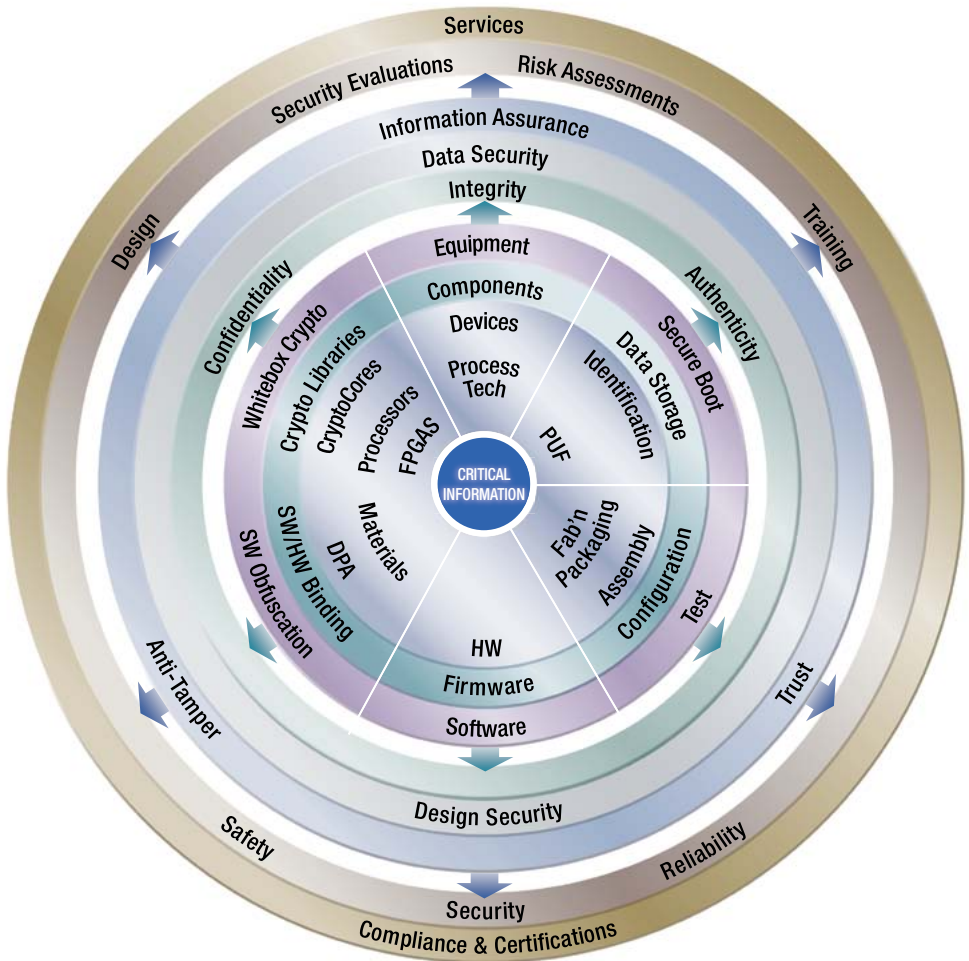
Microsemi has a history of custom hybrid design and manufacturing with over 30 years of custom capabilities.

With experience in defense, aerospace, space and industrial applications, we can assist customers in:

- Design and manufacture of products per requirements
- Build-to-print hybrid assembly services
- Custom packaging or modified characterizations to standard products
- A complete line of “standard” radiation hardened and tolerant power hybrids all submitted for DLA approval
- Point of Loads (POLs)
- Solid state relays
- Linear low drop out regulators
- Microsemi in-house qualified process and materials
- Thick film substrates
- Conductive silver epoxy die attach
- Non-conductive epoxy die attach
- Non-conductive sheet epoxy substrate attach
- SnPb element die attach
- AuSn substrate element attach
- InPb die attach to Au plated DBC-BeO
- AuSn element attach die to DBC-BeO
- Furnace reflow AuSn die attach to BeO-DBC
- AuSn element attach to thin film Au plated BeO
- 1.0 and 2.0 mil gold thermosonic bond
- 10 mil Al ultrasonic bond
- Parallel seam seal, lid
- Consistently meet challenges presented by high quality hybrid products
- AS9100 certified
- MIL PRF 38534 (Class H & K) certified
- Class 100K clean room (upgrading to Class 10K)
- Test and environmental screening
- Rack and stack test systems
- Testing over full temperature range
- VLSI digital testing
- Power semiconductor testing
- Element Evaluation
- MIL-STD-883 (conformance)
- Temperature cycle
- Constant acceleration
- Burn-in and Life test
- Leak test

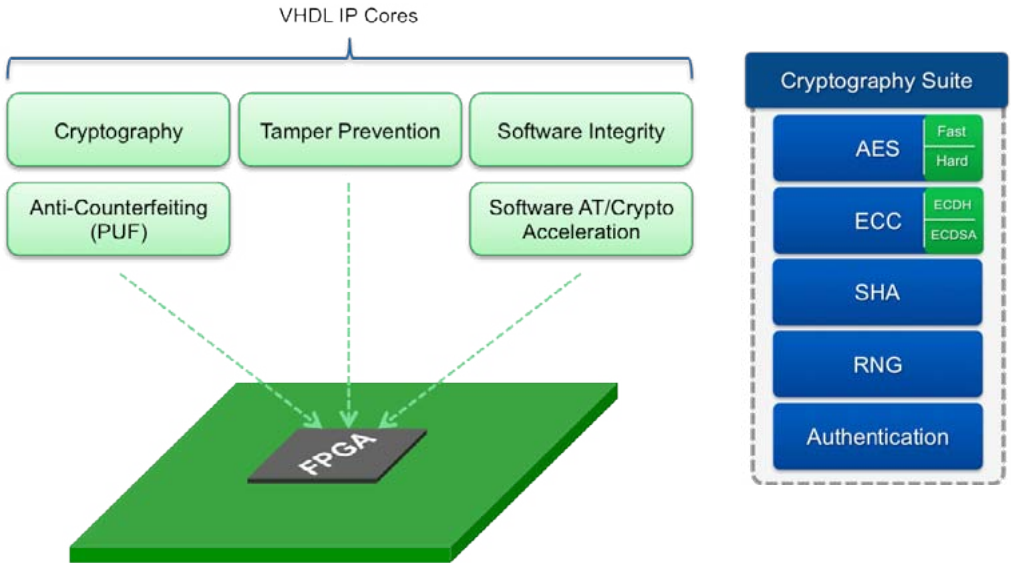


Microsemi provides uncompromising security wherever data is collected, communicated or processed, and whenever accuracy, availability and authenticity are essential. For more than 10 years, the company's security experts have been providing information assurance (IA) and anti-tamper (AT) cryptographic solutions and services to fortify critical program information and technology. Microsemi security products are used by U.S. federal organizations and commercial entities in applications requiring a high level of electronic security including financial, digital rights management, gaming, industrial automation and medical.



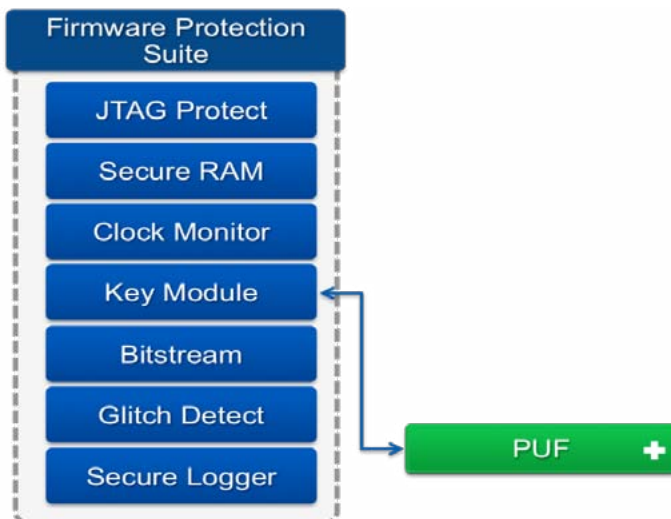
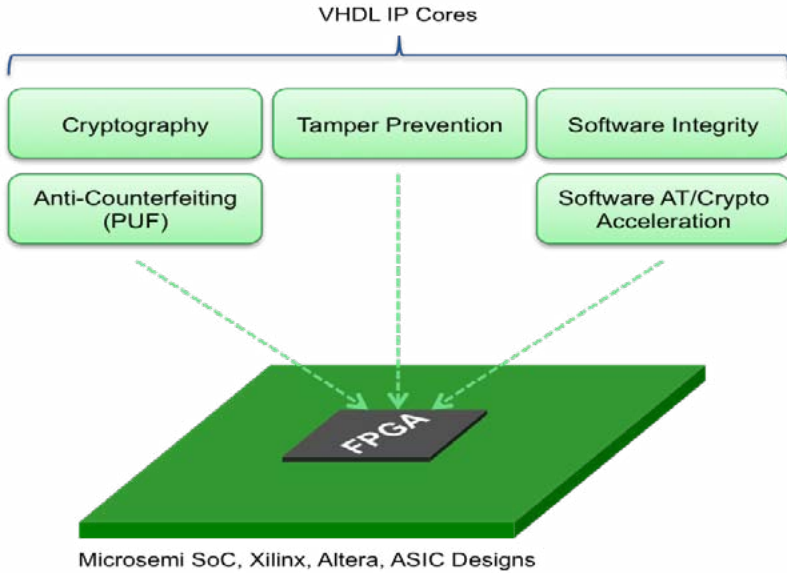
Microsemi's security solutions provide layers of protection ranging from components to subassemblies to services, protecting against reverse engineering, counterfeiting, side-channel analysis, code lifting and more.

EnforcIT is a customizable set of IP cores written in VHDL used to secure FPGAs and ASICs using information assurance principles and anti-tamper countermeasures. These countermeasures are inserted into an FPGA bitstream or ASIC design to provide protection customized to the systems' security and performance requirements. The EnforcIT Cryptography Suite is a selection of NSA Suite B, FIPS 140-2 certified cores used to implement cryptographic operations in FPGAs and ASICs. Users have access to AES, ECC, and secure hashing including SHA-1, SHA-2, and MD5. Additionally, a true random number generator is included to seed cryptography cores or to supply your own design with random data.



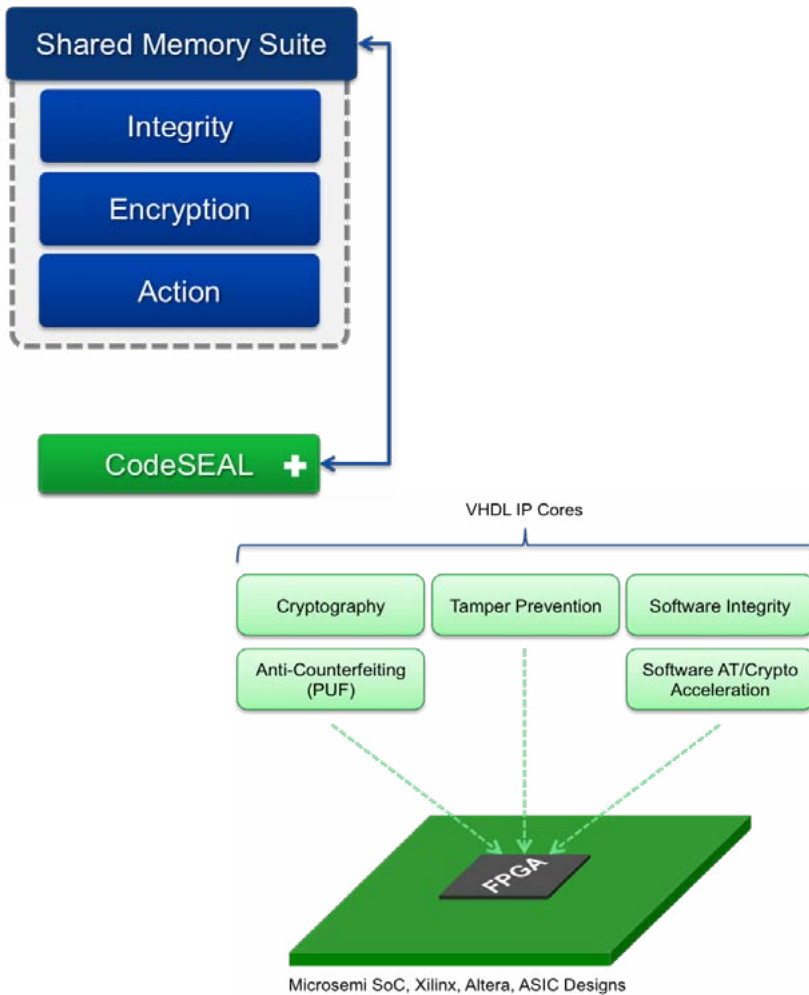
Microsemi SoC, Xilinx, Altera, ASIC Designs

EnforcIT is a customizable set of IP cores written in VHDL used to secure FPGAs and ASICs using information assurance principles and anti-tamper countermeasures. These countermeasures are inserted into an FPGA bitstream or ASIC design to provide protection customized to the systems' security and performance requirements. The EnforcIT Firmware Protection Suite is a selection of IP cores that allows an FPGA or ASIC design to protect against unauthorized debugging, ensure clock integrity, authenticate end-point nodes, boots devices securely, provide tamper responses, and utilize numerous other device security features to prevent both static and dynamic reverse engineering, tampering, and counterfeiting attacks.

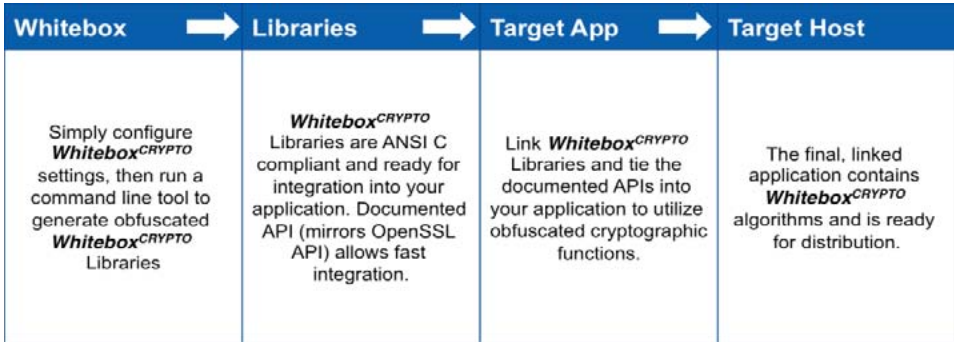


Shared Memory Protection Suite

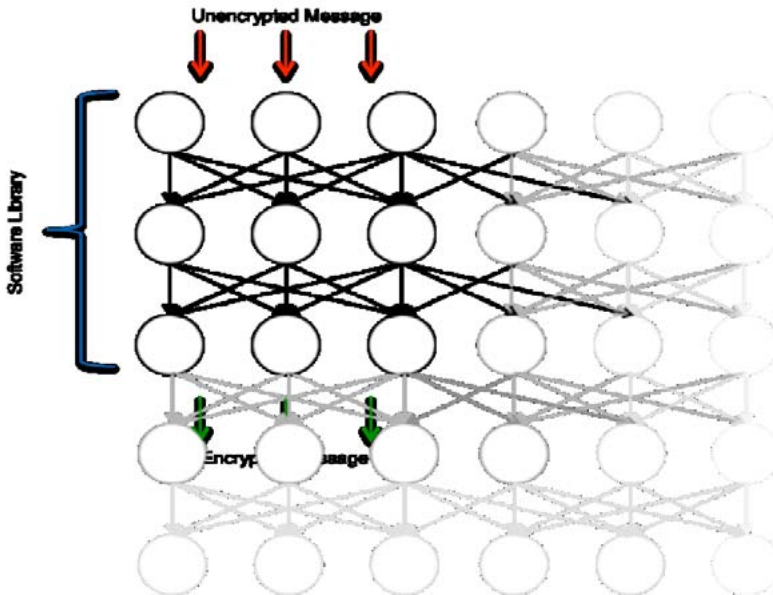
EnforclT is a customizable set of IP cores written in VHDL used to secure FPGAs and ASICs using information assurance principles and anti-tamper countermeasures. These countermeasures are inserted into an FPGA bitstream or ASIC design to provide protection customized to the systems' security and performance requirements. The EnforclT Shared Memory Protection Suite Integrates software and firmware anti-tamper mechanisms to protect critical technologies in shared memory. This suite combines Microsemi's CodeSEAL(TM) protection mechanisms with IP cores to create hardware-rooted security whereby a hardware device detects and reacts to software tampering, prevents static code analysis, and deters dynamic attacks in real-time. With the software protection offloaded onto an FPGA or ASIC, this Suite also acts as a software anti-tamper accelerator.



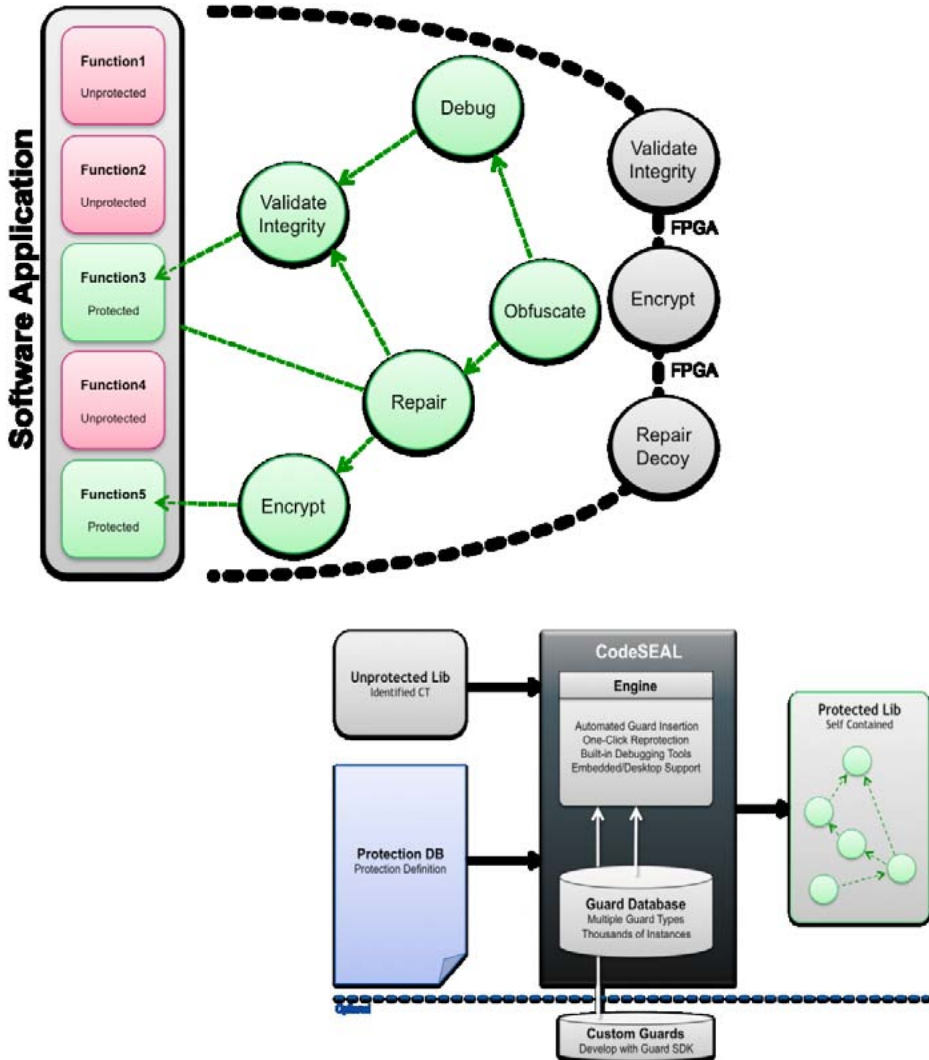
Keys used in software are easily identifiable in cryptographic routines using signature, pattern, and memory analysis. Microsemi's WhiteboxCRYPTO™ product combines mathematical algorithms, data, and code obfuscation techniques to transform a key and related crypto operations in complex ways. Hence, the key is never present in static or runtime memory. Rather, the key becomes useless without the uniquely generated whitebox algorithm that knows how to use that data to achieve the same output as the classical crypto counterpart. WhiteboxCRYPTO libraries support configurable key sizes for both RSA and AES and are fully compatible with any environment that can link C libraries and can integrate with the Java Cryptography Engine. To further prevent reverse engineering and tampering attacks on these libraries, you can fortify them with additional layers using EnforcIT and CodeSEAL.



Obfuscated Software Crypto



CodeSEAL™ enables security engineers to build robust anti-tamper (AT) protection schemes to protect critical technologies and intellectual property against reverse engineering, tampering, and counterfeiting by hostile entities. CodeSEAL takes a defense-in-depth approach to AT by inserting preventative, proactive, and reactive protection mechanisms into software applications with sensitive algorithms and data. These protection mechanisms form a dense network of mitigations against common software vulnerabilities and can bind software to hardware for a protection that cannot be defeated without hardware attack capabilities.



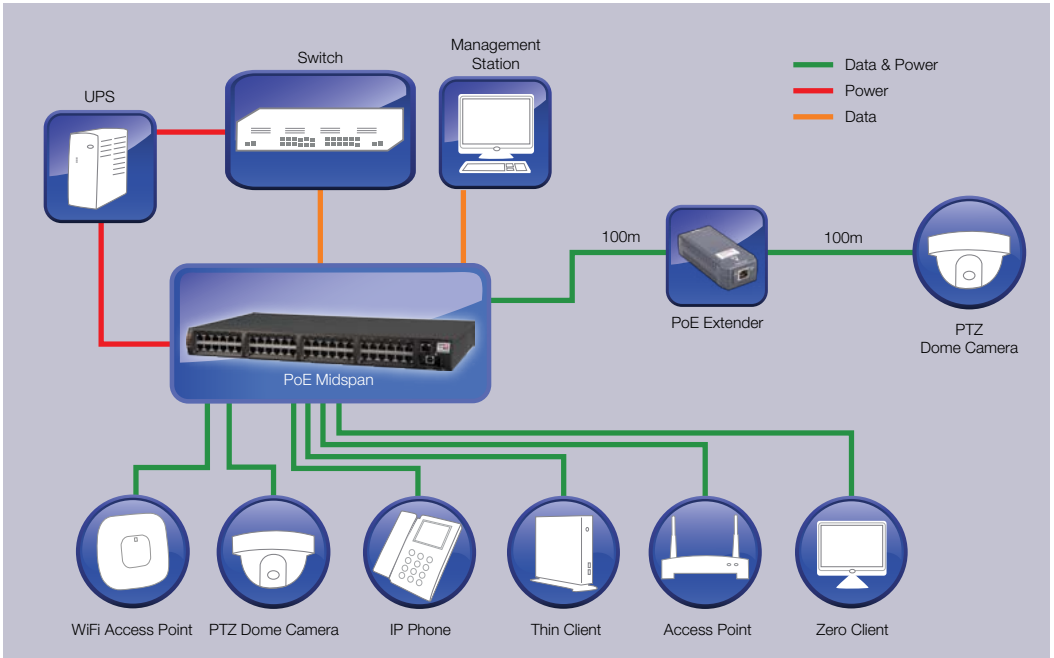
Host OS		Board	CPU		Target OS	Language	Compiler	
Windows	Linux	MVME 5100	PPC	x86	VxWorks	C/C++ Ada	Tornado GCC Workbench	
		MVME2604					Linux	Visual Studio
		MVME5500					Windows	GCC MaxAda Aonix PERC
		SBC8240						
		CW183						

CodeSEAL Total System Solution



Power over Ethernet Midspans

Part Number	Ports	Watts per Port	Remotely Managed	Input	Deployable Outdoors	Warranty
PD-3501G/AC	1	15.4W	–	AC	–	1-year
PD-3504G/AC	4	15.4W	–	AC	–	1-year
PD-3506G/AC	6	15.4W	–	AC	–	1-year
PD-3512G/AC	12	15.4W	–	AC	–	1-year
PD-3524G/AC	24	15.4W	–	AC	–	1-year
PD-3524G/AC/F	24	15.4W	–	AC	–	1-year
PD-6506G/AC/M	6	15.4W	x	AC	–	Limited Lifetime
PD-6512GAC/M	12	15.4W	x	AC	–	Limited Lifetime
PD-6524G/AC/M	24	15.4W	x	AC	–	Limited Lifetime
PD-6524G/AC/M/F	24	15.4W	x	AC	–	Limited Lifetime
PD-9001GR/AC	1	30W	–	AC	–	1-year
PD-9001G-40/SP/AC	1	30W	–	AC	–	1-year
PD-9004G/AC	4	30W	–	AC	–	1-year
PD-9006G/ACDC/M	6	30W	x	AC & DC	–	Limited Lifetime
PD-9012G/ACDC/M	12	30W	x	AC & DC	–	Limited Lifetime
PD-9024G/ACDC/M/F	24	30W	x	AC & DC	–	Limited Lifetime
PD-5524G/ACDC/M	24	30W	x	AC & DC	–	Limited Lifetime
PD-9501G/AC	1	60W	–	AC	–	1-year
PD-9506G/ACDC/M	6	60W	x	AC & DC	–	Limited Lifetime
PD-9512G/ACDC/M	12	60W	x	AC & DC	–	Limited Lifetime
PD-9524G/ACDC/M	24	60W	x	AC & DC	–	Limited Lifetime
PD-9601G/ACDC/M	1	95W	x	AC & DC	–	–
PD-9001GO/AC	1	30W	–	AC	x	1-year
PD-9501GO/AC	1	60W	–	AC	x	1-year
PD-9002GHO/AC	2	30W	–	AC	x	1-year



Microsemi PoE systems offer high-power environmentally aware choices for optimal powering through the life of your network as well as enable delivery of up to 90 watts of reliable, scalable power to IP cameras, WLAN access points, IP phones, and other Ethernet devices using PowerDsine PoE technology. By decoupling power from data networks, midspans streamline deployment, enhance upgrade flexibility and optimize power profiles for lowest total cost of ownership.

As well as being innovators of PoE systems, Microsemi is a thought leader in PoE technology and is a major source of the 802.3af, 802.3at and HDBaseT standards.

Available in a range of power levels and port configurations, there is a PoE system available for your next network upgrade — be it indoors or out.

Markets

- Government Agencies
- Asset protection
- Customs Border Protection
- High security Checkpoints

Solutions

All Clear® Touchless Pat-Down

All Clear is a handheld, image-free, battery-powered, passive millimeter wave people screening device that detects both metallic and non-metallic objects. All Clear is also an alternative to physical pat-downs by providing a high-level of object detection without making any contact with the person's body. All surfaces of a person can be scanned without contact—including the hair, top of head, chest, arms, sides, groin area, legs, and ankles. As it captures no images, All Clear alerts the operator to a potential detection through lights (LEDs), as well as sound or vibration, depending on the mode selected. It only requires one operator, minimal training, and is easy to use. With All Clear, security personnel can easily detect concealed items while protecting the safety and privacy of the people being screened.



GEN 2®

GEN 2 is the base technology for all Microsemi systems. This system enables security screeners to perform manual checks quickly and efficiently without physical contact. The GEN 2 alerts screeners to potential metallic and non-metallic concealed objects under clothing. It also has a small footprint and easily integrates with existing security measures.

*The image below shows accessories not included in the standard specifications.



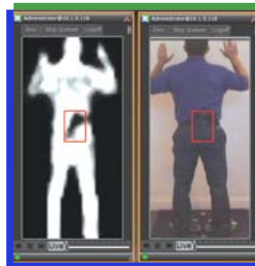
MobileScan®

MobileScan is a portable GEN 2 device that is designed for ease of transport. This system is completely self-contained, uses its own rechargeable power supply, and can be at operational readiness within minutes. The MobileScan is ideal for installations where transportable turnkey checkpoints are needed.



Why Microsemi's Security Scanners?

- Fast Throughput Screening
- Identifies Concealed Objects
- Safe and Emits NO Radiation
- Shows NO anatomical detail



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