Solar Solutions

Flex Diodes

Semiconductor Inverter Modules

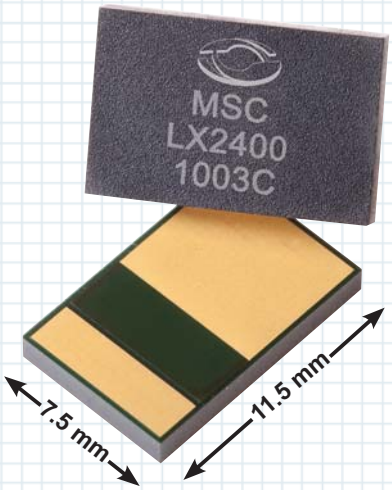
The IDEAL™ Solar Bypass Solution

Discrete Components

Microsemi®

LX2400™

The IDEAL™ Solar Bypass Solution

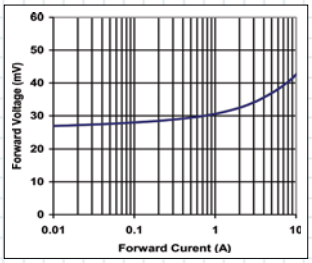


- **Negligible Heat Generation – CoolRUN™ Technology**
  - Less than 10°C rise at 10A
  - Future proof support for higher current modules
  - No need for Heat Sink
- **30 Year, High Reliability Design Rule Methodology**
  - Supports Long-life Warranties
  - Supports Steady State Current of 20A
  - Low Reverse Leakage
  - Bi-Directional Lightning Survivability per IEC
- **Extreme Environment Survivability**
  - Fully functional from -50°C to +150°C
  - Passes 1.4 Joule Lightning Tests
- **IEC61215, Section10.18 Compliant**

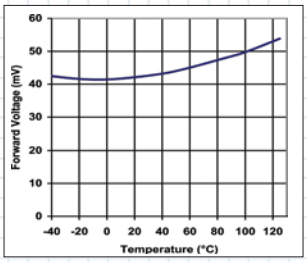
Forward Voltage: 50mV, 10A @90ºC typ.
Reverse Current: 100uA Leakage @ 90ºC

Typical Performance Curves for LX2400

FORWARD VOLTAGE

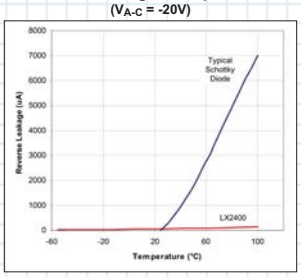


Vf@10A vs TEMPERATURE

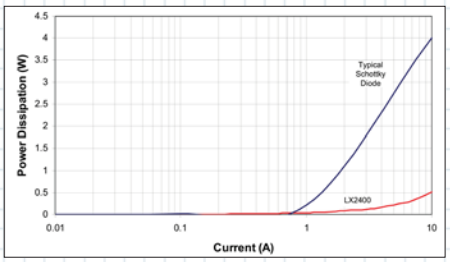


LX2400 COMPARISON TO TYPICAL SCHOTTKY DIODE

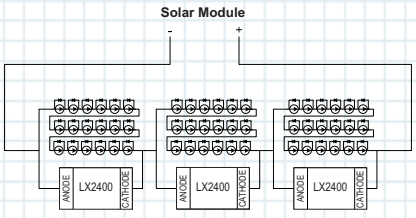
Reverse Leakage vs Temperature (V_{A-C} = -20V)



Power Dissipation vs. Current 100ºC Ambient



APPLICATION DRAWING



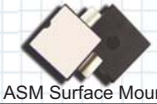
Additional Solar Bypass Diode Solutions

Consult your Microsemi representative for details on the full line of solar bypass solutions.

SAS1045L/LH

P6 Axial

SASMS1045L/LH



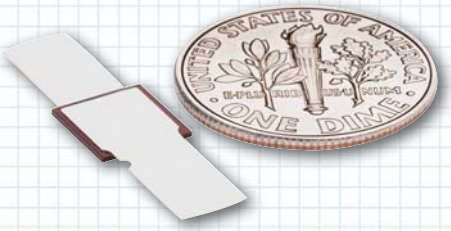
ASM Surface Mount

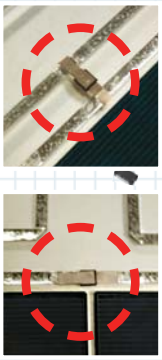
UPS1040e3

Powermite® 3 Surface Mount

World's Thinnest Solar Diodes

At only 0.74mm high, Microsemi's new Schottky barrier photovoltaic bypass diodes are the thinnest in the world. Designed specifically for solar panels, the new 10A diodes are packaged with unique flexible copper leads having satellite-proven reliability.





Only 0.74mm high !
Mounts under glass !

Key Product Specifications

	SFDS1045L	SFDS1045LH
I_O	10A	10A
V_{RRM}	45V	45V
$T_{j(MAX)}$	200ºC	200ºC
$V_{F(MAX)}$	0.41V	0.49V

RoHS Compliant
Halogen Free

- 0.74mm (29 mil) Thick
- 10A Solar By-pass Diode
- Weld or Solder Mount Under Glass Panel
- Eliminate Junction Box
- High Temperature Operation

Absolute Maximum Ratings*

Symbol	Parameter	Specification	
		SFDS1045L	SFDS1045LH
V_{RRM} V_{RWM} V_R	Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	45V	45V
$V_{R(RMS)}$	RMS Reverse Voltage	32V	32V
I_o	Average rectified forward output current (TC = 135ºC)	10A	10A
I_{FRM}	Peak repetitive forward current (100kHz square wave, TC = 135ºC)	2.0A	2.0A
I_{FSM}	Non repetitive peak forward surge current (8.3ms single half sine wave)	120A	120A
I_{RSM}	Non repetitive peak reverse surge current (100kHz square wave, TC = 135ºC)	2.0A	2.0A
T_{STG}	Storage temperature	-55 to +150ºC	-55 to +175ºC
$T_{J(R)}$	Junction temperature (reverse blocking)	-55 to +150ºC	-55 to +175ºC
$T_{J(F)}$	Junction temperature (Forward conducting)	-55 to +200ºC	-55 to +200ºC

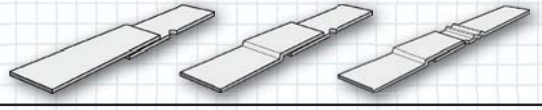
* All ratings at 25ºC unless specified otherwise

Static Electrical Characteristics

				SFDS1045L	SFDS1045LH
Symbol	Parameter	Test Conditions	Typ	Max	Max
VF(2)	Maximum forward voltage	T_J = 25ºC	I_F = 0.1 A I_F = 8.0 A I_F = 10.0 A	0.27V 0.42V 0.44V	0.33V 0.50V 0.52V
		T_J = 85ºC	I_F = 0.1 A I_F = 8.0 A I_F = 10.0 A	0.26V 0.39V 0.41V	0.30V 0.47V 0.49V
IR(2)	Maximum instantaneous reverse current	T_J = 25ºC	V_R = 45V	0.15 mA	0.50 µA

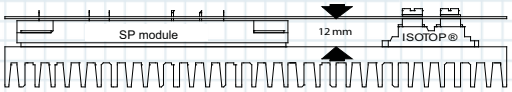
Stress Relief

Flex diodes are availble with several lead forms to provide varying levels of mechanical stress relief. Call for details.



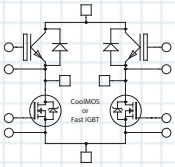
Low Profile Power Semiconductor Modules for Superior Inverter Efficiency

With 26 years experience in the power semiconductor module industry, Microsemi develops and manufactures semiconductor inverter modules with mix-and-match components and assembly materials to offer the best combination of cost, size, performance and reliability. Microsemi also offers a complete range of input and output diode bridge modules (Recovery diodes, FRED and SiC diodes), Boost and Buck Choppers and resonant inverter topologies in the same low profile packages.



Most low profile modules are height compatible with SOT-227 packages.

FULL BRIDGE



V_{CES} (V)	Technology	I_C (A) T_C=80° C	$V_{CE\ (on)}$ (V) at rated Ic	Package	NTC	Part Number
600	DC/AC Inverter (NPT/Trench IGBT)	30	2.1/1.5	SP3	YES	APTGV30H60T3G
		50	2.1/1.5	SP3	YES	APTGV50H60T3G
		75	2.1/1.5	SP3	YES	APTGV75H60T3G
		100	2.1/1.5	SP3	YES	APTGV100H60T3G
	DC/AC Inverter (CoolMOS/Trench IGBT)	50	83mR/1.5	SP1	YES	APTCV40H60CT1G
		50	45mR/1.5	SP3	YES	APTCV50H60T3G
1200	DC/AC Inverter (NPT/Trench IGBT)	15	3.2/1.7	SP3	YES	APTGV15H120T3G
		25	3.2/1.7	SP3	YES	APTGV25H120T3G
		50	3.2/1.7	SP3	YES	APTGV50H120T3G

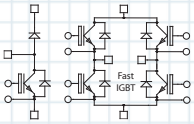
SP1

- Replaces 2 SOT-227 parts
- Height compatible with SOT-227
- Copper base plate

SP3

- Replaces up to 4 SOT-227 parts
- Height compatible with SOT-227
- Copper base plate

BOOST CHOPPER + FULL BRIDGE

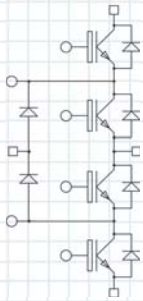


V_{CES} (V)	Technology	I_C (A) T_C=80° C	$V_{CE\ (on)}$ (V) at rated Ic	Package	NTC	Part Number
600	DC/AC Inverter (NPT/Trench IGBT)	50	2.1/1.5	SP4	-	APTGV50H60BG
		100	2.1/1.5	SP6-P	YES	APTGV100H60BTPG
1200	DC/AC Inverter (NPT/Trench IGBT)	25	3.2/1.7	SP4	-	APTGV25H120BG
		50	3.2/1.7	SP6-P	YES	APTGV50H120BTPG

SP4

- 17mm height
- Plastic posts ease mounting to pcb
- Low inductance solder pins
- Replaces up to 5 SOT-227 parts

THREE LEVEL INVERTER

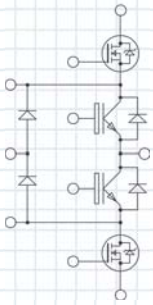


V_{CES} (V)	Technology	I_C (A) T_C=80° C	$V_{CE\ (on)}$ (V) at rated Ic	Package	NTC	Part Number
600	TRENCH	20	1.5	SP3	YES	APTGT20TL60T3G
		20	1.5	SP1	-	APTGT20TL601G
		30	1.5	SP3	YES	APTGT30TL60T3G
		30	1.5	SP1	-	APTGT30TL601G
		50	1.5	SP3	YES	APTGT50TL60T3G
		50	1.5	SP1	-	APTGT50TL601G
		75	1.5	SP3	YES	APTGT75TL60T3G
		100	1.5	SP3	YES	APTGT100TL60T3G
		150	1.5	SP6	-	APTGT150TL60G
		200	1.5	SP6	-	APTGT200TL60G
		300	1.5	SP6	-	APTGT300TL60G
	NPT fast	30	2.1	SP3	YES	APTGF30TL60T3G
		30	2.1	SP1	-	APTGF30TL601G
		50	2.1	SP3	YES	APTGF50TL60T3G
1200	TRENCH 4	60	1.85	SP3	YES	APTGL60TL120T3G

SP6

Same footprint and pinout location as 62mm package. Lower height for:

- Reduced stray inductance
- Reduced parasitic resistance
- Higher efficiency at high frequency



V_{CES} (V)	Technology	$R_{DS(ON)}$ COOLMOS (mΩ)	$V_{CE(on)}$ IGBT (V) / I_C (A)	Package	NTC	Part Number
600	Mix Coolmos/Trench IGBT	24	1.5/75	SP3	YES	APTCV60TLM24T3G
		45	1.5/75	SP3	YES	APTCV60TLM45T3G
		70	1.5/50	SP3	YES	APTCV60TLM70T3G
		99	1.5/30	SP3	YES	APTCV60TLM99T3G
		99	1.5/30	SP1	-	APTCV60TLM991G
900	Mix Coolmos/Trench IGBT	120	1.85/50	SP3	YES	APTCV90TL12T3G

SP6-P

- Replaces up to 6 SOT-227 parts
- Height compatible with SOT-227
- Low inductance solder pins
- High current capability

Discrete Solutions for Solar Inverters and Panel Test Equipment

New High Performance Family of CoolMOS® C6 Products

Designated the C6 Series, this family supersedes the previous C3 generation of MOSFETs. The new 600V CoolMOS devices feature fifth-generation high voltage superjunction technology for extremely low conduction and switching losses, thus enabling the design of switching systems having new levels of efficiency and power density. This is the latest series of MOSFETs designed to increase switching speed and reduce on-resistance.

The new C6 Series MOSFETs are easy to design in, more compact, lighter and cooler. They are well suited for high power, high performance switch mode applications that include power factor correction, server and telecom power systems, solar inverters, arc welding, plasma cutting, battery chargers, medical, semiconductor capital equipment and induction heating.

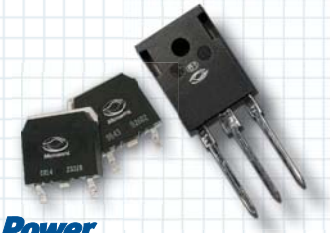
For information on the full line of Microsemi CoolMOS parts, including the new C6 Series, visit our website: www.microsemi.com

Sample Part	Device	$BV_{(DSS)}$ (V)	I_D (A) 25ºC	$R_{ds(on)}$ Ω	Package
APT106N60B2C6	MOSFET	600	106	0.035	T-Max®

Low Saturation Voltage (V_{sat}) MOS8 IGBT

The new MOS8 IGBT has been optimized for lower frequency operation (10KHz — 30KHz) where conduction loss dominates overall system losses. Target end applications include solar inverters, high performance SMPS, and industrial equipment such as welders, battery chargers, and induction heating equipment.

Microsemi's Power MOS8™ PT IGBT portfolio already provides low conduction loss options at 2.0 volts ($600V_{BR(CES)}$) and 2.5 volts ($900V_{BR(CES)}$). The new APT44GA60BD30C reduces this to 1.5 volts, enabling further increases in overall system efficiency for 600V designs. Input is rated at 44amps, with 38A maximums recommended at 10KHz and 27A at 30KHz. It also incorporates Microsemi's ultra fast reverse recovery DQ diode as an anti-parallel free wheeling diode.



Part Number	Device	$BV_{(CES)}$ (V)	I_{C2} (A) 100ºC	V_{sat} (V)	Package
APT44GA60BD30C	IGBT	600	44	1.5	TO-247
APT44GA60BS30C	IGBT	600	44	1.5	TO-268

Optimal Efficiency and Operation

- Low cost
- Simple gate drive Circuitry
- Fast Switching
- Ultra Fast Recover Combi Diode for ZVS topologies

For Information and Application Assistance

LX2400™ IDEAL™ Solar Bypass Solution

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