

Power Semiconductors

Power Modules

RF Power MOSFETs

About Microsemi

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense & security, aerospace and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services.

Microsemi is headquartered in Aliso Viejo, Calif., and has approximately 3,400 employees globally. Learn more at: www.microsemi.com.

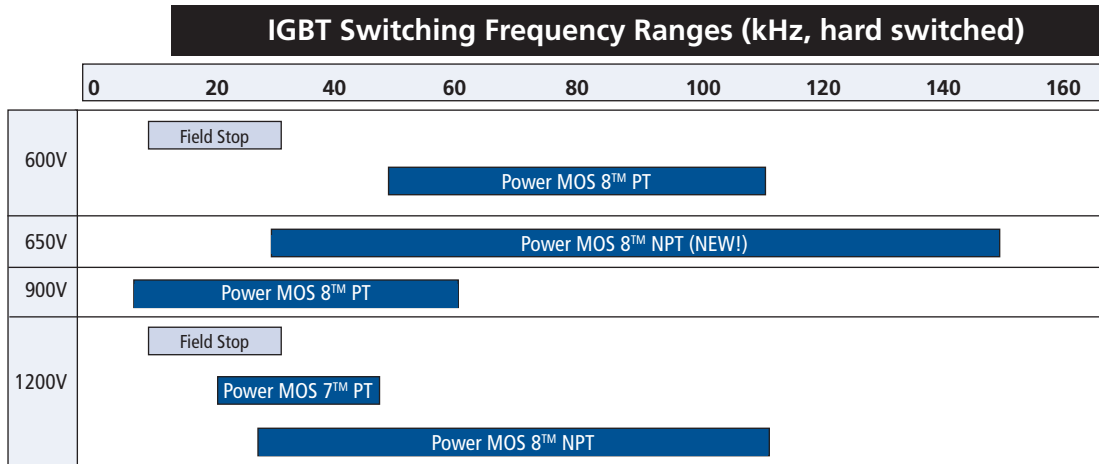
CONTENTS

| | Page No. |
|---|----------|
| HIGH VOLTAGE SMPS TRANSISTORS | |
| IGBTs (Insulated Gate Bipolar Transistors)..... | 3-5 |
| SiC and Power MOS 8™ MOSFETs / FREDFETs | 6-8 |
| Ultra-Fast Low Gate Charge MOSFETs | 9 |
| CoolMOS™ MOSFETs | 10 |
| High Voltage Linear MOSFETs | 10 |
| DIODES | |
| SiC Schottky and Ultra Fast Recovery Diodes | 11-13 |
| HIGH VOLTAGE RF MOSFETS | 14 |
| HIGH FREQUENCY RF MOSFETS | 14 |
| DRIVER-RF MOSFET HYBRIDS | 15 |
| REFERENCE DESIGN KITS | 15 |
| POWER MODULES | |
| Contents..... | 16 |
| Electrical Configuration | 17 |
| Packaging..... | 18 |
| Know How and Capabilities | 19-20 |
| Part Numbering System | 21 |
| IGBTs (Insulated Gate Bipolar Transistors) | 22-26 |
| MOSFETs | 27-31 |
| Renewable Energy Power Modules | 31-32 |
| SiC Power Modules..... | 33-35 |
| Diodes and Rectifiers | 36-38 |
| PACKAGE OUTLINE DRAWINGS | 39-43 |

Insulated Gate Bipolar Transistors (IGBTs)

IGBTs from Microsemi

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 150kHz 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.



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

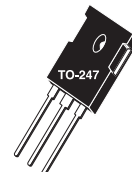
| Standard Series | Voltage Ratings (V) | Technology | Easy to Parallel | Short Circuit SOA | Comment |
|------------------------|---------------------|------------|------------------|-------------------|------------------------|
| MOS 7 TM | 1200 | PT | | | Ultra-low gate charge |
| MOS 8 TM | 600, 650, 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.

Insulated Gate Bipolar Transistors (IGBTs)

| | BV _{CES} Volts | V _{CE(ON)} Typ 25°C | I _{C2} 100°C | Maximum I _C at Frequency | | Part Number | Package Style | | |
|---|-------------------------------------|---------------------------------|--------------------------|--|--------------------------|---------------------------------|--------------------------|--------------------------|--------------------------|
| | | | | 50 kHz | 80 kHz | | | | |
| POWER MOS 8™ <ul style="list-style-type: none"> • NPT Technology • High Speed Switching • Low Switching Losses • Easy to Parallel | SINGLE | 2.5 | 25 | 50 kHz | 80 kHz | | | | |
| | | | | 1200 | 25 | 21 | APT25GR120B | TO-247 | |
| | | | | | 25 | 21 | APT25GR120S | D ³ | |
| | | | | | 40 | 28 | APT40GR120B | TO-247 | |
| | | | | | 40 | 28 | APT40GR120S | D ³ | |
| | | | | | 50 | 36 | APT50GR120B2 | T-MAX® | |
| | | | | | 50 | 36 | APT50GR120L | TO-264 | |
| | | | | | 25 kHz | 50 kHz | | | |
| | | | | | 66 | 42 | APT70GR120B2 | T-MAX® | |
| | | | | | 66 | 42 | APT70GR120L | TO-264 | |
| | 70* | 30 | APT70GR120J | | ISOTOP® | | | | |
| | 85 | 46 | APT85GR120B2 | T-MAX® | | | | | |
| | 85 | 46 | APT85GR120L | TO-264 | | | | | |
| | 85* | 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 | D ³ (DQ) | | |
| | | 2.5 | 25 | 25 | 21 | APT25GR120BSCD10 | TO-247 (SiC SBD) | | |
| | | 2.5 | 25 | 25 | 21 | APT25GR120SSCD10 | D ³ (SiC SBD) | | |
| | | 40 | 38 | 28 | 28 | APT40GR120B2D30 | T-MAX® (DQ) | | |
| 40 | | 38 | 28 | 28 | APT40GR120B2SCD10 | T-MAX® (SiC SBD) | | | |
| 25 kHz | | 50 kHz | | | | | | | |
| 50* | | 42 | 32 | 32 | APT50GR120JD30 | ISOTOP® (DQ) | | | |
| 70* | | 42 | 30 | 30 | APT70GR120JD60 | ISOTOP® (DQ) | | | |
| 85* | | 46 | 31 | 31 | APT85GR120JD60 | ISOTOP® (DQ) | | | |
| New! 650V | 650 | 1.9 | 45 | 150 kHz | 200 kHz | | | | |
| | | | | 31 | 25 | APT45GR65B | TO-247 | | |
| | | | | 100 kHz | 150 kHz | | | | |
| | | | | 52 | 39 | APT70GR65B | TO-247 | | |
| | 650 | 1.9 | 95 | 50 kHz | 100 kHz | | | | |
| | | | | | | 69 | 41 | APT95GR65B2 | T-MAX® |
| | | | | | | Combi (IGBT & Diode) | | | |
| | | | | | | 150 kHz | 200 kHz | | |
| | 650 | 1.9 | 45 | 31 | 25 | APT45GR65BSCD10 | TO-247 (SiC Diode) | | |
| | | | | | | 100 kHz | 150 kHz | | |
| | | | | | | 30 | 18 | APT45GR65B2DU30 | T-MAX® (DU Diode) |
| | | | | | | 52 | 39 | APT70GR65B2SCD30 | T-MAX® (SiC Diode) |
| | | | | | | 50 kHz | 100 kHz | | |
| | | | | | | 59 | 38 | APT70GR65B2DU40 | T-MAX® (DU Diode) |
| 650 | 1.9 | 95 | 40 kHz | 80 kHz | | | | | |
| | | | 50 | 35 | APT95GR65JDU60 | ISOTOP® (DU Diode) | | | |
| POWER MOS 8™ <ul style="list-style-type: none"> • PT Technology • Fast Switching • Highest Efficiency • Combi with High Speed DQ Diode | SINGLE | 2.0 | 36 | 50 kHz | 80 kHz | | | | |
| | | | | 600 | 21 | 17 | APT36GA60B | TO-247 or D ³ | |
| | | | | | 26 | 20 | APT44GA60B | TO-247 or D ³ | |
| | | | | | 30 | 23 | APT54GA60B | TO-247 or D ³ | |
| | | | | | 35 | 27 | APT68GA60B | TO-247 or D ³ | |
| | | | | | 40 | 31 | APT80GA60B | TO-247 or D ³ | |
| | | | | | 51 | 39 | APT102GA60B2 | T-MAX® or TO-264 | |
| | | | | | 25 kHz | 50 kHz | | | |
| | | | | | 17 | 10 | APT35GA90B | TO-247 or D ³ | |
| | | | | | 21 | 13 | APT43GA90B | TO-247 or D ³ | |
| | 29 | 19 | APT64GA90B | | TO-247 or D ³ | | | | |
| | 34 | 23 | APT80GA90B | TO-247 or D ³ | | | | | |
| | Combi (IGBT & "DQ" FRED) | | | | 50 kHz | 80 kHz | | | |
| | 600 | 2.0 | 36 | 21 | 17 | APT36GA60BD15 | TO-247 or D ³ | | |
| | | | | | | 26 | 20 | APT44GA60BD30 | TO-247 or D ³ |
| | | | | | | 30 | 23 | APT54GA60BD30 | TO-247 or D ³ |
| | | | | | | 48 | 36 | APT60GA60JD60 | ISOTOP® |
| | | | | | | 35 | 27 | APT68GA60B2D40 | T-MAX® or TO-264 |
| | | | | | | 40 | 31 | APT80GA60LD40 | TO-264 |
| | 900 | 2.5 | 27 | 14 | 8 | APT27GA90BD15 | TO-247 or D ³ | | |
| 17 | | | | | | 10 | APT35GA90BD15 | TO-247 or D ³ | |
| 21 | | | | | | 13 | APT43GA90BD30 | TO-247 or D ³ | |
| 33 | | | | | | 21 | APT46GA90JD40 | ISOTOP® | |
| 29 | | | | | | 19 | APT64GA90B2D30 | T-MAX® or TO-264 | |
| 34 | | | | | | 23 | APT80GA90LD40 | TO-264 | |
| Current @ Frequency Test Conditions: T _j = 125°C, T _c = 100°C except Isotop® where T _c = 80°C, V _{cc} = 67% rated voltage Hard Switch <small>* I_{c2} for ISOTOP® packages measured at 70°C for 1200V NPT IGBTs</small> | | | | | | | | | |



TO-247[B]

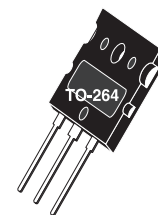


D³ PAK[S]

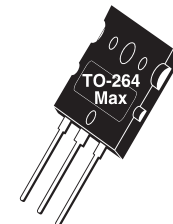
Part Numbers for D³ packages - replace "B" with "S" in part number



T-MAX®[B2]



TO-264[L]



264-MAX™[L2]

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



ISOTOP®[J]
SOT-227



Insulated Gate Bipolar Transistors (IGBTs)

FIELD STOP

- Trench Technology
- Short Circuit Rated
- Lowest Conduction Loss
- Easy Paralleling
- Combi with High Speed DQ Diode

| BV _{CES} Volts | V _{CE(ON)} Typ 25°C | I _{C2} 100°C | Maximum I _C at Frequency | | Part Number | Package Style |
|-------------------------------------|---------------------------------|-----------------------------|--|--------|------------------|--------------------------|
| | | | 15 kHz | 30 kHz | | |
| SINGLE | | | | | | |
| 600 | 1.5 | 24 | 15 | 10 | APT20GN60BG | TO-247 |
| | | 37 | 20 | 14 | APT30GN60BG | TO-247 |
| | | 64 | 30 | 21 | APT50GN60BG | TO-247 |
| | | 93 | 42 | 30 | APT75GN60BG | TO-247 |
| | | 123 | 75 | 47 | APT150GN60J | ISOTOP® |
| | | 135 | 54 | 39 | APT100GN60B2G | T-MAX® |
| | | 190 | 79 | 57 | APT150GN60B2G | T-MAX® |
| | | 230 | 103 | 75 | APT200GN60B2G | T-MAX® |
| 1200 | 1.5 | 158 | 100 | 66 | APT200GN60J | ISOTOP® |
| | | 10 kHz 20 kHz | | | | |
| | | 33 | 19 | 13 | APT25GN120BG | TO-247 or D ³ |
| | | 46 | 24 | 17 | APT35GN120BG | TO-247 |
| | | 66 | 32 | 22 | APT50GN120B2G | T-MAX® |
| | | 70 | 44 | 27 | APT100GN120J | ISOTOP® |
| | | 99 | 45 | 30 | APT75GN120B2G | T-MAX® or TO-264 |
| | | 120 | 58 | 38 | APT100GN120B2G | T-MAX® |
| 600 | 1.5 | 24 | 15 | 10 | APT20GN60BDQ1G | TO-247 |
| | | 37 | 20 | 14 | APT30GN60BDQ2G | TO-247 |
| | | 64 | 30 | 21 | APT50GN60BDQ2G | TO-247 |
| | | 93 | 42 | 30 | APT75GN60LDQ3G | TO-264 |
| | | 123 | 75 | 47 | APT150GN60JDQ4 | ISOTOP® |
| | | 135 | 54 | 39 | APT100GN60LDQ4G | TO-264 |
| | | 190 | 79 | 57 | APT150GN60LDQ4G | TO-264 |
| | | 158 | 100 | 66 | APT200GN60JDQ4 | ISOTOP® |
| 1200 | 1.7 | 10 kHz 20 kHz | | | | |
| | | 22 | 14 | 10 | APT15GN120BDQ1G | TO-247 or D ³ |
| | | 33 | 19 | 13 | APT25GN120B2DQ2G | T-MAX® |
| | | 46 | 24 | 17 | APT35GN120L2DQ2G | 264-MAX™ |
| | | 57 | 36 | 22 | APT75GN120JDQ3 | ISOTOP® |
| | | 66 | 32 | 22 | APT50GN120L2DQ2G | 264-MAX™ |
| | | 70 | 44 | 27 | APT100GN120JDQ4 | ISOTOP® |
| | | 99 | 60 | 36 | APT150GN120JDQ4 | ISOTOP® |
| SINGLE | | | | | | |
| 1200 | 3.3 | 33 | 19 | 12 | APT25GP120BG | TO-247 |
| | | 46 | 24 | 15 | APT35GP120BG | TO-247 |
| | | 54 | 29 | 18 | APT45GP120BG | TO-247 |
| | | 34 | 28 | 18 | APT45GP120J | ISOTOP |
| | | 91 | 42 | 24 | APT75GP120B2G | T-MAX® |
| | | 57 | 40 | 23 | APT75GP120J | ISOTOP |
| Combi (IGBT & "DQ" FRED) | | | | | | |
| 1200 | 3.3 | 20 | 11 | 7 | APT13GP120BDQ1G | TO-247 |
| | | 33 | 19 | 12 | APT25GP120BDQ1G | TO-247 |
| | | 46 | 24 | 15 | APT35GP120B2DQ2G | T-MAX® |
| | | 54 | 29 | 18 | APT45GP120B2DQ2G | T-MAX® |
| | | 34 | 28 | 18 | APT45GP120JDQ2 | ISOTOP |
| | | 57 | 40 | 23 | APT75GP120JDQ3 | ISOTOP |

Power MOS 7® and IGBT

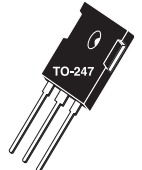
- PT Technology
- Ultra-low Gate Charge
- Combi with High Speed DQ Diode



TO-220[K]



D³ PAK[S]

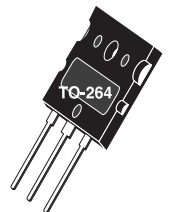


TO-247[B]

Part Numbers for D³ packages - replace "B" with "S" in part number



T-MAX®[B2]

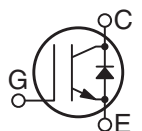


TO-264[L]

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




ISOTOP®[J]
SOT-227



Current @ Frequency Test Conditions: T_j = 125°C, T_c = 100°C except Isotop® where T_c = 80°C, V_{cc} = 67% rated voltage Hard Switch

SiC Silicon Carbide MOSFETs

| BVDSS VOLTS | RDS(ON) OHMS | ID(CONT) AMPS | PART NUMBER | PACKAGE STYLE |
|--|--------------|---------------|-------------|---------------|
|  1200 | 0.080 | 40 | APT40SM120B | TO-247 |
| | 0.080 | 40 | APT40SM120J | ISOTOP® |
| | 0.050 | 50 | APT50SM120B | TO-247 |
| | 0.050 | 50 | APT50SM120J | ISOTOP® |



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:



- 1) **MOSFET**
- 2) **FREDFETs** have a fast recovery body diode characteristic, providing high commutation dv/dt ruggedness and high reliability in ZVS circuits.

Features

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

Applications

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

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

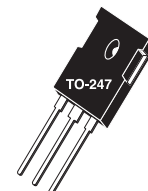
As with previous generation products, Power MOS 8™ MOSFETs and FREDFETs are available in all voltage ratings. A FREDFET is a MOSFET with a faster recovery intrinsic body diode. This results in improved reliability in ZVS circuits due to shorter minority carrier lifetime and increased commutation dv/dt 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 D ³ |
| | 2.10 | 8 | APT7M120B | | | TO-247 |
| | 1.20 | | | 14 | APT13F120B | TO-247 or D ³ |
| | 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 D ³ |
| | 1.40 | 9 | APT9M100B | | | TO-247 |
| | 0.98 | | | 14 | APT14F100B | TO-247 or D ³ |
| | 0.88 | 14 | APT14M100B | | | TO-247 or D ³ |
| | 0.78 | | | 17 | APT17F100B | TO-247 or D ³ |
| | 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 D ³ |
| | 0.80 | 13 | APT12M80B | | | TO-247 |
| | 0.58 | | | 18 | APT17F80B | TO-247 or D ³ |
| | 0.53 | 19 | APT18M80B | | | TO-247 or D ³ |
| | 0.43 | | | 23 | APT22F80B | TO-247 or D ³ |
| | 0.39 | 25 | APT24M80B | | | TO-247 or D ³ |
| | 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® |



TO-220[K]



TO-247[B]

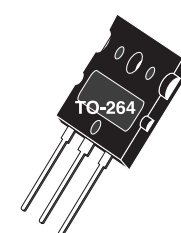


D³ PAK[S]

Part Numbers for D³ packages - replace "B" with "S" in part number



T-MAX®[B2]



TO-264[L]

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



ISOTOP®[J]
SOT-227
(ISOLATED BASE)

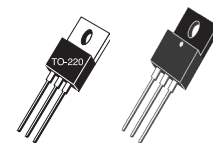
Power MOS 8™ MOSFETs / FREDFETs

| BV _(DSS) Volts | R _{DS(ON)} Max | I _D | MOSFET Part # | I _D | FREDFET Part # | Package Style |
|------------------------------|----------------------------|----------------|------------------|----------------|-------------------|--------------------------|
| 600 | 0.62 | | | 12 | APT12F60K | TO-220 |
| | 0.43 | | | 16 | APT15F60B | TO-247 or D ³ |
| | 0.37 | | | 19 | APT18F60B | TO-247 or D ³ |
| | 0.29 | | | 24 | APT23F60B | TO-247 or D ³ |
| | 0.22 | | | 30 | APT28F60B | TO-247 or D ³ |
| | 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 D ³ |
| | 0.24 | | | 24 | APT24F50B | TO-247 or D ³ |
| | 0.19 | | | 30 | APT30F50B | TO-247 or D ³ |
| | 0.15 | | | 37 | APT37F50B | TO-247 or D ³ |
| | 0.13 | | | 43 | APT42F50B | TO-247 or D ³ |
| | 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® |

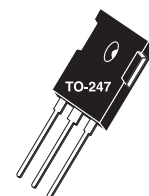
* Available on APT15F50K

Low Voltage Power MOS V® MOSFETs / FREDFETs

| | | | | | | |
|-----|-------|-----|----------------|-----|----------------|---------------------------------|
| 300 | 0.085 | 40 | APT30M85BVVRG | 40 | APT30M85BVFRG | TO-247 |
| | 0.070 | 48 | APT30M70BVVRG | 48 | APT30M70BVFRG | TO-247 or D ³ |
| | 0.040 | 70 | APT30M40JVVRG | 70 | APT30M40JVFRG | ISOTOP® |
| | 0.019 | 130 | APT30M19JVVR | 130 | APT30M19JVFR | ISOTOP® |
| 200 | 0.045 | 56 | APT20M45BVVRG | 56 | APT20M45BVFRG | TO-247 |
| | 0.038 | 67 | APT20M38BVVRG | 37 | APT20M38BVFRG | TO-247 or D ³ or T/R |
| | 0.022 | 100 | APT20M22B2VVRG | 100 | APT20M22B2VFRG | T-MAX® or TO-264 |
| | 0.011 | 175 | APT20M11JVVR | 175 | APT20M11JVFR | ISOTOP® |



TO-220[K] or TO-220[KF]*

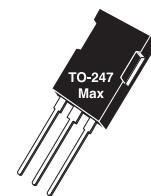


TO-247[B]

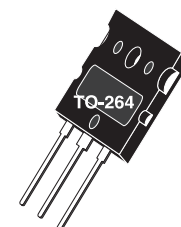


D³ PAK[S]

Part Numbers for D³ packages
- replace "B" with "S" in part
number



T-MAX®[B2]



TO-264[L]

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



ISOTOP®[J]
SOT-227
(ISOLATED BASE)

Ultrafast, Low Gate Charge MOSFETs

FOR 250 kHz - 2 MHz SWITCHING APPLICATIONS

The Ultrafast, Low Gate Charge MOSFET family combines the lowest gate charge available in the industry with Microsemi's proprietary self-aligned aluminum metal gate structure. The result is a MOSFET capable of extremely fast switching speeds and very low switching losses. The metal gate structure and the layout of these chips provide an internal series gate resistance (EGR) an order of magnitude lower than competitive devices built with a polysilicon gate.

These devices are ideally suited for high frequency and pulsed high voltage applications.

Typical Applications:

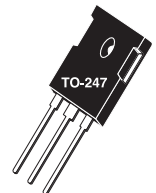
- Class D amplifiers up to 2 MHz
- High voltage pulsed DC
- AM transmitters
- Plasma deposition/etch

| FEATURES: | BENEFITS: |
|---|--|
| <ul style="list-style-type: none"> • Series Gate Resistance (Rg) <0.1 ohm | <ul style="list-style-type: none"> • Fast switching, uniform signal propagation |
| <ul style="list-style-type: none"> • Tr and Tf times of <10ns | <ul style="list-style-type: none"> • Pulse power applications |
| <ul style="list-style-type: none"> • Industry's Lowest Gate Charge | <ul style="list-style-type: none"> • Fast switching, reduced gate drive power |

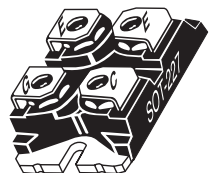
| BV _(DSS) Volts | R _{DS(ON)} Max | I _D | MOSFET Part # | FREDFET Part # | Package Style |
|------------------------------|----------------------------|----------------|---------------|----------------|----------------------------------|
| 1200 | 4.700 | 3.5 | | APT1204R7KFLG | TO-220 |
| | 4.700 | 3.5 | | APT1204R7BFLG | TO-247 or D ³ |
| | 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 D ³ |
| | 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® |
| 800 | 0.140 | 52 | APT8014L2LLLG | APT8014L2FLLG | TO-264 MAX |
| | 0.110 | 51 | APT8011JLL | APT8011JFLL | T-MAX® or TO-264 |
| | 0.200 | 38 | APT8020B2LL | | T-MAX® |
| | 0.200 | 33 | APT8020JLL | | ISOTOP® or D ³ 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® |



T-MAX®[B2]

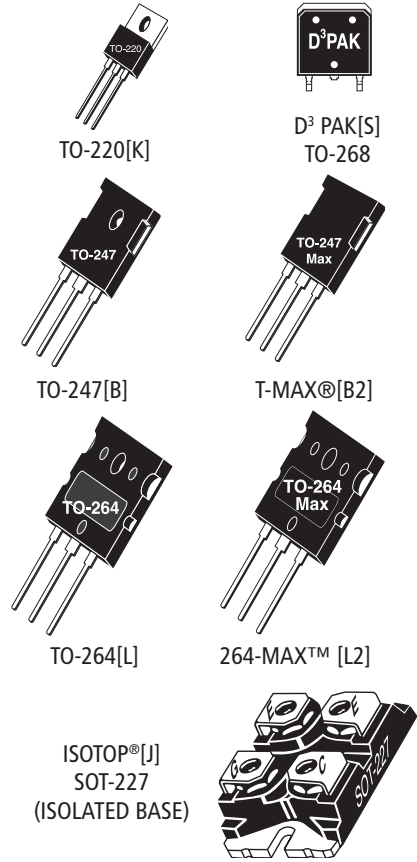


TO-247[B]



ISOTOP®[J]
SOT-227
(ISOLATED BASE)

| BV _{DSS} Volts | R _{DS(ON)} Ohms | I _{D(Cont)} Amps | Part Number | Package Style | |
|----------------------------|-----------------------------|------------------------------|---------------|---------------------------------|--|
| C3 TECHNOLOGY | | | | | |
| 900 | 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 | |
| 650 | 0.145 | 34 | APT34N80LC3G | TO-264 | |
| | 0.035 | 94 | APT94N65B2C3G | T-MAX [®] or TO-264 | |
| 600 | 0.070 | 47 | APT47N65BC3G | TO-247 or D ³ | |
| | 0.070 | 47 | APT47N60BC3G | TO-247 or D ³ | |
| | 0.035 | 77 | APT77N60JC3 | ISOTOP [®] | |
| | 0.042 | 94 | APT94N60LC3G | 264-MAX [™] | |
| SERVER SERIES | | | | | |
| 600 | 0.045 | 60 | APT60N60BCSG | TO-247 or D ³ or T/R | |
| | C6 TECHNOLOGY | | | | |
| | 0.041 | 77 | APT77N60BC6 | TO-247 or D ³ | |
| | 0.070 | 53 | APT53N60BC6 | TO-247 or D ³ | |
| | 0.099 | 38 | APT38N60BC6 | TO-247 or D ³ | |
| | 0.125 | 30 | APT30N60KC6 | TO-220 | |
| | 0.125 | 30 | APT30N60BC6 | TO-247 or D ³ | |
| | 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 [™] | |



"CoolMOS" comprise a new family of transistors developed by Infineon Technologies AG.
 "CoolMOS" is a trademark of Infineon Technologies AG.

Linear MOSFETs

What is a Linear MOSFET?

A MOSFET specifically designed to be more robust than a standard MOSFET when operated with both high voltage and high current near DC conditions (>100msecs).

The Problem with SMPS MOSFETs

MOSFETs optimized for high frequency SMPS applications have poor high voltage DC SOA. Most SMPS type MOSFETs over-state SOA capability at high voltage on the data sheets. Above ~30V and DC conditions, SOA drops faster than is indicated by P_D limited operation.

For pulsed loads (<10ms) there is generally no problem using a standard MOSFET.

Technology Innovation

Introduced in 1999, Microsemi modified its proprietary patented self-aligned metal gate MOSFET technology for enhanced performance in high voltage, linear applications. These Linear MOSFETs typically provide 1.5-2.0 times the DC SOA capability at high voltage compared to other MOSFET technologies optimized for switching applications.

Designers will need Linear MOSFETs when...

- High Current & > 200V >100msec
- Used as a variable power resistor
- Soft start application (limit surge currents)
- Linear amplifier circuit

Typical Applications...

- Active loads above 200 volts such as DC dynamic loads for testing power supplies, batteries, fuel cells, etc.
- High voltage, high current constant current sources.

| BV _{DSS} Volts | R _{DS(ON)} Ohms | I _{D(Cont)} Amps | SOA Watts | Part Number | Package Style |
|----------------------------|-----------------------------|------------------------------|--------------|-------------|---------------|
| 1000 | 0.600 | 18 | 325 | APL1001J | |
| 600 | 0.125 | 49 | 325 | APL602B2G | |
| | 0.125 | 43 | 325 | APL602J | |
| 500 | 0.090 | 58 | 325 | APL502B2G | |
| | 0.090 | 52 | 325 | APL502J | |

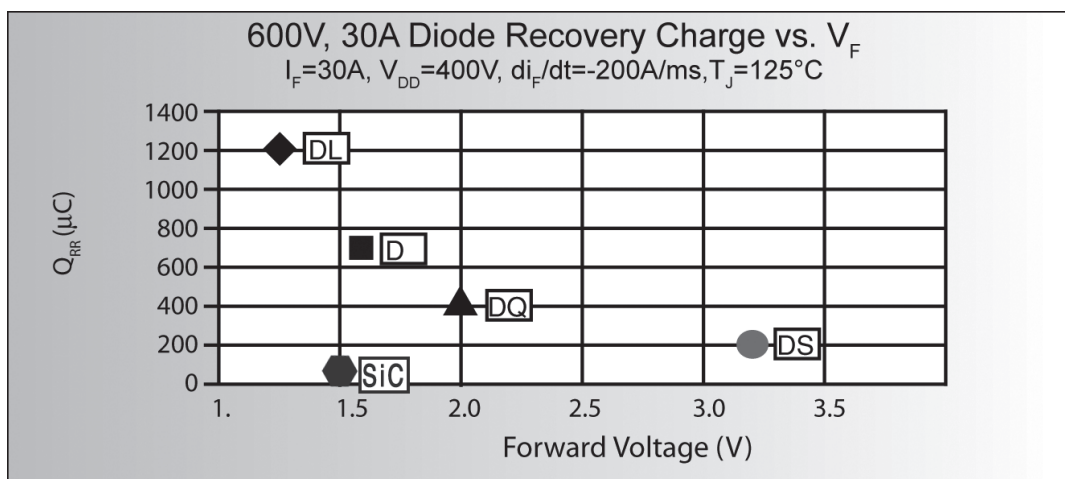
Part Numbers for TO-264 packages - replace "B2" with "L" in part number

Ultra Fast Recovery Diodes

Microsemi PPG offers five series of discrete diode products: a new DL series low V_F ultra-soft recovery, the medium speed medium V_F 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 V_F Ultra-soft recovery Avalanche Rated | Output rectifier Resonant circuits | Ultra-soft recovery minimizes or eliminates snubber |
| D | 200, 300, 400, 600, 1000, 1200 | Medium V_F 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 V_F Avalanche rated | Output rectifier Freewheeling Diode DC-DC converter | |
| SiC Schottky | 650, 1200, 1700 | Zero Reverse Recovery | PFC, Freewheeling Diode DC-DC converter | Low switching losses, high power density and high temperature operation |

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



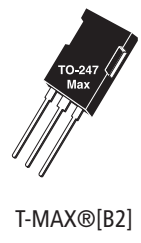
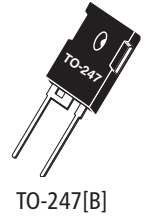
SIC SCHOTTKY Diodes



| SIC SCHOTTKY DIODES | | | | | |
|---------------------|------------------------------|-----------------------------------|-----------------|----------------|----------------|
| Volts | I _{F (avg)} Amps | V _F volts Typ 25° C | Diode Series | Part Number | Package Style |
| SINGLE | | | | | |
| 1700 | 10 | 1.5 | SCE | APT10SCE170B | TO-247 |
| | 10 | 1.5 | SCD | APT10SCD120B | TO-247 |
| 1200 | 10 | 1.5 | SCD | APT10SCD120K | TO-220 |
| | 20 | 1.5 | SCD | APT20SCD120B | TO-247 |
| | 20 | 1.5 | SCD | APT20SCD120S | D ³ |
| | 30 | 1.5 | SCD | APT30SCD120B | TO-247 |
| | 30 | 1.5 | SCD | APT30SCD120S | D ³ |
| | 650 | 10 | 1.5 | SCD | APT10SCD65K |
| 20 | | 1.5 | SCD | APT20SCD65K | TO-220 |
| 30 | | 1.5 | SCD | APT30SCD65B | TO-247 |
| DUAL | | | | | |
| 1200 | 2 x 10 | 1.5 | SCD | APT10SCD120BCT | TO-247 |
| 650 | 2 x 10 | 1.5 | SCD | APT10SCD65KCT | TO-220 |

Ultra Fast Recovery Diodes

| Volts | I _{F (avg)} Amps | V _F (volts) Typ 25°C | t _{RR} (ns) Typ 25°C | Q _{RR} (nC) Typ 125°C at I _F = I _{F (avg)} | Diode Series | Part Number | Package Style | |
|---------------|------------------------------|------------------------------------|----------------------------------|---|-----------------|--------------|--------------------------|---------------------------------|
| SINGLE | | | | | | | | |
| 1200 | 15 | 2.8 | 21 | 960 | DQ | APT15DQ120BG | TO-247 | |
| | 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 | |
| 1000 | 75 | 2.8 | 32 | 3340 | DQ | APT75DQ120BG | TO-247 | |
| | 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 | |
| 600 | 75 | 2.5 | 33 | 2660 | DQ | APT75DQ100BG | TO-247 | |
| | 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 | |
| 400 | 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 | |
| | 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 |



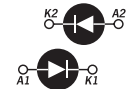
Part Numbers for D³ packages - replace "B" with "S" in part number

Ultra Fast Recovery Diodes

| Volts | I _F (avg) Amps | V _F (volts) Typ 25°C | t _{RR} (ns) Typ 25°C | Q _{RR} (nC) Typ 125°C at I _F = I _F (avg) | Diode Series | Part Number | Package Style |
|-------|------------------------------|------------------------------------|----------------------------------|---|-----------------|-----------------------------|------------------|
| 1200 | 2x27 | 2.0 | 31 | 3450 | D | APT2X30D120J | ISOTOP® |
| | 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 | APT2X30D100J | |
| | 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 | |
| 400 | 2x30 | 1.3 | 22 | 360 | D | APT2X30D40J | |
| | 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 | TO-247 [BCT] |
| 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] |
| 400 | 2x60 | 1.6 | 30 | 920 | D | APT60D60LCTG | TO-264 [LCT] |
| | 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] |

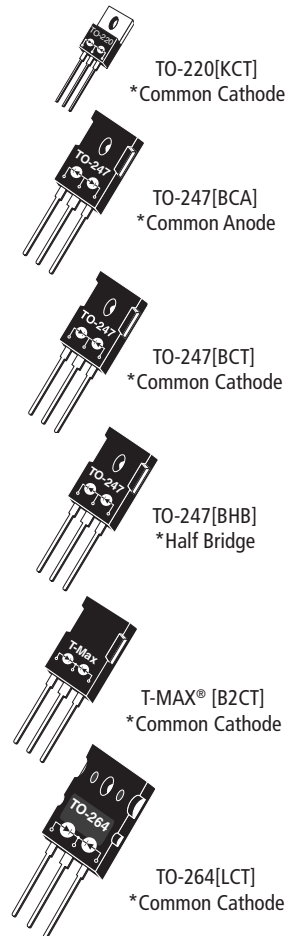


ISOTOP®[J] SOT-227
Antiparallel
Configuration
(ISOLATED BASE)



Part Numbers for Parallel Configuration replace 30, 60, or 100 with 31, 61, or 101. Except Schottky

Example: 2X30D120J becomes 2X31D120J



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)

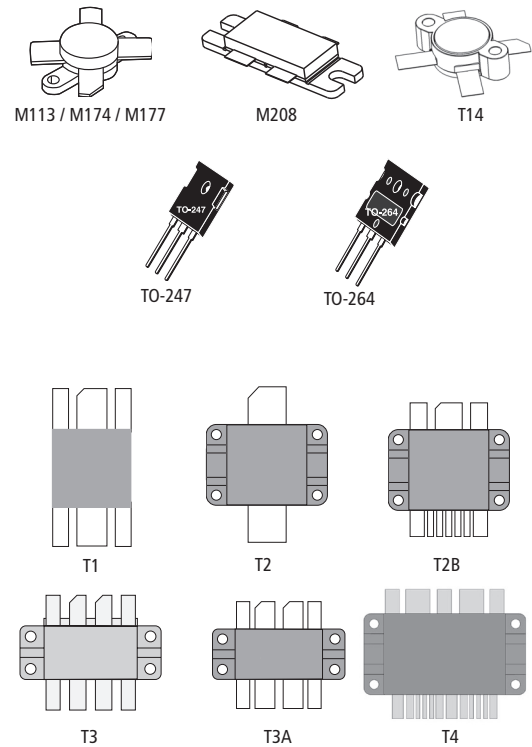
Part Numbers for D³ packages - replace "B" with "S" in part number

High Voltage RF MOSFETs

The ARF family of RF Power MOSFETs are optimized for applications requiring frequencies as high as 150MHz and operating voltages as high as 400V. Historically, RF Power MOSFETs were limited to applications of 50V or less. This limitation has been removed by combining Microsemi's high voltage MOSFET technology with RF specific die geometries.

Why Higher Voltage? Higher V_{DD} means higher load impedance. For 150W output from a 50V supply, the load impedance is only 8 ohms. At 125V, the load impedance is 50 ohms. The higher impedance allows simpler transformers and combiners. Paralleled devices can still operate into reasonable and convenient impedances. The increased operating voltage also lowers the DC current required for any given power output, increasing efficiency and reducing the size, weight and cost of other system components. High breakdown voltage is a necessity in high efficiency switchmode amplifiers such as class C-E, which can see peak drain voltages of over 4X the applied V_{DD} .

| Part Number | Pout (W) | Freq. (MHz) | VDD/BVDSS (V) | Rthjc (OC/W) | Package Style | Class of Operation |
|-----------------|----------|-------------|---------------|--------------|---------------|--------------------|
| ARF449AG/BG | 90 | 120 | 150/450 | 0.76 | TO-247 | A-E |
| ARF463AG/BG | 100 | 100 | 125/500 | 0.70 | TO-247 | A-E |
| ARF463AP1G/BP1G | 100 | 100 | 125/500 | 0.70 | TO-247 | A-E |
| ARF446G/ARF447G | 140 | 65 | 250/900 | 0.55 | TO-247 | A-E |
| ARF521 | 150 | 150 | 165/500 | 0.60 | M174 | A-E |
| ARF460AG/BG | 150 | 65 | 125/500 | 0.50 | TO-247 | A-E |
| ARF461AG/BG | 150 | 65 | 250/1000 | 0.50 | TO-247 | A-E |
| ARF465AG/BG | 150 | 60 | 300/1200 | 0.50 | TO-247 | A-E |
| ARF468AG/BG | 270 | 45 | 165/500 | 0.38 | TO-264 | A-E |
| ARF475FL | 300 | 150 | 165/500 | 0.31 | T3A | A-E |
| ARF476FL | 300 | 150 | 165/500 | 0.31 | T3 | A-E |
| ARF466AG/BG | 300 | 45 | 200/1000 | 0.35 | TO-264 | A-E |
| ARF466FL | 300 | 45 | 200/1000 | 0.13 | T3A | A-E |
| ARF469AG/BG | 300 | 45 | 165/500 | 0.35 | TO-264 | A-E |
| ARF477FL | 400 | 65 | 165/500 | 0.18 | T3A | A-E |
| ARF1500 | 750 | 40 | 125/500 | 0.12 | T1 | A-E |
| ARF1501 | 750 | 40 | 250/1000 | 0.12 | T1 | A-E |
| ARF1510 | 750 | 40 | 700/1000 | 0.12 | T1 | D |
| ARF1511 | 750 | 40 | 380/500 | 0.12 | T1 | D |
| ARF1519 | 750 | 25 | 250/1000 | 0.13 | T2 | A-E |



High Frequency RF MOSFETs

The VRF family of RF MOSFETs are improved replacements for industry standard RF transistors. They provide improved ruggedness by increasing the BV_{DSS} over 30% from the industry standard of 125 volts to 170V minimum. Low cost flangeless packages are another improvement that show Microsemi's dedication to optimizing performance, reducing cost and improving reliability. We will continue to offer a greater number of product offerings in the new reduced-cost flangeless packages.

| Part Number | Pout (W) | Freq. (MHz) | Gain typ (dB) | Eff. Typ (%) | VDD/BVDSS (V) | Rthjc (OC/W) | Package Style |
|-------------|----------|-------------|---------------|--------------|---------------|--------------|---------------|
| VRF148A | 30 | 175 | 16 | 50 | 65/170 | 1.52 | M113 |
| VRF141 | 150 | 175 | 13 | 45 | 28/80 | 0.60 | M174 |
| VRF151 | 150 | 175 | 14 | 50 | 65/170 | 0.60 | M174 |
| VRF152 | 150 | 175 | 14 | 50 | 50/140 | 0.60 | M174 |
| VRF191 | 150 | 175 | 14 | 50 | 100/250 | 0.60 | M174 |
| VRF150 | 150 | 150 | 11 | 50 | 65/170 | 0.60 | M174 |
| VRF161 | 200 | 175 | 25 | 50 | 65/170 | 0.50 | M177 |
| VRF151G | 300 | 175 | 16 | 55 | 65/170 | 0.30 | M208 |
| VRF2933 | 300 | 150 | 25 | 50 | 65/170 | 0.27 | M177 |
| VRF2933FL | 300 | 150 | 25 | 50 | 65/170 | 0.27 | T14 |
| VRF3933 | 300 | 150 | 28 | 60 | 100/250 | 0.27 | M177 |
| VRF3933FL | 300 | 150 | 28 | 60 | 100/250 | 0.27 | T14 |
| VRF2944 | 400 | 150 | 25 | 50 | 65/170 | 0.22 | M177 |
| VRF2944FL | 400 | 150 | 25 | 50 | 65/170 | 0.22 | T14 |
| VRF154FL | 600 | 30 | 17 | 45 | 65/170 | 0.13 | T2 |
| VRF157FL | 600 | 30 | 21 | 45 | 65/170 | 0.13 | T2 |
| VRF164FL | 600 | 30 | 21 | 45 | 65/170 | 0.10 | T2 |

Drivers and Driver-RF MOSFET Hybrids

The DRF1200/01/02/03 Hybrids integrate Driver, bypass capacitors and RF MOSFETS into a single package. Integration maximizes amplifier performance by minimizing transmission line parasitics between the Driver and MOSFET. The DRF1300 or DRF1301 has two independent channels, each containing a Driver and RF MOSFET in a push pull configuration. The DRF1400A and B are half bridge hybrids with symmetrically orientated leads so that the two can easily be configured into a full bridge converter. All DRF parts feature a proprietary Anti-ring function to eliminate cross conduction in a Bridge or push-pull topologies. All DRF parts can be externally selected in either an inverting or non-inverting configuration.

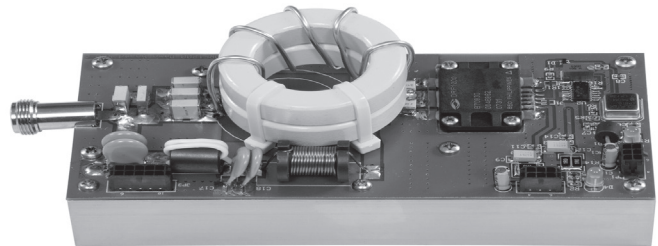
| Part Number | Pout (W) | Freq. (MHz) | VDD/BVDSS (V) | Rthjc (OC/W) | Package Style | Class of Operation |
|-------------|----------|-------------|---------------|--------------|---------------|--------------------|
| DRF1200 | 400 | 30 | 15/1000 | 0.10 | T2B | D-E |
| DRF1201 | 600 | 30 | 15/1000 | 0.13 | T2B | D-E |
| DRF1300 | 1000 | 30 | 15/500 | 0.06 | T4 | D-E |
| DRF1301 | 1000 | 30 | 15/1000 | 0.06 | T4 | D-E |
| DRF1400 | 1000 | 30 | 15/500 | 0.06 | T4 | D-E |

Reference Design Kits

DRF1200/CLASS-E, 13.56 MHz

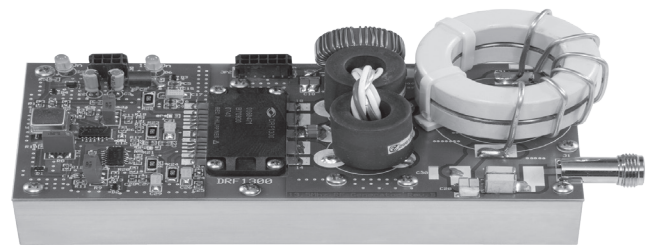
DRF1200/CLASS-E, 27.12 MHz

The DRF1200/CLASS-E Single Ended RF Generator is a reference design providing the designer the ability to evaluate an 85% efficient 1000W CLASS-E RF Generator



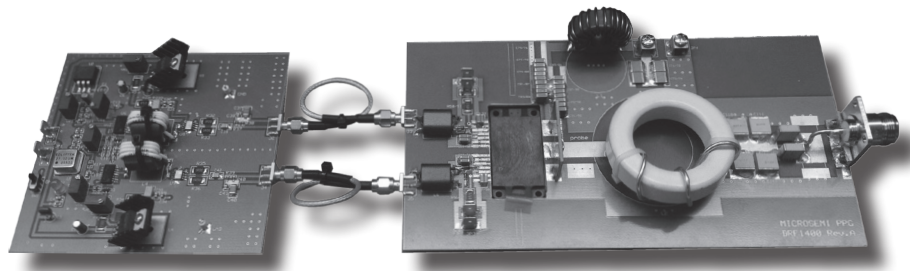
DRF1300/CLASS-D, 13.56 MHz

The DRF1300/CLASS-D Push Pull RF Generator is a reference design providing the designer the ability to evaluate an 80% efficient 2000W CLASS-D RF Generator



DRF1400/CLASS-D, 13.56 MHz

The DRF1400/CLASS-D Half Bridge RF Generator is a reference design providing the designer the ability to evaluate an 85% efficient 2500W CLASS-D RF Generator



All kits include: A fully populated board attached to an aluminum heat sink. An extensive application note explaining the theory of operation with designer's recommendations for evaluation and board layout. All key waveforms are illustrated and described. A complete parts list with recommended vendor part numbers and the board's Gerber file are provided for an easy transition into an end application.

Power Modules Contents

IGBT Power Modules

| | |
|-----------------------------------|-------|
| POWER MODULE INFORMATION | 17-21 |
| BOOST and BUCK CHOPPER | 22-23 |
| PHASE LEG | 22-23 |
| 3 PHASE BRIDGE | 23 |
| PHASE LEG for welding application | 24 |
| TRIPLE PHASE LEG | 24 |
| TRIPLE DUAL COMMON SOURCE | 24 |
| INTERLEAVED PFC | 24 |
| DUAL CHOPPER | 24 |
| FULL & ASYMMETRICAL BRIDGE | 25 |
| SINGLE SWITCH | 26 |
| SINGLE SWITCH + SERIES DIODE | 26 |
| DUAL COMMON SOURCE | 26 |

Intelligent Power Modules

| | |
|-----------|----|
| PHASE LEG | 26 |
|-----------|----|

MOSFET Power Modules

| | |
|--|----|
| BOOST and BUCK CHOPPER | 27 |
| DUAL CHOPPER | 27 |
| FULL BRIDGE | 28 |
| FULL BRIDGE + SERIES AND PARALLEL DIODES | 28 |
| ASYMMETRICAL BRIDGE | 28 |
| PHASE LEG | 29 |
| PHASE LEG + SERIES AND PARALLEL DIODES | 29 |
| PHASE LEG + SERIES DIODES | 29 |
| TRIPLE PHASE LEG | 29 |
| TRIPLE DUAL COMMON SOURCE | 30 |
| DUAL COMMON SOURCE | 30 |
| SINGLE SWITCH | 30 |
| SINGLE SWITCH + SERIES DIODE | 30 |
| SINGLE SWITCH + SERIES AND PARALLEL DIODES | 30 |
| INTERLEAVED PFC | 30 |
| SINGLE AND DUAL LINEAR MOSFET | 31 |

RENEWABLE ENERGY Power Modules

| | |
|--|----|
| FULL BRIDGE | 31 |
| PFC + BYPASS DIODE + PHASE LEG | 31 |
| PFC + FULL BRIDGE | 31 |
| PFC + BYPASS DIODE + FULL BRIDGE | 31 |
| SECONDARY FAST RECTIFIER + FULL BRIDGE | 31 |
| BOOST BUCK | 32 |
| 3- LEVEL NPC INVERTER | 32 |
| T-TYPE 3-LEVEL INVERTER | 32 |

SiC Diode Power Modules

| | |
|-------------|----|
| DUAL DIODE | 33 |
| FULL BRIDGE | 33 |

IGBT + SiC Diode Power Modules

| | |
|---------------|----|
| BOOST CHOPPER | 33 |
| DUAL CHOPPER | 33 |

MOSFET + SiC Diode Power Modules

| | |
|---|----|
| SINGLE SWITCH + SERIES FRED AND SiC PARALLEL DIODES | 34 |
| CHOPPER | 34 |
| PHASE LEG + SERIES FRED AND SiC PARALLEL DIODES | 34 |
| FULL BRIDGE + SERIES FRED AND SiC PARALLEL DIODES | 34 |
| TRIPLE PHASE LEG | 34 |

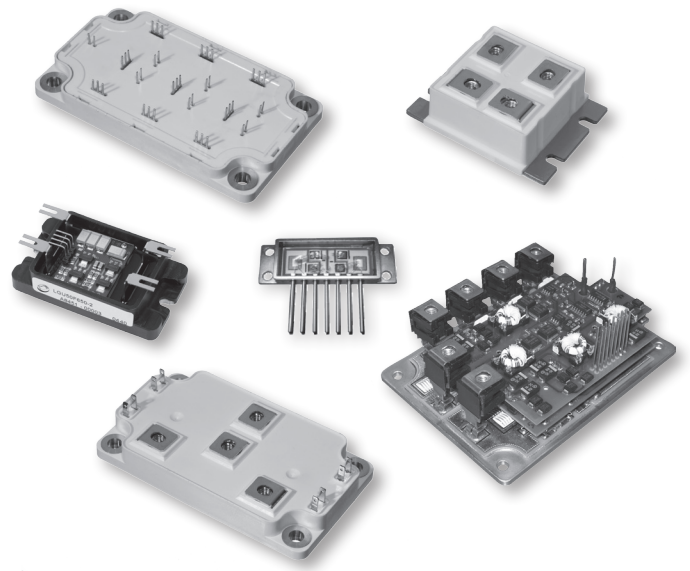
SiC MOSFET Power Modules

| | |
|-------------------------|----|
| PHASE LEG | 35 |
| T-TYPE 3-LEVEL INVERTER | 35 |
| 3-LEVEL NPC INVERTER | 35 |
| BOOST CHOPPER | 35 |

Diode Power Modules

| | |
|---|----|
| SINGLE DIODE | 36 |
| SINGLE DIODE - NON ISOLATED PACKAGE | 36 |
| 3-PHASE BRIDGE | 36 |
| 3-PHASE BRIDGE + THYRISTOR | 36 |
| FULL BRIDGE | 37 |
| THYRISTOR & DIODE DOUBLER | 37 |
| COMMON CATHODE - COMMON ANODE - DOUBLER | 38 |

| | |
|---------------------------|-------|
| Package Outlines Drawings | 40-43 |
|---------------------------|-------|



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
- Low cost
- Space savings
- Reduced assembly time

The readily available standard module product line spans a wide selection of circuit topologies, semiconductors including Silicon Carbide, voltage and current ratings and packages. If you need even more flexibility or intellectual property protection, Microsemi can often customize a standard module with low set up cost and with a short lead time. Unique requirements can be met with Application Specific Power Modules (ASPM®).

Microsemi serves a broad spectrum of industrial applications for Welding, Solar, Induction Heating, Medical, UPS, Motor Control and SMPS markets as well as HI-REL applications for Semicap, Defense and Aerospace markets. A wide selection of construction materials enables Microsemi to manufacture with short lead times modules that feature:

- Extended temperature range: -60°C to +200°C
- High reliability
- Reduced size and weight
- Hi-Rel testing and screening options

Microsemi's experience and expertise in power electronic conversion brings the most effective technical support for your new development.

- Isolated gate driver
- Snubbers
- Mix & match semiconductors
- Short circuit protection
- Temperature & current sensing
- Parameter binning

Standard Electrical Configurations

Microsemi offers a wide range of standard electrical configurations housed in a variety of packages to match your specific need for high power density and performance. Various semiconductor types are offered in the same topology.

| 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 | |

NPT
Trench3
Trench4
Trench4 Fast

MOSFET
FREDFET
CoolMOS

Schottky
FRED
Std Rectifier
Thyristor

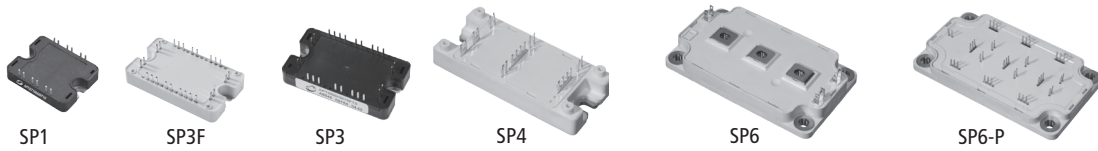
IGBT
MOSFET
Diode

Diode
MOSFET

Packaging

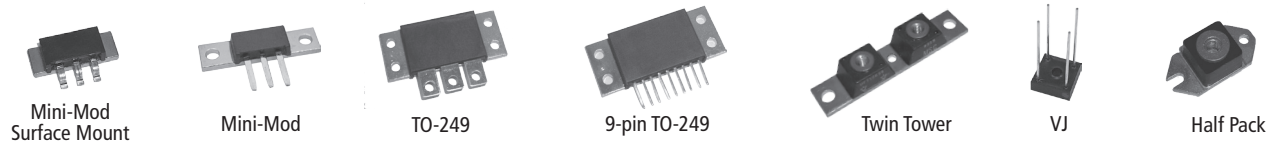
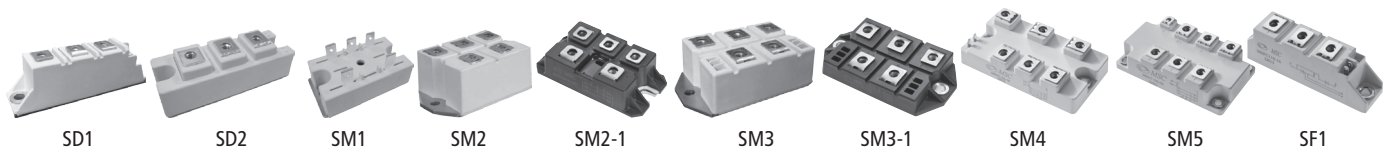
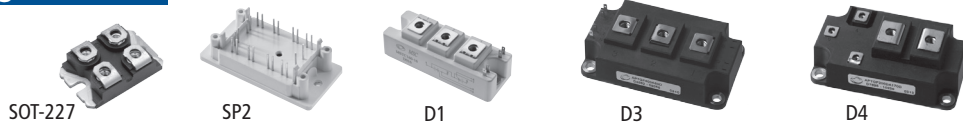
Improved Low Profile Packages

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

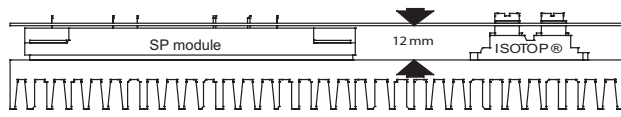


Industry Standard Packages

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



Package Advantages



SP1 package:
 -Replaces 2 SOT-227 parts
 -Improved assembly time and cost
 -Height compatible with SOT-227
 -Copper base plate



SP3F package:
 -Replaces up to 4 SOT-227 parts
 -Reduced assembly time and cost
 -Height compatible with SOT-227
 -Copper base plate



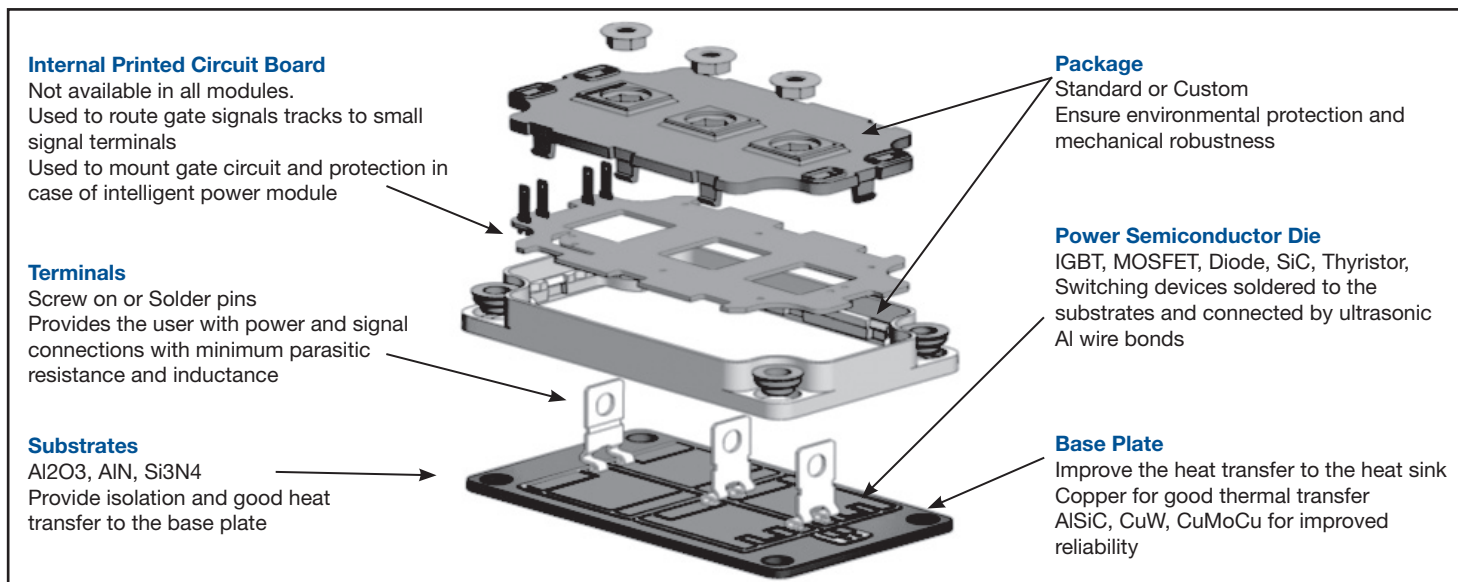
SP6 package:
 30 mm
 17 mm
 Offers the same footprint and the same pinout location as the popular 62mm package but with lower height, leading to:
 - Reduced stray inductance
 - Reduced parasitic resistance
 - Higher efficiency at high frequency



SP6-P package:
 -Replaces up to 6 SOT-227 parts
 -Height compatible with SOT-227
 -Low inductance solder pins
 -High current capability

Custom Power Modules

Microsemi PMP has created the Application Specific Power Module (ASPM) concept and has been offering customized power modules since 1983. Microsemi PMP offers a complete engineered solution with mix and match capabilities in term of package, configuration, performance and cost.



3 levels of customization are proposed offering different cost and low volume entry:

| Change Options: | Die | Substrate | Base plate | Plastic lid | Terminals | NRE level | MOQ |
|--|---------|-------------------|------------------|------------------|-----------|----------------|----------------|
| Elect./thermal performance | Die P/N | Material | Material | - | - | None to low | 5 to 10 pieces |
| Elect./thermal performance + electrical configuration | Die P/N | Material & Layout | Material | - | - | Low to medium | |
| Elect./thermal performance + electrical configuration + module housing | Die P/N | Material & Layout | Material & Shape | Material & Shape | Shape | Medium to high | |

Microsemi PMP power modules are made of different sub-elements. Most of them are standard and can be re-used to build infinite solutions for the end user.

Microsemi PMP offers optimum development cost and cycle time thanks to long term experience and wide range of available technologies.

Power Modules Features

High Power Density

Isolated and highly thermally conductive substrate

Internal wiring

Minimum parasitics

Minimum output terminals

Mix & 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

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
Various substrate technologies

TECHNOLOGY

Application oriented

RELIABILITY

Coefficient of thermal expansion matching

APPLICATIONS

Solar - Welding - Plasma Cutting - Semicap - MRI & X-Ray - EV/HEV - Induction Heating - UPS - Motor control - Data Communication

Rugged Custom Power Modules

Microsemi PMP 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
- Wider Operating Temperatures
- Higher Power
- Higher Efficiency
- Lower Weight and Size
- Lower Cost

Applications

- Avionics actuation system
- Avionics lift and pump
- Military ground vehicle
- power supply and motor control
- Navy ship auxiliary power supply
- Down hole drilling

Test Capabilities

- X-Ray inspection
- Dielectric test (up to 6KV)
- Electrical testing at specified temperature
- 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

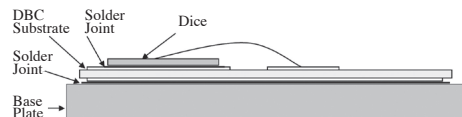
All tests can be conducted upon demand by sampling or at 100%. Tests performed in house or with external lab.

Our Core Competencies

- Extensive experience of rugged solutions for harsh environments
- 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
- Material expertise
- Product life management associated to risks analysis

Various solutions are proposed offering different cost and low volume of entry:

| | Industrial Application | Extended Temperature Application | Harsh Environment Application | |
|-------------------|------------------------|----------------------------------|-------------------------------|--|
| Standard Module | X | | | No NRE Low Volume Entry |
| Modified Standard | X | X | | Low NRE Low Volume Entry |
| Custom Module | X | X | X | Medium to High NRE Low Volume Entry |



| | CTE (ppm/K) | Thermal conductivity (W/m.K) | Rthjc (K/W) |
|--------------------------------------|-------------|------------------------------|-------------|
| Silicon Die (120 mm2) | 4 | 136 | |
| Cu/Al ₂ O ₃ | 17/7 | 390/25 | 0.35 |
| AlSiC/Al ₂ O ₃ | 7/7 | 170/25 | 0.38 |
| Cu/AlN | 17/5 | 390/170 | 0.28 |
| AlSiC/AlN | 7/5 | 170/170 | 0.31 |
| AlSiC/Si ₃ N ₄ | 7/3 | 170/60 | 0.31 |

| | Material | CTE (ppm/K) | Thermal conductivity (W/m.K) | Density (g/cc) |
|------------|--------------------------------|-------------|------------------------------|----------------|
| Base plate | CuW | 6.5 | 190 | 17 |
| | AlSiC | 7 | 170 | 2.9 |
| Substrate | Cu | 17 | 390 | 8.9 |
| | Al ₂ O ₃ | 7 | 25 | - |
| | AlN | 5 | 170 | - |
| Die | Si ₃ N ₄ | 3 | 60 | - |
| | Si | 4 | 136 | - |
| | SiC | 2.6 | 270 | - |

Module performance and reliability depends on the choice of the assembly materials

More closely matched materials TCE's increase the module life time because it will result in much less 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.



Power Module Part Numbering System

IGBT Modules

| APT | GL | 475 | A | 120 | T | D3 | G |
|-----|----|-----|----|-----|----|-----|------|
| I | II | III | IV | V | VI | VII | VIII |

I Trade Mark

II IGBT Type:
GF = NPT or NPT FAST
GFQ = NPT ULTRA FAST
GL = TRENCH 4
GT = TRENCH 3
GV = Mix NPT/TRENCH
CV = Mix TRENCH/CoolMOS

III Current:
Ic @ Tc=80°C

IV Topology:
A = Phase Leg
BB = Boost Buck
DA = Boost Chopper
DDA = Double Boost Chopper
DH = Asymmetrical Bridge
DSK = Double Buck Chopper
DU = Dual Common Source
H = Full Bridge
HR = T-Type 3-Level
SDA = Double Boost + Bypass Diode
SK = Buck Chopper
TA = Triple Phase Leg
TDU = Triple Dual Common Source
TL = Three Level
U = Single Switch
VDA = Interleaved PFC
X = Three Phase Bridge

V Blocking Voltage:
60 = 600V
120 = 1200V
170 = 1700V

VI Option:
A = AlN Substrate
C = SiC Diode
D = Series Diode
T = Temperature Sensor
W = Clamping Parallel Diode

VII Package:
1 = SP1
2 = SP2
3 = SP3
P = SP6-P
D1 = D1 (34mm)
D3 = D3 (62mm)
D4 = D4 (62mm)

VIII G = RoHS Compliant

MOSFET Modules

| APT | C | 60 | DA | M24 | T | 1 | G |
|-----|----|-----|----|-----|----|-----|------|
| I | II | III | IV | V | VI | VII | VIII |

I Trade Mark

II MOSFET Type:
MC = MOSFET SiC
M = MOSFET
C = CoolMOS

III Blocking Voltage:
08 = 75V
10 = 100V
20 = 200V
50 = 500V
60 = 600V
80 = 800V
90 = 900V
100 = 100V
120 = 120V

IV Topology:
A = Phase Leg
BB = Boost Buck
DA = Boost Chopper
DDA = Double Boost Chopper
DH = Asymmetrical Bridge
DSK = Double Buck Chopper
DU = Dual Common Source
H = Full Bridge
HR = T-Type 3-Level
SDA = Double Boost + Bypass Diode
SK = Buck Chopper
TA = Triple Phase Leg
TDU = Triple Dual Common Source
TL = Three Level NPC
U = Single Switch
VDA = Interleaved PFC

V RDS(on) @ Tc=25°C
240 = 2400mΩ
24 = 240mΩ
M24 = 24mΩ

VI Option:
A = AlN Substrate
C = SiC Diode
D = Series Diode
F = FREDFET
S = Series and Parallel Diodes
T = Temperature Sensor
U = Ultrafast FREDFET

VII Package:
1 = SP1
2 = SP2
3 = SP3
P = SP6-P

VIII G = RoHS Compliant

Diode Modules

| APT | DR | 90 | X | 160 | 1 | G |
|-----|----|-----|----|-----|----|-----|
| I | II | III | IV | V | VI | VII |

I Trade Mark

II Diode Type:
DF = FRED
DR = Standard Rectifier
DC = SiC
DSK = Schottky

III Current:
IF @ Tc=80°C

IV Topology:
AA = Dual Common Anode
BB = Boost Buck
AK = Dual Series
KK = Dual Common Cathode
H = Single Phase Bridge
U = Single Switch
X = Three Phase Bridge

V Blocking Voltage:
20 = 200V
40 = 400V
60 = 600V
100 = 1000V
120 = 1200V
160 = 1600V
170 = 1700V

VI Package:
1 = SP1
3 = SP3

VII G = RoHS Compliant

Optional Materials

Optional materials are available upon demand on most of the listed standard power modules. Options are indicated with a letter in the suffix of the module part number. Temperature Sensor Option is indicated in the catalog with "YES" or "option" when available on standard part or on demand.

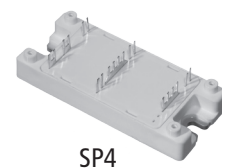
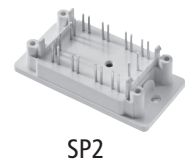
- A** AlN Substrate for higher thermal conductivity
- M** AlSiC Base plate material for improved temperature cycling capabilities
- T** Temperature Sensor (NTC or PTC) for Case Temperature information
- C** SiC Diode for higher efficiency
- N** Si3N4 Substrate
- E** Press fit terminals (for SP3 package only)

IGBT Power Modules

CHOPPER AND PHASE LEG

| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | | | | |
|---------------|-----------|-------------------------------------|------------------------------------|---------|------------------|------------------|------------------|------------------|-----------------|
| 600 | NPT | 250 | 2.1 | D3 | option | APTGF250DA60D3G | APTGF250SK60D3G | APTGF250A60D3G | |
| | | 330 | 2.1 | D3 | option | APTGF330DA60D3G | APTGF330SK60D3G | APTGF330A60D3G | |
| | NPT FAST | 30 | 2.1 | SOT227 | - | APT30GF60JU2 | APT30GF60JU3 | N/A | |
| | | 30 | 2.1 | SP1 | YES | N/A | N/A | APTGF30A60T1G | |
| | | 50 | 2.1 | SOT227 | - | APT50GF60JU2 | APT50GF60JU3 | N/A | |
| | | 60 | 2.1 | SOT227 | - | APT60GF60JU2 | APT60GF60JU3 | N/A | |
| | | 90 | 2.1 | SP1 | YES | APTGF90DA60T1G | APTGF90SK60T1G | APTGF90A60T1G | |
| | | 100 | 2.1 | SOT227 | - | APT100GF60JU2 | APT100GF60JU3 | N/A | |
| | | 150 | 2.1 | SP3 | YES | N/A | N/A | APTGF150A60T3AG | |
| | | 165 | 2.1 | D1 | - | APTGF165DA60D1G | APTGF165SK60D1G | APTGF165A60D1G | |
| | | 180 | 2.1 | SP4 | YES | APTGF180DA60TG | APTGF180SK60TG | APTGF180A60TG | |
| | | 350 | 2.1 | SP6 | option | APTGF350DA60G | APTGF350SK60G | APTGF350A60G | |
| | TRENCH3 | 75 | 1.5 | SP1 | YES | APTGT75DA60T1G | APTGT75SK60T1G | APTGT75A60T1G | |
| | | 100 | 1.5 | SP1 | YES | APTGT100DA60T1G | APTGT100SK60T1G | APTGT100A60T1G | |
| | | 100 | 1.5 | SP2 | - | N/A | N/A | APTGT100A60T2G | |
| | | 150 | 1.5 | SP1 | YES | APTGT150DA60T1G | APTGT150SK60T1G | APTGT150A60T1G | |
| | | 150 | 1.5 | SP3 | YES | N/A | N/A | APTGT150A60T3AG | |
| | | 200 | 1.5 | SP2 | - | N/A | N/A | APTGT200A60T2G | |
| | | 200 | 1.5 | SP3 | YES | APTGT200DA60T3AG | APTGT200SK60T3AG | APTGT200A60T3AG | |
| | | 300 | 1.5 | SP4 | YES | N/A | N/A | APTGT300A60TG | |
| | | 300 | 1.5 | SP6 | option | APTGT300DA60G | APTGT300SK60G | APTGT300A60G | |
| | | 300 | 1.5 | D3 | option | APTGT300DA60D3G | APTGT300SK60D3G | APTGT300A60D3G | |
| | 650 | TRENCH 4 FAST | 100 | 1.85 | SP1 | YES | N/A | N/A | APTGLQ100A65T1G |
| | | | 600 | 1.85 | SP6 | YES | N/A | N/A | APTGLQ600A65T6G |
| | | NPT FAST | 15 | 3.2 | SP1 | YES | N/A | N/A | APTGF15A120T1G |
| | | | 50 | 3.2 | SP1 | YES | APTGF50DA120T1G | APTGF50SK120T1G | APTGF50A120T1G |
| | | | 75 | 3.2 | SP1 | YES | APTGF75DA120T1G | N/A | N/A |
| | | | 100 | 3.2 | SP1 | YES | APTGF100DA120T1G | N/A | N/A |
| 100 | | | 3.2 | SP2 | - | N/A | N/A | APTGF100A120T2G | |
| 100 | | | 3.2 | SP3 | YES | N/A | N/A | APTGF100A120T3AG | |
| 100 | | | 3.2 | SP4 | YES | APTGF100DA120TG | APTGF100SK120TG | APTGF100A120TG | |
| 150 | | | 3.2 | SP3 | YES | N/A | N/A | APTGF150A120T3AG | |
| TRENCH 3 | 150 | 3.2 | SP4 | YES | APTGF150DA120TG | APTGF150SK120TG | APTGF150A120TG | | |
| | 200 | 3.2 | D3 | option | N/A | N/A | APTGF200A120D3G | | |
| | 300 | 3.2 | SP6 | option | APTGF300DA120G | APTGF300SK120G | APTGF300A120G | | |
| | 300 | 3.2 | D3 | option | APTGF300DA120D3G | APTGF300SK120D3G | APTGF300A120D3G | | |
| | 35 | 1.7 | SP1 | YES | N/A | N/A | APTGT35A120T1G | | |
| | 35 | 1.7 | SOT227 | - | APT35GT120JU2 | APT35GT120JU3 | N/A | | |
| | 50 | 1.7 | SOT227 | - | APT50GT120JU2 | APT50GT120JU3 | N/A | | |
| | 50 | 1.7 | SP1 | YES | N/A | N/A | APTGT50A120T1G | | |
| 1200 | TRENCH 3 | 50 | 1.7 | SP2 | - | N/A | N/A | APTGT50A120T2G | |
| | | 50 | 1.7 | SP4 | YES | APTGT50DA120TG | APTGT50SK120TG | N/A | |
| | | 75 | 1.7 | SOT227 | - | APT75GT120JU2 | APT75GT120JU3 | N/A | |
| | | 75 | 1.7 | SP1 | YES | N/A | N/A | APTGT75A120T1G | |

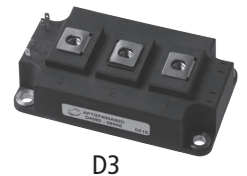
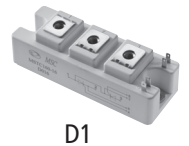
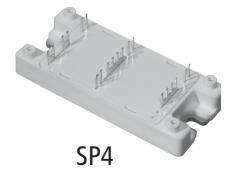
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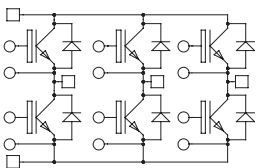
IGBT Power Modules

CHOPPER AND PHASE LEG CONT.

| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | | | |
|---------------|-----------|-------------------------------------|------------------------------------|------------------|------------------|------------------|------------------|-------------------|
| 1200 | TRENCH 3 | 75 | 1.7 | SP2 | - | N/A | N/A | APTGT75A1202G |
| | | 75 | 1.7 | SP4 | YES | APTGT75DA120TG | APTGT75SK120TG | N/A |
| | | 100 | 1.7 | SP1 | YES | APTGT100DA120T1G | N/A | N/A |
| | | 100 | 1.7 | SOT227 | - | APT100GT120JU2 | APT100GT120JU3 | N/A |
| | | 100 | 1.7 | D1 | - | N/A | N/A | APTGT100A120D1G |
| | | 100 | 1.7 | SP2 | - | N/A | N/A | APTGT100A1202G |
| | | 100 | 1.7 | SP3 | YES | N/A | N/A | APTGT100A120T3AG |
| | | 100 | 1.7 | SP4 | YES | N/A | N/A | APTGT100A120TG |
| | | 150 | 1.7 | SP6 | option | APTGT150DA120G | APTGT150SK120G | APTGT150A120G |
| | | 150 | 1.7 | D1 | - | APTGT150DA120D1G | APTGT150SK120D1G | APTGT150A120D1G |
| | | 150 | 1.7 | SP3 | YES | N/A | N/A | APTGT150A120T3AG |
| | | 150 | 1.7 | SP4 | YES | N/A | N/A | APTGT150A120TG |
| | | 200 | 1.7 | SP6 | option | APTGT200DA120G | APTGT200SK120G | APTGT200A120G |
| | | 200 | 1.7 | D3 | option | APTGT200DA120D3G | APTGT200SK120D3G | APTGT200A120D3G |
| | | 300 | 1.7 | SP6 | option | APTGT300DA120G | APTGT300SK120G | APTGT300A120G |
| | | 300 | 1.7 | D3 | option | APTGT300DA120D3G | APTGT300SK120D3G | APTGT300A120D3G |
| | 400 | 1.7 | SP6 | option | APTGT400DA120G | APTGT400SK120G | APTGT400A120G | |
| | 400 | 1.7 | D3 | option | N/A | N/A | APTGT400A120D3G | |
| | TRENCH 4 | 40 | 1.85 | SOT227 | - | APT40GL120JU2 | APT40GL120JU3 | N/A |
| | | 90 | 1.85 | SP1 | YES | APTGL90DA120T1G | APTGL90SK120T1G | APTGL90A120T1G |
| | | 180 | 1.85 | SP2 | - | N/A | N/A | APTGL180A1202G |
| | | 180 | 1.85 | SP3 | YES | N/A | N/A | APTGL180A120T3AG |
| | | 325 | 1.85 | D3 | option | APTGL325DA120D3G | APTGL325SK120D3G | APTGL325A120D3G |
| | | 475 | 1.85 | D3 | option | APTGL475DA120D3G | APTGL475SK120D3G | APTGL475A120D3G |
| 700 | | 1.85 | D3 | option | APTGL700DA120D3G | APTGL700SK120D3G | N/A | |
| TRENCH 4 FAST | | 100 | 2.05 | SP3 | YES | N/A | N/A | APTGLQ100A120T3AG |
| | 400 | 2.05 | SP6 | YES | N/A | N/A | APTGLQ400A120T6G | |
| 1700 | TRENCH 3 | 30 | 2.0 | SP1 | YES | APTGT30DA170T1G | APTGT30SK170T1G | APTGT30A170T1G |
| | | 50 | 2.0 | SP1 | YES | APTGT50DA170T1G | APTGT50SK170T1G | APTGT50A170T1G |
| | | 50 | 2.0 | SP4 | YES | APTGT50DA170TG | APTGT50SK170TG | APTGT50A170TG |
| | | 75 | 2.0 | SP1 | YES | APTGT75DA170T1G | N/A | N/A |
| | | 75 | 2.0 | D1 | - | APTGT75DA170D1G | APTGT75SK170D1G | APTGT75A170D1G |
| | | 100 | 2.0 | SP4 | YES | APTGT100DA170TG | APTGT100SK170TG | APTGT100A170TG |
| | | 150 | 2.0 | SP6 | option | APTGT150DA170G | APTGT150SK170G | APTGT150A170G |
| | | 200 | 2.0 | D3 | option | APTGT200DA170D3G | APTGT200SK170D3G | APTGT200A170D3G |
| | | 225 | 2.0 | SP6 | option | APTGT225DA170G | APTGT225SK170G | APTGT225A170G |
| | | 300 | 2.0 | SP6 | option | APTGT300DA170G | APTGT300SK170G | APTGT300A170G |
| 300 | 2.0 | D3 | option | APTGT300DA170D3G | APTGT300SK170D3G | APTGT300A170D3G | | |

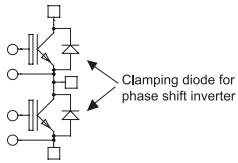


3 PHASE BRIDGE



| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|----------------|
| 600 | NPT FAST | 30 | 2.1 | SP3 | YES | APTGF30X60T3G |
| | | 50 | 2.1 | SP3 | YES | APTGF50X60T3G |
| | TRENCH 3 | 30 | 1.5 | SP3 | YES | APTGT30X60T3G |
| | | 50 | 1.5 | SP3 | YES | APTGT50X60T3G |
| | | 75 | 1.5 | SP3 | YES | APTGT75X60T3G |
| 1200 | NPT FAST | 15 | 3.2 | SP3 | YES | APTGF15X120T3G |
| | | 25 | 3.2 | SP3 | YES | APTGF25X120T3G |
| | TRENCH 3 | 25 | 1.7 | SP3 | YES | APTGT25X120T3G |
| | | 35 | 1.7 | SP3 | YES | APTGT35X120T3G |
| | | 40 | 1.85 | SP3 | YES | APTGL40X120T3G |

IGBT Power Modules



PHASE LEG FOR WELDING APPLICATION

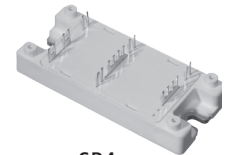
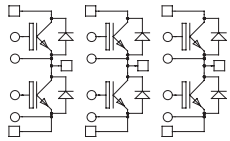
| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|------------------|
| 1200 | NPT FAST | 100 | 3.2 | SP3 | YES | APTGF100A120T3WG |
| | | 150 | 3.2 | SP3 | YES | APTGF150A120T3WG |



SP3

TRIPLE PHASE LEG

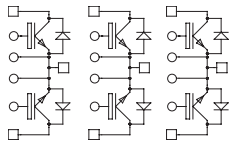
| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|--------|------------------|
| 600 | NPT FAST | 90 | 2.1 | SP6-P | option | APTGF90TA60PG |
| | | 50 | 1.5 | SP6-P | option | APTGT50TA60PG |
| | TRENCH 3 | 75 | 1.5 | SP6-P | option | APTGT75TA60PG |
| | | 150 | 1.5 | SP6-P | option | APTGT150TA60PG |
| 1200 | NPT FAST | 50 | 3.2 | SP6-P | option | APTGF50TA120PG |
| | | 75 | 1.7 | SP6-P | option | APTGT75TA120PG |
| | TRENCH 3 | 100 | 1.7 | SP6-P | YES | APTGT100TA120TPG |
| | | 120 | 1.85 | SP6-P | YES | APTGL120TA120TPG |



SP4

TRIPLE DUAL COMMON SOURCE

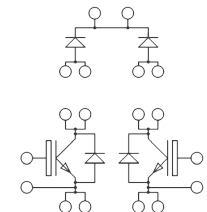
| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|--------|-------------------|
| 600 | TRENCH 3 | 50 | 1.5 | SP6-P | option | APTGT50TDU60PG |
| | | 75 | 1.5 | SP6-P | option | APTGT75TDU60PG |
| | | 100 | 1.5 | SP6-P | option | APTGT100TDU60PG |
| | | 150 | 1.5 | SP6-P | option | APTGT150TDU60PG |
| 1200 | TRENCH 3 | 50 | 3.2 | SP6-P | option | APTGF50TDU120PG |
| | | 75 | 1.7 | SP6-P | option | APTGT75TDU120PG |
| | | 120 | 1.85 | SP6-P | YES | APTGL120TDU120TPG |
| 1700 | TRENCH 3 | 50 | 2.0 | SP6-P | option | APTGT50TDU170PG |



SP6-P

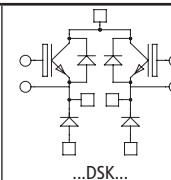
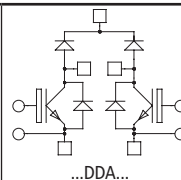
INTERLEAVED PFC

| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|------------------|
| 600 | NPT FAST | 50 | 2.1 | SP3 | YES | APTGF50VDA60T3G |
| 1200 | | 50 | 3.2 | SP3 | YES | APTGF50VDA120T3G |



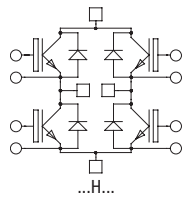
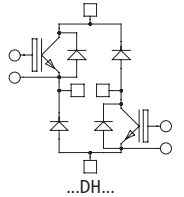
DUAL CHOPPER

| V_{CES} (V) | IGBT Type | I_C (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | ...DDA... | ...DSK... |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|------------------|------------------|
| 600 | NPT FAST | 50 | 2.1 | SP3 | YES | APTGF50DDA60T3G | APTGF50DSK60T3G |
| | | 75 | 1.5 | SP3 | YES | APTGT50DDA60T3G | APTGT50DSK60T3G |
| | TRENCH 3 | 75 | 1.5 | SP3 | YES | APTGT75DDA60T3G | APTGT75DSK60T3G |
| 1200 | NPT FAST | 25 | 3.2 | SP3 | YES | APTGF25DDA120T3G | APTGF25DSK120T3G |
| | | 50 | 3.2 | SP3 | YES | APTGF50DDA120T3G | APTGF50DSK120T3G |
| | | 75 | 3.2 | SP4 | YES | APTGF75DDA120TG | APTGF75DSK120TG |
| | TRENCH 3 | 50 | 1.7 | SP3 | YES | APTGT50DDA120T3G | APTGT50DSK120T3G |
| | | 60 | 1.85 | SP3 | YES | APTGL60DDA120T3G | APTGL60DSK120T3G |
| | | 90 | 1.85 | SP3 | YES | APTGL90DDA120T3G | APTGL90DSK120T3G |



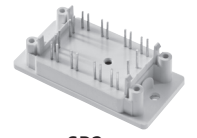
IGBT Power Modules

FULL & ASYMMETRICAL BRIDGE

| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC |  |  |
|------------------|----------------|-------------------------------------|------------------------------------|--------------|-----------------|--|---|
| | | | | | | ...H... | ...DH... |
| 600 | NPT FAST | 30 | 2.1 | SP1 | YES | APTGF30H60T1G | N/A |
| | | 30 | 2.1 | SP3 | YES | APTGF30H60T3G | N/A |
| | | 50 | 2.1 | SP1 | YES | APTGF50H60T1G | APTGF50DH60T1G |
| | | 50 | 2.1 | SP3 | YES | APTGF50H60T3G | N/A |
| | | 90 | 2.1 | SP3 | YES | APTGF90H60T3G | APTGF90DH60T3G |
| | | 180 | 2.1 | SP6 | - | APTGF180H60G | APTGF180DH60G |
| | TRENCH 3 | 20 | 1.5 | SP1 | YES | APTGT20H60T1G | N/A |
| | | 30 | 1.5 | SP1 | YES | APTGT30H60T1G | N/A |
| | | 50 | 1.5 | SP1 | YES | APTGT50H60T1G | APTGT50DH60T1G |
| | | 50 | 1.5 | SP2 | YES | APTGT50H60T2G | N/A |
| | | 50 | 1.5 | SP3 | YES | APTGT50H60T3G | N/A |
| | | 75 | 1.5 | SP1 | YES | APTGT75H60T1G | APTGT75DH60T1G |
| | | 75 | 1.5 | SP2 | YES | APTGT75H60T2G | N/A |
| | | 75 | 1.5 | SP3 | YES | APTGT75H60T3G | N/A |
| | | 100 | 1.5 | SP4 | YES | APTGT100H60TG | APTGT100DH60TG |
| | | 100 | 1.5 | SP3 | YES | APTGT100H60T3G | APTGT100DH60T3G |
| | | 150 | 1.5 | SP4 | YES | APTGT150H60TG | APTGT150DH60TG |
| | | 200 | 1.5 | SP6 | - | APTGT200H60G | APTGT200DH60G |
| 300 | 1.5 | SP6 | - | APTGT300H60G | APTGT300DH60G | | |
| 650 | TRENCH 4 FAST | 75 | 1.85 | SP1 | YES | APTGLQ75H65T1G | N/A |
| | | 300 | 1.85 | SP6 | option | APTGLQ300H65G | N/A |
| 1200 | NPT ULTRA FAST | 25 | 2.1 | SP2 | YES | APTGFQ25H120T2G | N/A |
| | NPT FAST | 15 | 3.2 | SP1 | YES | APTGF15H120T1G | N/A |
| | | 25 | 3.2 | SP1 | YES | APTGF25H120T1G | N/A |
| | | 25 | 3.2 | SP2 | YES | APTGF25H120T2G | N/A |
| | | 25 | 3.2 | SP3 | YES | APTGF25H120T3G | N/A |
| | | 50 | 3.2 | SP3 | YES | N/A | APTGF50DH120T3G |
| | | 50 | 3.2 | SP4 | YES | APTGF50H120TG | APTGF50DH120TG |
| | | 75 | 3.2 | SP4 | YES | APTGF75H120TG | APTGF75DH120TG |
| | TRENCH 3 | 150 | 3.2 | SP6 | - | APTGF150H120G | APTGF150DH120G |
| | | 35 | 1.7 | SP3 | YES | APTGT35H120T3G | N/A |
| | | 50 | 1.7 | SP3 | YES | N/A | APTGT50DH120T3G |
| | | 50 | 1.7 | SP4 | YES | APTGT50H120TG | APTGT50DH120TG |
| | | 50 | 1.7 | SP3 | YES | APTGT50H120T3G | N/A |
| | | 75 | 1.7 | SP3 | YES | N/A | APTGT75DH120T3G |
| | | 75 | 1.7 | SP4 | YES | APTGT75H120TG | APTGT75DH120TG |
| | | 100 | 1.7 | SP4 | YES | N/A | APTGT100DH120TG |
| | TRENCH 4 | 100 | 1.7 | SP6 | - | APTGT100H120G | N/A |
| | | 150 | 1.7 | SP6 | - | APTGT150H120G | APTGT150DH120G |
| | | 200 | 1.7 | SP6 | - | APTGT200H120G | APTGT200DH120G |
| | | 40 | 1.85 | SP1 | YES | APTGL40H120T1G | N/A |
| 60 | | 1.85 | SP3 | YES | APTGL60H120T3G | APTGL60DH120T3G | |
| 90 | | 1.85 | SP3 | YES | APTGL90H120T3G | APTGL90DH120T3G | |
| TRENCH 4 FAST | 40 | 2.05 | SP1 | YES | APTGLQ40H120T1G | N/A | |
| | 75 | 2.05 | SP3 | YES | APTGLQ75H120T3G | N/A | |
| | 200 | 2.05 | SP6 | option | APTGLQ200H120G | N/A | |
| 1700 | TRENCH 3 | 30 | 2.0 | SP3 | YES | APTGT30H170T3G | N/A |
| | | 50 | 2.0 | SP4 | YES | APTGT50H170TG | APTGT50DH170TG |
| | | 100 | 2.0 | SP6 | - | APTGT100H170G | APTGT100DH170G |
| | | 150 | 2.0 | SP6 | - | APTGT150H170G | APTGT150DH170G |



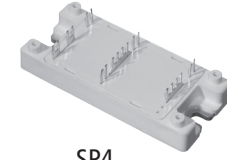
SP1



SP2



SP3



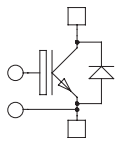
SP4



SP6 Full Bridge

IGBT Power Modules

SINGLE SWITCH

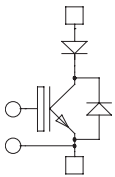


| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | NPT FAST | 360 | 2.1 | D4 | - | APTGF360U60D4G |
| | | 500 | 2.1 | D4 | - | APTGF500U60D4G |
| | | 660 | 2.1 | D4 | - | APTGF660U60D4G |
| 1200 | TRENCH 3 | 750 | 1.5 | D4 | - | APTGT750U60D4G |
| | NPT FAST | 530 | 3.2 | D4 | - | APTGF530U120D4G |
| | | 400 | 1.7 | D4 | - | APTGT400U120D4G |
| | | 600 | 1.7 | D4 | - | APTGT600U120D4G |
| | TRENCH 4 | 475 | 1.85 | D4 | - | APTGL475U120D4G |
| | | 700 | 1.85 | D4 | - | APTGL700U120D4G |
| 1700 | TRENCH 3 | 400 | 2.0 | D4 | - | APTGT400U170D4G |
| | | 600 | 2.0 | D4 | - | APTGT600U170D4G |

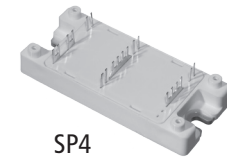


D4

SINGLE SWITCH + SERIES DIODE

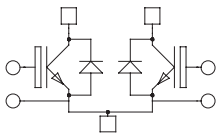


| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 1200 | NPT FAST | 200 | 3.2 | SP6 | - | APTGF200U120DG |
| | | 300 | 3.2 | SP6 | - | APTGF300U120DG |
| | TRENCH 4 | 475 | 1.85 | SP6 | - | APTGL475U120DAG |

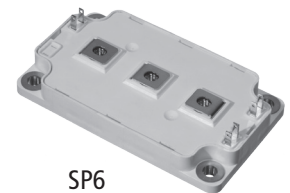


SP4

DUAL COMMON SOURCE



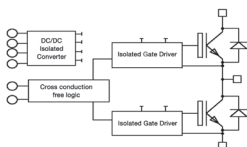
| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | NPT FAST | 90 | 2.1 | SP4 | YES | APTGF90DU60TG |
| | | 180 | 2.1 | SP4 | YES | APTGF180DU60TG |
| | | 350 | 2.1 | SP6 | - | APTGF350DU60G |
| | TRENCH 3 | 100 | 1.5 | SP4 | YES | APTGT100DU60TG |
| | | 200 | 1.5 | SP4 | YES | APTGT200DU60TG |
| | | 300 | 1.4 | SP6 | - | APTGT300DU60G |
| 1200 | NPT FAST | 600 | 1.4 | SP6 | - | APTGT600DU60G |
| | | 100 | 3.2 | SP4 | YES | APTGF100DU120TG |
| | | 150 | 3.2 | SP4 | YES | APTGF150DU120TG |
| | TRENCH 3 | 300 | 3.2 | SP6 | - | APTGF300DU120G |
| | | 50 | 1.7 | SP4 | YES | APTGT50DU120TG |
| | | 75 | 1.7 | SP4 | YES | APTGT75DU120TG |
| | | 100 | 1.7 | SP4 | YES | APTGT100DU120TG |
| | | 150 | 1.7 | SP6 | - | APTGT150DU120G |
| | | 150 | 1.7 | SP4 | YES | APTGT150DU120TG |
| | | 200 | 1.7 | SP6 | - | APTGT200DU120G |
| | | 300 | 1.7 | SP6 | - | APTGT300DU120G |
| | | 400 | 1.7 | SP6 | - | APTGT400DU120G |
| 1700 | TRENCH 3 | 100 | 2.0 | SP4 | YES | APTGT100DU170TG |
| | | 225 | 2.0 | SP6 | - | APTGT225DU170G |
| | | 300 | 2.0 | SP6 | - | APTGT300DU170G |



SP6

Intelligent Power Modules

PHASE LEG



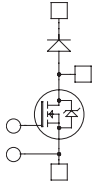
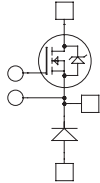
| V_{CES} (V) | IGBT Type | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|-----------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | NPT FAST | 350 | 2.1 | LP8 | - | APTLGF350A608G |
| | TRENCH 3 | 400 | 1.5 | LP8 | - | APTLGT400A608G |
| 1200 | NPT FAST | 300 | 3.2 | LP8 | - | APTLGF300A1208G |
| | TRENCH 3 | 300 | 1.7 | LP8 | - | APTLGT300A1208G |
| | TRENCH 4 | 325 | 1.8 | LP8 | - | APTLGL325A1208G |

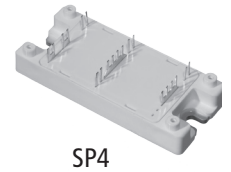


LP8

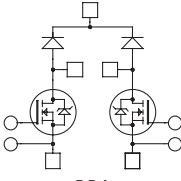
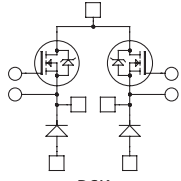
MOSFET Power Modules

CHOPPER

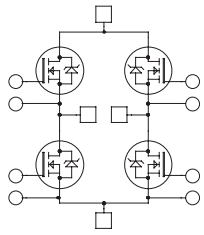
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_c=80^\circ\text{C}$ | Package | NTC |  DA...or...U2 |  SK...or...U3 |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|---|---|
| 100 | MOS 5 | 11 | 100 | SOT-227 | - | APT10M11JVU2 | APT10M11JVU3 |
| | | 4.5 | 207 | SP4 | YES | APTM10DAM05TG | APTM10SKM05TG |
| | | 2.25 | 370 | SP6 | - | APTM10DAM02G | APTM10SKM02G |
| 200 | MOS 5 | 22 | 71 | SOT-227 | - | APT20M22JVU2 | APT20M22JVU3 |
| | | 8 | 147 | SP4 | YES | APTM20DAM08TG | APTM20SKM08TG |
| | MOS 7 | 5 | 250 | SP6 | option | APTM20DAM05G | APTM20SKM05G |
| | | 4 | 300 | SP6 | option | APTM20DAM04G | APTM20SKM04G |
| 500 | MOS 5 | 100 | 30 | SOT-227 | - | APT5010JVU2 | APT5010JVU3 |
| | | 100 | 30 | SOT-227 | - | APT5010JLLU2 | APT5010JLLU3 |
| | | 75 | 32 | SOT-227 | - | APT50M75JLLU2 | APT50M75JLLU3 |
| | MOS 7 | 19 | 125 | SP6 | option | APTM50DAM19G | APTM50SKM19G |
| | | 17 | 140 | SP6 | option | APTM50DAM17G | APTM50SKM17G |
| | MOS 8 | 65 | 43 | SOT-227 | - | APT58M50JU2 | APT58M50JU3 |
| 600 | CoolMOS | 70 | 40 | SOT-227 | - | APT40N60JCU2 | APT40N60JCU3 |
| | | 24 | 70 | SP1 | YES | APTC60DAM24T1G | APTC60SKM24T1G |
| 900 | CoolMOS | 120 | 25 | SOT-227 | - | APT33N90JCU2 | APT33N90JCU3 |
| | | 60 | 44 | SP1 | YES | APTC90DAM60T1G | APTC90SKM60T1G |
| 1000 | MOS 7 | 180 | 33 | SP4 | YES | APTM100DA18TG | APTM100SK18TG |
| | | 90 | 59 | SP6 | option | APTM100DAM90G | APTM100SKM90G |
| | MOS 8 | 330 | 17 | SP1 | YES | APTM100DA33T1G | APTM100SK33T1G |
| 1200 | MOS8 | 300 | 23 | SP1 | YES | APTM120DA30T1G | N/A |



DUAL CHOPPER

| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_c=80^\circ\text{C}$ | Package | NTC |  ...DDA... |  ...DSK... |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|---|--|
| 100 | MOS 5 | 19 | 50 | SP3 | YES | APTM10DDAM19T3G | APTM10DSKM19T3G |
| | | 9 | 100 | SP3 | YES | APTM10DDAM09T3G | APTM10DSKM09T3G |
| 500 | MOS 7 | 100 | 24 | SP3 | YES | APTM50DDA10T3G | APTM50DSK10T3G |
| | | 65 | 37 | SP3 | YES | APTM50DDAM65T3G | APTM50DSKM65T3G |
| 600 | CoolMOS | 45 | 38 | SP1 | YES | APTC60DDAM45T1G | APTC60DSKM45T1G |
| | | 70 | 29 | SP1 | YES | APTC60DDAM70T1G | APTC60DSKM70T1G |
| | | 35 | 54 | SP3 | YES | APTC60DDAM35T3G | APTC60DSKM35T3G |
| | | 24 | 70 | SP3 | YES | APTC60DDAM24T3G | APTC60DSKM24T3G |
| 800 | CoolMOS | 150 | 21 | SP3 | YES | APTC80DDA15T3G | APTC80DSK15T3G |
| 1000 | MOS 7 | 350 | 17 | SP3 | YES | APTM100DDA35T3G | APTM100DSK35T3G |

MOSFET Power Modules

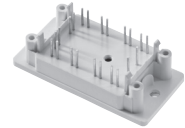


FULL BRIDGE

| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _C =80° C | Package | NTC | Part Number | |
|----------------------|-------------|--------------------------|---|---------|-----|-----------------|---------------|
| 100 | FREDFET 5 | 4.5 | 207 | SP6 | - | APTM10HM05FG | |
| | | 19 | 50 | SP3 | YES | APTM10HM19FT3G | |
| | | 9 | 100 | SP3 | YES | APTM10HM09FT3G | |
| 200 | FREDFET 7 | 20 | 62 | SP4 | YES | APTM20HM20FTG | |
| | | 16 | 74 | SP4 | YES | APTM20HM16FTG | |
| | | 10 | 125 | SP6 | - | APTM20HM10FG | |
| | | 8 | 147 | SP6 | - | APTM20HM08FG | |
| | | 140 | 18 | SP3 | YES | APTM50H14FT3G | |
| 500 | FREDFET 7 | 100 | 24 | SP3 | YES | APTM50H10FT3G | |
| | | 75 | 32 | SP4 | YES | APTM50HM75FTG | |
| | | 75 | 32 | SP3 | YES | APTM50HM75FT3G | |
| | | 65 | 37 | SP4 | YES | APTM50HM65FTG | |
| | | 65 | 37 | SP3 | YES | APTM50HM65FT3G | |
| | | 38 | 64 | SP6 | - | APTM50HM38FG | |
| | | 35 | 70 | SP6 | - | APTM50HM35FG | |
| | FREDFET 8 | 150 | 19 | SP1 | YES | APTM50H15FT1G | |
| 600 | CoolMOS | 70 | 29 | SP1 | YES | APTC60HM70T1G | |
| | | 45 | 38 | SP1 | YES | APTC60HM45T1G | |
| | | 83 | 21 | SP2 | YES | APTC60HM83FT2G | |
| | | 70 | 29 | SP3 | YES | APTC60HM70T3G | |
| | | 35 | 54 | SP3 | YES | APTC60HM35T3G | |
| | | 24 | 70 | SP3 | YES | APTC60HM24T3G | |
| 800 | CoolMOS | FREDFET 8 | 230 | 15 | SP1 | YES | APTM60H23FT1G |
| | | 150 | 21 | SP1 | YES | APTC80H15T1G | |
| | | 290 | 11 | SP3 | YES | APTC80H29T3G | |
| 900 | CoolMOS | 150 | 21 | SP3 | YES | APTC80H15T3G | |
| | | 120 | 23 | SP1 | YES | APTC90H12T1G | |
| | | 60 | 44 | SP3 | YES | APTC90HM60T3G | |
| 1000 | FREDFET 7 | 450 | 14 | SP3 | YES | APTM100H45FT3G | |
| | | 350 | 17 | SP4 | YES | APTM100H35FTG | |
| | | 350 | 17 | SP3 | YES | APTM100H35FT3G | |
| | | 180 | 33 | SP6 | - | APTM100H18FG | |
| | FREDFET 8 | 460 | 14 | SP3 | YES | APTM100H46FT3G | |
| 1200 | FREDFET 7 | 290 | 25 | SP6 | - | APTM120H29FG | |
| | FREDFET 8 | 1400 | 6 | SP1 | YES | APTM120H140FT1G | |



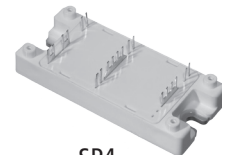
SP1



SP2



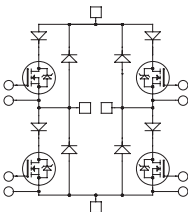
SP3



SP4



SP6

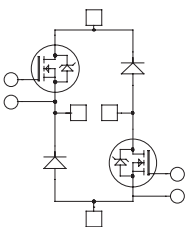


FULL BRIDGE + SERIES AND PARALLEL DIODES

| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _C =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|-----|---------------|
| 200 | MOS 7 | 20 | 62 | SP4 | YES | APTM20HM20STG |
| 500 | MOS 7 | 75 | 32 | SP4 | YES | APTM50HM75STG |
| 1000 | MOS 7 | 450 | 13 | SP4 | YES | APTM100H45STG |

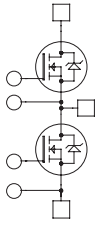
ASYMMETRICAL BRIDGE

| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _C =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|-----|----------------|
| 100 | MOS5 | 4.5 | 207 | SP6 | - | APTM10DHM05G |
| 200 | MOS 7 | 16 | 77 | SP3 | YES | APTM20DHM16T3G |
| | | 8 | 147 | SP6 | - | APTM20DHM08G |
| 500 | MOS 7 | 38 | 64 | SP6 | - | APTM50DHM38G |
| | MOS 8 | 65 | 32 | SP3 | YES | APTM50DHM65T3G |
| 600 | CoolMOS | 24 | 70 | SP3 | YES | APTC60DHM24T3G |



MOSFET Power Modules

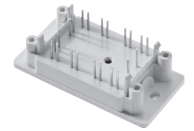
PHASE LEG



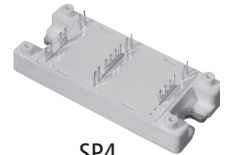
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|----------------|
| 100 | FREDFET 5 | 4.5 | 207 | SP4 | YES | APTM10AM05FTG |
| | | 2.25 | 370 | SP6 | option | APTM10AM02FG |
| 200 | FREDFET 7 | 10 | 125 | SP4 | YES | APTM20AM10FTG |
| | | 8 | 147 | SP4 | YES | APTM20AM08FTG |
| | | 5 | 250 | SP6 | option | APTM20AM05FG |
| | | 4 | 300 | SP6 | option | APTM20AM04FG |
| 500 | FREDFET 7 | 38 | 64 | SP4 | YES | APTM50AM38FTG |
| | | 35 | 70 | SP4 | YES | APTM50AM35FTG |
| | | 19 | 125 | SP6 | option | APTM50AM19FG |
| | | 17 | 140 | SP6 | option | APTM50AM17FG |
| | | 45 | 38 | SP1 | YES | APTC60AM45T1G |
| 600 | CoolMOS | 42 | 40 | SP2 | - | APTC60AM42F2G |
| | | 35 | 54 | SP1 | YES | APTC60AM35T1G |
| | | 24 | 70 | SP1 | YES | APTC60AM24T1G |
| | | 24 | 70 | SP2 | - | APTC60AM242G |
| | | 110 | 30 | SP1 | YES | APTM60A11FT1G |
| 900 | CoolMOS | 60 | 44 | SP1 | YES | APTC90AM60T1G |
| | | 60 | 44 | SP2 | - | APTC90AM602G |
| 1000 | FREDFET 7 | 180 | 33 | SP4 | YES | APTM100A18FTG |
| | | 90 | 59 | SP6 | option | APTM100AM90FG |
| 1200 | FREDFET 8 | 400 | 16 | SP1 | YES | APTM100A40FT1G |
| | | 290 | 25 | SP4 | YES | APTM120A29FTG |
| | | 150 | 45 | SP6 | option | APTM120A15FG |
| | | 650 | 12 | SP1 | YES | APTM120A65FT1G |



SP1



SP2



SP4

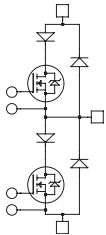


SP6



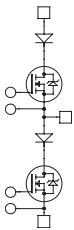
SP6-P

PHASE LEG + SERIES AND PARALLEL DIODES



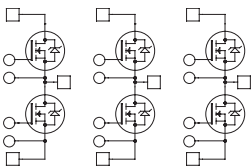
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|---------------|
| 200 | MOS 7 | 10 | 125 | SP4 | YES | APTM20AM10STG |
| | | 6 | 225 | SP6 | - | APTM20AM06PSG |
| 500 | MOS 7 | 38 | 64 | SP4 | YES | APTM50AM38STG |
| | | 24 | 110 | SP6 | - | APTM50AM24SG |
| 1000 | MOS 7 | 230 | 26 | SP4 | YES | APTM100A23STG |
| | | 130 | 49 | SP6 | - | APTM100A13SG |
| 1200 | MOS 7 | 200 | 37 | SP6 | - | APTM120A20SG |

PHASE LEG + SERIES DIODES



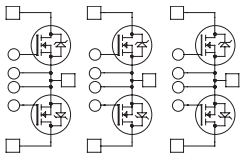
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|--------------|
| 1000 | MOS 7 | 130 | 49 | SP6 | - | APTM100A13DG |
| 1200 | MOS 7 | 200 | 37 | SP6 | - | APTM120A20DG |

TRIPLE PHASE LEG



| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|----------------|
| 75 | MOSFET | 4.2 | 90 | SP6-P | option | APTM08TAM04PG |
| 100 | FREDFET 5 | 19 | 50 | SP6-P | option | APTM10TAM19FPG |
| | | 9 | 100 | SP6-P | option | APTM10TAM09FPG |
| 200 | FREDFET 7 | 16 | 74 | SP6-P | option | APTM20TAM16FPG |
| 500 | FREDFET 7 | 65 | 37 | SP6-P | option | APTM50TAM65FPG |
| 600 | CoolMOS | 35 | 54 | SP6-P | option | APTC60TAM35PG |
| | | 24 | 70 | SP6-P | YES | APTC60TAM24TPG |
| 800 | CoolMOS | 150 | 21 | SP6-P | option | APTC80TA15PG |
| 900 | CoolMOS | 60 | 44 | SP6-P | YES | APTC90TAM60TPG |
| 1000 | FREDFET 7 | 350 | 17 | SP6-P | option | APTM100TA35FPG |

MOSFET Power Modules



TRIPLE DUAL COMMON SOURCE

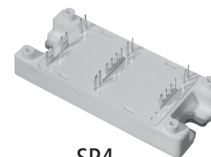
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|----------------|
| 100 | MOS 5 | 9 | 100 | SP6-P | option | APTM10TDUM09PG |
| 600 | CoolMOS | 35 | 54 | SP6-P | option | APTC60TDUM35PG |
| 800 | CoolMOS | 150 | 21 | SP6-P | option | APTC80TDU15PG |
| 1200 | MOS 7 | 570 | 13 | SP6-P | option | APTM120TDU57PG |



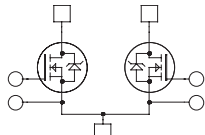
SP1



SP3



SP4



DUAL COMMON SOURCE

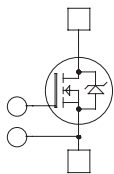
| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|---------------|
| 100 | MOS 5 | 2.25 | 370 | SP6 | - | APTM10DUM02G |
| 200 | MOS 7 | 8 | 147 | SP4 | YES | APTM20DUM08TG |
| | | 5 | 250 | SP6 | - | APTM20DUM05G |
| | | 4 | 300 | SP6 | - | APTM20DUM04G |
| 500 | MOS 7 | 35 | 70 | SP4 | YES | APTM50DUM35TG |
| | | 17 | 140 | SP6 | - | APTM50DUM17G |
| 1000 | MOS 7 | 90 | 59 | SP6 | - | APTM100DUM90G |
| 1200 | MOS 7 | 150 | 45 | SP6 | - | APTM120DU15G |



SP6



SP6-P

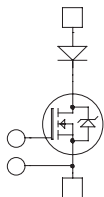


SINGLE SWITCH

| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|----------------|
| 100 | FREDFET 5 | 2.25 | 430 | SP6 | option | APTM10UM02FAG |
| | | 1.5 | 640 | SP6 | option | APTM10UM01FAG |
| 200 | FREDFET 7 | 3 | 434 | SP6 | option | APTM20UM03FAG |
| 500 | FREDFET 7 | 9 | 371 | SP6 | option | APTM50UM09FAG |
| 1000 | FREDFET 7 | 60 | 97 | SP6 | option | APTM100UM60FAG |
| | | 45 | 160 | SP6 | option | APTM100UM45FAG |
| 1200 | FREDFET 7 | 70 | 126 | SP6 | option | APTM120UM70FAG |

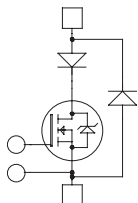
SINGLE SWITCH + SERIES DIODE

| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|----------------|
| 1000 | MOS 7 | 65 | 110 | SP6 | - | APTM100UM65DAG |
| | | 45 | 160 | SP6 | - | APTM100UM45DAG |
| 1200 | MOS 7 | 70 | 126 | SP6 | - | APTM120UM70DAG |



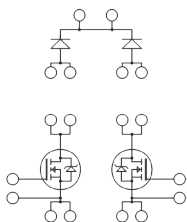
SINGLE SWITCH + SERIES AND PARALLEL DIODES

| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|--------|----------------|
| 200 | MOS 7 | 4 | 310 | SP6 | option | APTM20UM04SAG |
| 500 | MOS 7 | 13 | 250 | SP6 | option | APTM50UM13SAG |
| 1000 | MOS 7 | 65 | 110 | SP6 | option | APTM100UM65SAG |
| 1200 | MOS 7 | 100 | 86 | SP6 | option | APTM120U10SAG |

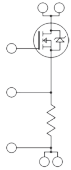
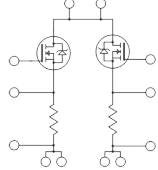


INTERLEAVED PFC

| V_{DSS} (V) | MOSFET Type | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------|----------------------------|-------------------------------------|---------|-----|-----------------|
| 600 | CoolMOS | 45 | 38 | SP1 | YES | APTC60VDAM45T1G |
| | | 24 | 70 | SP3 | YES | APTC60VDAM24T3G |

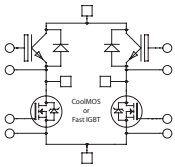


SINGLE AND DUAL LINEAR MOSFET

| V_{DS} (V) | MOSFET Type | $R_{DS(on)}$ (m Ω) | Shunt Resistor (mR) | Package | NTC |  |  |
|--------------|---------------|----------------------------|---------------------|------------|-----|---|---|
| 100 | MOS 5 | 9 | 4.4 | SP1 or SP3 | YES | APTML10UM09R004T1AG | APTML102UM09R004T3AG |
| 200 | | 18 | 10 | | YES | APTML20UM18R010T1AG | APTML202UM18R010T3AG |
| 500 | | 90 | 20 | | YES | APTML50UM90R020T1AG | APTML502UM90R020T3AG |
| 600 | MOSFET Linear | 125 | 20 | | YES | APTML60U12R020T1AG | APTML602U12R020T3AG |
| 1000 | MOS 4 Linear | 600 | 20 | | YES | APTML100U60R020T1AG | APTML1002U60R020T3AG |

Renewable Energy Power Modules

FULL BRIDGE



| V_{CES} (V) | Technology | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|----------------------------|-------------------------------------|------------------------------------|---------|-----|----------------|
| 600 | Mix Trench IGBT & NPT IGBT | 50 | 2.1/1.5 | SP3 | YES | APTGV50H60T3G |
| | | 75 | 2.1/1.5 | SP3 | YES | APTGV75H60T3G |
| | | 100 | 2.1/1.5 | SP3 | YES | APTGV100H60T3G |
| | Mix Trench IGBT & CoolMOS | 50 | 83mR/1.5 | SP1 | YES | APTCV40H60CT1G |
| | | 50 | 45mR/1.5 | SP3 | YES | APTCV50H60T3G |
| 1200 | Mix Trench IGBT & NPT IGBT | 25 | 3.2/1.7 | SP3 | YES | APTGV25H120T3G |
| | | 50 | 3.2/1.7 | SP3 | YES | APTGV50H120T3G |

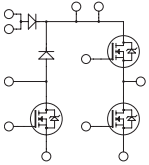


SP1



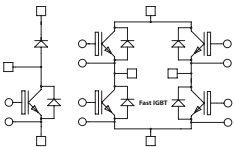
SP3

PFC + BYPASS DIODE + PHASE LEG

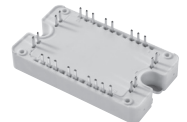


| V_{CES} (V) | Technology | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Special | Part Number |
|---------------|------------|-------------------------------------|------------------------------------|---------|-----|-------------------|---------------|
| 600 | CoolMOS | 38 | 45mR | SP1 | N/A | 10A PFC SiC diode | APTC60AM45B1G |
| | | 38 | 45mR | SP1 | N/A | - | APTC60AM45B1G |
| | | 27 | 83mR | SP1 | N/A | 10A PFC SiC diode | APTC60AM83B1G |
| | | 27 | 83mR | SP1 | N/A | - | APTC60AM83B1G |

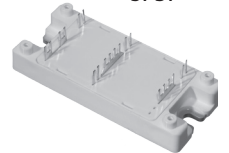
PFC + FULL BRIDGE



| V_{CES} (V) | Technology | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|----------------------------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | Mix Trench IGBT & NPT IGBT | 50 | 2.1/1.5 | SP4 | - | APTGV50H60BG |
| | | 100 | 2.1/1.5 | SP6-P | YES | APTGV100H60BTPG |
| 1200 | Mix Trench IGBT & NPT IGBT | 25 | 3.2/1.7 | SP4 | - | APTGV25H120BG |
| | | 50 | 3.2/1.7 | SP6-P | YES | APTGV50H120BTPG |

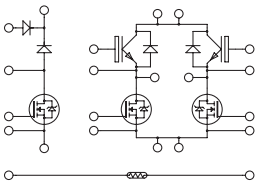


SP3F



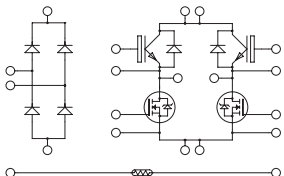
SP4

PFC + BYPASS DIODE + FULL BRIDGE

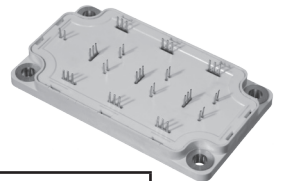


| V_{CES} (V) | Technology | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Special | Part Number | |
|---------------|---------------------------|-------------------------------------|------------------------------------|---------|------|-------------------|------------------|----------------|
| 600 | Mix Trench IGBT & CoolMOS | 38 | 1.5/45mR | SP3F | YES | 20A PFC SiC diode | APTCV60HM45BCT3G | |
| | | 38 | 1.5/45mR | SP3F | YES | - | APTCV60HM45BT3G | |
| | | 29 | 1.5/70mR | SP3F | YES | - | APTCV60HM70BT3G | |
| | CoolMOS | 29 | 70mR | SP3F | YES | - | APTCV60HM70BT3G | |
| | | Mix Trench IGBT & NPT IGBT | 50 | 3.2/1.7 | SP3F | YES | - | APTGV50H60BT3G |

SECONDARY FAST RECTIFIER + FULL BRIDGE

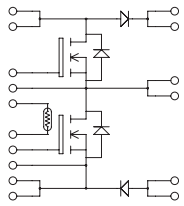


| V_{CES} (V) | Technology | I_c (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Special | Part Number | |
|---------------|---------------------------|-------------------------------------|------------------------------------|---------|------|----------------------------|------------------|----------------|
| 600 | Mix Trench IGBT & CoolMOS | 38 | 1.5/45mR | SP3F | YES | 20A SiC antiparallel diode | APTCV60HM45RCT3G | |
| | | 38 | 1.5/45mR | SP3F | YES | - | APTCV60HM45RT3G | |
| | | 29 | 1.5/70mR | SP3F | YES | - | APTCV60HM70RT3G | |
| | CoolMOS | 29 | 70mR | SP3F | YES | - | APTCV60HM70RT3G | |
| | | TRENCH 3 | 50 | 1.5 | SP3F | YES | - | APTGT50H60RT3G |



SP6-P

Renewable Energy Power Modules



BOOST BUCK

| V_{CES} (V) | Technology | I_C (A) $T_C=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|------------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | CoolMOS | 70 | 24mR | SP3F | YES | APTC60BBM24T3G |
| 600 | TRENCH 3 | 100 | 1.5 | SP3F | YES | APTGT100BB60T3G |



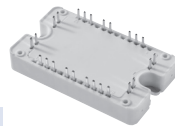
SP1

3-LEVEL NPC INVERTER

| V_{CES} (V) | Technology | I_C (A) $T_C=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Part Number |
|---------------|------------|-------------------------------------|------------------------------------|---------|-----|-----------------|
| 600 | TRENCH 3 | 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 |
| | | 600 | NPT FAST | 30 | 2.1 | SP1 |
| 50 | 2.1 | | | SP3 | YES | APTGF50TL60T3G |
| 650 | Trench 3 | 300 | 1.5 | SP6 | - | APTGT300TL65G |
| | | 400 | 1.5 | SP6 | - | APTGT400TL65G |
| 1200 | TRENCH 4 | 60 | 1.85 | SP3 | YES | APTGL60TL120T3G |
| | | 240 | 1.8 | SP6 | - | APTGL240TL120G |
| 1700 | TRENCH 3 | 100 | 2.0 | SP6 | - | APTGT100TL170G |

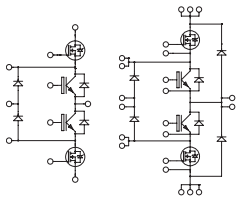
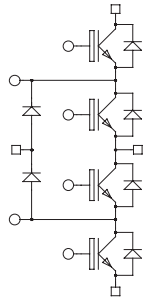


SP3



NEW!
NEW!

SP3F



SP1

SP3

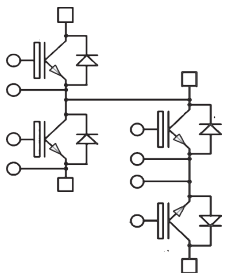
| V_{CES} (V) | Technology | $R_{DS(ON)}$ CoolMOS (m Ω) | $V_{CE(on)}$ IGBT (V) / I_C (A) | Package | NTC | Part Number |
|---------------|---------------------------|------------------------------------|-----------------------------------|---------|-----|-----------------|
| 600 | Mix Trench IGBT & CoolMOS | 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 |
| 900 | Mix Trench IGBT & CoolMOS | 120 | 1.85/50 | SP3 | YES | APTCV90TL12T3G |



SP6 3-Level

T-TYPE 3-LEVEL INVERTER

| V_{CES} (V) | Technology | I_C (A) $T_C=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_C | Package | NTC | Special | Part Number |
|---------------|---------------|-------------------------------------|------------------------------------|---------|-----|--------------|-------------------|
| 600/1200 | TRENCH 4 FAST | 40 | 2.05 | SP3F | YES | 10A/600V SiC | APTGLQ40HR120CT3G |
| | | 80 | 2.05 | SP3F | YES | 30A/600V SiC | APTGLQ80HR120CT3G |
| | | 200 | 2.05 | SP6 | NO | - | APTGLQ200HR120G |



Power Modules with SiC Schottky Diodes

Silicon Carbide (SiC) Schottky Diodes offer superior dynamic and thermal performance over conventional Silicon power diodes. The main advantages of the SiC Schottky Diodes are:

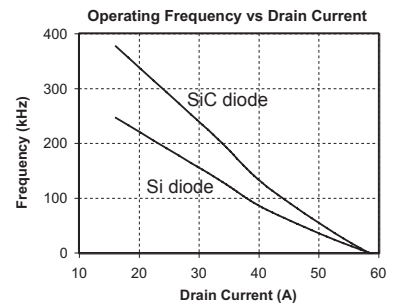
- Essentially zero forward and reverse recovery = reduced switch and diode switching losses
- Temperature independent switching behavior = stable high temperature performance
- Positive temperature coefficient of VF = ease of parallel operation
- Usable 175°C Junction Temperature = safely operate at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

Extremely fast switching of SiC Schottky diode enables designs with:

- Improved System Efficiency
- Higher Reliability
- Lower System Switching Losses
- Lower System Cost
 - Smaller EMI Filter
 - Smaller Magnetic Components
 - Smaller Heat-Sink
 - Smaller Switches, Eliminate Snubbers
- Reduced System Size
 - Fewer / Smaller Components

Applications:

- PFC
- Output Rectification
- Solar Inverter
- Motor Control
- Snubber Diode



Diode Power Modules with SiC Diodes

DUAL DIODE

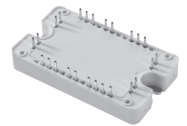
| V_{RRM} (V) | DIODE Type | IF (A) $T_c=100^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package | Anti-Parallel | Parallel |
|---------------|------------|-----------------------------------|----------------------------------|---------|---------------|---------------|
| 600 | SiC | 20 | 1.6 | SOT-227 | APT2X20DC60J | APT2X21DC60J |
| | | 30 | 1.6 | SOT-227 | APT2X30DC60J | APT2X31DC60J |
| | | 40 | 1.6 | SOT-227 | APT2X40DC60J | APT2X41DC60J |
| | | 50 | 1.6 | SOT-227 | APT2X50DC60J | APT2X51DC60J |
| | | 60 | 1.6 | SOT-227 | APT2X60DC60J | APT2X61DC60J |
| 1200 | SiC | 20 | 1.6 | SOT-227 | APT2X20DC120J | APT2X21DC120J |
| | | 40 | 1.6 | SOT-227 | APT2X40DC120J | APT2X41DC120J |
| | | 50 | 1.6 | SOT-227 | APT2X50DC120J | APT2X51DC120J |
| | | 60 | 1.6 | SOT-227 | APT2X60DC120J | APT2X61DC120J |



SOT-227

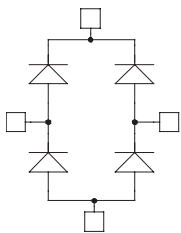


SP1



SP3F

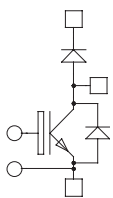
FULL BRIDGE



| V_{RRM} (V) | DIODE Type | IF (A) $T_c=100^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package | Part Number |
|---------------|------------|-----------------------------------|----------------------------------|---------|---------------|
| | SiC | 20 | 1.6 | SP1 | APTDC20H601G |
| | | 40 | 1.6 | SP1 | APTDC40H601G |
| | | 40 | 1.6 | SOT-227 | APT40DC60HJ |
| 1200 | SiC | 10 | 1.6 | SOT-227 | APT10DC120HJ |
| | | 20 | 1.6 | SP1 | APTDC20H1201G |
| | | 20 | 1.6 | SOT-227 | APT20DC120HJ |
| | | 40 | 1.6 | SP1 | APTDC40H1201G |
| | | 40 | 1.6 | SOT-227 | APT40DC120HJ |
| | | 40 | 1.6 | SOT-227 | APT40DC120HJ |

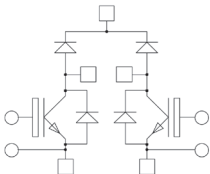
IGBT Power Modules with SiC Diodes

BOOST CHOPPER



| V_{RRM} (V) | IGBT Type | IC (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|---------------|----------------------------------|------------------------------------|---------|-----|------------------|
| 600 | NPT | 50 | 2.1 | SOT-227 | - | APT50GF60JCU2 |
| 1200 | NPT | 15 | 3.2 | SOT-227 | - | APT15GF120JCU2 |
| | | 25 | 3.2 | SOT-227 | - | APT25GF120JCU2 |
| | | 50 | 3.2 | SP1 | YES | APTGF50DA120CT1G |
| | TRENCH 4 FAST | 25 | 2.05 | SOT-227 | - | APT25GLQ120JCU2 |
| | | 40 | 2.05 | SOT-227 | - | APT40GLQ120JCU2 |

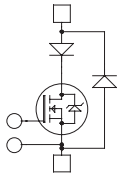
DUAL CHOPPER



| V_{RRM} (V) | IGBT Type | IC (A) $T_c=80^\circ\text{C}$ | $V_{CE(on)}$ (V) at rated I_c | Package | NTC | Part Number |
|---------------|---------------|----------------------------------|------------------------------------|---------|-----|--------------------|
| 1200 | TRENCH 4 FAST | 40 | 2.05 | SP3F | YES | APTGLQ40DDA120CT3G |

Power Modules with SiC Schottky Diodes

MOSFETs & CoolMOS™ Power Modules with SiC Diodes



SINGLE SWITCH + SERIES FRED AND SIC PARALLEL DIODES

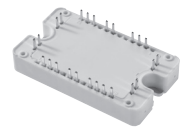
| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _c =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|--------|------------------|
| 1000 | MOS7 | 65 | 110 | SP6 | option | APTM100UM65SCAVG |
| 1200 | MOS7 | 100 | 86 | SP6 | option | APTM120U10SCAVG |



SOT-227



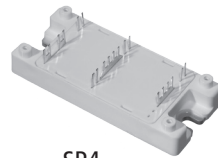
SP1



SP3F

CHOPPER

| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _c =80° C | Package | NTC | ...DA... or U2 | ...SK... or U3 |
|----------------------|-------------|--------------------------|---|---------|-----|-----------------|-----------------|
| 500 | MOS8 | 65 | 43 | SOT-227 | - | APT58M50JCU2 | N/A |
| | | 45 | 38 | SOT-227 | - | APT50N60JCCU2 | N/A |
| 600 | CoolMOS | 24 | 70 | SP1 | YES | N/A | APTC60SKM24CT1G |
| | | 18 | 107 | SP4 | YES | APTC60DAM18CTG | N/A |
| 900 | CoolMOS | 120 | 25 | SOT-227 | - | APT33N90JCCU2 | N/A |
| | | 60 | 44 | SP1 | YES | APTC90DAM60CT1G | APTC90SKM60CT1G |
| 1000 | MOS 8 | 330 | 20 | SOT-227 | - | APT26M100JCU2 | APT26M100JCU3 |
| | | 560 | 15 | SOT-227 | - | APT20M120JCU2 | APT20M120JCU3 |
| 1200 | MOS 8 | 300 | 23 | SP1 | YES | APTM120DA30CT1G | N/A |



SP4



SP6



SP6-P

PHASE LEG + SERIES FRED AND SIC PARALLEL DIODES

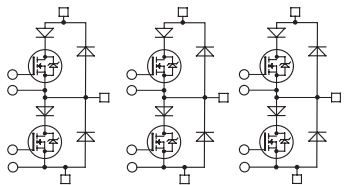
| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _c =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|-----|----------------|
| 500 | MOS 7 | 38 | 67 | SP4 | YES | APTM50AM38SCTG |
| | | 24 | 110 | SP6 | - | APTM50AM24SCG |
| 600 | CoolMOS | 35 | 54 | SP4 | YES | APTC60AM35SCTG |
| | | 24 | 70 | SP4 | YES | APTC60AM24SCTG |
| | | 18 | 107 | SP6 | - | APTC60AM18SCG |
| 900 | CoolMOS | 60 | 44 | SP4 | YES | APTC90AM60SCTG |
| 800 | CoolMOS | 150 | 21 | SP4 | YES | APTC80A15SCTG |
| | | 100 | 32 | SP4 | YES | APTC80A10SCTG |
| | | 75 | 43 | SP6 | - | APTC80AM75SCG |
| 1000 | MOS 7 | 130 | 49 | SP6 | - | APTM100A13SCG |

FULL BRIDGE + SERIES FRED AND SIC PARALLEL DIODES

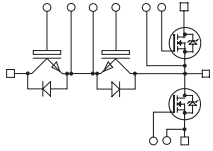
| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _c =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|-----|----------------|
| 500 | MOS 7 | 75 | 34 | SP4 | YES | APTM50HM75SCTG |
| 600 | CoolMOS | 70 | 29 | SP4 | YES | APTC60HM70SCTG |
| | | 45 | 38 | SP4 | YES | APTC60HM45SCTG |
| 800 | CoolMOS | 290 | 11 | SP4 | YES | APTC80H29SCTG |
| 900 | CoolMOS | 120 | 23 | SP4 | YES | APTC90H12SCTG |
| 1000 | MOS 7 | 450 | 14 | SP4 | YES | APTM100H45SCTG |

TRIPLE PHASE LEG

| V _{DSS} (V) | MOSFET Type | R _{DS(ON)} (mΩ) | I _D (A) T _c =80° C | Package | NTC | Part Number |
|----------------------|-------------|--------------------------|---|---------|-----|-------------------|
| 600 | CoolMOS | 24 | 87 | SP6-P | YES | APTC60TAM21SCTPAG |
| 1000 | MOS 7 | 350 | 50 | SP6-P | YES | APTM100TA35SCTPG |



SiC MOSFET Power Modules

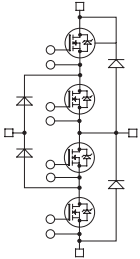


T-TYPE 3-LEVEL INVERTER

| V_{CES} (V) | Technology | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|-------------------|----------------------------|-------------------------------------|---------|-----|-------------------|
| 600/1200 | IGBT & SiC MOSFET | 110 | 20 | SP3F | YES | APTMC120HR11CT3G |
| | | 40 | 50 | SP3F | YES | APTMC120HRM40CT3G |



SOT-227



3-LEVEL NPC INVERTER

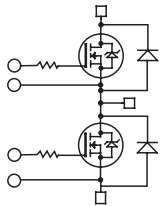
| V_{CES} (V) | Technology | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|------------|----------------------------|-------------------------------------|---------|-----|-------------------|
| 600 | SiC MOSFET | 110 | 20 | SP3F | YES | APTMC60TL11CT3AG |
| | | 55 | 40 | SP3F | YES | APTMC60TLM55CT3AG |
| | | 14 | 160 | SP6 | - | APTMC60TLM14CAG |



SP1

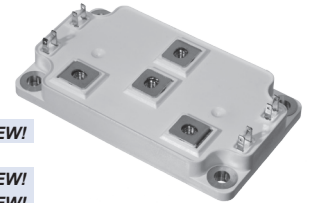


SP3F



PHASE LEG

| V_{CES} (V) | Technology | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|------------|----------------------------|-------------------------------------|---------|-----|-------------------|
| 1200 | SiC MOSFET | 55 | 40 | SP1 | YES | APTMC120AM55CT1AG |
| | | 25 | 80 | SP3 | YES | APTMC120A25CT3AG |
| | | 20 | 108 | SP1 | YES | APTMC120AM20CT1AG |
| | | 16 | 102 | D3 | - | APTMC120AM16CD3AG |
| | | 12 | 150 | SP3 | YES | APTMC120AM12CT3AG |
| | | 9 | 200 | SP3 | YES | APTMC120AM09CT3AG |
| | | 8 | 200 | D3 | - | APTMC120AM08CD3AG |
| 1700 | SiC MOSFET | 60 | 40 | SP1 | YES | APTMC170AM60CT1AG |
| | | 30 | 80 | SP1 | YES | APTMC170AM30CT1AG |



SP6 3-Level

NEW!

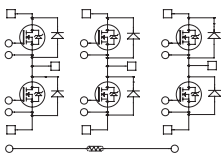
NEW!

NEW!

NEW!

NEW!

NEW!



TRIPLE PHASE LEG

| V_{CES} (V) | Technology | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|------------|----------------------------|-------------------------------------|---------|-----|--------------------|
| 1200 | SiC MOSFET | 33 | 60 | SP6-P | YES | APTMC120TAM33CTPAG |
| | | 17 | 100 | SP6-P | YES | APTMC120TAM17CTPAG |
| | | 12 | 150 | SP6-P | YES | APTMC120TAM12CTPAG |

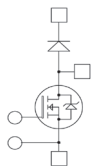


D3

NEW!

NEW!

NEW!



BOOST CHOPPER

| V_{CES} (V) | Technology | $R_{DS(ON)}$ (m Ω) | I_D (A) $T_C=80^\circ\text{C}$ | Package | NTC | Part Number |
|---------------|------------|----------------------------|-------------------------------------|---------|-----|----------------|
| 1200 | SiC MOSFET | 40 | 50 | SOT-227 | - | APT50MC120JCU2 |



SP6-P

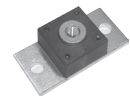
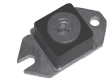
DIODE Power Modules

SINGLE DIODE

| V_{RRM} (V) | DIODE Type | IF (A) $T_c=80^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package | |
|---------------|------------|----------------------------------|----------------------------------|---------|--|
| 200 | FRED | 500 | 1.1 | LP4 | |
| 400 | | 500 | 1.5 | | |
| 600 | | 450 | 1.8 | | |
| 1000 | | 430 | 2.3 | | |
| 1200 | | 400 | 2.5 | | |
| | | | | | |
| | | | | | APTDF500U20G APTDF500U40G APTDF450U60G APTDF430U100G APTDF400U120G |



Non Isolated Packages

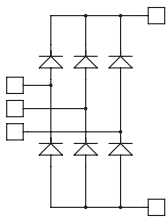


SINGLE DIODE - NON ISOLATED PACKAGE

| V_{RRM} (V) | DIODE Type | IF (A) per Diode | VF (V) $T_j=25^\circ\text{C}$ | Package | | |
|---------------|------------|---------------------|----------------------------------|-----------|-----------------|-----------------|
| | | | | | Cathode to Base | Cathode to Base |
| 600 | FRED | 100 | 1.35 | Half-Pack | HU10260 | HU10260R |
| 400 | RECTIFIER | 300 | 1.1 | SDM | SDM30004 | SDM30004R |
| 30 | SCHOTTKY | 180 | 0.55 | Half-Pack | HS18230 | HS18230R |
| 40 | | 240 | 0.56 | | HS24040 | HS24040R |
| 45 | | 120 | 0.55 | | HS12045 | HS12045R |
| | | 180 | 0.72 | | HS18145 | HS18145R |
| | | 240 | 0.57 | | HS24045 | HS24045R |
| 100 | | 120 | 0.91 | | HS123100 | HS123100R |
| | | 180 | | | HS183100 | HS183100R |
| | | 240 | | | HS243100 | HS243100R |
| 150 | | 240 | 0.87 | | HS246150 | HS246150R |
| 180 | | 240 | 0.88 | | HS247180 | HS247180R |
| 200 | 240 | 0.89 | HS247200 | HS247200R | | |



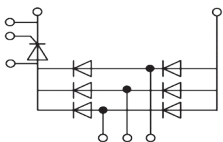
3-PHASE BRIDGE



| V_{RRM} (V) | DIODE Type | IF (A) $T_c=80^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package | Part Number |
|-----------------------------|------------|----------------------------------|----------------------------------|---------|---------------------|
| 1600 | RECTIFIER | 40 | 1.3 | SP1 | APTDR40X1601G |
| | | 90 | 1.3 | SP1 | APTDR90X1601G |
| 800 1200 1600 1800 | RECTIFIER | 30 | 1.6 | SM1 | MSD30-08/12/16/18 |
| | | 50 | 1.5 | SM1 | MSD50-08/12/16/18 |
| | | 50 | 1.45 | SM2-1 | MSDM50-08/12/16/18 |
| | | 52 | 1.8 | SM2 | MSD52-08/12/16/18 |
| | | 75 | 1.6 | SM2 | MSD75-08/12/16/18 |
| | | 75 | 1.38 | SM2-1 | MSDM75-08/12/16/18 |
| | | 100 | 1.9 | SM3 | MSD100-08/12/16/18 |
| | | 100 | 1.7 | SM2-1 | MSDM100-08/12/16/18 |
| | | 130 | 1.8 | SM3 | MSD130-08/12/16/18 |
| | | 150 | 1.28 | SM3-1 | MSDM150-08/12/16/18 |
| | | 160 | 1.65 | SM3 | MSD160-08/12/16/18 |
| | | 200 | 1.55 | SM3 | MSD200-08/12/16/18 |
| | | 200 | 1.31 | SM3-1 | MSDM200-08/12/16/18 |



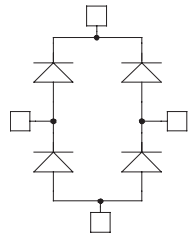
3-PHASE BRIDGE + THYRISTOR



| V_{RRM} (V) | DIODE Type | IF (A) $T_c=80^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package | Part Number |
|---------------|---------------------|----------------------------------|----------------------------------|---------|-------------|
| 1600 | RECTIFIER THYRISTOR | 75 | 1.4 | SM4 | MSDT75-16 |
| | | 100 | 1.35 | SM4 | MSDT100-16 |
| | | 150 | 1.35 | SM4 | MSDT150-16 |
| | | 200 | 1.35 | SM5 | MSDT200-16 |



DIODE Power Modules



FULL BRIDGE

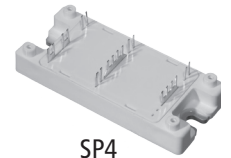
| V_{RRM} (V) | DIODE Type | IF (A) $T_c=80^\circ\text{C}$ | VF (V) $T_j=25^\circ\text{C}$ | Package Style | Part Number |
|---------------|------------|----------------------------------|----------------------------------|---------------------------------|---------------|
| 200 | FRED | 30 | 1.0 | SOT-227 | APT30DF20HJ |
| | | 60 | 1.0 | SOT-227 | APT60DF20HJ |
| | | 100 | 1.0 | SP4 | APTDF100H20G |
| 600 | | 30 | 1.8 | SP1 | APTDF30H601G |
| | | 30 | 1.8 | SOT-227 | APT30DF60HJ |
| | | 60 | 1.8 | SOT-227 | APT60DF60HJ |
| | | 60 | 1.8 | SP1 | APTDF60H601G |
| | | 75 | 1.6 | SOT-227 | APT75DL60HJ |
| | | 100 | 1.6 | SOT-227 | APT100DL60HJ |
| | | 100 | 1.6 | SP1 | APTDF100H601G |
| 1000 | | 200 | 1.6 | SP6 | APTDF200H60G |
| | | 30 | 2.1 | SOT-227 | APT30DF100HJ |
| | | 100 | 2.1 | SP4 | APTDF100H100G |
| 1200 | | 200 | 2.1 | SP6 | APTDF200H100G |
| | | 30 | 2.6 | SP1 | APTDF30H1201G |
| | 60 | 2.6 | SP1 | APTDF60H1201G | |
| 1700 | 200 | 2.4 | SP6 | APTDF200H120G | |
| | 50 | 1.8 | SOT-227 | APT50DF170HJ | |
| | 75 | 1.8 | SOT-227 | APT75DF170HJ | |
| | 100 | 2.2 | SP4 | APTDF100H170G | |
| 100 | SCHOTTKY | 60 | 0.9 | SOT-227 | APT60DS10HJ |
| | | | | VJ | VJ248M |
| 200 | RECTIFIER | 10 | 1.3 | VJ | VJ448M |
| 400 | | | | SOT-227 | APT40DR160HJ |
| 1600 | | | | | APT90DR160HJ |
| 250-700 | | | | Controlled Avalanche Rectifiers | 10 |
| 450-900 | VJ | VJ447M | | | |
| 660-1100 | VJ | VJ647M | | | |



SOT-227



SP1



SP4



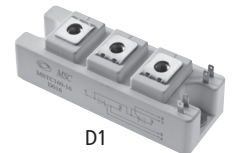
SP6



VJ

THYRISTOR & DIODE DOUBLER

| V_{RRM} (V) | DIODE Type | IF (A) per Diode | VF/VTM (V) $T_j=25^\circ\text{C}$ | Package Style | Thyristor Diode Doubler | Thyristor Doubler | |
|---------------------|---------------------|---------------------|--------------------------------------|---------------|-------------------------|-------------------|------------------|
| 800 1200 1600 | RECTIFIER THYRISTOR | 25 | 1.8 | SF1 | MSFC25-08/12/16 | MSTC25-08/12/16 | |
| | | 40 | 1.95 | | MSFC40-08/12/16 | MSTC40-08/12/16 | |
| | | 60 | 1.65 | | MSFC60-08/12/16 | MSTC60-08/12/16 | |
| | | 90 | 1.65 | | MSFC90-08/12/16 | MSTC90-08/12/16 | |
| | | 110 | 1.65 | | MSFC110-08/12/16 | MSTC110-08/12/16 | |
| | | 130 | 1.8 | | MSFC130-08/12/16 | MSTC130-08/12/16 | |
| | | 160 | D1 | 160 | 1.7 | MSFC160-08/12/16 | MSTC160-08/12/16 |



D1

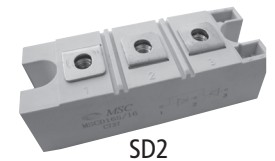


SF1

DIODE Power Modules

COMMON CATHODE - COMMON ANODE - DOUBLER

| V _{RRM} (V) | DIODE Type | IF (A) per Diode | VF (V) T _J =25° C | Package | Circuit Diagrams | | | | | | |
|-------------------------|---------------|---------------------|---------------------------------|---------------------|---------------------|---------------------|-------------|-------------|------------|------------|-----------|
| | | | | | Common Cathode | Common Anode | Doubler | | | | |
| 200 | FRED | 400 | 1.0 | SP6 | | | | | | | |
| 600 | | | 1.6 | | | | | | | | |
| 1000 | | | 2.1 | | | | | | | | |
| 1200 | | | 2.4 | | | | | | | | |
| 1700 | | | 2.2 | | | | | | | | |
| 800-1200-1600-1800 | | | RECTIFIER | | | | | 36 | 1.15 | SD1 | |
| | 60 | | | | | | | | | | |
| | 70 | | | | | | | | | | |
| | 100 | | | | | | | | | | |
| | 120 | | | | | | | | | | |
| | 165 | | | | | | | | | | |
| | 200 | SD2 | | MSKD36-08/12/16/18 | MSAD36-08/12/16/18 | MSCD36-08/12/16/18 | | | | | |
| | | | | MSKD60-08/12/16/18 | MSAD60-08/12/16/18 | MSCD60-08/12/16/18 | | | | | |
| | | | | MSKD70-08/12/16/18 | MSAD70-08/12/16/18 | MSCD70-08/12/16/18 | | | | | |
| | | | | MSKD100-08/12/16/18 | MSAD100-08/12/16/18 | MSCD100-08/12/16/18 | | | | | |
| | | | | MSKD120-08/12/16/18 | MSAD120-08/12/16/18 | MSCD120-08/12/16/18 | | | | | |
| | | | | MSKD165-08/12/16/18 | MSAD165-08/12/16/18 | MSCD165-08/12/16/18 | | | | | |
| | | | MSKD200-08/12/16/18 | MSAD200-08/12/16/18 | MSCD200-08/12/16/18 | | | | | | |
| 200 | FRED | 60 | 0.98 | TwinTower | UFT12520 | UFT12520A | UFT12520D | | | | |
| | | 70 | 0.98 | TO-249 Flat Pack | UFT14020 | UFT14020A | UFT14020D | | | | |
| | | 100 | 0.98 | TwinTower | UFT20020 | UFT20020A | UFT20020D | | | | |
| | | | | | UFT20120 | UFT20120A | UFT20120D | | | | |
| | | 200 | 0.98 | TwinTower | UFT40020 | UFT40020A | UFT40020D | | | | |
| | | 70 | 1.25 | TO-249 Flat Pack | UFT14140 | UFT14140A | UFT14140D | | | | |
| | | 100 | 1.25 | TwinTower | UFT20140 | UFT20140A | UFT20140D | | | | |
| | | | | | UFT40020 | UFT40020A | UFT40020D | | | | |
| | | 400 | 70 | 1.25 | TO-249 Flat Pack | UFT14140 | UFT14140A | UFT14140D | | | |
| | | 500 | 35 | 1.20 | Mini-Mod | UFT7150 | UFT7150A | UFT7150D | | | |
| | | | | | | UFT7260SMxC | UFT7260SMxA | UFT7260SMxD | | | |
| | | 600 | 70 | 1.35 | TO-249 Flat Pack | UFT14260 | UFT14260A | UFT14260D | | | |
| 800 | 60 | 1.35 | TwinTower | UFT12780 | UFT12780A | UFT12780D | | | | | |
| | | | | UFT14280 | UFT14280A | UFT14280D | | | | | |
| 30 | SCHOTTKY | 30 | 0.47 | TO-249 Flat Pack | FST16230 | FST16230A | FST16230D | | | | |
| | | 250 | 0.55 | TwinTower | CPT50235 | CPT50235A | CPT50235D | | | | |
| | | 300 | 0.65 | | CPT60035 | CPT60035A | CPT60035D | | | | |
| | | 40 | 0.76 | | CPT30040 | CPT30040A | CPT30040D | | | | |
| | | 45 | 40 | 40 | 0.53 | Mini-Mod | FST8145 | FST8145A | FST8145D | | |
| | | | | 80 | 0.65 | TO-249 Flat Pack | FST16145 | FST16145A | FST16145D | | |
| | | | | 80 | 0.74 | | FST16045 | FST16045A | FST16045D | | |
| | | | | 100 | 0.68 | | CPT20145 | CPT20145A | CPT20145D | | |
| | | | | 50 | 150 | 150 | 0.62 | TwinTower | CPT30145 | CPT30145A | CPT30145D |
| | | | | | | 200 | 0.57 | | CPT40145 | CPT40145A | CPT40145D |
| | | 250 | 0.55 | | | CPT50145 | CPT50145A | | CPT50145D | | |
| | | 300 | 0.65 | | | CPT60145 | CPT60145A | | CPT60145D | | |
| 60 | 0.8 | CPT12050 | CPT12050A | | | CPT12050D | | | | | |
| 80 | 0.74 | TO-249 Flat Pack | FST16050 | | | FST16050A | FST16050D | | | | |
| 60 | 150 | 150 | 0.78 | TwinTower | CPT30050 | CPT30050A | CPT30050D | | | | |
| | | 250 | 0.73 | | CPT30060 | CPT30060A | CPT30060D | | | | |
| | | 200 | 0.89 | | CPT50060 | CPT50060A | CPT50060D | | | | |
| | | 80 | 0.96 | | CPT40080 | CPT40080A | CPT40080D | | | | |
| | | 90 | 80 | | 0.96 | TO-249 Flat Pack | FST16090 | FST16090A | FST16090D | | |
| | | | | | | | CPT30090 | CPT30090A | CPT30090D | | |
| 100 | 200 | 200 | 0.90 | TwinTower | CPT40090 | CPT40090A | CPT40090D | | | | |
| | | 40 | 0.82 | | Mini-Mod | FST80100 | FST80100A | FST80100D | | | |
| | | 60 | 0.86 | | TO-249, 9 Pins | FST60100 | FST60100A | FST60100D | | | |
| | | 150 | 80 | 0.96 | TO-249, Flat Pack | FST160100 | FST160100A | FST160100D | | | |
| | | | | | | 150 | 0.98 | CPT300100 | CPT300100A | CPT300100D | |
| | | | | | | 200 | 0.91 | CPT400100 | CPT400100A | CPT400100D | |
| | | | | | | 250 | 0.90 | CPT500100 | CPT500100A | CPT500100D | |
| | | | | | | 80 | 0.85 | CPT600100 | CPT600100A | CPT600100D | |
| | | | | | | 150 | 0.85 | CPT600150 | CPT600150A | CPT600150D | |



Non Isolated Packages

x option for Mini-Mod Surface Mount Package

Mini-Mod Surface Mount

Mini-Mod

TO-249 Flat Pack

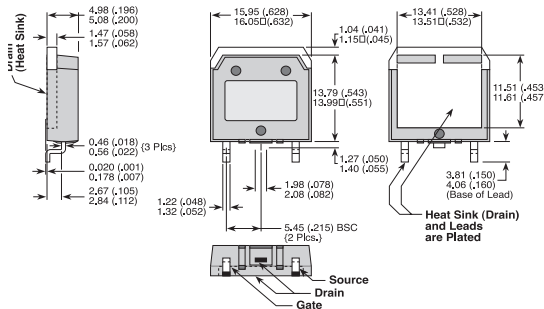
Twin Tower Non Isolated

10-pin TO-249

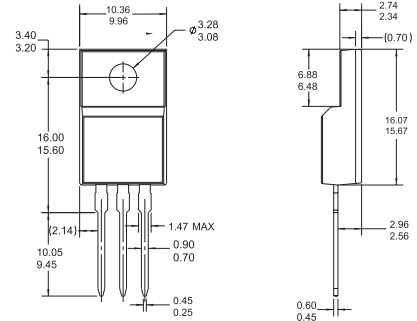
Package Outlines

Pin out location depends on the module configuration. Please refer to the product datasheet for pins assignment. All dimensions in millimeters.

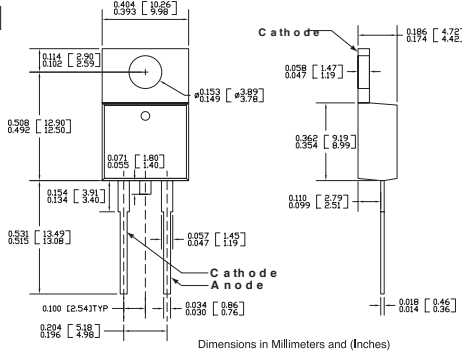
D³ Pak or TO-268



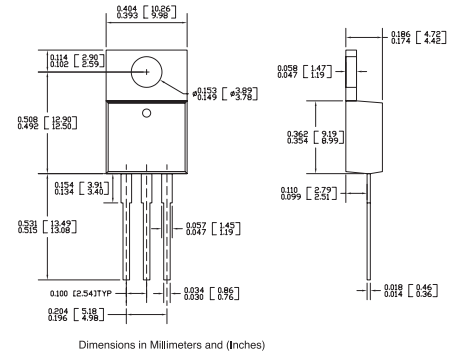
TO-220 [KF]



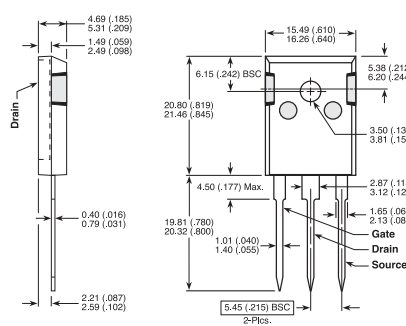
TO-220 2-Lead



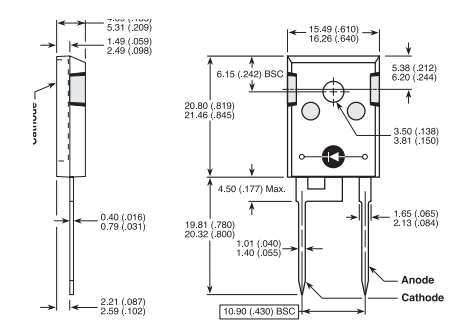
TO-220 3-Lead



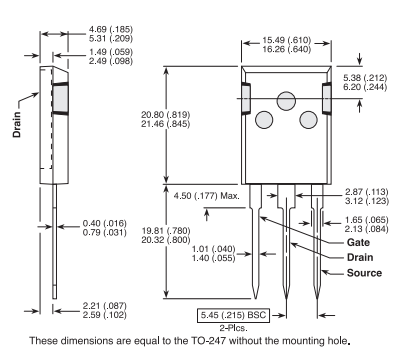
TO-247 3-Lead



TO-247 2-Lead

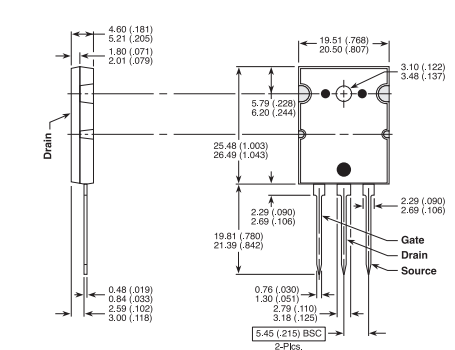


T-MAX[®]

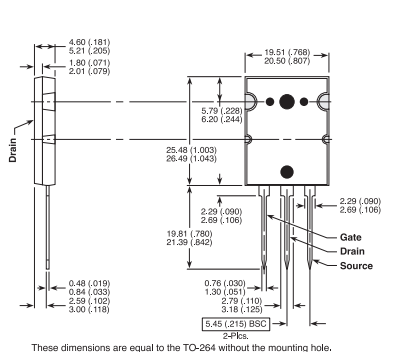


These dimensions are equal to the TO-247 without the mounting hole.

TO-264

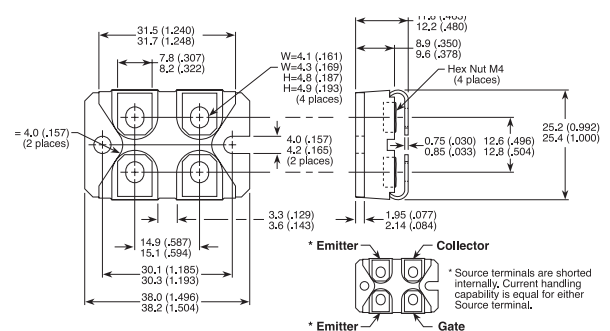


264 MAX[™]



These dimensions are equal to the TO-264 without the mounting hole.

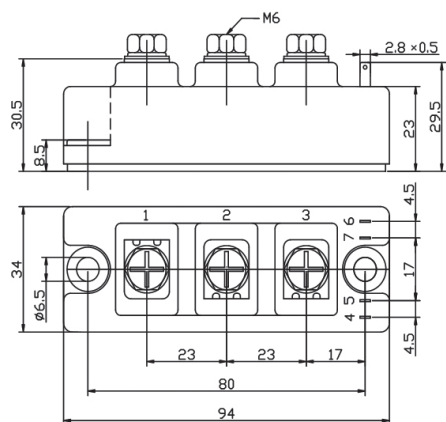
ISOTOP[®] or SOT-227



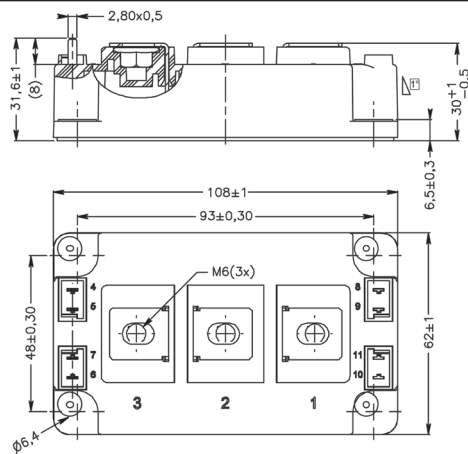
Power Module Outlines

Pin out location depends on the module configuration. Please refer to the product datasheet for pins assignment. All dimensions in millimeters.

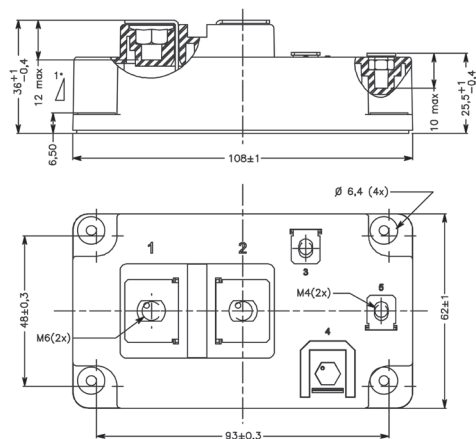
D1



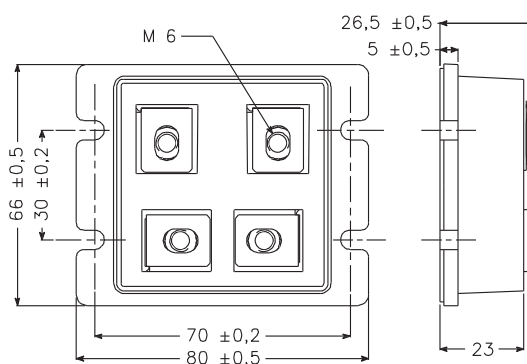
D3



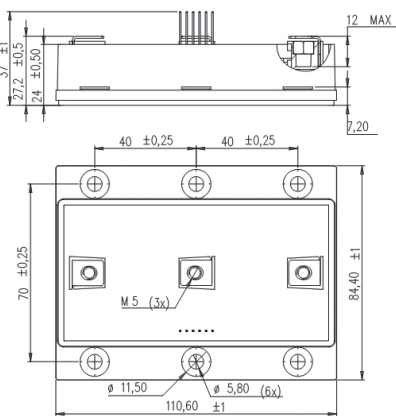
D4



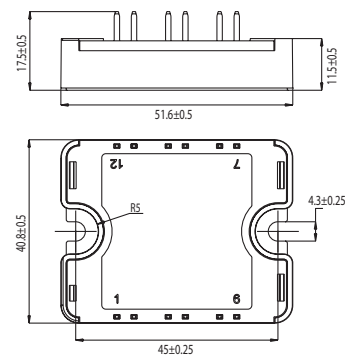
LP4



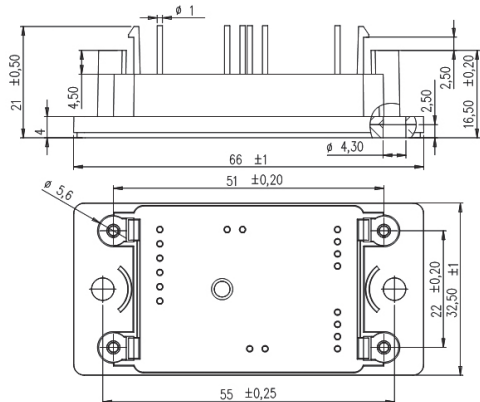
LP8



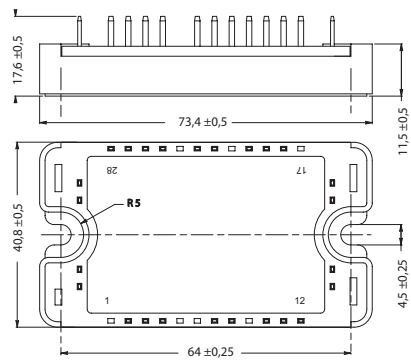
SP1



SP2

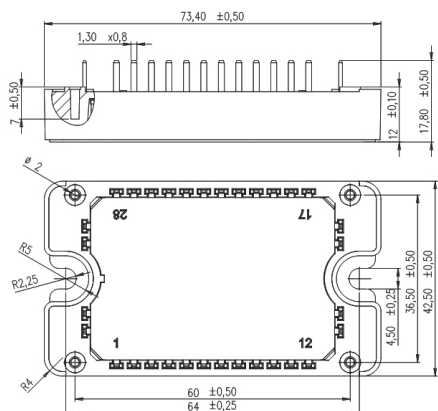


SP3

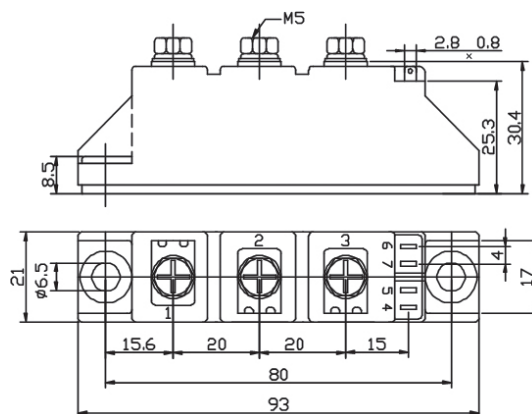


Power Module Outlines

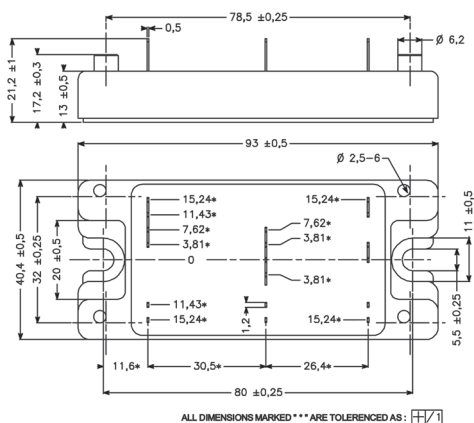
SP3F



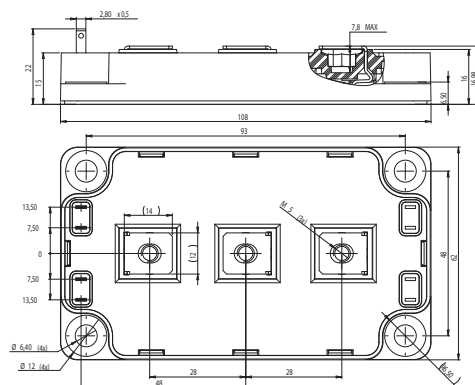
SF1



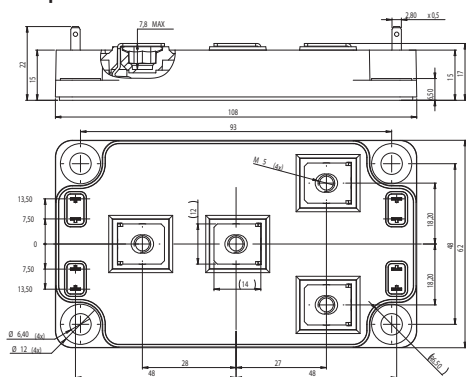
SP4



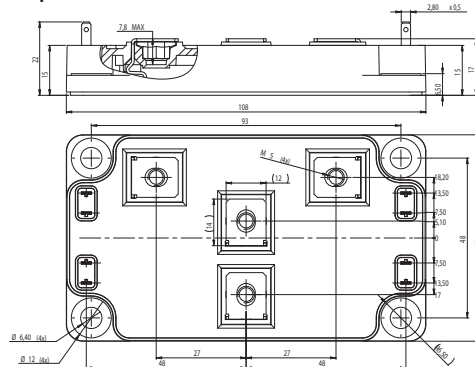
SP6 - 3 outputs



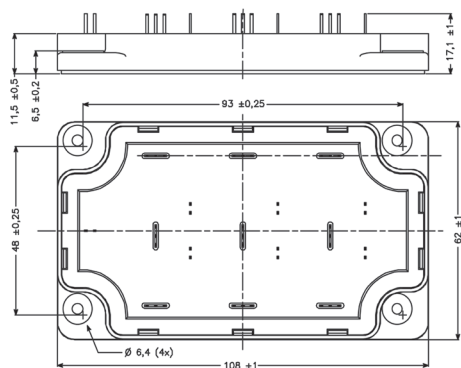
SP6 - 4 outputs, Version 1



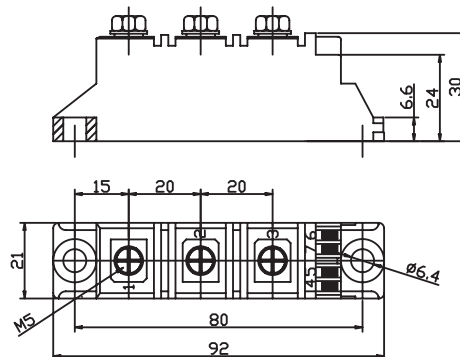
SP6 4 outputs, Version 2



SP6-P



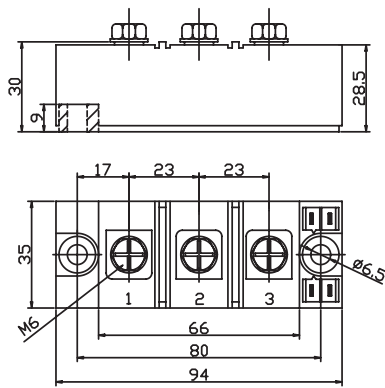
SD1



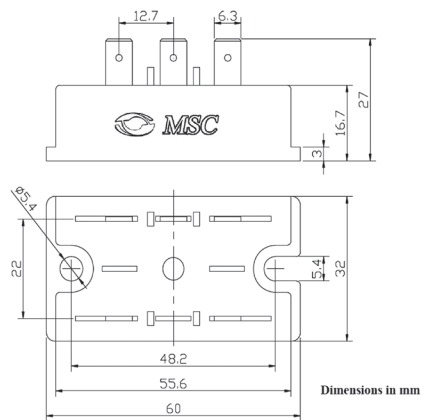
Power Module Outlines

Pin out location depends on the module configuration. Please refer to the product datasheet for pins assignment. All dimensions in millimeters.

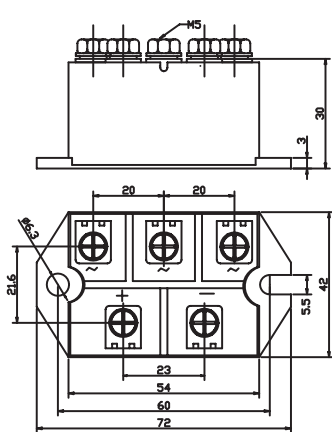
SD2



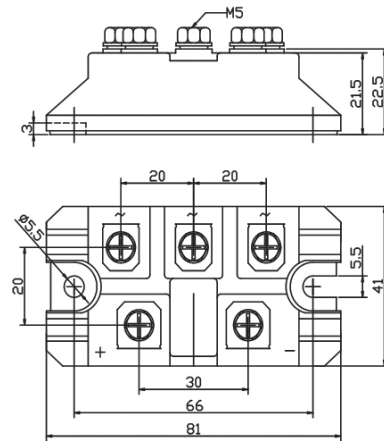
SM1



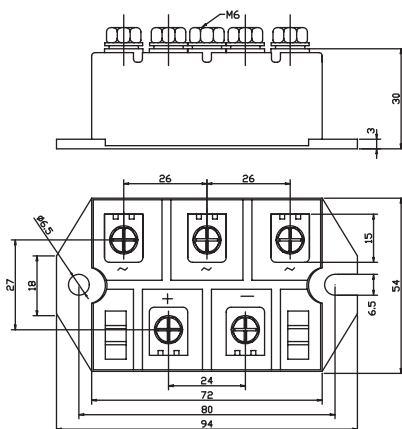
SM2



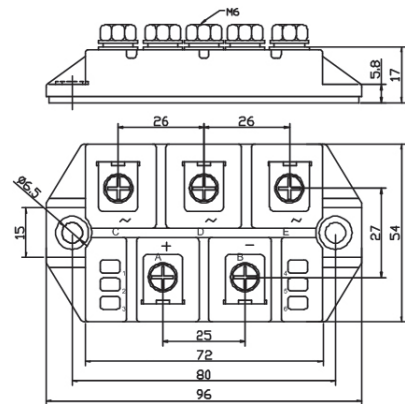
SM2-1



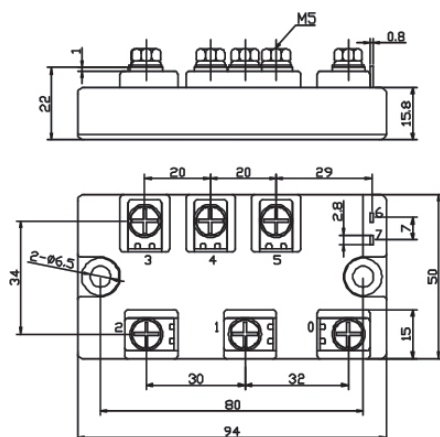
SM3



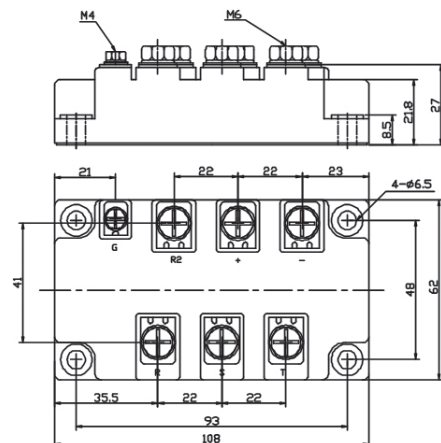
SM3-1



SM4



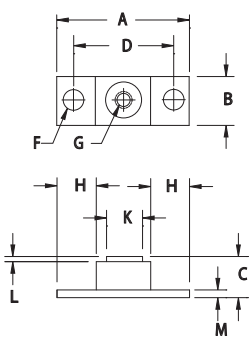
SM5



Power Module Outlines

Pin out location depends on the module configuration. Please refer to the product datasheet for pins assignment. All dimensions in millimeters.

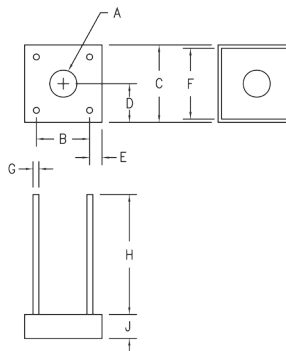
SDM



| Dim. | Inches | | Millimeters | | Notes |
|------|--------|----------|-------------|-----------|-------------|
| | Min. | Max. | Min. | Max. | |
| A | --- | 2.650 | --- | 67.31 | |
| B | 1.240 | 1.260 | 31.49 | 32.00 | |
| C | --- | .925 | --- | 23.49 | |
| D | --- | 2.00 BSC | --- | 50.80 BSC | |
| F | 0.320 | 0.340 | 8.13 | 8.64 | Dia. |
| G | --- | --- | --- | --- | 5/16-18 UNC |
| H | 0.630 | --- | 16.00 | --- | |
| K | 0.610 | 0.640 | 15.49 | 16.26 | |
| L | --- | .100 | --- | 2.54 | |
| M | 0.182 | 0.192 | 4.62 | 4.88 | |

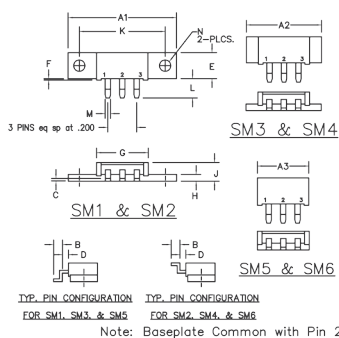
Standard Polarity: Base plate is cathode
Reverse Polarity: Base plate is anode

VJ



| Dim. | Inches | | Millimeter | | Notes |
|------|---------|----------|------------|------------|-------|
| | Minimum | Maximum | Minimum | Maximum | |
| A | .137 | .167 | 3.84 | 2.21 | Dia. |
| B | .411 | .441 | 10.44 | 11.20 | |
| C | .600 | .620 | --- | --- | |
| D | .295 | .310 | --- | --- | |
| E | .076 | .096 | --- | --- | |
| F | .545 | .555 | 13.85 | 14.10 | |
| G | .076 | .096 | .970 | 1.07 | |
| H | --- | 1.0 Min. | --- | 25.40 Min. | |
| J | .195 | .215 | 4.95 | 5.46 | |

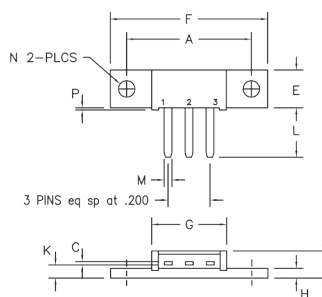
Mini-Mod Surface Mount



| Dim. | Inches | | Millimeter | | Notes |
|------|---------|---------|------------|---------|-------|
| | Minimum | Maximum | Minimum | Maximum | |
| A1 | 1.490 | 1.510 | 37.85 | 38.35 | |
| A2 | 1.020 | 1.040 | 26.12 | 26.42 | |
| A3 | .695 | .715 | 17.65 | 18.16 | |
| B | .110 | .120 | 2.79 | 3.04 | |
| C | .027 | .037 | 0.69 | 0.94 | |
| D | .100 | .110 | 2.54 | 2.79 | |
| E | .350 | .370 | 8.89 | 9.40 | |
| F | .015 | .025 | 0.38 | 0.64 | |
| G | .695 | .715 | 17.65 | 18.16 | |
| H | .088 | .098 | 2.24 | 2.49 | |
| J | .240 | .260 | 6.10 | 6.60 | |
| K | 1.180 | 1.195 | 29.97 | 30.35 | |
| L | .230 | .250 | 5.84 | 6.35 | |
| M | .065 | .085 | 1.65 | 2.16 | |
| N | .151 | .161 | 3.84 | 4.09 | Dia. |

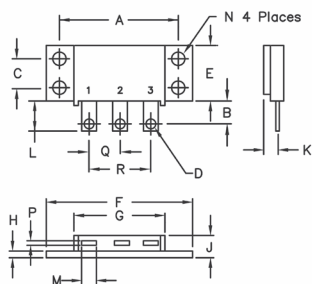
Note: Baseplate Common with Pin 2

Mini-Mod



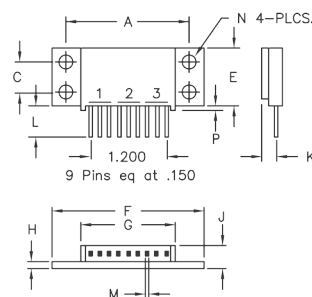
| Dim. | Inches | | Millimeter | | Notes |
|------|---------|---------|------------|---------|-------|
| | Minimum | Maximum | Minimum | Maximum | |
| A | 1.180 | 1.195 | 29.97 | 30.35 | |
| C | .027 | .037 | 0.69 | 0.94 | |
| E | .350 | .370 | 8.89 | 9.40 | |
| F | 1.490 | 1.510 | 37.85 | 38.35 | |
| G | .695 | .715 | 17.65 | 18.16 | |
| H | .088 | .098 | 2.24 | 2.49 | |
| J | .240 | .260 | 6.10 | 6.60 | |
| K | .115 | .135 | 2.92 | 3.43 | |
| L | .460 | .480 | 11.68 | 12.19 | |
| M | .065 | .085 | 1.65 | 2.16 | |
| N | .151 | .161 | 3.84 | 4.09 | Dia. |
| P | .015 | .025 | 0.38 | 0.64 | |

TO-249



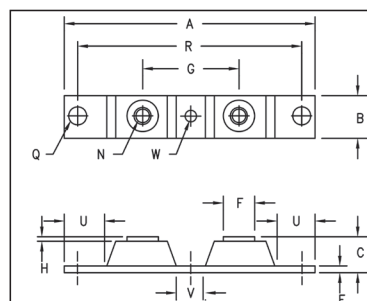
| Dim. | Inches | | Millimeters | | Notes |
|------|--------|-------|-------------|---------------------|-------|
| | Min. | Max. | Min. | Max. | |
| A | 1.995 | 2.005 | 50.67 | 50.93 | |
| B | 0.300 | 0.325 | 7.62 | 8.26 | |
| C | 0.495 | 0.505 | 12.57 | 12.83 | |
| D | 0.182 | 0.192 | 4.62 | 4.88 | Dia. |
| E | 0.990 | 1.010 | 25.15 | 25.65 | |
| F | 2.390 | 2.410 | 60.71 | 61.21 | |
| G | 1.500 | 1.525 | 38.10 | 38.70 | |
| H | 0.120 | 0.130 | 3.05 | 3.30 | |
| J | --- | 0.400 | --- | 10.16 | |
| K | 0.240 | 0.260 | 6.10 | 6.60 to Lead ϕ | |
| L | 0.490 | 0.510 | 12.45 | 12.95 | |
| M | 0.330 | 0.350 | 8.38 | 6.90 | |
| N | 0.175 | 0.195 | 4.45 | 4.95 | Dia. |
| P | 0.035 | 0.045 | 0.89 | 1.14 | |
| Q | 0.445 | 0.455 | 11.30 | 11.56 | |
| R | 0.890 | 0.910 | 22.61 | 23.11 | |

9 Pin TO-249



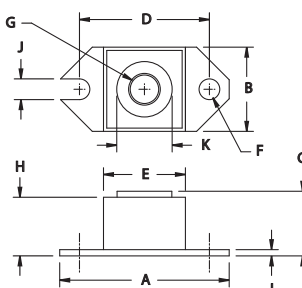
| Dim. | Inches | | Millimeter | | Notes |
|------|---------|---------|------------|---------------------|------------|
| | Minimum | Maximum | Minimum | Maximum | |
| A | 1.995 | 2.005 | 50.67 | 50.93 | |
| C | 0.495 | 0.506 | 12.57 | 12.83 | |
| E | 0.990 | 1.010 | 25.15 | 25.65 | |
| F | 2.390 | 2.410 | 60.71 | 61.21 | |
| G | 1.490 | 1.510 | 37.85 | 38.35 | |
| H | 0.120 | 0.130 | 3.05 | 3.30 | |
| J | --- | 0.400 | --- | 10.16 | |
| K | 0.240 | 0.260 | 6.10 | 6.60 to Lead ϕ | |
| L | 0.490 | 0.510 | 12.45 | 12.95 | |
| M | 0.040 | .050 | 1.02 | 1.27 | Square Dia |
| N | 0.175 | 0.195 | 4.45 | 4.95 | |
| P | 0.032 | 0.052 | 0.81 | 1.32 | |

Twin Tower



| Dim. | Inches | | Millimeters | | Notes |
|------|--------|-----------|-------------|-----------|-------|
| | Min. | Max. | Min. | Max. | |
| A | --- | 3.630 | --- | 92.20 | |
| B | 0.700 | 0.800 | 17.78 | 20.32 | |
| C | --- | 0.630 | --- | 16.00 | |
| E | 0.120 | 0.130 | 3.05 | 3.30 | |
| F | 0.490 | 0.510 | 12.45 | 12.95 | |
| G | --- | 1.375 BSC | --- | 34.92 BSC | |
| H | 0.010 | --- | 0.25 | --- | |
| N | --- | --- | --- | --- | |
| Q | 0.275 | 0.290 | 6.99 | 7.37 | |
| R | --- | 3.150 BSC | --- | 80.01 BSC | |
| U | 0.600 | --- | 15.24 | --- | |
| V | 0.312 | 0.340 | 7.92 | 8.64 | |
| W | 0.180 | 0.195 | 4.57 | 4.95 | |

Half-Pack



| Dim. | Inches | | Millimeter | | Notes |
|------|---------|---------------|------------|---------|----------|
| | Minimum | Maximum | Minimum | Maximum | |
| A | 1.52 | 1.56 | 38.61 | 39.62 | |
| B | .725 | .775 | 18.42 | 19.69 | |
| C | .605 | .625 | 15.37 | 15.88 | |
| D | 1.182 | 1.192 | 30.02 | 30.28 | |
| E | .745 | .755 | 18.92 | 19.18 | |
| F | .152 | .160 | 3.86 | 4.06 | Sq. Dia. |
| G | --- | 1/4-20 UNC-2B | --- | --- | |
| H | .525 | .580 | 13.34 | 14.73 | |
| J | .156 | .160 | 3.96 | 4.06 | |
| K | .495 | .505 | 12.57 | 12.83 | Dia. |
| L | .120 | .130 | 3.05 | 3.30 | |

Std. Polarity: Base is cathode
Rev. Polarity: Base is anode

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