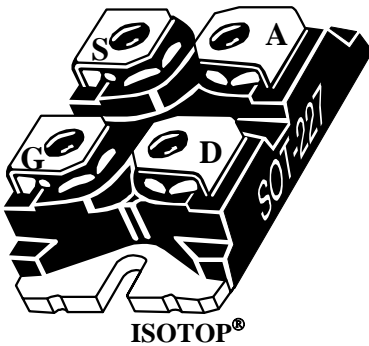
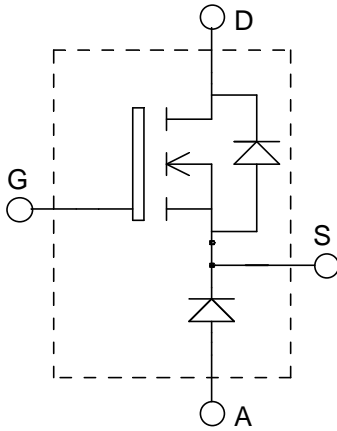


**ISOTOP[®] Buck chopper
MOSFET + SiC chopper diode
Power module**

$V_{DSS} = 1200V$
 $R_{DSon} = 680m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 17A$ @ $T_c = 25^\circ C$



Application

- AC and DC motor control
- Switched Mode Power Supplies

Features

- **Power MOS 8TM MOSFET**
 - Low R_{DSon}
 - Low input and Miller capacitance
 - Low gate charge
 - Avalanche energy rated
- **SiC Schottky Diode**
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature Independent switching behavior
 - Positive temperature coefficient on VF
- ISOTOP[®] Package (SOT-227)
- Very low stray inductance
- High level of integration

Benefits

- Outstanding performance at high frequency operation
- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive TC of VCEsat
- RoHS Compliant

Absolute maximum ratings

| Symbol | Parameter | Max ratings | Unit |
|------------|---|--------------------|------------|
| V_{DSS} | Drain - Source Breakdown Voltage | 1200 | V |
| I_D | Continuous Drain Current | $T_c = 25^\circ C$ | 17 |
| | | $T_c = 80^\circ C$ | 13 |
| I_{DM} | Pulsed Drain current | 90 | A |
| V_{GS} | Gate - Source Voltage | ± 30 | V |
| R_{DSon} | Drain - Source ON Resistance | 816 | m Ω |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 480 |
| I_{AR} | Avalanche current (repetitive and non repetitive) | 12 | A |

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

All ratings @ $T_j = 25^\circ\text{C}$ unless otherwise specified

Electrical Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit | |
|--------------|---------------------------------|---|---------------------------|-----|-----------|------------------|---------------|
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 1200\text{V}$ $V_{GS} = 0\text{V}$ | $T_j = 25^\circ\text{C}$ | | | 100 | μA |
| | | | $T_j = 125^\circ\text{C}$ | | | 500 | |
| $R_{DS(on)}$ | Drain – Source on Resistance | $V_{GS} = 10\text{V}, I_D = 12\text{A}$ | | 680 | 816 | $\text{m}\Omega$ | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 2.5\text{mA}$ | 3 | 4 | 5 | V | |
| I_{GSS} | Gate – Source Leakage Current | $V_{GS} = \pm 30\text{V}$ | | | ± 100 | nA | |

Dynamic Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|---|-----|------|-----|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$ | | 6696 | | pF |
| C_{oss} | Output Capacitance | | | 615 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 80 | | |
| Q_g | Total gate Charge | $V_{GS} = 10\text{V}$ $V_{Bus} = 600\text{V}$ $I_D = 12\text{A}$ | | 260 | | nC |
| Q_{gs} | Gate – Source Charge | | | 42 | | |
| Q_{gd} | Gate – Drain Charge | | | 120 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 12\text{A}$ $R_G = 2.2\Omega$ | | 45 | | ns |
| T_r | Rise Time | | | 27 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 145 | | |
| T_f | Fall Time | | | 42 | | |

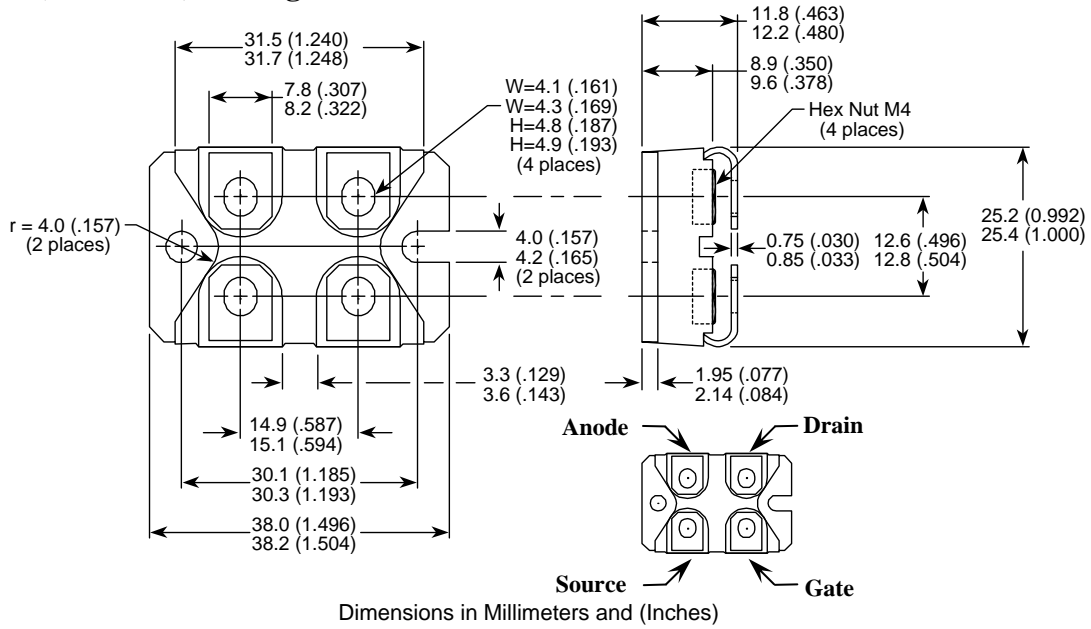
SiC chopper diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-----------|---|--|---------------------------|-----|------|---------------|
| V_{RRM} | Maximum Peak Repetitive Reverse Voltage | | 1200 | | | V |
| I_{RM} | Maximum Reverse Leakage Current | $V_R = 1200\text{V}$ | $T_j = 25^\circ\text{C}$ | 32 | 200 | μA |
| | | | $T_j = 175^\circ\text{C}$ | 56 | 1000 | |
| I_F | DC Forward Current | | | 10 | | A |
| V_F | Diode Forward Voltage | $I_F = 10\text{A}$ | $T_j = 25^\circ\text{C}$ | 1.6 | 1.8 | V |
| | | | $T_j = 175^\circ\text{C}$ | 2.3 | 3 | |
| Q_C | Total Capacitive Charge | $I_F = 10\text{A}, V_R = 600\text{V}$ $di/dt = 500\text{A}/\mu\text{s}$ | | 80 | | nC |
| C | Total Capacitance | $f = 1\text{MHz}, V_R = 200\text{V}$ | | 96 | | pF |
| | | $f = 1\text{MHz}, V_R = 400\text{V}$ | | 69 | | |

Thermal and package characteristics

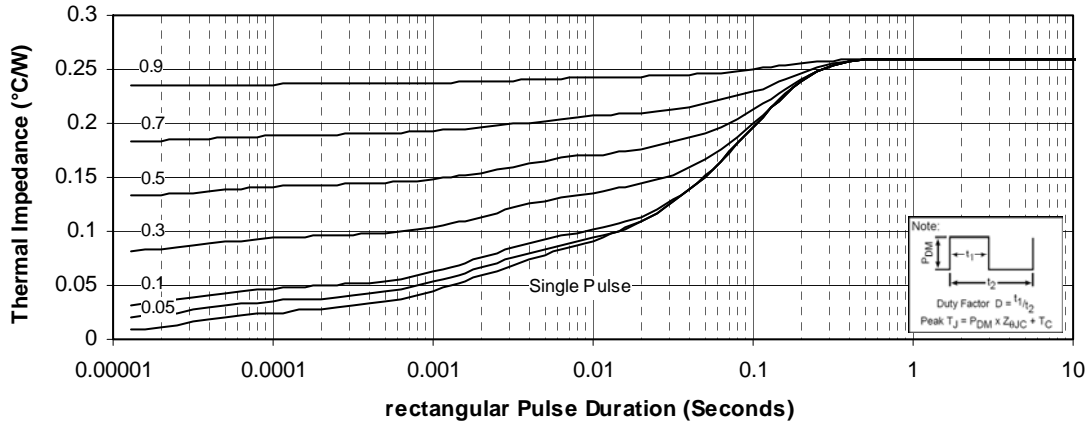
| Symbol | Characteristic | Min | Typ | Max | Unit |
|----------------|--|-----------|------|------|---------------------------|
| R_{thJC} | Junction to Case Thermal Resistance | Mosfet | | 0.26 | $^\circ\text{C}/\text{W}$ |
| | | SiC Diode | | 1.65 | |
| R_{thJA} | Junction to Ambient (IGBT & Diode) | | | 20 | |
| V_{ISOL} | RMS Isolation Voltage, any terminal to case $t = 1\text{min}, I_{isol} < 1\text{mA}, 50/60\text{Hz}$ | 2500 | | | V |
| T_j, T_{STG} | Storage Temperature Range | -40 | | 150 | $^\circ\text{C}$ |
| T_L | Max Lead Temp for Soldering: 0.063" from case for 10 sec | | | 300 | |
| Torque | Mounting torque (Mounting = 8-32 or 4mm Machine and terminals = 4mm Machine) | | | 1.5 | N.m |
| Wt | Package Weight | | 29.2 | | g |

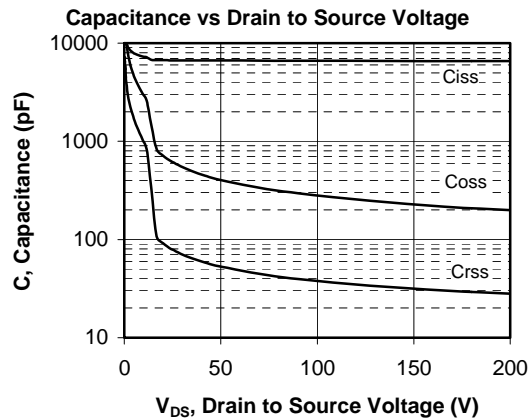
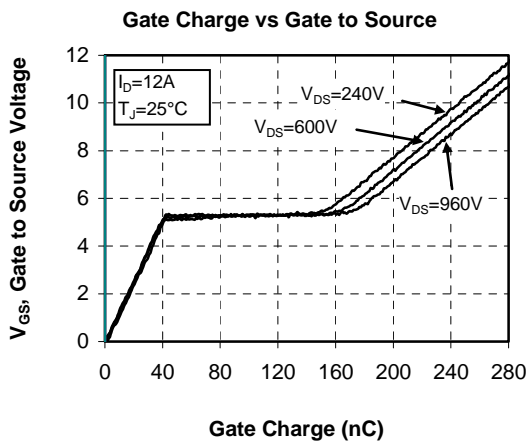
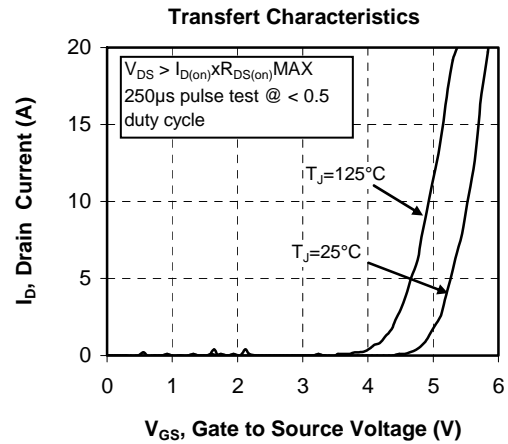
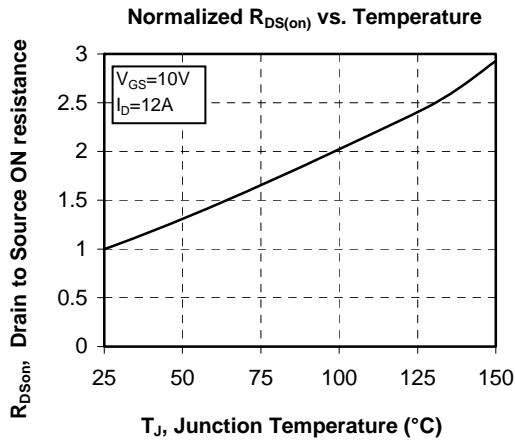
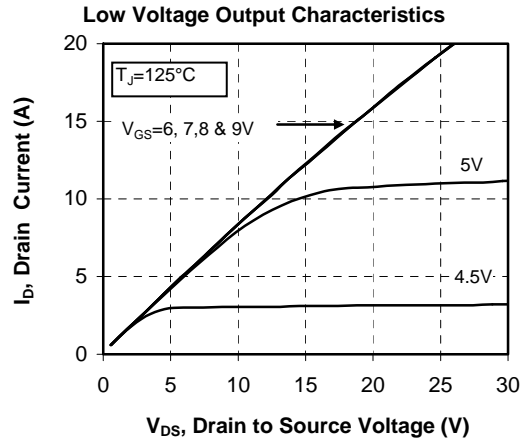
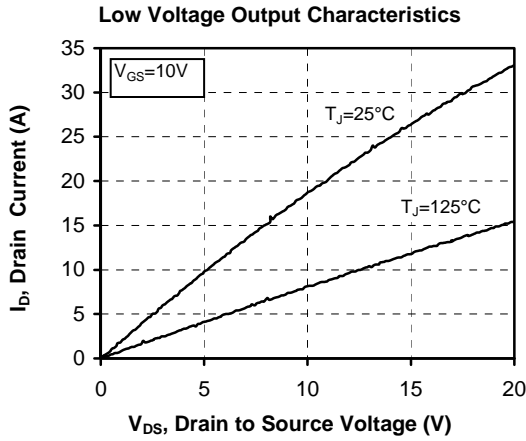
SOT-227 (ISOTOP[®]) Package Outline



Typical Mosfet Performance Curve

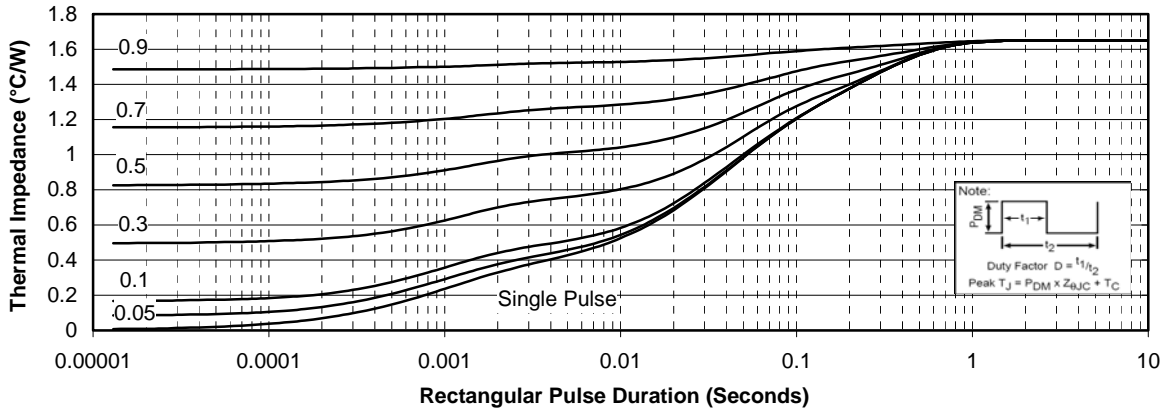
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



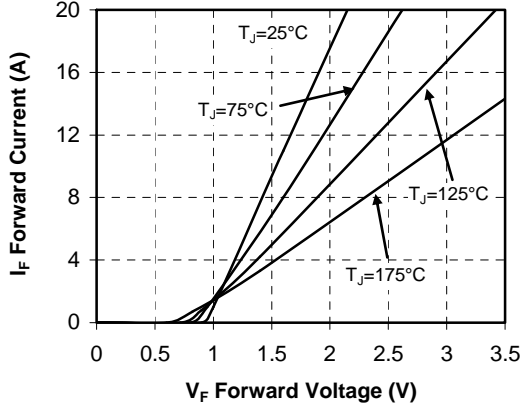


Typical SiC Diode Performance Curve

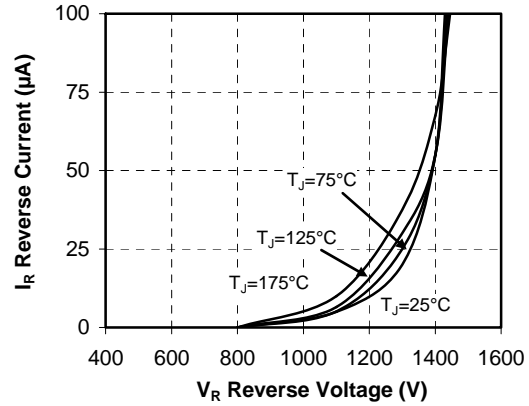
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



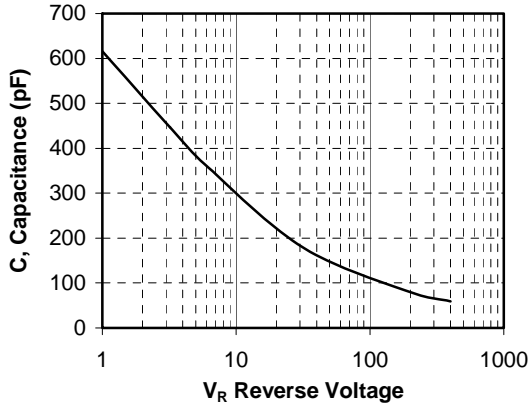
Forward Characteristics



Reverse Characteristics



Capacitance vs. Reverse Voltage



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Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 6,939,743 7,352,045 5,283,201 5,801,417 5,648,283 7,196,634 6,664,594 7,157,886 6,939,743 7,342,262 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.