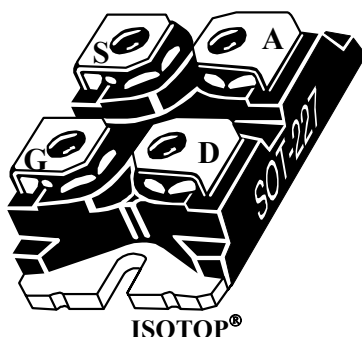
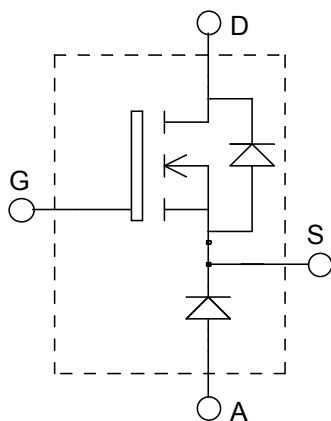


**ISOTOP<sup>®</sup> Buck chopper  
MOSFET + SiC chopper diode  
Power module**

**$V_{DSS} = 1000V$**   
 **$R_{DSon} = 330m\Omega$  typ @  $T_j = 25^\circ C$**   
 **$I_D = 26A$  @  $T_c = 25^\circ C$**



## Application

- AC and DC motor control
- Switched Mode Power Supplies

## Features

- **Power MOS 8<sup>TM</sup> 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<sup>®</sup> 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                  | 1000               | V          |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$ | A          |
|            |                                                   | $T_c = 80^\circ C$ |            |
| $I_{DM}$   | Pulsed Drain current                              | 140                |            |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$           | V          |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 396                | m $\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$ | W          |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 18                 | A          |

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://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 | $V_{DS} = 1000\text{V}$<br>$V_{GS} = 0\text{V}$ | $T_j = 25^\circ\text{C}$  |     | 100       | $\mu\text{A}$    |
|              |                                 |                                                 | $T_j = 125^\circ\text{C}$ |     | 500       |                  |
| $R_{DS(on)}$ | Drain – Source on Resistance    | $V_{GS} = 10\text{V}$ , $I_D = 18\text{A}$      |                           | 330 | 396       | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage          | $V_{GS} = V_{DS}$ , $I_D = 2.5\text{mA}$        | 3                         | 4   | 5         | V                |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 30\text{V}$                       |                           |     | $\pm 100$ | nA               |

### Dynamic Characteristics

| Symbol       | Characteristic               | Test Conditions                                                                                                                                           | Min | Typ  | Max | Unit        |
|--------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|-------------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0\text{V}$                                                                                                                                      |     | 7868 |     | $\text{pF}$ |
| $C_{oss}$    | Output Capacitance           | $V_{DS} = 25\text{V}$                                                                                                                                     |     | 825  |     |             |
| $C_{rss}$    | Reverse Transfer Capacitance | $f = 1\text{MHz}$                                                                                                                                         |     | 104  |     |             |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10\text{V}$                                                                                                                                     |     | 305  |     | nC          |
| $Q_{gs}$     | Gate – Source Charge         | $V_{Bus} = 500\text{V}$                                                                                                                                   |     | 55   |     |             |
| $Q_{gd}$     | Gate – Drain Charge          | $I_D = 18\text{A}$                                                                                                                                        |     | 145  |     |             |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Resistive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 15\text{V}$<br>$V_{Bus} = 667\text{V}$<br>$I_D = 18\text{A}$<br>$R_G = 2.2\Omega$ |     | 44   |     | ns          |
| $T_r$        | Rise Time                    |                                                                                                                                                           |     | 40   |     |             |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                                                                           |     | 150  |     |             |
| $T_f$        | Fall Time                    |                                                                                                                                                           |     | 38   |     |             |

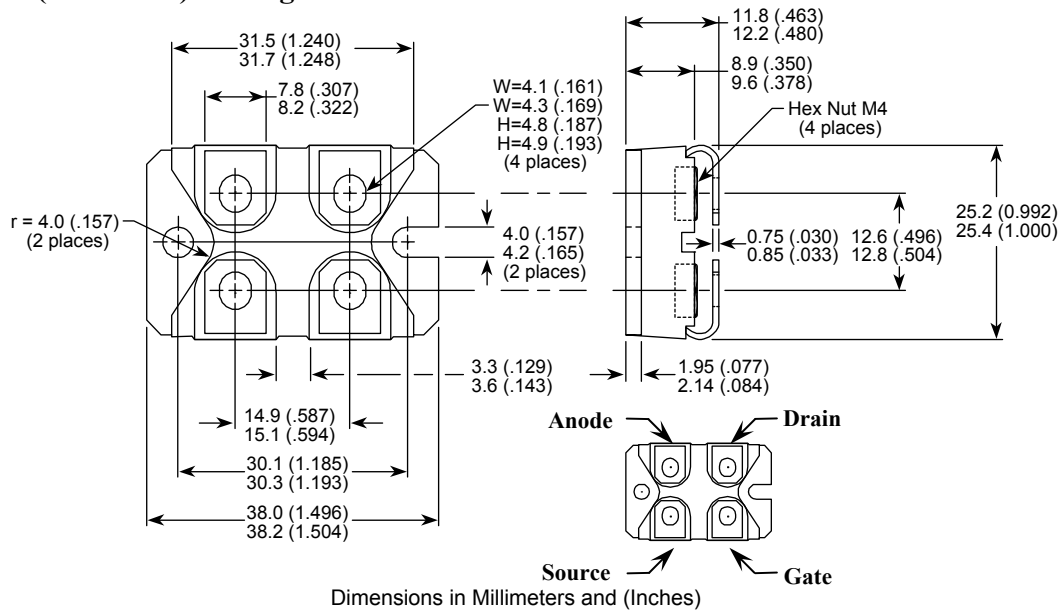
### SiC chopper diode ratings and characteristics

| 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  | $\mu\text{A}$ |
|           |                                         |                                                                               | $T_j = 175^\circ\text{C}$ | 56  | 1000 |               |
| $I_F$     | DC Forward Current                      |                                                                               | $T_c = 100^\circ\text{C}$ | 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                 | $I_F = 10\text{A}$ , $V_R = 600\text{V}$<br>$di/dt = 500\text{A}/\mu\text{s}$ |                           | 80  |      | nC            |
| C         | Total Capacitance                       | $f = 1\text{MHz}$ , $V_R = 200\text{V}$                                       |                           | 96  |      | $\text{pF}$   |
|           |                                         | $f = 1\text{MHz}$ , $V_R = 400\text{V}$                                       |                           | 69  |      |               |

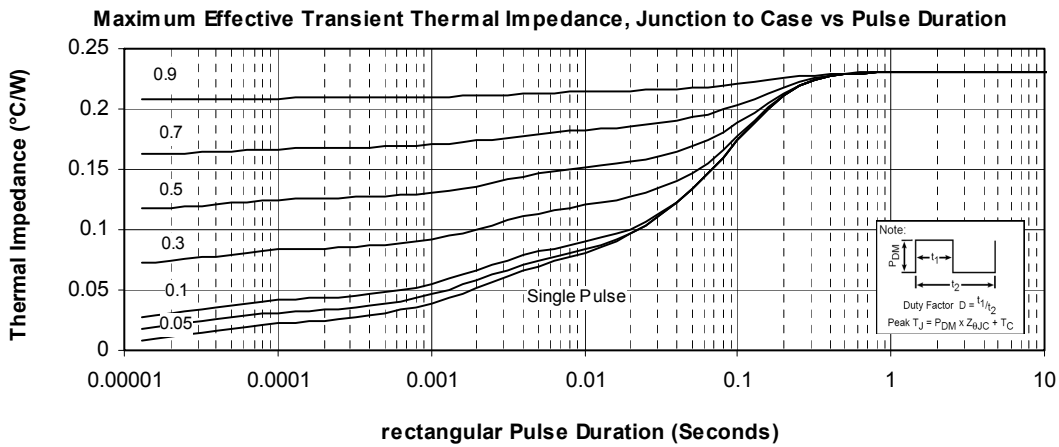
### Thermal and package characteristics

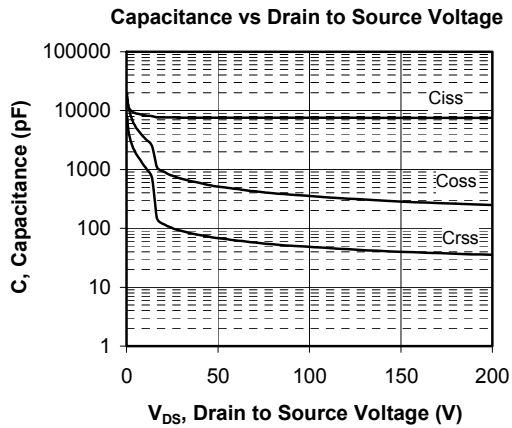
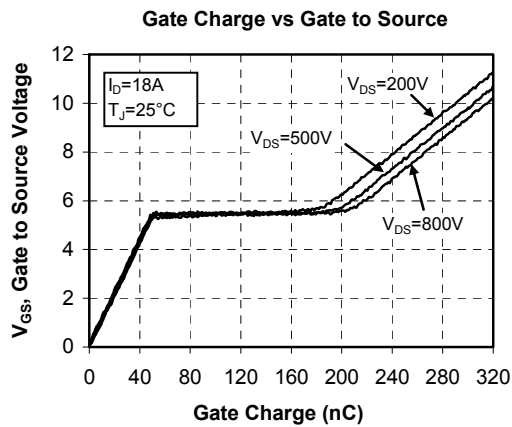
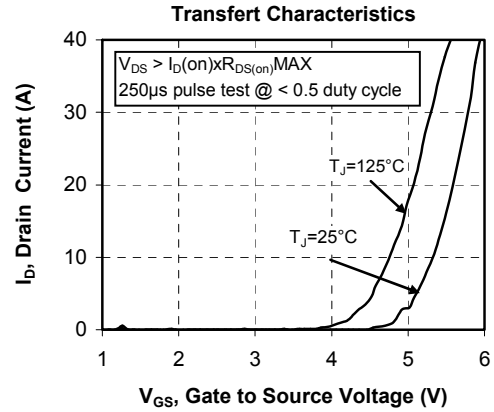
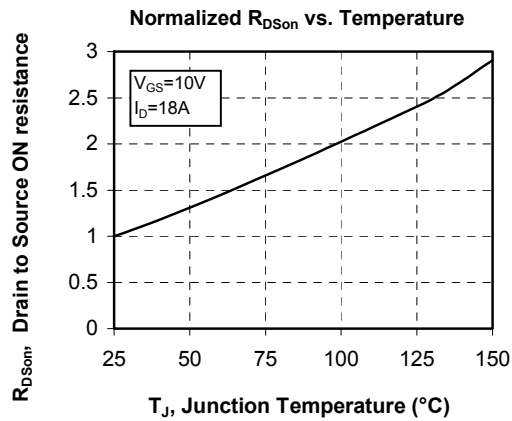
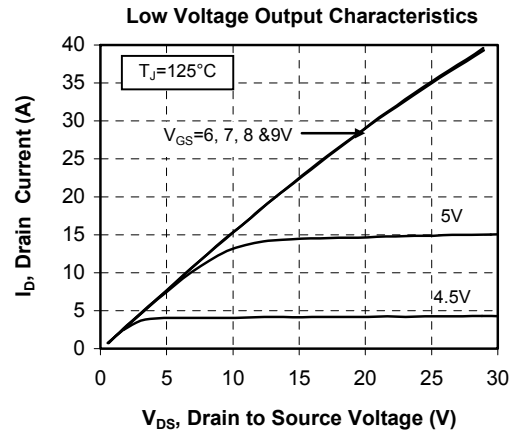
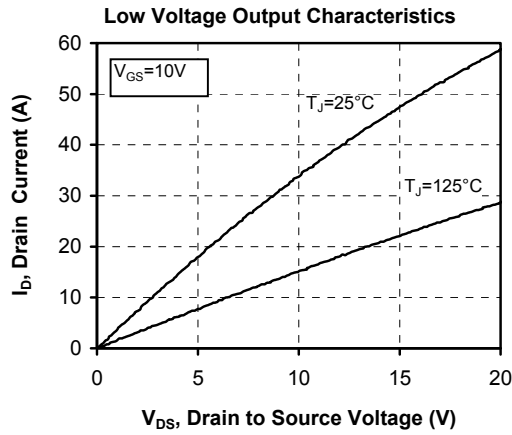
| Symbol         | Characteristic                                                               | Min       | Typ  | Max  | Unit                      |
|----------------|------------------------------------------------------------------------------|-----------|------|------|---------------------------|
| $R_{thJC}$     | Junction to Case Thermal Resistance                                          | Mosfet    |      | 0.23 | $^\circ\text{C}/\text{W}$ |
|                |                                                                              | SiC Diode |      | 1.65 |                           |
| $R_{thJA}$     | Junction to Ambient (IGBT & Diode)                                           |           |      | 20   |                           |
| $V_{ISOL}$     | RMS Isolation Voltage, any terminal to case $t = 1\text{ min}$ , 50/60Hz     | 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

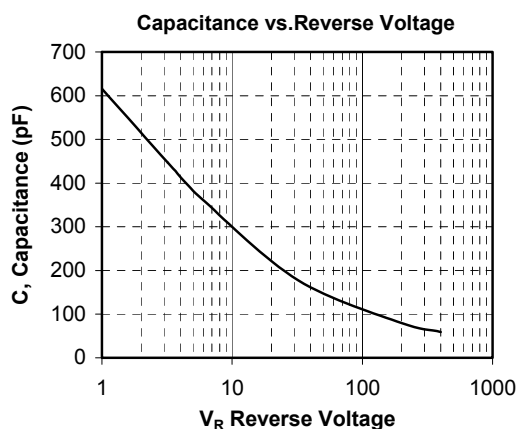
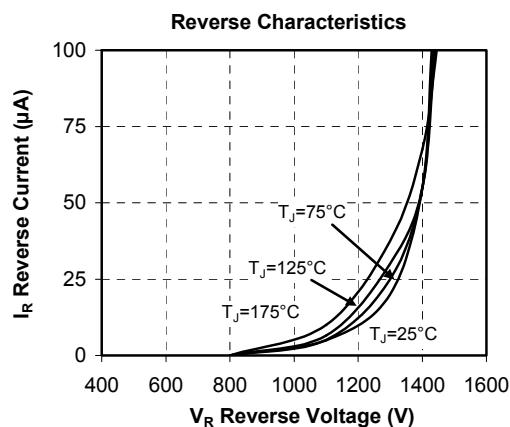
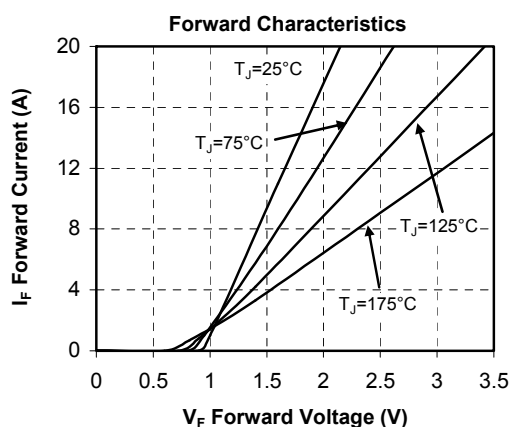
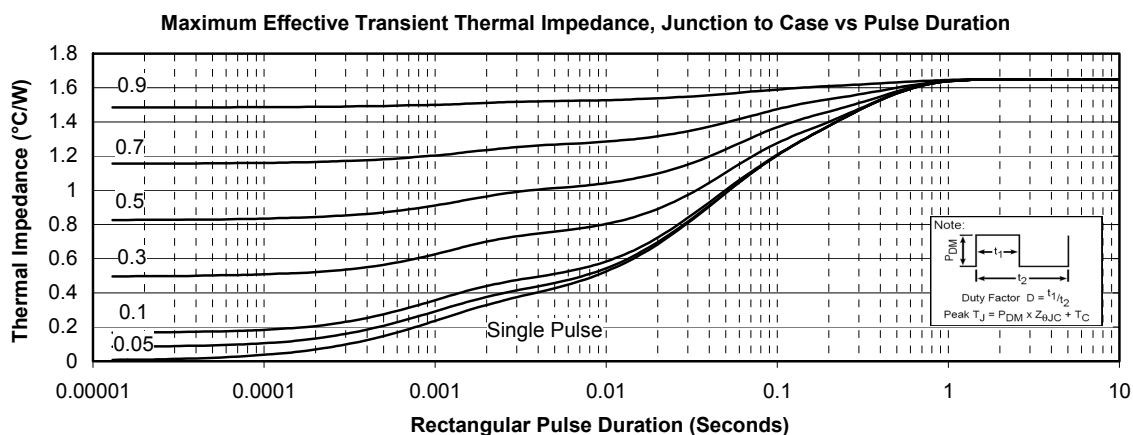


## Typical Mosfet Performance Curve





## Typical SiC Diode Performance Curve



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