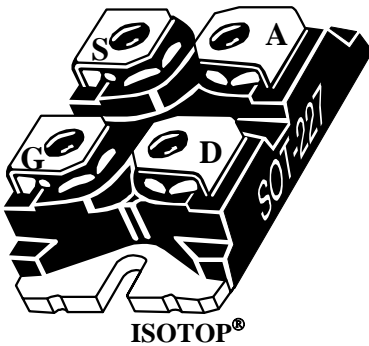
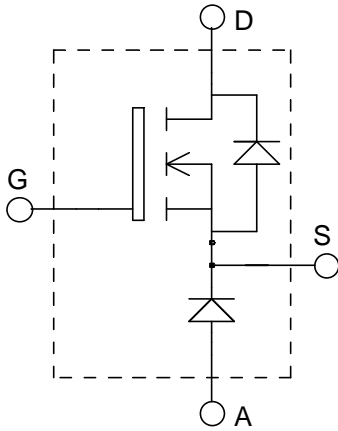


**ISOTOP<sup>®</sup> Buck chopper  
MOSFET + SiC chopper diode  
Power module**

**$V_{DSS} = 1200V$**   
 **$R_{DSon} = 560m\Omega$  typ @  $T_j = 25^\circ C$**   
 **$I_D = 20A$  @  $T_c = 25^\circ C$**



### 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	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	20
		$T_c = 80^\circ C$	15
$I_{DM}$	Pulsed Drain current	104	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	672	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	543
$I_{AR}$	Avalanche current (repetitive and non repetitive)	14	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	$V_{DS} = 1200\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$			100	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 14\text{A}$		560	672	$\text{m}\Omega$	
$V_{GS(th)}$	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	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$		7736		$\text{pF}$
$C_{oss}$	Output Capacitance			715		
$C_{rss}$	Reverse Transfer Capacitance			92		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 600\text{V}$ $I_D = 14\text{A}$		300		nC
$Q_{gs}$	Gate – Source Charge			50		
$Q_{gd}$	Gate – Drain Charge			140		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 14\text{A}$ $R_G = 2.2\Omega$		50		ns
$T_r$	Rise Time			31		
$T_{d(off)}$	Turn-off Delay Time			170		
$T_f$	Fall Time			48		

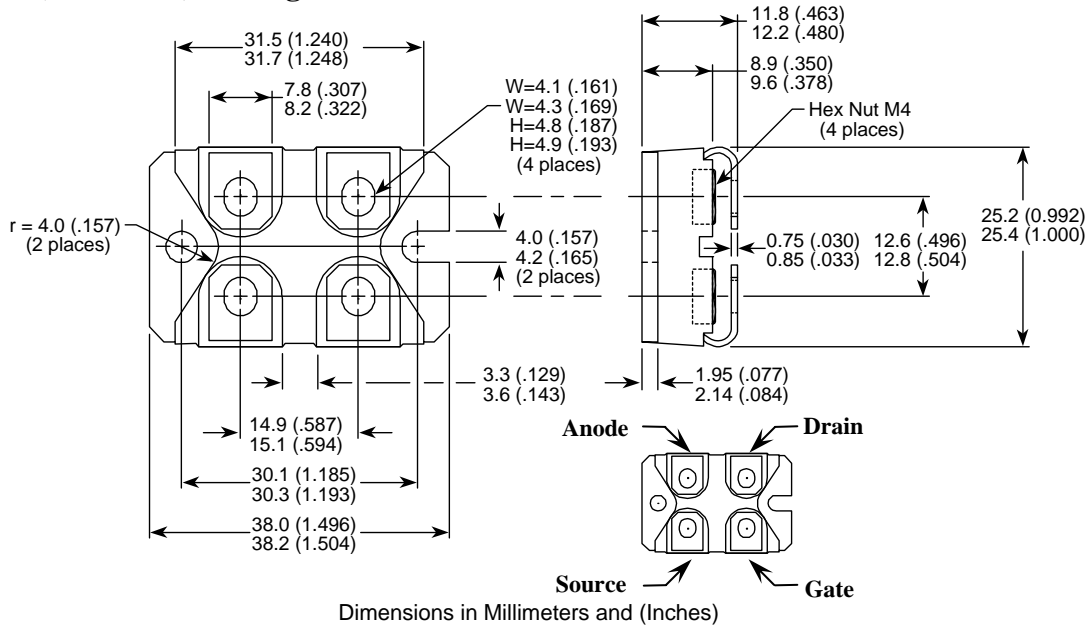
## SiC chopper diode ratings and characteristics

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			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		$\text{pF}$	
		$f = 1\text{MHz}, V_R = 400\text{V}$		69			

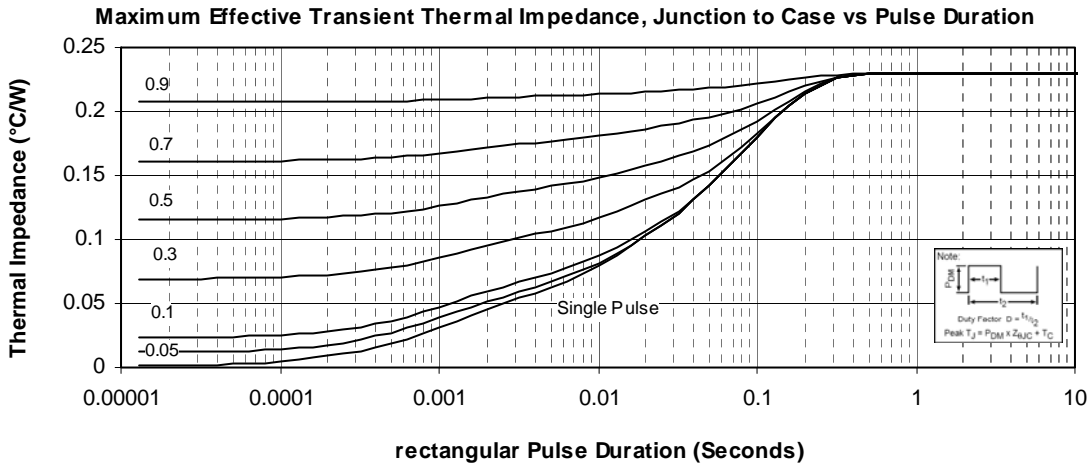
## Thermal and package characteristics

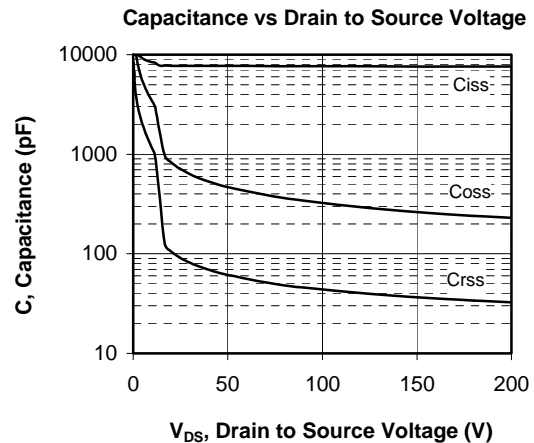
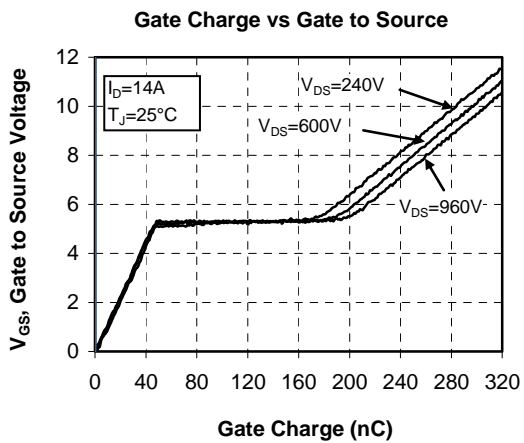
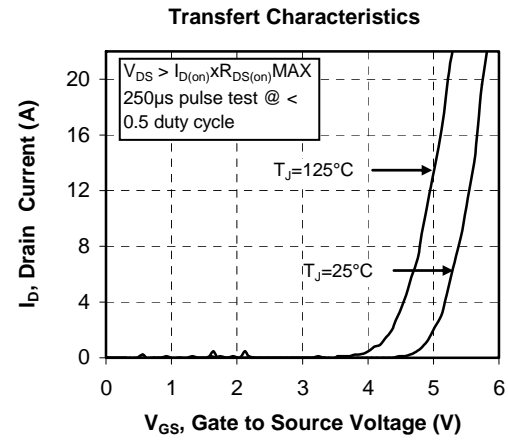
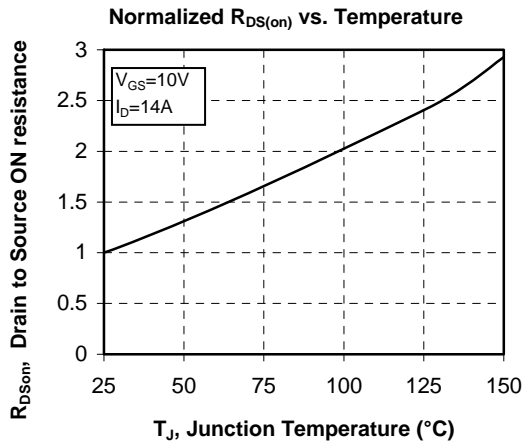
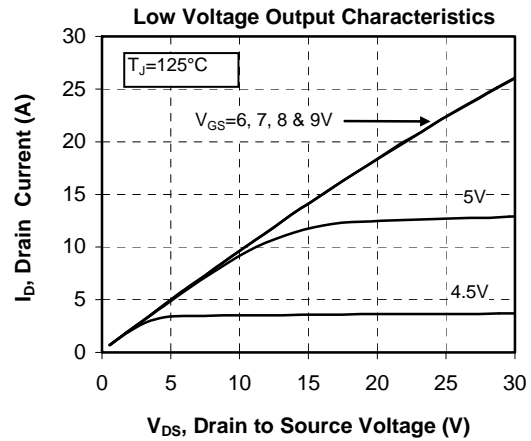
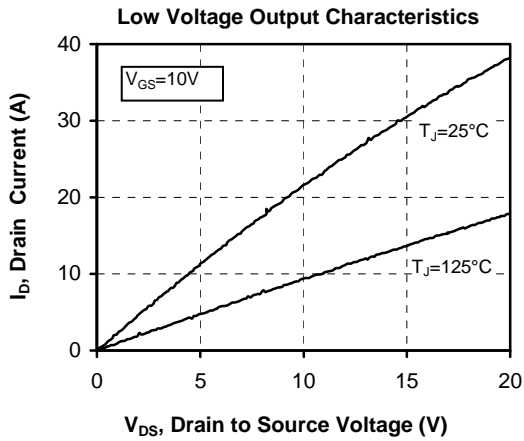
Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{thJC}$	Junction to Case Thermal Resistance	Mosfet			0.23	$^\circ\text{C}/\text{W}$
		SiC Diode			1.65	
$R_{thJA}$	Junction to Ambient (IGBT & Diode)			20		
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1\text{min}, I_{isol} < 1\text{mA}, 50/60\text{Hz}$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

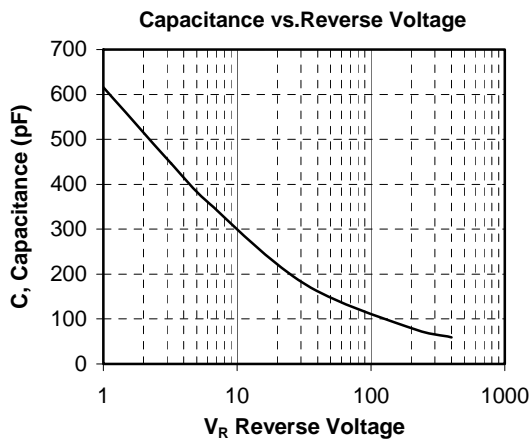
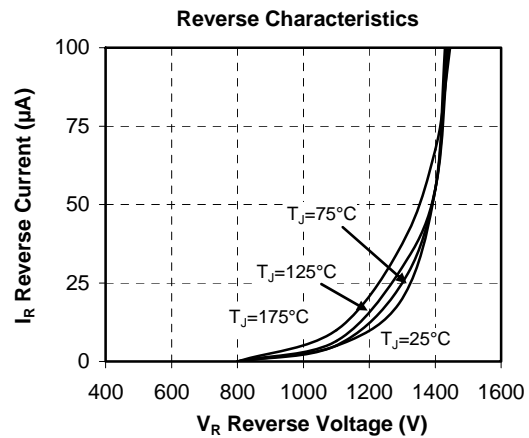
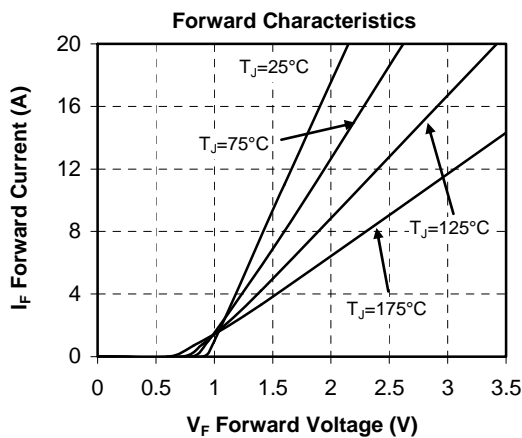
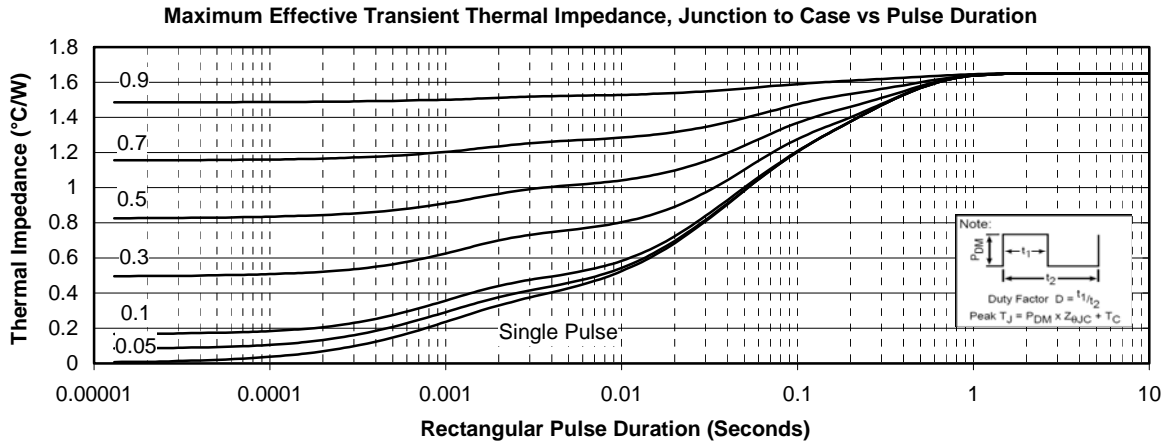


## Typical Mosfet Performance Curve





## Typical SiC Diode Performance Curve



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