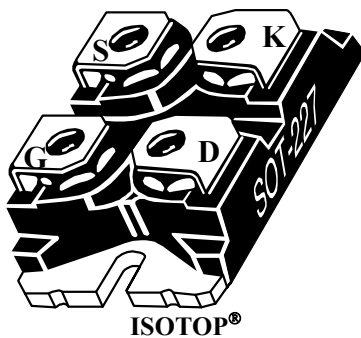
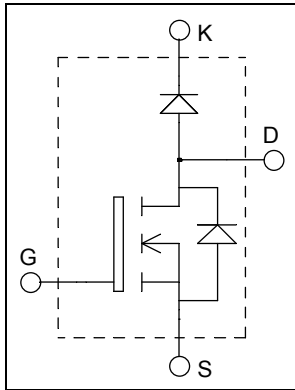


**ISOTOP<sup>®</sup> Boost chopper  
SiC MOSFET + SiC chopper diode  
Power module**

**$V_{DSS} = 1200V$   
 $R_{DS(on)} = 17m\Omega$  max @  $T_j = 25^\circ C$   
 $I_D = 143A$  @  $T_c = 25^\circ C$**



### Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction
- Brake switch

### Features

- **SiC Power MOSFET**
  - Low  $R_{DS(on)}$
  - High temperature performance
- **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  $V_{CEsat}$
- RoHS Compliant

**All ratings @  $T_j = 25^\circ C$  unless otherwise specified**

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	143
		$T_c = 80^\circ C$	108
$I_{DM}$	Pulsed Drain current	280	
$V_{GS}$	Gate - Source Voltage	-10/+25	V
$R_{DS(on)}$	Drain - Source ON Resistance	17	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$ 600	W

**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)

**Electrical Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1200V$		20	200	$\mu A$
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 100A$	$T_j = 25^\circ C$	12.5	17	m $\Omega$
			$T_j = 150^\circ C$	22	32	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2mA$	1.9	2.3		V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = 20V, V_{DS} = 0V$			1	$\mu A$

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		5960		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 1000V$		440		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		46		
$Q_g$	Total gate Charge	$V_{GS} = -2/+20V$		360		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 800V$		64		
$Q_{gd}$	Gate – Drain Charge	$I_D = 100A$		126		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = -2/+20V$		21		ns
$T_r$	Rise Time	$V_{Bus} = 800V$		19		
$T_{d(off)}$	Turn-off Delay Time	$I_D = 100A$		50		
$T_f$	Fall Time	$R_L = 8\Omega; R_G = 10\Omega$		30		
$E_{on}$	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V$	$T_j = 150^\circ C$	2.2		mJ
$E_{off}$	Turn off Energy	$I_D = 100A$ $R_G = 10\Omega$	$T_j = 150^\circ C$	1.2		
$R_{thJC}$	Junction to Case Thermal Resistance				0.21	$^\circ C/W$

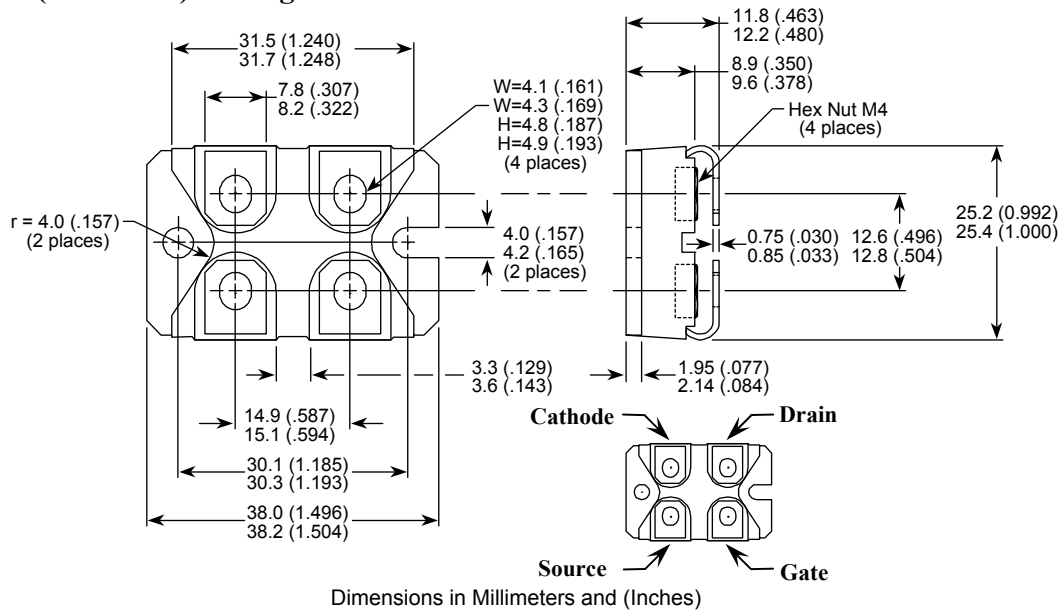
**SiC chopper diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1200			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$	70	400	$\mu A$
			$T_j = 175^\circ C$	130	800	
$I_F$	DC Forward Current		$T_c = 125^\circ C$	40		A
$V_F$	Diode Forward Voltage	$I_F = 40A$	$T_j = 25^\circ C$	1.5	1.8	V
			$T_j = 175^\circ C$	2.2	3	
$Q_C$	Total Capacitive Charge	$I_F = 40A, V_R = 1200V$ $di/dt = 1000A/\mu s$		260		nC
$C$	Total Capacitance	$f = 1MHz, V_R = 200V$		186		pF
		$f = 1MHz, V_R = 400V$		134		
$R_{thJC}$	Junction to Case Thermal Resistance				0.7	$^\circ C/W$

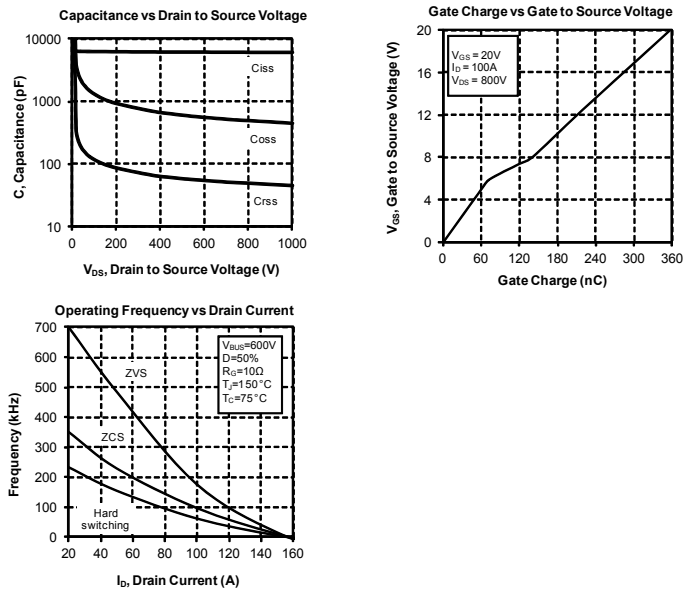
## Thermal and package characteristics

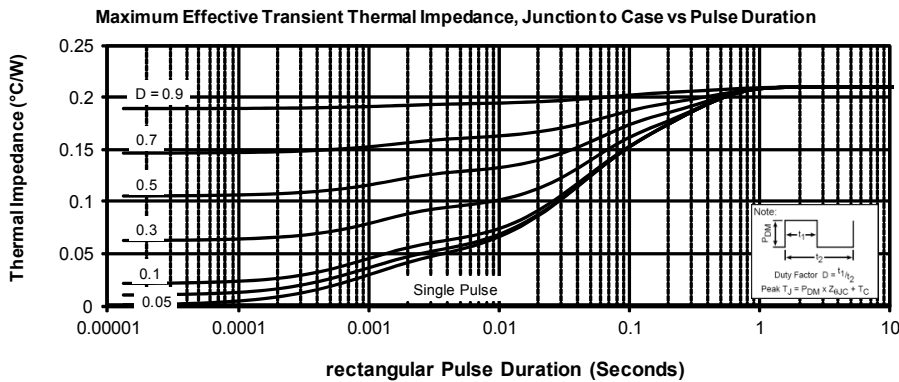
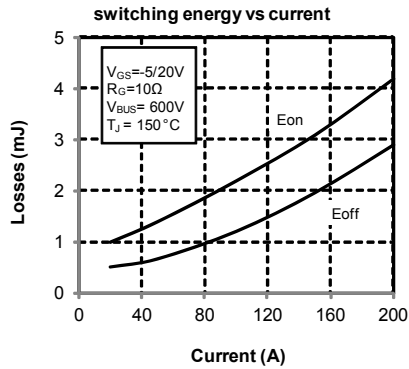
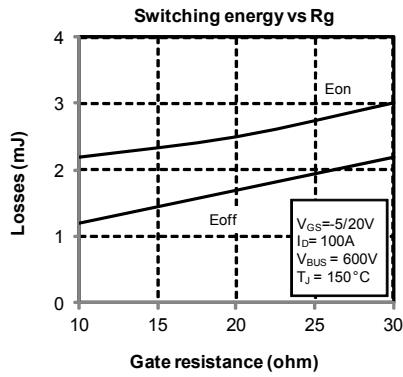
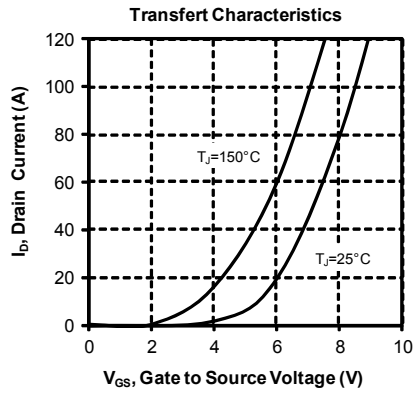
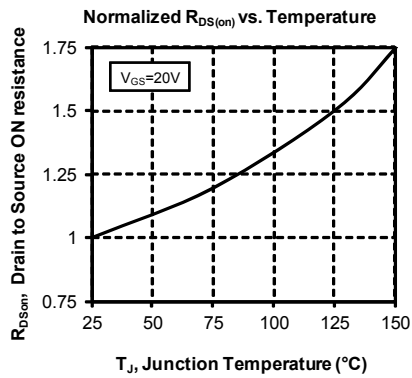
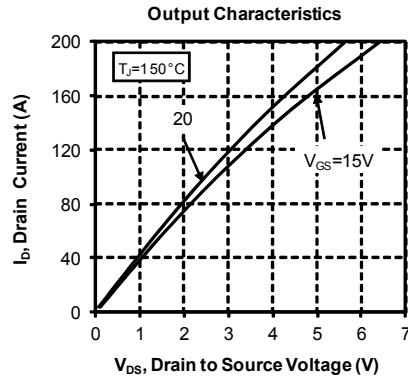
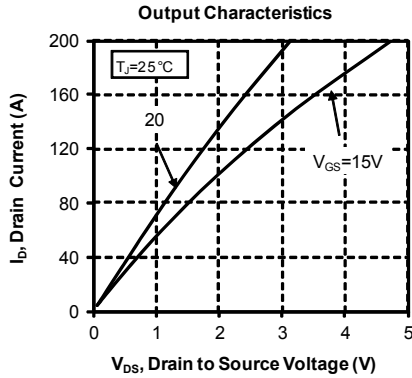
Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>thJA</sub>	Junction to Ambient (IGBT & Diode)			20	°C/W
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	2500			V
T <sub>STG</sub>	Storage Temperature Range	-40		150	°C
T <sub>J</sub>	Operating junction temperature range	SiC MOSFET	-40	150	
		SiC Diode	-40	175	
T <sub>JOP</sub>	Recommended junction temperature under switching conditions	-40		T <sub>Jmax</sub> -25	
Torque	Terminals and mounting screws			1.1	N.m
Wt	Package Weight		29.2		g

## SOT-227 (ISOTOP<sup>®</sup>) Package Outline



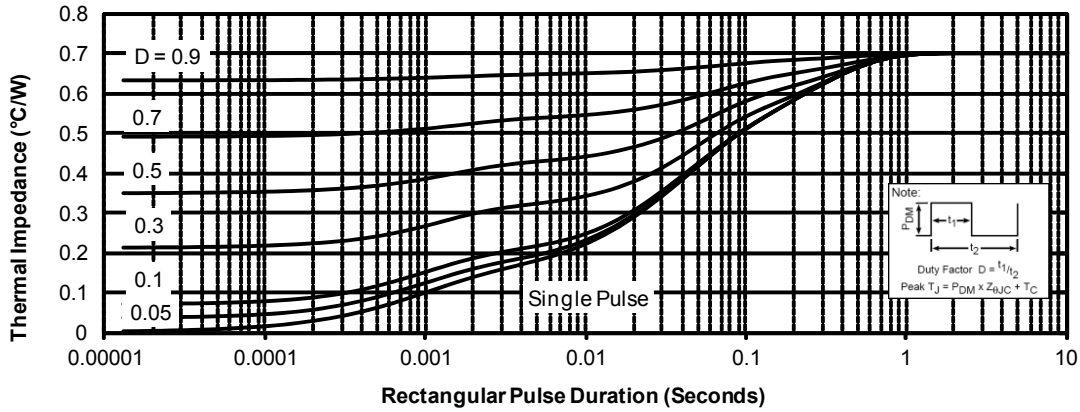
## Typical Mosfet Performance Curve



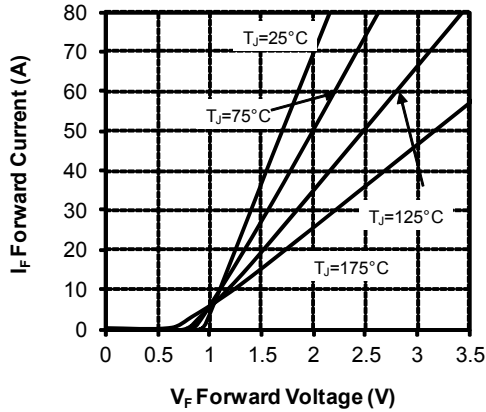


## Typical SiC Diode Performance Curve

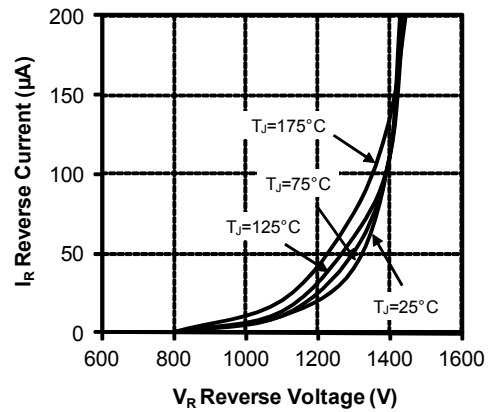
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



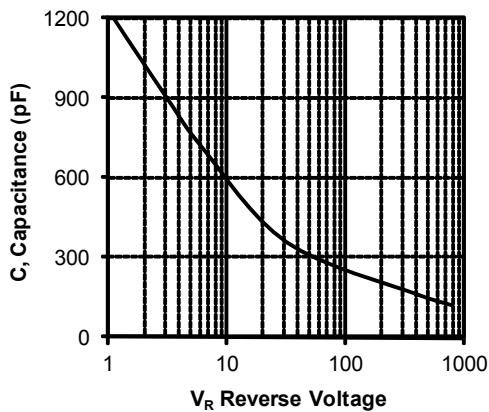
Forward Characteristics



Reverse Characteristics



Capacitance vs. Reverse Voltage



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