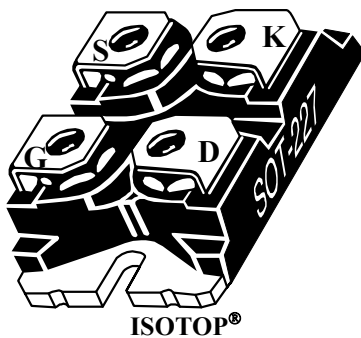
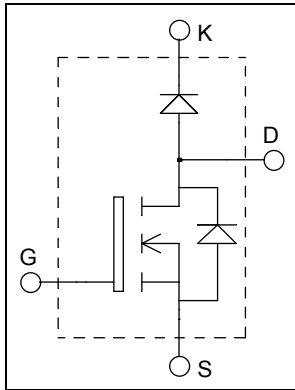


**ISOTOP[®] Boost chopper
SiC MOSFET + SiC chopper diode
Power module**

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



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[®] 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

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	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 100A$	$T_j = 25^\circ C$	12.5	17	m Ω
			$T_j = 150^\circ C$	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	μA

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	$^\circ C/W$

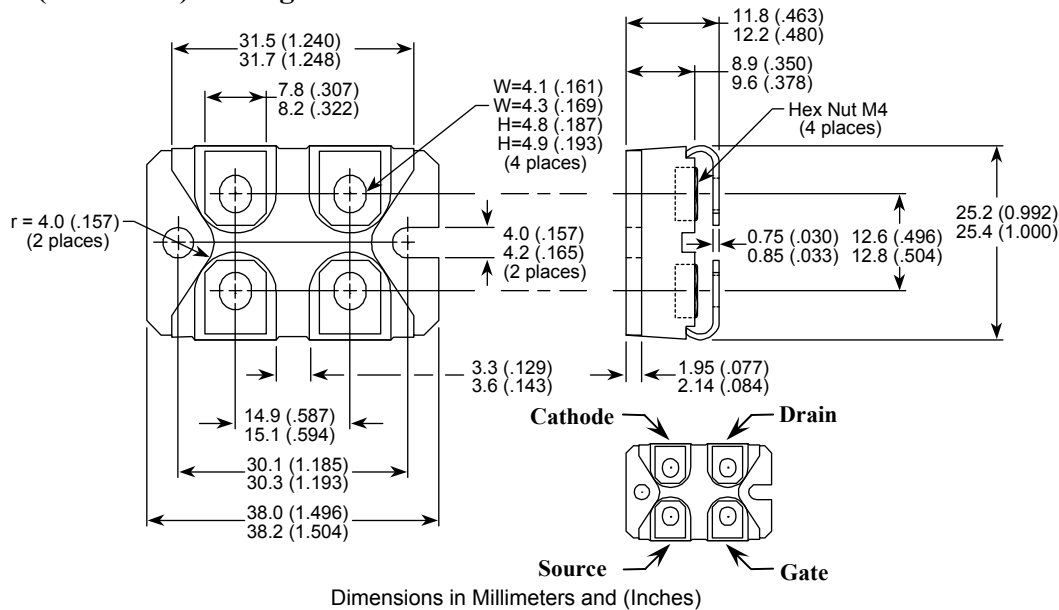
SiC chopper diode ratings and characteristics

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	μA
			$T_j = 175^\circ C$	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	$^\circ C/W$

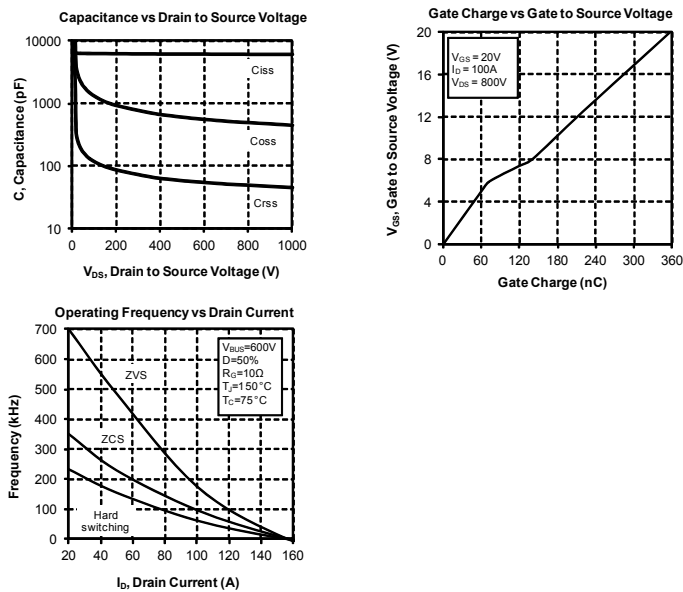
Thermal and package characteristics

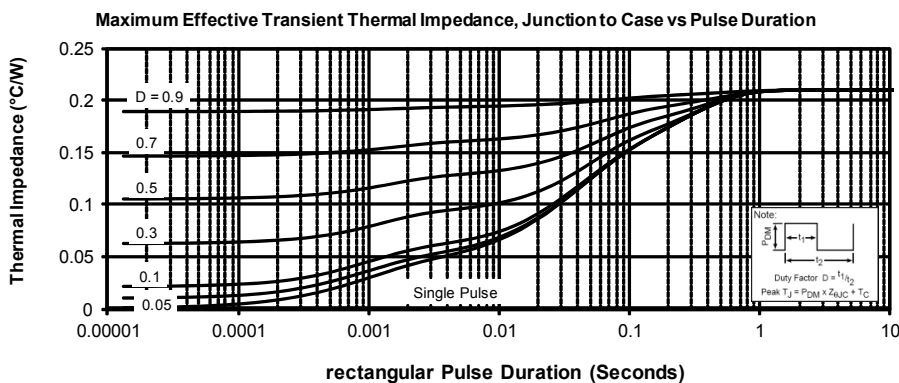
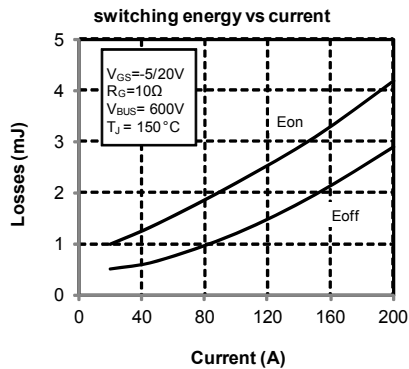
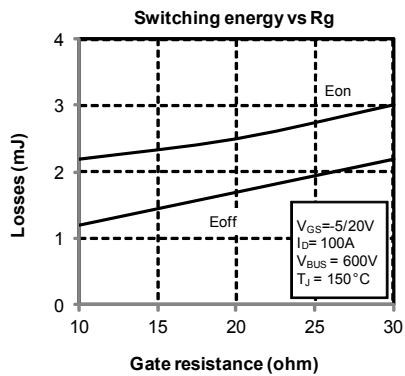
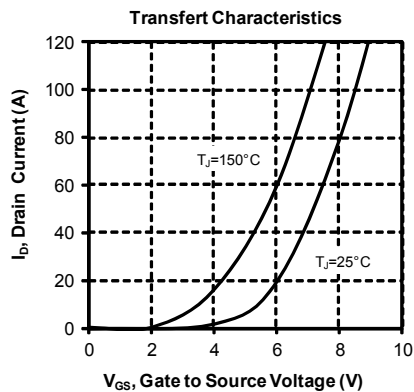
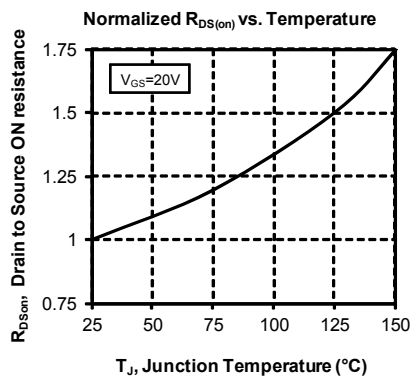
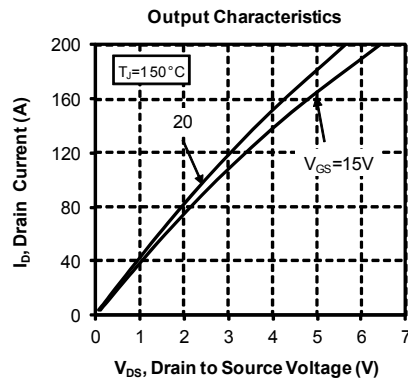
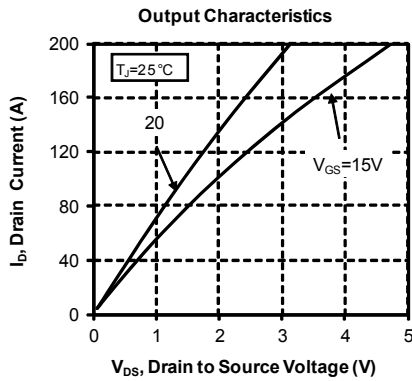
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJA}	Junction to Ambient (IGBT & Diode)			20	°C/W
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, 50/60Hz	2500			V
T_{STG}	Storage Temperature Range	-40		150	°C
T_J	Operating junction temperature range	SiC MOSFET	-40	150	
		SiC Diode	-40	175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

SOT-227 (ISOTOP[®]) Package Outline



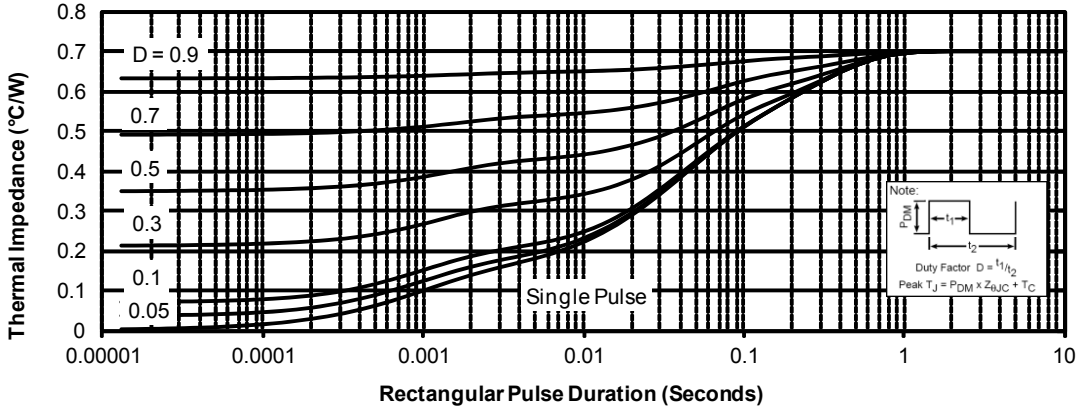
Typical Mosfet Performance Curve



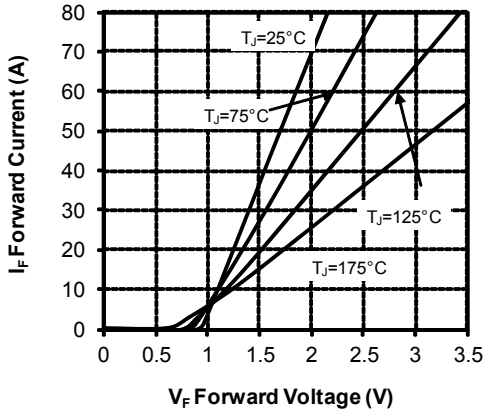


Typical SiC Diode Performance Curve

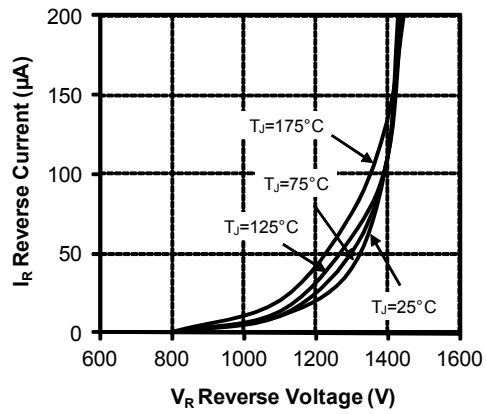
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



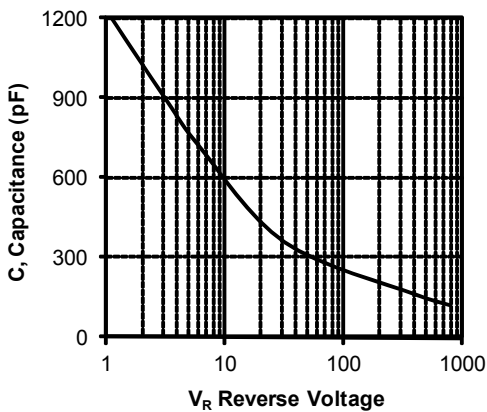
Forward Characteristics



Reverse Characteristics



Capacitance vs. Reverse Voltage



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