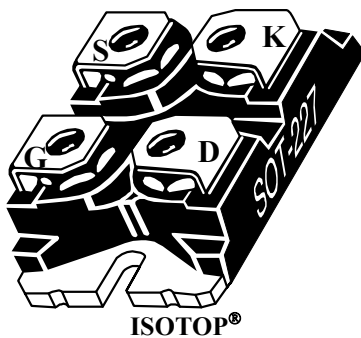
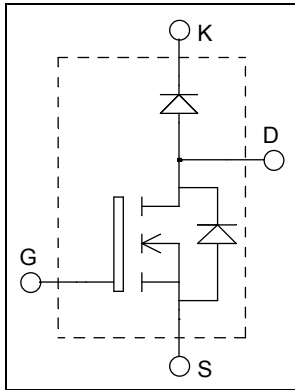


**ISOTOP[®] Boost chopper
SiC MOSFET + SiC chopper diode
Power module**

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



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 VCEsat
- 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 Ω
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		12.5 22	17 32	mΩ
						T _j = 25°C T _j = 150°C
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} = 20 V, 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 = 8Ω ; R _G = 10Ω		30		
E _{on}	Turn on Energy	Inductive Switching V _{GS} = -5/+20V V _{Bus} = 600V		2.2		mJ
E _{off}	Turn off Energy	I _D = 100A R _G = 10Ω		1.2		
R _{thJC}	Junction to Case Thermal Resistance				0.21	°C/W

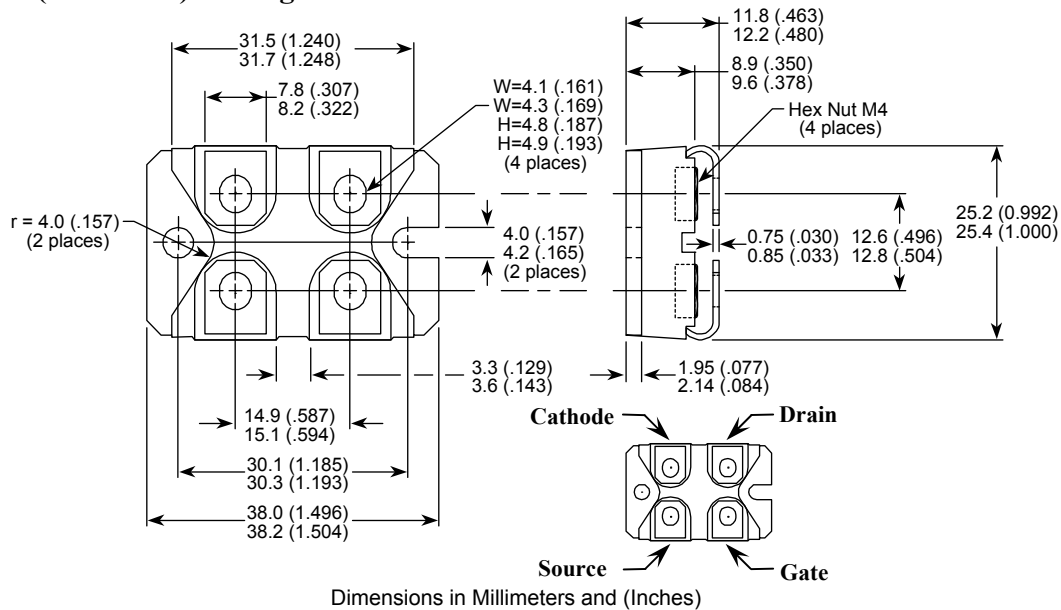
SiC chopper diode ratings and characteristics

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		70 130	400 800	μA
						T _j = 25°C T _j = 175°C
I _F	DC Forward Current			40		A
						T _c = 125°C
V _F	Diode Forward Voltage	I _F = 40A		1.5 2.2	1.8 3	V
						T _j = 25°C T _j = 175°C
Q _C	Total Capacitive Charge	I _F = 40A, V _R = 1200V di/dt = 1000A/μs		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	°C/W

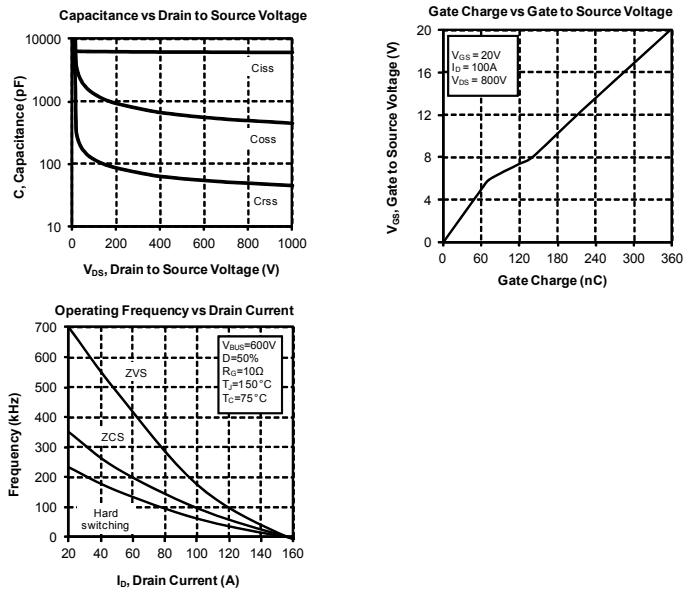
Thermal and package characteristics

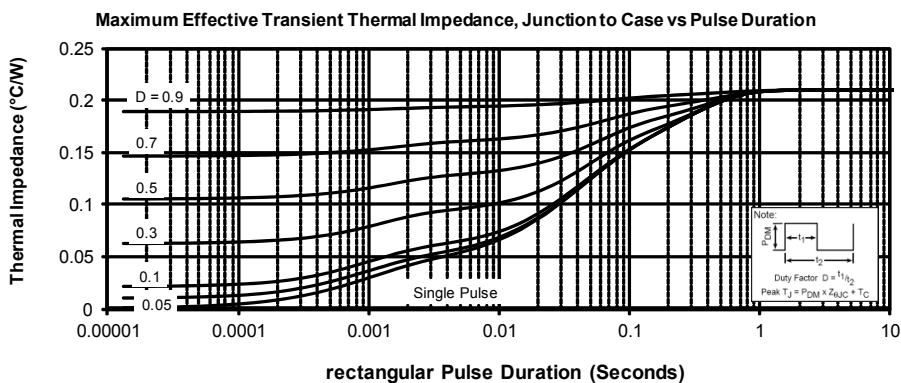
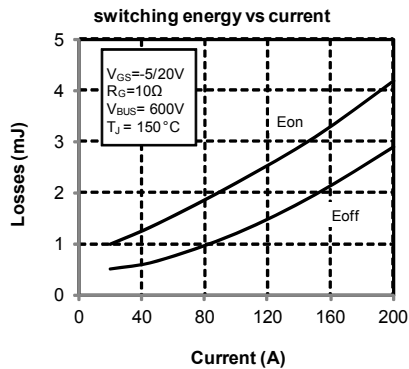
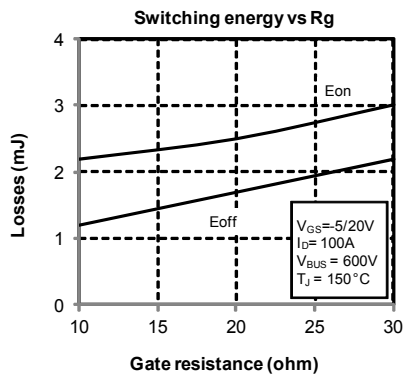
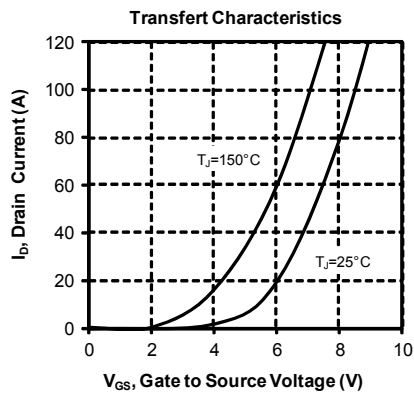
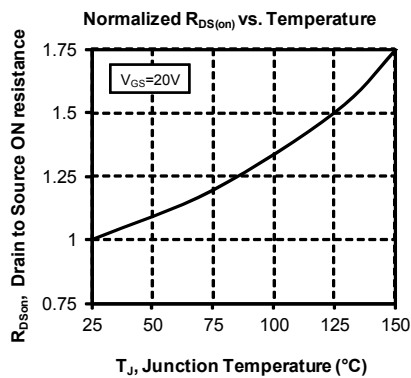
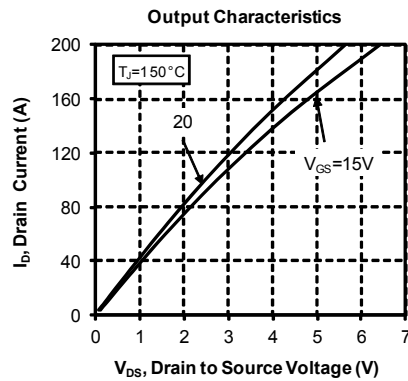
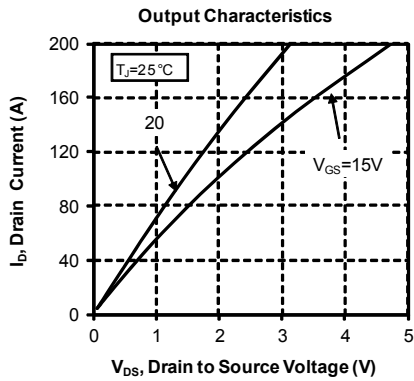
Symbol	Characteristic	Min	Typ	Max	Unit
R_{thJA}	Junction to Ambient (IGBT & Diode)			20	°C/W
V_{ISOL}	RMS Isolation Voltage, any terminal to case $t=1$ min, 50/60Hz	2500			V
T_{STG}	Storage Temperature Range	-40		150	°C
T_J	Operating junction temperature range	SiC MOSFET	-40	150	
		SiC Diode	-40	175	
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



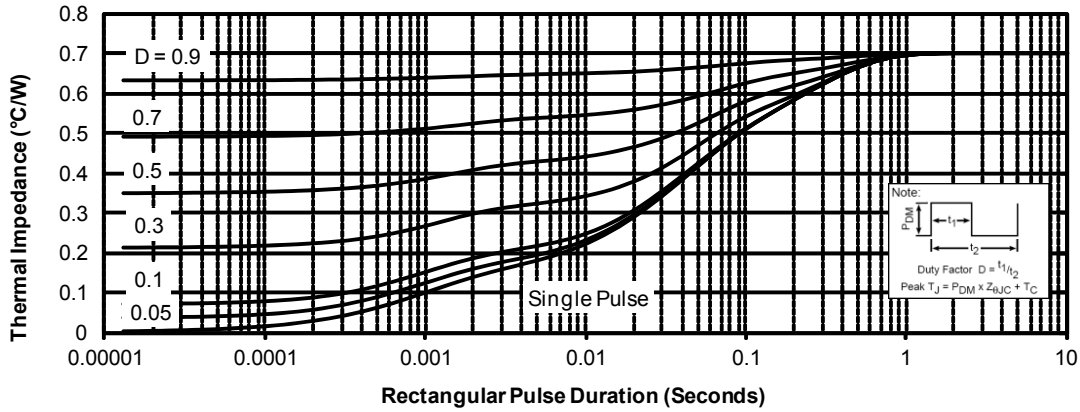
Typical Mosfet Performance Curve



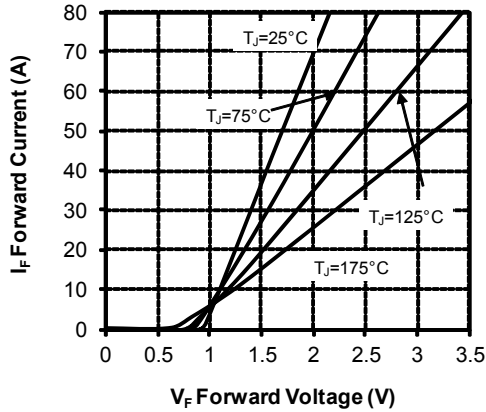


Typical SiC Diode Performance Curve

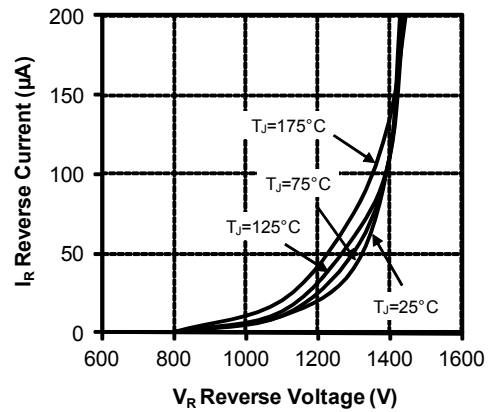
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



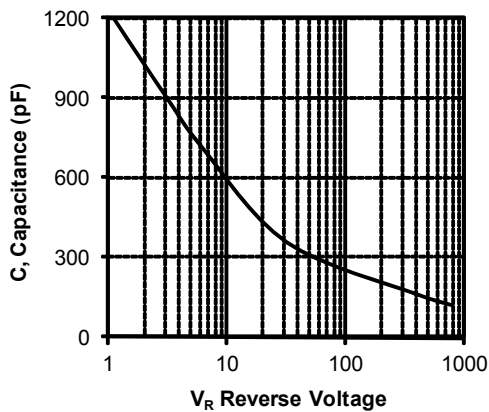
Forward Characteristics



Reverse Characteristics



Capacitance vs. Reverse Voltage



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