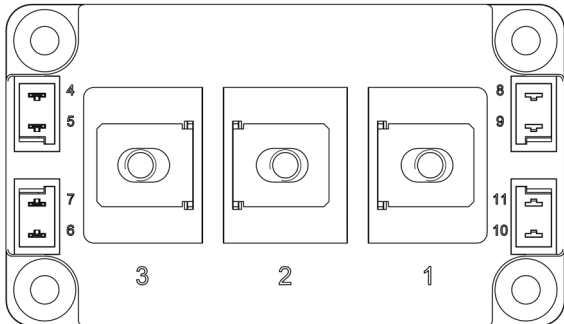
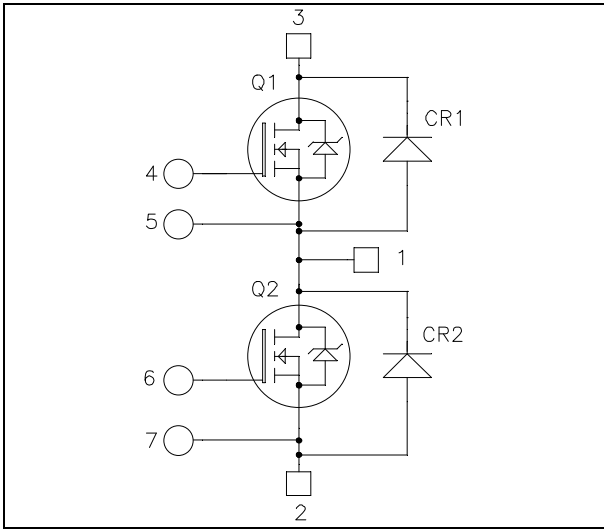




**Phase leg
SiC MOSFET Power Module**

$V_{DSS} = 1200V$
 $R_{DS(on)} = 8m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 250A$ @ $T_c = 25^\circ C$



Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

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
- Kelvin source for easy drive
- High level of integration
- AlN substrate for improved thermal performance
- M6 power connectors

Benefits

- Stable temperature behavior
- Very rugged
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- RoHS Compliant

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

Absolute maximum ratings (per SiC MOSFET)

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	1200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	250
		$T_c = 80^\circ C$	190
I_{DM}	Pulsed Drain current	550	A
V_{GS}	Gate - Source Voltage	-10/25V	V
$R_{DS(on)}$	Drain - Source ON Resistance	10	m Ω
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	1100
			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 (per SiC MOSFET)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1200V$		120	1000	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 200A$	$T_j = 25^\circ C$	8	10	m Ω
			$T_j = 150^\circ C$	15	21	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}; I_D = 10mA$	1.7	2.2		V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = 20V, V_{DS} = 0V$			2.5	μA

Dynamic Characteristics (per SiC MOSFET)

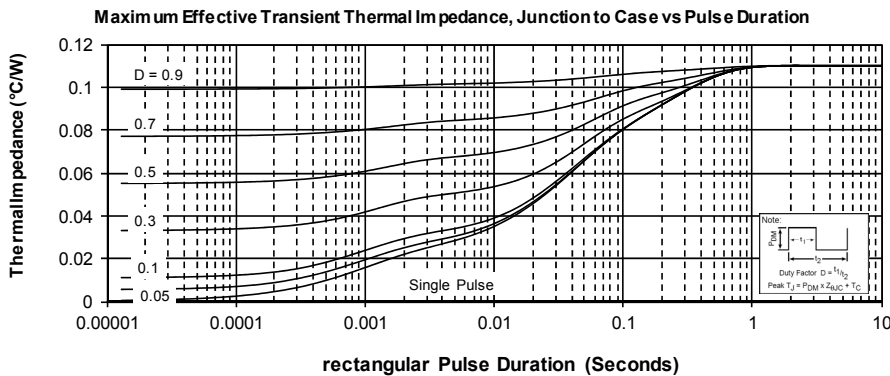
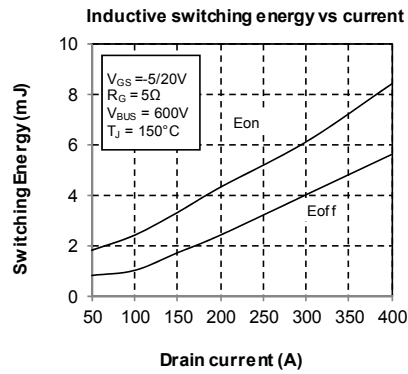
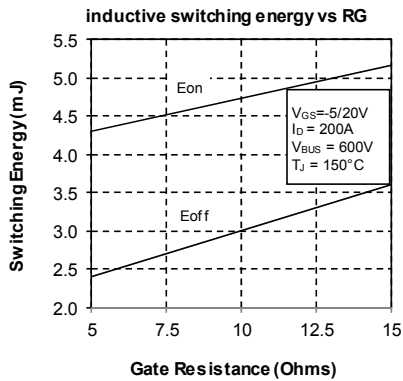
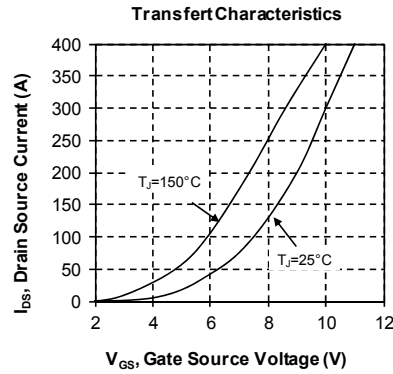
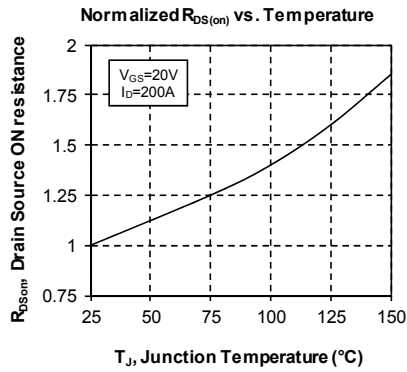
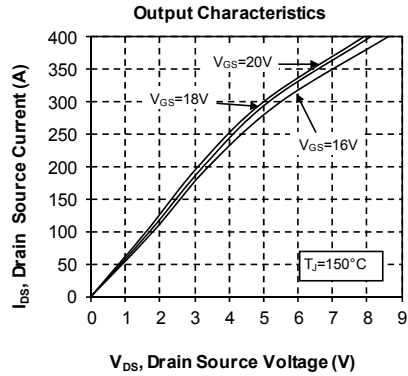
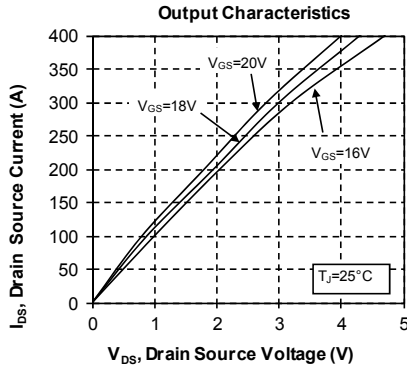
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
C_{iss}	Input Capacitance	$V_{GS} = 0V$		9500		pF
C_{oss}	Output Capacitance	$V_{DS} = 1000V$		800		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		65		
Q_g	Total gate Charge	$V_{GS} = 20V$		490		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 800V$		110		
Q_{gd}	Gate – Drain Charge	$I_D = 200A$		180		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = -2/+20V$ $V_{Bus} = 800V$ $I_D = 200A ; T_j = 150^\circ C$ $R_L = 4\Omega ; R_G = 5\Omega$		20		ns
T_r	Rise Time			20		
$T_{d(off)}$	Turn-off Delay Time			75		
T_f	Fall Time			35		
E_{on}	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V$ $I_D = 200A$ $R_G = 5\Omega$	$T_j = 150^\circ C$	4.3		mJ
E_{off}	Turn off Energy			$T_j = 150^\circ C$	2.4	
R_{Gint}	Internal gate resistance			1		Ω
R_{thJC}	Junction to Case Thermal Resistance				0.11	$^\circ C/W$

Body diode ratings and characteristics (per SiC MOSFET)

<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V_{SD}	Diode Forward Voltage	$V_{GS} = -5V, I_{SD} = 100A$		3.3		V
		$V_{GS} = -2V, I_{SD} = 100A$		3.1		
t_{rr}	Reverse Recovery Time	$I_{SD} = 200A ; V_{GS} = -5V$ $V_R = 800V ; di_F/dt = 3500A/\mu s$		40		ns
Q_{rr}	Reverse Recovery Charge			1650		nC
I_{rr}	Reverse Recovery Current				64	

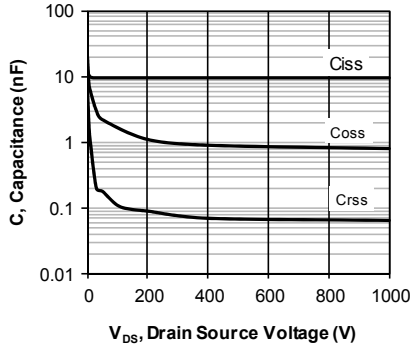


Typical SiC MOSFET Performance Curve

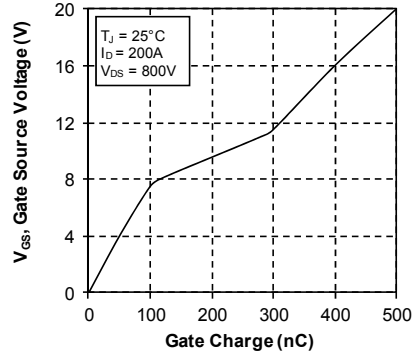




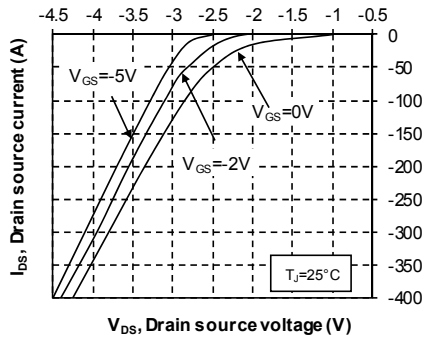
Capacitance vs Drain Source Voltage



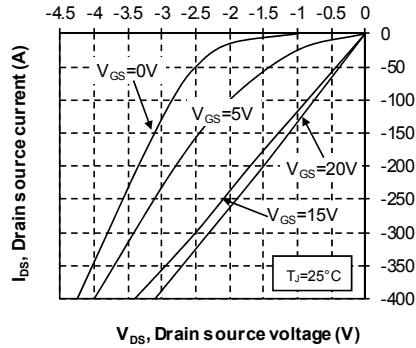
Gate Charge vs Gate Source Voltage



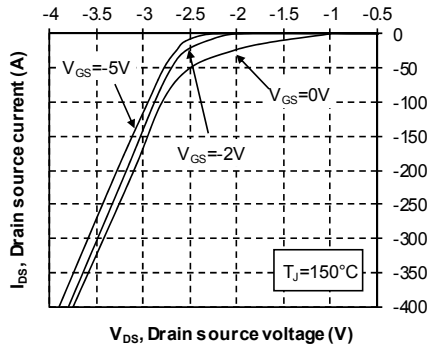
Body diode Characteristics



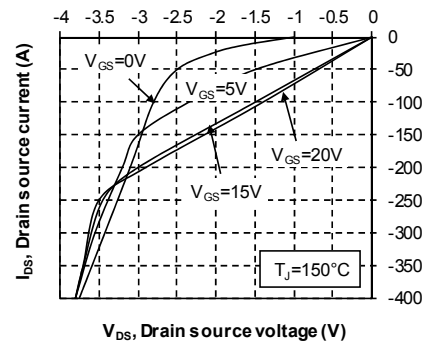
Output Characteristics



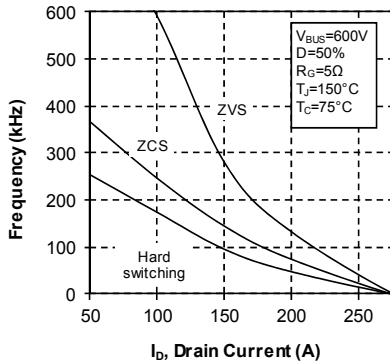
Body diode Characteristics



Output Characteristics



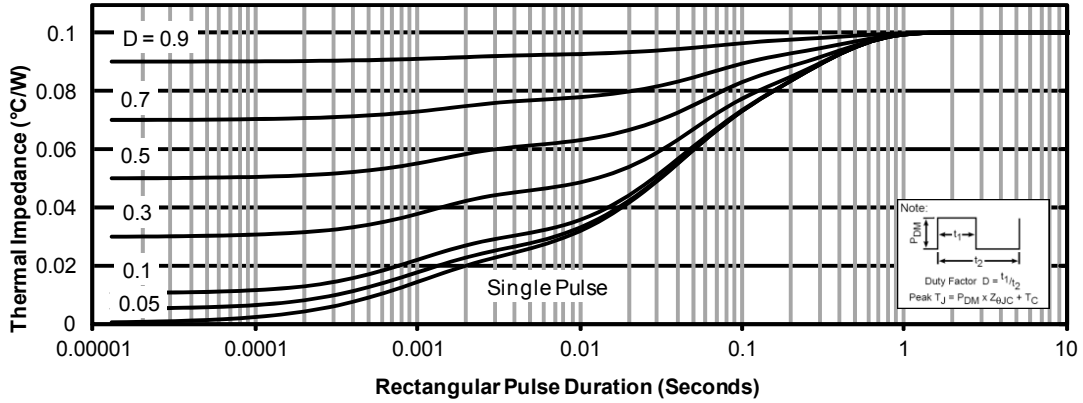
Operating Frequency vs Drain Current



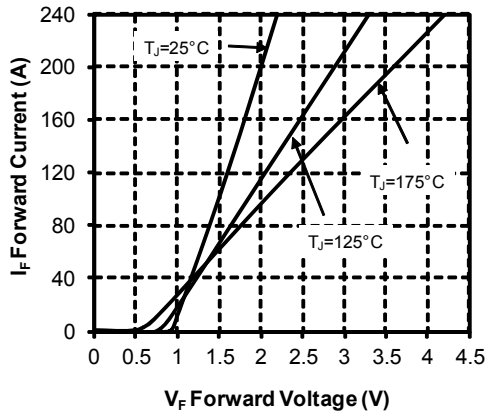


Typical SiC diode Performance Curve

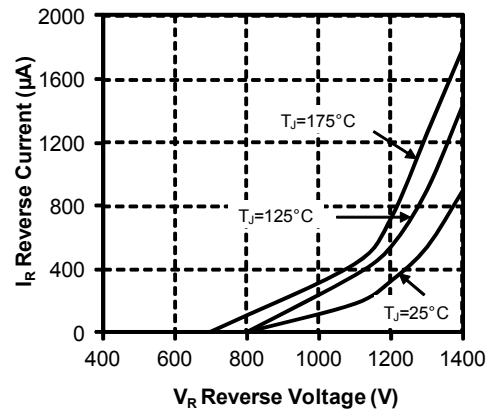
Maximum Effective Transient Thermal Impedance, Junction to Case vs Pulse Duration



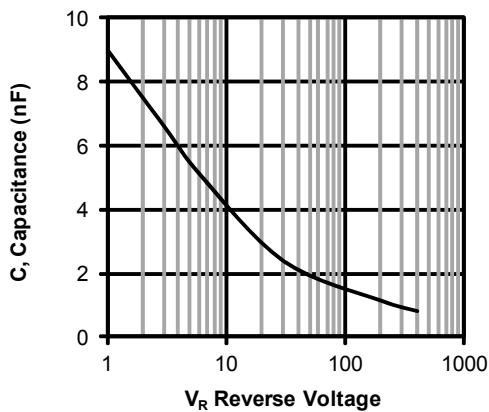
Forward Characteristics



Reverse Characteristics



Capacitance vs. Reverse Voltage





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