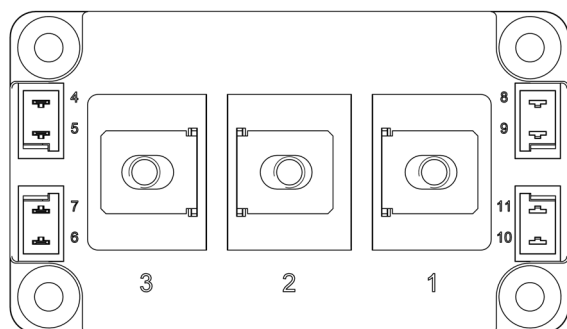
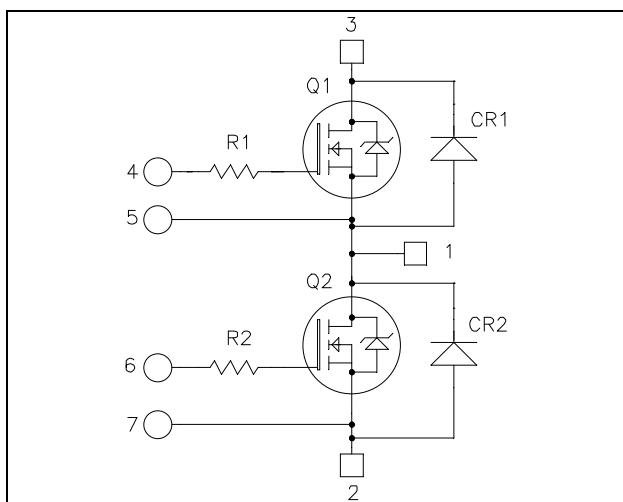


Phase leg MOSFET Power Module

$$V_{DSS} = 1200V$$

$$R_{DS(on)} = 10m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 260A \text{ @ } T_c = 25^\circ C$$



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 emitter 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
- Easy paralleling due to positive T_c 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	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{DM}	Pulsed Drain current	550	
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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V$, $V_{DS} = 1200V$		120	1000	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 200A$	$T_j = 25^\circ C$ $T_j = 150^\circ C$	8 15	10 21	$m\Omega$
$V_{GS(th)}$	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

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
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	$V_{GS} = -2/+20V$		12		ns
T_r	Rise Time	$V_{Bus} = 800V$		14		
$T_{d(off)}$	Turn-off Delay Time	$I_D = 200A$		23		
T_f	Fall Time	$R_L = 4\Omega$; $R_G = 5\Omega$		18		
E_{on}	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V$	$T_j = 150^\circ C$	4.5		mJ
E_{off}	Turn off Energy	$I_D = 200A$ $R_G = 5\Omega$	$T_j = 150^\circ C$	2.5		
R_{thJC}	Junction to Case Thermal Resistance				0.11	$^\circ C/W$

SiC schottky diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_{RRM}	Maximum Reverse Leakage Current	$V_R = 1200V$	$T_j = 25^\circ C$ $T_j = 175^\circ C$	0.38 0.68	2.4 12	mA
$I_{F(AV)}$	Maximum Average Forward Current	50% duty cycle	$T_c = 125^\circ C$	120		A
V_F	Diode Forward Voltage	$I_F = 120A$	$T_j = 25^\circ C$ $T_j = 175^\circ C$	1.6 2.3	1.8 3	V
Q_C	Total Capacitive Charge	$I_F = 120A$, $V_R = 1200V$ $di/dt = 5000A/\mu s$		960		nC
C	Total Capacitance	$f = 1MHz$, $V_R = 200V$ $f = 1MHz$, $V_R = 400V$		1152 828		pF
R_{thJC}	Junction to Case Thermal Resistance				0.18	$^\circ C/W$

Resistor characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R_i	Gate resistor	$i = 1$ to 2		1		Ω
P_i	Power dissipation			5		W

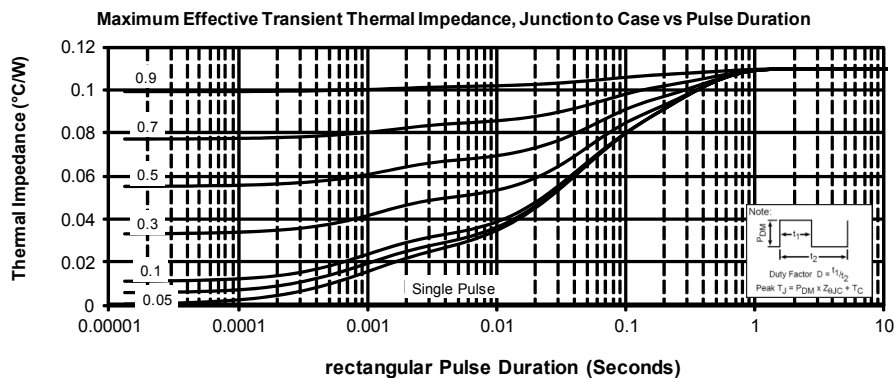
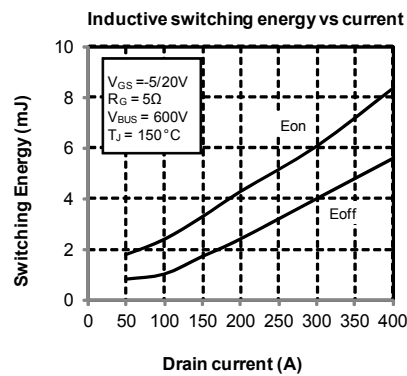
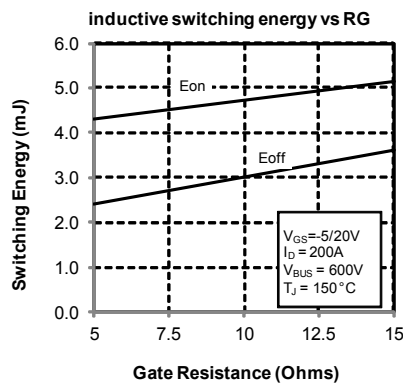
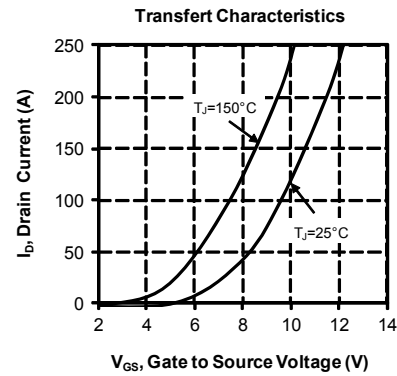
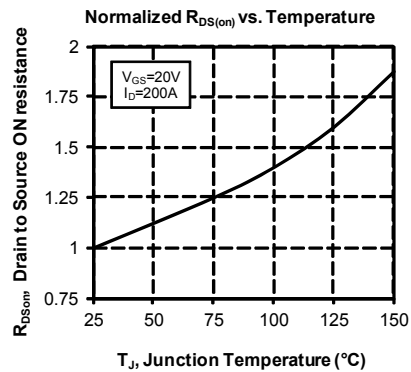
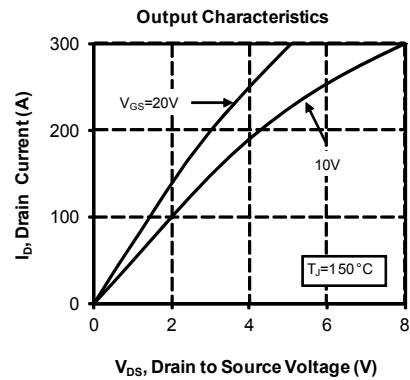
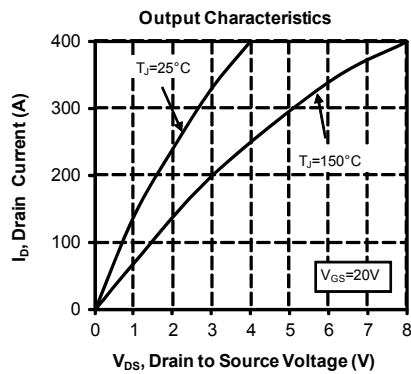
<i>Symbol</i>	<i>Characteristic</i>
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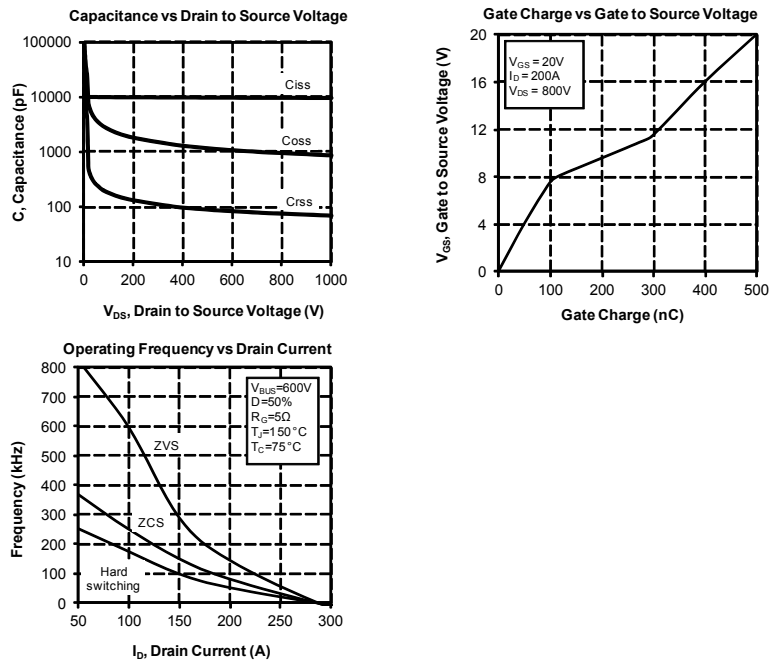
D3 Package outline (dimensions in mm)



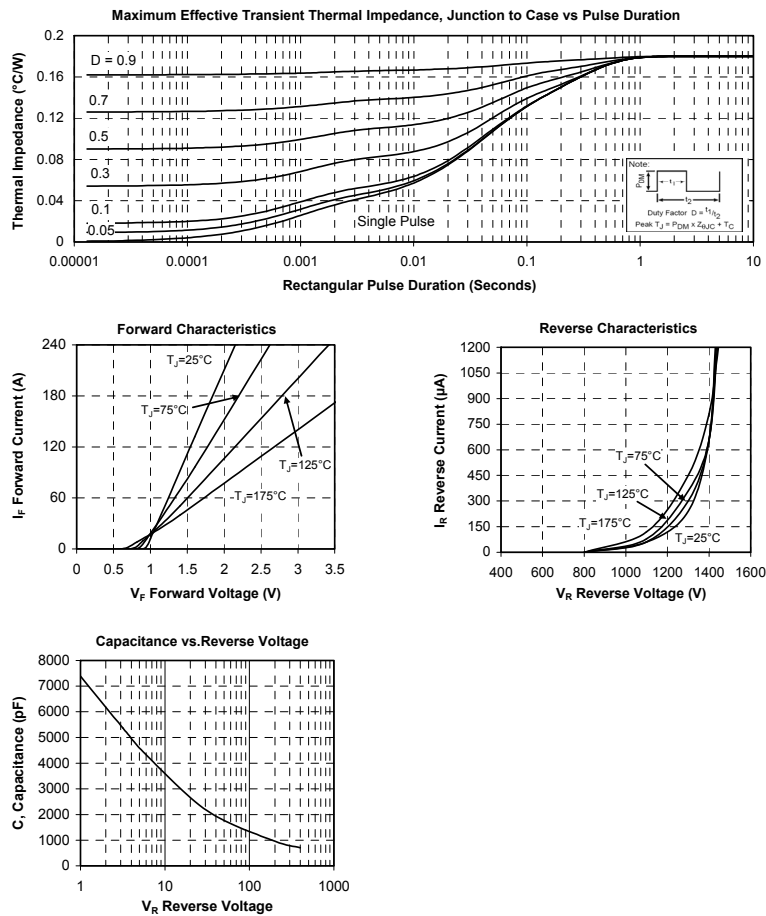


Typical SiC MOSFET Performance Curve





Typical SiC diode Performance Curve





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