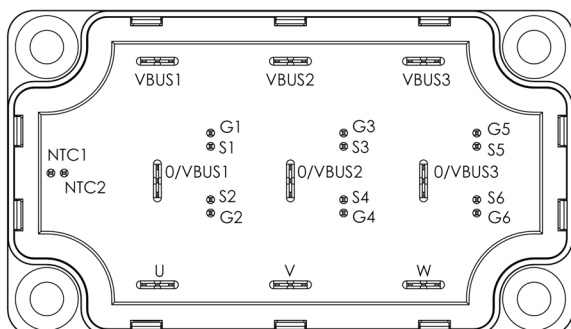
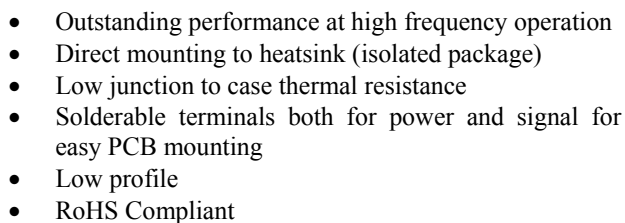


**$I_p = 147A$  @  $T_c = 25^\circ C$**



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

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**Absolute maximum ratings** (per SiC MOSFET)

Symbol	Parameter	Max ratings	Unit
$V_{DS}$	Drain - Source Voltage	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ\text{C}$	A
		$T_c = 80^\circ\text{C}$	
$I_{DM}$	Pulsed Drain current	300	
$V_{GS}$	Gate - Source Voltage	-10/25V	V
$R_{DS(on)}$	Drain - Source ON Resistance	17	m $\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ\text{C}$	W

**Electrical Characteristics** (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1200V$			200	$\mu\text{A}$
$R_{DS(on)}$	Drain - Source on Resistance	$V_{GS} = 20V, I_D = 100A$		12.5	17	m $\Omega$
		$T_j = 150^\circ\text{C}$		22	32	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 20mA$	2.1	2.4		V
$I_{GSS}$	Gate - Source Leakage Current	$V_{GS} = 20V, V_{DS} = 0V$			1.2	$\mu\text{A}$

**Dynamic Characteristics** (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$		5.6		nF
$C_{oss}$	Output Capacitance	$V_{DS} = 1000V$		0.44		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1MHz$		0.03		
$Q_g$	Total gate Charge	$V_{GS} = -5/+20V$		322		nC
$Q_{gs}$	Gate - Source Charge	$V_{Bus} = 800V$		92		
$Q_{gd}$	Gate - Drain Charge	$I_D = 100A$		100		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = -5/+20V$		35		ns
$T_r$	Rise Time	$V_{Bus} = 800V$		40		
$T_{d(off)}$	Turn-off Delay Time	$I_D = 100A, T_j = 150^\circ\text{C}$		150		
$T_f$	Fall Time	$R_L = 8\Omega; R_{Gext} = 10\Omega$		70		
$E_{on}$	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V$		2.2		mJ
$E_{off}$	Turn off Energy	$I_D = 100A$ $R_{Gext} = 10\Omega$		1.2		
$R_{Gint}$	Internal gate resistance			3		$\Omega$
$R_{thJC}$	Junction to Case Thermal Resistance				0.2	$^\circ\text{C/W}$

**Source - Drain diode ratings and characteristics** (per SiC MOSFET)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{SD}$	Diode Forward Voltage	$V_{GS} = -5V, I_{SD} = 50A$		3.3		V
		$V_{GS} = -2V, I_{SD} = 50A$		3.1		
$t_{rr}$	Reverse Recovery Time	$I_{SD} = 100A; V_{GS} = -5V$ $V_R = 800V; di_F/dt = 2000A/\mu s$		45		ns
$Q_{rr}$	Reverse Recovery Charge			0.8		$\mu\text{C}$
$I_{rr}$	Reverse Recovery Current			26		A

**SiC schottky diode ratings and characteristics** (per SiC diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V <sub>RRM</sub>	Peak Repetitive Reverse Voltage				1200	V
I <sub>RRM</sub>	Reverse Leakage Current	V <sub>R</sub> =1200V		70	400	μA
		T <sub>j</sub> = 25°C				
		T <sub>j</sub> = 175°C		130	800	
I <sub>F</sub>	DC Forward Current	T <sub>C</sub> = 125°C		40		A
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 40A		1.5	1.8	V
		T <sub>j</sub> = 25°C				
		T <sub>j</sub> = 175°C		2.2	3	
Q <sub>C</sub>	Total Capacitive Charge	I <sub>F</sub> = 40A, V <sub>R</sub> = 1200V di/dt = 1000A/μs		260		nC
C	Total Capacitance	f = 1MHz, V <sub>R</sub> = 400V		186		pF
		f = 1MHz, V <sub>R</sub> = 800V		134		
R <sub>thJC</sub>	Junction to Case Thermal Resistance				0.55	°C/W

**Temperature sensor NTC** (see application note APT0406 on www.microsemi.com).

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
ΔR <sub>25</sub> /R <sub>25</sub>			5		%
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K
ΔB/B			4		%
					T <sub>C</sub> =100°C

$$R_T = \frac{R_{25}}{\exp \left[ B_{25/85} \left( \frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

**Thermal and package characteristics**

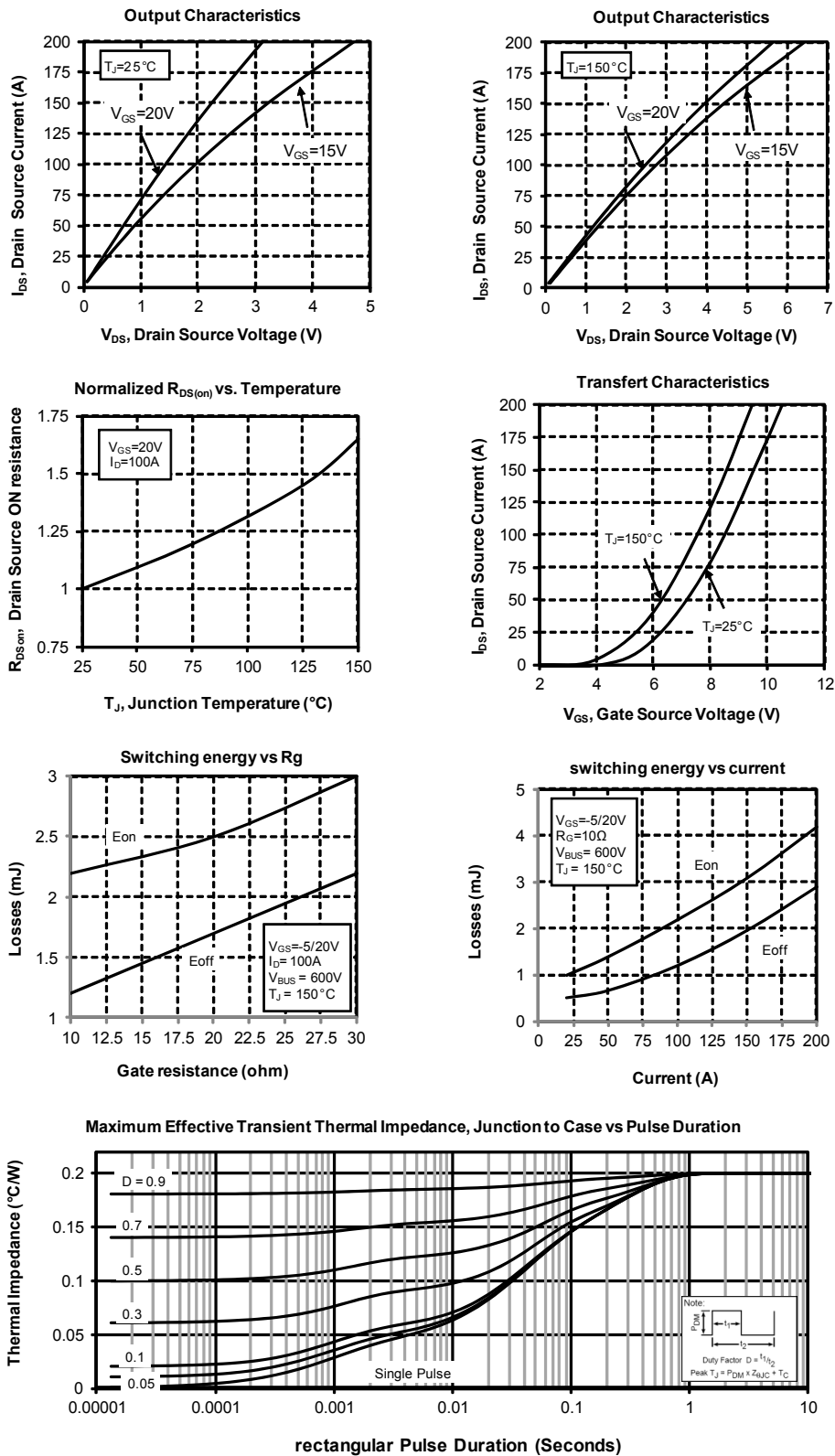
Symbol	Characteristic			Min	Max	Unit
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz			4000		V
T <sub>J</sub>	Operating junction temperature range		SiC MOSFET	-40	150	°C
			SiC diode	-40	175	
T <sub>JOP</sub>	Recommended junction temperature under switching conditions			-40	T <sub>J</sub> max -25	
T <sub>STG</sub>	Storage Temperature Range			-40	125	
T <sub>C</sub>	Operating Case Temperature			-40	100	
Torque	Mounting torque	To heatsink	M6	3	5	N.m
Wt	Package Weight				250	g

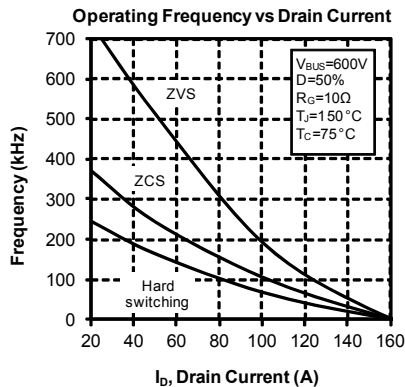
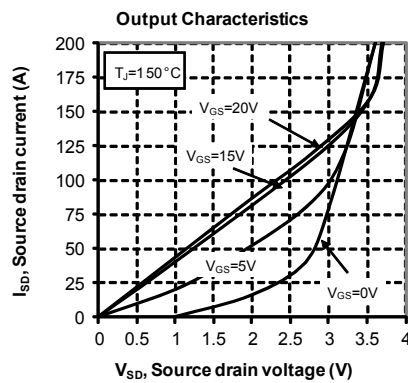
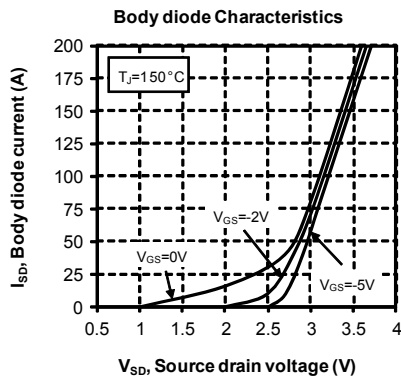
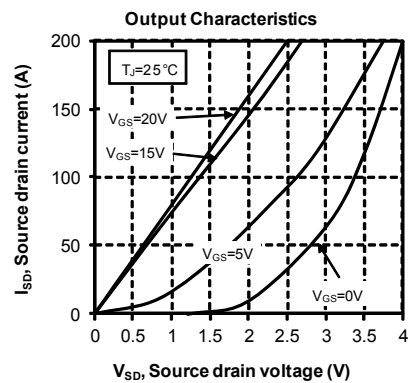
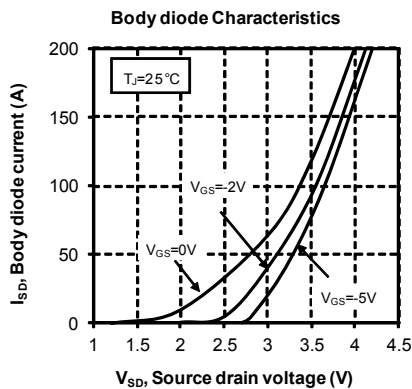
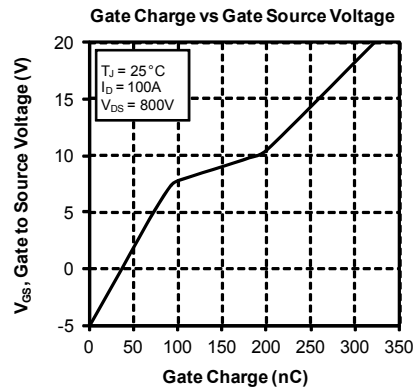
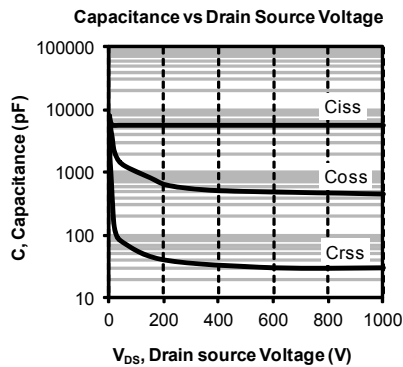
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ALL DIMENSIONS MARKED "\*" ARE TOLERANCED AS :  $\pm 0.1$   $\varnothing 1$

See application note 1902 - Mounting Instructions for SP6-P (12mm) Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical SiC MOSFET Performance Curve





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**Typical SiC diode Performance Curve**

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