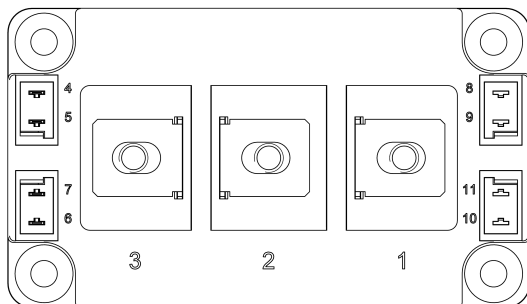
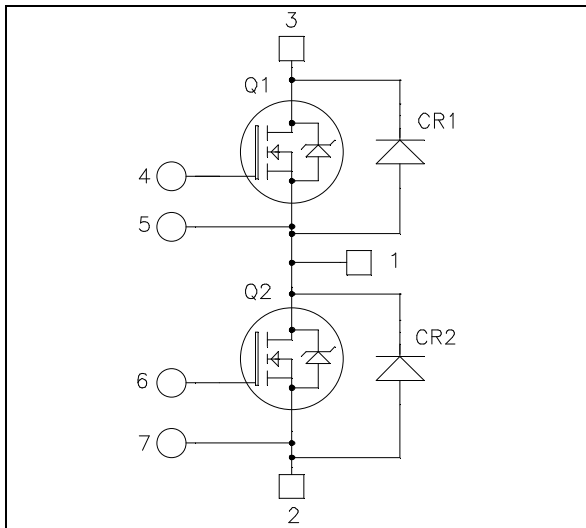


*Phase leg
SiC Power Module*

$V_{DSS} = 1200V$
 $R_{DS(on)} = 12.5m\Omega$ typ @ $T_j = 25^\circ C$
 $I_D = 171A$ @ $T_c = 25^\circ C$


Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- EV motor and traction drive

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

- High efficiency converter
- Stable temperature behavior
- 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	$T_c = 25^\circ C$	171
		$T_c = 80^\circ C$	136
I_{DM}	Pulsed Drain current	342	A
V_{GS}	Gate - Source Voltage	-10/25	V
$R_{DS(on)}$	Drain - Source ON Resistance	15.5	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	728
			W

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed.

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	$V_{GS} = 0V ; V_{DS} = 1200V$		20	200	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 80A$	$T_j = 25^\circ C$	12.5	16	m Ω
			$T_j = 175^\circ C$	20		
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}; I_D = 2mA$	1.8	2.8		V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = 20V, V_{DS} = 0V$			200	nA

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	$V_{GS} = 0V$ $V_{DS} = 1000V$ $f = 1MHz$		6040		pF
C_{oss}	Output Capacitance			540		
C_{rss}	Reverse Transfer Capacitance			50		
Q_g	Total gate Charge	$V_{GS} = -5/20V$ $V_{Bus} = 800V$ $I_D = 80A$		464		nC
Q_{gs}	Gate – Source Charge			82		
Q_{gd}	Gate – Drain Charge			100		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = -5/20V ; V_{Bus} = 600V$ $I_D = 100A ; T_j = 150^\circ C$ $R_{GON} = 4\Omega ; R_{GOFF} = 2.4\Omega$		60		ns
T_r	Rise Time			50		
$T_{d(off)}$	Turn-off Delay Time			180		
T_f	Fall Time			30		
E_{on}	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V ; I_D = 100A$ $R_{GON} = 4\Omega ; R_{GOFF} = 2.4\Omega$	$T_j = 150^\circ C$	2.04		mJ
E_{off}	Turn off Energy		$T_j = 150^\circ C$	1.8		mJ
R_{Gint}	Internal gate resistance			2.94		Ω
R_{thJC}	Junction to Case Thermal Resistance				0.206	$^\circ C/W$

Body diode ratings and characteristics (per SiC MOSFET)

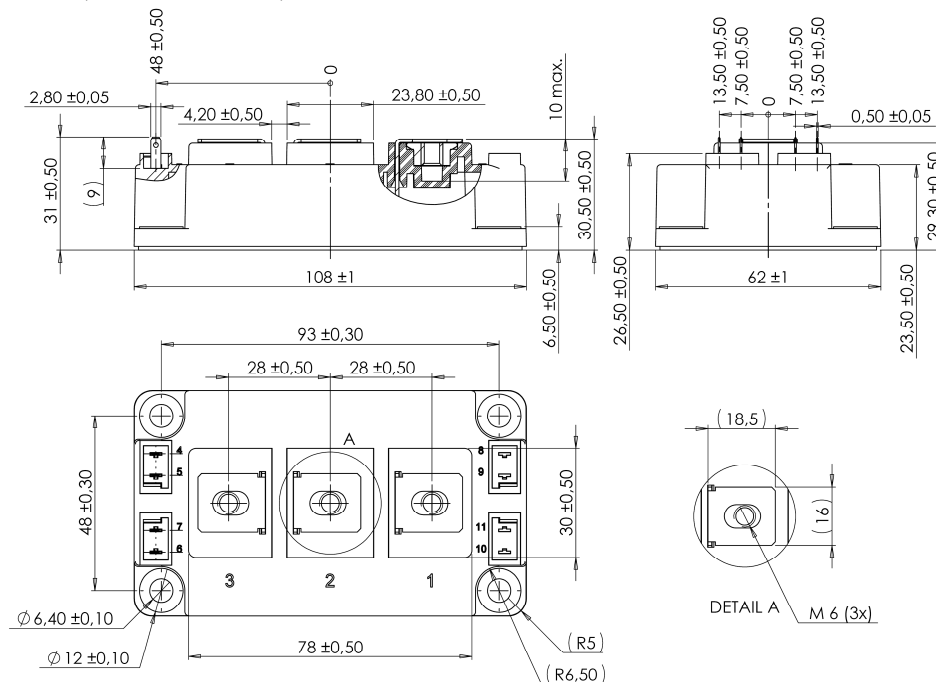
<i>Symbol</i>	<i>Characteristic</i>	<i>Test Conditions</i>	<i>Min</i>	<i>Typ</i>	<i>Max</i>	<i>Unit</i>
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V ; I_{SD} = 80A$		4		V
		$V_{GS} = -5V ; I_{SD} = 80A$		4.2		
t_{rr}	Reverse Recovery Time	$I_{SD} = 80A ; V_{GS} = -5V$ $V_R = 800V ; di_F/dt = 2000A/\mu s$		90		ns
Q_{rr}	Reverse Recovery Charge			1100		nC
I_{rr}	Reverse Recovery Current				27	

SiC schottky diode ratings and characteristics (per SiC diode)

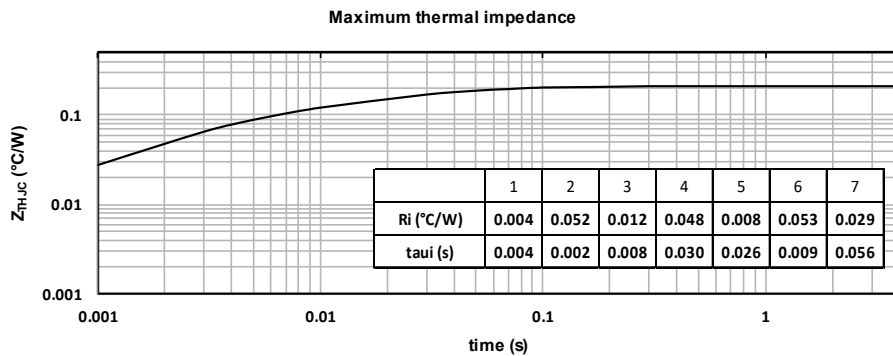
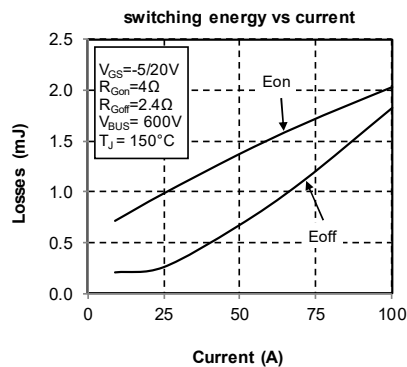
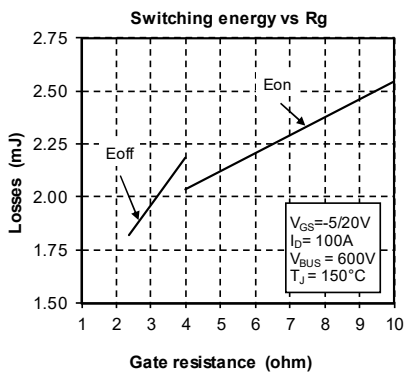
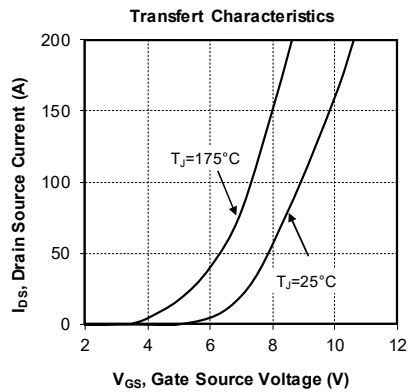
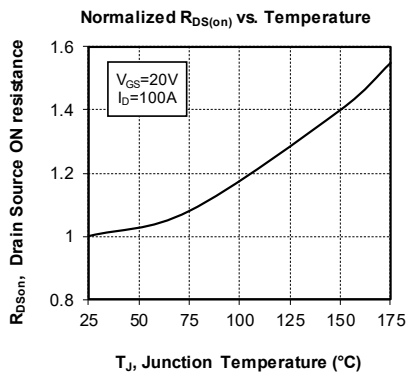
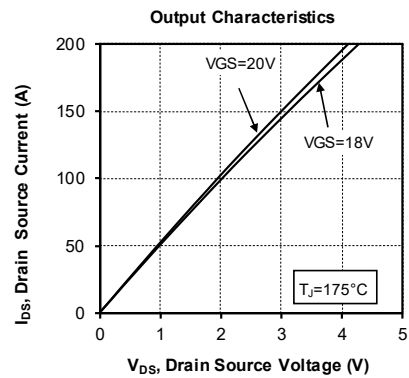
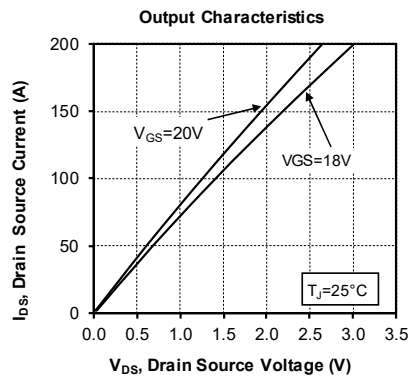
Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Peak Repetitive Reverse Voltage				1200	V
I _{RRM}	Reverse Leakage Current	V _R =1200V	T _j = 25°C	20	400	μA
			T _j = 175°C	300		
I _F	Forward Current	T _c = 100°C		60		A
V _F	Diode Forward Voltage	I _F = 60A	T _j = 25°C	1.5	1.8	V
			T _j = 175°C	2.1		
Q _C	Total Capacitive Charge	V _R = 600V		260		nC
C	Total Capacitance	f = 1MHz, V _R = 400V		282		pF
		f = 1MHz, V _R = 800V		210		
R _{thJC}	Junction to Case Thermal Resistance				0.49	°C/W

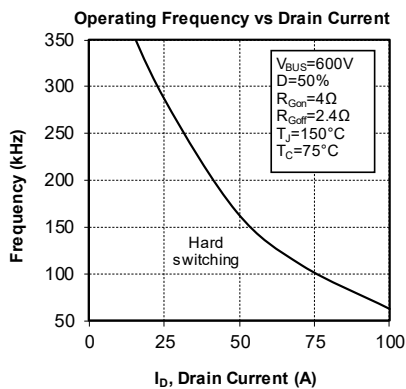
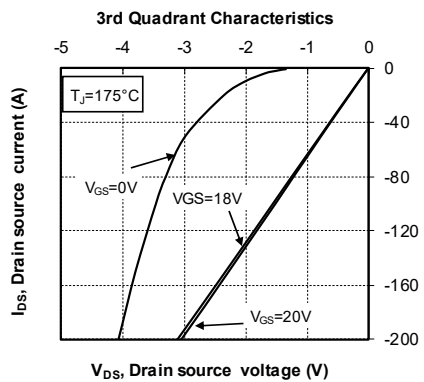
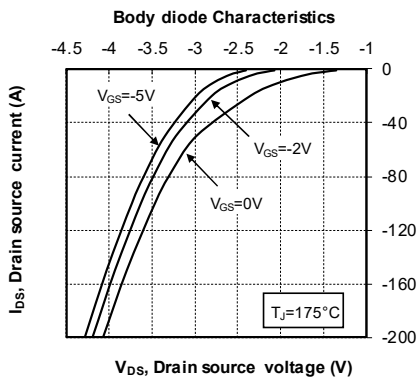
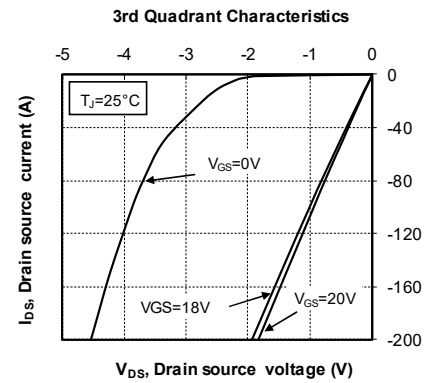
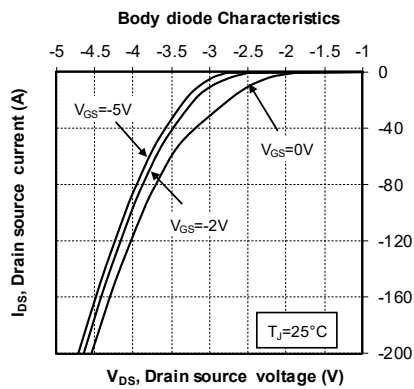
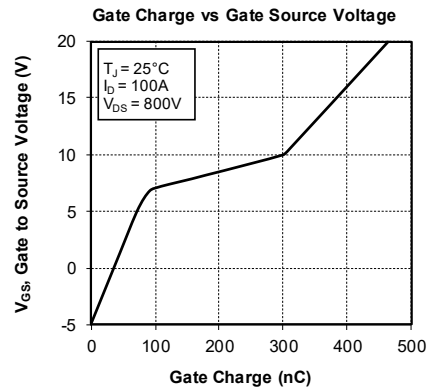
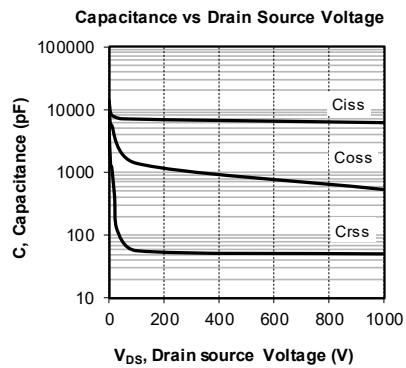
Thermal and package characteristics

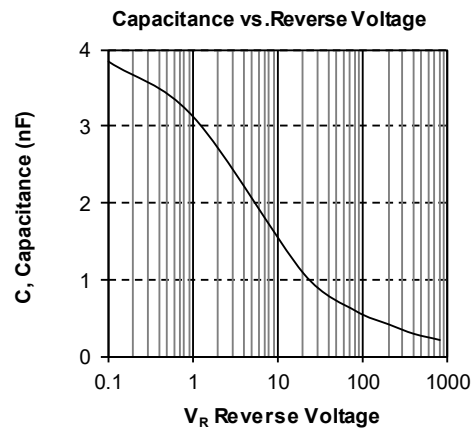
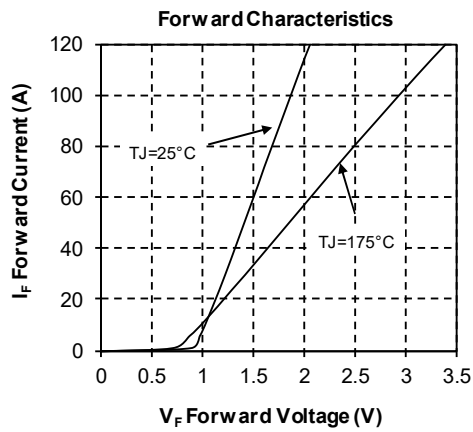
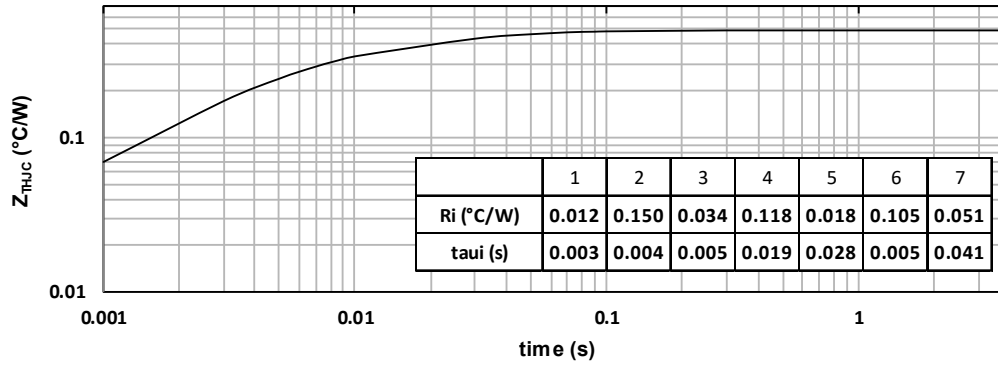
Symbol	Characteristic	Min	Max	Unit		
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz	4000		V		
T _J	Operating junction temperature range	-40	175	°C		
T _{JOP}	Recommended junction temperature under switching conditions	-40	T _{Jmax} -25			
T _{STG}	Storage Temperature Range	-40	125			
T _C	Operating Case Temperature	-40	125			
Torque	Mounting torque	For terminals	M6	3	5	N.m
		To Heatsink	M6	3	5	
Wt	Package Weight				350	g

Package outline (dimensions in mm)


See application note 1908 - Mounting instructions for D3 & D4 power modules

Typical SiC MOSFET Performance Curve




Typical SiC diode Performance Curve
Maximum thermal impedance


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