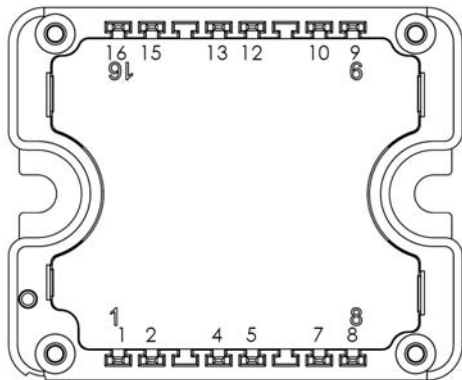
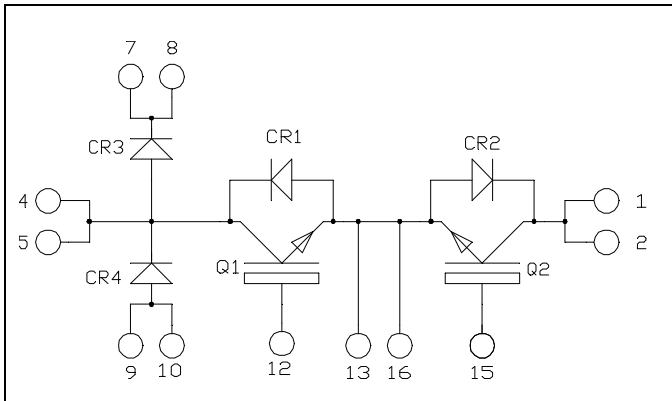


**Power Factor Correction
High speed IGBT 5 Power Module**

**$V_{CES} = 650V$
 $I_C = 100A @ T_c = 60^\circ C$**



Pins : 4/5 ; 7/8 ; 9/10 ; 1/2 must be shorted together

Application

- Power factor correction

Features

- **High speed IGBT 5**
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 100 kHz
 - Low leakage current
- **SiC Schottky Diode**
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature Independent switching behavior
 - Positive temperature coefficient on VF

- Kelvin emitter for easy drive
- Very low stray inductance
- AlN substrate for improved thermal performance

Benefits

- Stable temperature behavior
- Very rugged
- Solderable terminals for easy PCB mounting
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Easy paralleling due to positive T_C of V_{CESat}
- Low profile
- RoHS Compliant

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

Absolute maximum ratings (per IGBT)

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Voltage	650	V
I_C	Continuous Collector Current	$T_C = 60^\circ C$	100
		$T_C = 80^\circ C$	80
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	200
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Power Dissipation	330	W

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

Electrical Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 650V$			50	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 100A$		1.65	2.2	V
		$T_j = 25^\circ C$ $T_j = 150^\circ C$				
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 1mA$	3.3	4.0	4.7	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			150	nA

Dynamic Characteristics (per IGBT)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		6560		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		97		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		21		
Q_G	Gate charge	$V_{GE} = 15V, I_C = 100A$ $V_{CE} = 520V$		210		nC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = 15V$ $V_{Bus} = 400V$ $I_C = 50A$ $R_G = 8\Omega$		21		ns
T_r	Rise Time			15		
$T_{d(off)}$	Turn-off Delay Time			180		
T_f	Fall Time			18		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = 15V$ $V_{Bus} = 400V$ $I_C = 50A$ $R_G = 8\Omega$		20		ns
T_r	Rise Time			15		
$T_{d(off)}$	Turn-off Delay Time			205		
T_f	Fall Time			26		
E_{on}	Turn on Energy	$V_{GE} = 15V$ $V_{Bus} = 400V$		0.9		mJ
E_{off}	Turn off Energy	$I_C = 50A$ $R_G = 8\Omega$		0.75		
R_{thJC}	Junction to Case Thermal Resistance				0.455	$^\circ C/W$

SiC diode ratings and characteristics (CR1 ; CR2) (per SiC diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Peak Repetitive Reverse Voltage				650	V
I_{RM}	Reverse Leakage Current	$V_R = 650V$		50	500	μA
		$T_j = 25^\circ C$ $T_j = 175^\circ C$		200	1000	
I_F	DC Forward Current			50		A
V_F	Diode Forward Voltage	$I_F = 50A$		1.5	1.8	V
		$T_j = 25^\circ C$ $T_j = 175^\circ C$		1.8	2.2	
Q_C	Total Capacitive Charge	$V_R = 400V$		110		nC
C	Total Capacitance	$f = 1MHz, V_R = 200V$ $f = 1MHz, V_R = 400V$		200		pF
				180		
R_{thJC}	Junction to Case Thermal Resistance				0.92	$^\circ C/W$

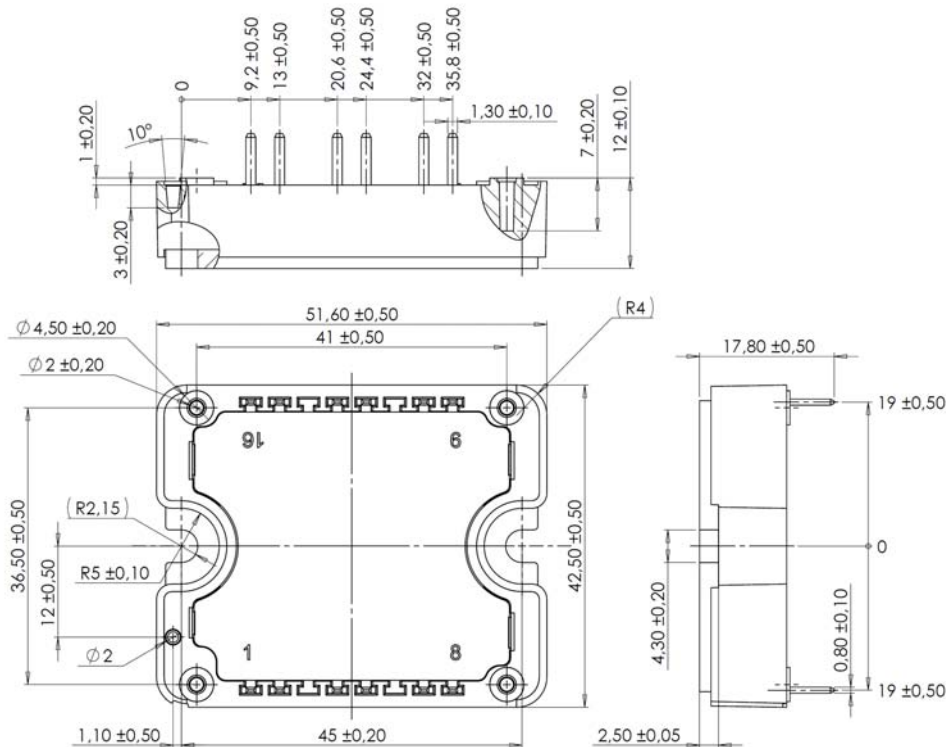
SiC diode ratings and characteristics (CR3 ; CR4) (per SiC diode)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V _{RRM}	Peak Repetitive Reverse Voltage				1200	V
I _{RM}	Reverse Leakage Current	V _R = 1200V		100	500	μA
				300	1000	
I _F	DC Forward Current			50		A
V _F	Diode Forward Voltage	I _F = 50A		1.6	1.8	V
				2.25	2.7	
Q _C	Total Capacitive Charge	V _R = 800V		246		nC
C	Total Capacitance	f = 1MHz, V _R = 400V		230		pF
		f = 1MHz, V _R = 800V		173		
R _{thJC}	Junction to Case Thermal Resistance				0.47	°C/W

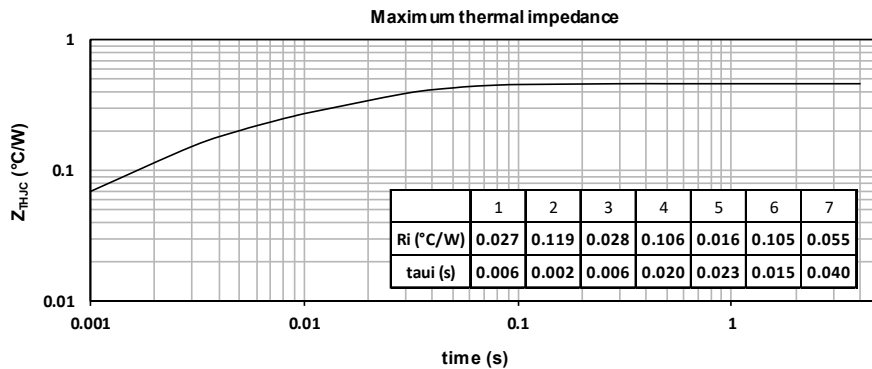
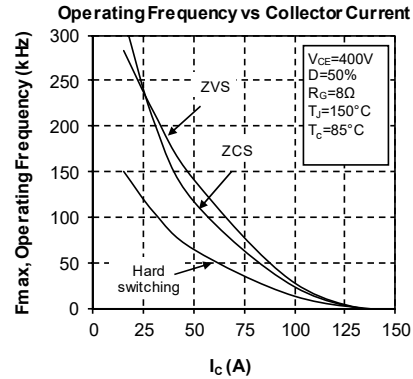
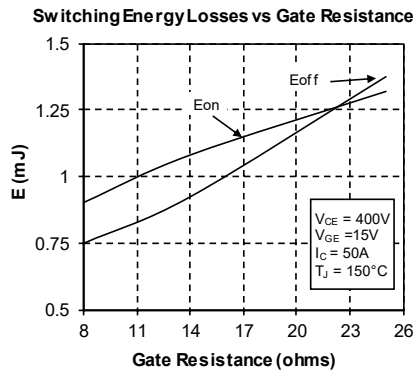
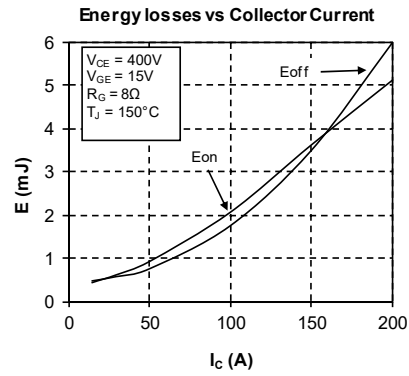
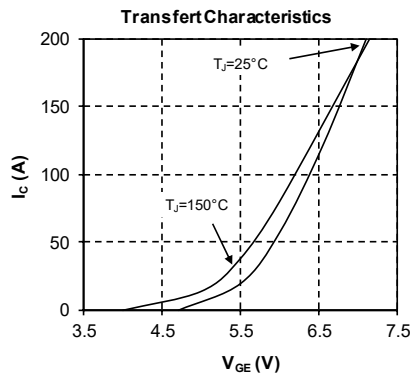
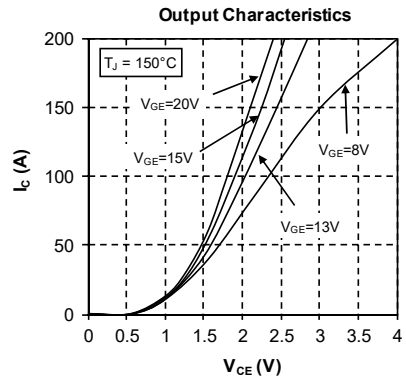
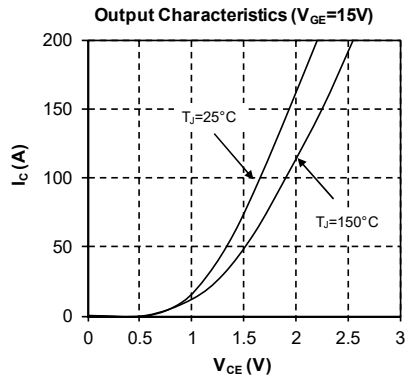
Thermal and package characteristics

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	To heatsink	M4		2	3
Wt	Package Weight				80	g

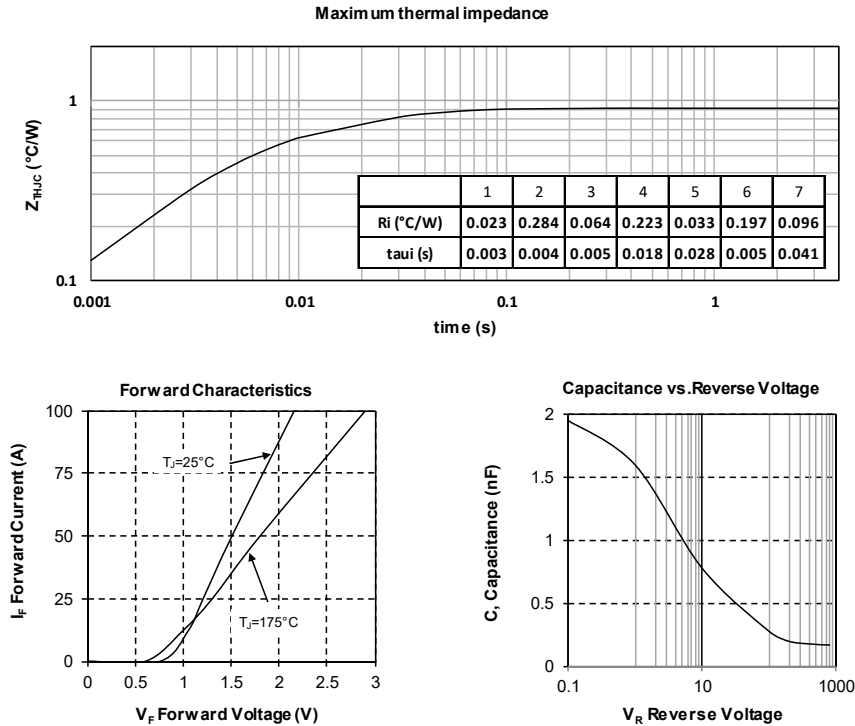
Package outline (dimensions in mm)



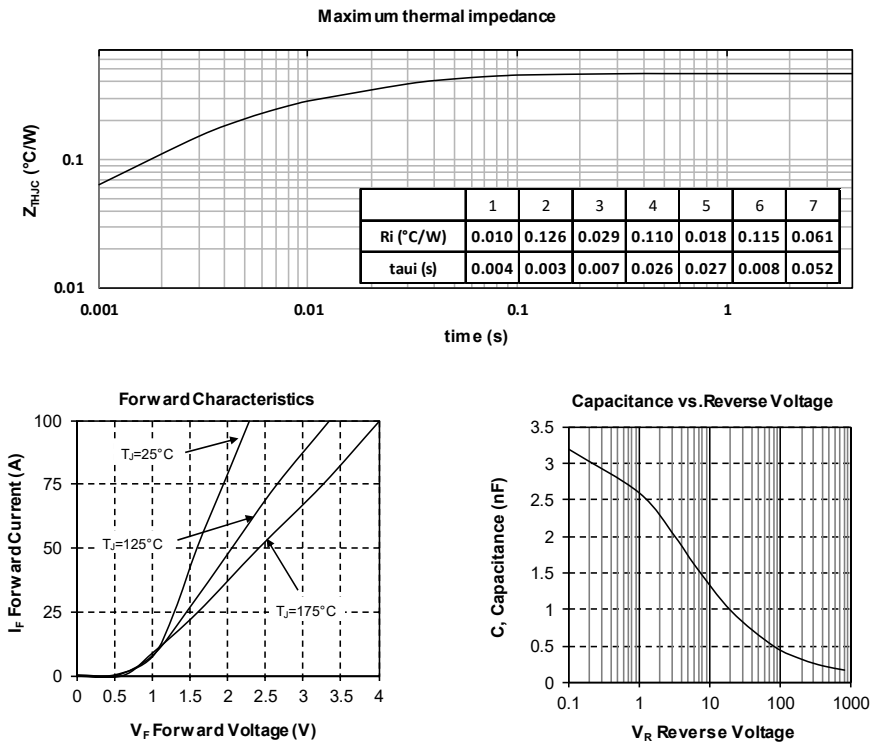
IGBT typical Performance Curve



SiC diode typical Performance Curve (CR1 ; CR2)



SiC diode typical Performance Curve (CR3 ; CR4)



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