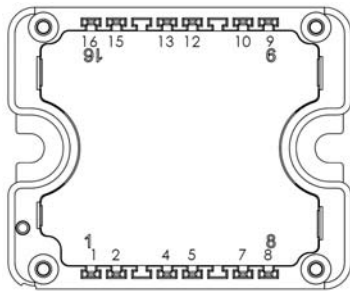
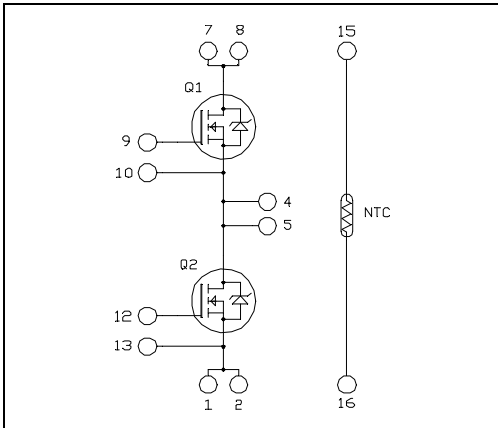


**Phase leg
SiC MOSFET Power Module**

$V_{DSS} = 1200V$
 $R_{DS(on)} = 31m\Omega \text{ max @ } T_j = 25^\circ C$
 $I_D = 89A \text{ @ } T_c = 25^\circ C$



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

Application

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

Features

- **SiC Power MOSFET**
 - Low $R_{DS(on)}$
 - High temperature performance
- Very low stray inductance
- Internal thermistor for temperature monitoring
- AlN substrate for improved thermal performance

Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Solderable terminals both for power and signal for easy PCB mounting
- Low profile
- RoHS Compliant

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

1. SiC MOSFET characteristics (Per MOSFET)

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{DSS}	Drain - Source Voltage	1200	V
I_D	Continuous Drain Current	$T_c = 25^\circ C$	89
		$T_c = 80^\circ C$	71
I_{DM}	Pulsed Drain current	180	
V_{GS}	Gate - Source Voltage	-10/25	V
$R_{DS(on)}$	Drain - Source ON Resistance	31	$m\Omega$
P_D	Power Dissipation	$T_c = 25^\circ C$	395
			W

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{DSS}	Zero Gate Voltage Drain Current	$V_{GS} = 0V$; $V_{DS} = 1200V$		10	100	μA
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 20V$ $I_D = 40A$		$T_j = 25^\circ C$ 25 $T_j = 175^\circ C$ 40	31	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$; $I_D = 1mA$	1.8	2.8		V
I_{GSS}	Gate – Source Leakage Current	$V_{GS} = 20V$, $V_{DS} = 0V$			150	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{iss}	Input Capacitance	$V_{GS} = 0V$		2685		pF
C_{oss}	Output Capacitance	$V_{DS} = 1000V$		270		
C_{rss}	Reverse Transfer Capacitance	$f = 1MHz$		29		
Q_g	Total gate Charge	$V_{GS} = -5/20V$		206		nC
Q_{gs}	Gate – Source Charge	$V_{Bus} = 800V$		37		
Q_{gd}	Gate – Drain Charge	$I_D = 40A$		62		
$T_{d(on)}$	Turn-on Delay Time	$V_{GS} = -5/+20V$		60		ns
T_r	Rise Time	$V_{Bus} = 800V$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_D = 100A$		180		
T_f	Fall Time	$R_G = 12\Omega$		30		
E_{on}	Turn on Energy	Inductive Switching $V_{GS} = -5/+20V$ $V_{Bus} = 600V$	$T_j = 150^\circ C$	1.2		mJ
E_{off}	Turn off Energy	$I_D = 50A$ $R_G = 12\Omega$	$T_j = 150^\circ C$	0.6		mJ
R_{Gint}	Internal gate resistance			0.6		Ω
R_{thJC}	Junction to Case Thermal Resistance				0.38	$^\circ C/W$

Body diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{SD}	Diode Forward Voltage	$V_{GS} = 0V$; $I_{SD} = 40A$ $V_{GS} = -5V$; $I_{SD} = 40A$		4 4.2		V
t_{rr}	Reverse Recovery Time	$I_{SD} = 40A$; $V_{GS} = -5V$		110		ns
Q_{rr}	Reverse Recovery Charge	$V_R = 800V$; $di_F/dt = 1000A/\mu s$		640		nC
I_{rr}	Reverse Recovery Current			21		A

2. Thermal and package characteristics

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	N.m
Wt	Package Weight				80	g

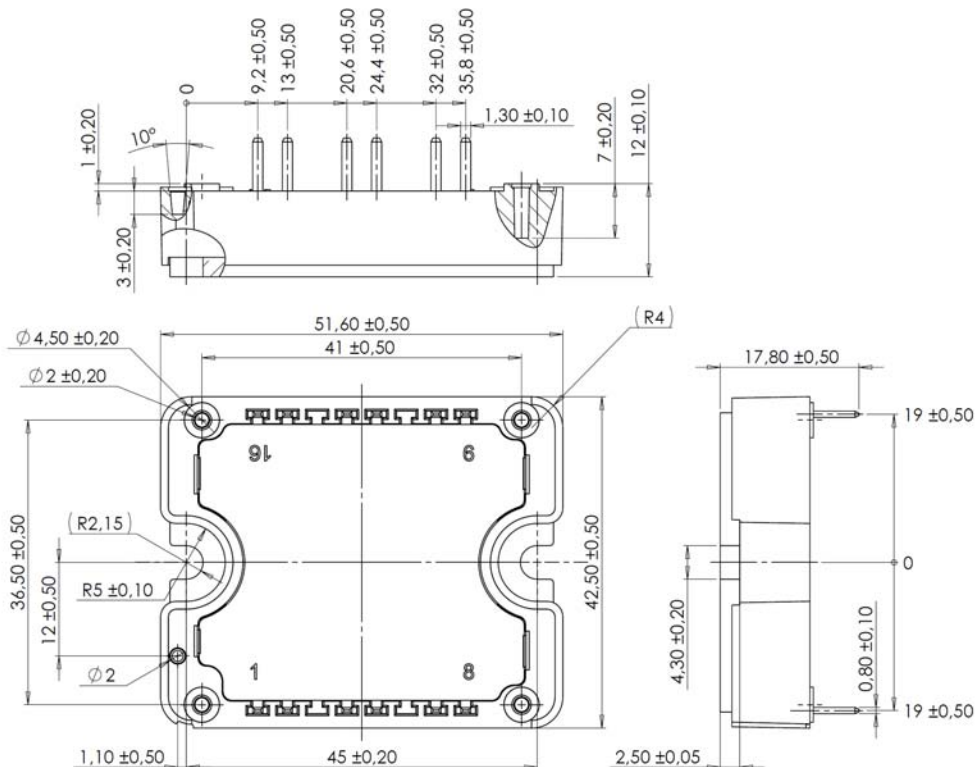
Temperature sensor NTC (see application note APT0406 on www.microsemi.com).

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

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

T: Thermistor temperature
R_T: Thermistor value at T

Package outline (dimensions in mm)



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