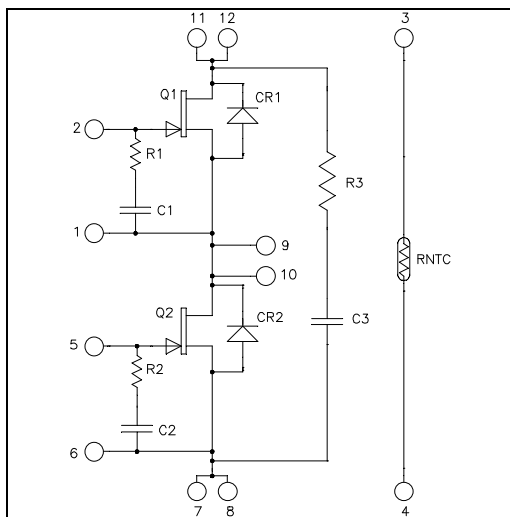


Phase leg SiC Power Module

$$V_{DSX} = 1200V$$

$$R_{DSon} = 25 \text{ m}\Omega \text{ max @ } T_j = 25 \text{ }^{\circ}\text{C}$$

$$I_D = 50 \text{ A @ } T_c = 50 \text{ }^{\circ}\text{C}$$

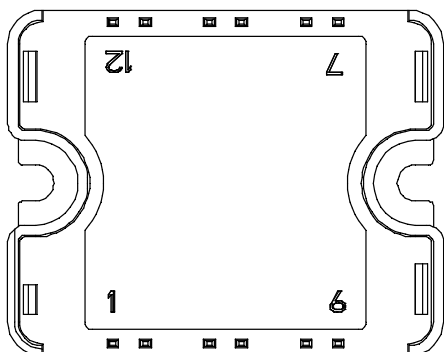


Application

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

Features

- **SemiSouth SiC JFET, Normally off**
(4* SJEC120R100 in parallel per switch)
 - **SemiSouth SiC Schottky Diode**
(3* SDC10S120 in parallel per switch)
 - Zero reverse recovery
 - Zero forward recovery
 - Temperature-independent switching behavior
 - Positive temperature coefficient on V_F
 - Very low stray inductance
 - Internal RC decoupling snubber
 - High level of integration
 - AlN substrate for improved thermal performance
 - Internal thermistor for temperature monitoring
 - Semisouth driver board (SGDR2500P2) recommended for this module)
- ### Benefits
- Outstanding performance at high-frequency operation
 - Direct mounting to heatsink (isolated package)
 - Low junction-to-case thermal resistance
 - Solderable terminals for both power and signal for easy PCB mounting
 - Low profile
 - RoHS Compliant



Pins 7/8; 9/10; 11/12 must be shorted together

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

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
V_{DSX}	Drain-Source & Drain-Gate Blocking Voltage	$V_{GS} \leq 0V, I_D < I_{DSS}$	1200			V
I_{GL}	Total Gate-Source Leakage	$V_{GS} > -15V, V_{DS} = 0V$			2.4	mA
I_{DSS}	Off-State Drain Current	$V_{GS} \leq -5V, V_{DS} = 1200V$			1.6	mA
$R_{DS(on)}$	Drain-Source On-state Resistance	$V_{GS} = 2.5V, I_D = 20A$			25	mΩ
R_G	Internal Gate Resistance (per JFET)	Drain-source shorted, $f = 1MHz$			1.5	Ω
V_{th}	Threshold Voltage	$V_{DS} = 1V, I_{DS} = 300mA$	0.75	1.00	1.25	V
I_D	Continuous Drain Current	$T_c = 50^\circ C, T_J = 125^\circ C$			50	A
		$T_c = 80^\circ C, T_J = 125^\circ C$			37	
P_D	Maximum Power Dissipation				180	W

SiC diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		1200			V
I_R	Reverse Leakage Current	$V_R = 1200V$		$T_J = 25^\circ C$	30	μA
				$T_J = 175^\circ C$	600	
$I_{F(AV)}$	Continuous Forward Current	$T_c < 145^\circ C$		30		A
V_F	Diode Forward Voltage	$I_F = 30A$		$T_J = 25^\circ C$	1.6	V
				$T_J = 175^\circ C$	2.4	
Q_C	Total Capacitive Charge	$I_F = 30A, V_R = 400V$ $di/dt = 1500A/\mu s$		120		nC
C	Total Capacitance	$f = 100kHz, V_R = 1V$		2300		pF
		$f = 100kHz, V_R = 300V$		144		
		$f = 100kHz, V_R = 600V$		100		

Output resistance and capacitor characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R_3	Input impedance		4		Ω
R_{3tol}	Tolerance		5		%
P_{D3}	Power dissipation		5		W
C_3	Ceramic Capacitor value		4.7		nF
C_{3tol}	Tolerance		10		%
U_{rde3}	Rated DC voltage		1000		V

Input resistance and capacitor characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R_i	Input impedance		1		Ω
R_{itol}	Tolerance		5		%
P_{Di}	Power dissipation		1		W
C_i	Ceramic Capacitor value		15		nF
C_{itol}	Tolerance		10		%
U_{rdei}	Rated DC voltage		50		V

Temperature sensor NTC

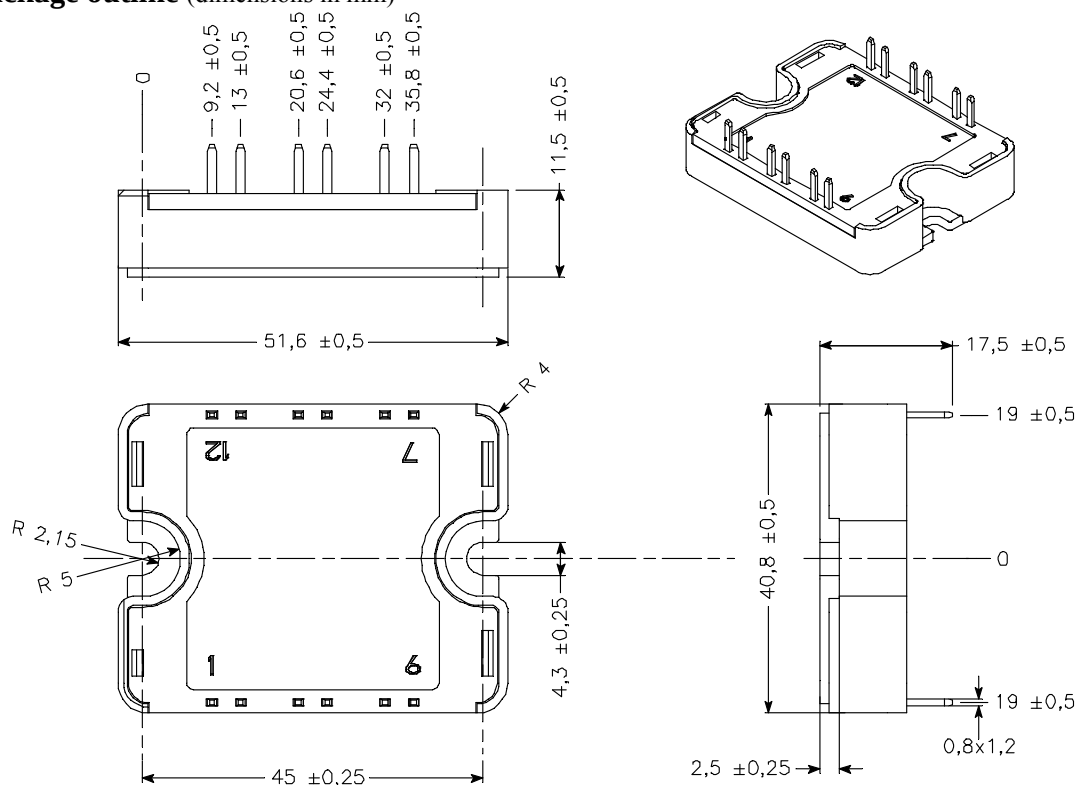
Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25 °C		22		kΩ
ΔR ₂₅ /R ₂₅	Resistance tolerance			5	%
ΔB/B	Beta tolerance			3	
B _{25/100}	T ₂₅ = 298.16 K		3980		K

$$R_T = \frac{R_{25}}{\exp \left[B_{25/100} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance		JFET			0.7	°C/W
			Diode			0.9	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, I isol < 1 mA, 50/60 Hz			4000			V
T _J	Operating junction temperature range			-40		150	°C
T _{STG}	Storage Temperature Range			-40		125	
T _C	Operating Case Temperature			-40		100	
Torque	Mounting torque	To heat sink	M4	2.5		4.7	N.m
Wt	Package Weight					80	g

SP1 Package outline (dimensions in mm)


See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Microsemi reserves the right to change, without notice, the specifications and information contained herein