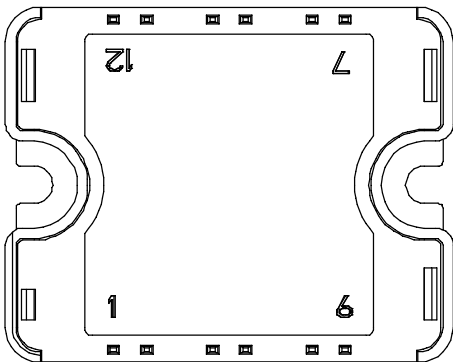
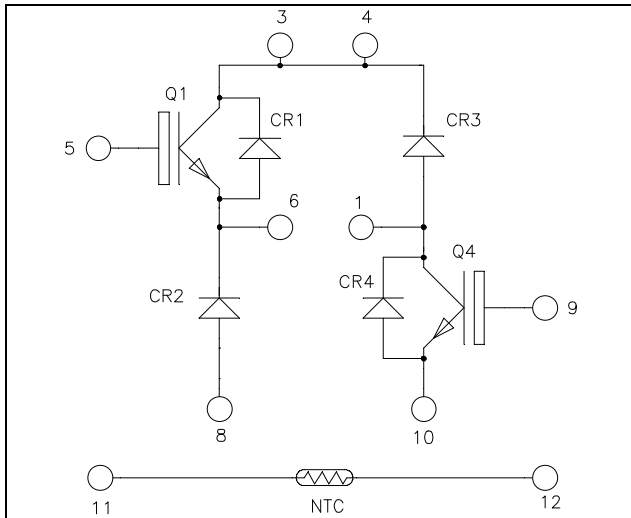


**Asymmetrical - Bridge
Trench + Field Stop IGBT
Power Module**

**$V_{CES} = 600V$
 $I_C = 75A^* @ T_c = 80^\circ C$**



Pins 3/4 must be shorted together

Application

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

Features

- Trench + Field Stop IGBT Technology
 - Low voltage drop
 - Low tail current
 - Switching frequency up to 20 kHz
 - Soft recovery parallel diodes
 - Low diode VF
 - Low leakage current
 - RBSOA and SCSOA rated
- Very low stray inductance
 - Symmetrical design
- Internal thermistor for temperature monitoring
- High level of integration

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

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_C = 25^\circ C$	100*
		$T_C = 80^\circ C$	75*
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	140
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	250
RBSOA	Reverse Bias Safe Operating Area	$T_J = 150^\circ C$	150A @ 550V

* Specification of IGBT device but output current must be limited to 40A to not exceed a delta of temperature greater than 35°C for the connectors.

CAUTION: These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on www.microsemi.com

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

Electrical Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
I_{CES}	Zero Gate Voltage Collector Current	$V_{GE} = 0V, V_{CE} = 600V$			250	μA
$V_{CE(sat)}$	Collector Emitter Saturation Voltage	$V_{GE} = 15V$ $I_C = 75A$		1.5	1.9	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 600\mu\text{A}$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			600	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		4620		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		300		
C_{res}	Reverse Transfer Capacitance	$f = 1\text{MHz}$		140		
Q_G	Gate charge	$V_{GE} = \pm 15V, I_C = 75A$ $V_{CE} = 300V$		0.8		μC
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		110		ns
T_r	Rise Time	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$		45		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 75A$		200		
T_f	Fall Time	$R_G = 4.7\Omega$		40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C)		120		ns
T_r	Rise Time	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$		50		
$T_{d(off)}$	Turn-off Delay Time	$I_C = 75A$		250		
T_f	Fall Time	$R_G = 4.7\Omega$		60		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$		0.35		mJ
E_{off}	Turn-off Switching Energy	$I_C = 75A$ $R_G = 4.7\Omega$		0.6		
				2.2		mJ
				2.6		
I_{sc}	Short Circuit data	$V_{GE} \leq 15V; V_{Bus} = 360V$ $t_p \leq 6\mu\text{s}; T_j = 150^\circ\text{C}$		380		A

Diode ratings and characteristics (CR2 & CR3)

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$			250	μA
					500	
I_F	DC Forward current			75		A
V_F	Diode Forward Voltage	$I_F = 75A$ $V_{GE} = 0V$		1.6	2	V
				1.5		
t_{rr}	Reverse Recovery Time			100		ns
				150		
Q_{rr}	Reverse Recovery Charge	$I_F = 75A$ $V_R = 300V$ $di/dt = 2000A/\mu\text{s}$		3.6		μC
				7.6		
E_r	Reverse Recovery Energy			0.85		mJ
				1.8		

CR1 & CR4 are IGBT protection diodes only

Thermal and package characteristics

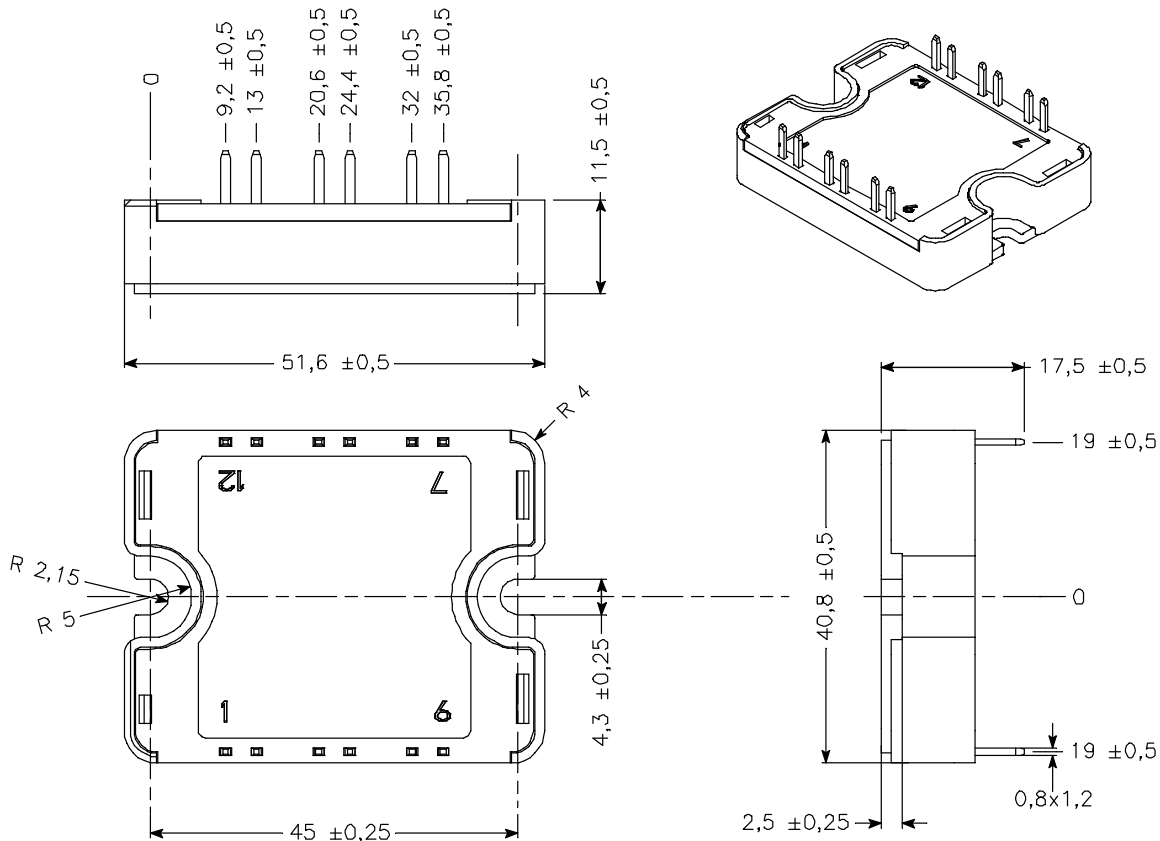
Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.60	°C/W
		Diode			0.98	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, I _{isol} < 1mA, 50/60Hz		2500			V
T _J	Operating junction temperature range		-40		175	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M4		4.7	N.m
Wt	Package Weight				80	g

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

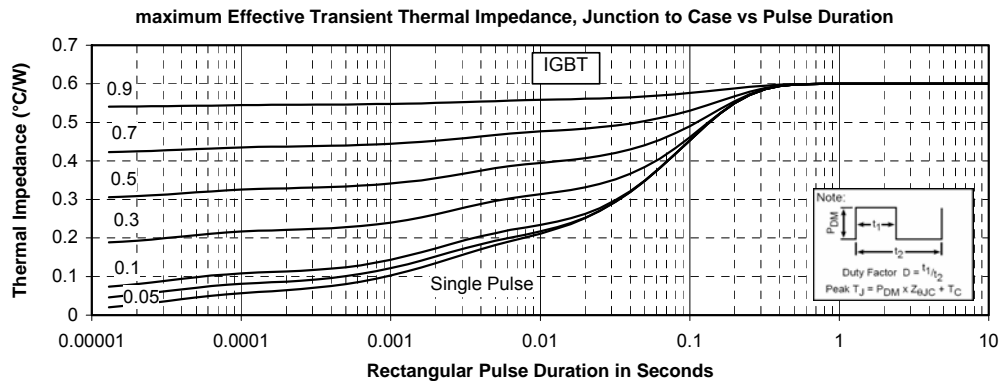
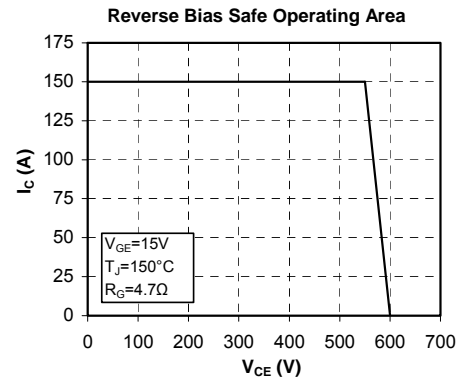
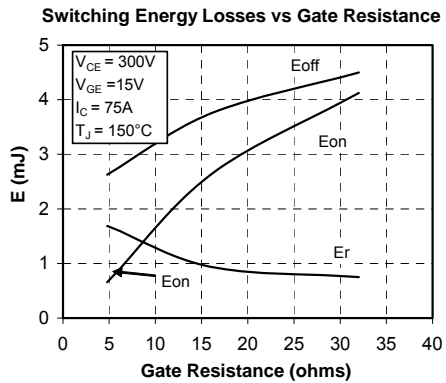
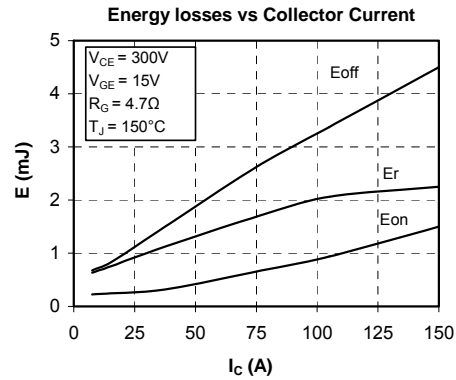
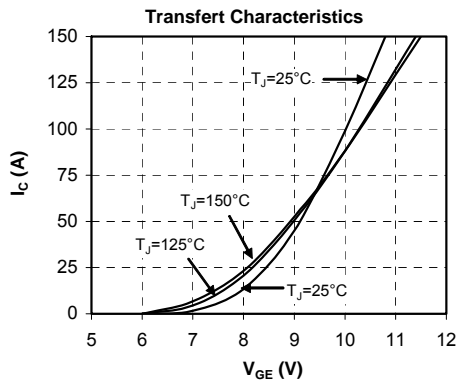
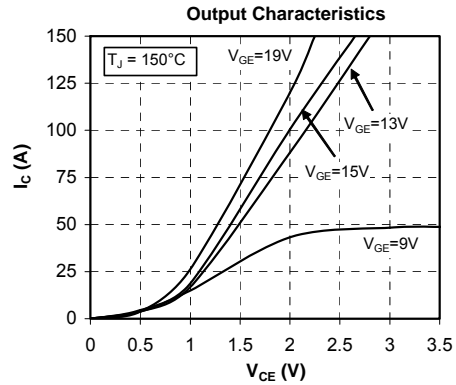
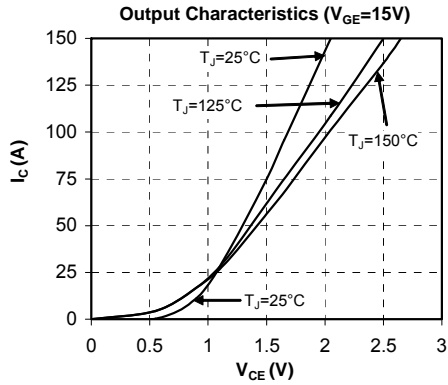
Symbol	Characteristic		Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C			50		kΩ
ΔR ₂₅ /R ₂₅				5		%
B _{25/85}	T ₂₅ = 298.15 K			3952		K
ΔB/B		T _C = 100°C		4		%

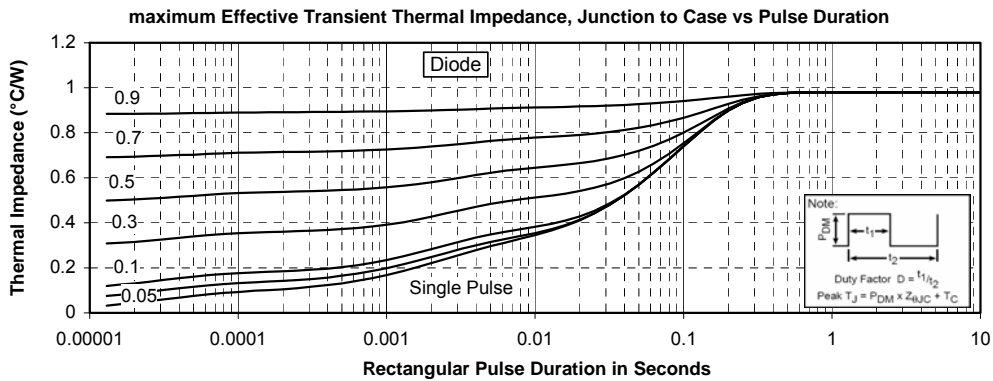
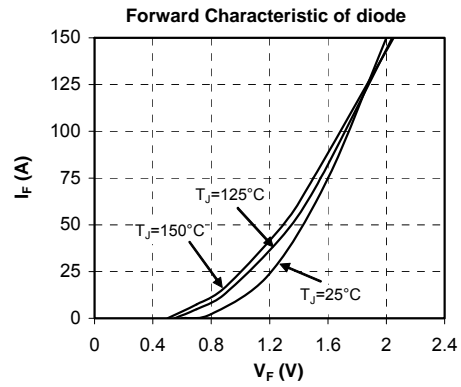
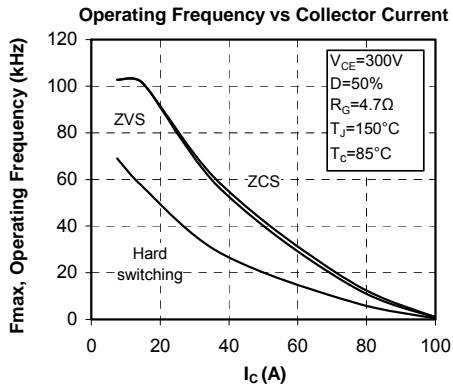
$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]}$$

T: Thermistor temperature
 R_T: Thermistor value at T

SP1 Package outline (dimensions in mm)


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

Typical Performance Curve




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

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