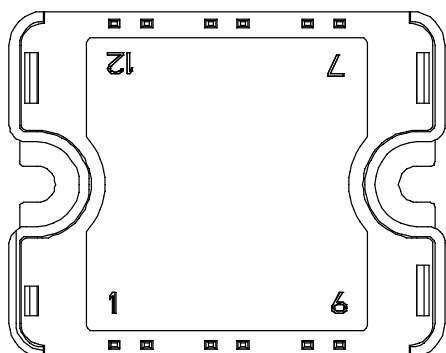
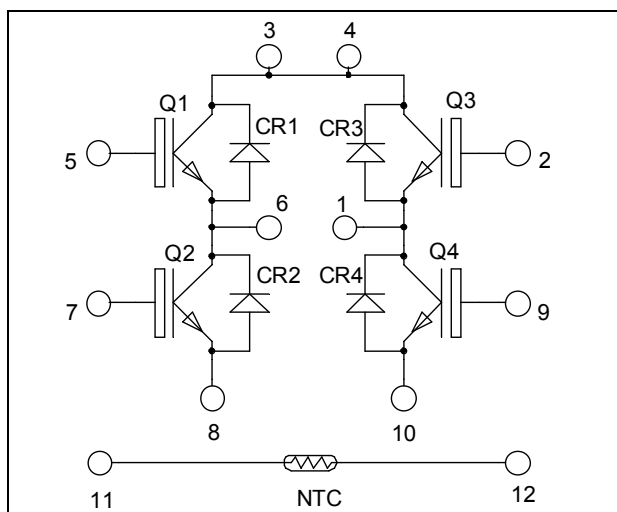


**Full bridge
Trench + Field Stop IGBT3
Power Module**

**$V_{CES} = 600V$
 $I_C = 20A @ T_c = 80^\circ C$**



Pins 3/4 must be shorted together

Application

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

Features

- Trench + Field Stop IGBT3 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	$T_C = 25^\circ C$	32
		$T_C = 80^\circ C$	20
I_{CM}	Pulsed Collector Current	$T_C = 25^\circ C$	40
V_{GE}	Gate - Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_C = 25^\circ C$	62
RBSOA	Reverse Bias Safe Operating Area	$T_J = 150^\circ C$	40A @ 550V

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	$V_{GE} = 15V$ $I_C = 20A$		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.5 1.7	V
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE} = V_{CE}, I_C = 300\mu A$	5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20V, V_{CE} = 0V$			300	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0V$		1100		pF
C_{oes}	Output Capacitance	$V_{CE} = 25V$		70		
C_{res}	Reverse Transfer Capacitance	$f = 1MHz$		35		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C)		110		ns
T_r	Rise Time	$V_{GE} = \pm 15V$		45		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 300V$		200		
T_f	Fall Time	$I_C = 20A$ $R_G = 12\Omega$		40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C)		120		ns
T_r	Rise Time	$V_{GE} = \pm 15V$		50		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 300V$		250		
T_f	Fall Time	$I_C = 20A$ $R_G = 12\Omega$		60		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15V$ $V_{Bus} = 300V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	0.11 0.2		mJ
E_{off}	Turn-off Switching Energy	$I_C = 20A$ $R_G = 12\Omega$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	0.5 0.7		mJ

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
V_{RRM}	Maximum Peak Repetitive Reverse Voltage		600			V
I_{RM}	Maximum Reverse Leakage Current	$V_R = 600V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$		100 350	μA
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$	20		A
V_F	Diode Forward Voltage	$I_F = 20A$ $V_{GE} = 0V$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.6 1.5	2	V
t_{rr}	Reverse Recovery Time		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	100 150		ns
Q_{rr}	Reverse Recovery Charge	$I_F = 20A$ $V_R = 300V$ $di/dt = 1600A/\mu s$	$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	1.1 2.3		μC
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$ $T_j = 150^\circ\text{C}$	0.23 0.50		mJ

Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			2.4	°C/W
		Diode			3.25	
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 _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		100	
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				80	g

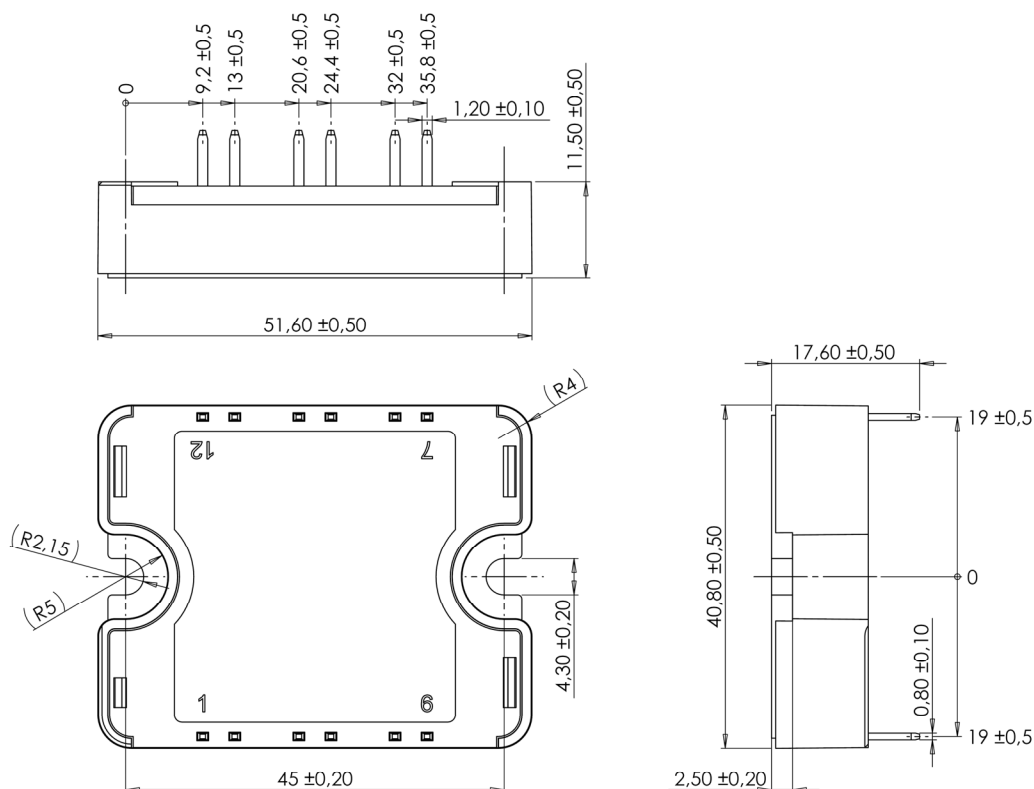
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R ₂₅	Resistance @ 25°C		50		kΩ
B _{25/85}	T ₂₅ = 298.15 K		3952		K

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

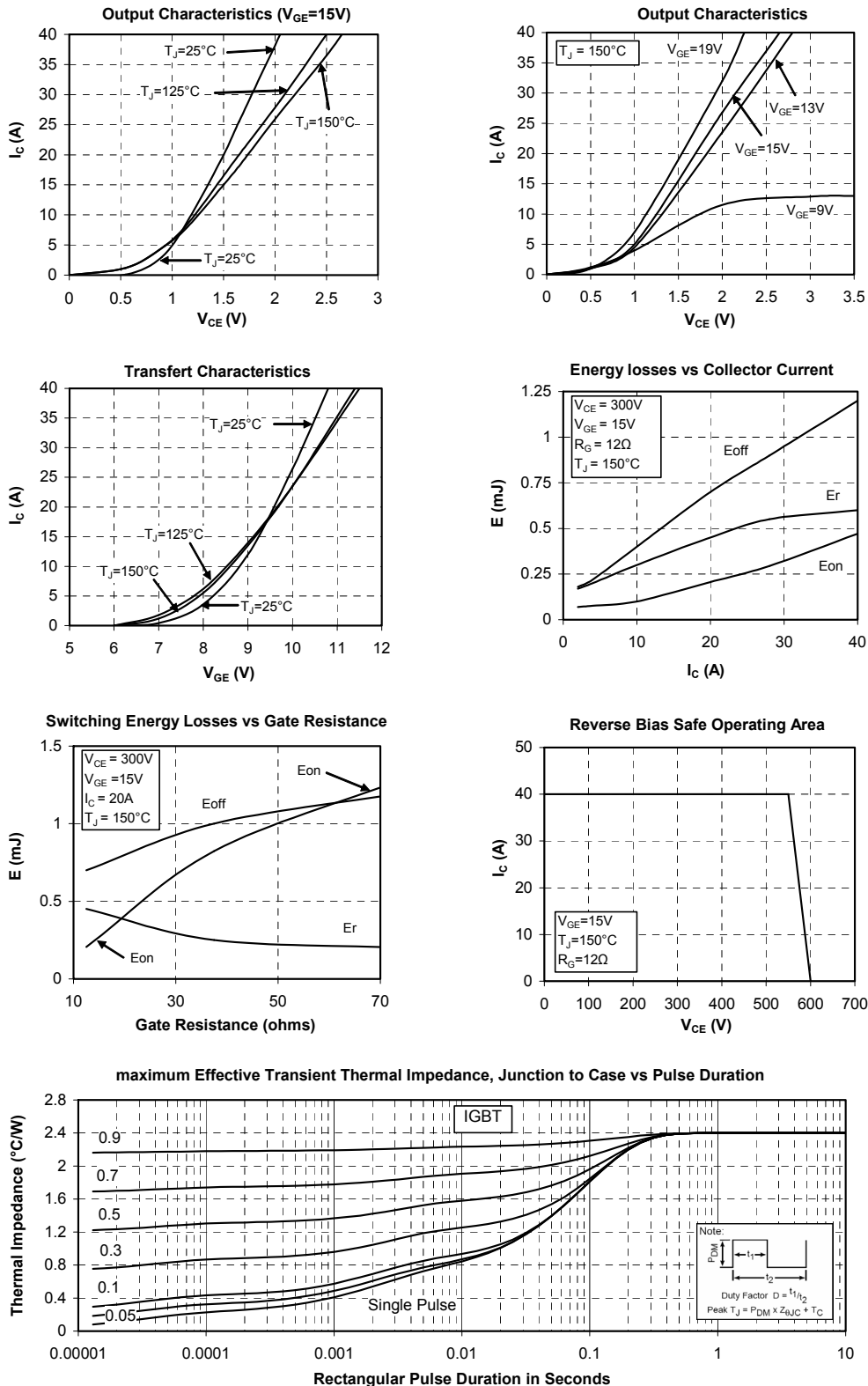
T: Thermistor temperature
 R_T: Thermistor value at T

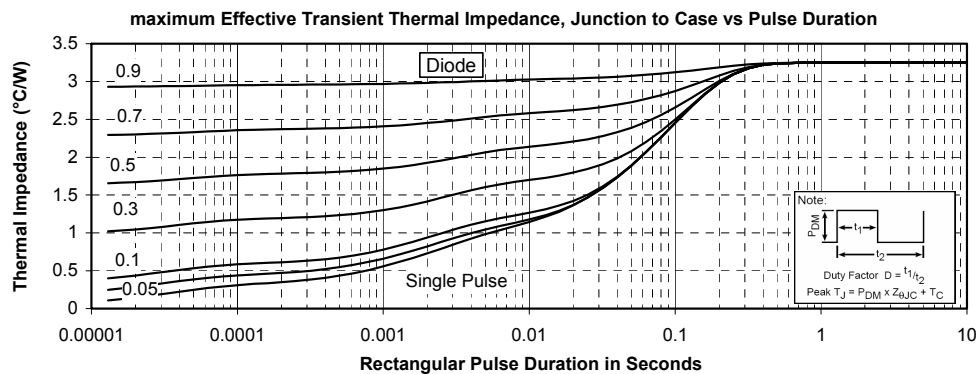
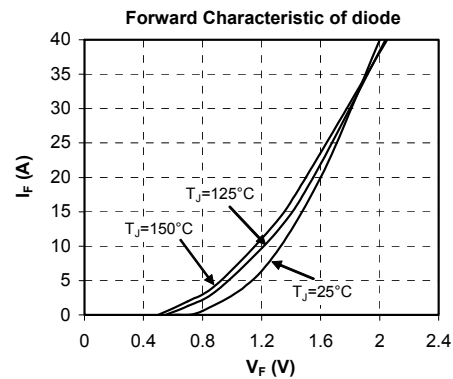
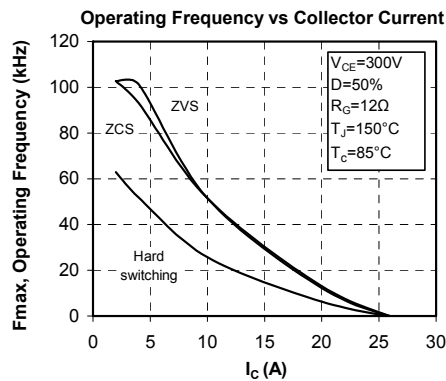
SP1 Package outline (dimensions in mm)



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

Typical Performance Curve





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