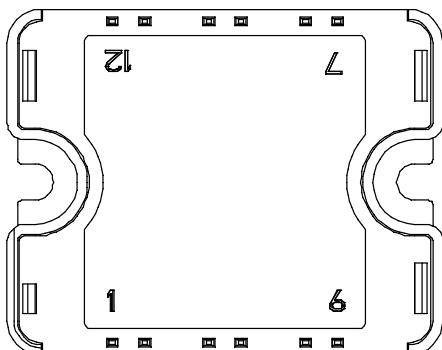
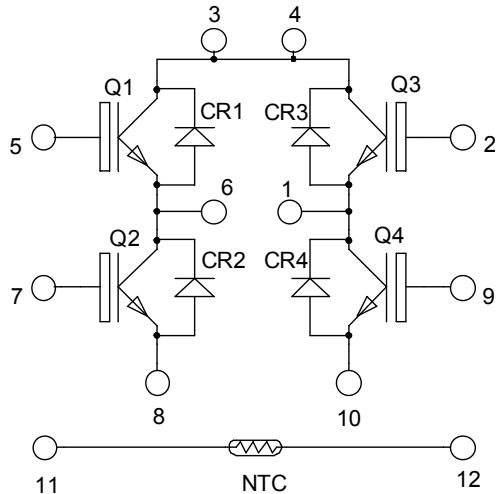


**Full - Bridge
Trench + Field Stop IGBT3
Power Module**
 $V_{CES} = 600V$
 $I_C = 30A @ T_c = 80^\circ C$


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
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS Compliant

Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
V_{CES}	Collector - Emitter Breakdown Voltage	600	V
I_C	Continuous Collector Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
I_{CM}	Pulsed Collector Current	$T_c = 25^\circ C$	
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	W
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	60A @ 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	$V_{GE} = 0\text{V}$, $V_{CE} = 600\text{V}$				250	μA
$V_{CE(\text{sat})}$	Collector Emitter Saturation Voltage	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$		1.5	1.9	V
		$I_C = 30\text{A}$	$T_j = 150^\circ\text{C}$		1.7		
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 400\mu\text{A}$		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$				300	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$			1600		pF
C_{oes}	Output Capacitance				110		
C_{res}	Reverse Transfer Capacitance				50		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 30\text{A}$ $R_G = 10\Omega$			110		ns
T_r	Rise Time				45		
$T_{d(off)}$	Turn-off Delay Time				200		
T_f	Fall Time				40		
$T_{d(on)}$	Turn-on Delay Time	Inductive Switching (150°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 30\text{A}$ $R_G = 10\Omega$			120		ns
T_r	Rise Time				50		
$T_{d(off)}$	Turn-off Delay Time				250		
T_f	Fall Time				60		
E_{on}	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$	$T_j = 25^\circ\text{C}$		0.16		mJ
		$V_{Bus} = 300\text{V}$	$T_j = 150^\circ\text{C}$		0.3		
E_{off}	Turn-off Switching Energy	$I_C = 30\text{A}$	$T_j = 25^\circ\text{C}$		0.7		mJ
		$R_G = 10\Omega$	$T_j = 150^\circ\text{C}$		1.05		

Reverse diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit		
V_{RRM}	Maximum Peak Repetitive Reverse Voltage	$V_R = 600\text{V}$		600			V		
I_{RM}	Maximum Reverse Leakage Current			$T_j = 25^\circ\text{C}$		250	μA		
				$T_j = 150^\circ\text{C}$		500			
I_F	DC Forward Current			$T_C = 80^\circ\text{C}$		30	A		
V_F	Diode Forward Voltage	$I_F = 30\text{A}$ $V_{GE} = 0\text{V}$		$T_j = 25^\circ\text{C}$		1.6	V		
				$T_j = 150^\circ\text{C}$		1.5			
t_{rr}	Reverse Recovery Time	$I_F = 30\text{A}$ $V_R = 300\text{V}$ $di/dt = 1800\text{A}/\mu\text{s}$		$T_j = 25^\circ\text{C}$		100	ns		
				$T_j = 150^\circ\text{C}$		150			
Q_{rr}	Reverse Recovery Charge			$T_j = 25^\circ\text{C}$		1.5	μC		
				$T_j = 150^\circ\text{C}$		3.1			
E_r	Reverse Recovery Energy			$T_j = 25^\circ\text{C}$		0.34	mJ		
				$T_j = 150^\circ\text{C}$		0.75			

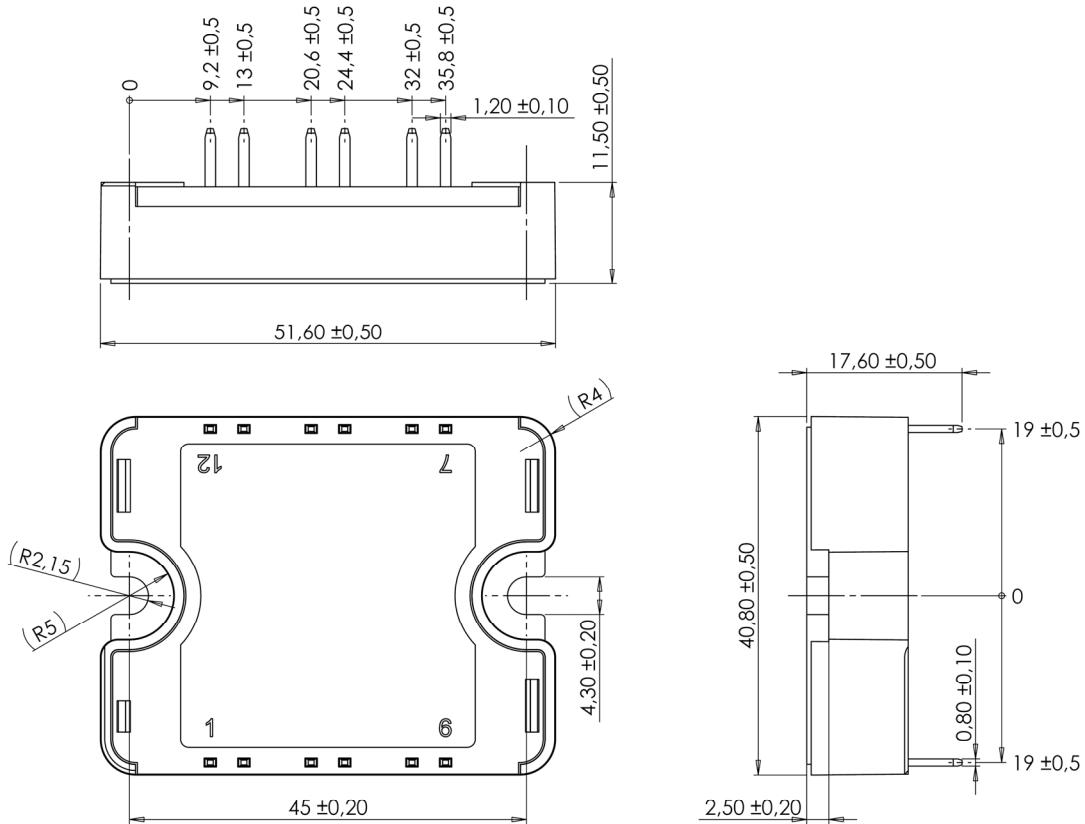
Thermal and package characteristics

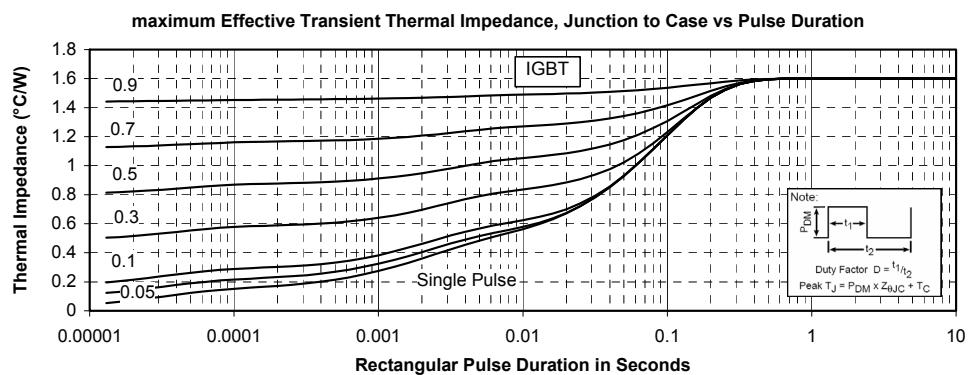
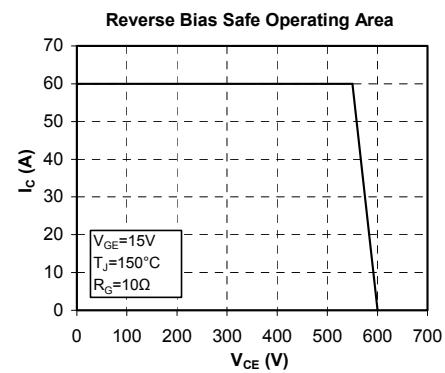
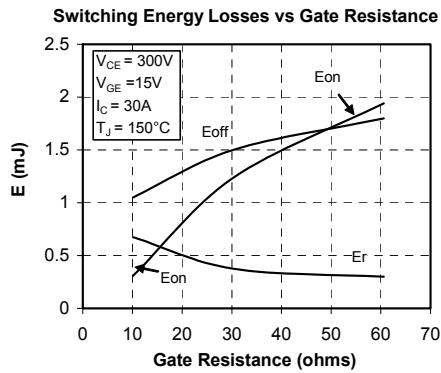
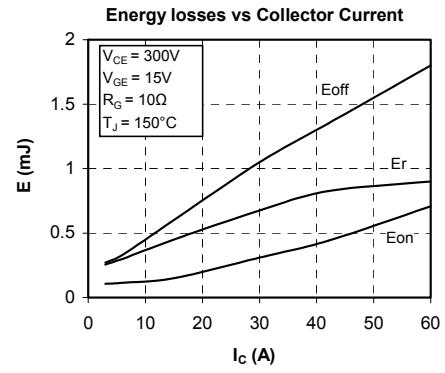
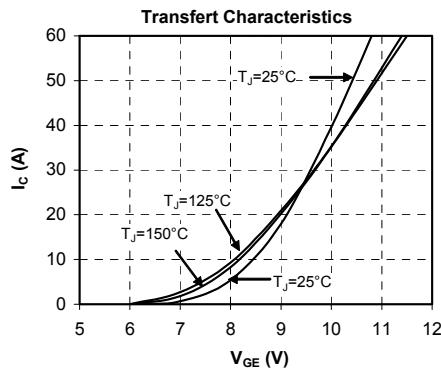
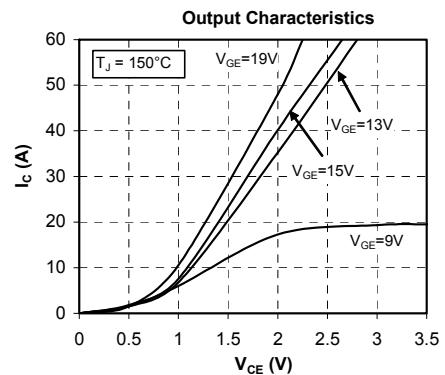
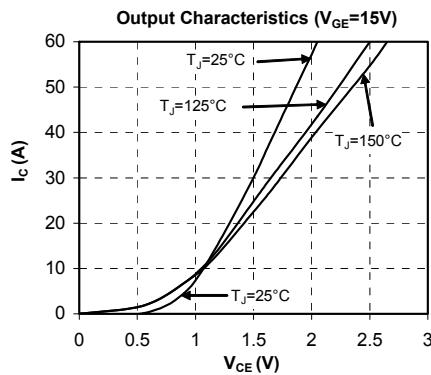
Symbol	Characteristic		Min	Typ	Max	Unit
R_{thJC}	Junction to Case Thermal Resistance	IGBT			1.6	$^{\circ}\text{C}/\text{W}$
		Diode			2.45	
V_{ISOL}	RMS Isolation Voltage, any terminal to case t=1 min, 50/60Hz		4000			V
T_J	Operating junction temperature range		-40		175	$^{\circ}\text{C}$
T_{STG}	Storage 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

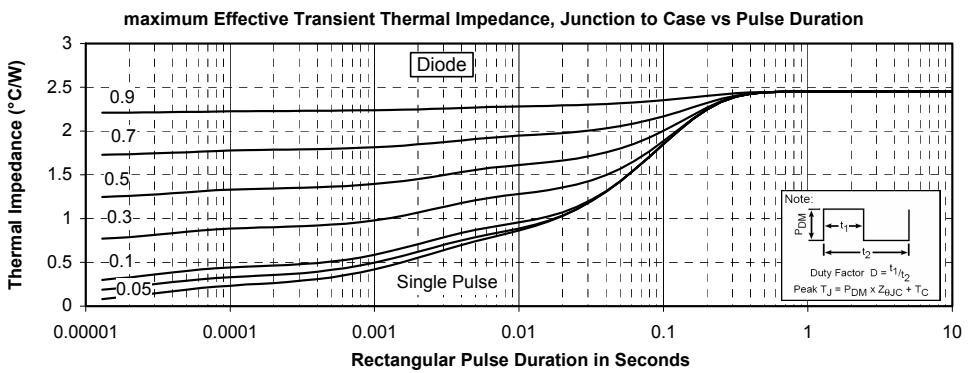
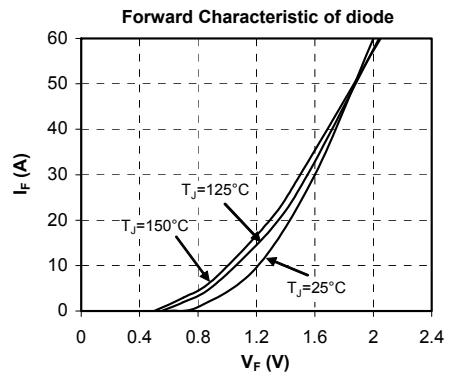
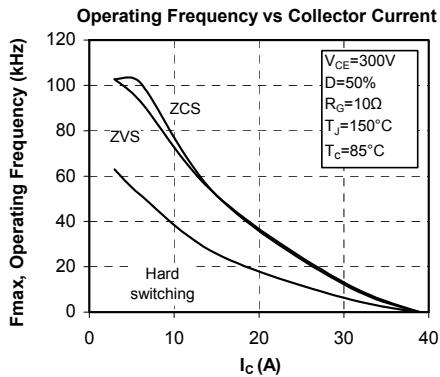
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic		Min	Typ	Max	Unit
R_{25}	Resistance @ 25°C			50		kΩ
$B_{25/85}$	$T_{25} = 298.15 \text{ K}$			3952		K

$$R_T = \frac{R_{25}}{\exp \left[B_{25/85} \left(\frac{1}{T_{25}} - \frac{1}{T} \right) \right]} \quad \begin{array}{l} \text{T: Thermistor temperature} \\ \text{R}_T: \text{Thermistor value at T} \end{array}$$

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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