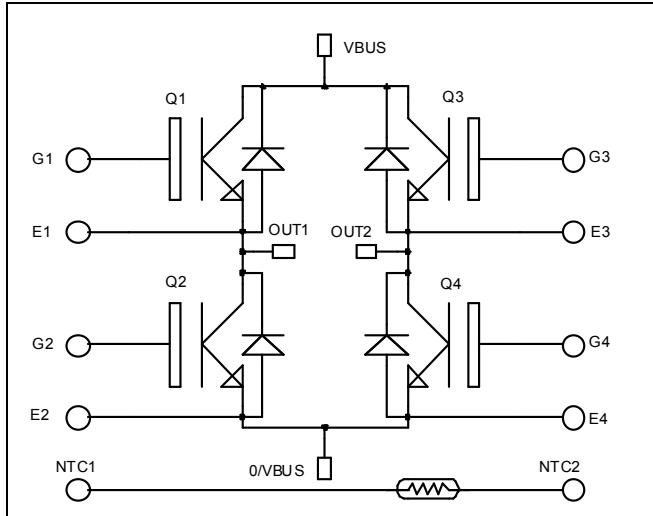
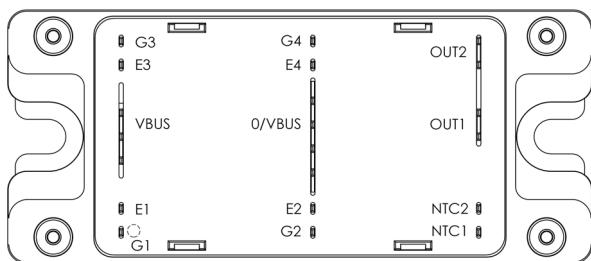


**Full - Bridge
Trench + Field Stop IGBT3
Power Module**
 $V_{CES} = 600V$
 $I_C = 150A @ T_c = 80^\circ C$

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
- Kelvin emitter for easy drive
- Very low stray inductance
 - Symmetrical design
 - Lead frames for power connections
- High level of integration
- Internal thermistor for temperature monitoring


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	$T_c = 25^\circ C$	350
V_{GE}	Gate – Emitter Voltage	± 20	V
P_D	Maximum Power Dissipation	$T_c = 25^\circ C$	480
RBSOA	Reverse Bias Safe Operating Area	$T_j = 150^\circ C$	300A @ 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
		$I_C = 150\text{A}$	$T_j = 150^\circ\text{C}$		1.7		
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$, $I_C = 1.5\text{ mA}$		5.0	5.8	6.5	V
I_{GES}	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$, $V_{CE} = 0\text{V}$				400	nA

Dynamic Characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
C_{ies}	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		9200			pF
C_{oes}	Output Capacitance			580			
C_{res}	Reverse Transfer Capacitance			270			
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 150\text{A}$ $R_G = 3.3\Omega$	Inductive Switching (25°C)	115			ns
T_r	Rise Time			45			
$T_{d(off)}$	Turn-off Delay Time			225			
T_f	Fall Time			55			
$T_{d(on)}$	Turn-on Delay Time	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 300\text{V}$ $I_C = 150\text{A}$ $R_G = 3.3\Omega$	Inductive Switching (150°C)	130			ns
T_r	Rise Time			50			
$T_{d(off)}$	Turn-off Delay Time			300			
T_f	Fall Time			70			
E_{on}	Turn on Energy	$V_{GE} = \pm 15\text{V}$	$T_j = 25^\circ\text{C}$	0.85			mJ
		$V_{Bus} = 300\text{V}$	$T_j = 150^\circ\text{C}$	1.5			
E_{off}	Turn off Energy	$I_C = 150\text{A}$	$T_j = 25^\circ\text{C}$	4.1			mJ
		$R_G = 3.3\Omega$	$T_j = 150^\circ\text{C}$	5.3			

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		$T_C = 80^\circ\text{C}$	150			A	
V_F	Diode Forward Voltage	$I_F = 150\text{A}$	$T_j = 25^\circ\text{C}$	1.6	2		V	
		$V_{GE} = 0\text{V}$	$T_j = 150^\circ\text{C}$	1.5				
t_{rr}	Reverse Recovery Time	$I_F = 150\text{A}$ $V_R = 300\text{V}$ $di/dt = 3000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$	130			ns	
			$T_j = 150^\circ\text{C}$	225				
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$	6.9			μC	
			$T_j = 150^\circ\text{C}$	14.5				
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$	1.6			mJ	
			$T_j = 150^\circ\text{C}$	3.5				

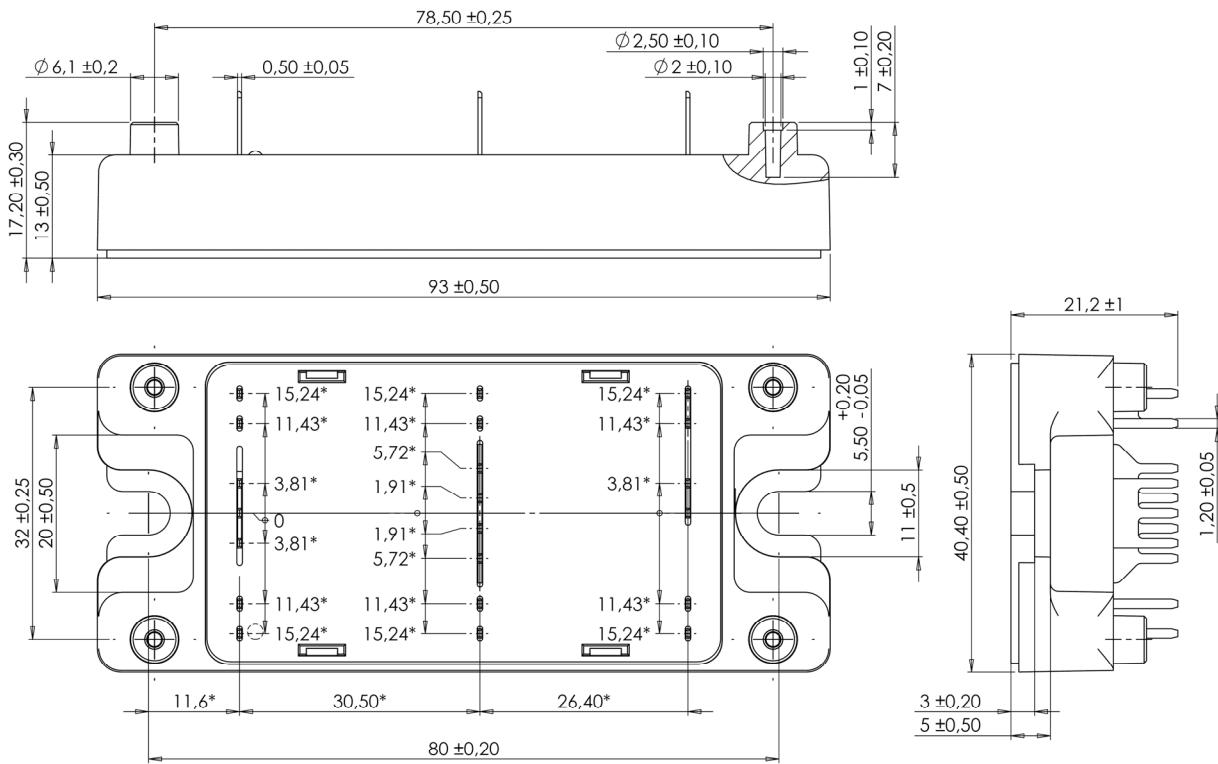
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

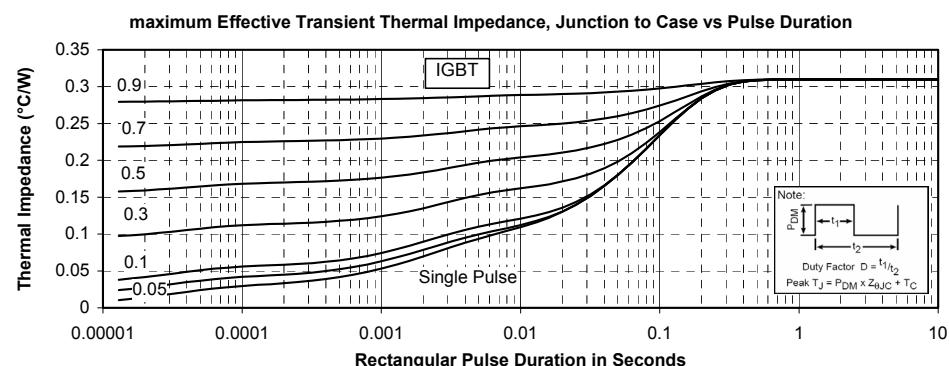
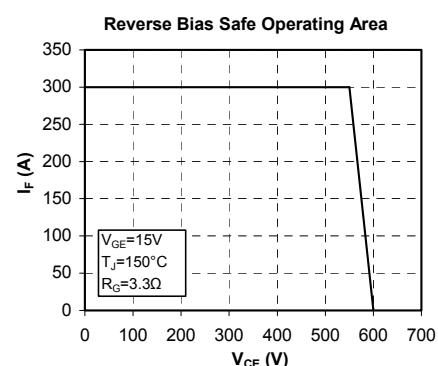
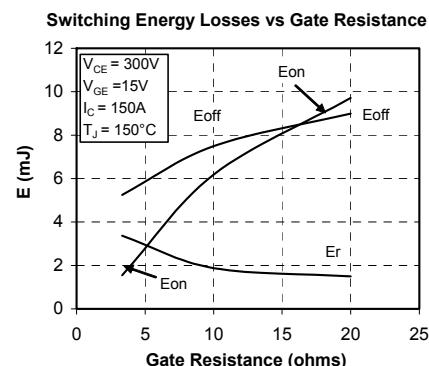
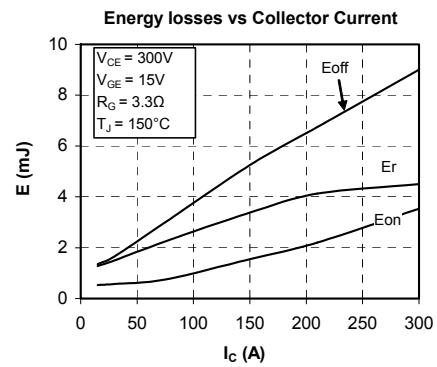
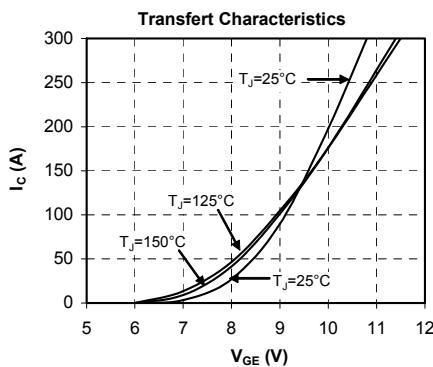
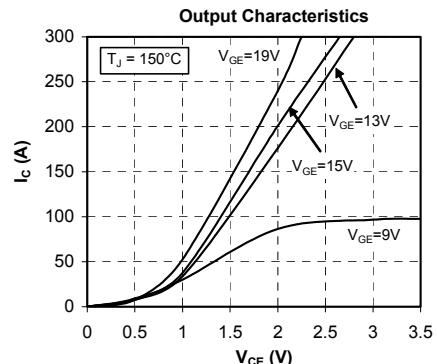
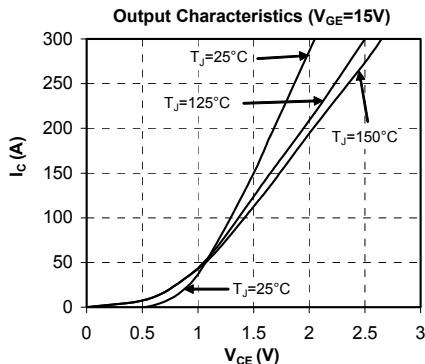
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]} \quad \begin{array}{l} T: \text{Thermistor temperature} \\ R_T: \text{Thermistor value at } T \end{array}$$

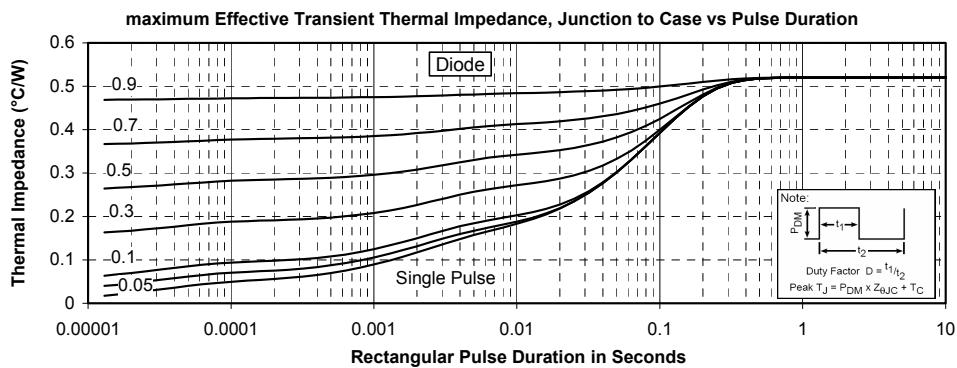
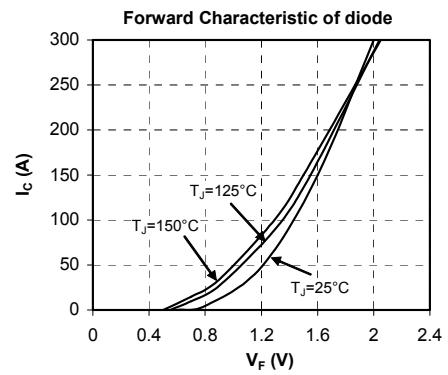
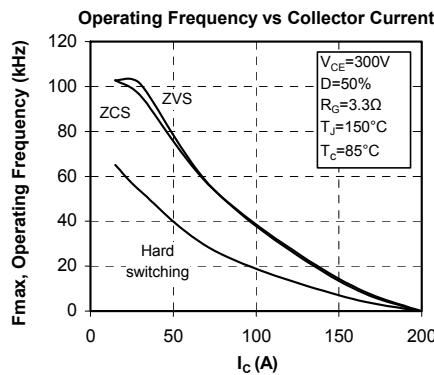
Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance			0.31	°C/W
				0.52	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz	4000			V
T _J	Operating junction temperature range	-40		175	
T _{STG}	Storage Temperature Range	-40		125	°C
T _C	Operating Case Temperature	-40		100	
Torque	Mounting torque	To Heatsink	M5	2.5	4.7
Wt	Package Weight			160	g

SP4 Package outline (dimensions in mm)

 ALL DIMENSIONS MARKED *** ARE TOLERANCED AS : ± 0.1

 See application note APT0501 - Mounting Instructions for SP4 Power Modules on www.microsemi.com

Typical Performance Curve




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