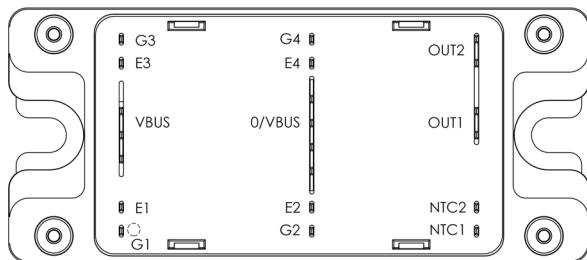
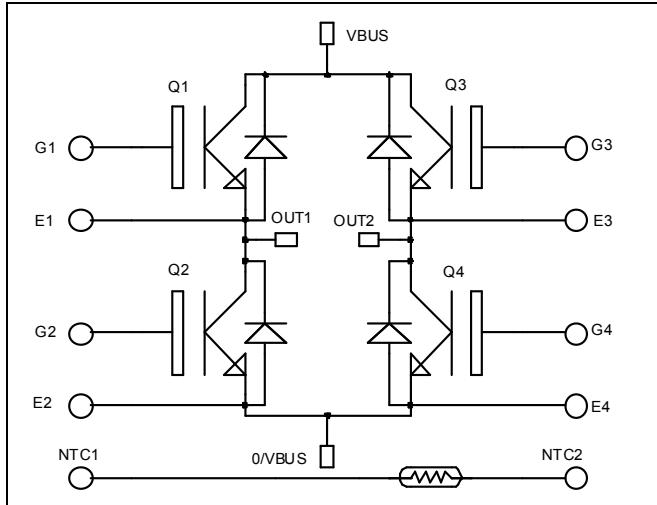


**Full - Bridge  
Fast Trench + Field Stop IGBT3  
Power Module**
 **$V_{CES} = 1200V$**   
 **$I_C = 75A @ T_c = 80^\circ C$** 

**Absolute maximum ratings**

Symbol	Parameter	Max ratings	Unit
$V_{CES}$	Collector - Emitter Breakdown Voltage	1200	V
$I_C$	Continuous Collector Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
$I_{CM}$	Pulsed Collector Current	$T_c = 25^\circ C$	175
$V_{GE}$	Gate – Emitter Voltage	$\pm 20$	V
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	357
RBSOA	Reverse Bias Safe Operating Area	$T_j = 125^\circ C$	150A @ 1150V

 **CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handling Procedures Should Be Followed. See application note APT0502 on [www.microsemi.com](http://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	$V_{GE} = 0\text{V}$ , $V_{CE} = 1200\text{V}$				250	$\mu\text{A}$
$V_{CE(\text{sat})}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	1.4	1.7	2.1	$\text{V}$
		$I_C = 75\text{A}$	$T_j = 125^\circ\text{C}$		2.0		
$V_{GE(\text{th})}$	Gate Threshold Voltage	$V_{GE} = V_{CE}$ , $I_C = 3\text{ mA}$		5.0		6.5	$\text{V}$
$I_{GES}$	Gate – Emitter Leakage Current	$V_{GE} = 20\text{V}$ , $V_{CE} = 0\text{V}$				400	$\text{nA}$

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$C_{ies}$	Input Capacitance	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$		5340			$\text{pF}$
$C_{oes}$	Output Capacitance			280			
$C_{res}$	Reverse Transfer Capacitance			240			
$T_{d(on)}$	Turn-on Delay Time	$\text{Inductive Switching}$ ( $25^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 4.7\Omega$		260			$\text{ns}$
$T_r$	Rise Time			30			
$T_{d(off)}$	Turn-off Delay Time			420			
$T_f$	Fall Time			70			
$T_{d(on)}$	Turn-on Delay Time	$\text{Inductive Switching}$ ( $125^\circ\text{C}$ ) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 4.7\Omega$		285			$\text{ns}$
$T_r$	Rise Time			50			
$T_{d(off)}$	Turn-off Delay Time			520			
$T_f$	Fall Time			90			
$E_{on}$	Turn-on Switching Energy	$V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 4.7\Omega$	$T_j = 125^\circ\text{C}$		7		$\text{mJ}$
$E_{off}$	Turn-off Switching Energy		$T_j = 125^\circ\text{C}$		8.1		

**Reverse diode ratings and characteristics**

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage			1200			$\text{V}$	
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$			350	$\mu\text{A}$	
			$T_j = 125^\circ\text{C}$			600		
$I_F$	DC Forward Current		$T_c = 80^\circ\text{C}$		75		$\text{A}$	
$V_F$	Diode Forward Voltage	$I_F = 75\text{A}$	$T_j = 25^\circ\text{C}$		1.6	2.1	$\text{V}$	
			$T_j = 125^\circ\text{C}$		1.6			
$t_{rr}$	Reverse Recovery Time	$I_F = 75\text{A}$ $V_R = 600\text{V}$ $\text{di/dt} = 2000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		170		$\text{ns}$	
			$T_j = 125^\circ\text{C}$		280			
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		7		$\mu\text{C}$	
			$T_j = 125^\circ\text{C}$		14			
$E_r$	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$		2.8		$\text{mJ}$	
			$T_j = 125^\circ\text{C}$		5.4			

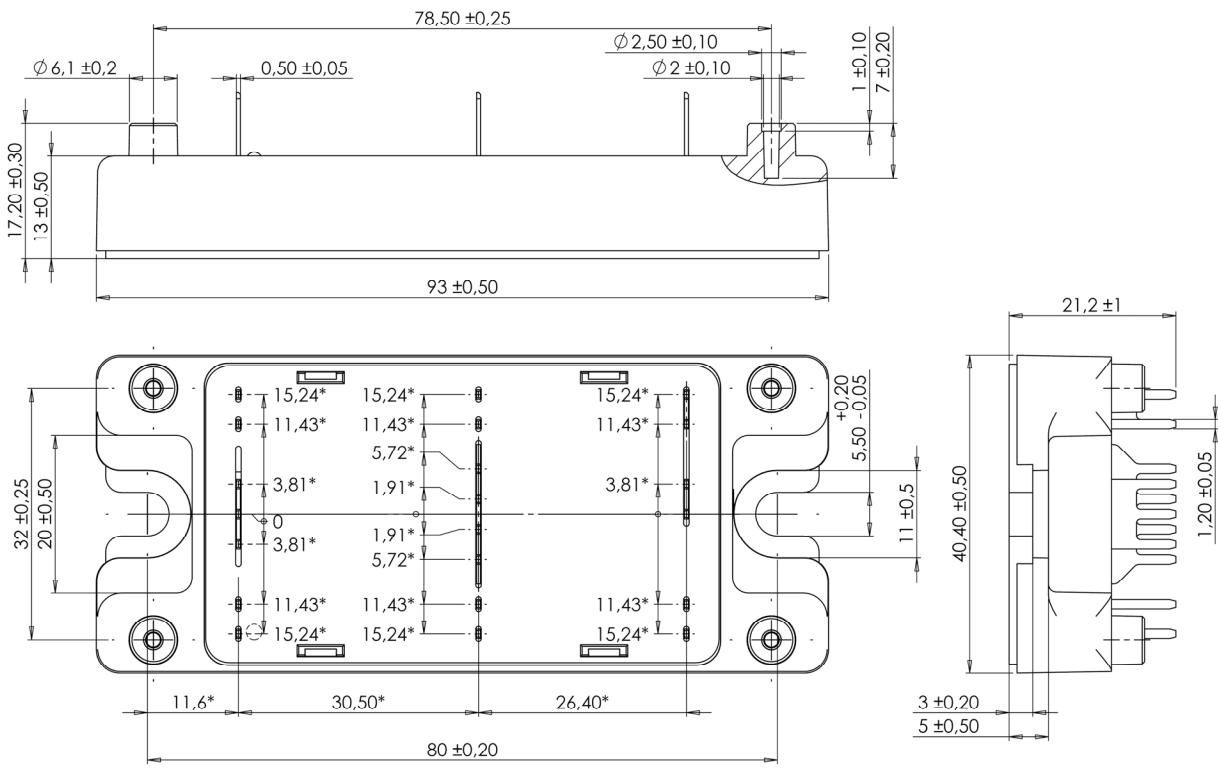
**Temperature sensor NTC** (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

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

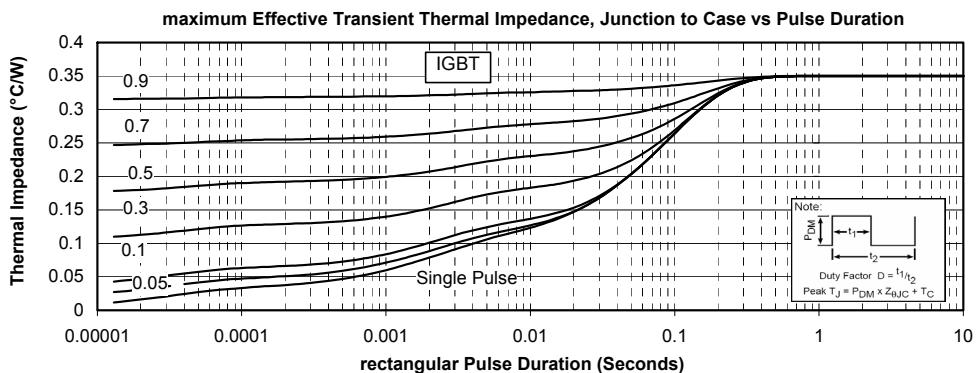
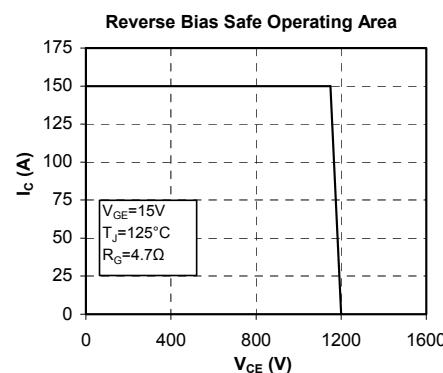
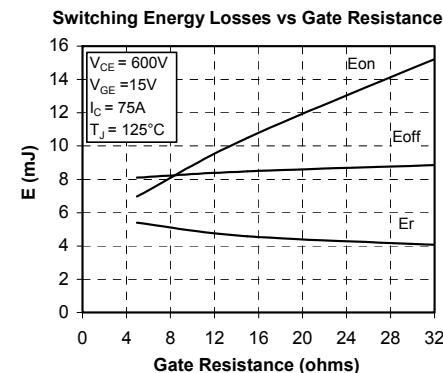
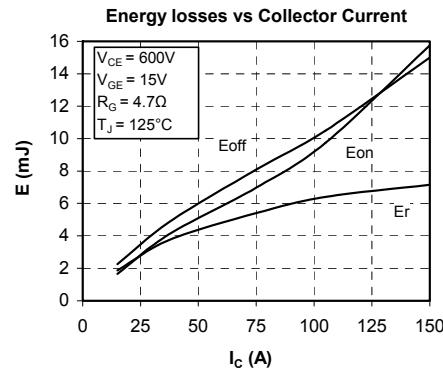
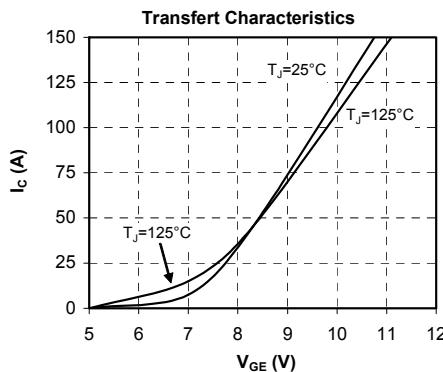
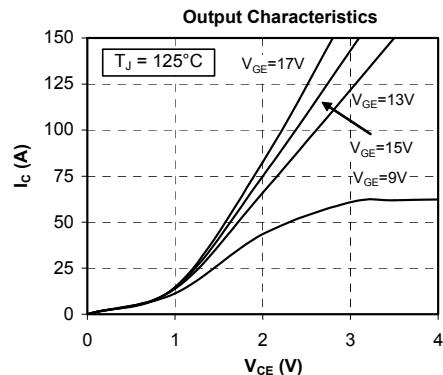
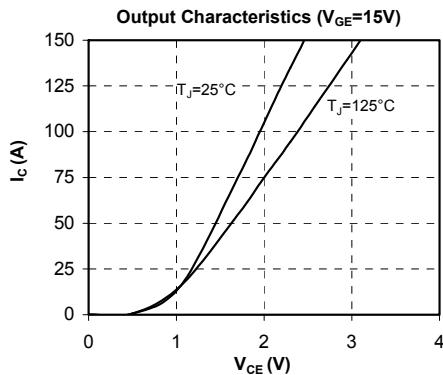
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]} \quad \begin{array}{l} \text{T: Thermistor temperature} \\ \text{R}_T: \text{Thermistor value at T} \end{array}$$

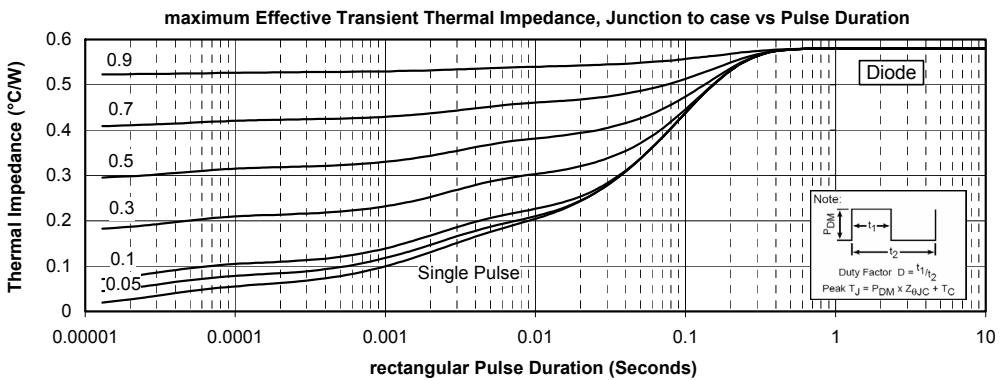
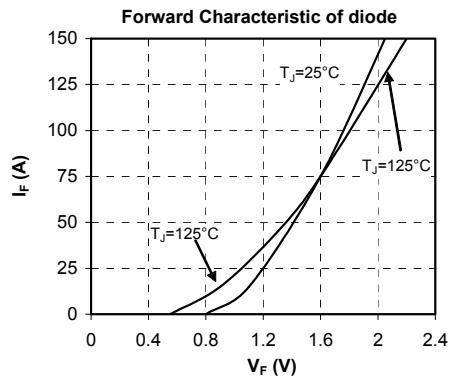
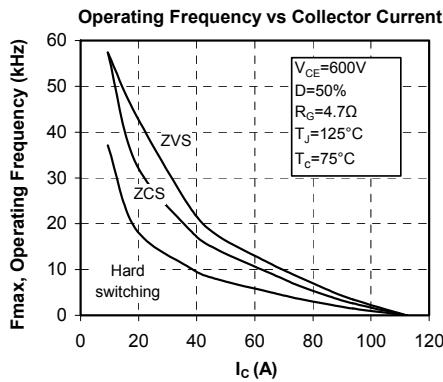
**Thermal and package characteristics**

Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{\text{thJC}}$	Junction to Case Thermal Resistance			0.35	$^{\circ}\text{C/W}$	
				0.58		
$V_{\text{ISOL}}$	RMS Isolation Voltage, any terminal to case $t = 1 \text{ min}$ , 50/60Hz	4000			V	
$T_J$	Operating junction temperature range	-40		150		
$T_{\text{STG}}$	Storage Temperature Range	-40		125	$^{\circ}\text{C}$	
$T_C$	Operating Case Temperature	-40		125		
Torque	Mounting torque	To Heatsink	M5	2.5	4.7	N.m
Wt	Package Weight			160	g	

**SP4 Package outline** (dimensions in mm)

 ALL DIMENSIONS MARKED \*\*\* ARE TOLERANCED AS :  $\phi$   $\pm 1$ 

 See application note APT0501 - Mounting Instructions for SP4 Power Modules on [www.microsemi.com](http://www.microsemi.com)

**Typical Performance Curve**




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