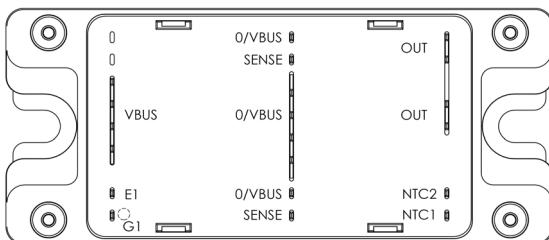
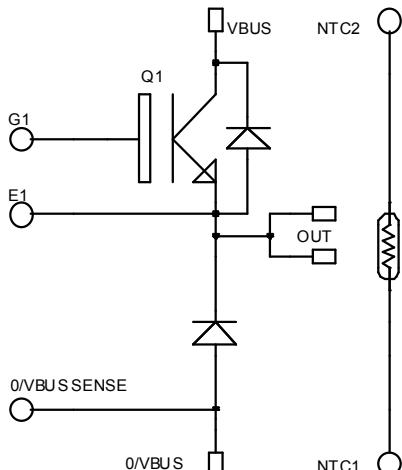


**Buck chopper
Fast Trench + Field Stop IGBT3
Power Module**

**V_{CES} = 1200V
I_C = 75A @ T_c = 80°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°C	A
		T _C = 80°C	
I _{CM}	Pulsed Collector Current	T _C = 25°C	175
V _{GE}	Gate – Emitter Voltage	±20	V
P _D	Maximum Power Dissipation	T _C = 25°C	357
RBSOA	Reverse Bias Safe Operating Area	T _j = 125°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

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	μA
$V_{CE(\text{sat})}$	Collector Emitter saturation Voltage	$V_{GE} = 15\text{V}$	$T_j = 25^\circ\text{C}$	1.4	1.7	2.1	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	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	$V_{GE} = 0\text{V}$ $V_{CE} = 25\text{V}$ $f = 1\text{MHz}$			5340		pF
C_{oes}	Output Capacitance				280		
C_{res}	Reverse Transfer Capacitance				240		
$T_{d(on)}$	Turn-on Delay Time	$\text{Inductive Switching}$ (25°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 4.7\Omega$			260		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°C) $V_{GE} = \pm 15\text{V}$ $V_{Bus} = 600\text{V}$ $I_C = 75\text{A}$ $R_G = 4.7\Omega$			285		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		mJ
E_{off}	Turn-off Switching Energy		$T_j = 125^\circ\text{C}$			8.1	

Chopper diode ratings and characteristics

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
V_{RRM}	Maximum Peak Repetitive Reverse Voltage			1200			V	
I_{RM}	Maximum Reverse Leakage Current	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$			250	μA	
			$T_j = 125^\circ\text{C}$			500		
I_F	DC Forward Current		$T_c = 80^\circ\text{C}$		75		A	
V_F	Diode Forward Voltage	$I_F = 75\text{A}$	$T_j = 25^\circ\text{C}$		1.5	2.0	V	
			$T_j = 125^\circ\text{C}$		1.4			
t_{rr}	Reverse Recovery Time	$I_F = 75\text{A}$ $V_R = 600\text{V}$ $di/dt = 2000\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		150		ns	
			$T_j = 125^\circ\text{C}$		250			
Q_{rr}	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		7		μC	
			$T_j = 125^\circ\text{C}$		13.5			
E_r	Reverse Recovery Energy		$T_j = 25^\circ\text{C}$		3.7		mJ	
			$T_j = 125^\circ\text{C}$		7.2			

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

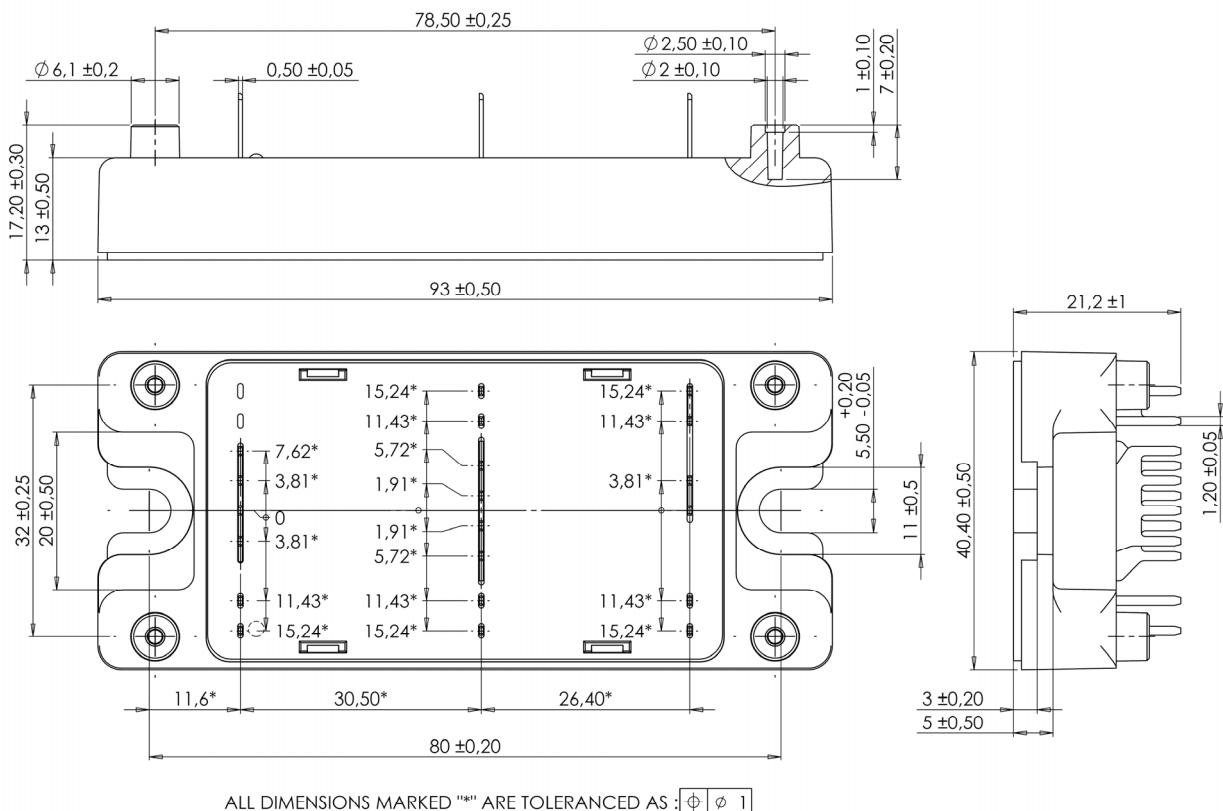
$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]}$$

T: Thermistor temperature
R_T: Thermistor value at T

Thermal and package characteristics

Symbol	Characteristic		Min	Typ	Max	Unit
R _{thJC}	Junction to Case Thermal Resistance	IGBT			0.35	°C/W
		Diode			0.48	
V _{ISOL}	RMS Isolation Voltage, any terminal to case t = 1 min, 50/60Hz		4000			V
T _J	Operating junction temperature range		-40		150	°C
T _{STG}	Storage Temperature Range		-40		125	
T _C	Operating Case Temperature		-40		125	
Torque	Mounting torque	To Heatsink	M5	2.5	4.7	N.m
Wt	Package Weight				160	g

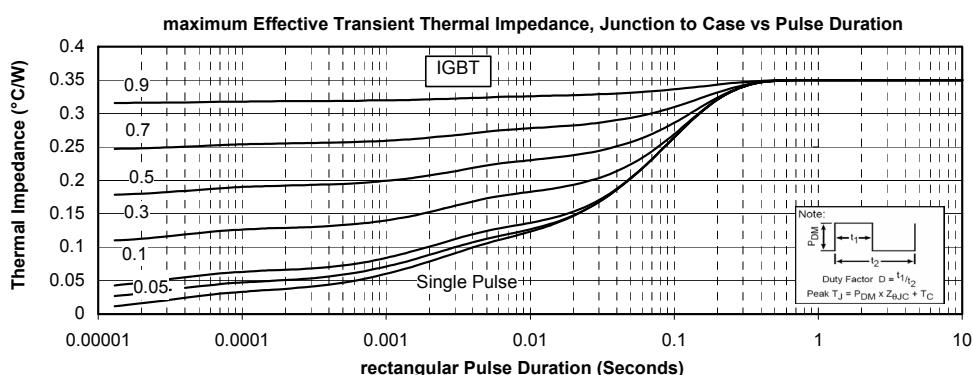
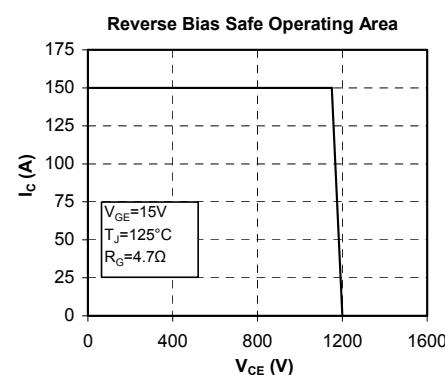
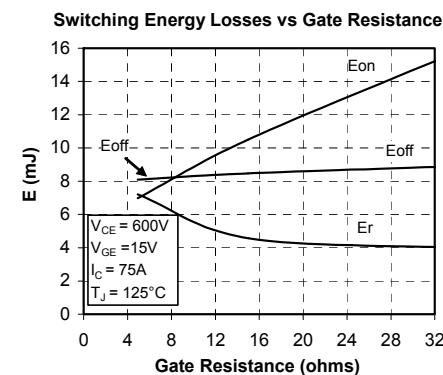
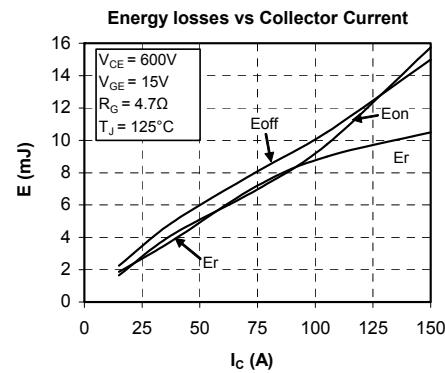
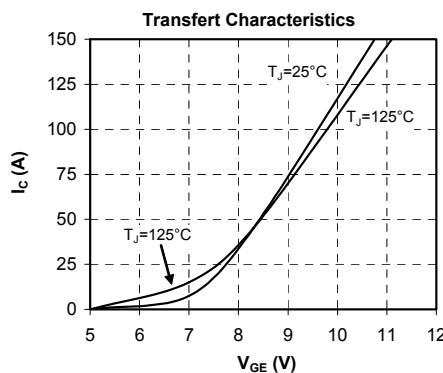
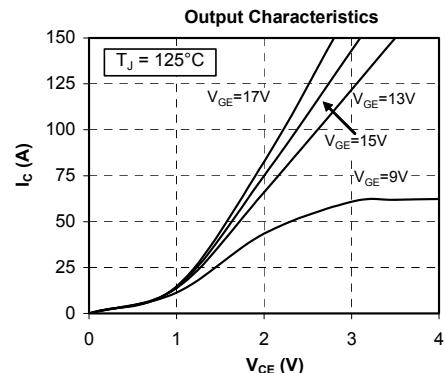
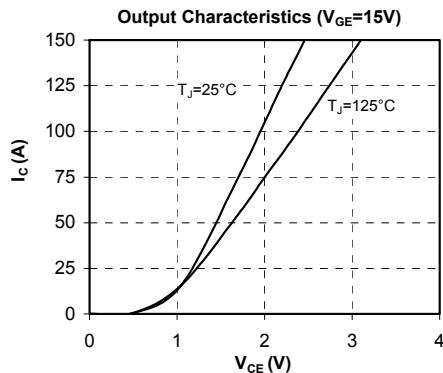
SP4 Package outline (dimensions in mm)

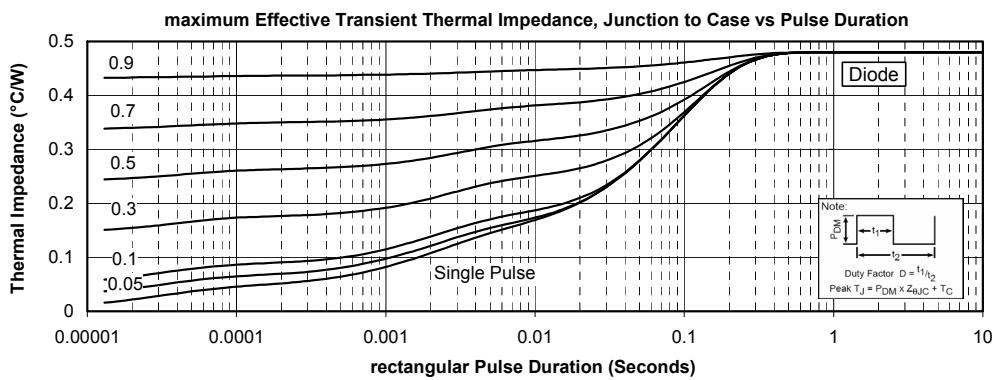
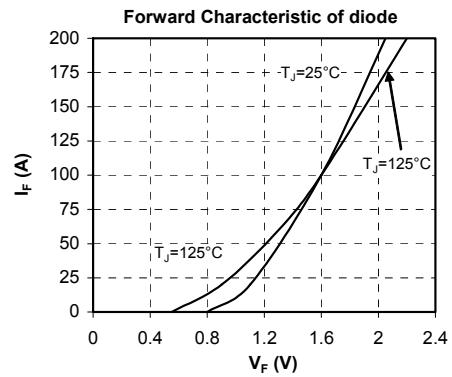
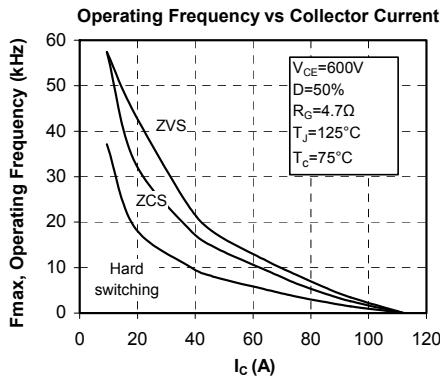


ALL DIMENSIONS MARKED "*" ARE TOLERANCED AS : ϕ 1

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

Typical Performance Curve





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