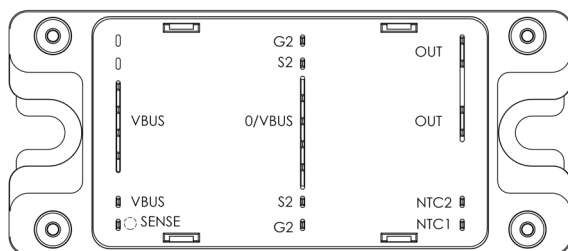
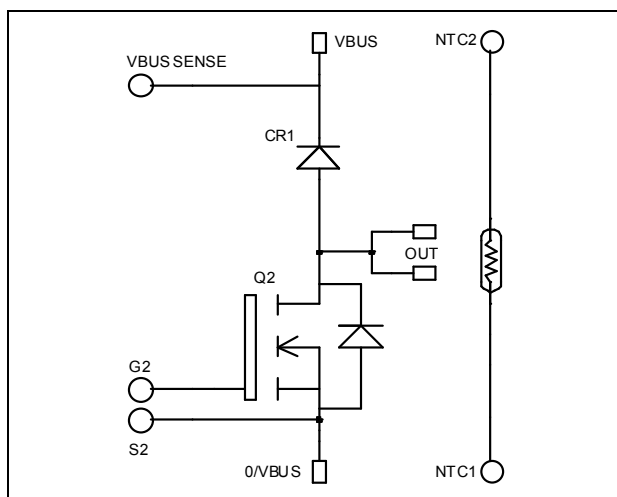


## Boost chopper MOSFET Power Module

**$V_{DSS} = 1000V$**

**$R_{DSon} = 180m\Omega$  typ @  $T_j = 25^\circ C$**

**$I_D = 43A$  @  $T_c = 25^\circ C$**



### Application

- AC and DC motor control
- Switched Mode Power Supplies
- Power Factor Correction

### Features

- Power MOS 7<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - Lead frames for power connections
- 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
$V_{DSS}$	Drain - Source Breakdown Voltage	1000	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	A
		$T_c = 80^\circ C$	
$I_{DM}$	Pulsed Drain current	172	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	210	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	W
$I_{AR}$	Avalanche current (repetitive and non repetitive)	25	A
$E_{AR}$	Repetitive Avalanche Energy	50	mJ
$E_{AS}$	Single Pulse Avalanche Energy	3000	



**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
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{GS} = 0V, V_{DS} = 1000V$ $T_j = 25^\circ\text{C}$			200	$\mu\text{A}$
		$V_{GS} = 0V, V_{DS} = 800V$ $T_j = 125^\circ\text{C}$			1000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10V, I_D = 21.5A$		180	210	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 5mA$	3		5	V
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30V, V_{DS} = 0V$			$\pm 150$	nA

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$		10.4		nF
$C_{oss}$	Output Capacitance			1.76		
$C_{rss}$	Reverse Transfer Capacitance			0.32		
$Q_g$	Total gate Charge	$V_{GS} = 10V$ $V_{Bus} = 500V$ $I_D = 43A$		372		nC
$Q_{gs}$	Gate – Source Charge			48		
$Q_{gd}$	Gate – Drain Charge			244		
$T_{d(on)}$	Turn-on Delay Time	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V$ $V_{Bus} = 670V$ $I_D = 43A$ $R_G = 2.5\Omega$		18		ns
$T_r$	Rise Time			12		
$T_{d(off)}$	Turn-off Delay Time			155		
$T_f$	Fall Time			40		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 43A, R_G = 2.5\Omega$		1800		$\mu\text{J}$
$E_{off}$	Turn-off Switching Energy			1246		
$E_{on}$	Turn-on Switching Energy	<b>Inductive switching @ <math>125^\circ\text{C}</math></b> $V_{GS} = 15V, V_{Bus} = 670V$ $I_D = 43A, R_G = 2.5\Omega$		2846		$\mu\text{J}$
$E_{off}$	Turn-off Switching Energy			1558		

**Chopper diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$V_{RRM}$	Maximum Peak Repetitive Reverse Voltage		1000			V
$I_{RM}$	Maximum Reverse Leakage Current	$V_R = 1000V$	$T_j = 25^\circ\text{C}$		250	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		500	
$I_F$	DC Forward Current	$T_c = 100^\circ\text{C}$		60		A
$V_F$	Diode Forward Voltage	$I_F = 60A$		1.9	2.5	V
		$I_F = 120A$		2.2		
		$I_F = 60A$ $T_j = 125^\circ\text{C}$		1.7		
$t_{rr}$	Reverse Recovery Time	$I_F = 60A$ $V_R = 670V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$	280		ns
			$T_j = 125^\circ\text{C}$	350		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 60A$ $V_R = 670V$ $di/dt = 200A/\mu s$	$T_j = 25^\circ\text{C}$	760		nC
			$T_j = 125^\circ\text{C}$	3600		

## Thermal and package characteristics

Symbol	Characteristic			Min	Typ	Max	Unit
R <sub>thJC</sub>	Junction to Case Thermal Resistance		Transistor			0.16	°C/W
			Diode			0.9	
V <sub>ISOL</sub>	RMS Isolation Voltage, any terminal to case t =1 min, 50/60Hz			4000			V
T <sub>J</sub>	Operating junction temperature range			-40		150	°C
T <sub>STG</sub>	Storage Temperature Range			-40		125	
T <sub>C</sub>	Operating Case Temperature			-40		100	
Torque	Mounting torque	To Heatsink	M5	2.5		4.7	N.m
Wt	Package Weight					160	g

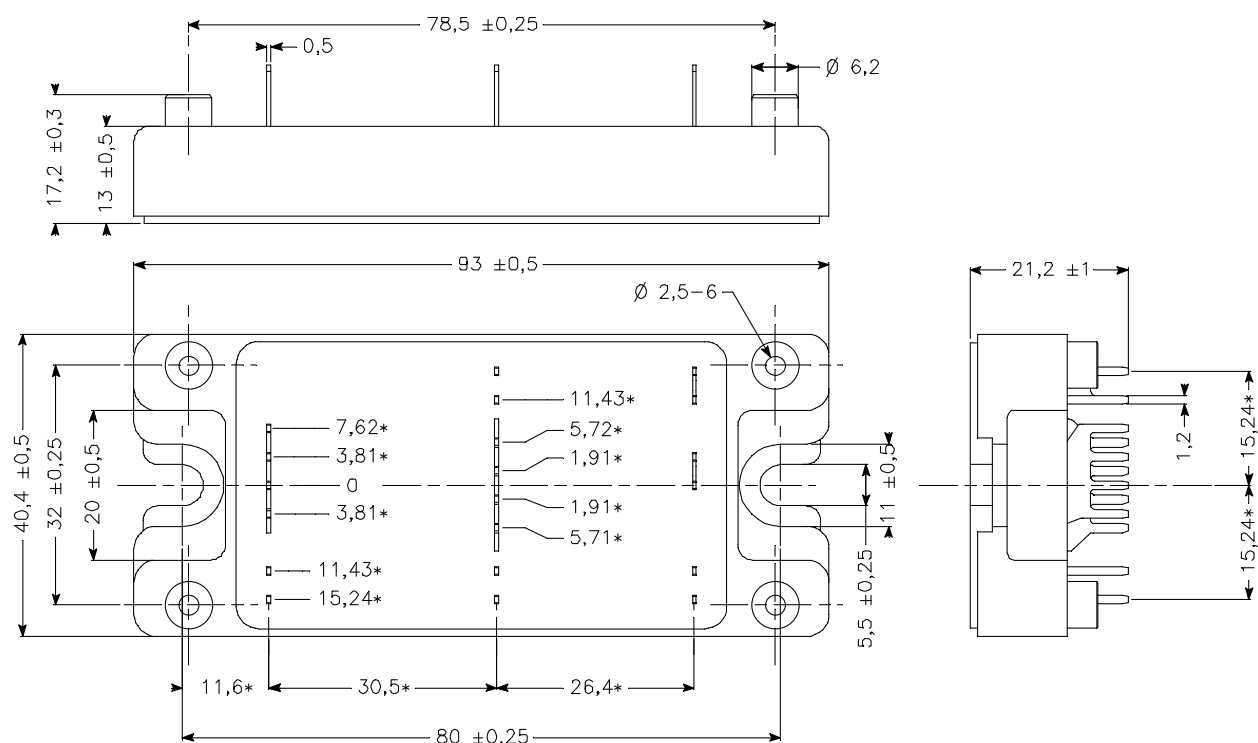
## Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

Symbol	Characteristic	Min	Typ	Max	Unit
R <sub>25</sub>	Resistance @ 25°C		50		kΩ
B <sub>25/85</sub>	T <sub>25</sub> = 298.15 K		3952		K

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

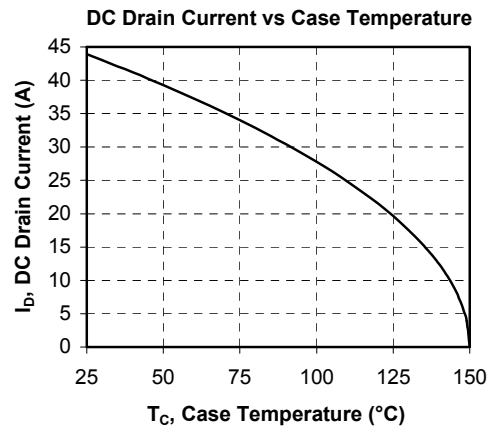
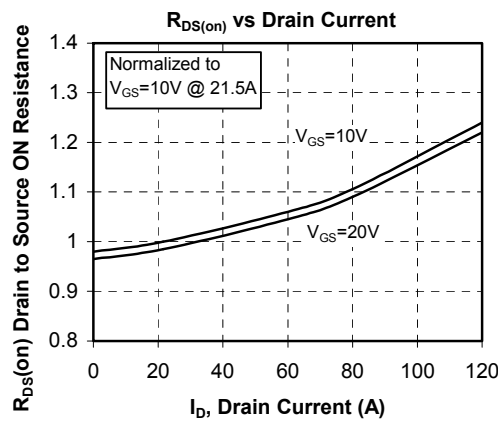
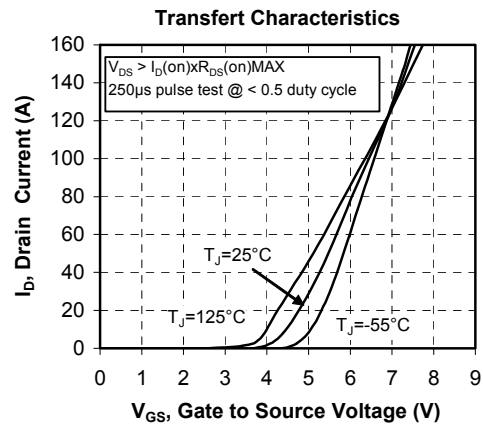
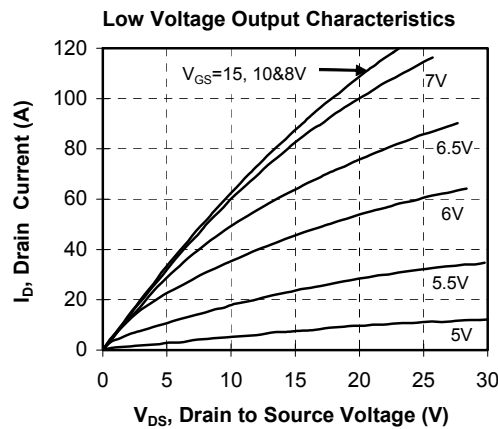
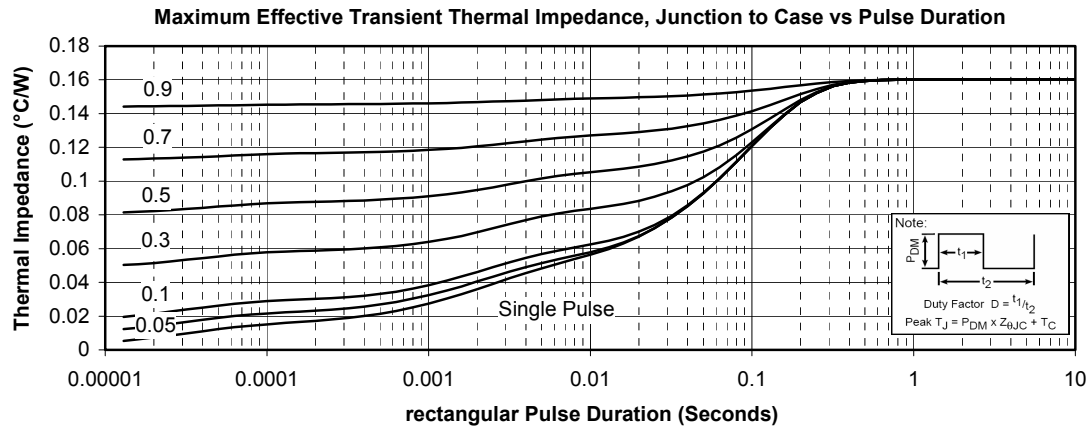
T: Thermistor temperature  
R<sub>T</sub>: Thermistor value at T

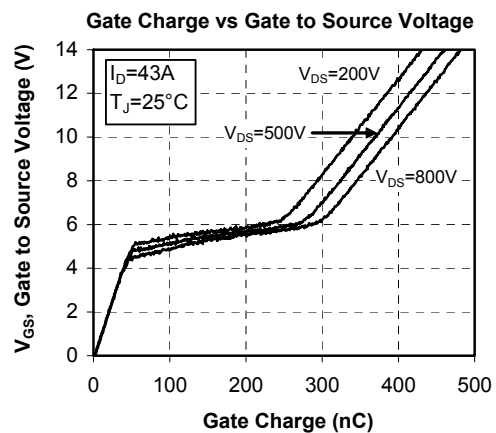
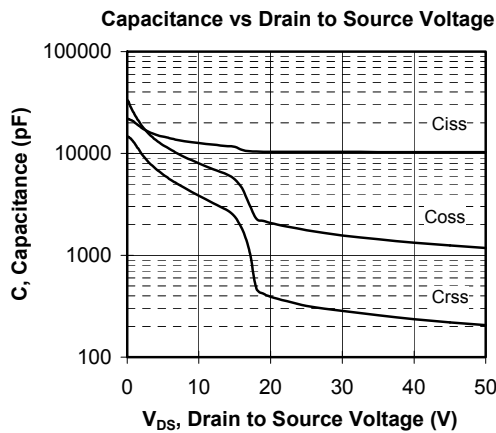
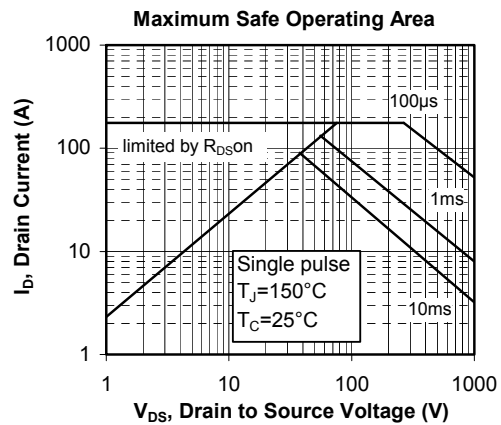
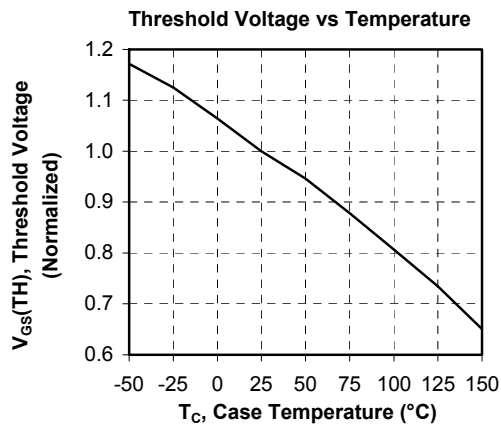
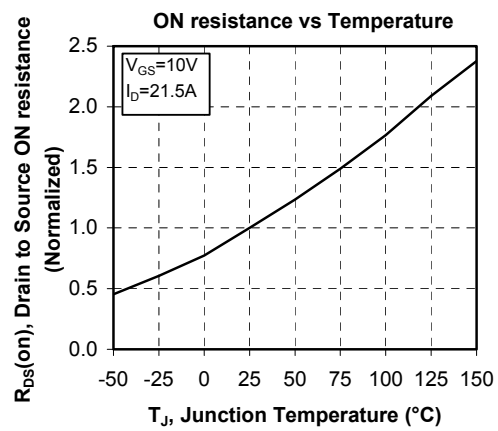
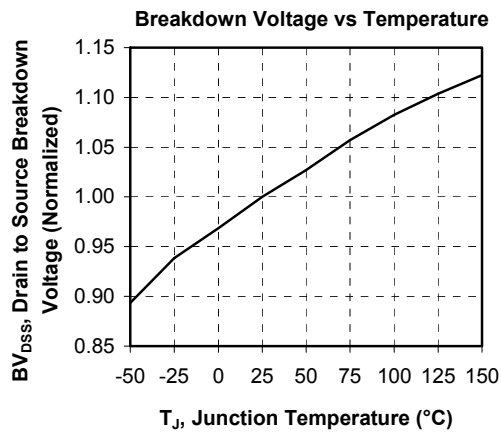
## SP4 Package outline (dimensions in mm)

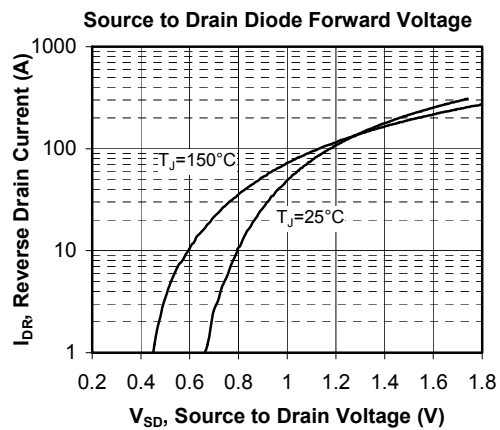
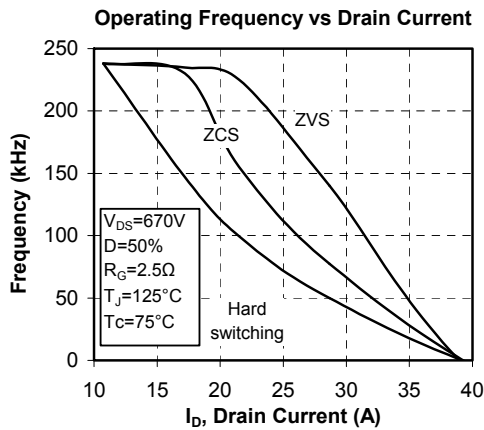
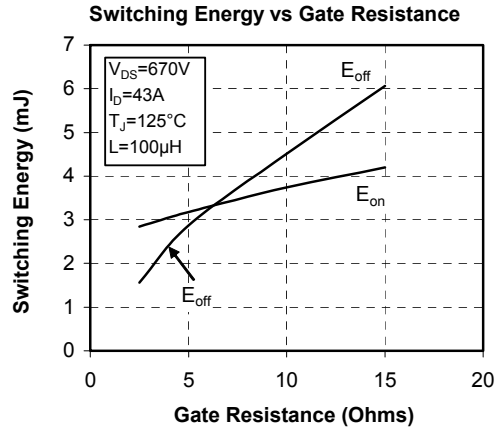
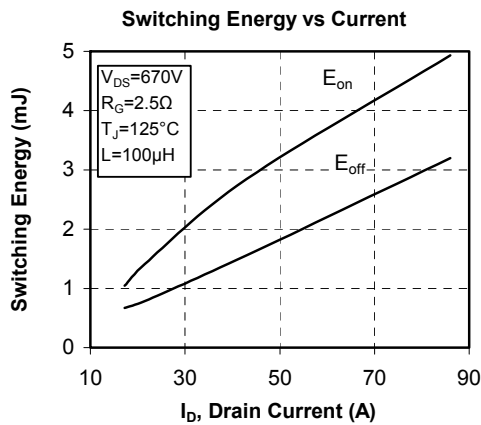
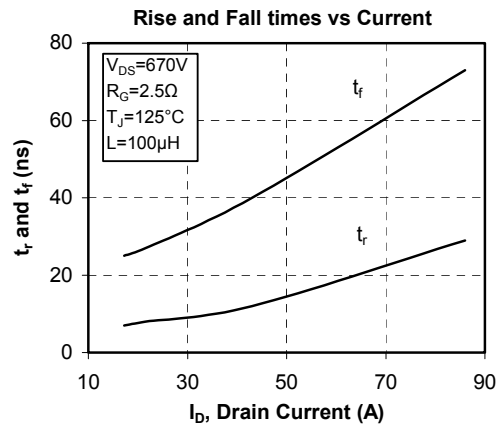
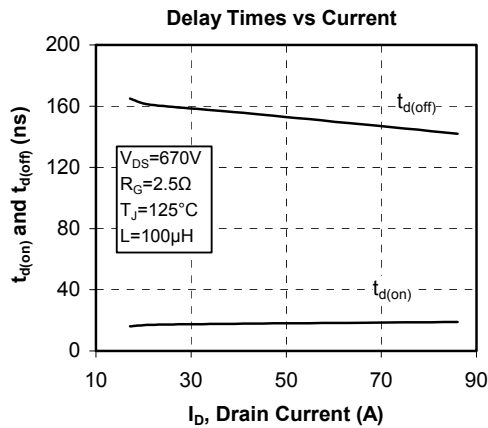


ALL DIMENSIONS MARKED "\*" ARE TOLERANCED AS :  $\pm 0.1$

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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