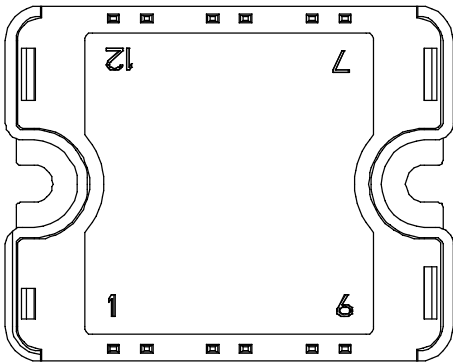
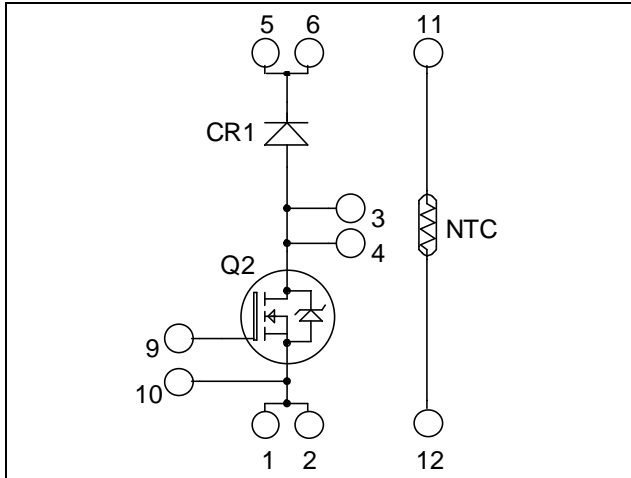


## Boost chopper MOSFET Power Module

$V_{DSS} = 1000V$   
 $R_{DSon} = 180m\Omega \text{ typ @ } T_j = 25^\circ C$   
 $I_D = 40A \text{ @ } T_c = 25^\circ C$



Pins 1/2 ; 3/4 ; 5/6 must be shorted together

### Application

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

### Features


- Power MOS 8<sup>TM</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Very low stray inductance
- 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	$T_c = 25^\circ C$	40
		$T_c = 80^\circ C$	30
$I_{DM}$	Pulsed Drain current	260	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	216	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	657
$I_{AR}$	Avalanche current (repetitive and non repetitive)	33	A


**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	$V_{DS} = 1000\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$			100	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$			500	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 33\text{A}$		180	216	$\text{m}\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 2.5\text{mA}$	3	4	5	V	
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{V}$			$\pm 100$	nA	

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$		14800		pF
$C_{oss}$	Output Capacitance			1555		
$C_{rss}$	Reverse Transfer Capacitance			196		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 500\text{V}$ $I_D = 33\text{A}$		570		nC
$Q_{gs}$	Gate – Source Charge			100		
$Q_{gd}$	Gate – Drain Charge			270		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15\text{V}$ $V_{Bus} = 667\text{V}$ $I_D = 33\text{A}$ $R_G = 2.2\Omega$		85		ns
$T_r$	Rise Time			75		
$T_{d(off)}$	Turn-off Delay Time			285		
$T_f$	Fall Time			70		

**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	$V_R = 1200\text{V}$	$T_j = 25^\circ\text{C}$			100	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$			500	
$I_F$	DC Forward Current	$T_c = 80^\circ\text{C}$		60		A	
$V_F$	Diode Forward Voltage	$I_F = 60\text{A}$		2.5	3	V	
		$I_F = 120\text{A}$		3			
		$I_F = 60\text{A}$	$T_j = 125^\circ\text{C}$	1.8			
$t_{rr}$	Reverse Recovery Time	$I_F = 60\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		265	ns	
			$T_j = 125^\circ\text{C}$		350		
$Q_{rr}$	Reverse Recovery Charge	$I_F = 60\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		560	nC	
			$T_j = 125^\circ\text{C}$		2890		

**Thermal and package characteristics**

Symbol	Characteristic	Min	Typ	Max	Unit	
$R_{thJC}$	Junction to Case Thermal Resistance	Transistor			0.19	$^\circ\text{C}/\text{W}$
		Diode			0.9	
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1\text{min}$ , $I_{isol} < 1\text{mA}$ , 50/60Hz	2500			V	
$T_j$	Operating junction temperature range	-40		150	$^\circ\text{C}$	
$T_{STG}$	Storage Temperature Range	-40		125		
$T_C$	Operating Case Temperature	-40		100		
Torque	Mounting torque	To heatsink	M4	2.5	4.7	N.m
Wt	Package Weight				80	g

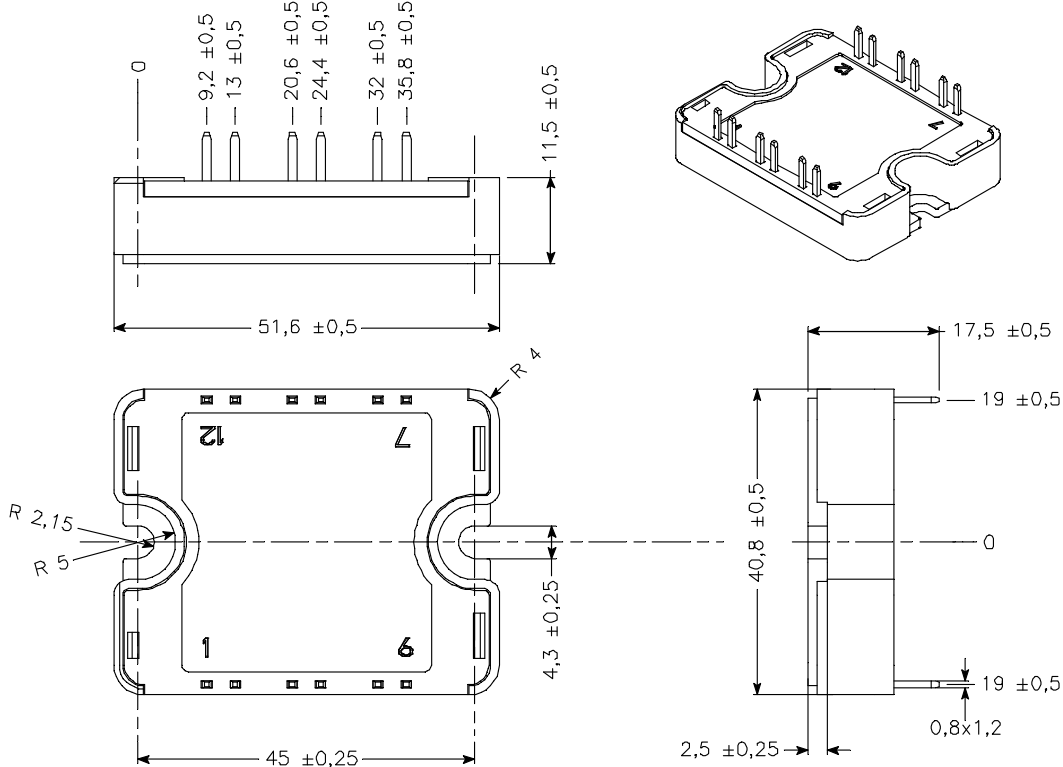
**Temperature sensor NTC** (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

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

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

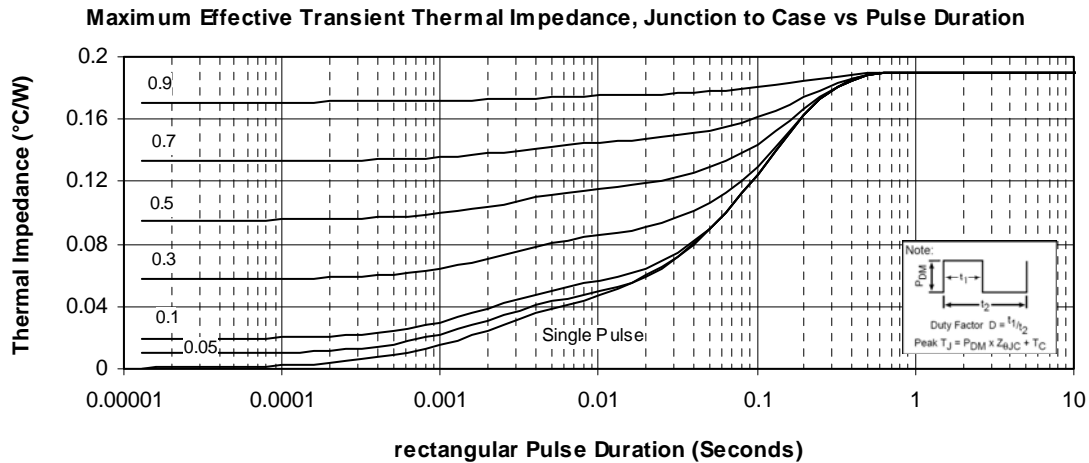
T: Thermistor temperature  
 R<sub>T</sub>: Thermistor value at T

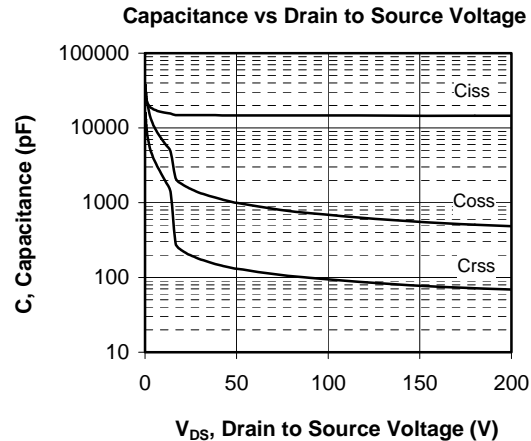
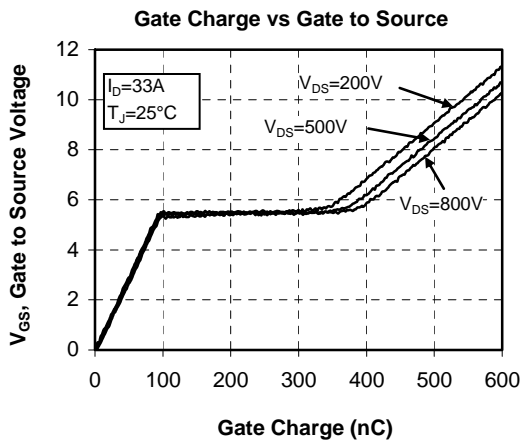
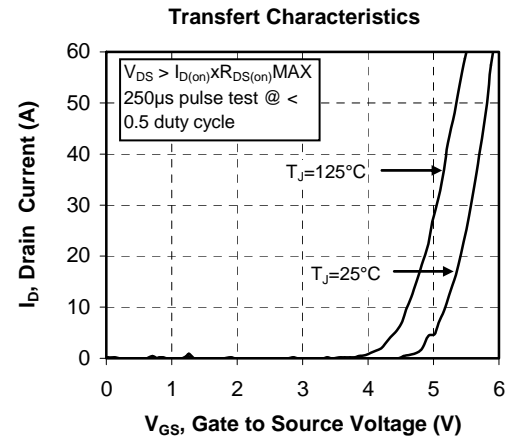
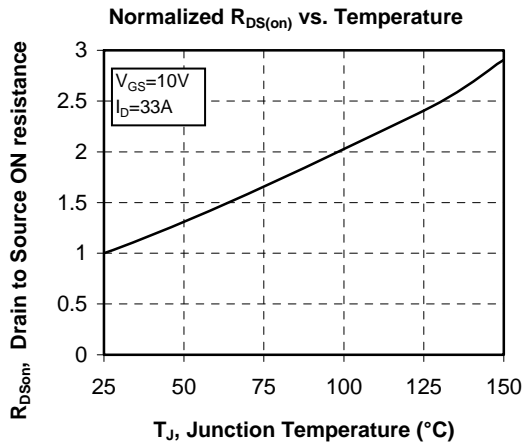
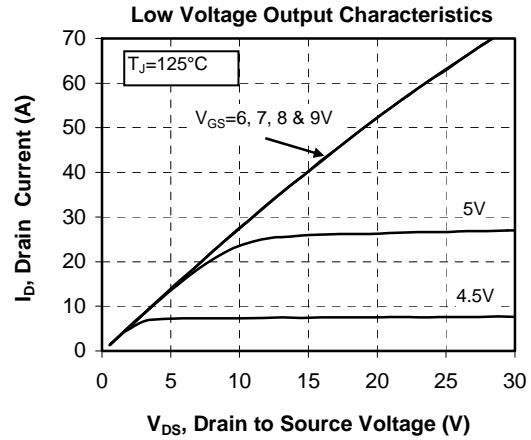
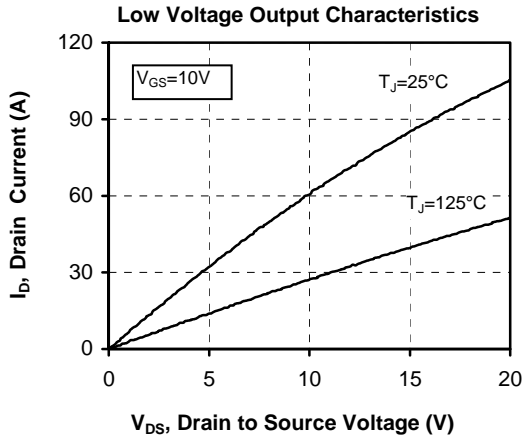
### SP1 Package outline (dimensions in mm)



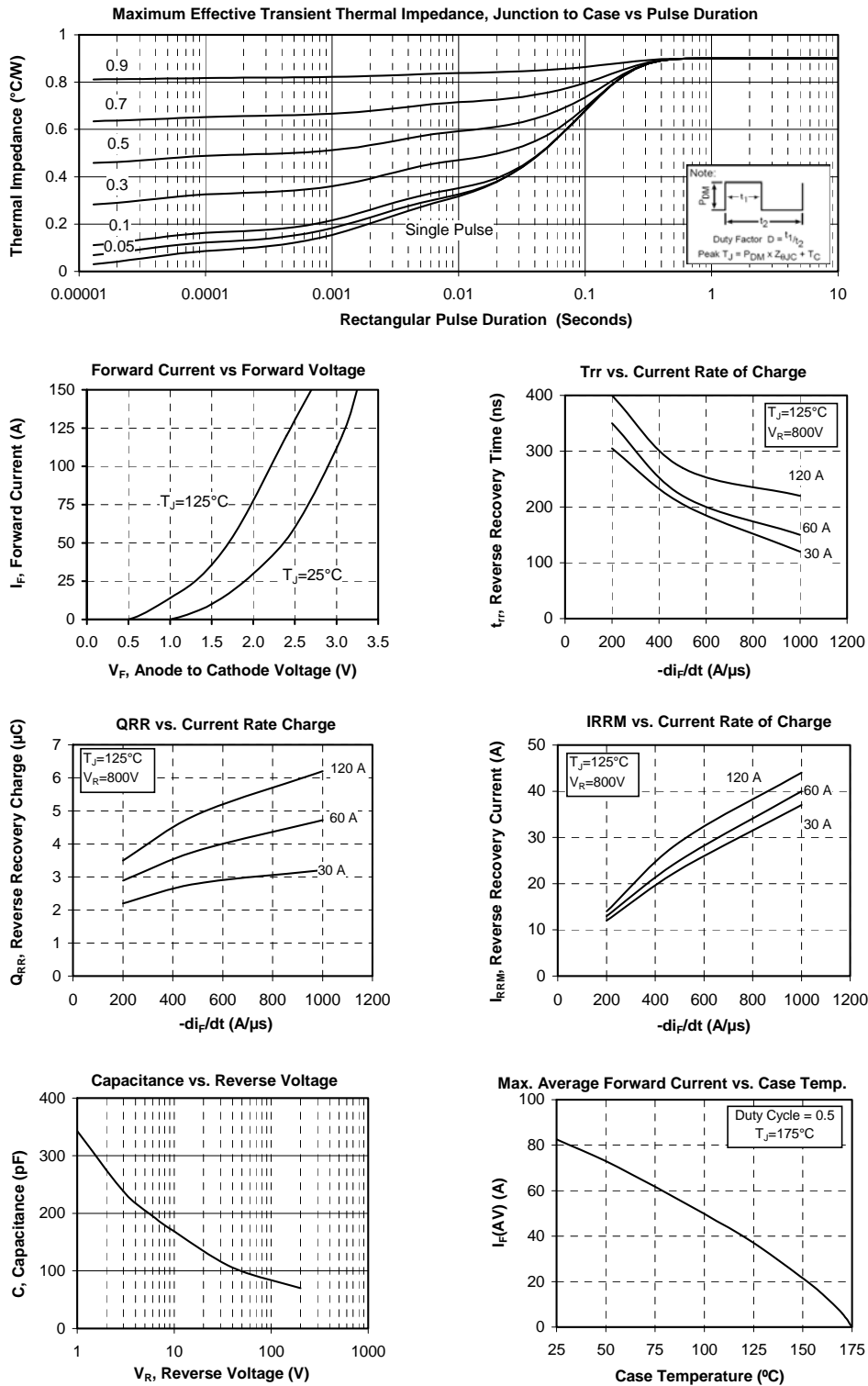
See application note 1904 - Mounting Instructions for SP1 Power Modules on [www.microsemi.com](http://www.microsemi.com)

### Typical Mosfet Performance Curve





## Typical Diode Performance Curve



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Microsemi's products are covered by one or more of U.S. patents 4,895,810 5,045,903 5,089,434 5,182,234 5,019,522 5,262,336 6,503,786 5,256,583 4,748,103 5,283,202 5,231,474 5,434,095 5,528,058 and foreign patents. U.S and Foreign patents pending. All Rights Reserved.