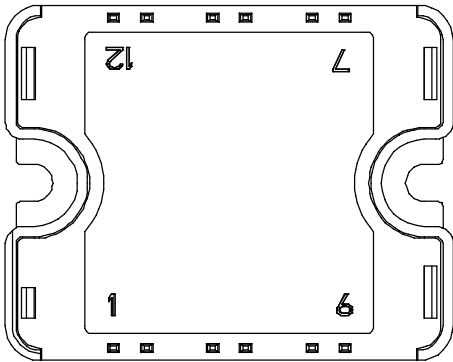
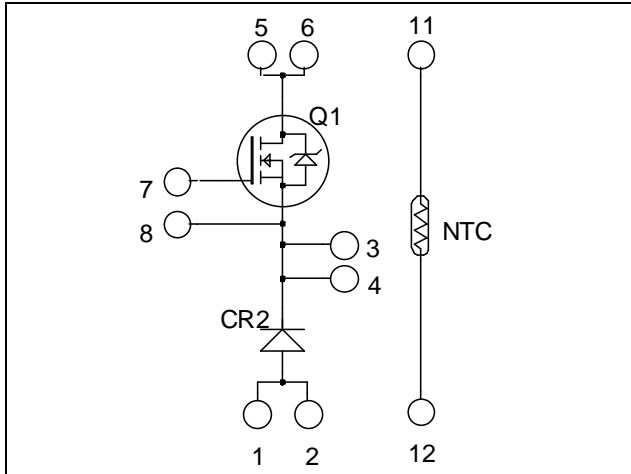


## Buck chopper MOSFET Power Module

$V_{DSS} = 1000V$   
 $R_{DSon} = 330m\Omega$  typ @  $T_j = 25^\circ C$   
 $I_D = 23A$  @  $T_c = 25^\circ C$



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

### Application

- AC and DC motor control
- Switched Mode Power Supplies

### 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	$T_c = 25^\circ C$	23
		$T_c = 80^\circ C$	17
$I_{DM}$	Pulsed Drain current	140	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	396	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	390
$I_{AR}$	Avalanche current (repetitive and non repetitive)	18	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	$V_{GS} = 10\text{V}, I_D = 18\text{A}$			330	396	$\text{m}\Omega$
$V_{GS(th)}$	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	$V_{GS} = 0\text{V}$			7868		pF
$C_{oss}$	Output Capacitance	$V_{DS} = 25\text{V}$			825		
$C_{rss}$	Reverse Transfer Capacitance	$f = 1\text{MHz}$			104		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$			305		nC
$Q_{gs}$	Gate – Source Charge	$V_{Bus} = 500\text{V}$			55		
$Q_{gd}$	Gate – Drain Charge	$I_D = 18\text{A}$			145		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive switching @ <math>25^\circ\text{C}</math></b>			44		ns
$T_r$	Rise Time	$V_{GS} = 15\text{V}$			40		
$T_{d(off)}$	Turn-off Delay Time	$V_{Bus} = 667\text{V}$			150		
$T_f$	Fall Time	$I_D = 18\text{A}$ $R_G = 2.2\Omega$			38		

**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	$T_c = 80^\circ\text{C}$			30		A
$V_F$	Diode Forward Voltage	$I_F = 30\text{A}$			2.6	3.1	V
		$I_F = 60\text{A}$			3.2		
		$I_F = 30\text{A}$	$T_j = 125^\circ\text{C}$		1.8		
$t_{rr}$	Reverse Recovery Time	$I_F = 30\text{A}$ $V_R = 800\text{V}$ $di/dt = 200\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$		300		ns
			$T_j = 125^\circ\text{C}$		380		
$Q_{rr}$	Reverse Recovery Charge				360		nC
					1700		

**Thermal and package characteristics**

Symbol	Characteristic			Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case Thermal Resistance	Transistor				0.32	$^\circ\text{C}/\text{W}$
		Diode				1.2	
$V_{ISOL}$	RMS Isolation Voltage, any terminal to case $t = 1\text{ min}, I_{isol} < 1\text{mA}, 50/60\text{Hz}$			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	
Wt	Package Weight					80	g

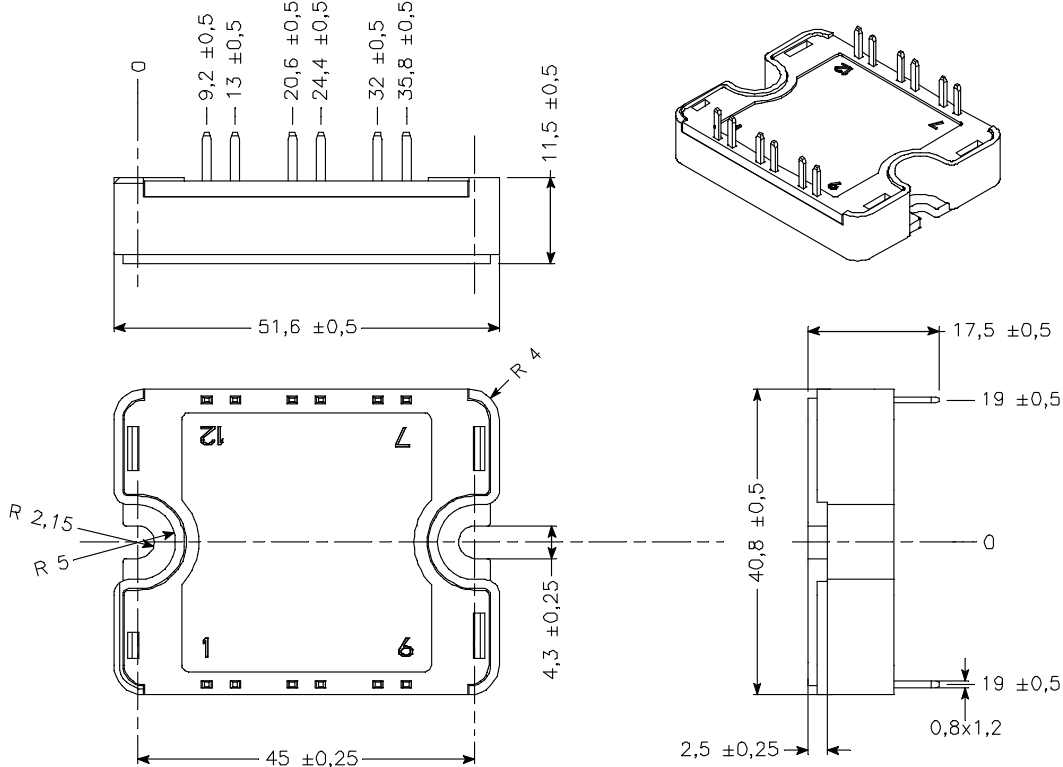
**Temperature sensor NTC** (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

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

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

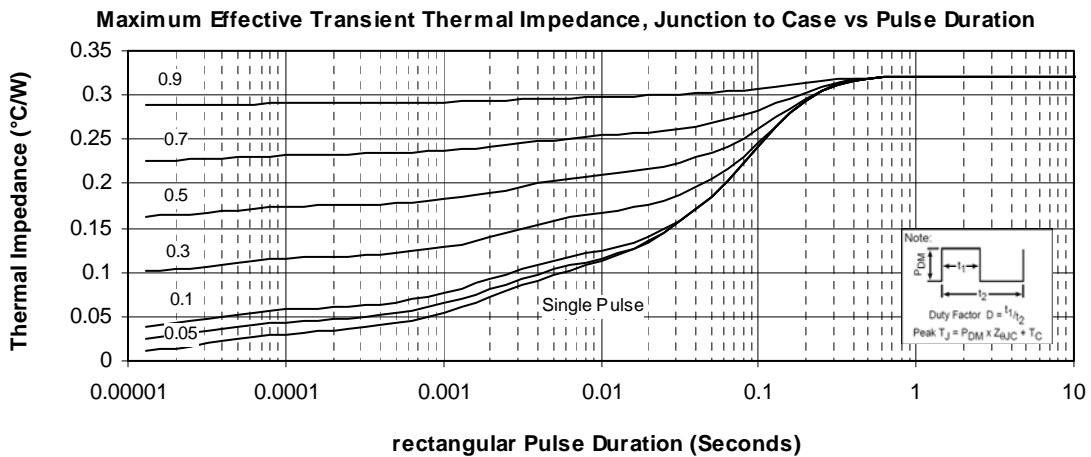
T: Thermistor temperature  
 R<sub>T</sub>: Thermistor value at T

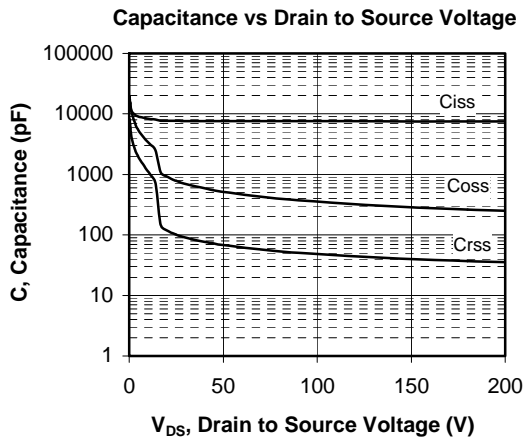
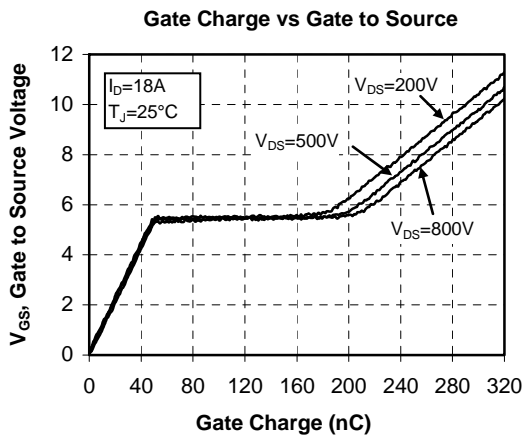
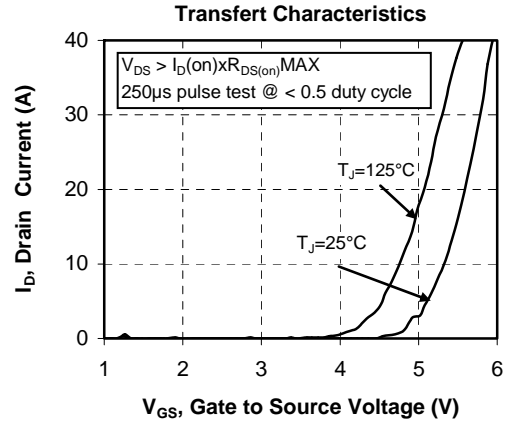
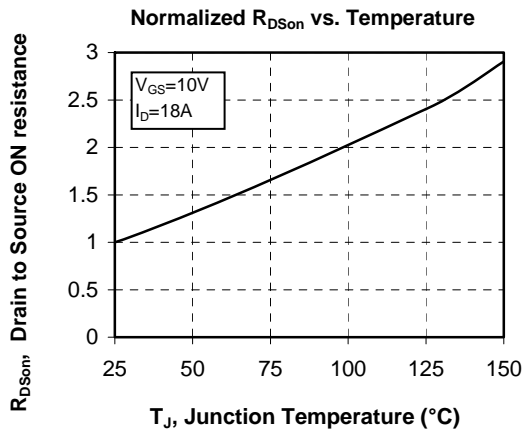
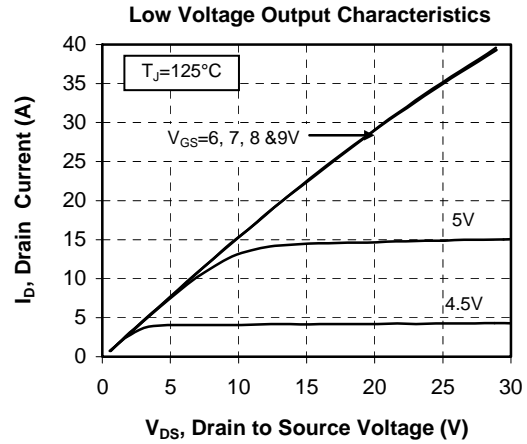
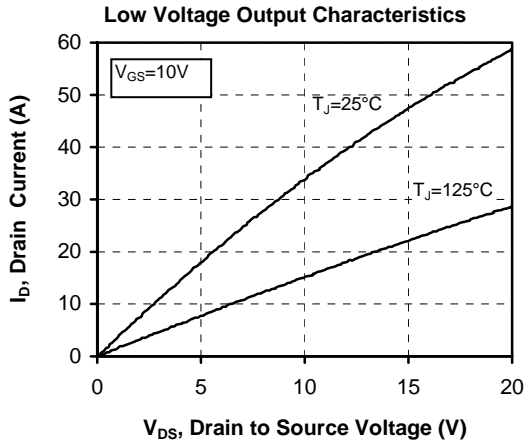
### SP1 Package outline (dimensions in mm)



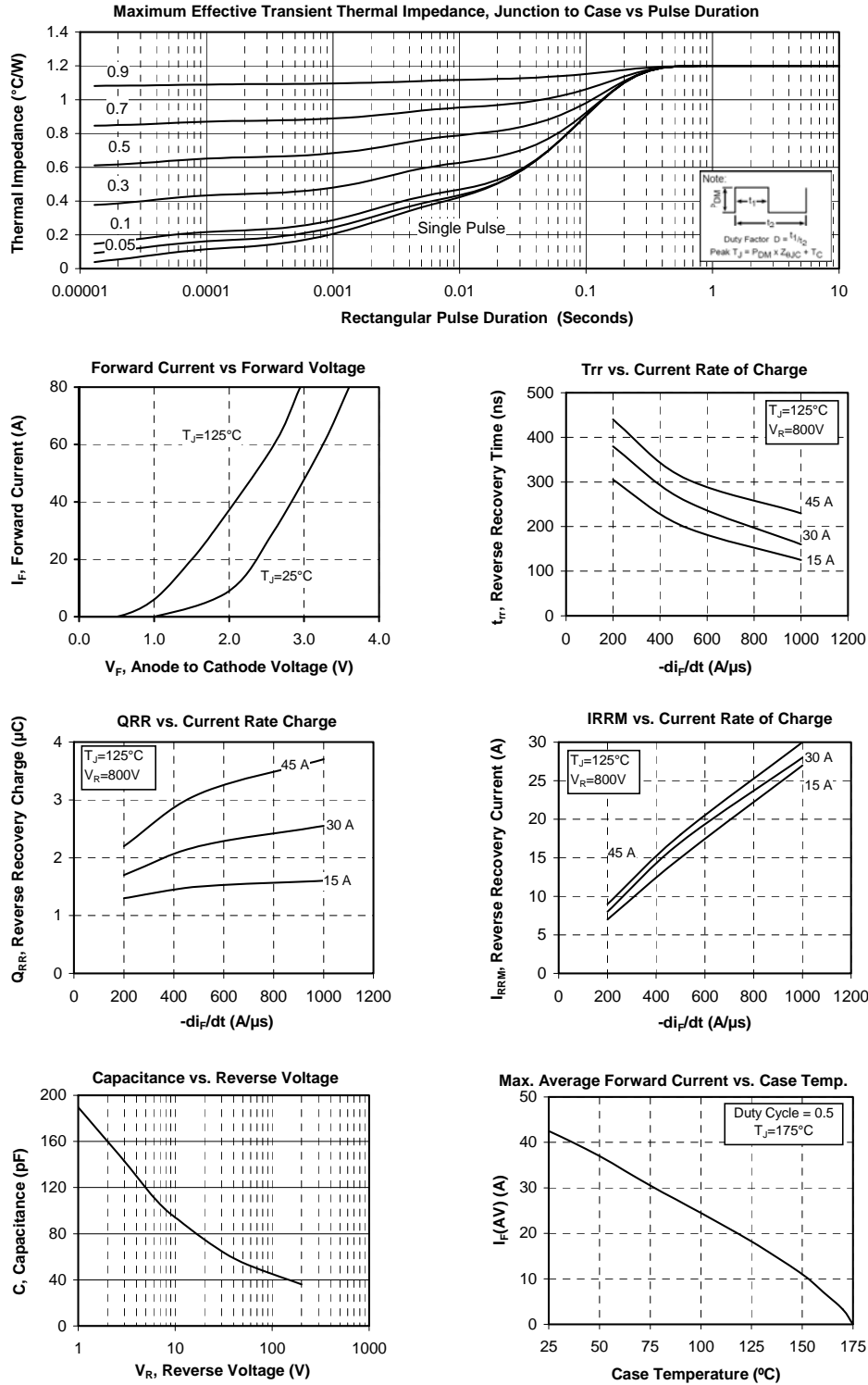
See application note 1904 - Mounting Instructions for SP1 Power Modules on [www.microsemi.com](http://www.microsemi.com)

### Typical Mosfet Performance Curve





## Typical Diode Performance Curve



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