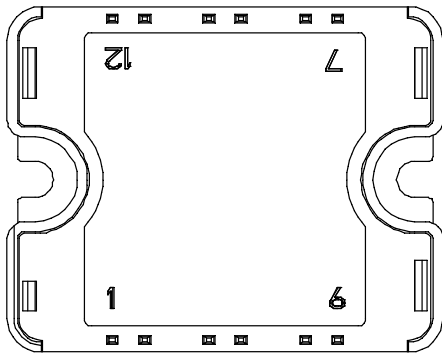
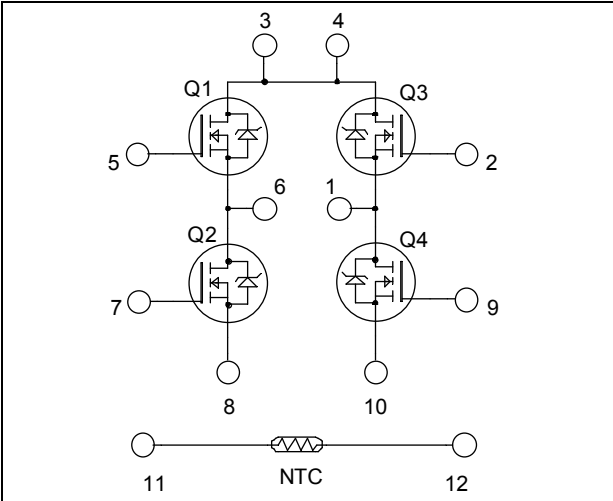


## Full - Bridge MOSFET Power Module

$V_{DSS} = 1200V$   
 $R_{DSon} = 1.4\Omega \text{ typ @ } T_j = 25^\circ C$   
 $I_D = 8A \text{ @ } T_c = 25^\circ C$



Pins 3/4 must be shorted together

### Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

### Features

- Power MOS 8™ Fast FREDFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic reverse diode
  - Avalanche energy rated
  - Very rugged
- Very low stray inductance
  - Symmetrical design
- 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
- Each leg can be easily paralleled to achieve a phase leg of twice the current capability
- RoHS Compliant

### Absolute maximum ratings

Symbol	Parameter	Max ratings	Unit
$V_{DSS}$	Drain - Source Breakdown Voltage	1200	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	8
		$T_c = 80^\circ C$	6
$I_{DM}$	Pulsed Drain current	50	A
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	1.68	$\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	208
$I_{AR}$	Avalanche current (repetitive and non repetitive)	7	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	$V_{DS} = 1200\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$			250	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$			1000	
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}, I_D = 7\text{A}$		1.4	1.68	$\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}, I_D = 1\text{mA}$	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	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$		3812		pF
$C_{oss}$	Output Capacitance			350		
$C_{rss}$	Reverse Transfer Capacitance			44		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 600\text{V}$ $I_D = 7\text{A}$		145		nC
$Q_{gs}$	Gate – Source Charge			24		
$Q_{gd}$	Gate – Drain Charge			70		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 7\text{A}$ $R_G = 4.7\Omega$		26		ns
$T_r$	Rise Time			15		
$T_{d(off)}$	Turn-off Delay Time			85		
$T_f$	Fall Time			24		

**Source - Drain diode ratings and characteristics**

Symbol	Characteristic	Test Conditions	Min	Typ	Max	Unit	
$I_S$	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$			8	A
			$T_c = 80^\circ\text{C}$			6	
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{V}, I_S = -7\text{A}$			1	V	
$dv/dt$	Peak Diode Recovery ①				25	V/ns	
$t_{rr}$	Reverse Recovery Time	$I_S = -7\text{A}$ $V_R = 100\text{V}$ $di_S/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$			250	ns
			$T_j = 125^\circ\text{C}$			520	
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$		1.12	$\mu\text{C}$	
			$T_j = 125^\circ\text{C}$		3.03		

 ①  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

$$I_S \leq -7\text{A} \quad di/dt \leq 1000\text{A}/\mu\text{s} \quad V_{DD} \leq 800\text{V} \quad T_j \leq 125^\circ\text{C}$$

## Thermal and package characteristics

Symbol	Characteristic	Min	Typ	Max	Unit	
R <sub>thJC</sub>	Junction to Case Thermal Resistance			0.6	°C/W	
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	M4	2	3	N.m
Wt	Package Weight			80		g

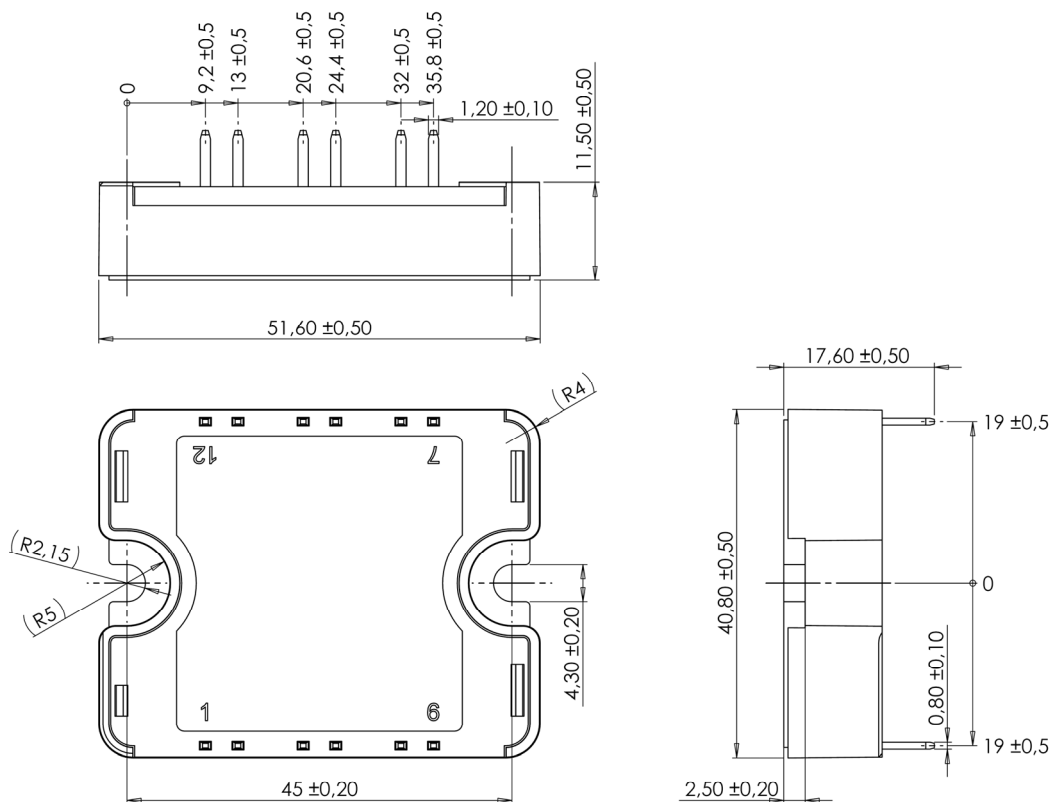
## Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

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

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

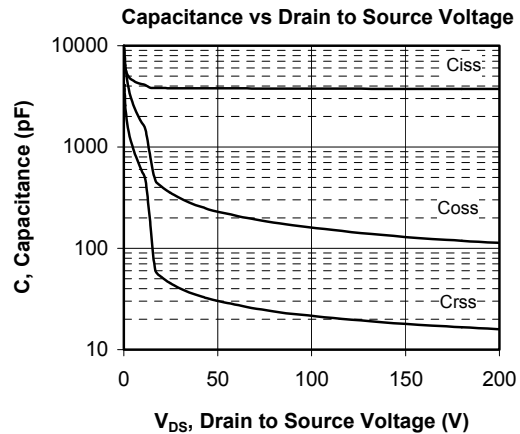
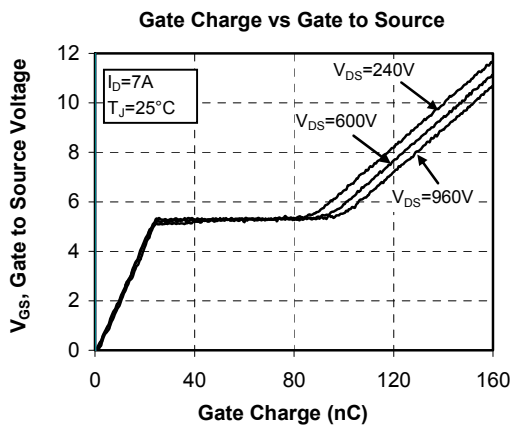
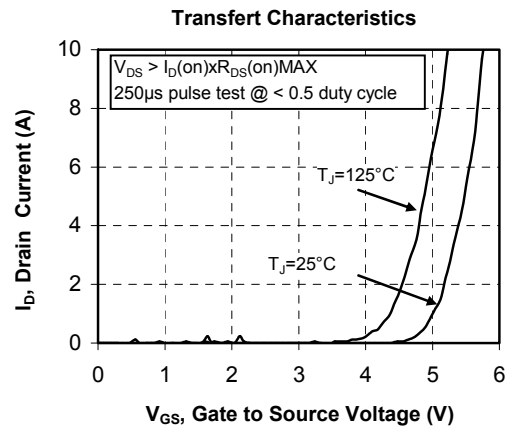
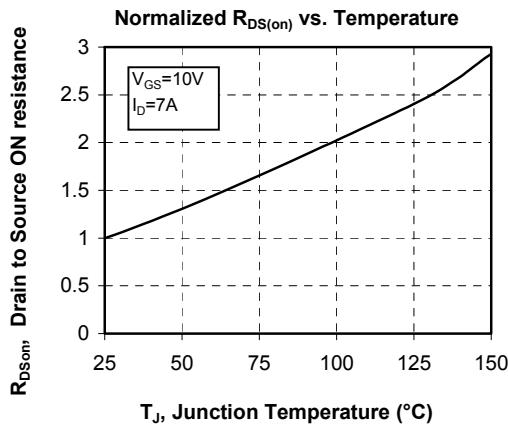
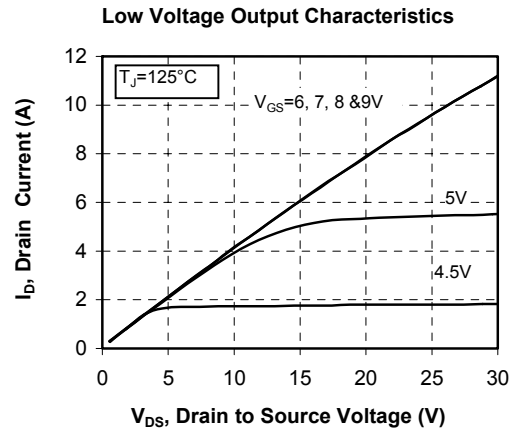
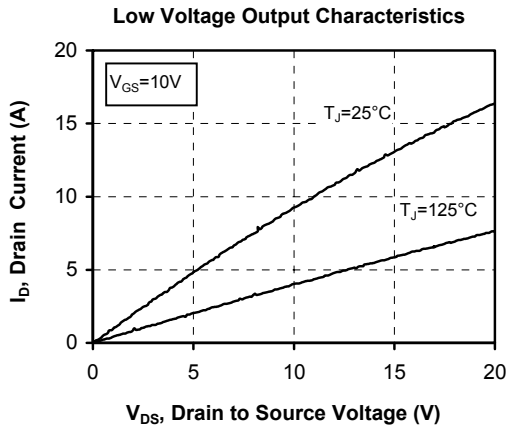
T: Thermistor temperature  
 R<sub>T</sub>: Thermistor value at T

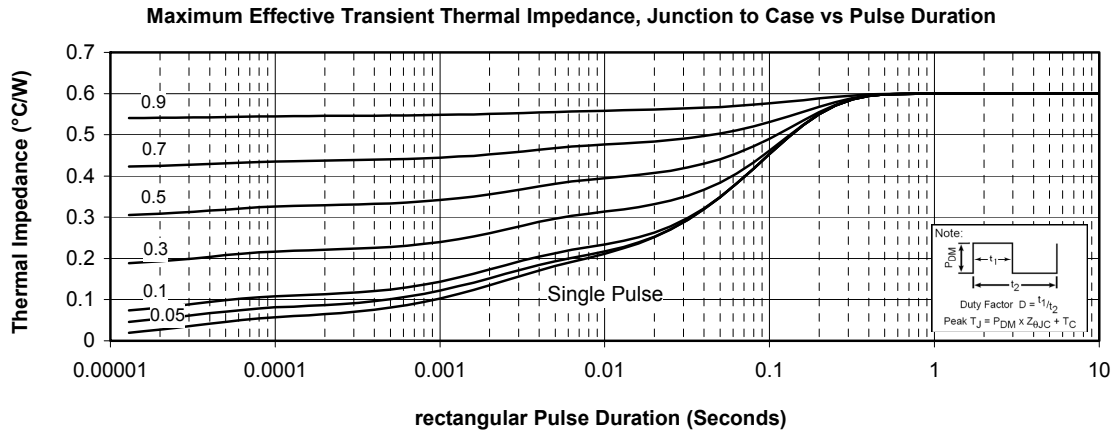
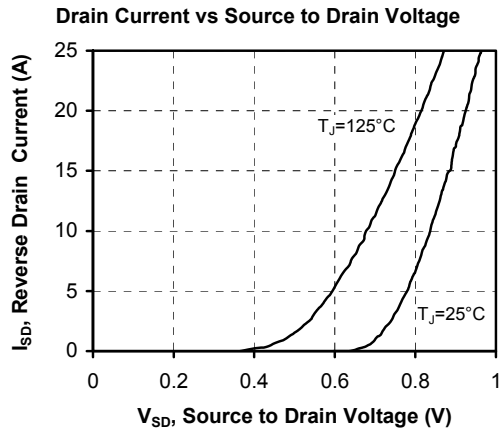
## SP1 Package outline (dimensions in mm)



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

## Typical Performance Curve





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