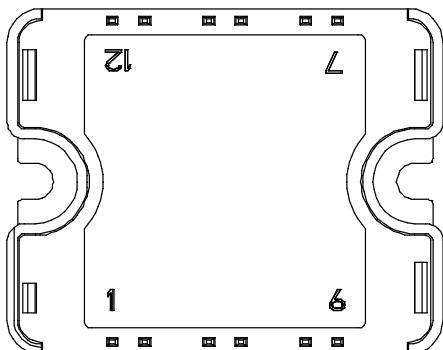
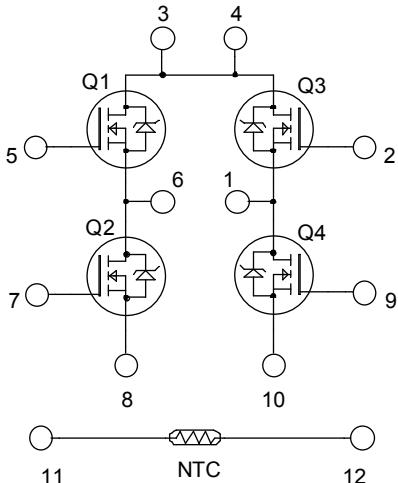


**Full - Bridge  
MOSFET Power Module**

**$V_{DSS} = 600V$**   
 **$R_{DSon} = 190m\Omega$  typ @  $T_j = 25^\circ C$**   
 **$I_D = 20A$  @  $T_c = 25^\circ C$**



Pins 3/4 must be shorted together

**Application**

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

**Features**

- Power MOS 8™ 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	600	V
$I_D$	Continuous Drain Current	$T_c = 25^\circ C$	20
		$T_c = 80^\circ C$	15
$I_{DM}$	Pulsed Drain current	125	
$V_{GS}$	Gate - Source Voltage	$\pm 30$	V
$R_{DSon}$	Drain - Source ON Resistance	230	$m\Omega$
$P_D$	Maximum Power Dissipation	$T_c = 25^\circ C$	208
$I_{AR}$	Avalanche current (repetitive and non repetitive)	17	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	$V_{DS} = 600\text{V}$ $V_{GS} = 0\text{V}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			250	$\mu\text{A}$	
						1000		
$R_{DS(on)}$	Drain – Source on Resistance	$V_{GS} = 10\text{V}$ , $I_D = 17\text{A}$			190	230	$\text{m}\Omega$	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS} = V_{DS}$ , $I_D = 1\text{mA}$		3	4	5	$\text{V}$	
$I_{GSS}$	Gate – Source Leakage Current	$V_{GS} = \pm 30\text{ V}$				$\pm 100$	$\text{nA}$	

**Dynamic Characteristics**

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit
$C_{iss}$	Input Capacitance	$V_{GS} = 0\text{V}$ $V_{DS} = 25\text{V}$ $f = 1\text{MHz}$			5316		$\text{pF}$
$C_{oss}$	Output Capacitance				610		
$C_{rss}$	Reverse Transfer Capacitance				56		
$Q_g$	Total gate Charge	$V_{GS} = 10\text{V}$ $V_{Bus} = 300\text{V}$ $I_D = 17\text{A}$			165		$\text{nC}$
$Q_{gs}$	Gate – Source Charge				36		
$Q_{gd}$	Gate – Drain Charge				70		
$T_{d(on)}$	Turn-on Delay Time	<b>Resistive switching @ <math>25^\circ\text{C}</math></b> $V_{GS} = 15\text{V}$ $V_{Bus} = 400\text{V}$ $I_D = 17\text{A}$ $R_G = 4.7\Omega$			37		$\text{ns}$
$T_r$	Rise Time				43		
$T_{d(off)}$	Turn-off Delay Time				115		
$T_f$	Fall Time				34		

**Source - Drain diode ratings and characteristics**

Symbol	Characteristic	Test Conditions		Min	Typ	Max	Unit	
$I_S$	Continuous Source current (Body diode)		$T_c = 25^\circ\text{C}$ $T_c = 80^\circ\text{C}$			20	$\text{A}$	
						15		
$V_{SD}$	Diode Forward Voltage	$V_{GS} = 0\text{V}$ , $I_S = - 17\text{A}$				1	$\text{V}$	
$dv/dt$	Peak Diode Recovery ①					30	$\text{V/ns}$	
$t_{rr}$	Reverse Recovery Time	$I_S = - 17\text{A}$ $V_R = 100\text{V}$ $di_S/dt = 100\text{A}/\mu\text{s}$	$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$			200	$\text{ns}$	
						370		
$Q_{rr}$	Reverse Recovery Charge		$T_j = 25^\circ\text{C}$ $T_j = 125^\circ\text{C}$		0.76		$\mu\text{C}$	
					1.91			

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

 $I_S \leq - 17\text{A}$     $di/dt \leq 1000\text{A}/\mu\text{s}$     $V_{DD} \leq 400\text{V}$     $T_j \leq 125^\circ\text{C}$

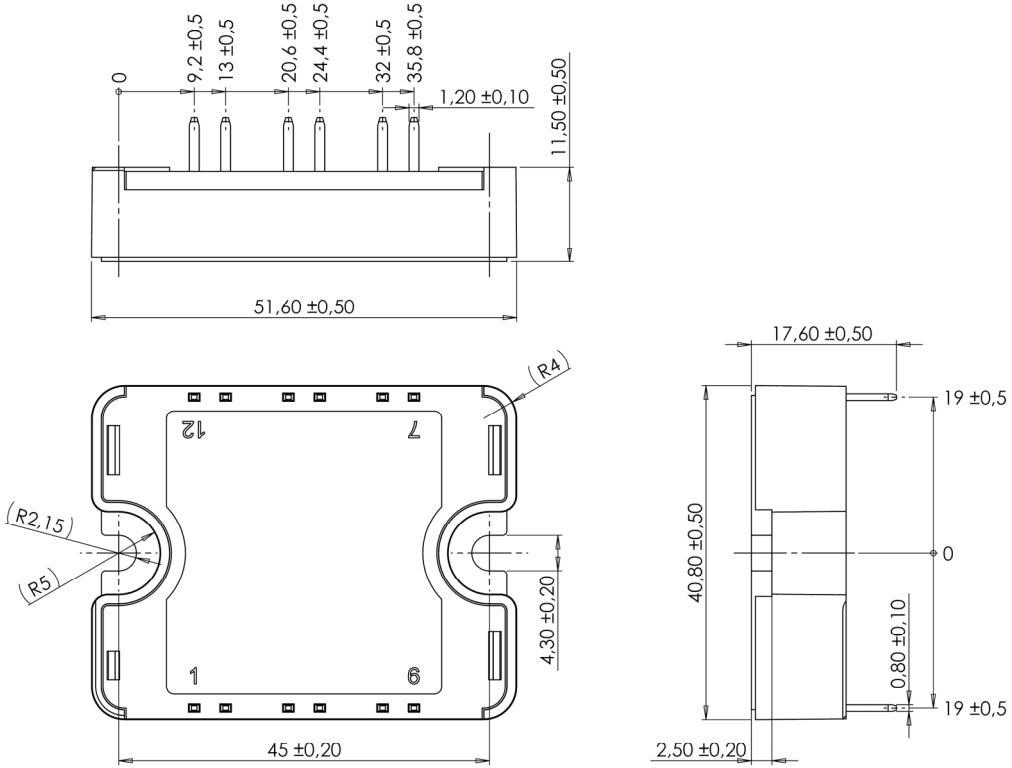
**Thermal and package characteristics**

Symbol	Characteristic		Min	Typ	Max	Unit
$R_{thJC}$	Junction to Case Thermal Resistance				0.6	°C/W
$V_{ISOL}$	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		100	
Torque	Mounting torque	To heatsink	M4	2	3	N.m
Wt	Package Weight				80	g

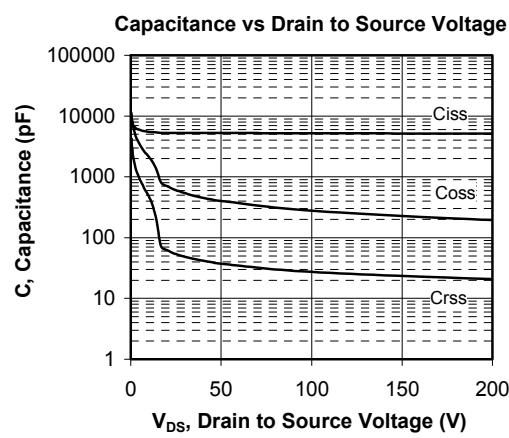
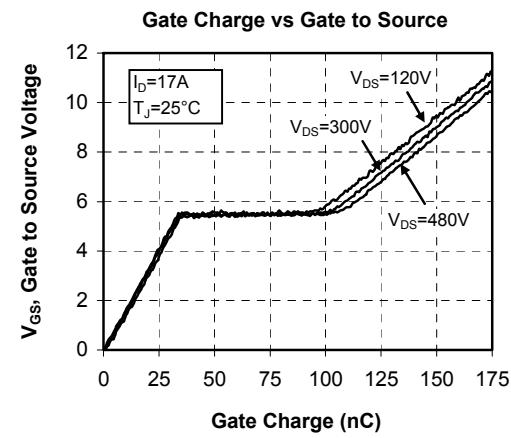
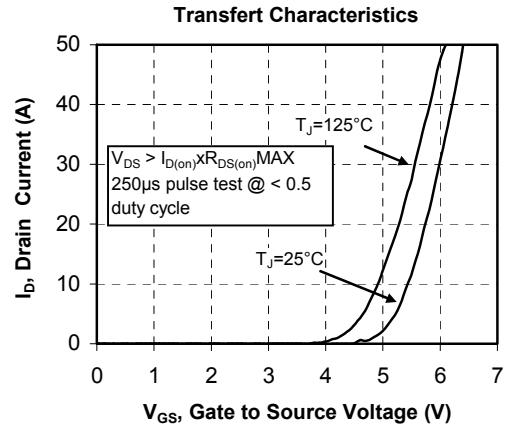
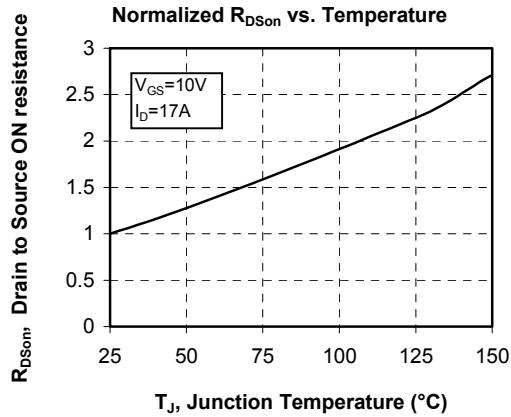
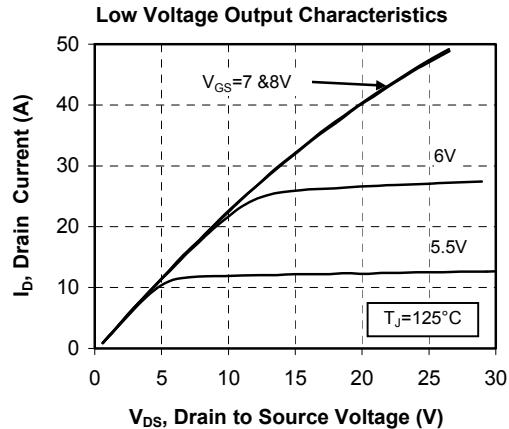
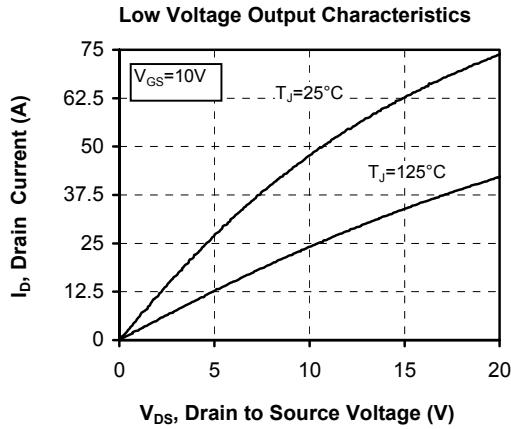
**Temperature sensor NTC** (see application note APT0406 on [www.microsemi.com](http://www.microsemi.com) for more information).

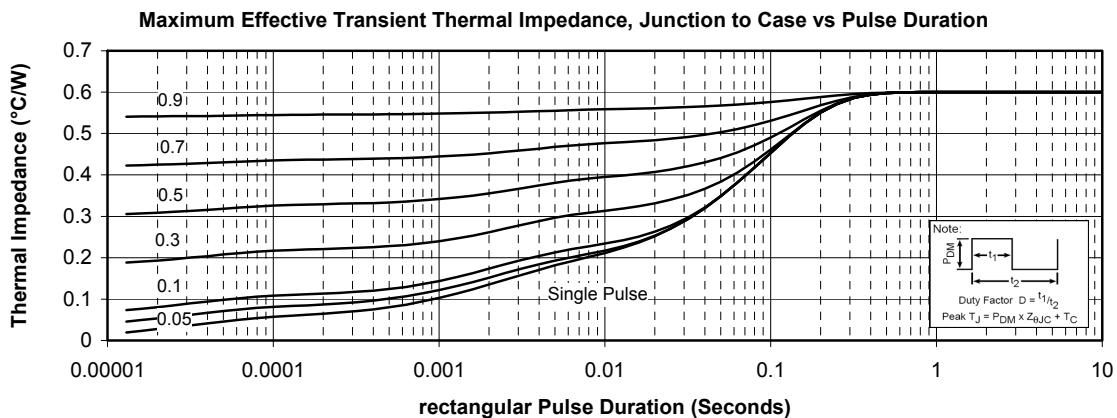
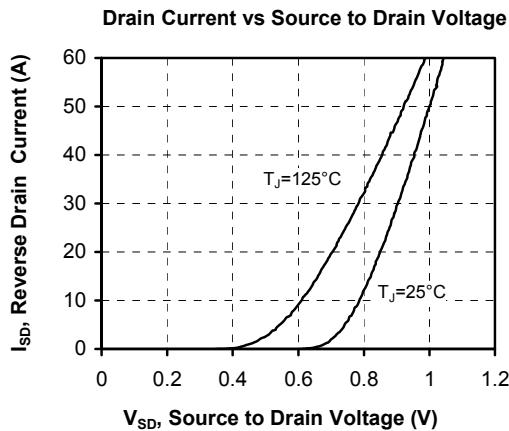
Symbol	Characteristic		Min	Typ	Max	Unit
$R_{25}$	Resistance @ 25°C			50		kΩ
$\Delta R_{25}/R_{25}$				5		%
$B_{25/85}$	$T_{25} = 298.15$ K			3952		K
$\Delta B/B$		$T_C=100^\circ\text{C}$		4		%

$$R_T = \frac{R_{25}}{\exp\left[B_{25/85}\left(\frac{1}{T_{25}} - \frac{1}{T}\right)\right]} \quad \begin{array}{l} \text{T: Thermistor temperature} \\ \text{R}_T: \text{Thermistor value at T} \end{array}$$

**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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