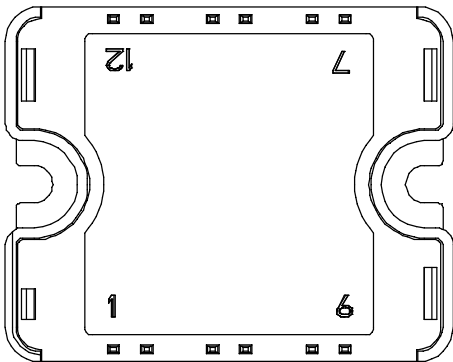
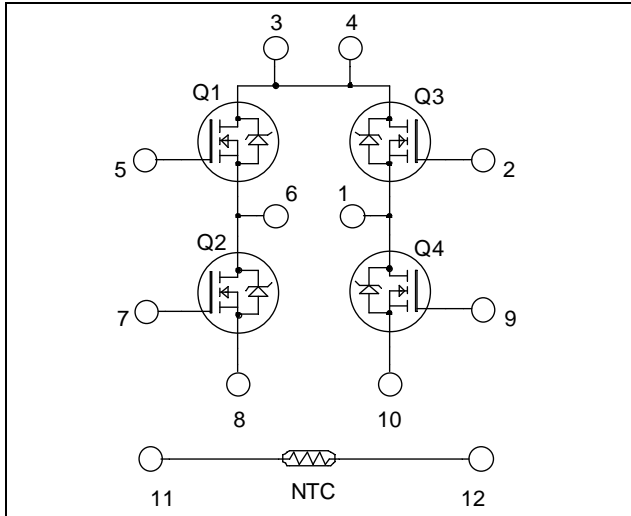


Full - Bridge MOSFET Power Module

$$V_{DSS} = 1200V$$

$$R_{DSon} = 1.4\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 8A \text{ @ } T_c = 25^\circ C$$



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 | |
| V_{GS} | Gate - Source Voltage | ± 30 | V |
| R_{DSon} | Drain - Source ON Resistance | 1.68 | Ω |
| 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

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 | μA |
| | | | $T_j = 125^\circ\text{C}$ | | | 1000 | |
| $R_{DS(on)}$ | Drain – Source on Resistance | $V_{GS} = 10\text{V}, I_D = 7\text{A}$ | | 1.4 | 1.68 | Ω | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 1\text{mA}$ | 3 | 4 | 5 | V | |
| I_{GSS} | Gate – Source Leakage Current | $V_{GS} = \pm 30\text{V}$ | | | ± 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 | Resistive switching @ 25°C $V_{GS} = 15\text{V}$ $V_{Bus} = 800\text{V}$ $I_D = 7\text{A}$ $R_G = 4.7\Omega$ | | 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 | μC | |
| | | | $T_j = 125^\circ\text{C}$ | | 3.03 | | |

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

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

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, I _{isol} < 1mA, 50/60Hz | 2500 | | | 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 | 2.5 | 4.7 | N.m |
| Wt | Package Weight | | | | 80 | g |

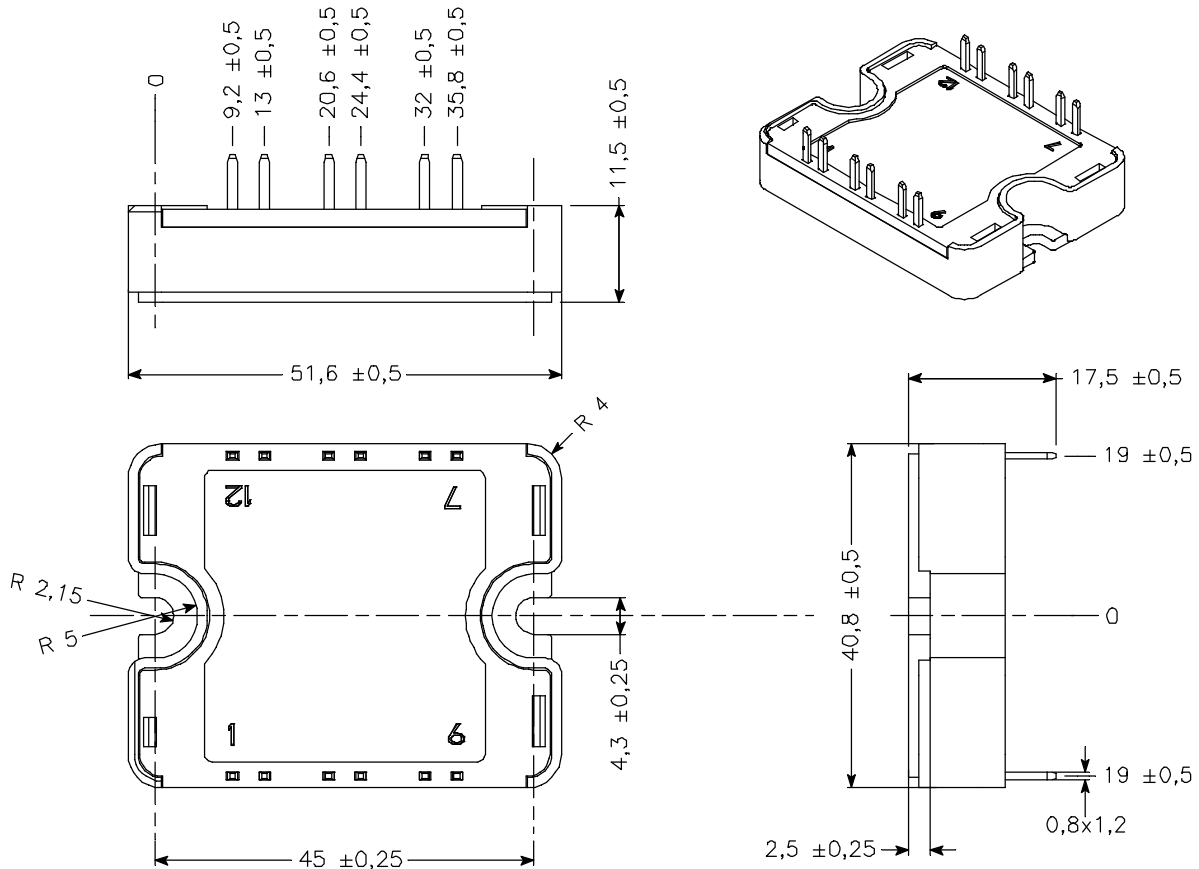
Temperature sensor NTC (see application note APT0406 on www.microsemi.com for more information).

| Symbol | Characteristic | Min | Typ | Max | Unit |
|--------------------|----------------------------|-----|------|-----|------|
| R ₂₅ | Resistance @ 25°C | | 50 | | kΩ |
| B _{25/85} | T ₂₅ = 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_T: Thermistor value at T

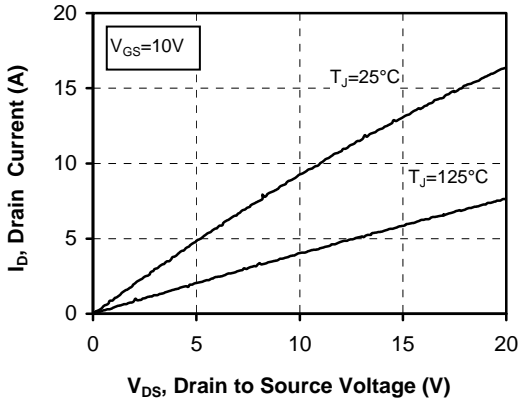
SP1 Package outline (dimensions in mm)



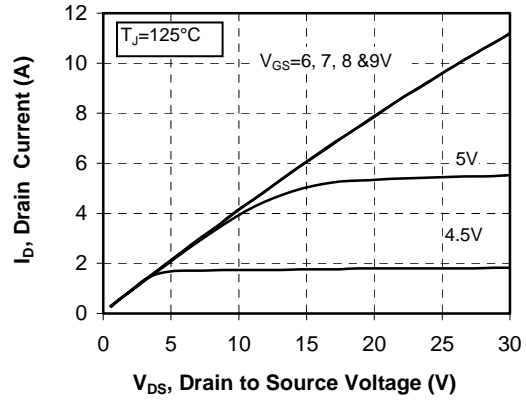
See application note 1904 - Mounting Instructions for SP1 Power Modules on www.microsemi.com

Typical Performance Curve

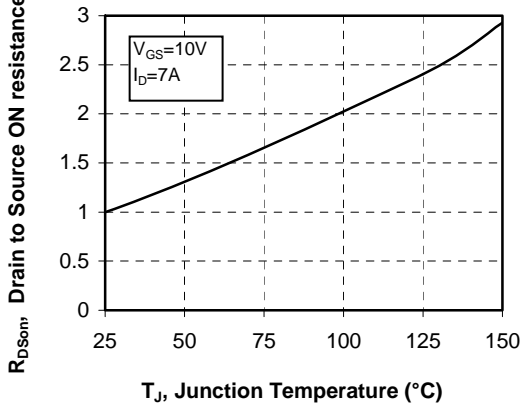
Low Voltage Output Characteristics



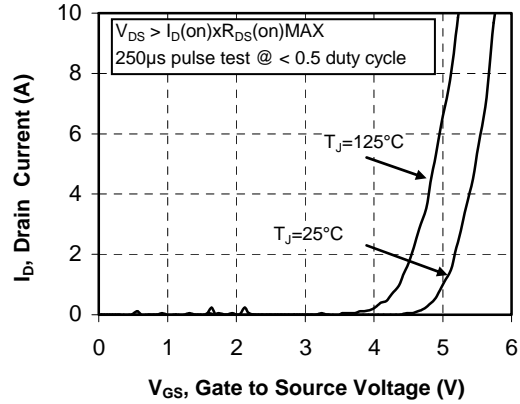
Low Voltage Output Characteristics



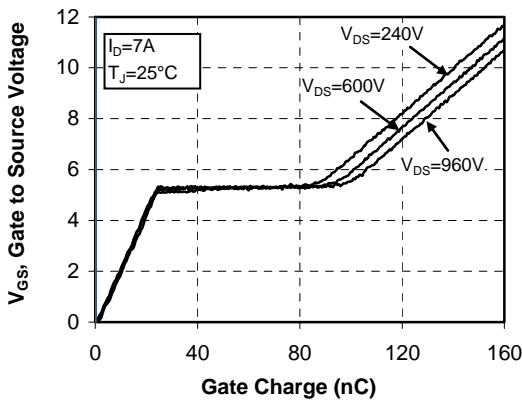
Normalized $R_{DS(on)}$ vs. Temperature



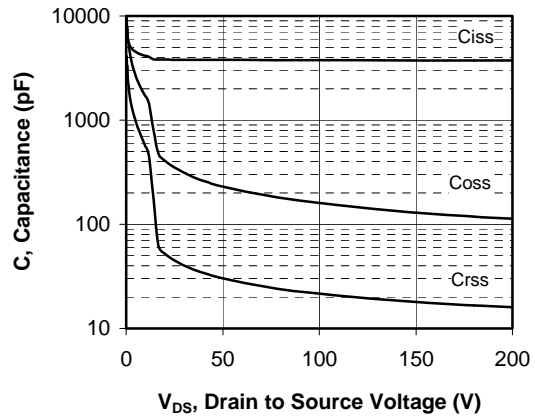
Transfer Characteristics

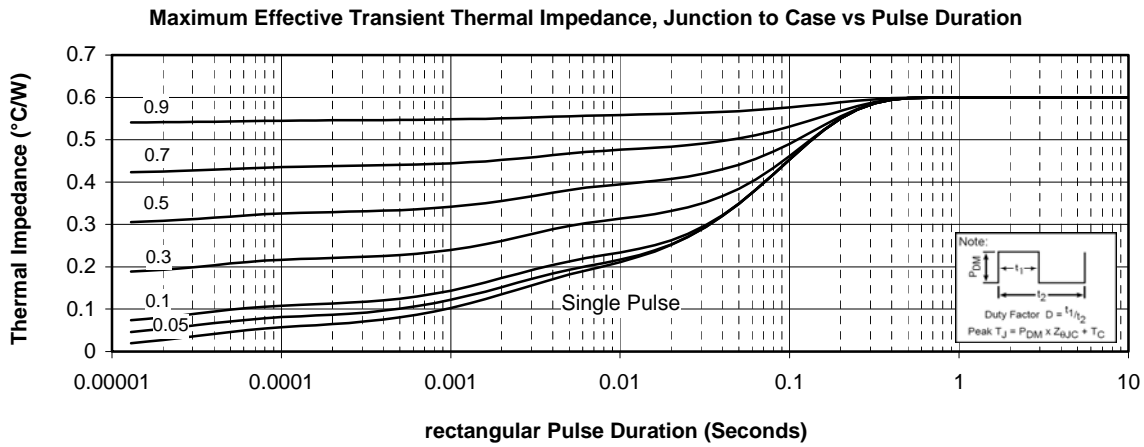
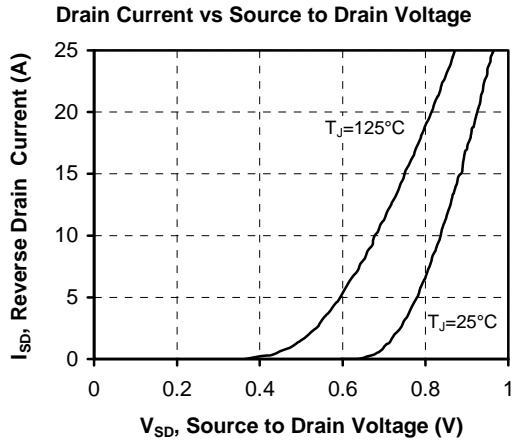


Gate Charge vs Gate to Source



Capacitance vs Drain to Source Voltage





Microsemi reserves the right to change, without notice, the specifications and information contained herein

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