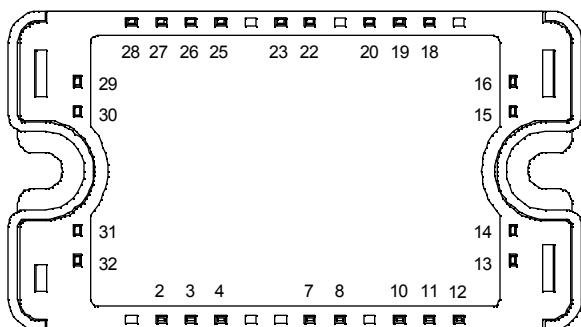
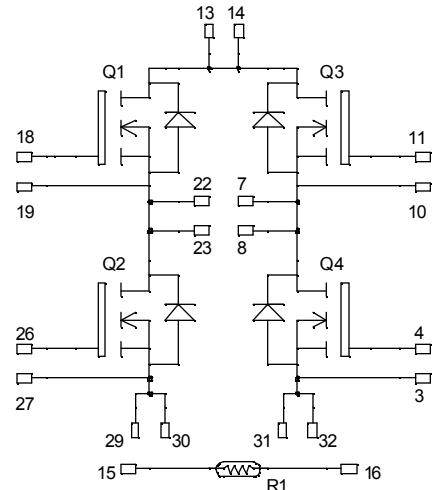




**Full - Bridge  
MOSFET Power Module**

**V<sub>DSS</sub> = 100V**  
**R<sub>DSon</sub> = 19mΩ typ @ T<sub>j</sub> = 25°C**  
**I<sub>D</sub> = 70A @ T<sub>c</sub> = 25°C**



All multiple inputs and outputs must be shorted together  
Example: 13/14 ; 29/30 ; 22/23 ...

**Absolute maximum ratings**

| Symbol            | Parameter   | Max ratings                                    | Unit     |
|-------------------|---|--|----------|
| V <sub>DSS</sub>  | Drain - Source Breakdown Voltage                  | 100  | V        |
| I <sub>D</sub>    | Continuous Drain Current                          | T <sub>c</sub> = 25°C<br>T <sub>c</sub> = 80°C | 70<br>50 |
| I <sub>DM</sub>   | Pulsed Drain current                              |  |          |
| V <sub>GS</sub>   | Gate - Source Voltage                             | ±30  | V        |
| R <sub>DSon</sub> | Drain - Source ON Resistance                      | 21   | mΩ       |
| P <sub>D</sub>    | Maximum Power Dissipation                         | T <sub>c</sub> = 25°C                          | 208      |
| I <sub>AR</sub>   | Avalanche current (repetitive and non repetitive) |  | A        |
| E <sub>AR</sub>   | Repetitive Avalanche Energy                       | 30   | mJ       |
| E <sub>AS</sub>   | Single Pulse Avalanche Energy                     | 1500   |          |

**CAUTION:** These Devices are sensitive to Electrostatic Discharge. Proper Handing 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 | $V_{GS} = 0\text{V}$ , $V_{DS} = 100\text{V}$     | $T_j = 25^\circ\text{C}$  |     |     | 250       | $\mu\text{A}$    |
|              |                                 | $V_{GS} = 0\text{V}$ , $V_{DS} = 80\text{V}$      | $T_j = 125^\circ\text{C}$ |     |     | 1000      |                  |
| $R_{DS(on)}$ | Drain – Source on Resistance    | $V_{GS} = 10\text{V}$ , $I_D = 35\text{A}$        |                           |     | 19  | 21        | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage          | $V_{GS} = V_{DS}$ , $I_D = 1\text{mA}$            |                           | 2   |     | 4         | $\text{V}$       |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 30\text{ V}$ , $V_{DS} = 0\text{V}$ |                           |     |     | $\pm 100$ | $\text{nA}$      |

### Dynamic Characteristics

| Symbol       | Characteristic               | Test Conditions  |  | Min  | Typ | Max | Unit          |
|--------------|------------------------------|--|--|------|-----|-----|---------------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0\text{V}$<br>$V_{DS} = 25\text{V}$<br>$f = 1\text{MHz}$   |  | 5100 |     |     | $\text{pF}$   |
| $C_{oss}$    | Output Capacitance           |  |  | 1900 |     |     |               |
| $C_{rss}$    | Reverse Transfer Capacitance |  |  | 800  |     |     |               |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10\text{V}$<br>$V_{Bus} = 100\text{V}$<br>$I_D = 70\text{A}$   |  | 200  |     |     | $\text{nC}$   |
| $Q_{gs}$     | Gate – Source Charge         |  |  | 40   |     |     |               |
| $Q_{gd}$     | Gate – Drain Charge          |  |  | 92   |     |     |               |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ 125°C</b><br>$V_{GS} = 15\text{V}$<br>$V_{Bus} = 66\text{V}$<br>$I_D = 70\text{A}$<br>$R_G = 5\Omega$ |  | 35   |     |     | $\text{ns}$   |
| $T_r$        | Rise Time                    |  |  | 70   |     |     |               |
| $T_{d(off)}$ | Turn-off Delay Time          |  |  | 95   |     |     |               |
| $T_f$        | Fall Time                    |  |  | 125  |     |     |               |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ 25°C</b><br>$V_{GS} = 15\text{V}$ , $V_{Bus} = 66\text{V}$<br>$I_D = 70\text{A}$ , $R_G = 5\Omega$    |  | 276  |     |     | $\mu\text{J}$ |
| $E_{off}$    | Turn-off Switching Energy    |  |  | 302  |     |     |               |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ 125°C</b><br>$V_{GS} = 15\text{V}$ , $V_{Bus} = 66\text{V}$<br>$I_D = 70\text{A}$ , $R_G = 5\Omega$   |  | 304  |     |     | $\mu\text{J}$ |
| $E_{off}$    | Turn-off Switching Energy    |  |  | 320  |     |     |               |

### Source - Drain diode ratings and characteristics

| Symbol   | Characteristic                            | Test Conditions  |                           | Min | Typ | Max | Unit          |
|----------|---|--|---------------------------|-----|-----|-----|---------------|
| $I_S$    | Continuous Source current<br>(Body diode) |  | $T_c = 25^\circ\text{C}$  |     |     | 70  | $\text{A}$    |
|          |   |  | $T_c = 80^\circ\text{C}$  |     |     | 50  |               |
| $V_{SD}$ | Diode Forward Voltage                     | $V_{GS} = 0\text{V}$ , $I_S = -70\text{A}$   |                           |     |     | 1.3 | $\text{V}$    |
| $dv/dt$  | Peak Diode Recovery ①                     |  |                           |     |     | 5   | $\text{V/ns}$ |
| $t_{rr}$ | Reverse Recovery Time                     | $I_S = -70\text{A}$<br>$V_{Bus} = 66\text{V}$<br>$dI/dt = 100\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$  |     |     | 200 | $\text{ns}$   |
|          |   |  | $T_j = 125^\circ\text{C}$ |     |     | 350 |               |
| $Q_{rr}$ | Reverse Recovery Charge                   |  | $T_j = 25^\circ\text{C}$  |     | 0.5 |     | $\mu\text{C}$ |
|          |   |  | $T_j = 125^\circ\text{C}$ |     | 1   |     |               |

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

$I_S \leq -70\text{A}$     $di/dt \leq 700\text{A}/\mu\text{s}$     $V_R \leq V_{DSS}$     $T_j \leq 150^\circ\text{C}$



### Thermal and package characteristics

Symbol    Characteristic

| 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 |     |      |
| $T_{STG}$  | Storage Temperature Range  | -40         |     | 125 |     | °C   |
| $T_C$      | Operating Case Temperature   | -40         |     | 100 |     |      |
| Torque     | Mounting torque  | To heatsink | M4  | 2.5 | 4.7 | N.m  |
| Wt         | Package Weight   |             |     | 110 |     | g    |

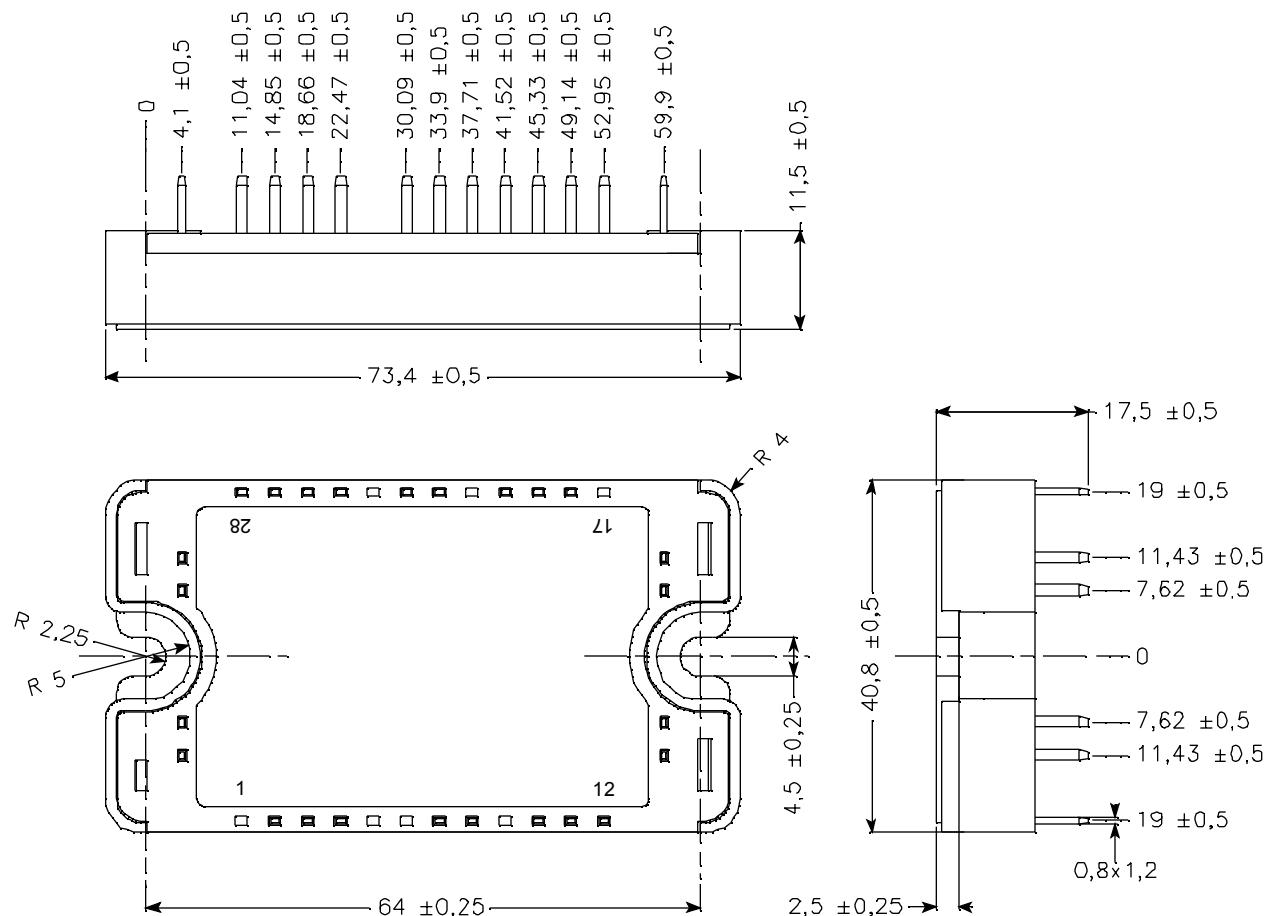
**Temperature sensor NTC** (see application note APT0406 on www.microsemi.com for more information).

Symbol    Characteristic

| Symbol      | Characteristic              |  | Min | Typ  | Max | Unit |
|-------------|-----------------------------|--|-----|------|-----|------|
| $R_{25}$    | Resistance @ 25°C           |  |     | 50   |     | kΩ   |
| $B_{25/85}$ | $T_{25} = 298.15 \text{ K}$ |  |     | 3952 |     | K    |

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

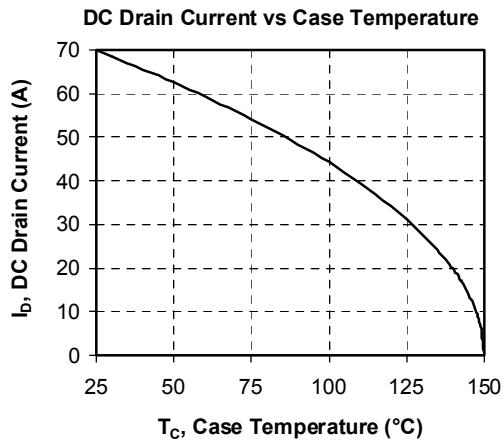
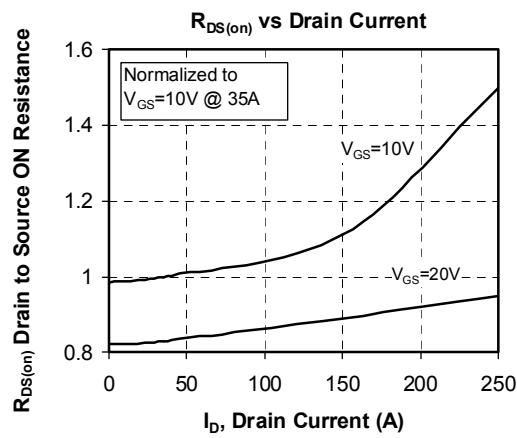
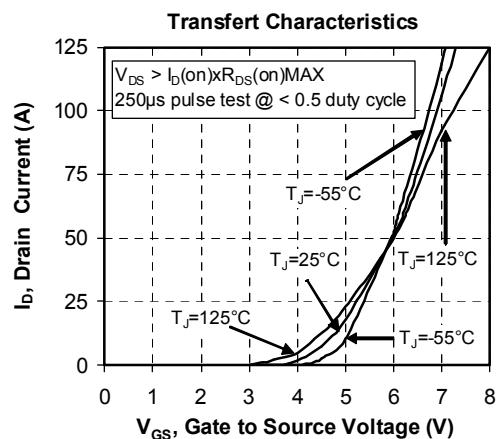
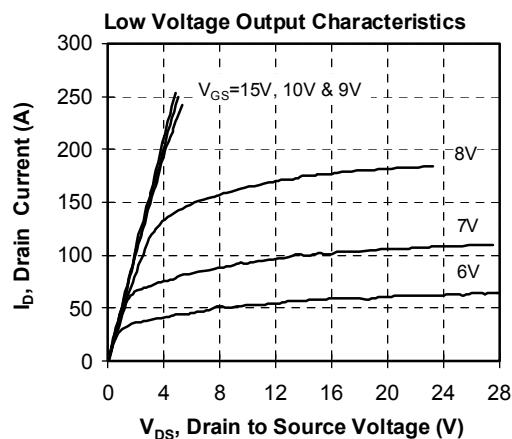
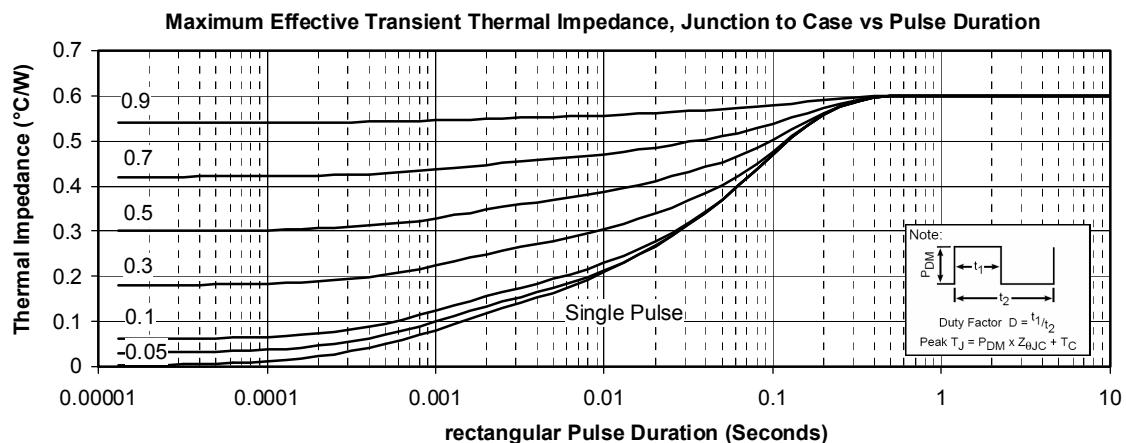
### SP3 Package outline (dimensions in mm)

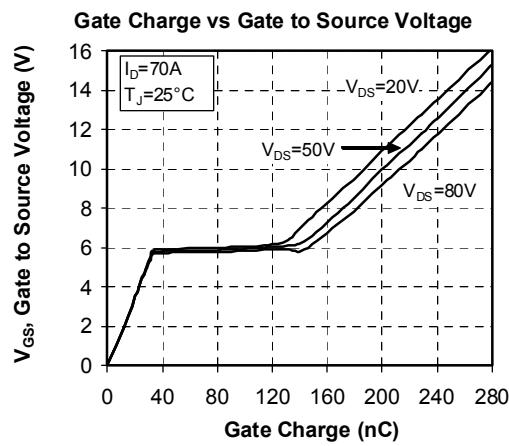
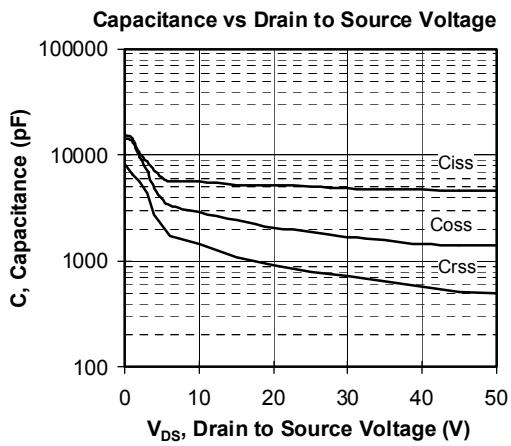
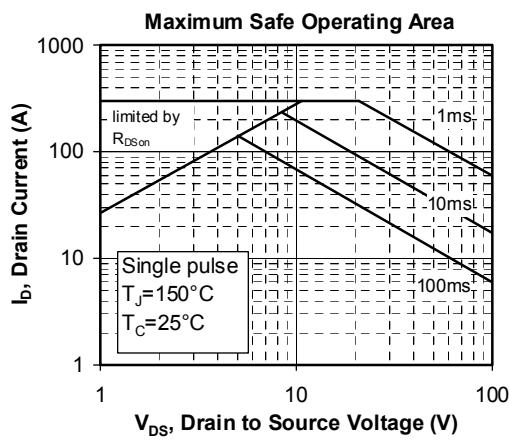
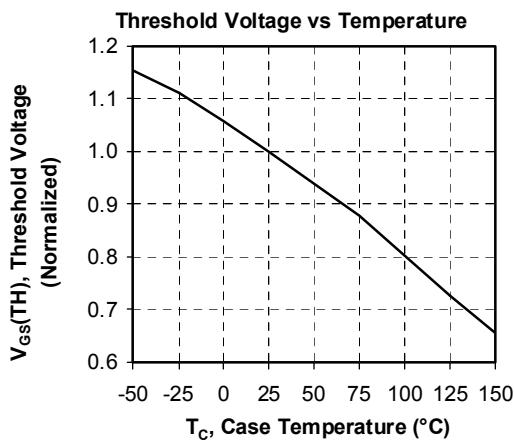
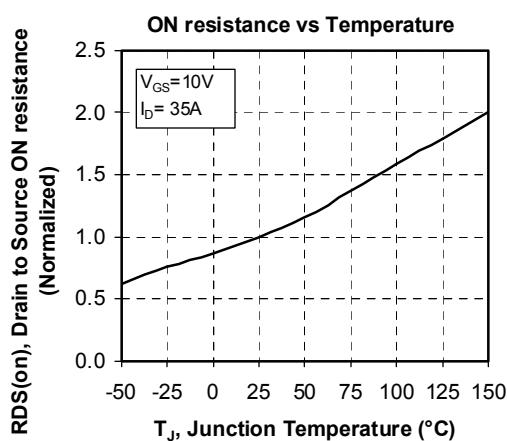
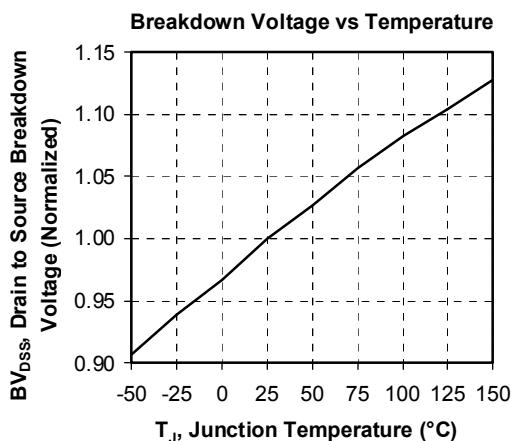


See application note 1901 - Mounting Instructions for SP3 Power Modules on [www.microsemi.com](http://www.microsemi.com)



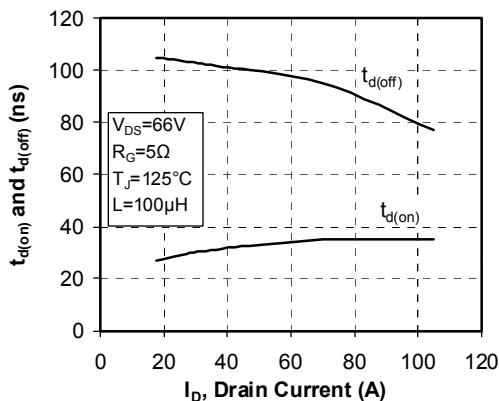
### Typical Performance Curve



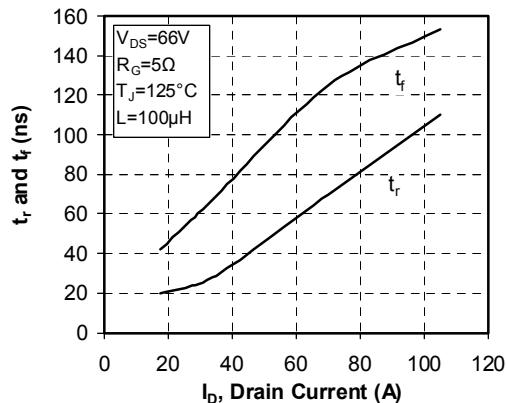




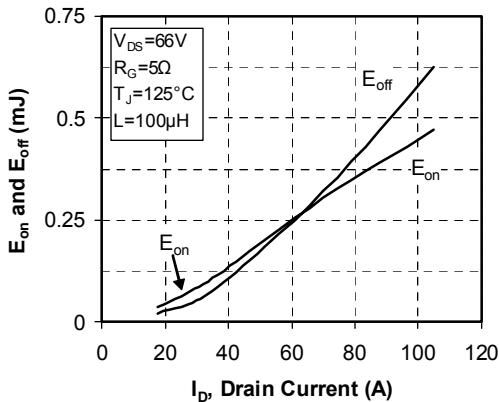
**Delay Times vs Current**



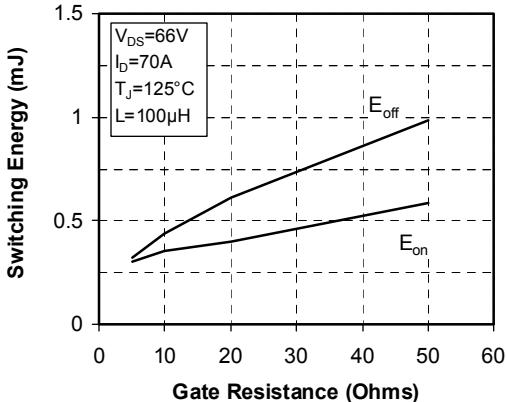
**Rise and Fall times vs Current**



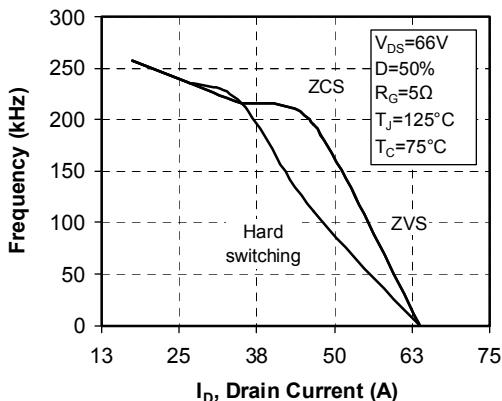
**Switching Energy vs Current**



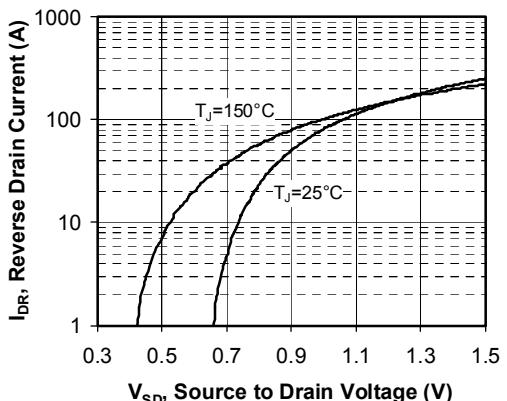
**Switching Energy vs Gate Resistance**



**Operating Frequency vs Drain Current**



**Source to Drain Diode Forward Voltage**



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

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.



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