



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 | $V_{GS} = 0V, V_{DS} = 100V$         |     |      | 400       | $\mu\text{A}$    |
|              |                                 | $V_{GS} = 0V, V_{DS} = 80V$          |     |      | 2000      |                  |
| $R_{DS(on)}$ | Drain – Source on Resistance    | $V_{GS} = 10V, I_D = 200A$           |     | 2.25 | 2.5       | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage          | $V_{GS} = V_{DS}, I_D = 10\text{mA}$ | 2   |      | 4         | V                |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 30V, V_{DS} = 0V$      |     |      | $\pm 400$ | nA               |

**Dynamic Characteristics**

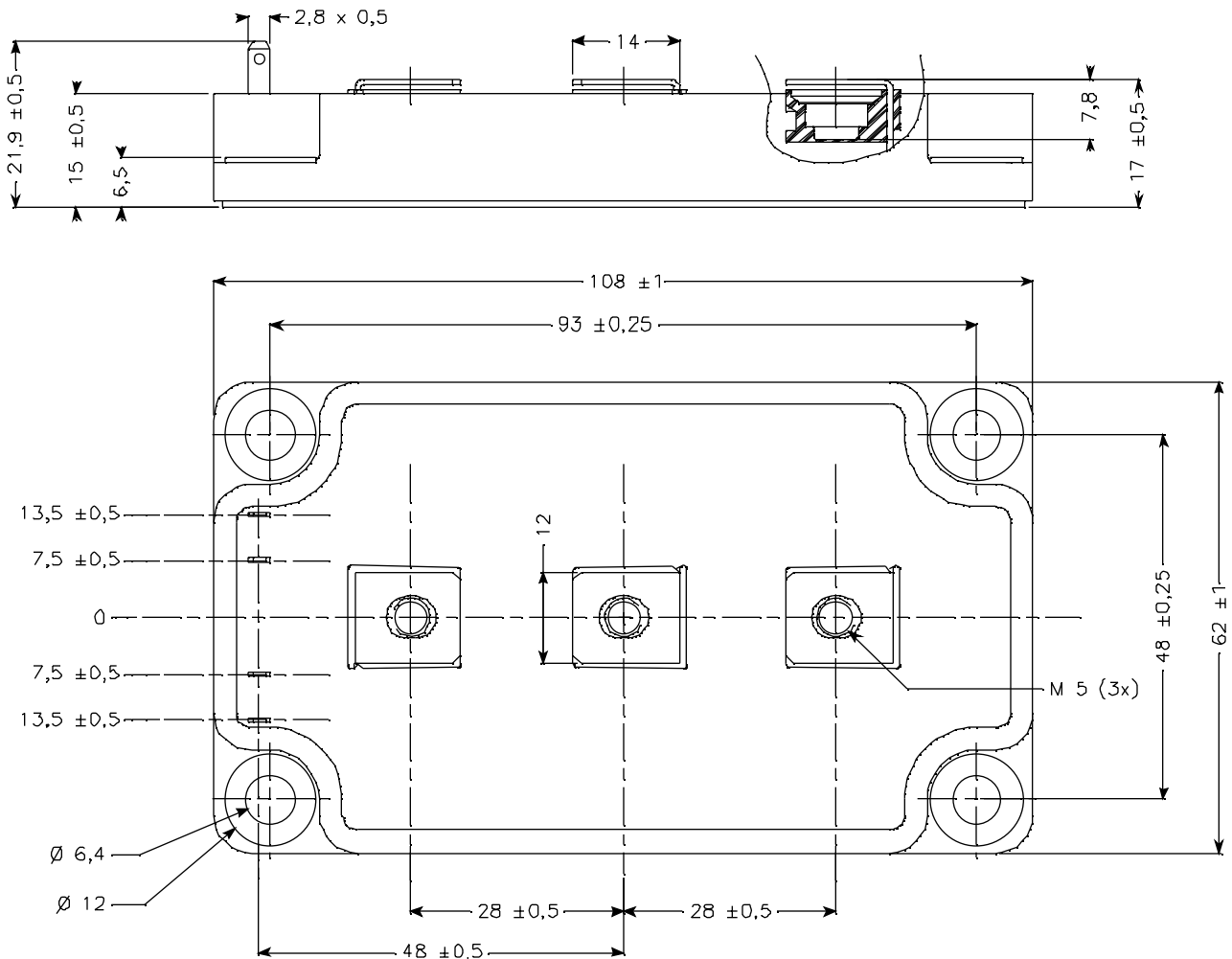
| Symbol       | Characteristic               | Test Conditions  | Min | Typ  | Max | Unit |
|--------------|------------------------------|--|-----|------|-----|------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$  |     | 40   |     | nF   |
| $C_{oss}$    | Output Capacitance           | $V_{DS} = 25V$   |     | 15.7 |     |      |
| $C_{rss}$    | Reverse Transfer Capacitance | $f = 1\text{MHz}$  |     | 5.9  |     |      |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10V$   |     | 1360 |     | nC   |
| $Q_{gs}$     | Gate – Source Charge         | $V_{Bus} = 50V$  |     | 240  |     |      |
| $Q_{gd}$     | Gate – Drain Charge          | $I_D = 400A$   |     | 720  |     |      |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V$<br>$V_{Bus} = 66V$<br>$I_D = 400A$<br>$R_G = 1.25\Omega$ |     | 160  |     | ns   |
| $T_r$        | Rise Time                    |  |     | 240  |     |      |
| $T_{d(off)}$ | Turn-off Delay Time          |  |     | 500  |     |      |
| $T_f$        | Fall Time                    |  |     | 160  |     |      |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 66V$<br>$I_D = 400A, R_G = 1.25\Omega$          |     | 2.2  |     | mJ   |
| $E_{off}$    | Turn-off Switching Energy    |  |     | 2.41 |     |      |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 66V$<br>$I_D = 400A, R_G = 1.25\Omega$         |     | 2.43 |     | mJ   |
| $E_{off}$    | Turn-off Switching Energy    |  |     | 2.56 |     |      |

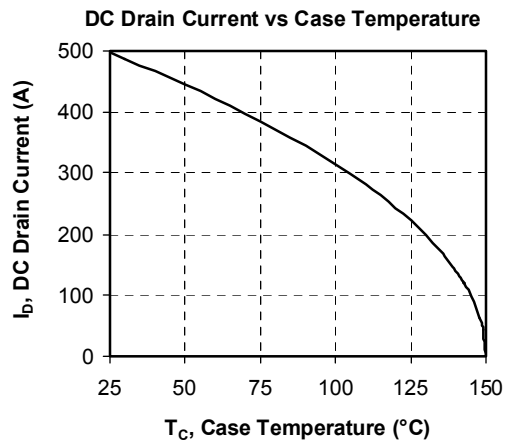
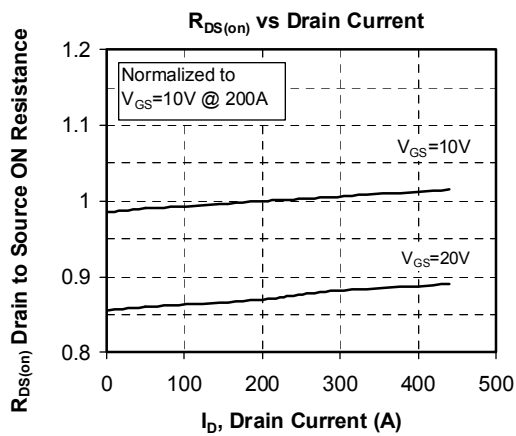
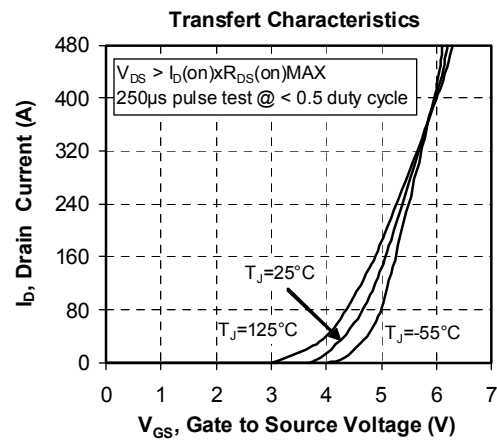
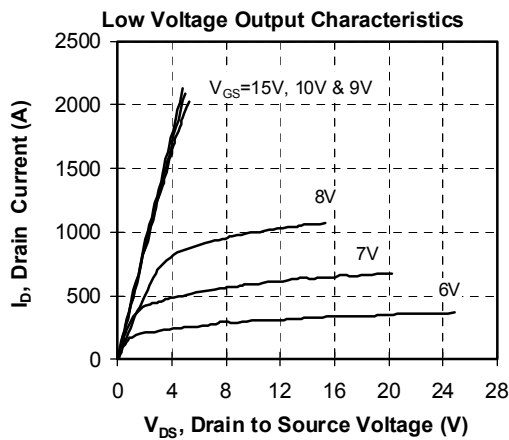
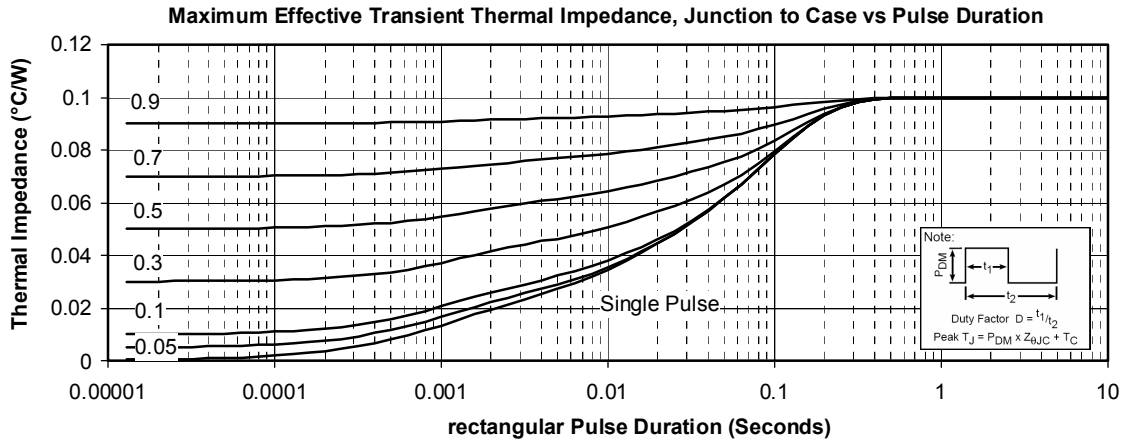
**Chopper diode ratings and characteristics**

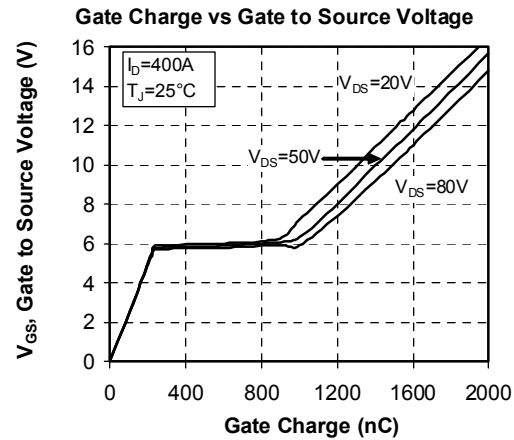
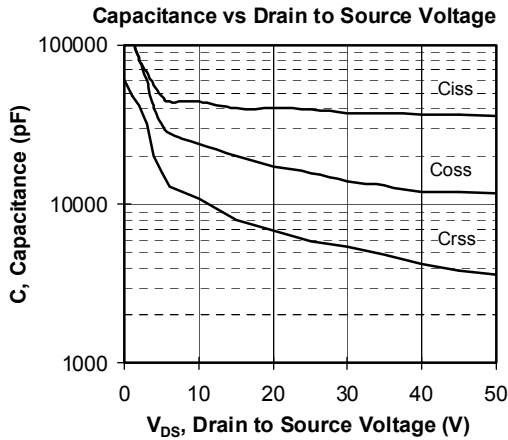
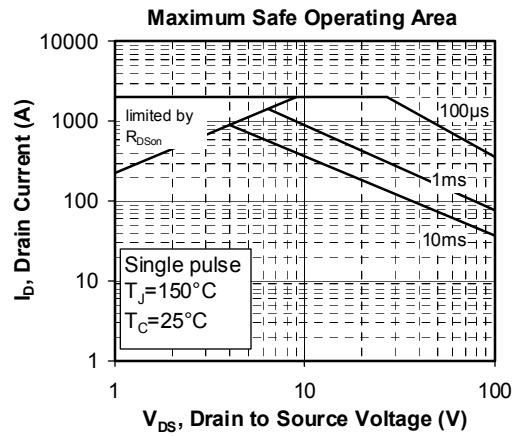
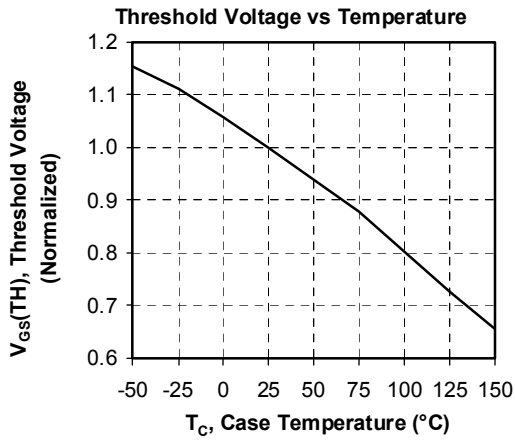
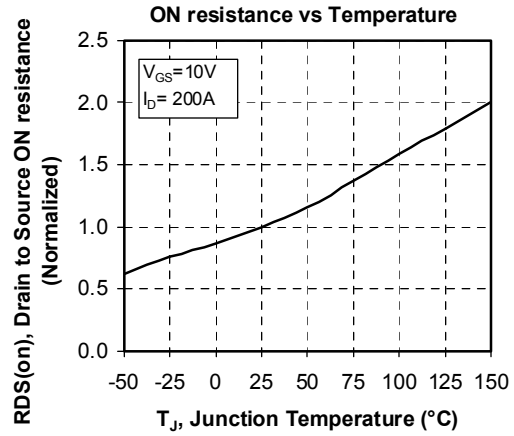
| Symbol    | Characteristic                          | Test Conditions  | Min                       | Typ | Max  | Unit          |
|-----------|---|--|---------------------------|-----|------|---------------|
| $V_{RRM}$ | Maximum Peak Repetitive Reverse Voltage |  | 200                       |     |      | V             |
| $I_{RM}$  | Maximum Reverse Leakage Current         | $V_R = 200V$   | $T_j = 25^\circ\text{C}$  |     | 750  | $\mu\text{A}$ |
|           |   |  | $T_j = 125^\circ\text{C}$ |     | 1000 |               |
| $I_F$     | DC Forward Current                      | $T_c = 80^\circ\text{C}$                                   |                           | 400 |      | A             |
| $V_F$     | Diode Forward Voltage                   | $I_F = 400A$   |                           | 1   |      | V             |
|           |   | $I_F = 800A$   |                           | 1.4 |      |               |
|           |   | $I_F = 400A$   | $T_j = 125^\circ\text{C}$ |     | 0.9  |               |
| $t_{rr}$  | Reverse Recovery Time                   | $I_F = 400A$<br>$V_R = 133V$<br>$di/dt = 800A/\mu\text{s}$ | $T_j = 25^\circ\text{C}$  |     | 60   | ns            |
|           | $T_j = 125^\circ\text{C}$               |  |                           | 110 |      |               |
| $Q_{rr}$  | Reverse Recovery Charge                 |  | $T_j = 25^\circ\text{C}$  |     | 800  | nC            |
|           |   |  | $T_j = 125^\circ\text{C}$ |     | 3360 |               |

**Thermal and package characteristics**
*Symbol Characteristic*

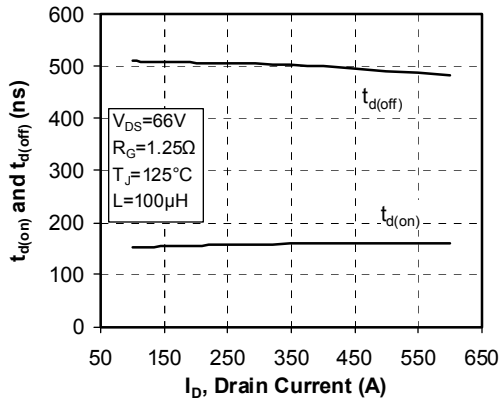
|            |   |               | <i>Min</i> | <i>Typ</i> | <i>Max</i> | <i>Unit</i> |
|------------|---|---------------|------------|------------|------------|-------------|
| $R_{thJC}$ | Junction to Case Thermal Resistance   | Transistor    |            |            | 0.1        | °C/W        |
|            |   | Diode         |            |            | 0.14       |             |
| $V_{ISOL}$ | RMS Isolation Voltage, any terminal to case $t=1$ min, $I_{Isol}<1$ mA, 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   | M6         | 3          | 5          | N.m         |
|            |   | For terminals | M5         | 2          | 3.5        |             |
| Wt         | Package Weight  |               |            |            | 280        | g           |

**SP6 Package outline (dimensions in mm)**

 See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

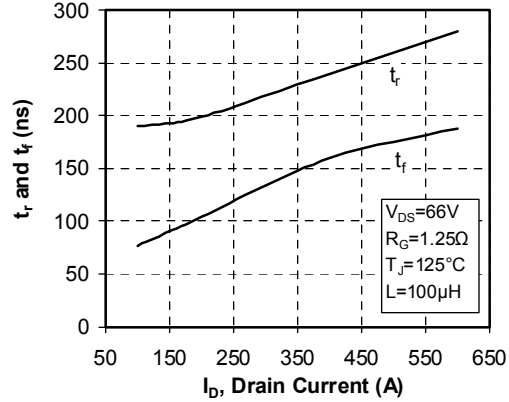
**Typical Performance Curve**




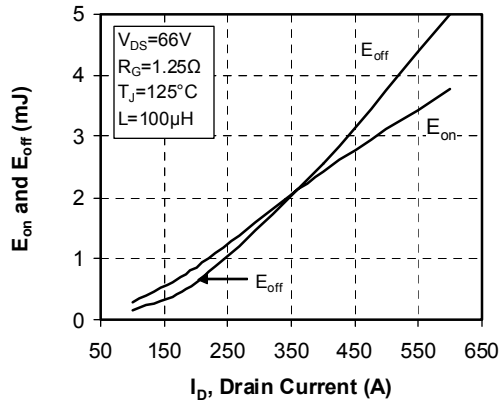
**Delay Times vs Current**



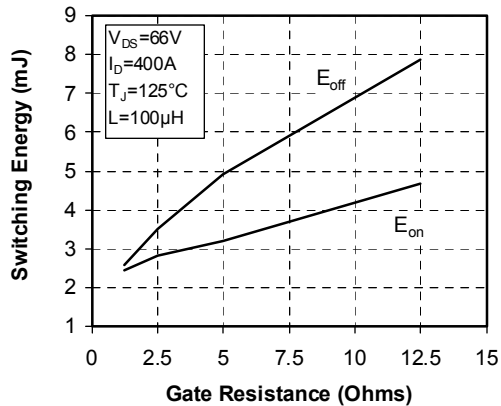
**Rise and Fall times vs Current**



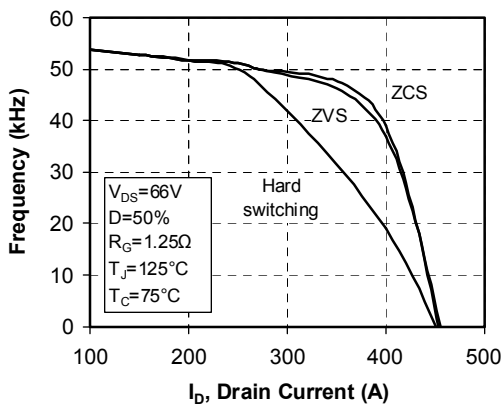
**Switching Energy vs Current**



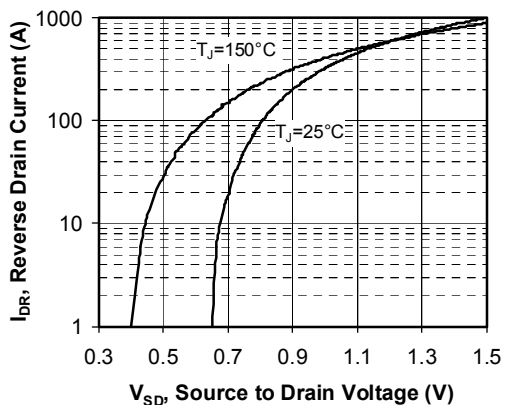
**Switching Energy vs Gate Resistance**



**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.