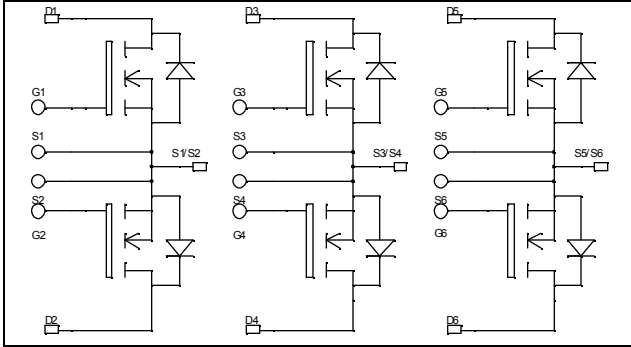


## Triple dual common source MOSFET Power Module

$V_{DSS} = 100V$   
 $R_{DSon} = 19m\Omega \text{ typ @ } T_j = 25^\circ C$   
 $I_D = 70A \text{ @ } T_c = 25^\circ C$

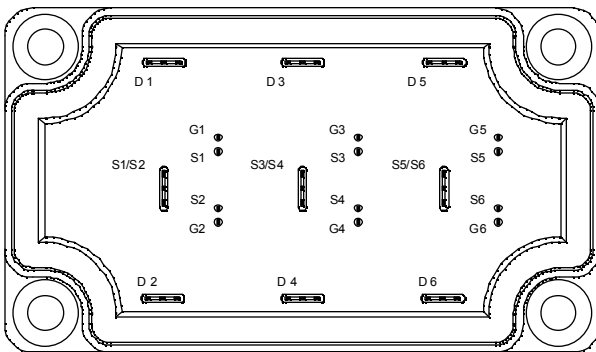


### Application

- AC Switches
- Switched Mode Power Supplies
- Uninterruptible Power Supplies

### Features

- Power MOS V<sup>®</sup> MOSFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Avalanche energy rated
  - Very rugged
- Kelvin source for easy drive
- Very low stray inductance
  - Symmetrical design
  - Lead frames for power connections
- 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
- Very low (12mm) profile
- Each leg can be easily paralleled to achieve a dual common source configuration of three times the current capability
- RoHS Compliant

### Absolute maximum ratings

| Symbol     | Parameter   | Max ratings        | Unit      |
|------------|---|--------------------|-----------|
| $V_{DSS}$  | Drain - Source Breakdown Voltage                  | 100                | V         |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$ | 70        |
|            |   | $T_c = 80^\circ C$ | 50        |
| $I_{DM}$   | Pulsed Drain current                              | 300                |           |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$           | V         |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 21                 | $m\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$ | 208       |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 75                 | A         |
| $E_{AR}$   | Repetitive Avalanche Energy                       | 30                 | mJ        |
| $E_{AS}$   | Single Pulse Avalanche Energy                     | 1500               |           |


**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 | $V_{GS} = 0\text{V}, V_{DS} = 100\text{V}$    |     |     | 250       | $\mu\text{A}$    |
|              |                                 | $V_{GS} = 0\text{V}, V_{DS} = 80\text{V}$     |     |     | 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         | V                |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 30\text{V}, V_{DS} = 0\text{V}$ |     |     | $\pm 100$ | 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 |     | 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  |     | nC            |
| $Q_{gs}$     | Gate – Source Charge         |   |     | 40   |     |               |
| $Q_{gd}$     | Gate – Drain Charge          |   |     | 92   |     |               |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ <math>125^\circ\text{C}</math></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   |     | 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 @ <math>25^\circ\text{C}</math></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 @ <math>125^\circ\text{C}</math></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  | A             |
|          |   |   | $T_c = 80^\circ\text{C}$ |     | 50  |               |
| $V_{SD}$ | Diode Forward Voltage                     | $V_{GS} = 0\text{V}, I_S = -139\text{A}$  |                          |     | 1.3 | V             |
| $dv/dt$  | Peak Diode Recovery ①                     |   |                          |     | 5   | V/ns          |
| $t_{rr}$ | Reverse Recovery Time                     | $I_S = -70\text{A}$<br>$V_R = 66\text{V}$ |                          | 200 |     | ns            |
| $Q_{rr}$ | Reverse Recovery Charge                   | $di/dt = 100\text{A}/\mu\text{s}$         |                          | 1.4 |     | $\mu\text{C}$ |

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

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

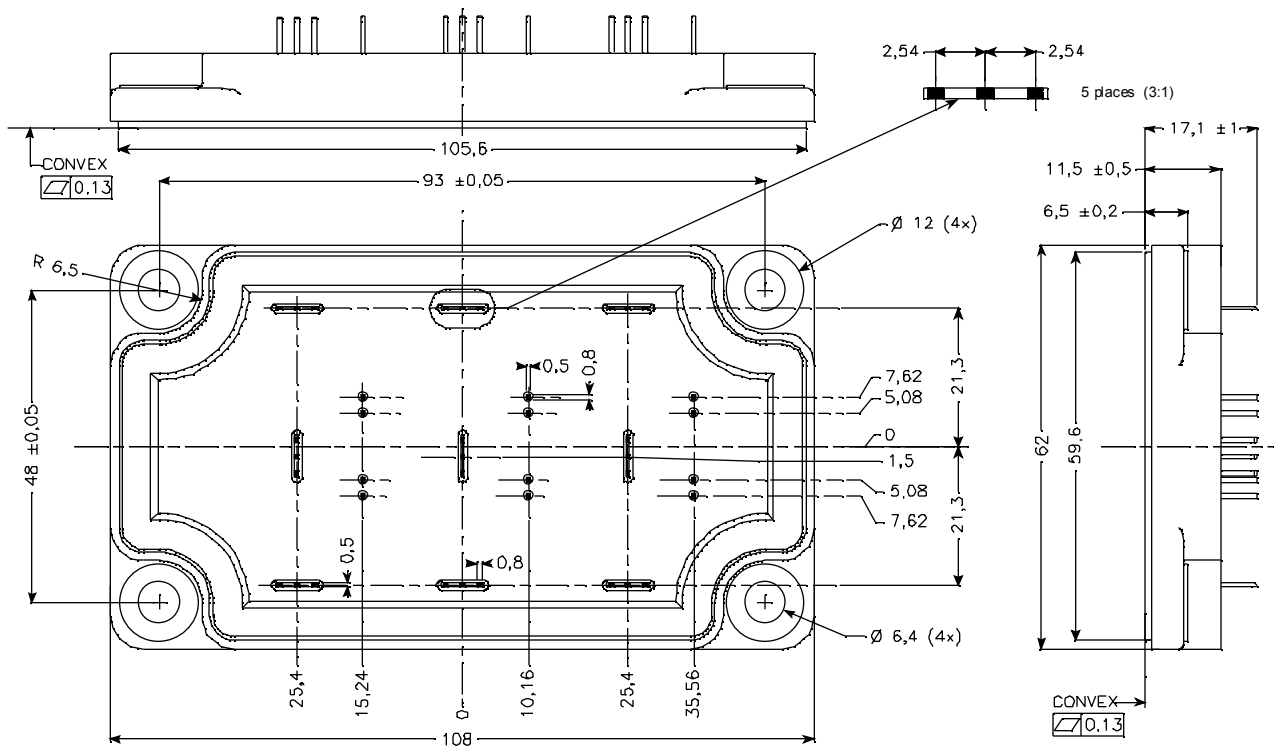
**Thermal and package characteristics**

*Symbol Characteristic*

*Min Typ Max Unit*

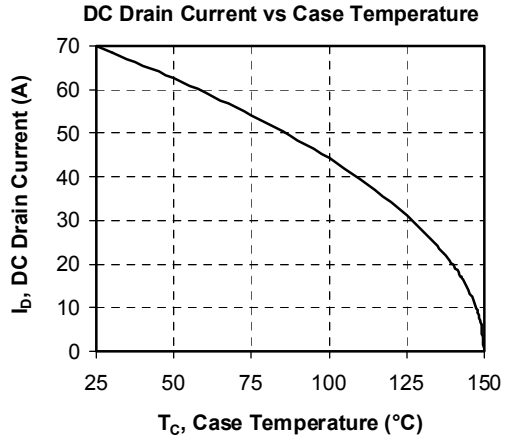
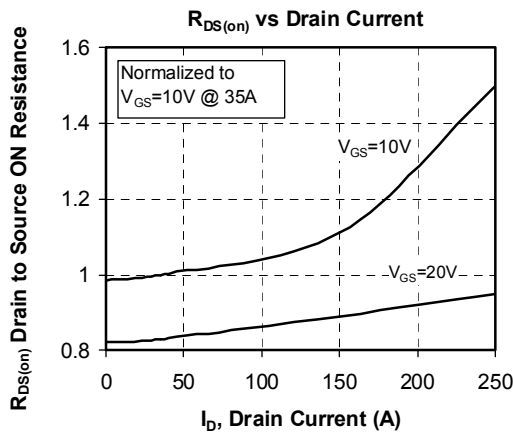
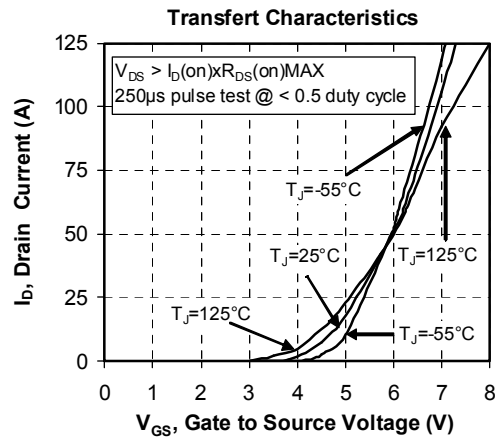
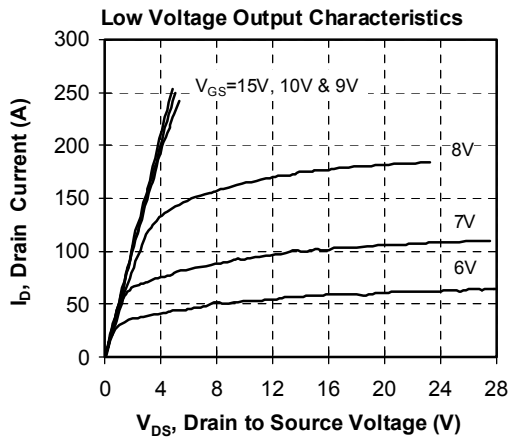
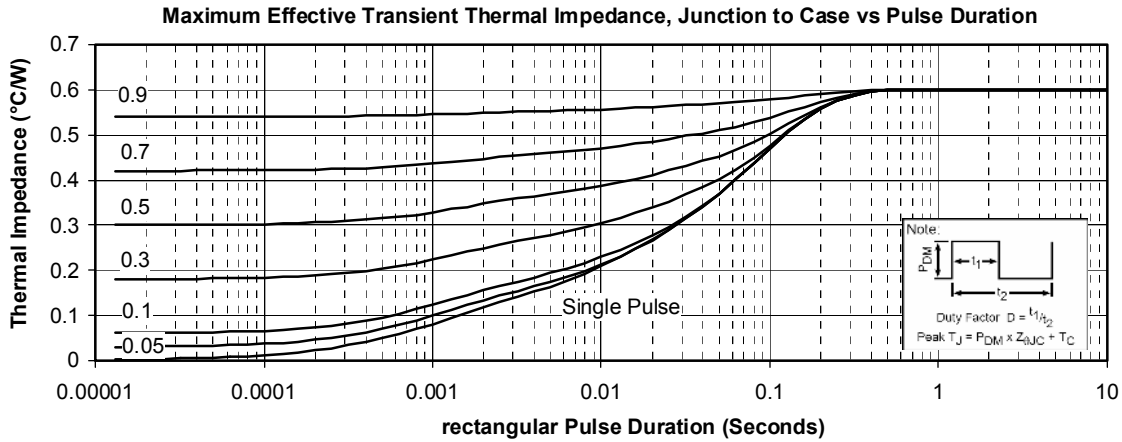
| <i>Symbol</i>     | <i>Characteristic</i>   | <i>Min</i> | <i>Typ</i>  | <i>Max</i> | <i>Unit</i> |     |     |
|-------------------|---|------------|-------------|------------|-------------|-----|-----|
| R <sub>thJC</sub> | Junction to Case Thermal Resistance   |            |             | 0.6        | °C/W        |     |     |
| V <sub>ISOL</sub> | RMS Isolation Voltage, any terminal to case t = 1 min, I <sub>isol</sub> < 1mA, 50/60Hz | 2500       |             |            | 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 | M6         | 3           | 5   | N.m |
| Wt                | Package Weight  |            |             |            |             | 250 | g   |

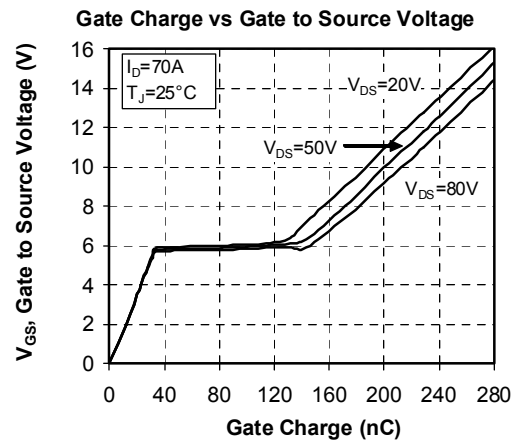
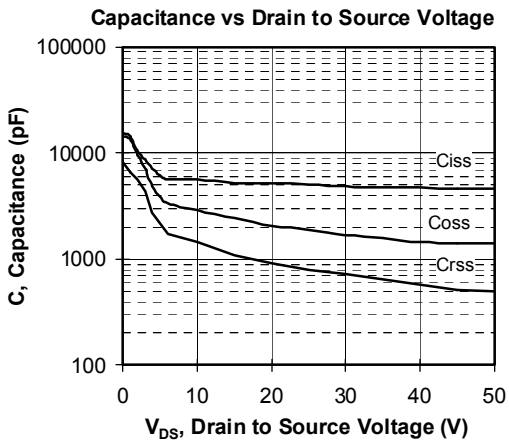
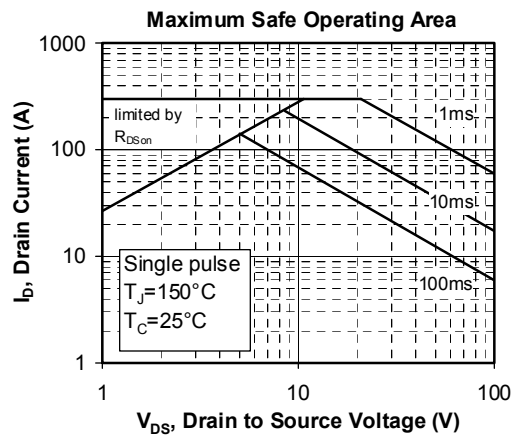
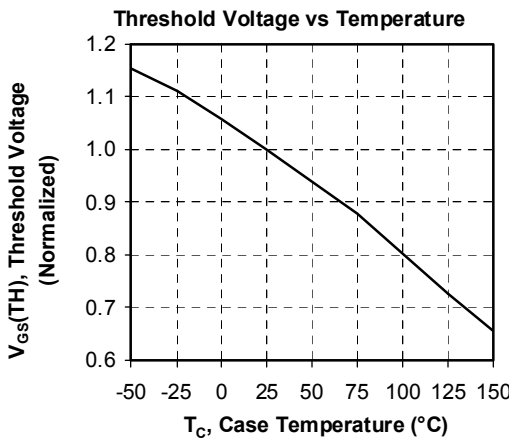
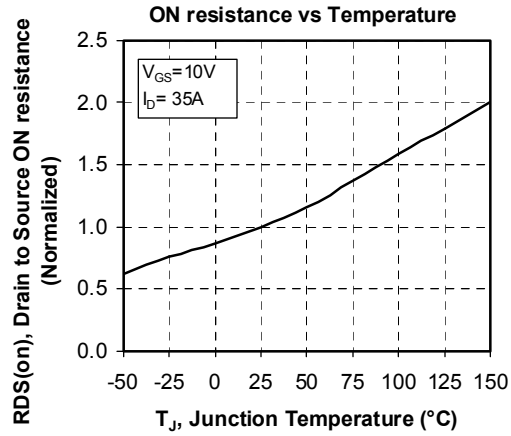
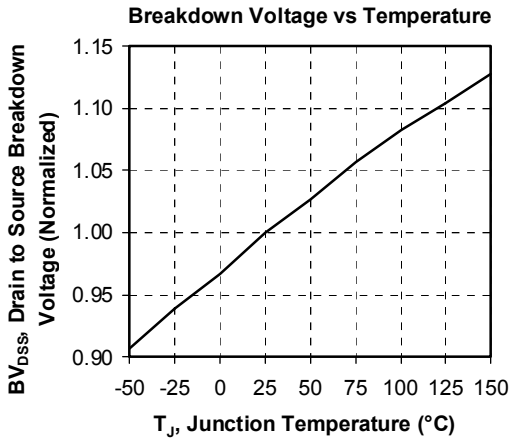
**SP6-P Package outline (dimensions in mm)**

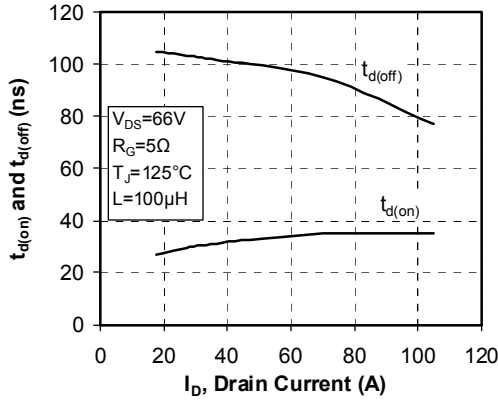
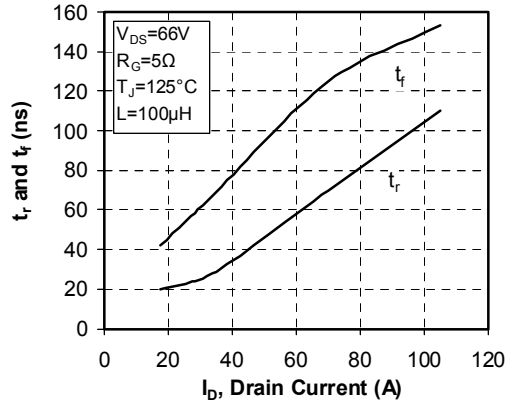
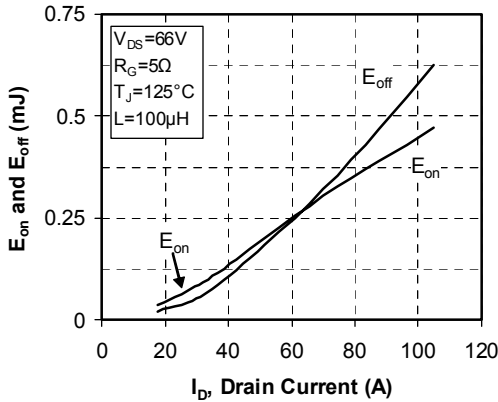
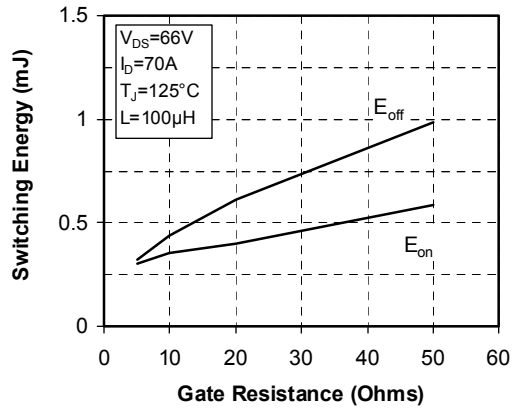
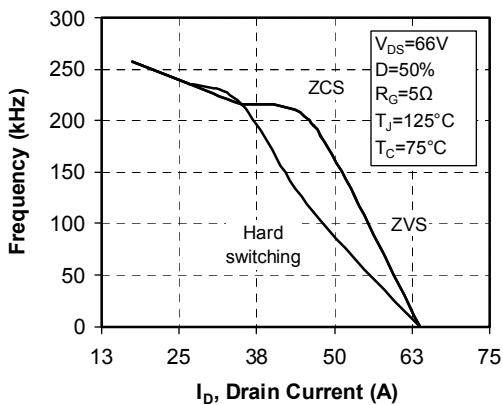
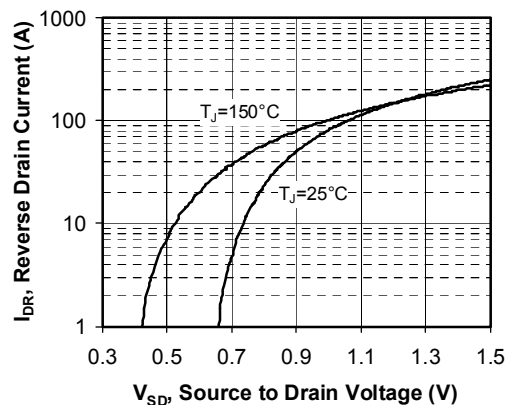


See application note 1902 - Mounting Instructions for SP6-P (12mm) Power Modules on [www.microsemi.com](http://www.microsemi.com)

## 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**


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