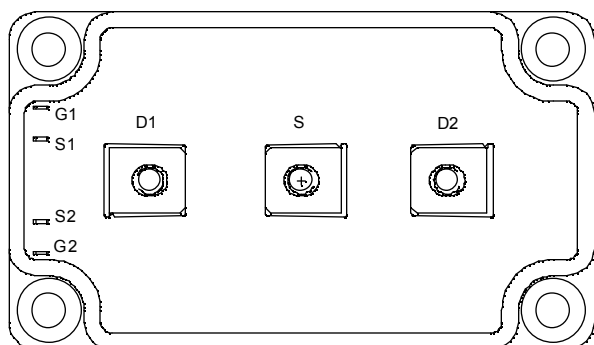
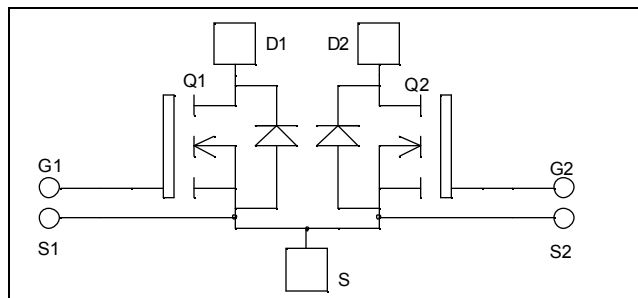


## Dual common source MOSFET Power Module

$$V_{DSS} = 200V$$

$$R_{DSon} = 5m\Omega \text{ typ @ } T_j = 25^\circ C$$

$$I_D = 317A \text{ @ } T_c = 25^\circ C$$



### Application

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

### Features

- Power MOS 7<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
  - M5 power connectors
- High level of integration

### Benefits

- Outstanding performance at high frequency operation
- Direct mounting to heatsink (isolated package)
- Low junction to case thermal resistance
- Low profile
- RoHS Compliant

### Absolute maximum ratings

| Symbol     | Parameter                                         | Max ratings        | Unit      |
|------------|---------------------------------------------------|--------------------|-----------|
| $V_{DSS}$  | Drain - Source Breakdown Voltage                  | 200                | V         |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$ | 317       |
|            |                                                   | $T_c = 80^\circ C$ | 237       |
| $I_{DM}$   | Pulsed Drain current                              | 1268               | A         |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$           | V         |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 6                  | $m\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$ | 1136      |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 89                 | A         |
| $E_{AR}$   | Repetitive Avalanche Energy                       | 50                 | mJ        |
| $E_{AS}$   | Single Pulse Avalanche Energy                     | 2500               |           |



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 | $V_{GS} = 0V, V_{DS} = 200V$    |     |     | 400       | $\mu A$   |
|              |                                 | $V_{GS} = 0V, V_{DS} = 160V$    |     |     | 2000      |           |
| $R_{DS(on)}$ | Drain – Source on Resistance    | $V_{GS} = 10V, I_D = 158.5A$    |     | 5   | 6         | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage          | $V_{GS} = V_{DS}, I_D = 10mA$   | 3   |     | 5         | V         |
| $I_{GSS}$    | Gate – Source Leakage Current   | $V_{GS} = \pm 30V, V_{DS} = 0V$ |     |     | $\pm 200$ | nA        |

**Dynamic Characteristics**

| Symbol       | Characteristic               | Test Conditions                                                                                                                        | Min | Typ  | Max | Unit    |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|---------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1MHz$                                                                                          |     | 27.4 |     | nF      |
| $C_{oss}$    | Output Capacitance           |                                                                                                                                        |     | 8.72 |     |         |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                                                                                        |     | 0.38 |     |         |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10V$<br>$V_{Bus} = 100V$<br>$I_D = 300A$                                                                                     |     | 448  |     | nC      |
| $Q_{gs}$     | Gate – Source Charge         |                                                                                                                                        |     | 172  |     |         |
| $Q_{gd}$     | Gate – Drain Charge          |                                                                                                                                        |     | 188  |     |         |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V$<br>$V_{Bus} = 133V$<br>$I_D = 300A$<br>$R_G = 1.2\Omega$ |     | 28   |     | ns      |
| $T_r$        | Rise Time                    |                                                                                                                                        |     | 56   |     |         |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                                                        |     | 81   |     |         |
| $T_f$        | Fall Time                    |                                                                                                                                        |     | 99   |     |         |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 133V$<br>$I_D = 300A, R_G = 1.2\Omega$          |     | 1852 |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy    |                                                                                                                                        |     | 1820 |     |         |
| $E_{on}$     | Turn-on Switching Energy     | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 133V$<br>$I_D = 300A, R_G = 1.2\Omega$         |     | 2432 |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy    |                                                                                                                                        |     | 2124 |     |         |

**Source - Drain diode ratings and characteristics**

| Symbol   | Characteristic                         | Test Conditions                                     | Min | Typ   | Max | Unit    |
|----------|----------------------------------------|-----------------------------------------------------|-----|-------|-----|---------|
| $I_S$    | Continuous Source current (Body diode) | $T_c = 25^\circ\text{C}$                            |     |       | 317 | A       |
|          |                                        | $T_c = 80^\circ\text{C}$                            |     |       | 237 |         |
| $V_{SD}$ | Diode Forward Voltage                  | $V_{GS} = 0V, I_S = -300A$                          |     |       | 1.3 | V       |
| $dv/dt$  | Peak Diode Recovery ❶                  |                                                     |     |       | 5   | V/ns    |
| $t_{rr}$ | Reverse Recovery Time                  | $I_S = -300A, V_R = 100V$<br>$di_S/dt = 400A/\mu s$ |     | 284   |     | ns      |
| $Q_{rr}$ | Reverse Recovery Charge                |                                                     |     | 12.24 |     | $\mu C$ |

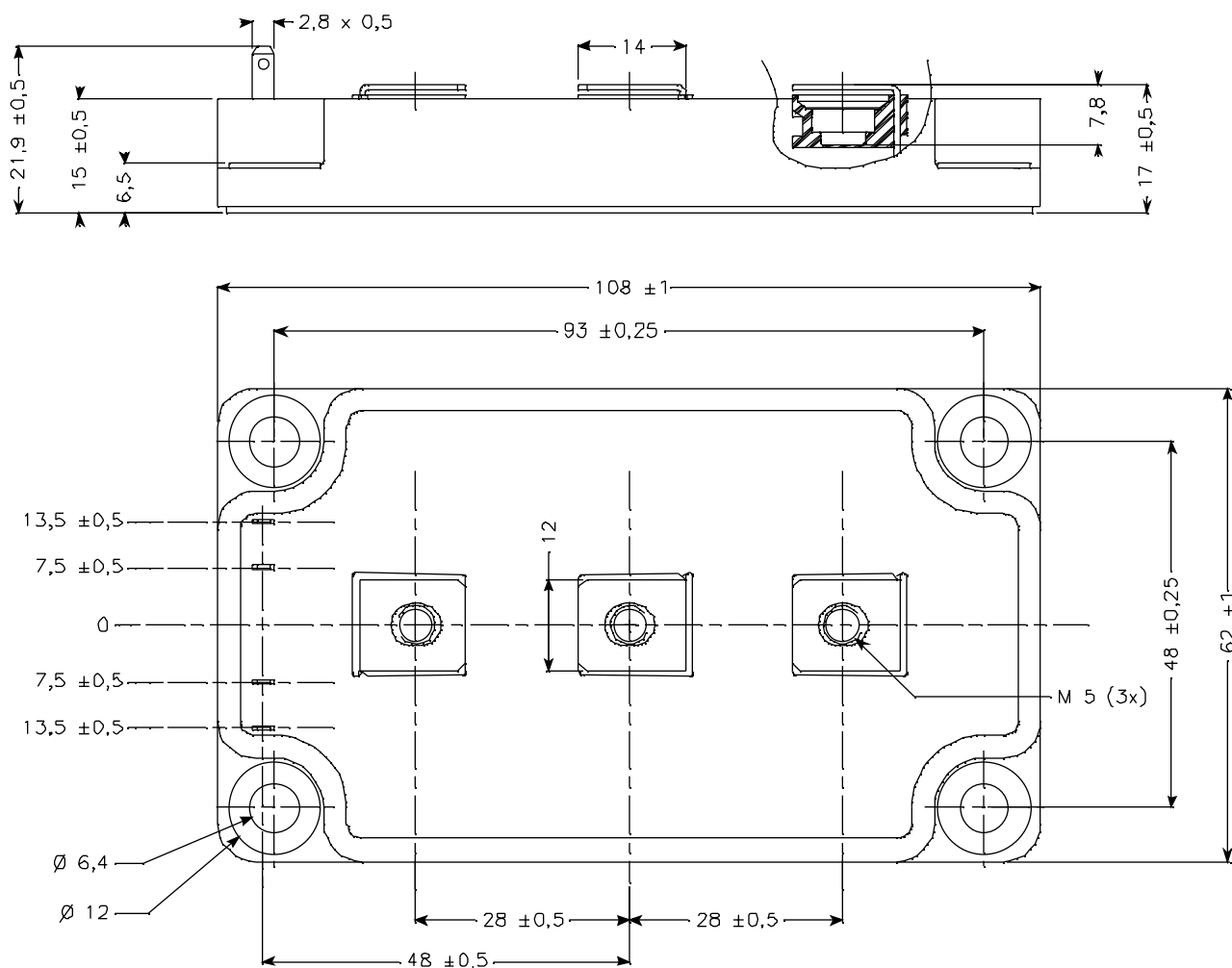
❶  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq -300A$      $di/dt \leq 700A/\mu s$      $V_R \leq V_{DSS}$      $T_j \leq 150^\circ\text{C}$

## Thermal and package characteristics

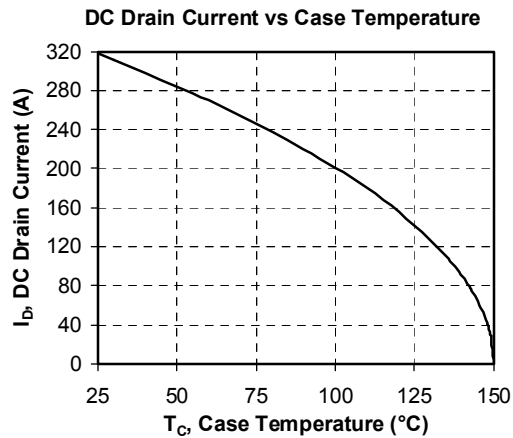
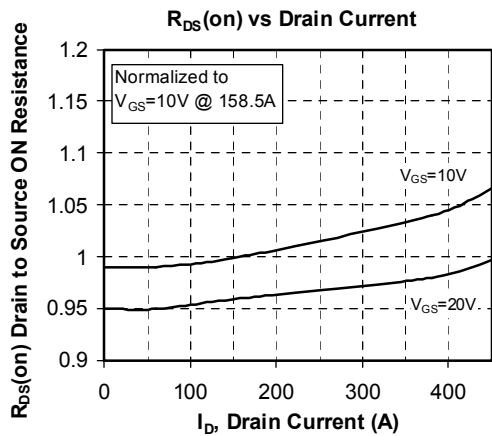
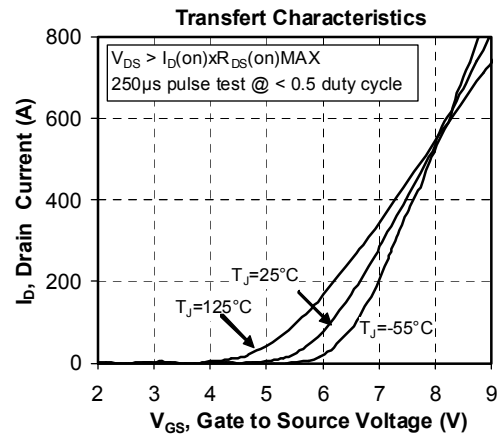
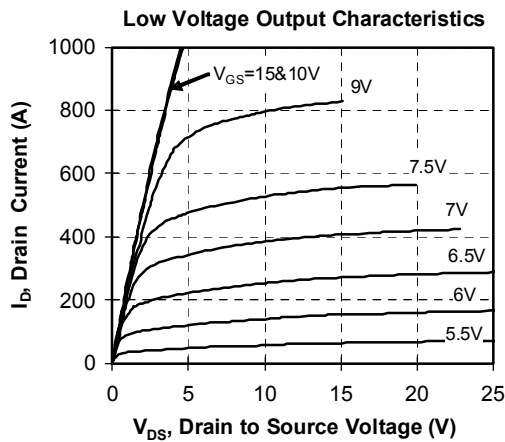
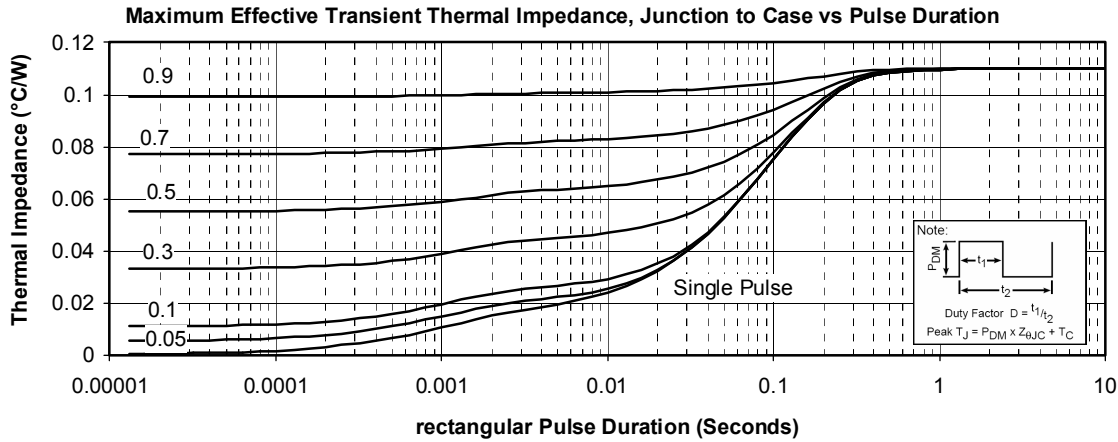
| Symbol     | Characteristic                                                                  | Min           | Typ | Max  | Unit |
|------------|---------------------------------------------------------------------------------|---------------|-----|------|------|
| $R_{thJC}$ | Junction to Case Thermal Resistance                                             |               |     | 0.11 | °C/W |
| $V_{ISOL}$ | 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    | N.m  |
|            |                                                                                 | For terminals | M5  | 2    |      |
| Wt         | Package Weight                                                                  |               |     | 280  | g    |

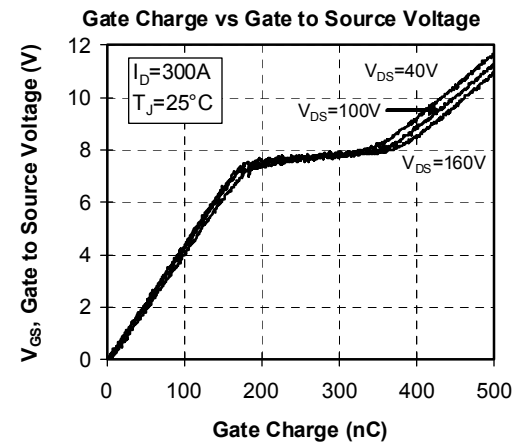
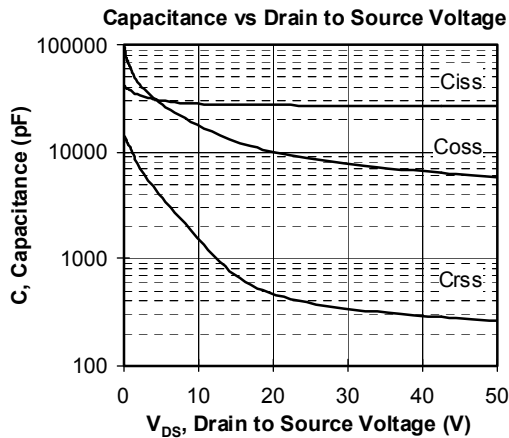
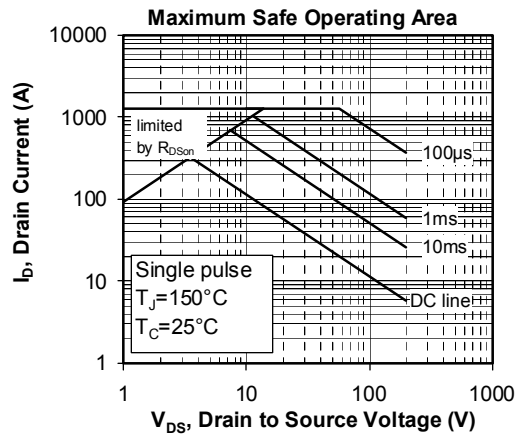
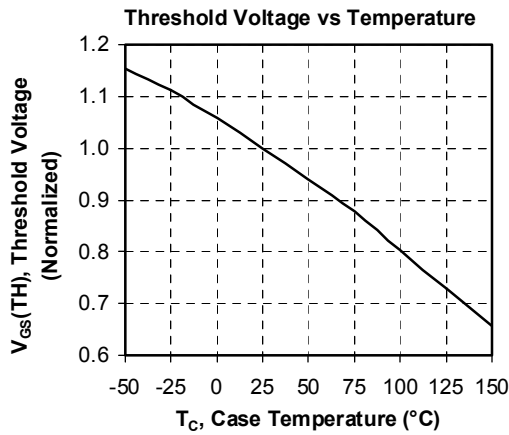
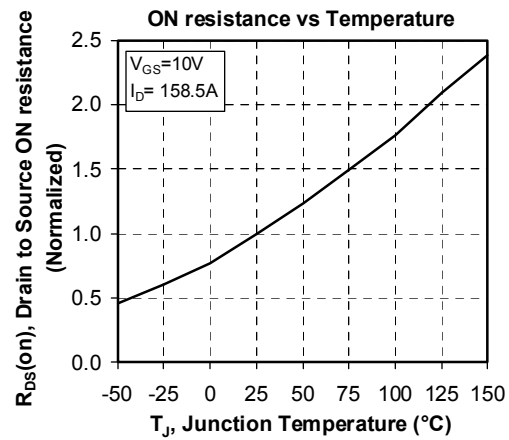
## SP6 Package outline (dimensions in mm)

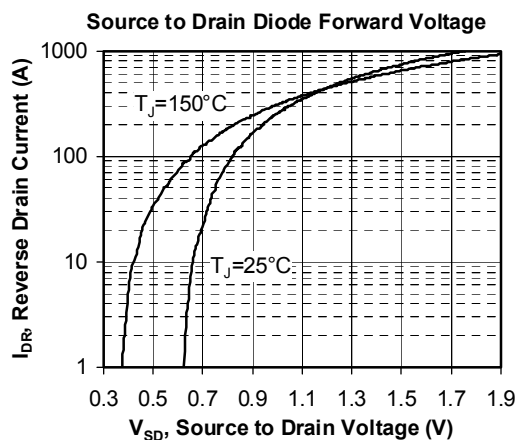
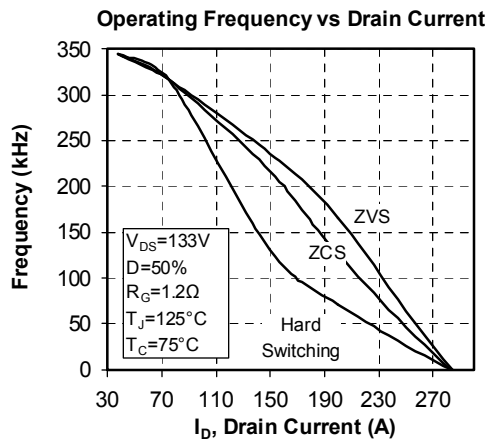
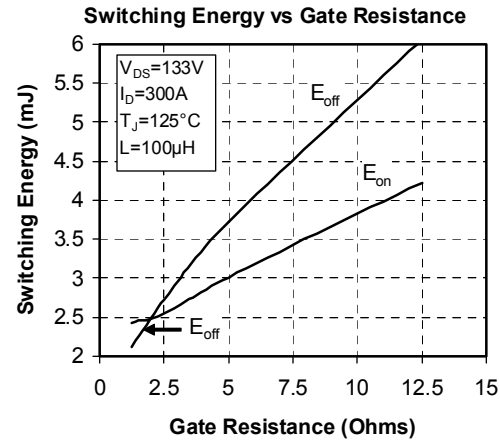
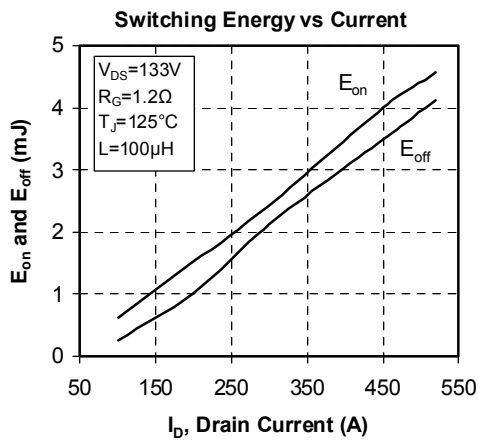
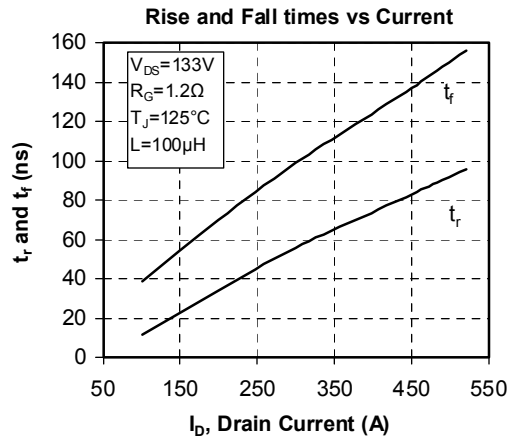
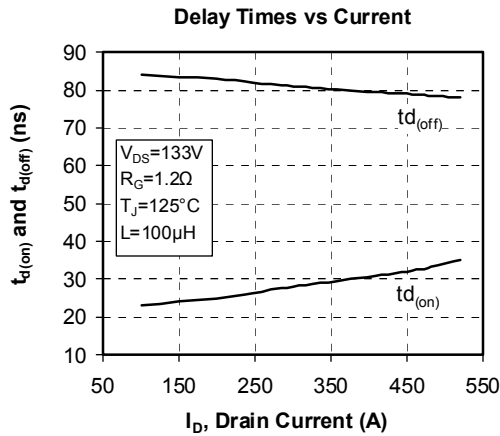


See application note APT0601 - Mounting Instructions for SP6 Power Modules on [www.microsemi.com](http://www.microsemi.com)

## Typical Performance Curve







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