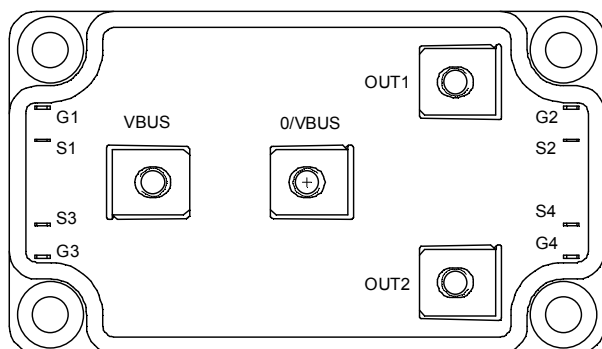
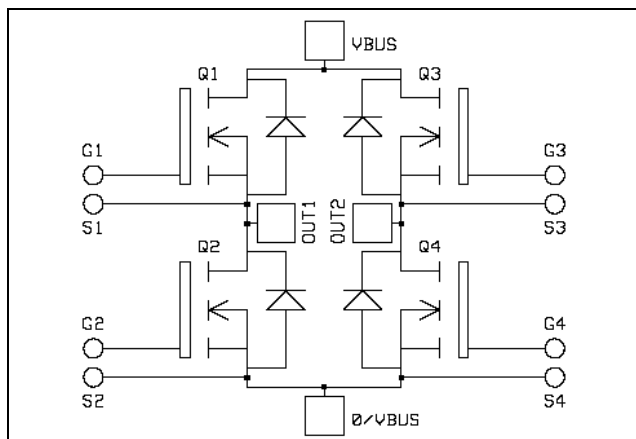


## Full - Bridge MOSFET Power Module

$$V_{DSS} = 200V$$

$$R_{DSon} = 10m\Omega \text{ max @ } T_j = 25^\circ C$$

$$I_D = 175A \text{ @ } T_c = 25^\circ C$$



### Application

- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

### Features

- Power MOS 7<sup>®</sup> FREDFETs
  - Low  $R_{DSon}$
  - Low input and Miller capacitance
  - Low gate charge
  - Fast intrinsic reverse diode
  - 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

### Absolute maximum ratings

| Symbol     | Parameter                                         | Max ratings        | Unit       |
|------------|---------------------------------------------------|--------------------|------------|
| $V_{DSS}$  | Drain - Source Breakdown Voltage                  | 200                | V          |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$ | A          |
|            |                                                   | $T_c = 80^\circ C$ |            |
| $I_{DM}$   | Pulsed Drain current                              | 700                |            |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$           | V          |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 10                 | m $\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$ | W          |
| $I_{AR}$   | 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.

All ratings @  $T_j = 25^\circ\text{C}$  unless otherwise specified

## Electrical Characteristics

| Symbol       | Characteristic                   | Test Conditions                                       | Min | Typ | Max       | Unit      |
|--------------|----------------------------------|-------------------------------------------------------|-----|-----|-----------|-----------|
| $BV_{DSS}$   | Drain - Source Breakdown Voltage | $V_{GS} = 0V, I_D = 375\mu A$                         | 200 |     |           | V         |
| $I_{DSS}$    | Zero Gate Voltage Drain Current  | $V_{GS} = 0V, V_{DS} = 200V, T_j = 25^\circ\text{C}$  |     |     | 375       | $\mu A$   |
|              |                                  | $V_{GS} = 0V, V_{DS} = 160V, T_j = 125^\circ\text{C}$ |     |     | 1500      |           |
| $R_{DS(on)}$ | Drain - Source on Resistance     | $V_{GS} = 10V, I_D = 87.5A$                           |     |     | 10        | $m\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage           | $V_{GS} = V_{DS}, I_D = 5mA$                          | 3   |     | 5         | V         |
| $I_{GSS}$    | Gate - Source Leakage Current    | $V_{GS} = \pm 30V, V_{DS} = 0V$                       |     |     | $\pm 150$ | nA        |

## Dynamic Characteristics

| Symbol       | Characteristic               | Test Conditions                                                                                                                        | Min | Typ  | Max | Unit    |
|--------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----|------|-----|---------|
| $C_{iss}$    | Input Capacitance            | $V_{GS} = 0V$<br>$V_{DS} = 25V$<br>$f = 1MHz$                                                                                          |     | 13.7 |     | nF      |
| $C_{oss}$    | Output Capacitance           |                                                                                                                                        |     | 4.36 |     |         |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                                                                                                        |     | 0.2  |     |         |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10V$<br>$V_{Bus} = 100V$<br>$I_D = 150A$                                                                                     |     | 224  |     | nC      |
| $Q_{gs}$     | Gate - Source Charge         |                                                                                                                                        |     | 86   |     |         |
| $Q_{gd}$     | Gate - Drain Charge          |                                                                                                                                        |     | 94   |     |         |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V$<br>$V_{Bus} = 133V$<br>$I_D = 150A$<br>$R_G = 2.5\Omega$ |     | 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 ❶   | <b>Inductive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 133V$<br>$I_D = 150A, R_G = 2.5\Omega$          |     | 926  |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy ❷  |                                                                                                                                        |     | 910  |     |         |
| $E_{on}$     | Turn-on Switching Energy ❶   | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 133V$<br>$I_D = 150A, R_G = 2.5\Omega$         |     | 1216 |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy ❷  |                                                                                                                                        |     | 1062 |     |         |

## Source - Drain diode ratings and characteristics

| Symbol   | Characteristic                         | Test Conditions                                       | Min                       | Typ  | Max | Unit    |
|----------|----------------------------------------|-------------------------------------------------------|---------------------------|------|-----|---------|
| $I_S$    | Continuous Source current (Body diode) | $T_c = 25^\circ\text{C}$                              |                           |      | 175 | A       |
|          |                                        | $T_c = 80^\circ\text{C}$                              |                           |      | 131 |         |
| $V_{SD}$ | Diode Forward Voltage                  | $V_{GS} = 0V, I_S = -150A$                            |                           |      | 1.3 | V       |
| $dv/dt$  | Peak Diode Recovery ❸                  |                                                       |                           |      | 8   | V/ns    |
| $t_{rr}$ | Reverse Recovery Time                  | $I_S = -150A$<br>$V_R = 133V$<br>$di/dt = 200A/\mu s$ | $T_j = 25^\circ\text{C}$  |      | 220 | ns      |
|          |                                        |                                                       | $T_j = 125^\circ\text{C}$ |      | 420 |         |
| $Q_{rr}$ | Reverse Recovery Charge                | $I_S = -150A$<br>$V_R = 133V$<br>$di/dt = 200A/\mu s$ | $T_j = 25^\circ\text{C}$  | 2.14 |     | $\mu C$ |
|          |                                        |                                                       | $T_j = 125^\circ\text{C}$ | 5.8  |     |         |

❶  $E_{on}$  includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

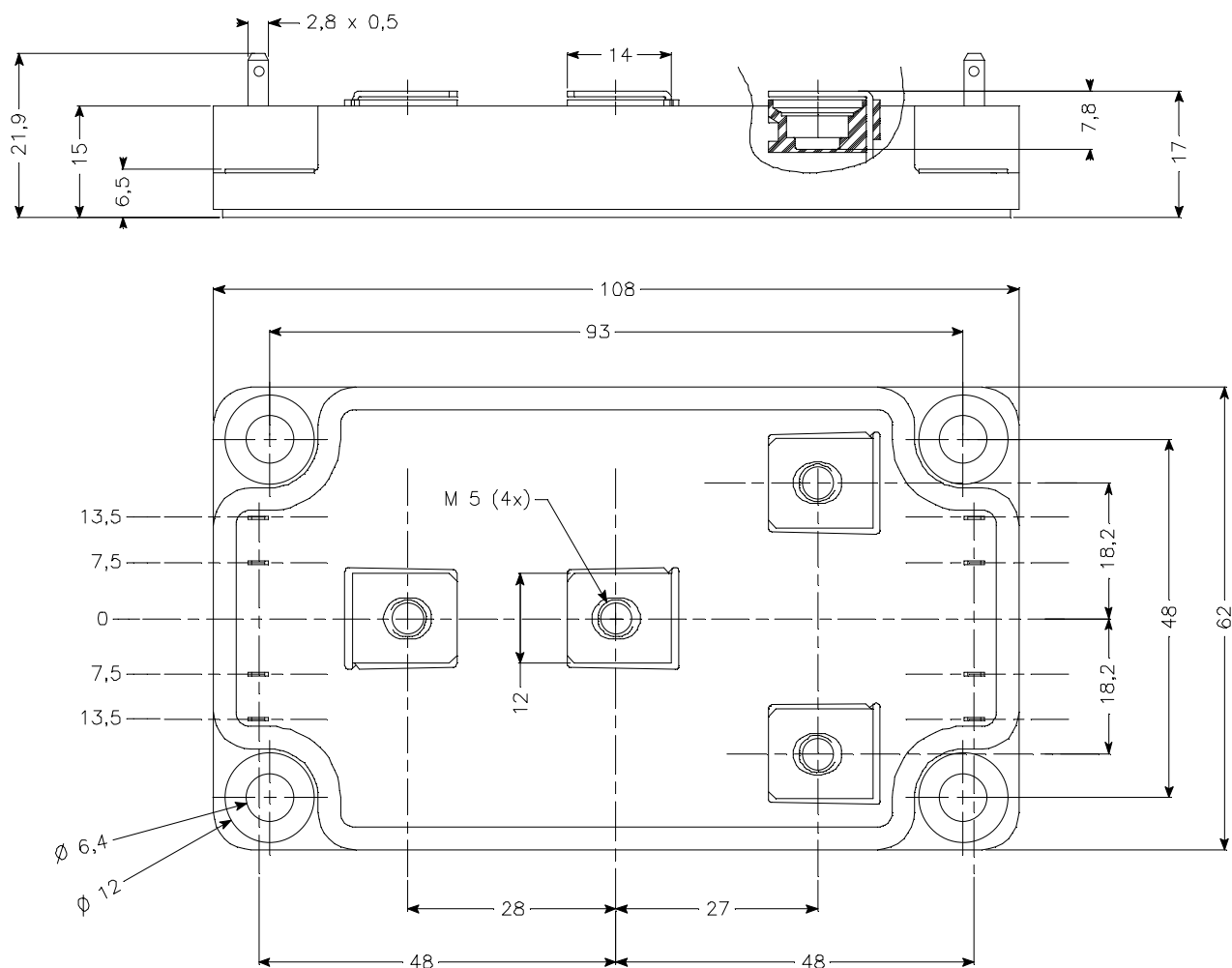
❸  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

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

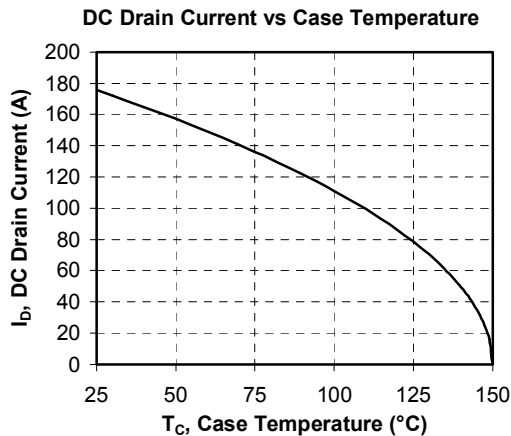
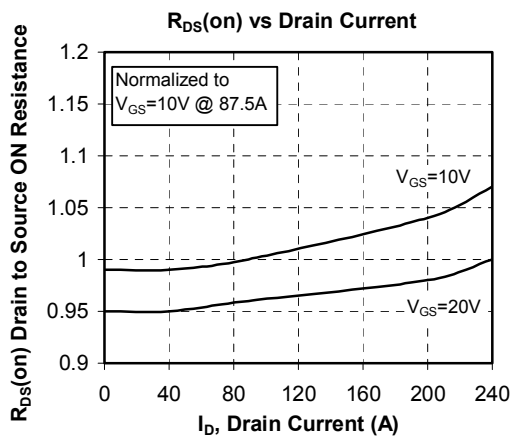
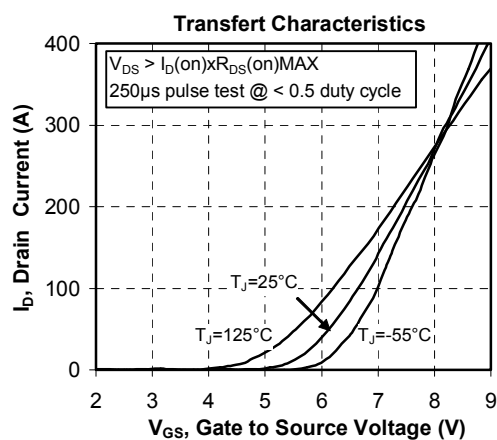
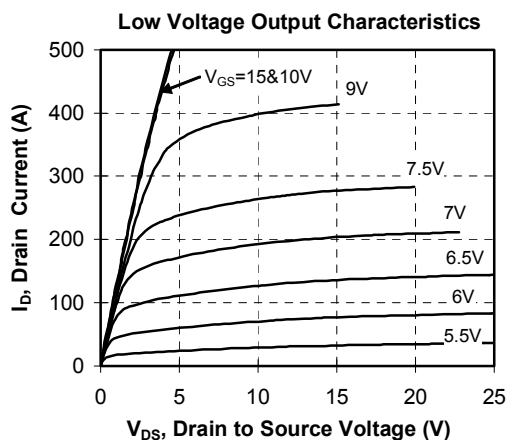
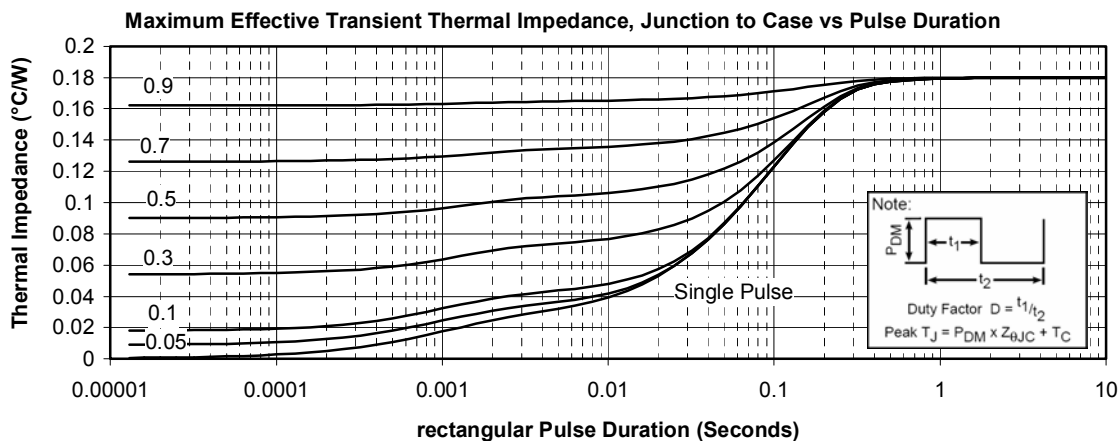
### Thermal and package characteristics

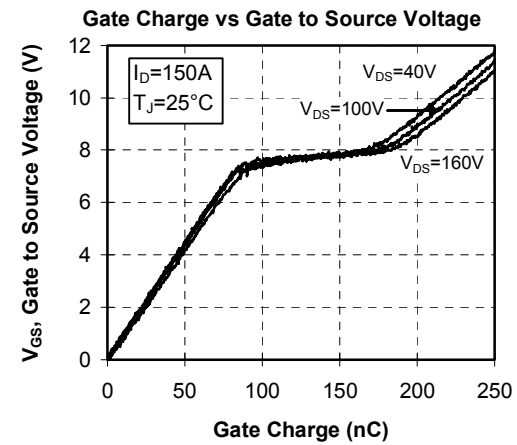
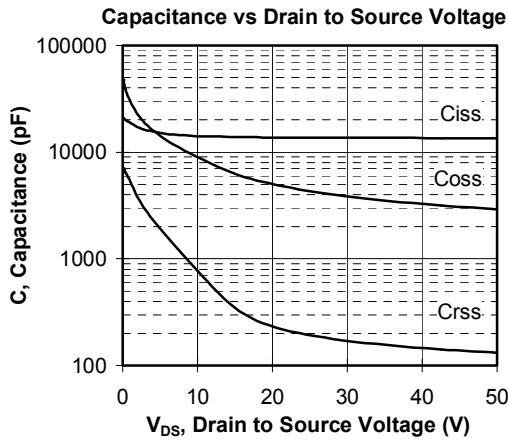
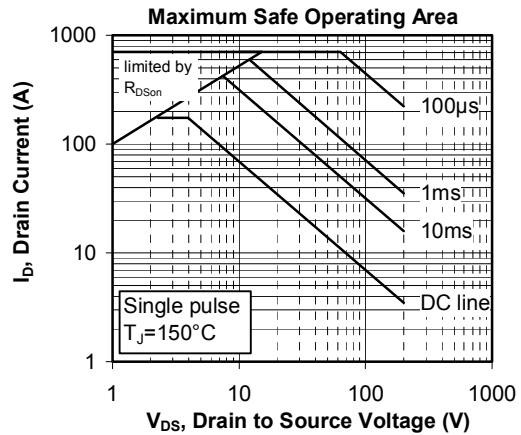
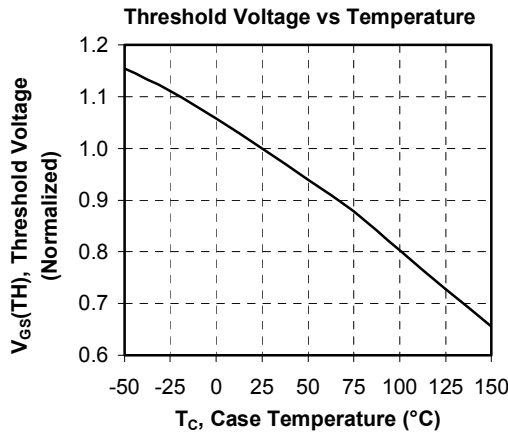
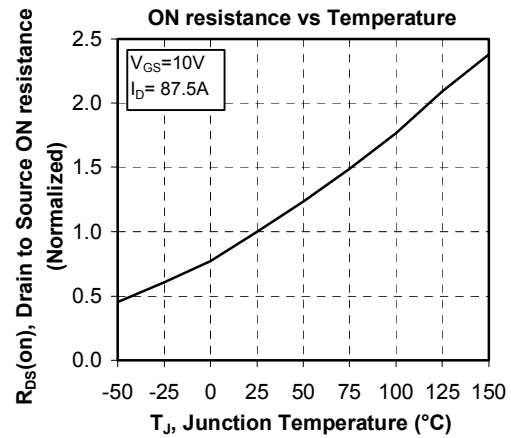
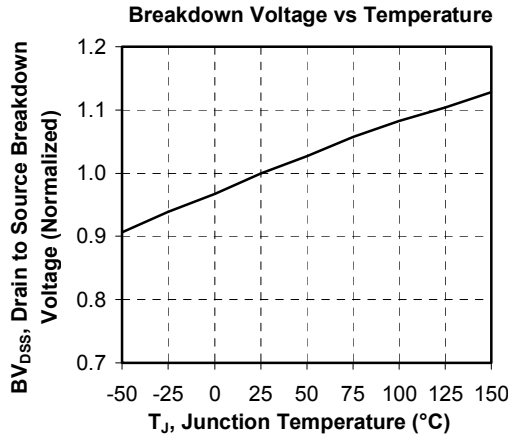
| Symbol            | Characteristic                                                            | Min           | Typ | Max  | Unit |
|-------------------|---------------------------------------------------------------------------|---------------|-----|------|------|
| R <sub>thJC</sub> | Junction to Case                                                          |               |     | 0.18 | °C/W |
| V <sub>ISOL</sub> | RMS Isolation Voltage, any terminal to case t =1 min, I isol<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    | N.m  |
|                   |                                                                           | For terminals | M5  | 2    |      |
| Wt                | Package Weight                                                            |               |     | 280  | g    |

### Package outline

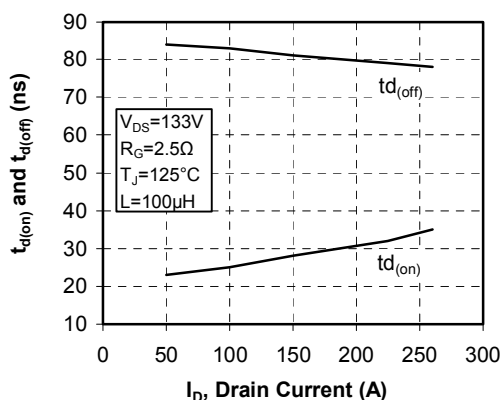


## Typical Performance Curve

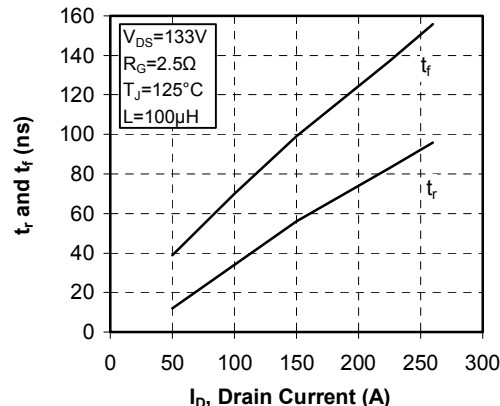




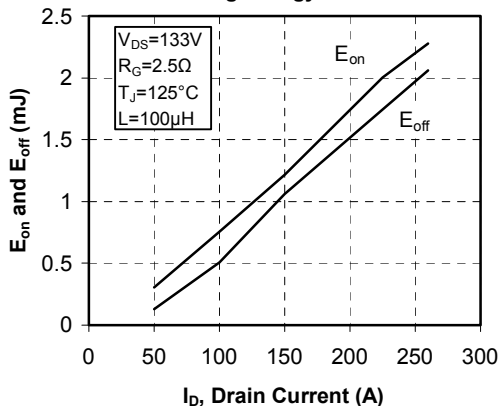
**Delay Times vs Current**



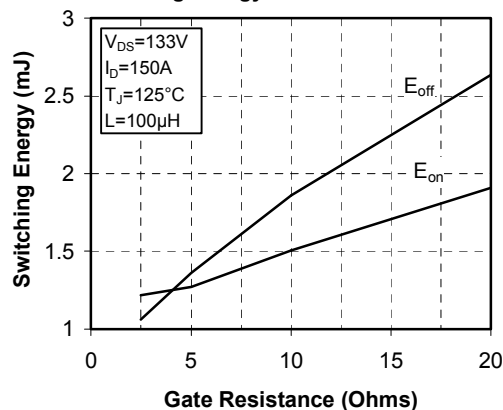
**Rise and Fall times vs Current**



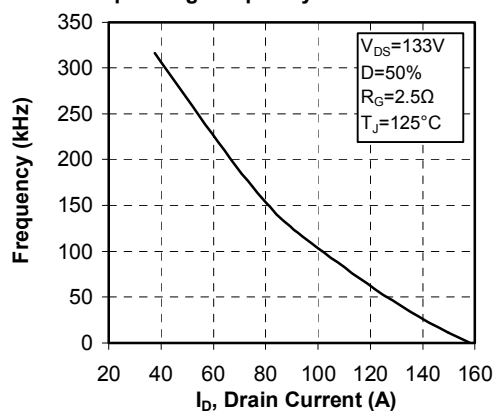
**Switching Energy vs Current**



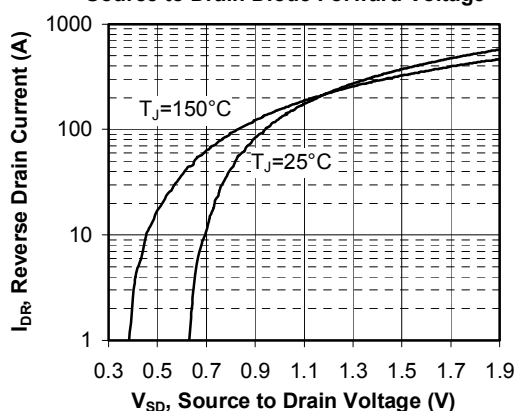
**Switching Energy vs Gate Resistance**



**Operating Frequency vs Drain Current**



**Source to Drain Diode Forward Voltage**



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