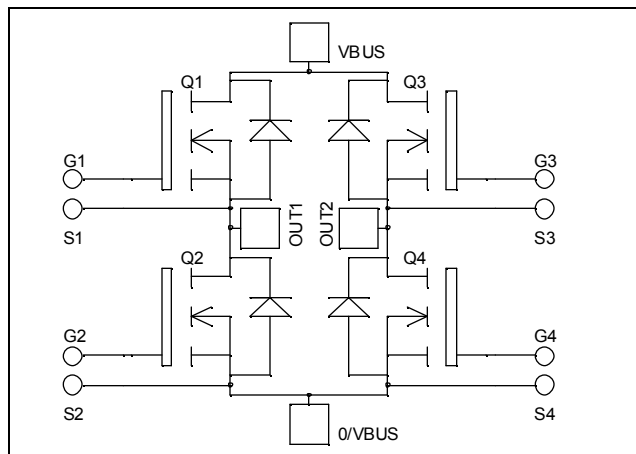


## Full - Bridge MOSFET Power Module

**$V_{DSS} = 1000V$**

**$R_{DSon} = 180m\Omega$  max @  $T_j = 25^\circ C$**

**$I_D = 43A$  @  $T_c = 25^\circ C$**



### Application

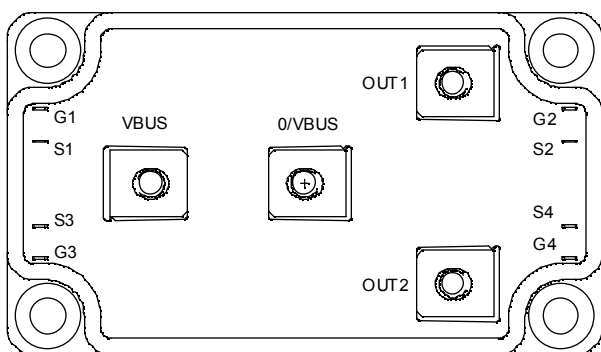
- Welding converters
- Switched Mode Power Supplies
- Uninterruptible Power Supplies
- Motor control

### 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                  | 1000                      | V         |
| $I_D$      | Continuous Drain Current                          | $T_c = 25^\circ C$<br>43  | A         |
|            |                                                   | $T_c = 80^\circ C$<br>33  |           |
| $I_{DM}$   | Pulsed Drain current                              | 172                       |           |
| $V_{GS}$   | Gate - Source Voltage                             | $\pm 30$                  | V         |
| $R_{DSon}$ | Drain - Source ON Resistance                      | 180                       | $m\Omega$ |
| $P_D$      | Maximum Power Dissipation                         | $T_c = 25^\circ C$<br>780 | W         |
| $I_{AR}$   | Avalanche current (repetitive and non repetitive) | 25                        | A         |
| $E_{AR}$   | Repetitive Avalanche Energy                       | 50                        | mJ        |
| $E_{AS}$   | Single Pulse Avalanche Energy                     | 3000                      |           |



**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 | $V_{GS} = 0V, I_D = 500\mu A$                         | 1000 |     |           | V         |
| $I_{DSS}$    | Zero Gate Voltage Drain Current  | $V_{GS} = 0V, V_{DS} = 1000V, T_j = 25^\circ\text{C}$ |      |     | 500       | $\mu A$   |
|              |                                  | $V_{GS} = 0V, V_{DS} = 800V, T_j = 125^\circ\text{C}$ |      |     | 2000      |           |
| $R_{DS(on)}$ | Drain - Source on Resistance     | $V_{GS} = 10V, I_D = 21.5A$                           |      |     | 180       | $m\Omega$ |
| $V_{GS(th)}$ | 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            | $V_{GS} = 0V$                                                                                                                         |     | 10.4 |     | nF      |
| $C_{oss}$    | Output Capacitance           | $V_{DS} = 25V$                                                                                                                        |     | 1.76 |     |         |
| $C_{rss}$    | Reverse Transfer Capacitance | $f = 1MHz$                                                                                                                            |     | 0.32 |     |         |
| $Q_g$        | Total gate Charge            | $V_{GS} = 10V$                                                                                                                        |     | 372  |     | nC      |
| $Q_{gs}$     | Gate - Source Charge         | $V_{Bus} = 500V$                                                                                                                      |     | 48   |     |         |
| $Q_{gd}$     | Gate - Drain Charge          | $I_D = 43A$                                                                                                                           |     | 244  |     |         |
| $T_{d(on)}$  | Turn-on Delay Time           | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V$<br>$V_{Bus} = 670V$<br>$I_D = 43A$<br>$R_G = 2.5\Omega$ |     | 18   |     | ns      |
| $T_r$        | Rise Time                    |                                                                                                                                       |     | 12   |     |         |
| $T_{d(off)}$ | Turn-off Delay Time          |                                                                                                                                       |     | 155  |     |         |
| $T_f$        | Fall Time                    |                                                                                                                                       |     | 40   |     |         |
| $E_{on}$     | Turn-on Switching Energy ❶   | <b>Inductive switching @ <math>25^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 670V$<br>$I_D = 43A, R_G = 2.5\Omega$          |     | 1800 |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy ❷  |                                                                                                                                       |     | 1246 |     |         |
| $E_{on}$     | Turn-on Switching Energy ❶   | <b>Inductive switching @ <math>125^\circ\text{C}</math></b><br>$V_{GS} = 15V, V_{Bus} = 670V$<br>$I_D = 43A, R_G = 2.5\Omega$         |     | 2846 |     | $\mu J$ |
| $E_{off}$    | Turn-off Switching Energy ❷  |                                                                                                                                       |     | 1558 |     |         |

## Source - Drain diode ratings and characteristics

| Symbol   | Characteristic                         | Test Conditions                                        | Min                       | Typ  | Max | Unit    |
|----------|----------------------------------------|--------------------------------------------------------|---------------------------|------|-----|---------|
| $I_S$    | Continuous Source current (Body diode) | $T_c = 25^\circ\text{C}$                               |                           |      | 43  | A       |
|          |                                        | $T_c = 80^\circ\text{C}$                               |                           |      | 33  |         |
| $V_{SD}$ | Diode Forward Voltage                  | $V_{GS} = 0V, I_S = -43A$                              |                           |      | 1.3 | V       |
| $dv/dt$  | Peak Diode Recovery ❸                  |                                                        |                           |      | 18  | V/ns    |
| $t_{rr}$ | Reverse Recovery Time                  | $I_S = -43A$<br>$V_R = 500V$<br>$di_S/dt = 200A/\mu s$ | $T_j = 25^\circ\text{C}$  |      | 320 | ns      |
|          |                                        |                                                        | $T_j = 125^\circ\text{C}$ |      | 650 |         |
| $Q_{rr}$ | Reverse Recovery Charge                | $I_S = -43A$<br>$V_R = 500V$<br>$di_S/dt = 200A/\mu s$ | $T_j = 25^\circ\text{C}$  | 7.2  |     | $\mu C$ |
|          |                                        |                                                        | $T_j = 125^\circ\text{C}$ | 19.5 |     |         |

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

❷ In accordance with JEDEC standard JESD24-1.

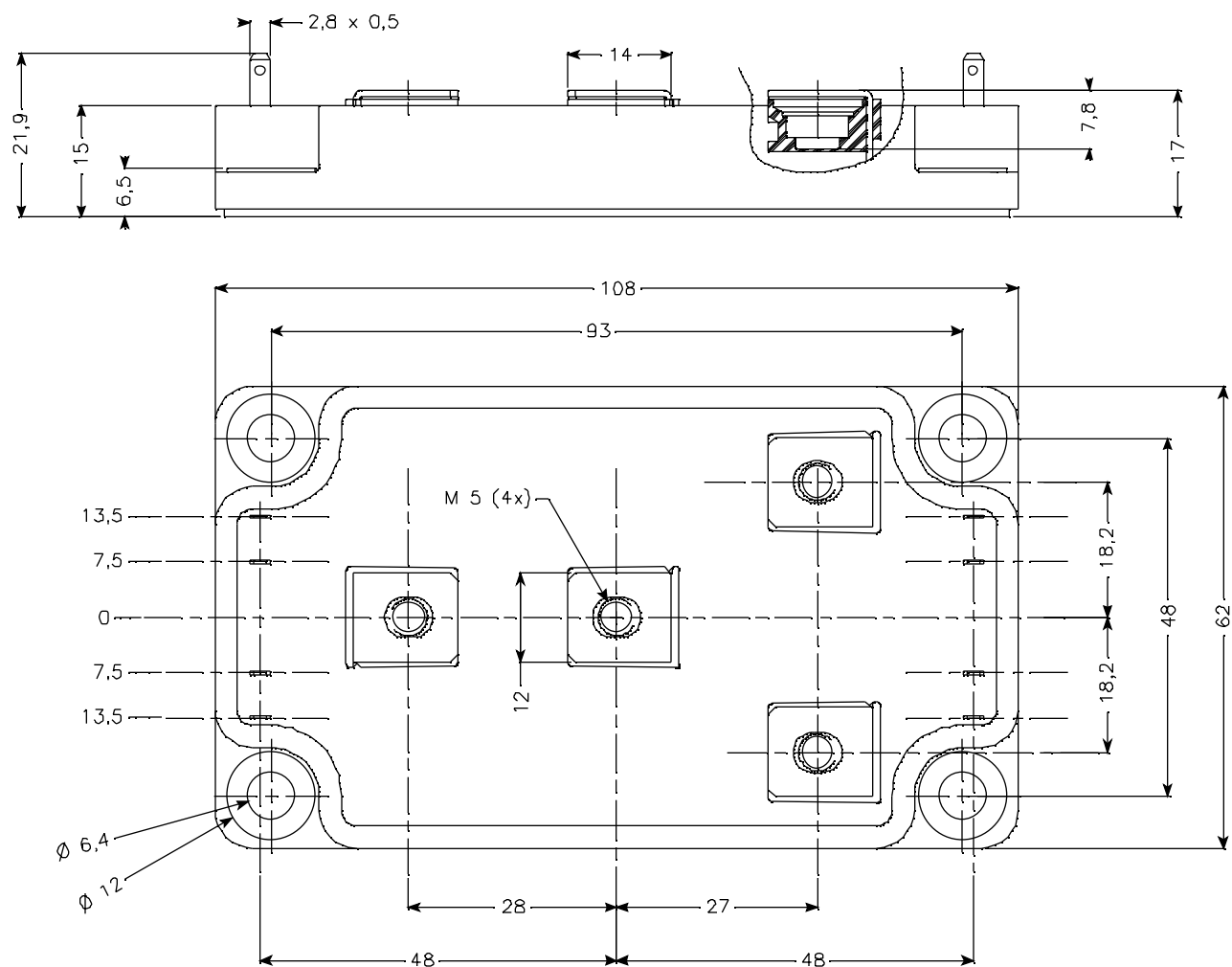
❸  $dv/dt$  numbers reflect the limitations of the circuit rather than the device itself.

$I_S \leq -43A$     $di/dt \leq 700A/\mu s$     $V_R \leq V_{DSS}$     $T_j \leq 150^\circ\text{C}$

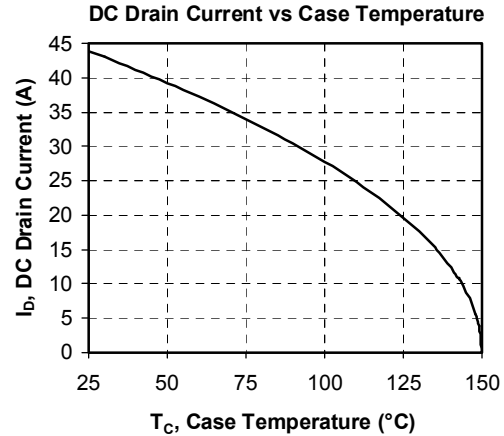
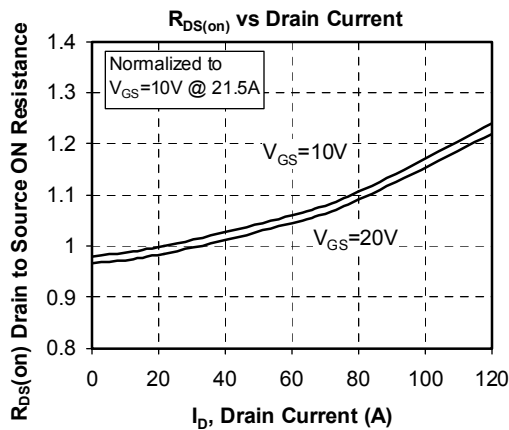
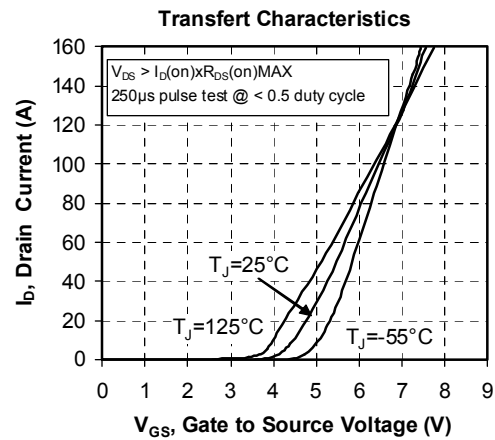
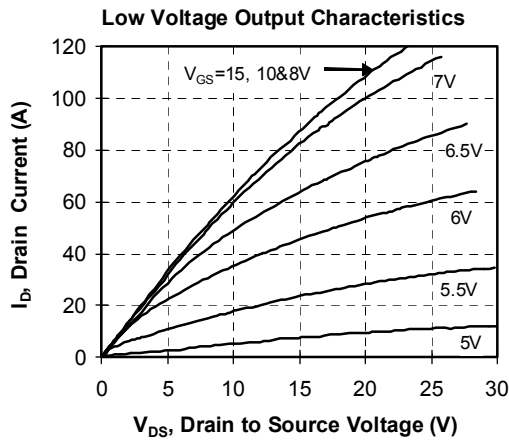
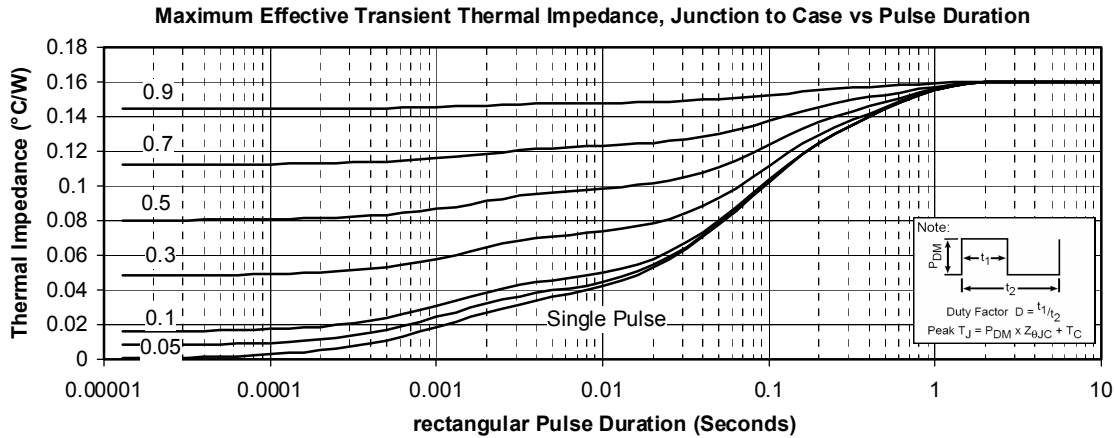
## Thermal and package characteristics

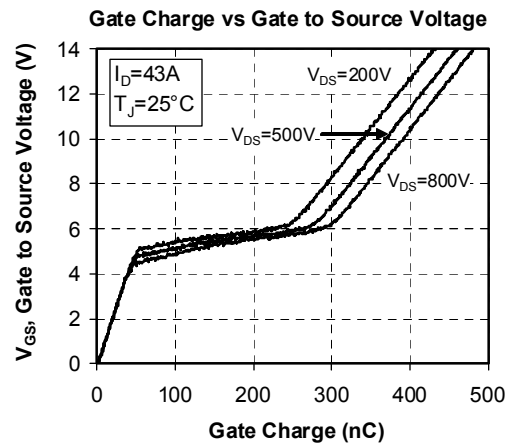
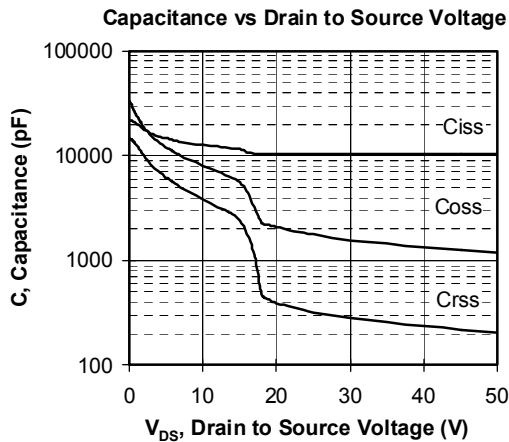
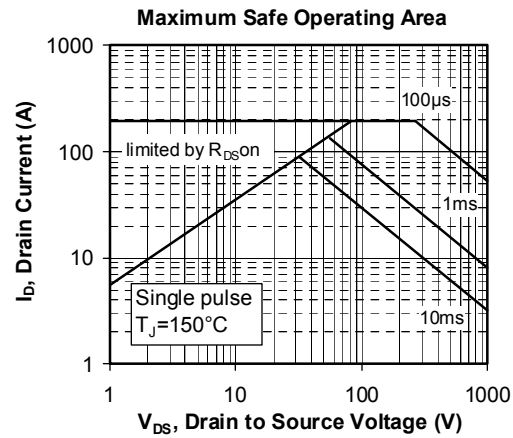
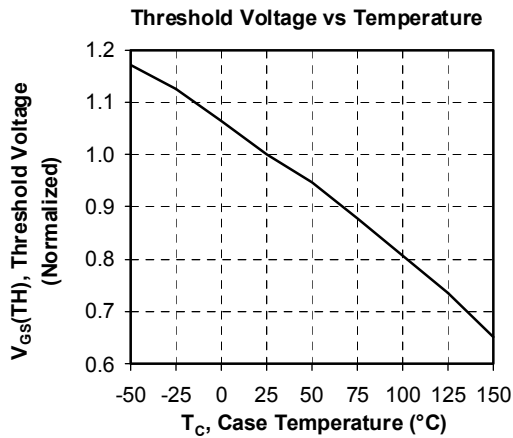
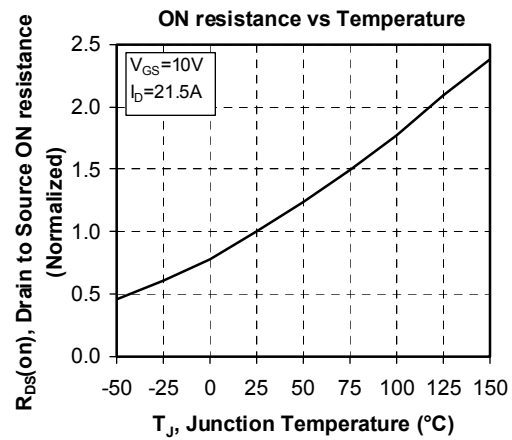
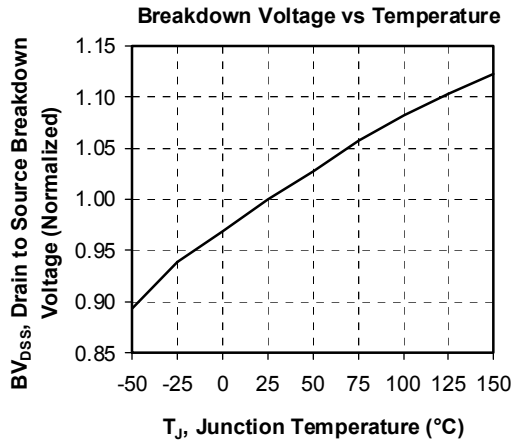
| Symbol     | Characteristic                                                                      | Min           | Typ | Max  | Unit |
|------------|-------------------------------------------------------------------------------------|---------------|-----|------|------|
| $R_{thJC}$ | Junction to Case                                                                    |               |     | 0.16 | °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    |

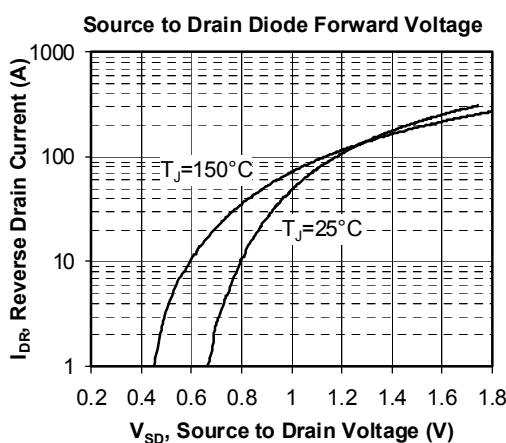
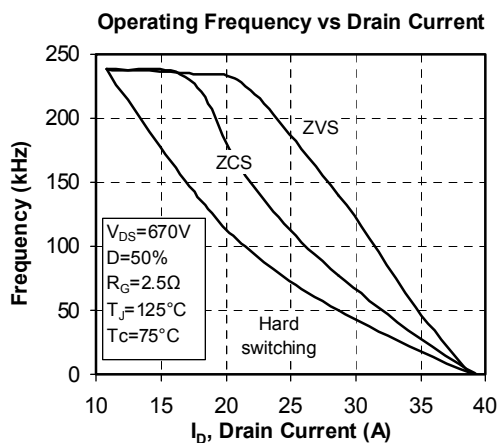
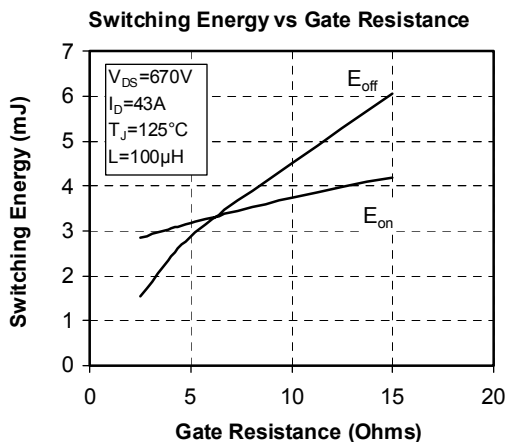
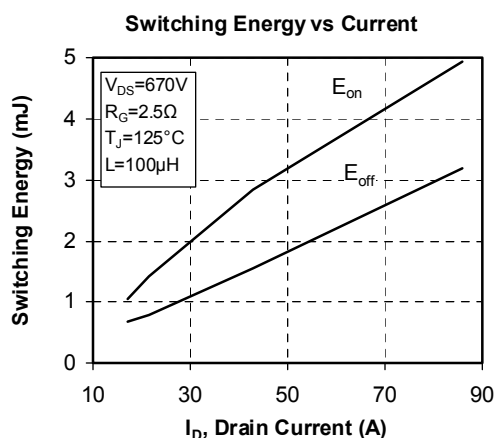
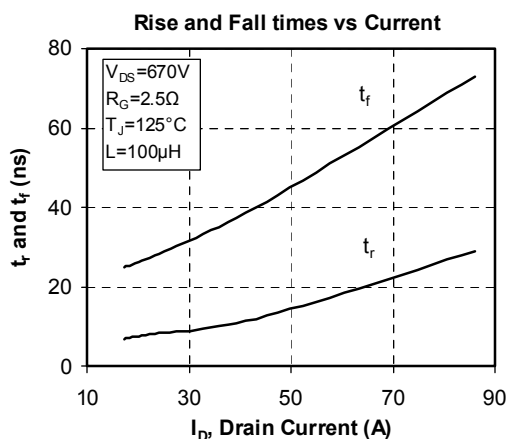
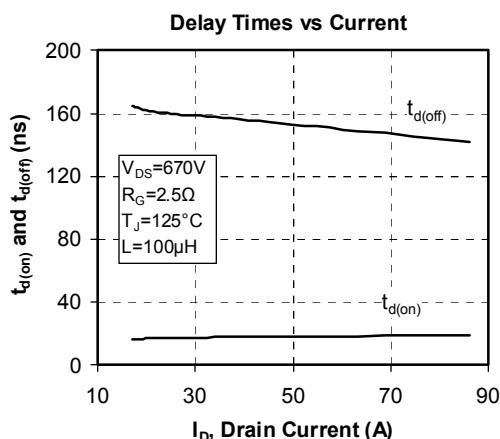
## Package outline



**Typical Performance Curve**







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