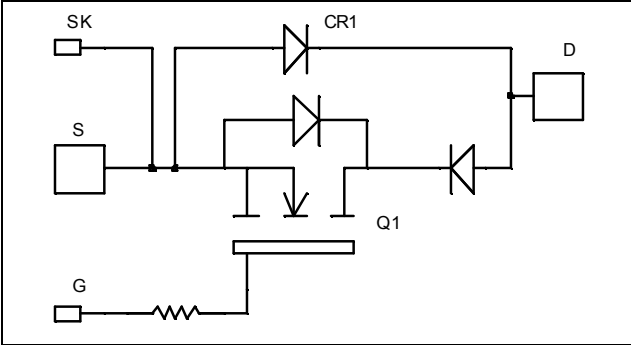


*Single switch
Series & parallel diodes
MOSFET Power Module*

**$V_{DSS} = 500V$
 $R_{DSon} = 13m\Omega$ max @ $T_j = 25^\circ C$
 $I_D = 335A$ @ $T_c = 25^\circ C$**

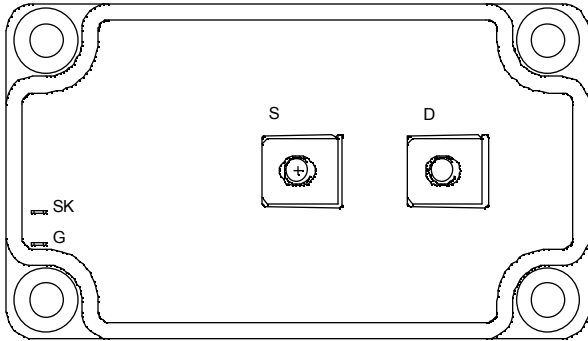


Application

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

Features

- Power MOS 7[®] 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
- AlN substrate for improved thermal performance



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 | 500 | V |
| I_D | Continuous Drain Current | $T_c = 25^\circ C$ | 335 |
| | | $T_c = 80^\circ C$ | 250 |
| I_{DM} | Pulsed Drain current | 1340 | |
| V_{GS} | Gate - Source Voltage | ± 30 | V |
| R_{DSon} | Drain - Source ON Resistance | 13 | m Ω |
| P_D | Maximum Power Dissipation | $T_c = 25^\circ C$ | 3290 |
| I_{AR} | Avalanche current (repetitive and non repetitive) | 71 | 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 | $V_{GS} = 0V, I_D = 1mA$ | 500 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{GS} = 0V, V_{DS} = 500V$ $T_j = 25^\circ\text{C}$ | | | 400 | μA |
| | | $V_{GS} = 0V, V_{DS} = 400V$ $T_j = 125^\circ\text{C}$ | | | 2000 | |
| $R_{DS(on)}$ | Drain - Source on Resistance | $V_{GS} = 10V, I_D = 167.5A$ | | | 13 | $\text{m}\Omega$ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS} = V_{DS}, I_D = 20mA$ | 3 | | 5 | V |
| I_{GSS} | Gate - Source Leakage Current | $V_{GS} = \pm 30V, V_{DS} = 0V$ | | | ± 300 | nA |

Dynamic Characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|--------------|------------------------------|--|---|------|-----|------|
| C_{iss} | Input Capacitance | $V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$ | | 42.2 | | nF |
| C_{oss} | Output Capacitance | | | 8.24 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 0.42 | | |
| Q_g | Total gate Charge | $V_{GS} = 10V$ $V_{Bus} = 250V$ $I_D = 335A$ | | 800 | | nC |
| Q_{gs} | Gate - Source Charge | | | 200 | | |
| Q_{gd} | Gate - Drain Charge | | | 420 | | |
| $T_{d(on)}$ | Turn-on Delay Time | Inductive switching @ 125°C $V_{GS} = 15V$ $V_{Bus} = 333V$ $I_D = 335A$ $R_G = 0.8\Omega$ | | 21 | | ns |
| T_r | Rise Time | | | 42 | | |
| $T_{d(off)}$ | Turn-off Delay Time | | | 96 | | |
| T_f | Fall Time | | | 100 | | |
| E_{on} | Turn-on Switching Energy ❶ | | Inductive switching @ 25°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 335A, R_G = 0.8\Omega$ | | 4 | |
| E_{off} | Turn-off Switching Energy ❷ | | | 4.16 | | |
| E_{on} | Turn-on Switching Energy ❶ | Inductive switching @ 125°C $V_{GS} = 15V, V_{Bus} = 333V$ $I_D = 335A, R_G = 0.8\Omega$ | | 6.32 | | mJ |
| E_{off} | Turn-off Switching Energy ❷ | | | 4.64 | | |

❶ E_{on} includes diode reverse recovery.

❷ In accordance with JEDEC standard JESD24-1.

Series diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | Min | Typ | Max | Unit |
|-------------|---------------------------------|---|-----|------|------|------|
| $I_{F(AV)}$ | Maximum Average Forward Current | 50% duty cycle $T_c = 85^\circ\text{C}$ | | 240 | | A |
| V_F | Diode Forward Voltage | $I_F = 240A$ | | 1.1 | 1.15 | V |
| | | $I_F = 480A$ | | 1.4 | | |
| | | $I_F = 240A$ $T_j = 125^\circ\text{C}$ | | 0.9 | | |
| t_{rr} | Reverse Recovery Time | $I_F = 240A$ $V_R = 133V$ $di/dt = 800A/\mu s$ $T_j = 25^\circ\text{C}$ | | 31 | | ns |
| | | $T_j = 125^\circ\text{C}$ | | 60 | | |
| Q_{rr} | Reverse Recovery Charge | $I_F = 240A$ $V_R = 133V$ $di/dt = 800A/\mu s$ $T_j = 25^\circ\text{C}$ | | 240 | | nC |
| | | $T_j = 125^\circ\text{C}$ | | 1000 | | |

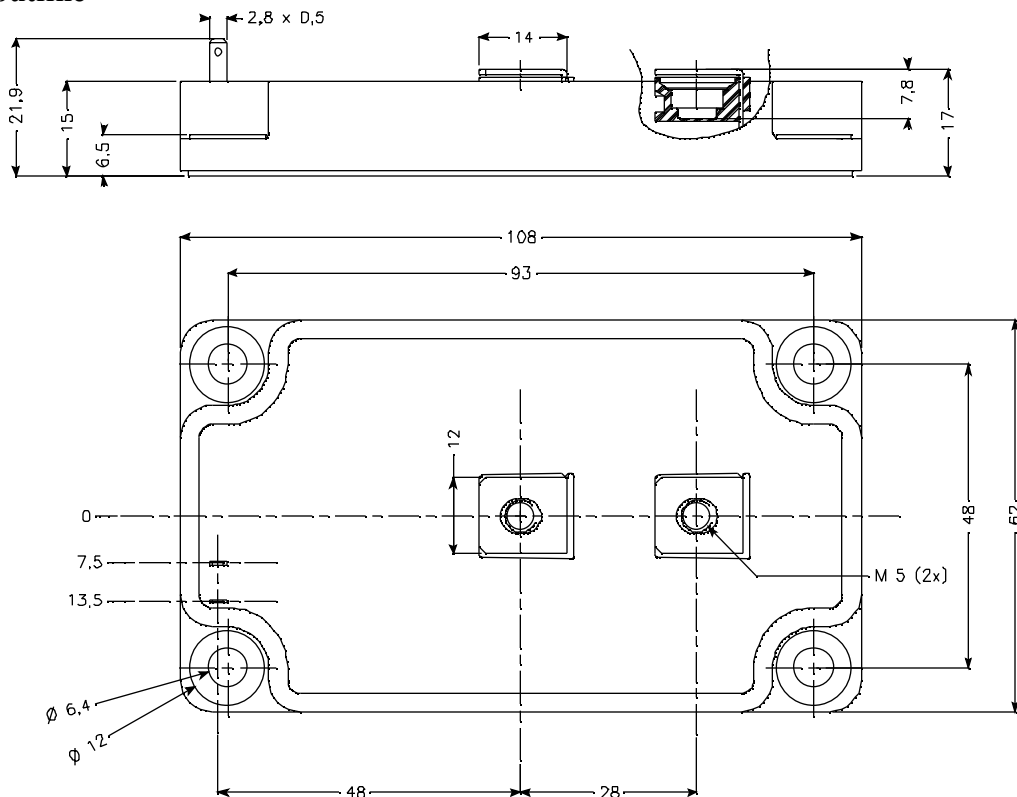
Parallel diode ratings and characteristics

| Symbol | Characteristic | Test Conditions | | Min | Typ | Max | Unit |
|-------------|---------------------------------|--|---------------------------|-----|------|-----|---------------|
| $I_{F(AV)}$ | Maximum Average Forward Current | 50% duty cycle | $T_c = 70^\circ\text{C}$ | | 360 | | A |
| V_F | Diode Forward Voltage | $I_F = 360\text{A}$ | | | 1.6 | 1.8 | V |
| | | $I_F = 720\text{A}$ | | | 1.9 | | |
| | | $I_F = 360\text{A}$ | $T_j = 125^\circ\text{C}$ | | 1.4 | | |
| t_{rr} | Reverse Recovery Time | $I_F = 360\text{A}$ $V_R = 400\text{V}$ $di/dt = 1000\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ | | 130 | | ns |
| | | | $T_j = 125^\circ\text{C}$ | | 170 | | |
| Q_{rr} | Reverse Recovery Charge | $I_F = 360\text{A}$ $V_R = 400\text{V}$ $di/dt = 1000\text{A}/\mu\text{s}$ | $T_j = 25^\circ\text{C}$ | | 1.32 | | μC |
| | | | $T_j = 125^\circ\text{C}$ | | 5.5 | | |

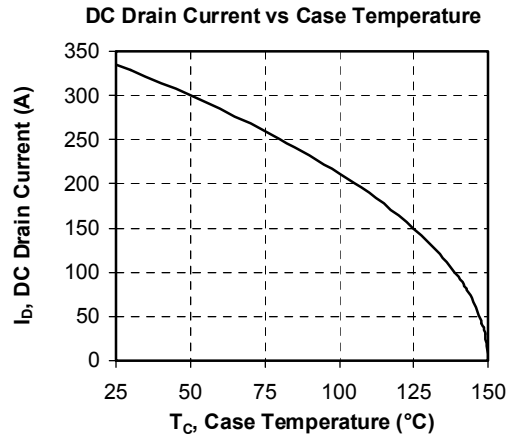
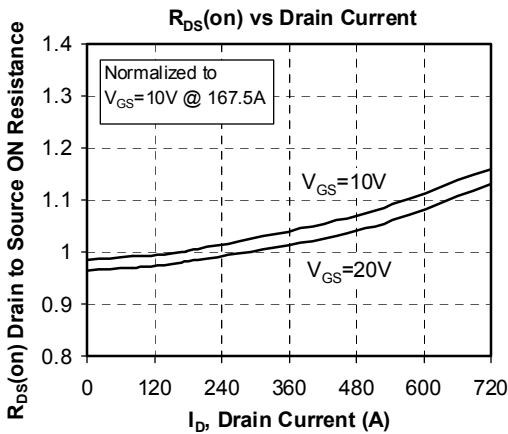
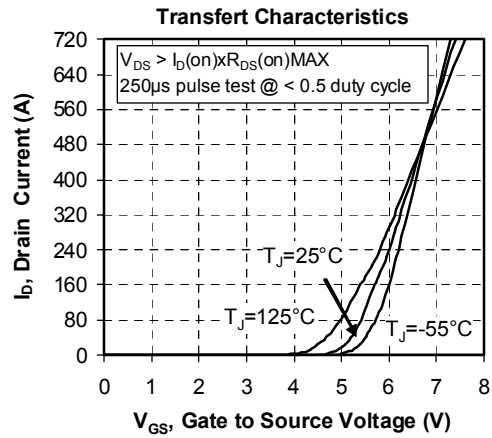
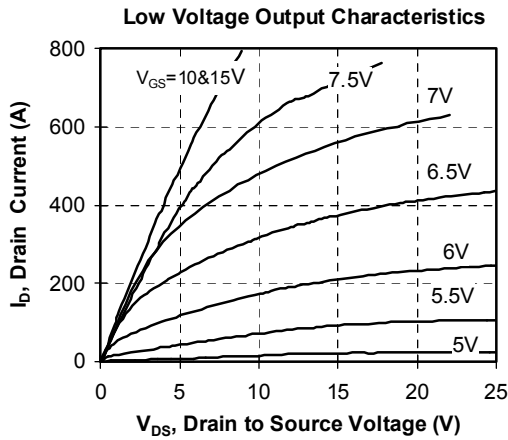
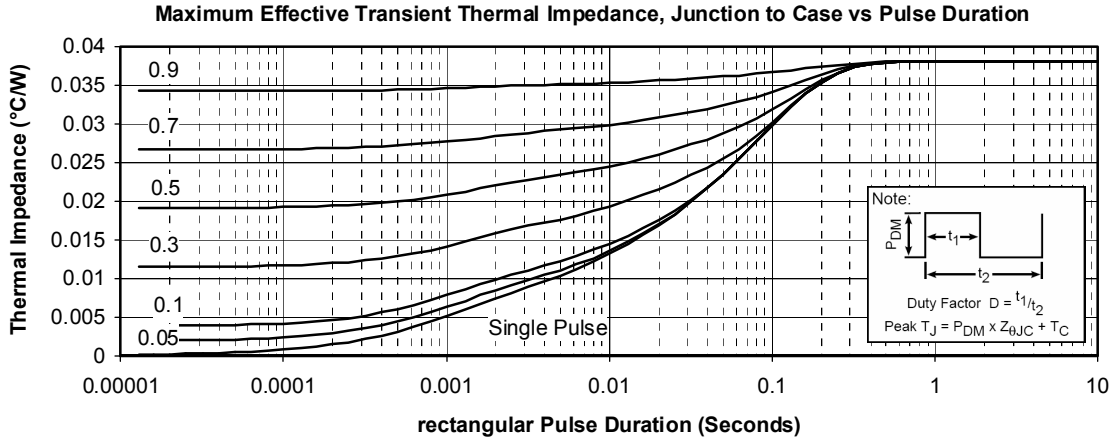
Thermal and package characteristics

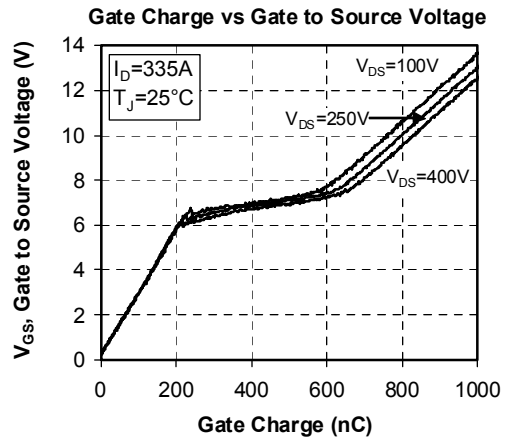
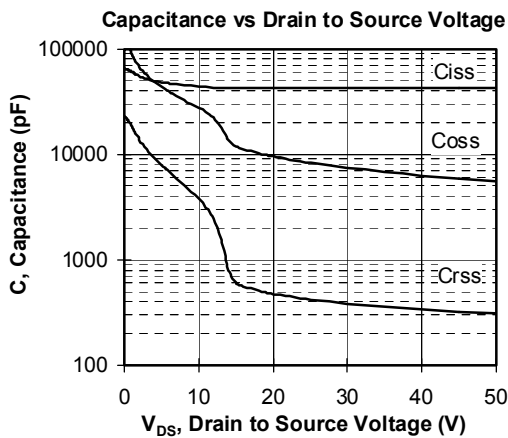
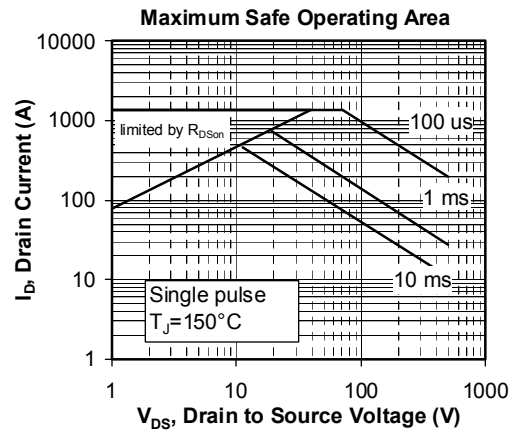
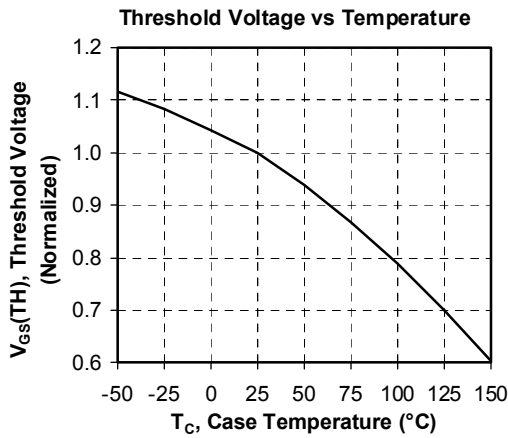
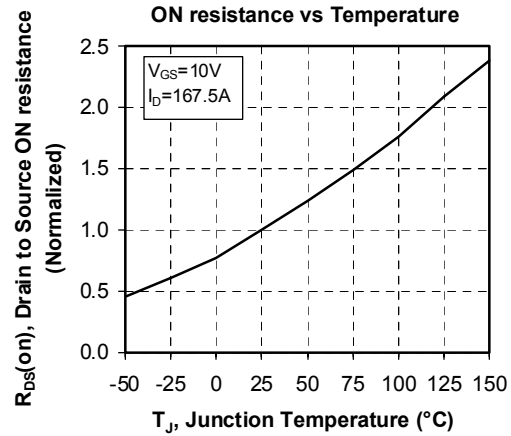
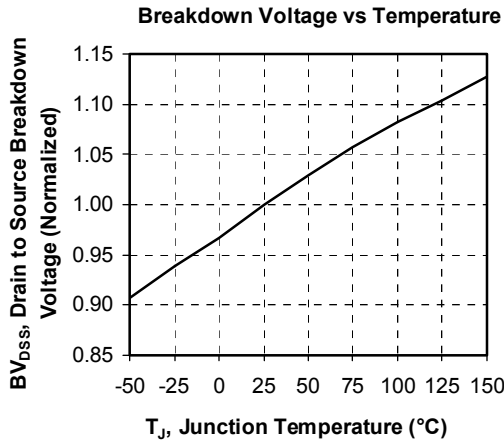
| Symbol | Characteristic | Min | Typ | Max | Unit | |
|------------|--|----------------|-----|-----|------------------|---------------------------|
| R_{thJC} | Junction to Case | Transistor | | | 0.038 | $^\circ\text{C}/\text{W}$ |
| | | Series diode | | | 0.23 | |
| | | Parallel diode | | | 0.16 | |
| V_{ISOL} | RMS Isolation Voltage, any terminal to case $t = 1\text{ min}$, $I_{isol} < 1\text{mA}$, 50/60Hz | 2500 | | | V | |
| T_J | Operating junction temperature range | -40 | | 150 | $^\circ\text{C}$ | |
| T_{STG} | Storage Temperature Range | -40 | | 125 | $^\circ\text{C}$ | |
| T_C | Operating Case Temperature | -40 | | 100 | $^\circ\text{C}$ | |
| Torque | Mounting torque | To heatsink | M6 | 3 | 5 | N.m |
| | | For terminals | M5 | 2 | 3.5 | |
| Wt | Package Weight | | | | 280 | g |

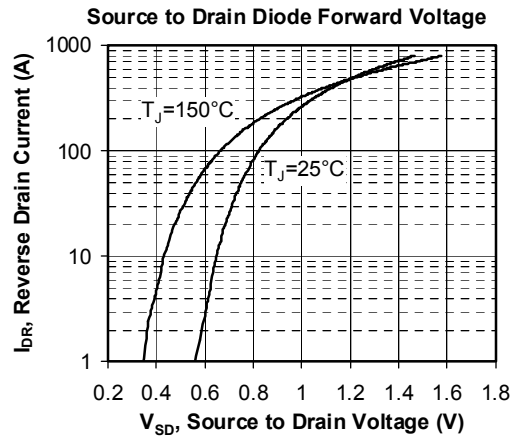
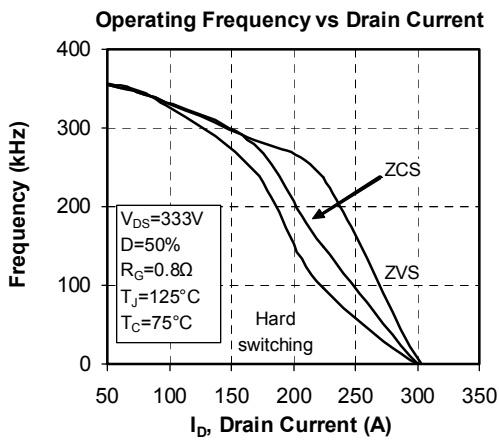
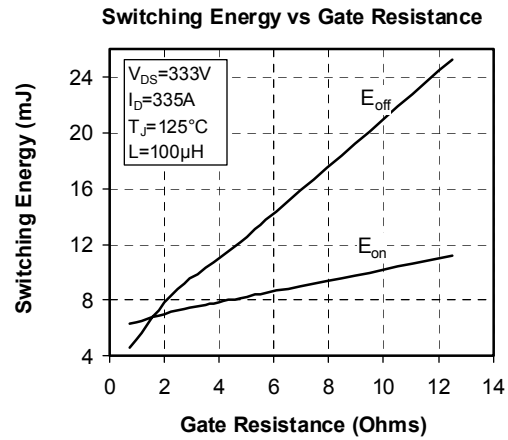
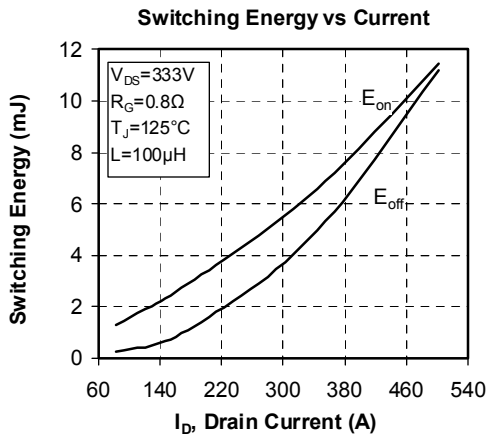
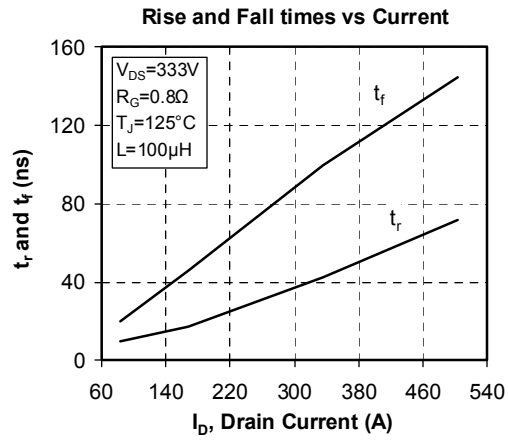
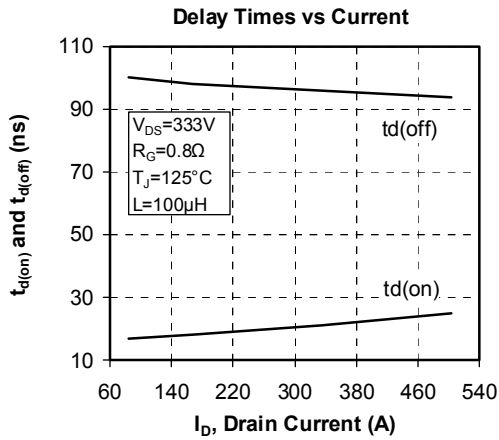
Package outline



Typical Performance Curve







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