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# FDS2672-F085
# N-Channel UltraFET Trench® MOSFET
## 200V, 3.9A, 70mΩ

### Features

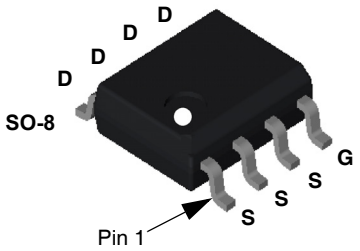
- Max $r_{DS(on)}$ = 70mΩ at $V_{GS}$ = 10V, $I_D$ = 3.9A
- Max $r_{DS(on)}$ = 80mΩ at $V_{GS}$ = 6V, $I_D$ = 3.5A
- Fast switching speed
- High performance trench technology for extremely low $r_{DS(on)}$
- Qualified to AEC Q101
- RoHS compliant

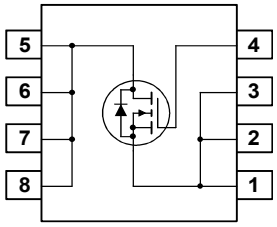
### General Description

This single N-Channel MOSFET is produced using ON Semiconductor's advanced UltraFET Trench® process that has been especially tailored to minimize the on-state resistance and yet maintain superior switching performance.

### Application

- DC-DC conversion




## MOSFET Maximum Ratings $T_A$ = 25°C unless otherwise noted

| Symbol | Parameter | | Ratings | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | | 200 | V |
| $V_{GS}$ | Gate to Source Voltage | | ±20 | V |
| $I_D$ | Drain Current -Continuous | (Note 1a) | 3.9 | A |
| | -Pulsed | | 50 | |
| $E_{AS}$ | Single Pulse Avalanche Energy | (Note 3) | 37.5 | mJ |
| $P_D$ | Power Dissipation | (Note 1a) | 2.5 | W |
| | Power Dissipation | (Note 1b) | 1.0 | |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature | | -55 to 150 | °C |

## Thermal Characteristics

| | | | | |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | (Note 1) | 25 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | (Note 1a) | 50 | |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | (Note 1b) | 125 | |

## Package Marking and Ordering Information

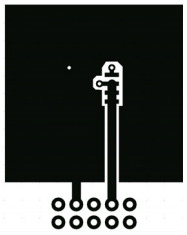
| Device Marking | Device | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|
| FDS2672 | FDS2672-F085 | 13'' | 12mm | 2500 units |

## Electrical Characteristics $T_J$ = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain to Source Breakdown Voltage | $I_D$ = 250μA, $V_{GS}$ = 0V | 200 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Breakdown Voltage Temperature Coefficient | $I_D$ = 250μA, referenced to 25°C | | 206 | | mV/°C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 160V, $V_{GS}$=0V | | | 1 | μA |
| | | $V_{DS}$ = 160V, $V_{GS}$=0V, $T_J$ = 55°C | | | 10 | μA |
| $I_{GSS}$ | Gate to Source Leakage Current | $V_{GS}$ = ±20V | | | ±100 | nA |
| **On Characteristics (Note 2)** | | | | | | |
| $V_{GS(th)}$ | Gate to Source Threshold Voltage | $V_{GS}$ = $V_{DS}$, $I_D$ = 250μA | 2 | 2.9 | 4 | V |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate to Source Threshold Voltage Temperature Coefficient | $I_D$ = 250μA, referenced to 25°C | | -11 | | mV/°C |
| $r_{DS(on)}$ | Drain to Source On Resistance | $V_{GS}$ = 10V, $I_D$ = 3.9A | | 59 | 70 | mΩ |
| | | $V_{GS}$ = 6V, $I_D$ = 3.5A | | 63 | 80 | |
| | | $V_{GS}$ = 10V, $I_D$ = 3.9A, $T_J$ = 125°C | | 124 | 148 | |
| $g_{FS}$ | Forward Transcondductance | $V_{DS}$ = 10V,$I_D$ = 3.9A | | 15 | | S |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 100V, $V_{GS}$ = 0V, f = 1MHz | | 1905 | 2535 | pF |
| $C_{oss}$ | Output Capacitance | | | 100 | 135 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 30 | 45 | pF |
| $R_g$ | Gate Resistance | f = 1MHz | | 0.7 | | Ω |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$ = 100V, $I_D$ = 3.9A $V_{GS}$ = 10V, $R_{GEN}$ = 6Ω | | 22 | 35 | ns |
| $t_r$ | Rise Time | | | 10 | 20 | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 35 | 56 | ns |
| $t_f$ | Fall Time | | | 10 | 20 | ns |
| $Q_{g(TOT)}$ | Total Gate Charge at 10V | $V_{DD}$ =100V $I_D$ = 3.9A | | 33 | 46 | nC |
| $Q_{gs}$ | Gate to Source Gate Charge | | | 11 | | nC |
| $Q_{gd}$ | Gate to Drain “Miller”Charge | | | 7 | | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source to Drain Diode Voltage | $V_{GS}$ = 0V, $I_S$ = 3.9A | | 0.75 | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = 3.9A, di/dt = 100A/μs | | 67 | 101 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $I_F$ = 3.9A, di/dt = 100A/μs | | 179 | 269 | nC |

**Notes:**

**1:** $R_{\theta JA}$ is the sum of the junction-to-case and case-to- ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user’s board design.



Scale 1:1 on letter size paper

**a)** 50°C/W (10 sec) 62.5°C/W steady state when mounted on a 1in$^2$ pad of 2 oz copper

**b)** 125°C/W when mounted on a minimum pad .

**2:** Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%.

**3:** Starting $T_J$ = 25°C, L = 3mH, $I_{AS}$ = 5A, $V_{DD}$ = 100V, $V_{GS}$ = 10V

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

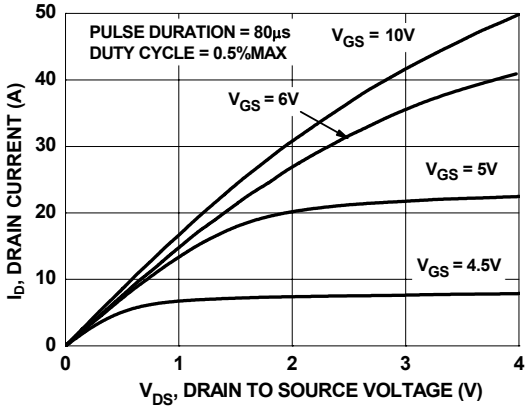



**Figure 1. On Region Characteristics**

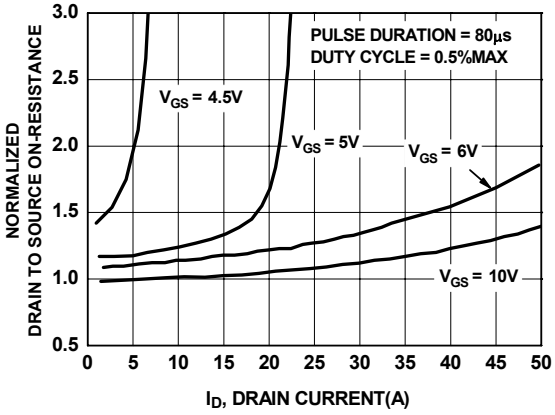



**Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage**

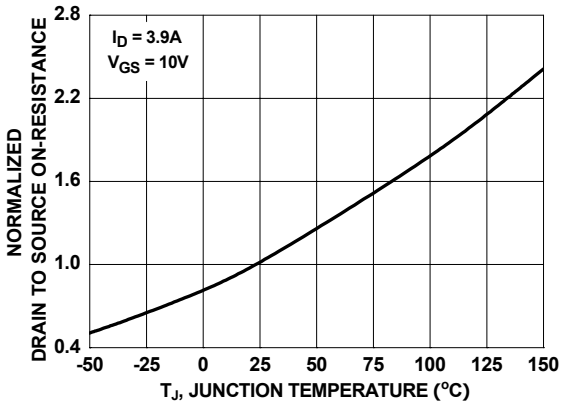



**Figure 3. Normalized On Resistance vs Junction Temperature**

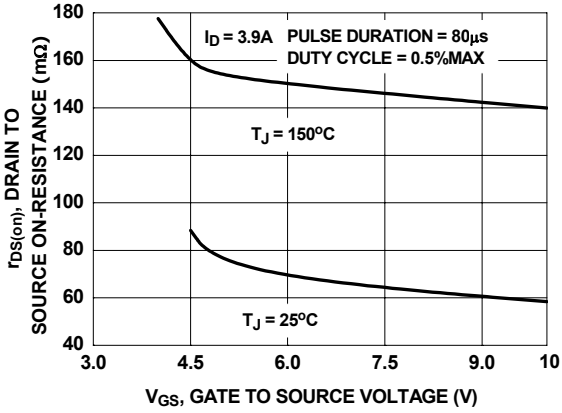



**Figure 4. On-Resistance vs Gate to Source Voltage**

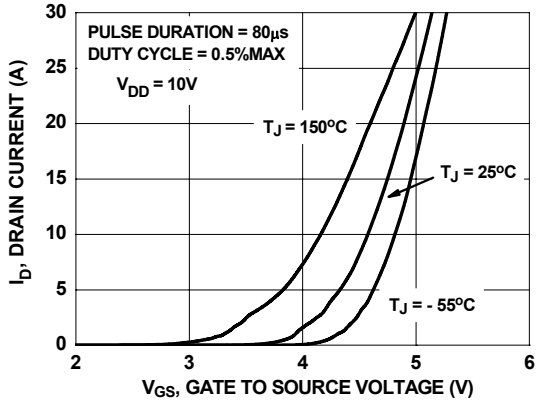



**Figure 5. Transfer Characteristics**

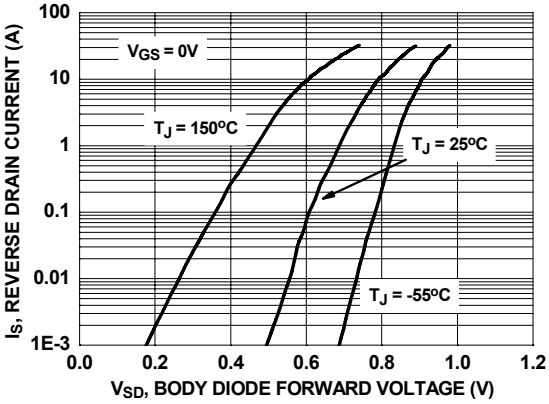



**Figure 6. Source to Drain Diode Forward Voltage vs Source Current**

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

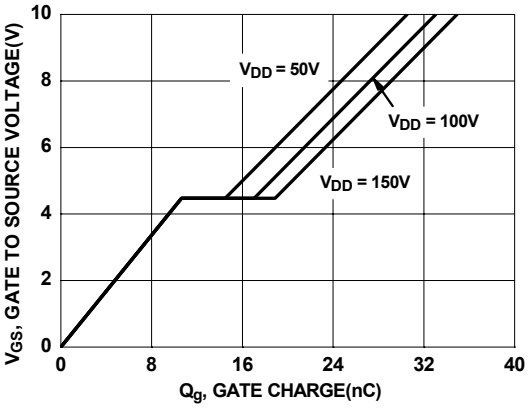



**Figure 7. Gate Charge Characteristics**

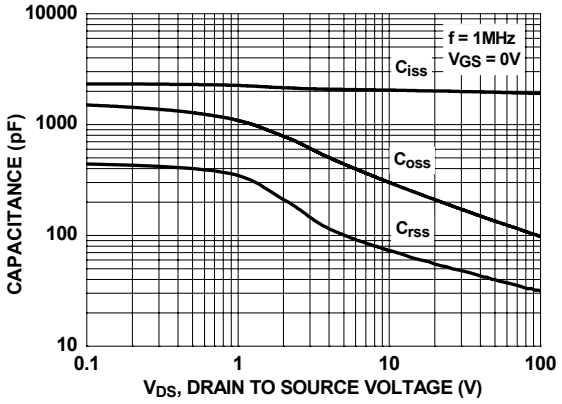



**Figure 8. Capacitance vs Drain to Source Voltage**

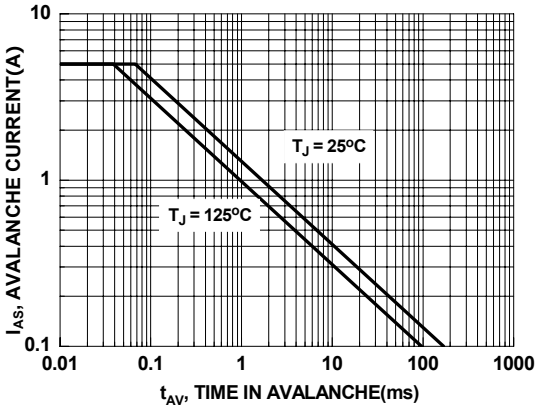



**Figure 9. Unclamped Inductive Switching Capability**

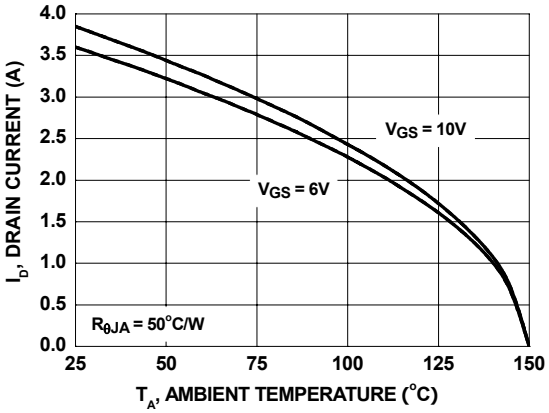



**Figure 10. Ambient Continuous Drain Current vs Case Temperature**

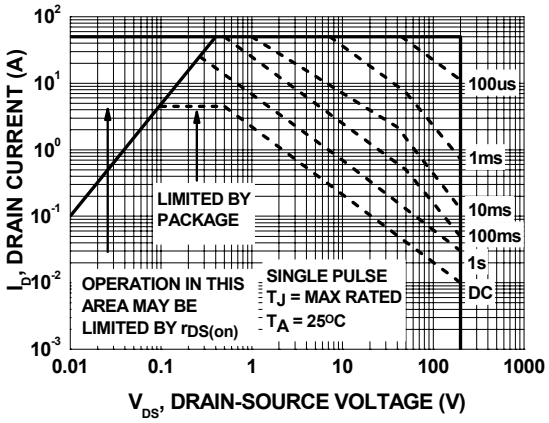



**Figure 11. Forward Bias Safe Operating Area**

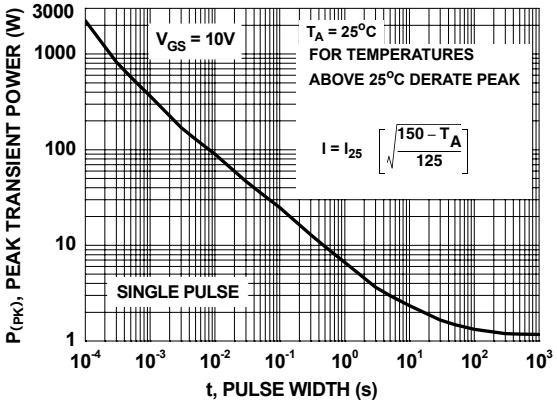



**Figure 12. Single Pulse Maximum Power Dissipation**

## Typical Characteristics $T_J$ = 25°C unless otherwise noted

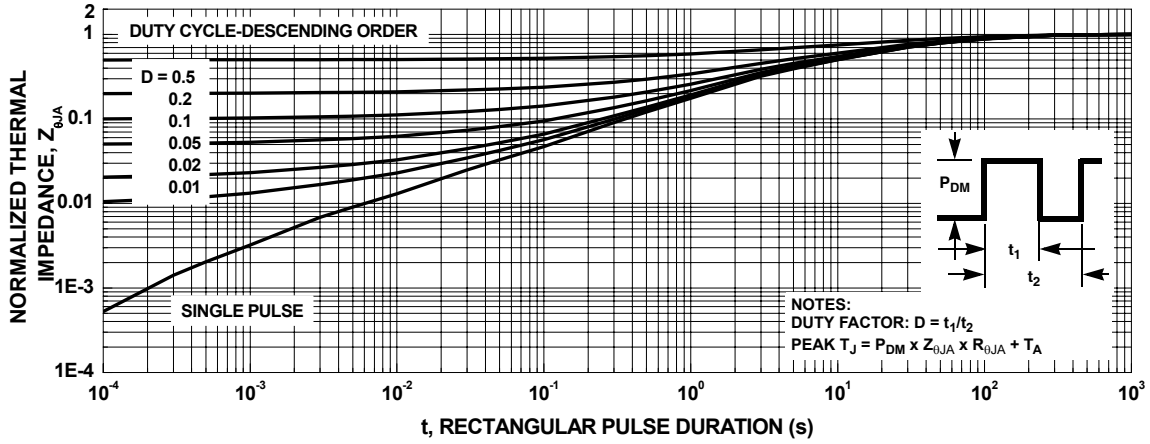



**Figure 13. Transient Thermal Response Curve**

**Thermal characterization performed using the conditions described in Note 1b**
**Transient thermal response will change depending on the circuit board design**

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