# N-Channel 200 V (D-S) MOSFET

RoHS COMPLIANT

| PRODUCT SUMMARY | | | |
|---|---|---|---|
| $V_{DS}$ (V) | $R_{DS(on)}$ (mΩ) (Typ.) | $I_D$ (A)[a] | $Q_g$ (Typ.) |
| 200 | 471 at $V_{GS}$ = 10 V | 1.4 | 16.8nC |
| | 478 at $V_{GS}$ = 4.5 V | | |

## FEATURES

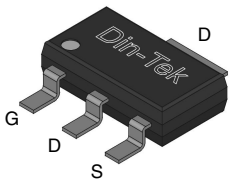
- DT-Trench Power MOSFET
- 100 % $R_g$ and UIS tested
- EAS Guaranteed
- High Power and Current Handing Capability

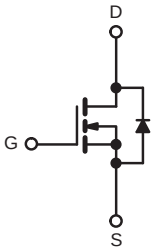
## APPLICATIONS

- Power Management Switches
- DC/DC Converters
- Load Switch

**SOT-223 Pin Configuration**

**Top View**




N-Channel MOSFET

| ABSOLUTE MAXIMUM RATINGS ($T_C$ = 25 °C, unless otherwise noted) | | | | |
|---|---|---|---|---|
| **PARAMETER** | | **SYMBOL** | **LIMIT** | **UNIT** |
| Drain-Source Voltage | | $V_{DS}$ | 200 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 20 | |
| Continuous Drain Current ($T_J$ = 150 °C)[a] | $T_C$ = 25 °C | $I_D$ | 1.4 | A |
| | $T_C$ = 100 °C | | 0.86 | |
| Pulsed Drain Current[b] | | $I_{DM}$ | 5.6 | |
| Single Avalanche Energy | | $E_{AS}$ | 10.6 | mJ |
| Maximum Power Dissipation[c] | $T_C$ = 25 °C | $P_D$ | 2.5 | W |
| | $T_C$ = 100 °C | | 1 | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | - 55 to +150 | °C |

| THERMAL RESISTANCE RATINGS | | | |
|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **LIMIT** | **UNIT** |
| Junction-to-Ambient (PCB Mount)[d] | $R_{thJA}$ | 50 | °C/W |

**Notes**

a. Calculated continuous current based on maximum allowablejunction temperature.
b. Repetitive rating; pulse width limited by max. junction temperature.
c. Pd is based on max. junction temperature, using junction-case thermal resistance.
d. The value of $R_{\theta JA}$ is measured with the device mounted on 1 in 2 FR-4 board with 2oz. Copper,in a still air environment with Ta=25 °C.

| SPECIFICATIONS ($T_C$ = 25 °C, unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 µA | 200 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 1 | - | 3 | |
| Gate-Body Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = ± 20 V | - | - | ± 100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 200 V, $V_{GS}$ = 0 V | - | - | 1 | µA |
| | | $V_{DS}$ =160 V, $V_{GS}$ = 0 V, $T_J$ = 125 °C | - | - | 100 | |
| On-State Drain Current [a] | $I_{D(on)}$ | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 10 V | 1.4 | - | - | A |
| Drain-Source On-State Resistance [a] | $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 2 A | - | 471 | 611 | mΩ |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 2 A | - | 478 | 636 | |
| Forward Transconductance [a] | $g_{fs}$ | $V_{DS}$ = 5 V, $I_D$ = 2 A | - | 6 | - | S |
| **Dynamic [b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 100 V, f = 1 MHz | - | 742 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 14 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 5 | - | |
| Total Gate Charge [c] | $Q_g$ | $V_{DS}$ = 100 V,$V_{GS}$ = 10 V, $I_D$ = 2 A | - | 16.8 | - | nC |
| Gate-Source Charge [c] | $Q_{gs}$ | | - | 2.4 | - | |
| Gate-Drain Charge [c] | $Q_{gd}$ | | - | 6.8 | - | |
| Turn-On Delay Time [c] | $t_{d(on)}$ | $V_{DD}$ = 100 V, $R_L$ = 50 Ω,$R_{GEN}$ = 2.5 Ω $V_{GS}$ = 10 V | - | 10 | - | ns |
| Rise Time [c] | $t_r$ | | - | 13 | - | |
| Turn-Off Delay Time [c] | $t_{d(off)}$ | | - | 16 | - | |
| Fall Time [c] | $t_f$ | | - | 14 | - | |
| **Drain-Source Body Diode Ratings and Characteristics [b]** ($T_C$ = 25 °C) | | | | | | |
| Continuous Source-Drain Diode Current | $I_S$ | $T_C$ = 25 °C | - | - | 1.4 | A |
| Pulsed Current | $I_{SM}$ | | - | - | 5.6 | A |
| Forward Voltage [a] | $V_{SD}$ | $I_F$ = 2 A, $V_{GS}$ = 0 V | - | - | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $I_F$ = 2 A, di/dt = 100 A/µs | - | 86 | - | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 290 | - | nC |

**Notes**

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.
b. Guaranteed by design, not subject to production testing.
c. Independent of operating temperature.

*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

**TYPICAL CHARAC TERISTICS** (25 °C, unless otherwise noted)

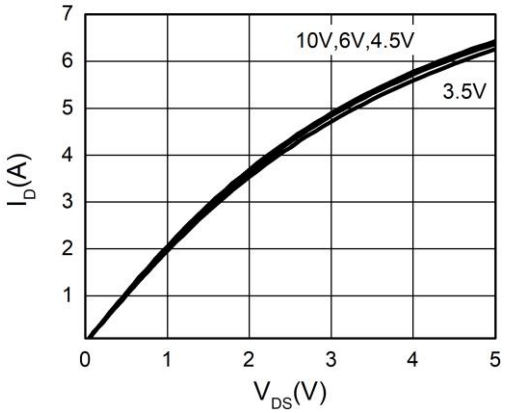



**Fig.1 Typical Output Characteristics**

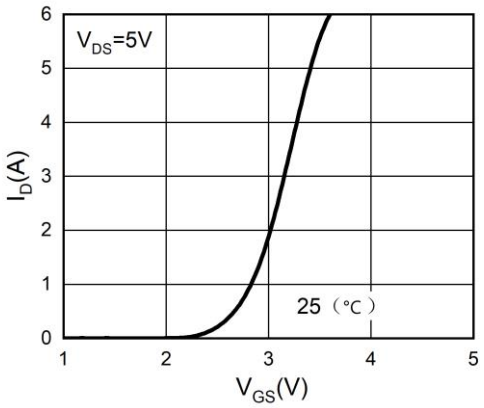



**Fig.2 Transfer Characteristics**

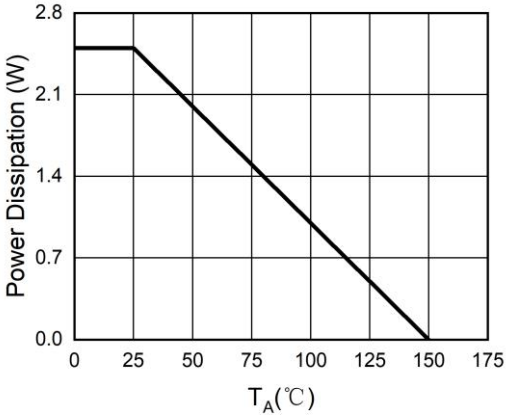



**Fig. 3 Power Dissipation**

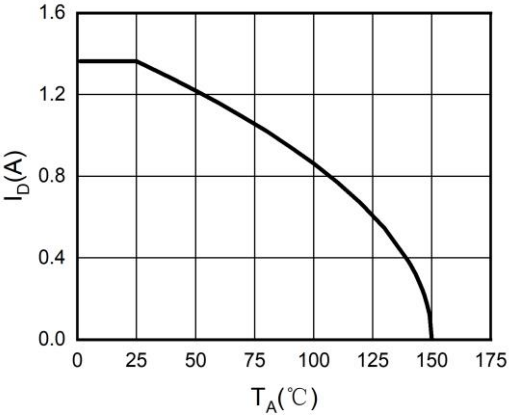



**Fig. 4 Drain Current**

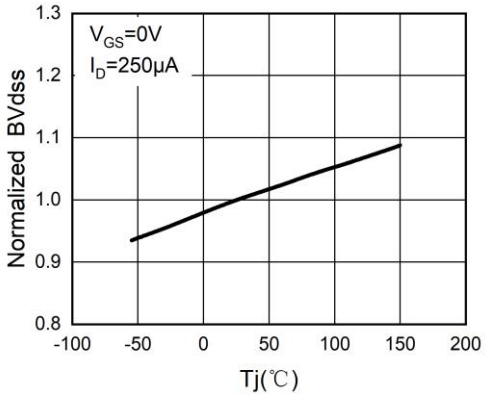



**Fig. 5 $BV_{DSS}$ vs Junction Temperature**

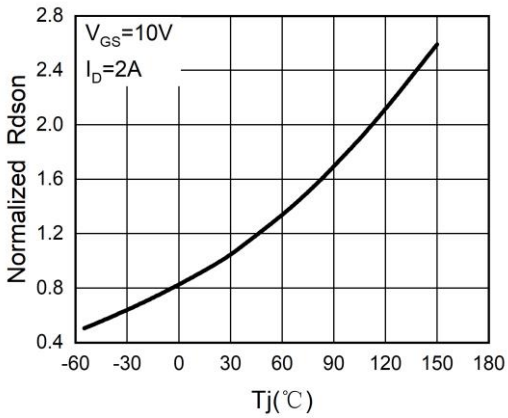



**Fig. 6 $R_{DS(ON)}$ vs Junction Temperature**

**TYPICAL CHARAC TERISTICS** (25 °C, unless otherwise noted)

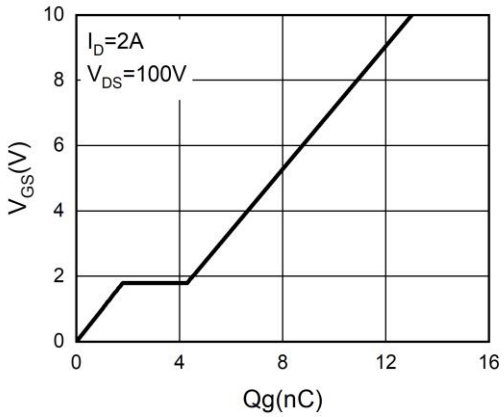



**Fig. 7 Capacitance**

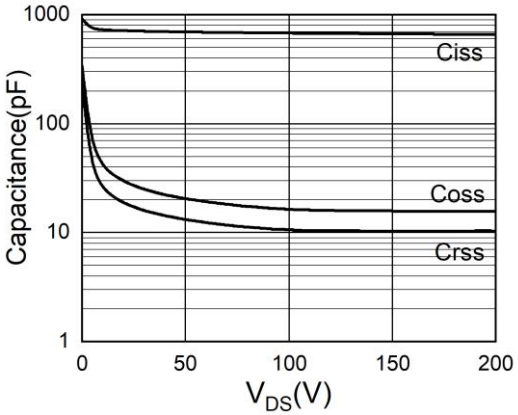



**Fig. 8 Gate Charge Waveforms**

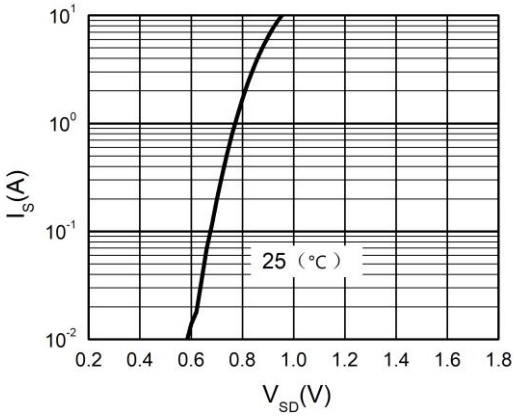



**Fig. 9 Body-Diode Characteristics**

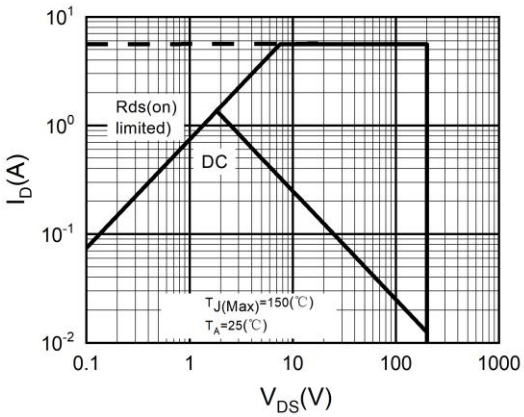
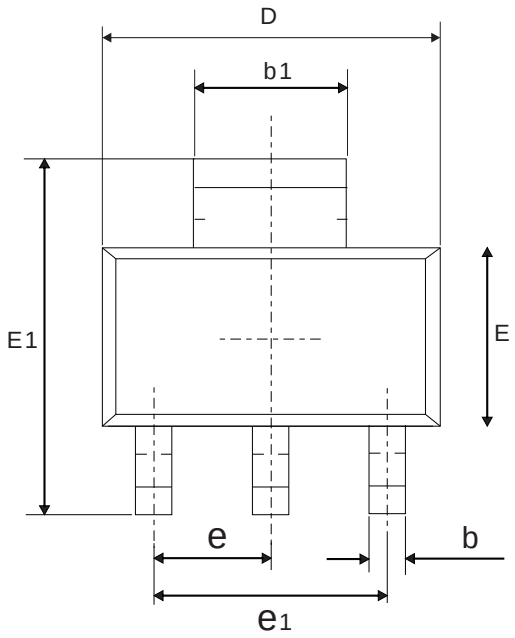
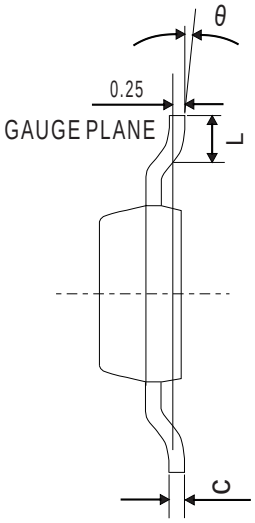



**Fig. 10 Maximum Safe Operation Area**

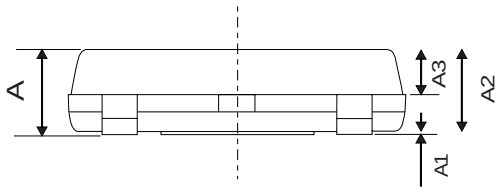
# SOT-223-3L PACKAGE OUTLINE




TOP VIEW




SIDE VIEW




SIDE VIEW

COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | TYP | MAX |
|---|---|---|---|
| A | - | - | 1.95 |
| A1 | 0.00 | 0.05 | 0.16 |
| A2 | 1.35 | 1.60 | 1.85 |
| A3 | 0.65 | 0.90 | 1.15 |
| b | 0.55 | 0.70 | 0.90 |
| b1 | 2.75 | 3.00 | 3.30 |
| C | 0.18 | 0.30 | 0.42 |
| D | 6.00 | 6.50 | 7.00 |
| E | 3.10 | 3.50 | 3.90 |
| E1 | 6.50 | 7.00 | 7.50 |
| e1 | 4.20 | 4.60 | 5.00 |
| L | 0.78 | - | 1.28 |
| θ | 0° | 5° | 10° |
| e | 2.3BSC | | |

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