

Features

- $V_{DS} = -40V$ $I_D = -85A$
- $R_{DS(ON)} < -10m\Omega$ @ $V_{GS} = -10V$ (Type: 6.0m Ω)

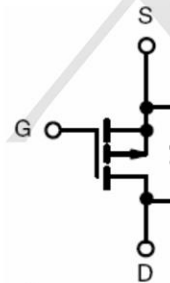
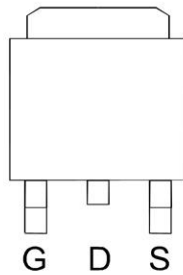
Application

- Load/Power Switching
- Interfacing Switching
- Battery Management for Ultra Small Portable Electronics
- Logic Level Shift

Package and Pin Configuration

(TO-252-3L)

Top View



Marking:



Absolute Maximum Ratings ($T_A = 25^\circ C$ unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---------------------------|--|------------|--------------|
| V_{DS} | Drain-Source Voltage | -40 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_C = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -85 | A |
| $I_D @ T_C = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ -10V^1$ | -56 | A |
| I_{DM} | Pulsed Drain Current ² | -280 | A |
| EAS | Single Pulse Avalanche Energy ³ | 500 | mJ |
| I_{AS} | Avalanche Current | -50 | A |
| $P_D @ T_C = 25^\circ C$ | Total Power Dissipation ⁴ | 52.1 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient ¹ | 62 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | 2.4 | $^\circ C/W$ |

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|--|---|------|--------|-----------|--------------------|
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=-250\mu A$ | -40 | | --- | V |
| $\Delta BV_{DSS}/\Delta T_J$ | BV_{DSS} Temperature Coefficient | Reference to 25°C , $I_D=-1\text{mA}$ | --- | -0.023 | --- | $V/^\circ\text{C}$ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance ² | $V_{GS}=-10V, I_D=-12A$ | --- | 6.0 | 10 | m Ω |
| | | $V_{GS}=-4.5V, I_D=-12A$ | --- | 8.5 | 15 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}=V_{DS}, I_D=-250\mu A$ | -1.2 | -1.8 | -2.5 | V |
| I_{DSS} | Drain-Source Leakage Current | $V_{DS}=-40V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $V_{DS}=-40V, V_{GS}=0V, T_J=55^\circ\text{C}$ | --- | --- | 5 | |
| I_{GSS} | Gate-Source Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | nA |
| g_{fs} | Forward Transconductance | $V_{DS}=-15V, I_D=-12A$ | --- | 20 | --- | S |
| R_g | Gate Resistance | $V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$ | --- | 7 | 14 | Ω |
| Q_g | Total Gate Charge (-4.5V) | $V_{DS}=-20V, V_{GS}=-10V, I_D=-12A$ | --- | 27.9 | --- | nC |
| Q_{gs} | Gate-Source Charge | | --- | 7.7 | --- | |
| Q_{gd} | Gate-Drain Charge | | --- | 7.5 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}=-20V, V_{GS}=-10V, R_G=3.0\Omega, I_D=-12A$ | --- | 40 | --- | ns |
| T_r | Rise Time | | --- | 35.2 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 100 | --- | |
| T_f | Fall Time | | --- | 9.6 | --- | |
| C_{iss} | Input Capacitance | $V_{DS}=-20V, V_{GS}=0V, f=1\text{MHz}$ | --- | 6500 | --- | pF |
| C_{oss} | Output Capacitance | | --- | 790 | --- | |
| C_{rss} | Reverse Transfer Capacitance | | --- | 605 | --- | |
| I_S | Continuous Source Current ^{1,5} | $V_G=V_D=0V, \text{Force Current}$ | --- | --- | -85 | A |
| V_{SD} | Diode Forward Voltage ² | $V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$ | --- | --- | -1.2 | V |

Typical Characteristics

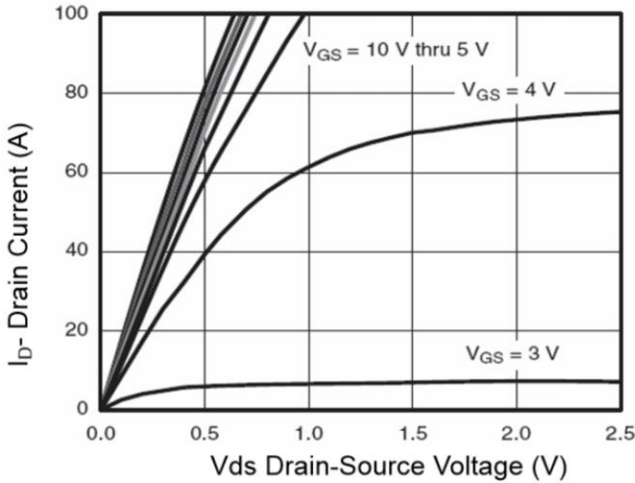


Figure 1 Output Characteristics

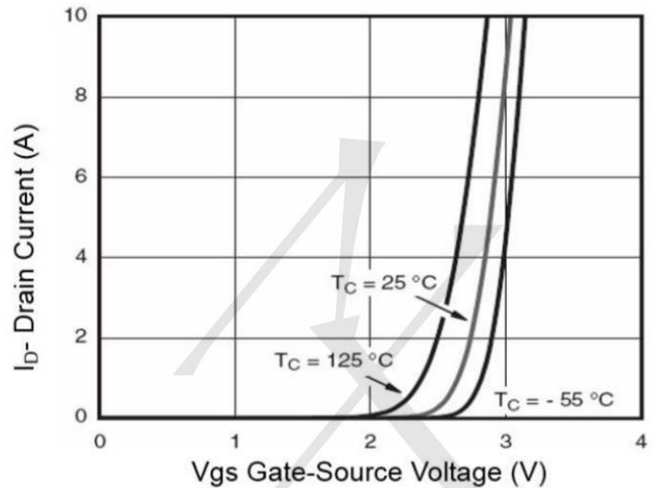


Figure 2 Transfer Characteristics

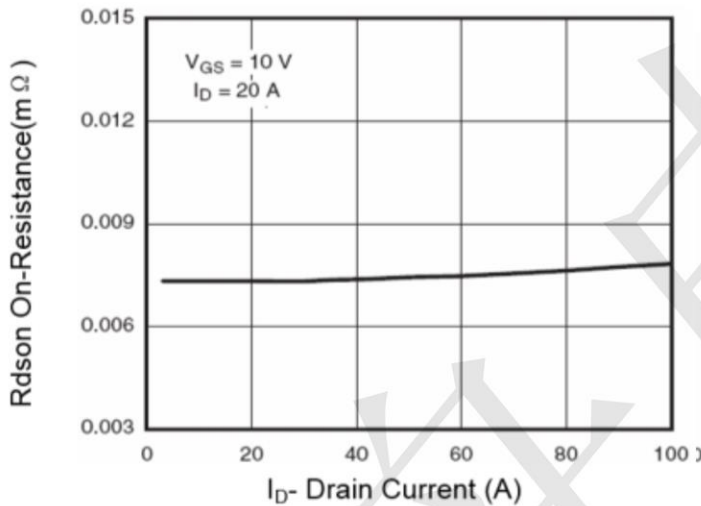


Figure 3 Rdson- Drain Current

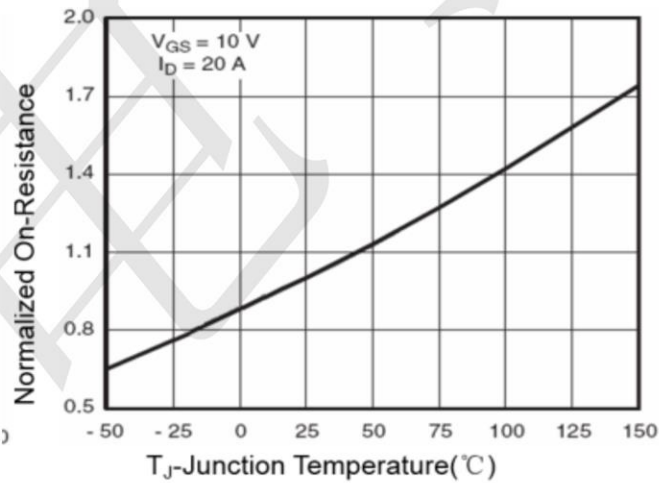


Figure 4 Rdson-Junction Temperature

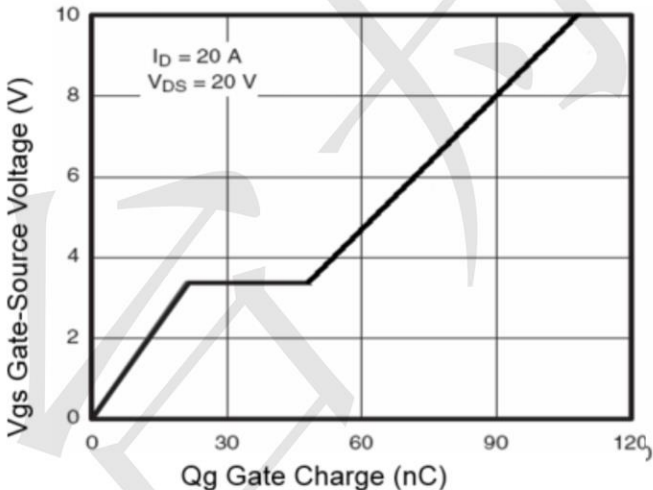


Figure 5 Gate Charge

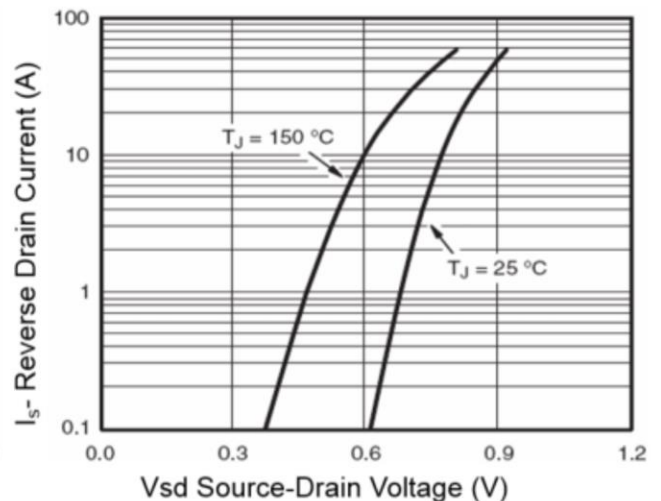


Figure 6 Source- Drain Diode Forward



Typical Characteristics

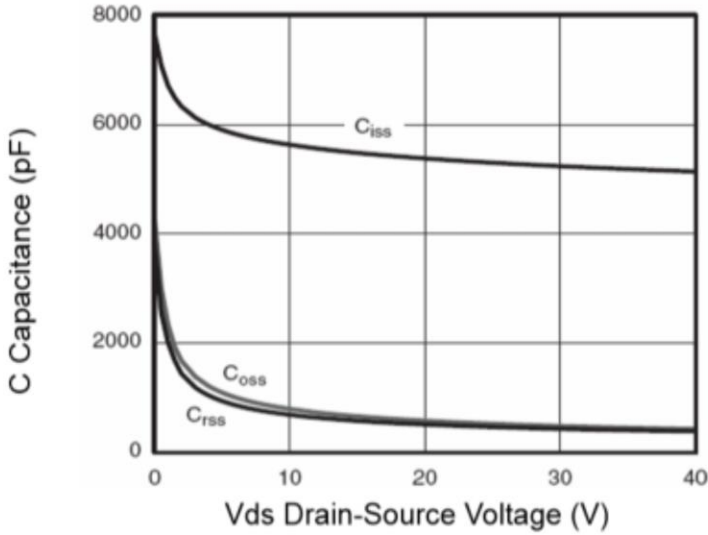


Figure 7 Capacitance vs Vds

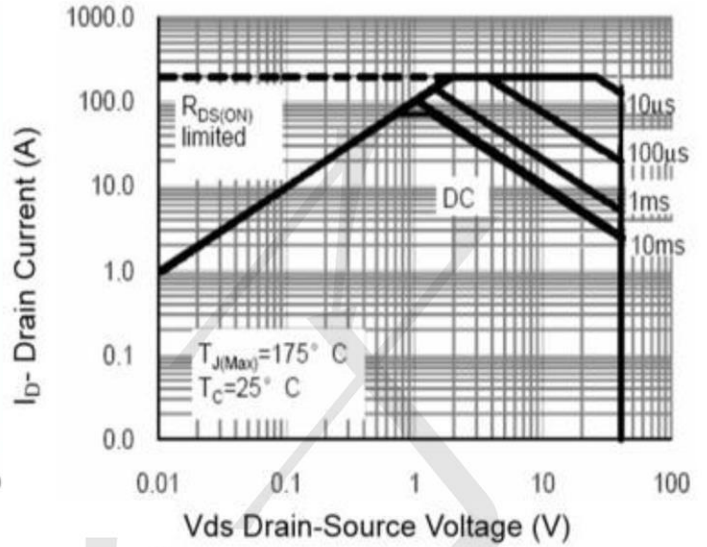


Figure 8 Safe Operation Area

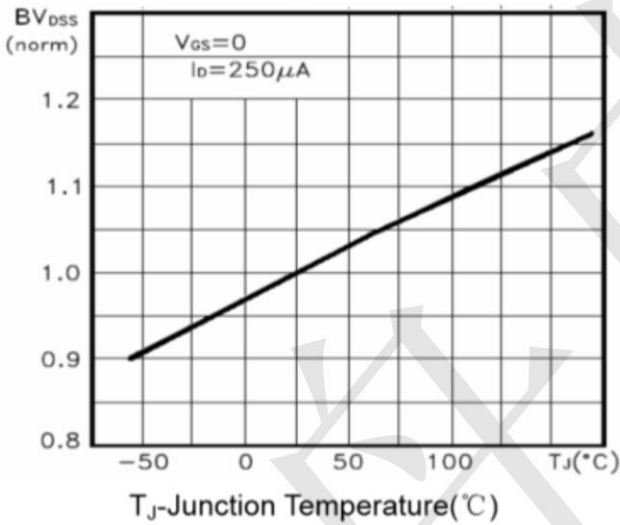


Figure 9 BV_{DSS} vs Junction Temperature

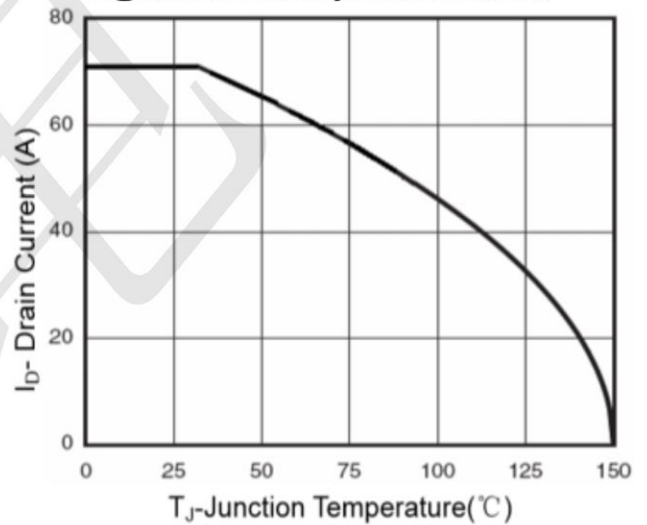


Figure 10 ID Current Derating vs Junction Temperature

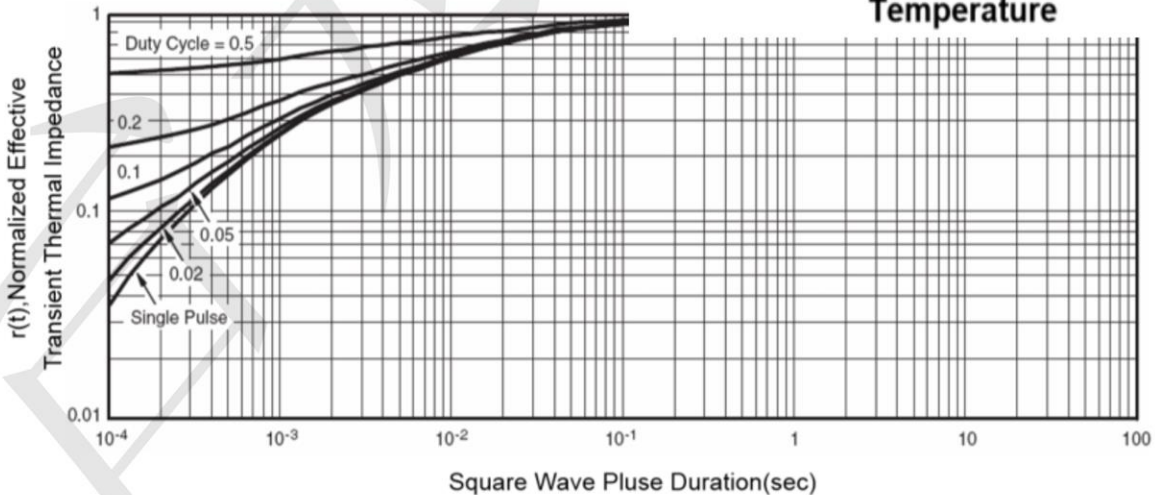
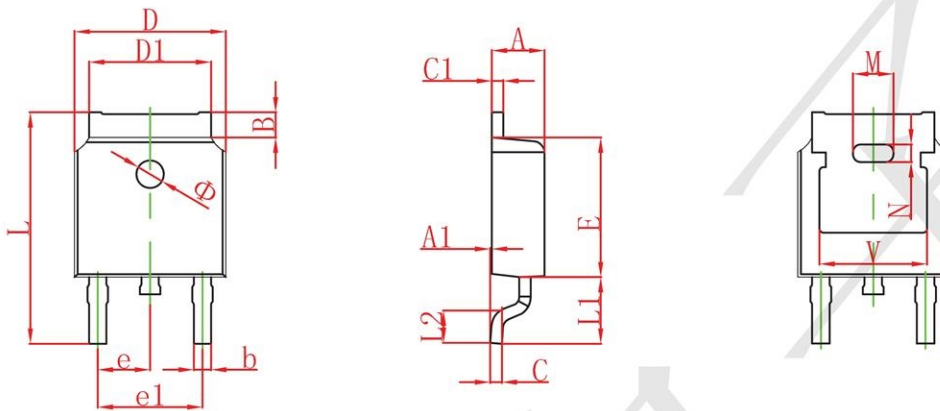


Figure 11 Normalized Maximum Transient Thermal Impedance

T0252 Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.380 | 0.087 | 0.094 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| B | 0.800 | 1.400 | 0.031 | 0.055 |
| b | 0.710 | 0.810 | 0.028 | 0.032 |
| c | 0.460 | 0.560 | 0.018 | 0.022 |
| c1 | 0.460 | 0.560 | 0.018 | 0.022 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.130 | 5.460 | 0.202 | 0.215 |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.286 TYP. | | 0.090 TYP. | |
| e1 | 4.327 | 4.727 | 0.170 | 0.186 |
| M | 1.778 REF. | | 0.070 REF. | |
| N | 0.762 REF. | | 0.018 REF. | |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.9 REF. | | 0.114 REF. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| V | 4.830 REF. | | 0.190 REF. | |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |