

N-channel Enhancement Mode Power MOSFET

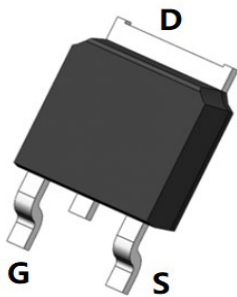
Features

- $V_{DS} = 150V$, $I_D = 20 A$
 $R_{DS(ON)} < 70 m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 80 m\Omega @ V_{GS} = 4.5V$

General Features

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free and Green Available

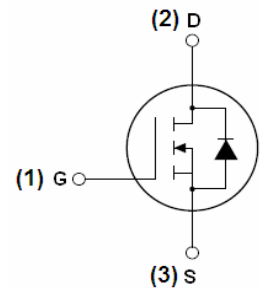
100% UIS TESTED!
 100% ΔV_{ds} TESTED!



TO-252-2L Top View



Pin Assignment



Schematic Diagram

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

| Symbol | Parameter | Limit | Unit |
|--------------------|---|------------|---------------|
| V_{DS} | Drain-Source Voltage | 150 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| I_D | Drain Current-Continuous | 20 | A |
| $I_D(100^\circ C)$ | Drain Current-Continuous($T_C = 100^\circ C$) | 14 | A |
| I_{DM} | Pulsed Drain Current | 40 | A |
| P_D | Maximum Power Dissipation | 90 | W |
| | Derating factor | 0.6 | W/ $^\circ C$ |
| E_{AS} | Single pulse avalanche energy ^(Note 5) | 80 | mJ |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 175 | $^\circ C$ |

Thermal Characteristic

| | | | |
|-----------------|--|-----|--------------|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case ^(Note 2) | 1.7 | $^\circ C/W$ |
|-----------------|--|-----|--------------|

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

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|----------------------------------|--|-----|------|-----------|------------|
| Off Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 150 | 165 | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=150V, V_{GS}=0V$ | - | - | 1 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| On Characteristics (Note 3) | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 2 | | 4 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}=10V, I_D=10A$ | - | | 70 | m Ω |
| | | $V_{GS}=7V, I_D=10A$ | | | 80 | |
| g_{FS} | Forward Transconductance | $V_{DS}=5V, I_D=10A$ | - | 20 | - | S |
| Dynamic Characteristics (Note 4) | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=75V, V_{GS}=0V,$ $F=1.0MHz$ | - | 1810 | - | PF |
| C_{oss} | Output Capacitance | | - | 61 | - | PF |
| C_{riss} | Reverse Transfer Capacitance | | - | 45 | - | PF |
| Switching Characteristics (Note 4) | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=75V, R_L=5\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$ | - | 15.5 | - | nS |
| t_r | Turn-on Rise Time | | - | 8.5 | - | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 19.5 | - | nS |
| t_f | Turn-Off Fall Time | | - | 7 | - | nS |
| Q_g | Total Gate Charge | $V_{DS}=75V, I_D=10A,$ $V_{GS}=10V$ | - | 45 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 9 | - | nC |
| Q_{gd} | Gate-Drain Charge | | - | 12 | - | nC |
| Drain-Source Diode Characteristics | | | | | | |
| V_{SD} | Diode Forward Voltage (Note 3) | $V_{GS}=0V, I_S=20A$ | - | - | 1.2 | V |
| I_S | Diode Forward Current (Note 2) | - | - | - | 20 | A |
| t_{rr} | Reverse Recovery Time | $T_J = 25^{\circ}\text{C}, I_F = 10A$ $di/dt = 100A/\mu s$ (Note 3) | - | 32 | - | nS |
| Q_{rr} | Reverse Recovery Charge | | - | 53 | - | nC |
| t_{on} | Forward Turn-On Time | Intrinsic turn-on time is negligible (turn-on is dominated by LS+LD) | | | | |

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production
5. EAS condition: $T_J=25^{\circ}\text{C}, V_{DD}=50V, V_G=10V, L=0.5mH, R_g=25\Omega$

Typical Electrical and Thermal Characteristics (Curves)

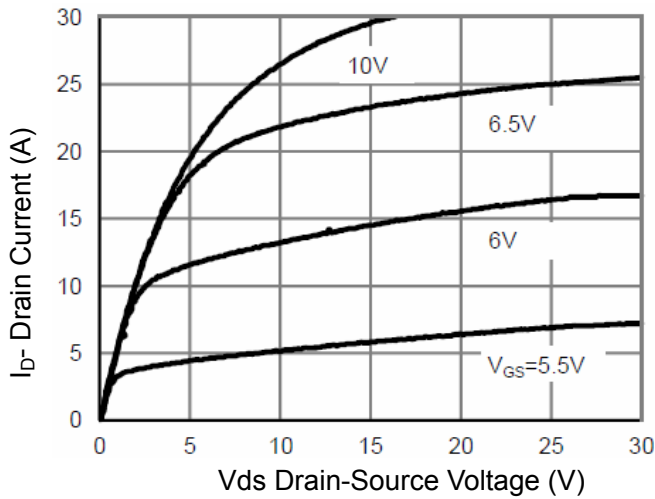


Figure 1 Output Characteristics

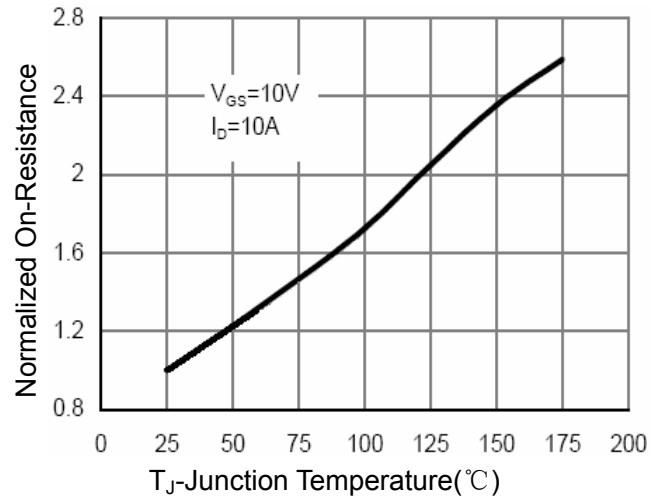


Figure 4 R_{dson} -Junction Temperature

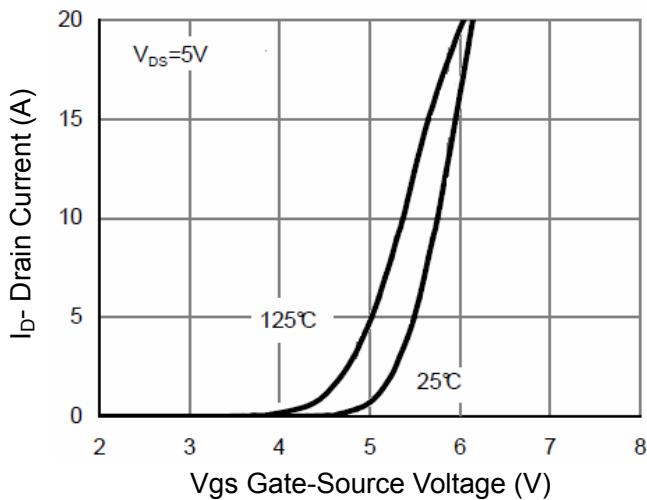


Figure 2 Transfer Characteristics

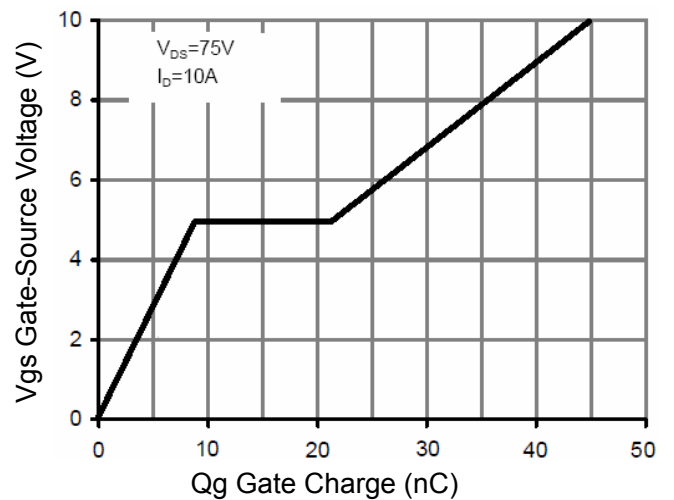


Figure 5 Gate Charge

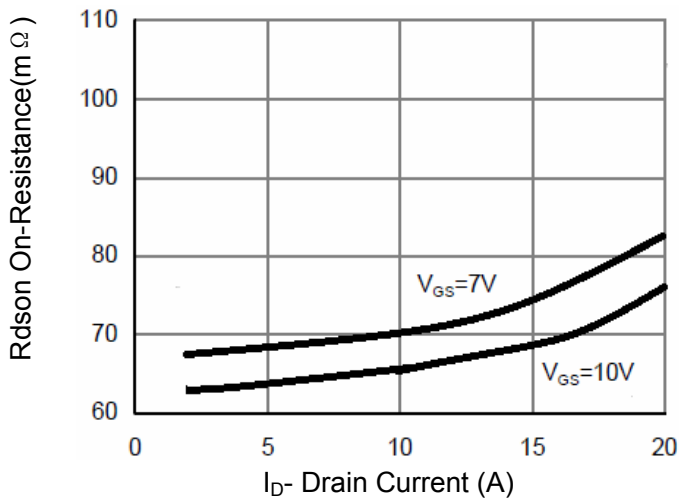


Figure 3 R_{dson} - Drain Current

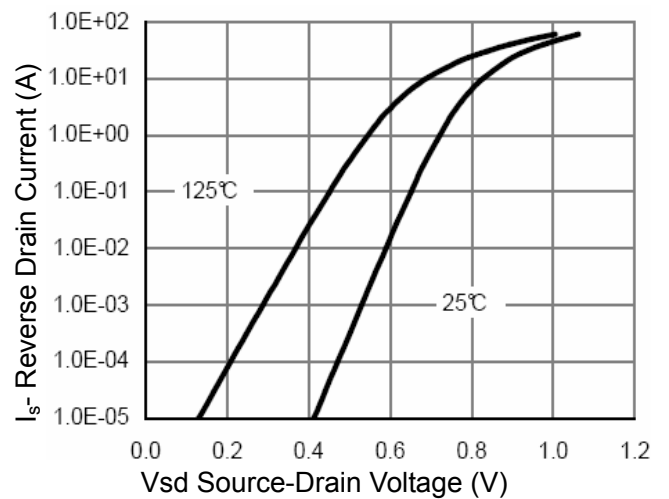


Figure 6 Source- Drain Diode Forward

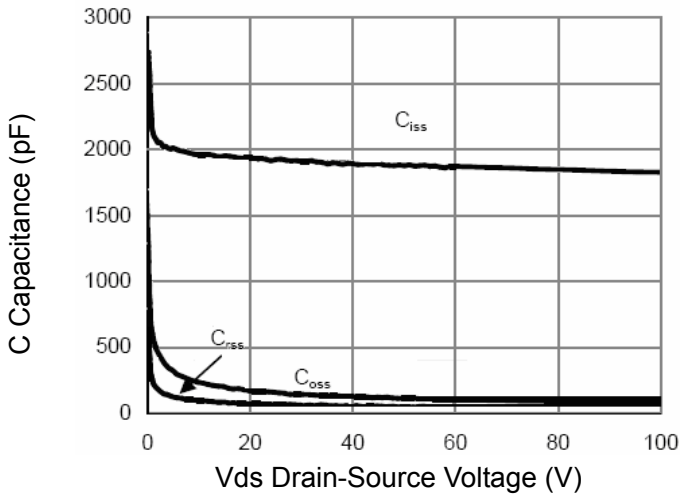


Figure 7 Capacitance vs Vds

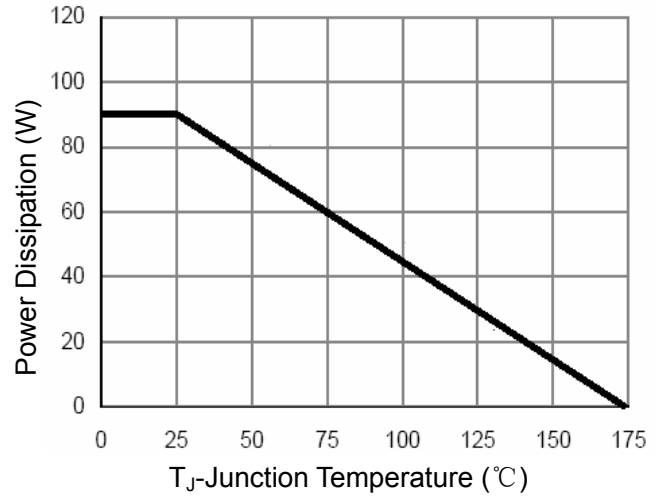


Figure 9 Power De-rating

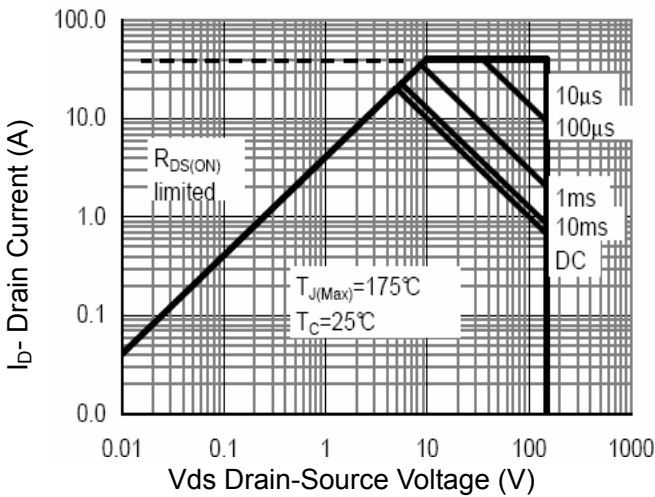


Figure 8 Safe Operation Area

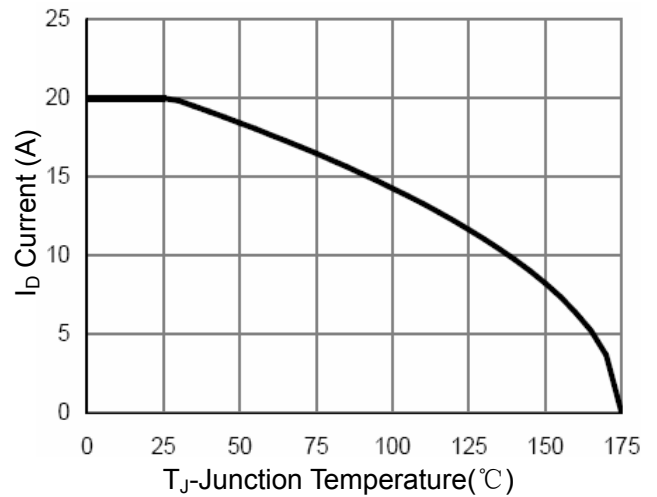


Figure 10 Id Current- Junction Temperature

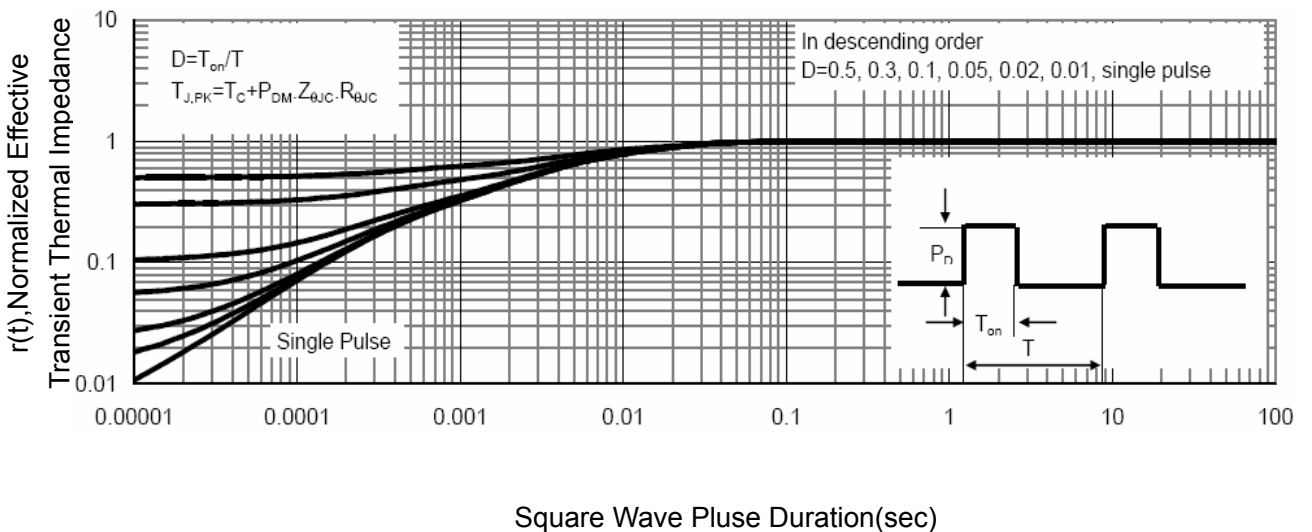


Figure 11 Normalized Maximum Transient Thermal Impedance