# N-channel Enhancement Mode Power MOSFET

## Features

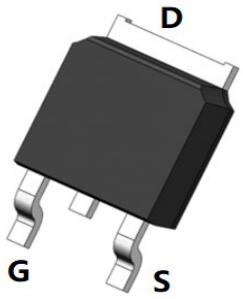
- $V_{DS}$= 60V, $I_D$= 30A
  $R_{DS(ON)}$ < 27 mΩ @ $V_{GS}$ = 10V
  $R_{DS(ON)}$ < 33 mΩ @ $V_{GS}$ = 4.5V

## General Features

- Advanced Trench Technology
- Provide Excellent RDS(ON) and Low Gate Charge
- Lead Free and Green Available

*100% UIS TESTED!*
*100% ΔVds TESTED!*

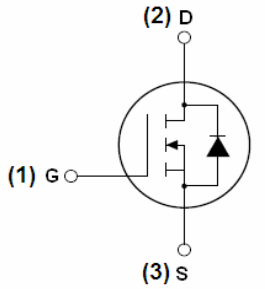
RoHS




**TO-252-2L Top View**




**Pin Assignment**




**Schematic Diagram**

### Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ | 30 | A |
| Drain Current-Continuous($T_C$=100℃) | $I_D$ (100℃) | 20 | A |
| Pulsed Drain Current | $I_{DM}$ | 74 | A |
| Maximum Power Dissipation | $P_D$ | 50 | W |
| Derating factor | | 0.33 | W/℃ |
| Single pulse avalanche energy (Note 5) | $E_{AS}$ | 144 | mJ |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 To 175 | ℃ |

### Thermal Characteristic

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Case (Note 2) | $R_{\theta JC}$ | 3 | ℃/W |

## Electrical Characteristics ($T_C$=25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 60 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=60V,$V_{GS}$=0V | - | - | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** (Note 3) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 1.0 | | 3.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=20A | - | 27 | | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V,$I_D$=20A | - | 30 | - | S |
| **Dynamic Characteristics** (Note4) | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=30V,$V_{GS}$=0V, F=1.0MHz | - | 1900 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 130 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 95 | - | PF |
| **Switching Characteristics** (Note 4) | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=30V, $R_L$=1.5Ω $V_{GS}$=10V,$R_G$=3Ω | - | 5 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 2.6 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 16.1 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 2.3 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=30V,$I_D$=20A, $V_{GS}$=10V | - | 30 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.5 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 7.5 | | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=30A | - | | 1.2 | V |
| Diode Forward Current (Note 2) | $I_S$ | | - | - | 30 | A |
| Reverse Recovery Time | $t_{rr}$ | TJ = 25°C, IF =20A di/dt = 100A/μs (Note3) | - | 35 | - | nS |
| Reverse Recovery Charge | Qrr | | - | 53 | - | nC |
| Forward Turn-On Time | $t_{on}$ | 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 ≤ 10 sec.
**3.** Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
**4.** Guaranteed by design, not subject to production
**5.** EAS condition:Tj=25℃,VDD=30V,VG=10V,L=0.5mH,Rg=25Ω

## Typical Electrical and Thermal Characteristics (Curves)

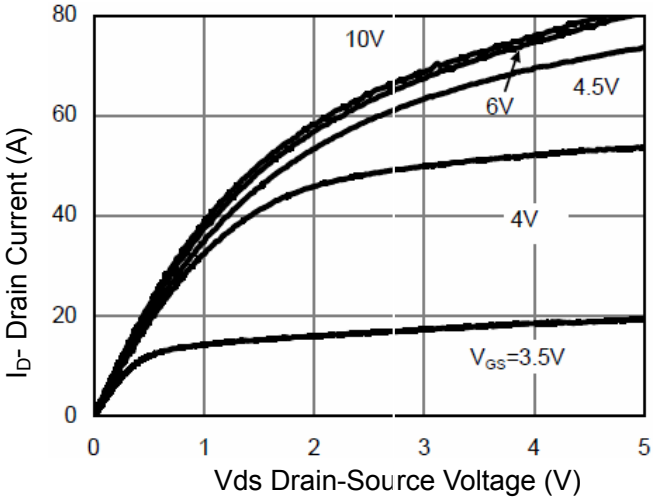



**Figure 1 Output Characteristics**

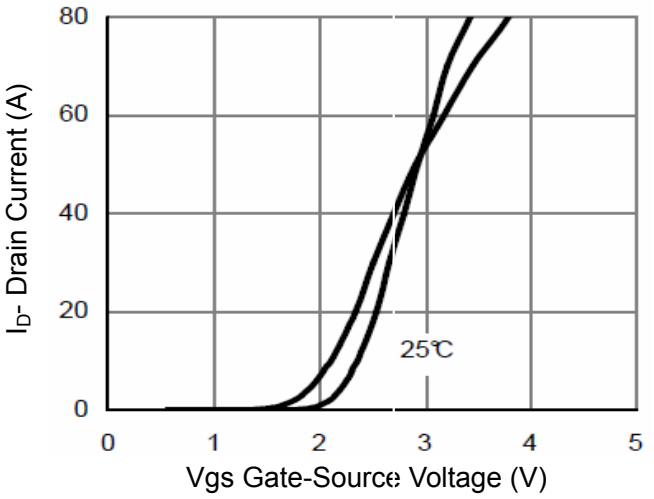



**Figure 2 Transfer Characteristics**

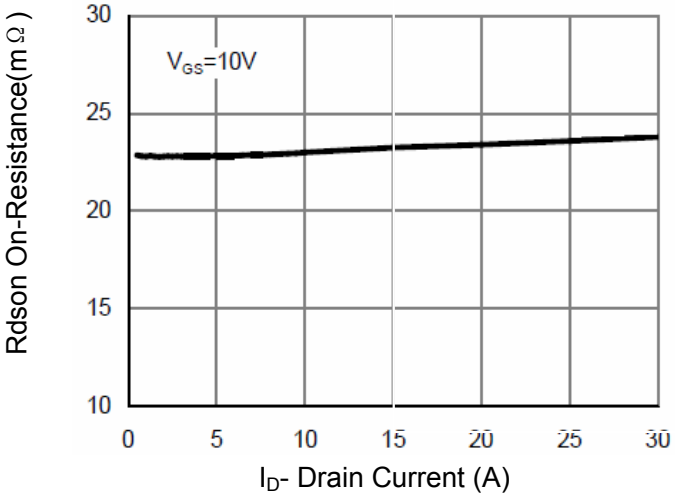



**Figure 3 Rdson- Drain Current**

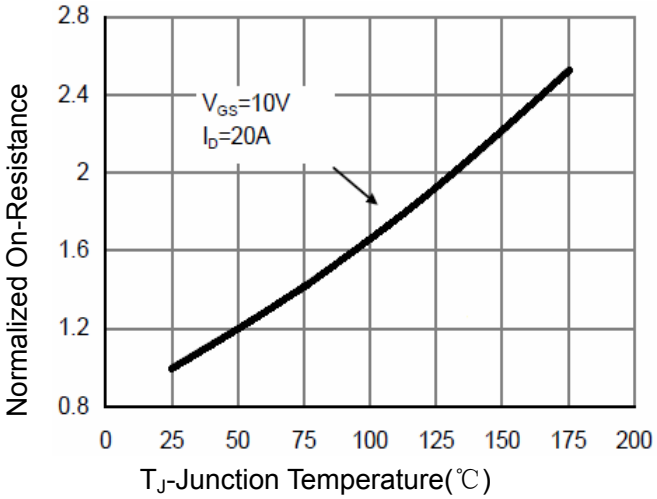



**Figure 4 Rdson-Junction Temperature**

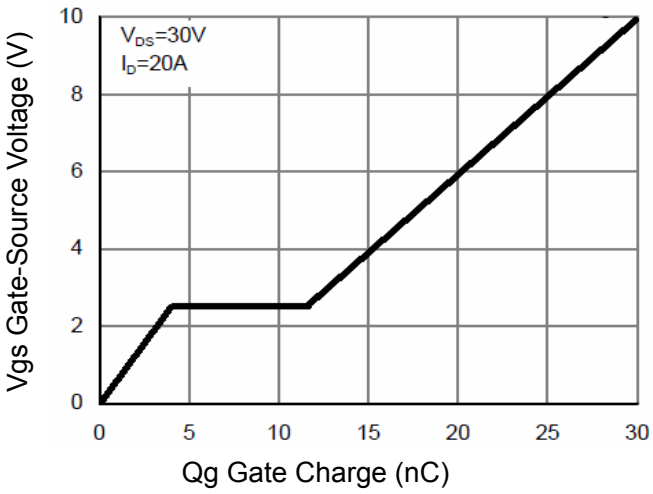



**Figure 5 Gate Charge**

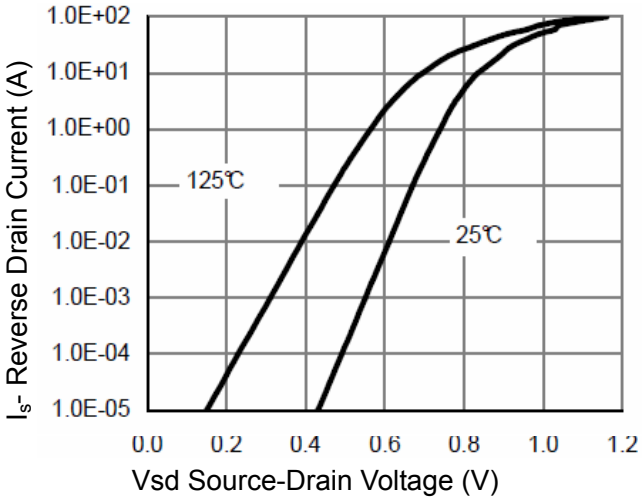



**Figure 6 Source- Drain Diode Forward**

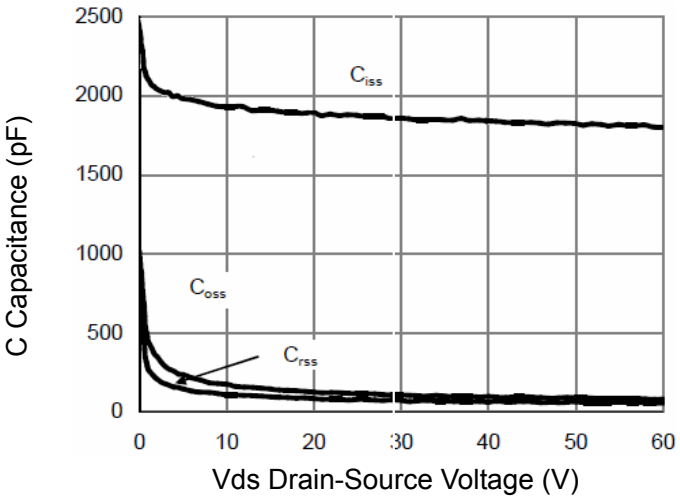



**Figure 7 Capacitance vs Vds**

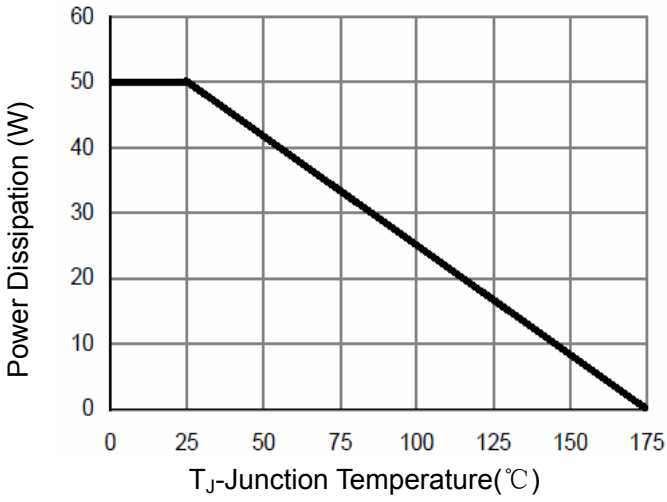



**Figure 9 Power De-rating**

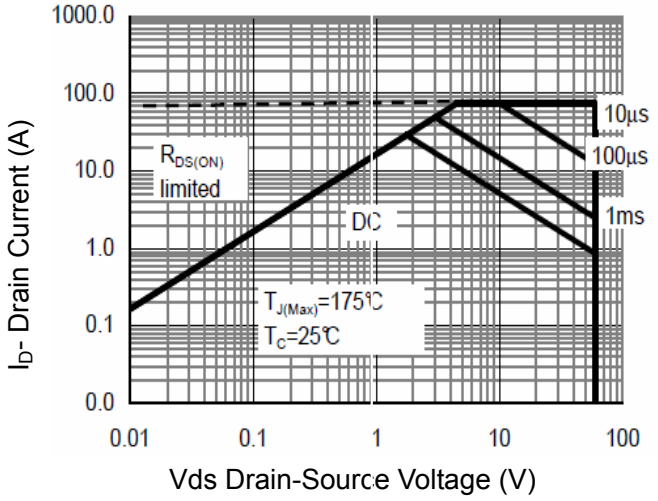



**Figure 8 Safe Operation Area**

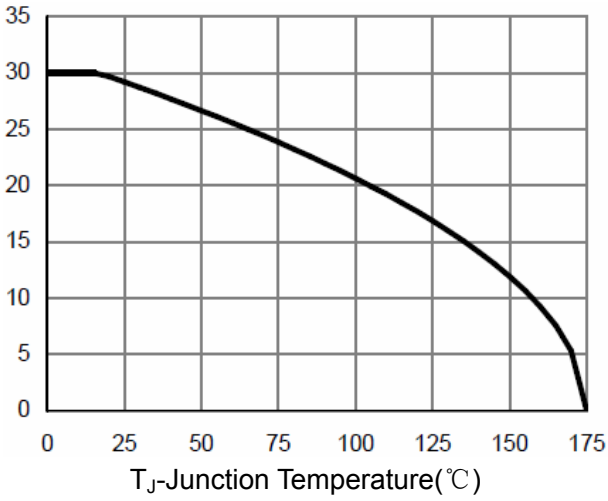



**Figure 10 $V_{GS(th)}$ vs Junction Temperature**

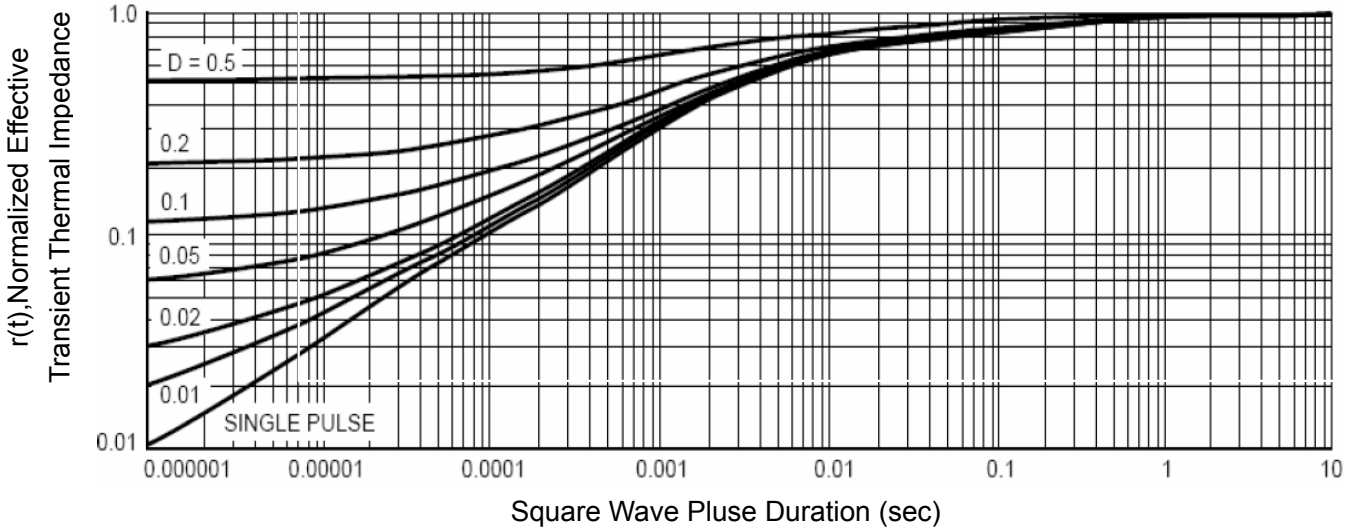



**Figure 11 Normalized Maximum Transient Thermal Impedance**