

## N-channel Enhancement Mode Power MOSFET

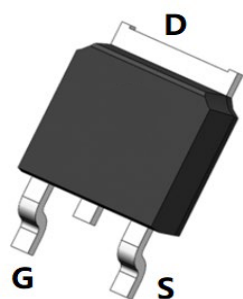
### Features

- $V_{DS} = 200\text{ V}$ ,  $I_D = 8\text{ A}$   
 $R_{DS(ON)} < 260\text{ m}\Omega$  @  $V_{GS} = 10\text{ V}$   
 $R_{DS(ON)} < 300\text{ m}\Omega$  @  $V_{GS} = 4.5\text{ V}$

### General Features

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

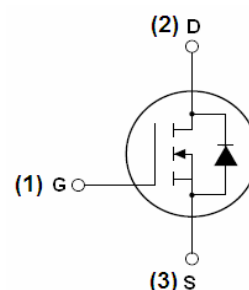
100% UIS TESTED!  
100%  $\Delta V_{ds}$  TESTED!



TO-252-2L Top View



Pin Assignment



Schematic Diagram

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

| Parameter                                              | Symbol                    | Limit      | Unit             |
|--------------------------------------------------------|---------------------------|------------|------------------|
| Drain-Source Voltage                                   | $V_{DS}$                  | 200        |                  |
| Gate-Source Voltage                                    | $V_{GS}$                  | $\pm 20$   |                  |
| Drain Current-Continuous                               | $I_D$                     | 8          |                  |
| Drain Current-Continuous ( $T_C = 100^\circ\text{C}$ ) | $I_D (100^\circ\text{C})$ | 5          | A                |
| Pulsed Drain Current                                   | $I_{DM}$                  | 20         |                  |
| Maximum Power Dissipation                              | $P_D$                     | 55         |                  |
| Operating Junction and Storage Temperature Range       | $T_J, T_{STG}$            | -55 To 150 | $^\circ\text{C}$ |

### Thermal Characteristic

|                                                          |                 |     |                    |
|----------------------------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction-to-Case <sup>(Note 2)</sup> | $R_{\theta JC}$ | 2.3 | $^\circ\text{C/W}$ |
|----------------------------------------------------------|-----------------|-----|--------------------|

# Electrical Characteristics (T<sub>C</sub>=25°C unless otherwise noted)

| Parameter                                     | Symbol              | Condition                                                                                 | Min | Typ | Max  | Unit |
|-----------------------------------------------|---------------------|-------------------------------------------------------------------------------------------|-----|-----|------|------|
| Off Characteristics                           |                     |                                                                                           |     |     |      |      |
| Drain-Source Breakdown Voltage                | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =250μA                                                 | 200 | 215 | -    | V    |
| Zero Gate Voltage Drain Current               | I <sub>DSS</sub>    | V <sub>DS</sub> =200V, V <sub>GS</sub> =0V                                                | -   | -   | 1    | μA   |
| Gate-Body Leakage Current                     | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                | -   | -   | ±100 | nA   |
| On Characteristics <sup>(Note 3)</sup>        |                     |                                                                                           |     |     |      |      |
| Gate Threshold Voltage                        | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 1   |     | 3.0  | V    |
| Drain-Source On-State Resistance              | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =4.5A                                                | -   | 260 |      | mΩ   |
| Forward Transconductance                      | g <sub>FS</sub>     | V <sub>DS</sub> =25V, I <sub>D</sub> =4.5A                                                | 3   | -   | -    | S    |
| Dynamic Characteristics <sup>(Note4)</sup>    |                     |                                                                                           |     |     |      |      |
| Input Capacitance                             | C <sub>iss</sub>    | V <sub>DS</sub> =25V, V <sub>GS</sub> =0V,<br>F=1.0MHz                                    |     | 540 |      | PF   |
| Output Capacitance                            | C <sub>Oss</sub>    |                                                                                           |     | 90  |      | PF   |
| Reverse Transfer Capacitance                  | C <sub>rss</sub>    |                                                                                           |     | 35  |      | PF   |
| Switching Characteristics <sup>(Note 4)</sup> |                     |                                                                                           |     |     |      |      |
| Turn-on Delay Time                            | t <sub>d(on)</sub>  | V <sub>DD</sub> =100V, I <sub>D</sub> =4.5A<br>V <sub>GS</sub> =10V, R <sub>GEN</sub> =5Ω | -   | 6.4 | -    | nS   |
| Turn-on Rise Time                             | t <sub>r</sub>      |                                                                                           | -   | 11  | -    | nS   |
| Turn-Off Delay Time                           | t <sub>d(off)</sub> |                                                                                           | -   | 20  | -    | nS   |
| Turn-Off Fall Time                            | t <sub>f</sub>      |                                                                                           | -   | 12  | -    | nS   |
| Total Gate Charge                             | Q <sub>g</sub>      | V <sub>DS</sub> =160V, I <sub>D</sub> =4.5A,<br>V <sub>GS</sub> =10V                      | -   | 16  | -    | nC   |
| Gate-Source Charge                            | Q <sub>gs</sub>     |                                                                                           | -   | 3.4 | -    | nC   |
| Gate-Drain Charge                             | Q <sub>gd</sub>     |                                                                                           | -   | 5.1 | -    | nC   |
| Drain-Source Diode Characteristics            |                     |                                                                                           |     |     |      |      |
| Diode Forward Voltage <sup>(Note 3)</sup>     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =8A                                                   | -   | -   | 1.2  | V    |
| Diode Forward Current <sup>(Note 2)</sup>     | I <sub>S</sub>      |                                                                                           | -   | -   | 8    | A    |

## 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

### Typical Electrical and Thermal Characteristics (Curves)

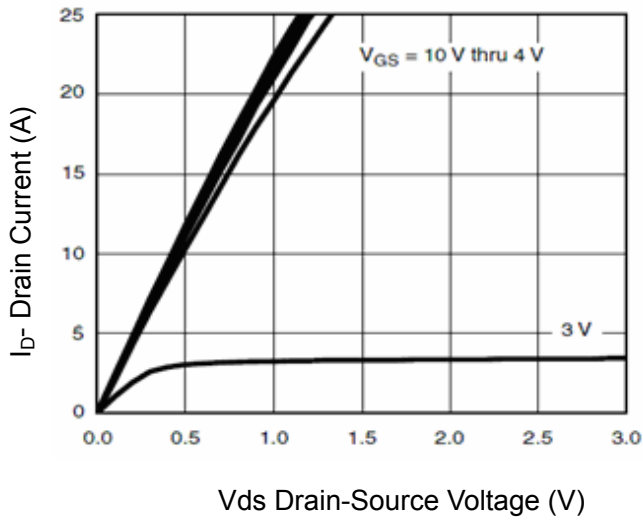


Figure 1 Output Characteristics

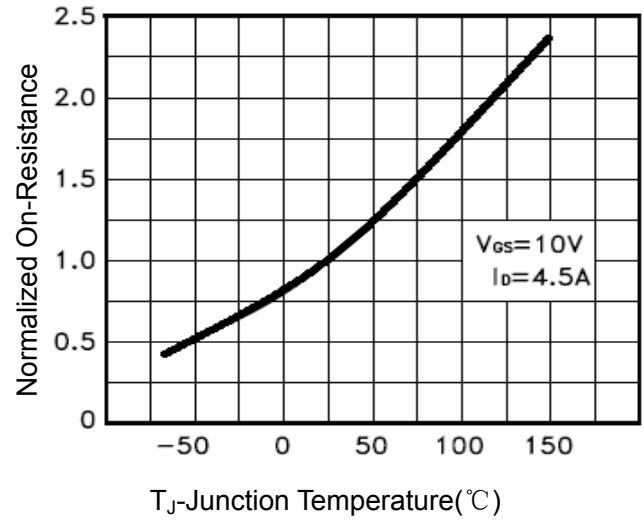


Figure 4  $R_{DS(on)}$ -Junction Temperature

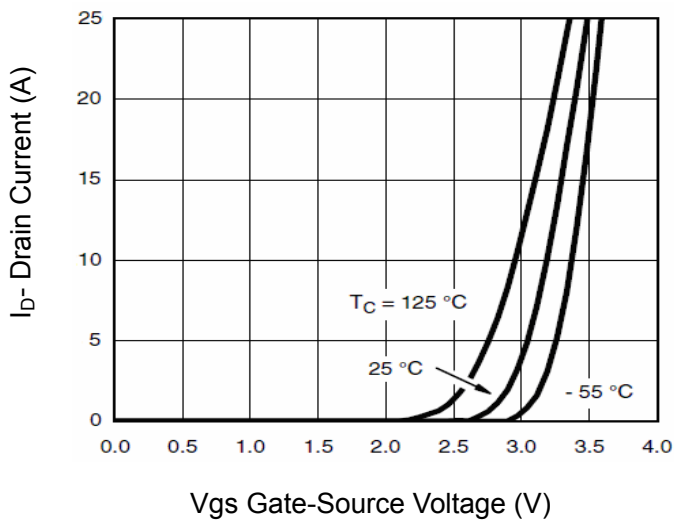


Figure 2 Transfer Characteristics

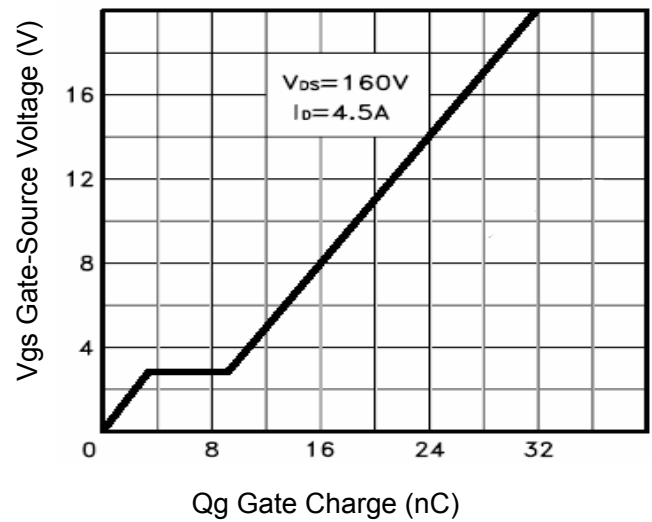


Figure 5 Gate Charge

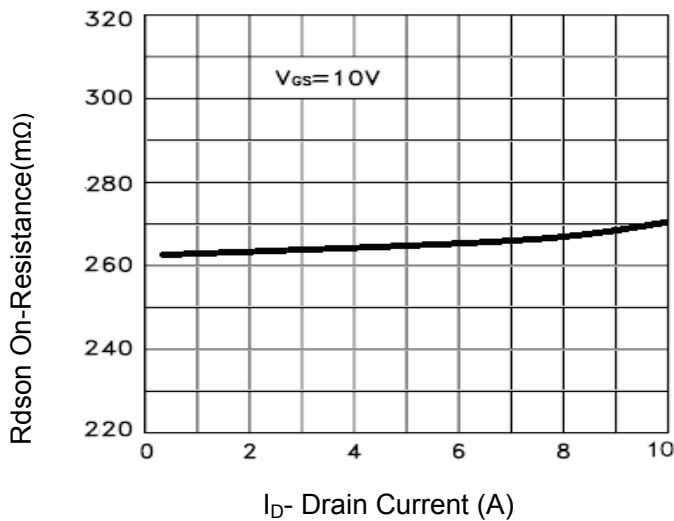


Figure 3  $R_{DS(on)}$ - Drain Current

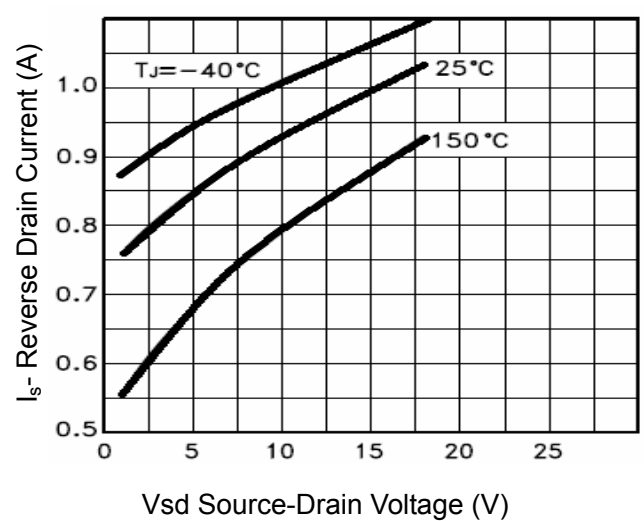
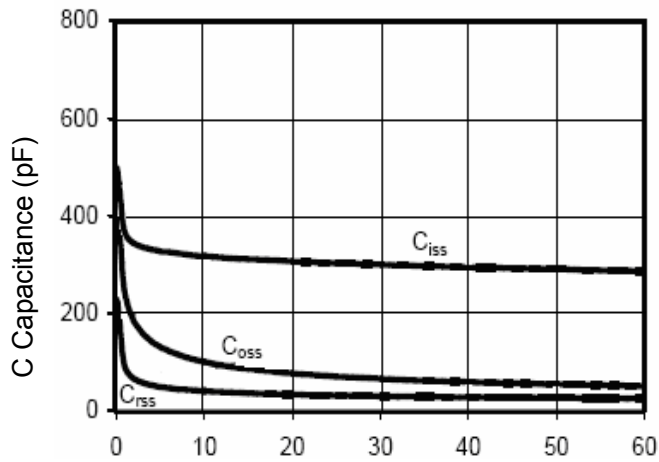
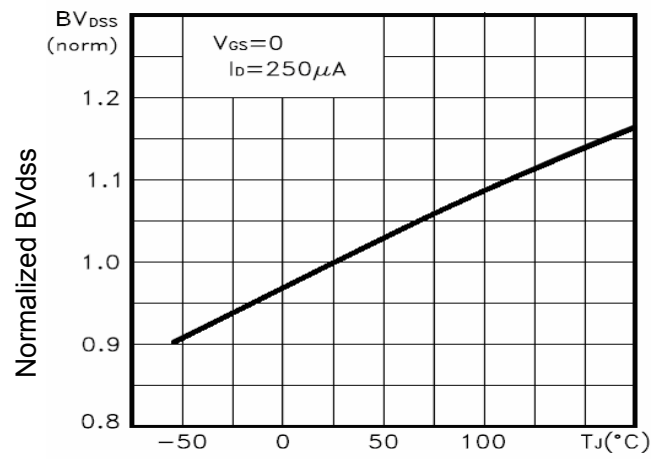


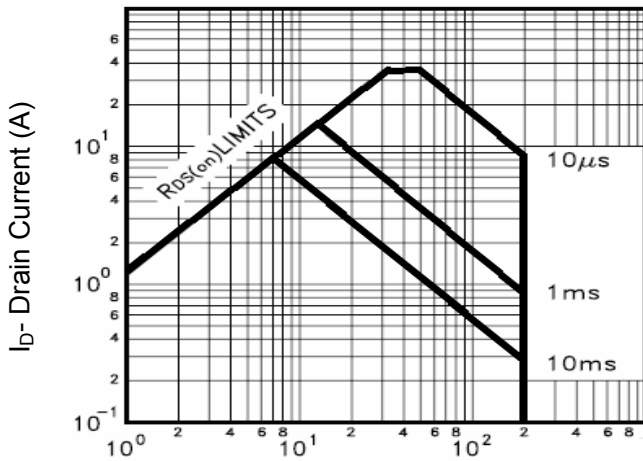
Figure 6 Source- Drain Diode Forward



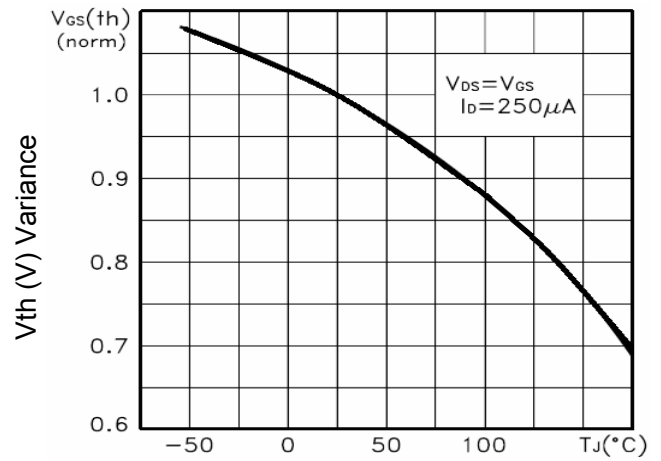
Vds Drain-Source Voltage (V)  
**Figure 7 Capacitance vs Vds**



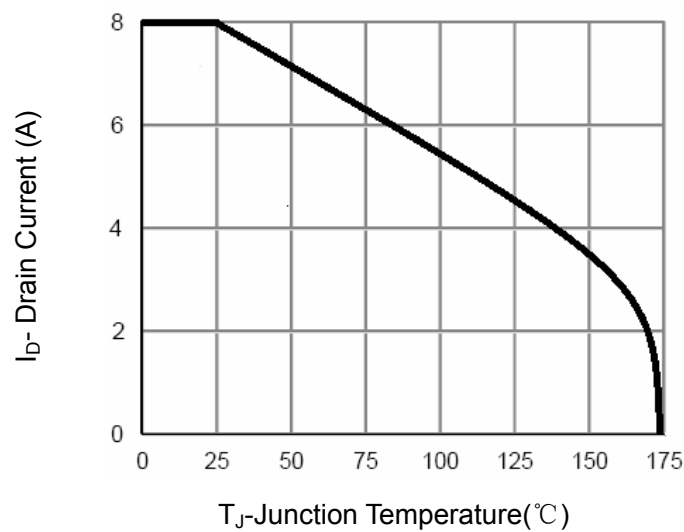
T<sub>J</sub>-Junction Temperature(°C)  
**Figure 9 BV<sub>DSS</sub> vs Junction Temperature**



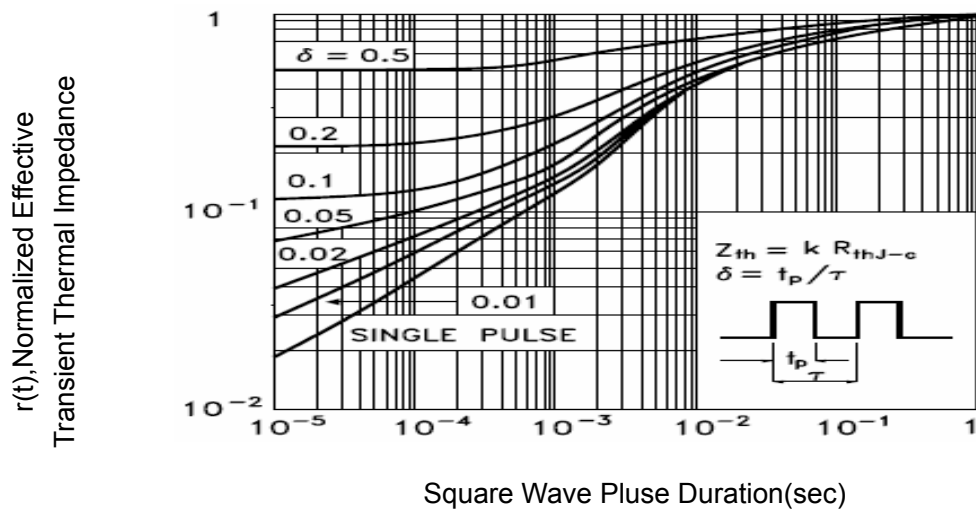
Vds Drain-Source Voltage (V)  
**Figure 8 Safe Operation Area**



T<sub>J</sub>-Junction Temperature(°C)  
**Figure 10 V<sub>GS(th)</sub> vs Junction Temperature**



T<sub>J</sub>-Junction Temperature(°C)  
**Figure 11 Current De-rating**



**Figure 12 Normalized Maximum Transient Thermal Impedance**