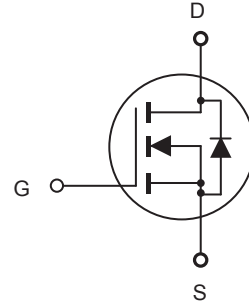


### FEATURES

- 700V, 5A,  $R_{DS(ON)} = 2\Omega$  @ $V_{GS} = 10V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Lead-free plating ; RoHS compliant.
- TO-251 & TO-252 package.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ\text{C}$ unless otherwise noted

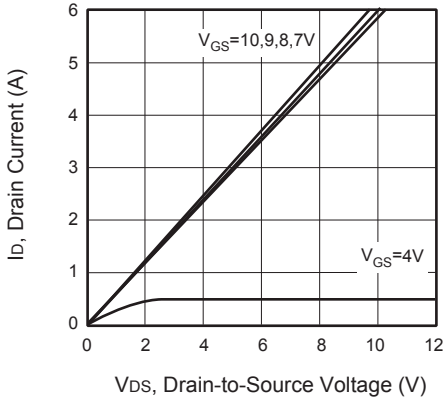
| Parameter   | Symbol         | Limit      | Units               |
|---|----------------|------------|---------------------|
| Drain-Source Voltage  | $V_{DS}$       | 700        | V                   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 30$   | V                   |
| Drain Current-Continuous  | $I_D$          | 5          | A                   |
| Drain Current-Pulsed <sup>a</sup>   | $I_{DM}$       | 20         | A                   |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$<br>- Derate above $25^\circ\text{C}$ | $P_D$          | 107        | W                   |
|   |                | 0.7        | W/ $^\circ\text{C}$ |
| Single Pulsed Avalanche Energy <sup>e</sup>   | $E_{AS}$       | 125        | mJ                  |
| Single Pulsed Avalanche Current <sup>e</sup>  | $I_{AS}$       | 5          | A                   |
| Operating and Store Temperature Range   | $T_J, T_{stg}$ | -55 to 175 | $^\circ\text{C}$    |

### Thermal Characteristics

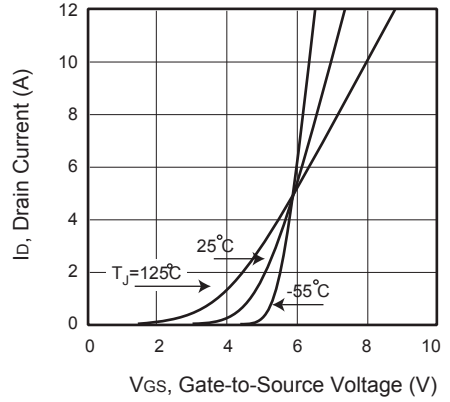
| Parameter                               | Symbol          | Limit | Units              |
|---|-----------------|-------|--------------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 1.4   | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 50    | $^\circ\text{C/W}$ |

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

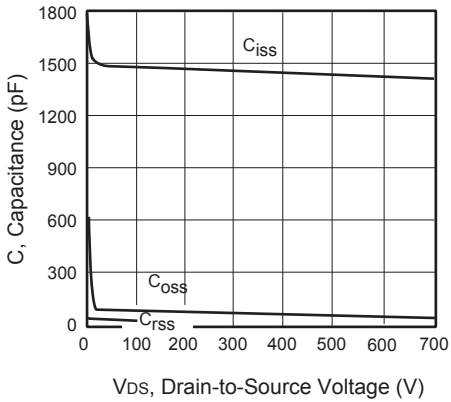
| Parameter   | Symbol       | Test Condition  | Min | Typ  | Max  | Units    |
|---|--------------|---|-----|------|------|----------|
| <b>Off Characteristics</b>  |              |   |     |      |      |          |
| Drain-Source Breakdown Voltage  | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                               | 700 |      |      | V        |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS} = 700V, V_{GS} = 0V$                                |     |      | 1    | $\mu A$  |
| Gate Body Leakage Current, Forward  | $I_{GSSF}$   | $V_{GS} = 30V, V_{DS} = 0V$                                 |     |      | 100  | nA       |
| Gate Body Leakage Current, Reverse  | $I_{GSSR}$   | $V_{GS} = -30V, V_{DS} = 0V$                                |     |      | -100 | nA       |
| <b>On Characteristics<sup>b</sup></b>   |              |   |     |      |      |          |
| Gate Threshold Voltage  | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                           | 2   |      | 4    | V        |
| Static Drain-Source On-Resistance   | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 2.5A$                                  |     | 1.65 | 2    | $\Omega$ |
| Gate input resistance   | $R_g$        | f=1MHz, open Drain  |     | 2    |      | $\Omega$ |
| <b>Dynamic Characteristics<sup>c</sup></b>  |              |   |     |      |      |          |
| Input Capacitance   | $C_{iss}$    | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0 \text{ MHz}$            |     | 1470 |      | pF       |
| Output Capacitance  | $C_{oss}$    |   |     | 110  |      | pF       |
| Reverse Transfer Capacitance  | $C_{rss}$    |   |     | 15   |      | pF       |
| <b>Switching Characteristics<sup>c</sup></b>  |              |   |     |      |      |          |
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{DD} = 560V, I_D = 5A, V_{GS} = 10V, R_{GEN} = 25\Omega$ |     | 27   | 54   | ns       |
| Turn-On Rise Time   | $t_r$        |   |     | 73   | 146  | ns       |
| Turn-Off Delay Time   | $t_{d(off)}$ |   |     | 87   | 174  | ns       |
| Turn-Off Fall Time  | $t_f$        |   |     | 79   | 158  | ns       |
| Total Gate Charge   | $Q_g$        | $V_{DS} = 560V, I_D = 5A, V_{GS} = 10V$                     |     | 29   | 38   | nC       |
| Gate-Source Charge  | $Q_{gs}$     |   |     | 5    |      | nC       |
| Gate-Drain Charge   | $Q_{gd}$     |   |     | 9    |      | nC       |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>   |              |   |     |      |      |          |
| Drain-Source Diode Forward Current  | $I_S$        |   |     |      | 5    | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>   | $V_{SD}$     | $V_{GS} = 0V, I_S = 5A$                                     |     |      | 1.5  | V        |
| <b>Notes :</b> □<br>a.Repetitive Rating : Pulse width limited by maximum junction temperature. □<br>b.Device Mounted on FR4 Board, $t < 10 \text{ sec.}$ □<br>c.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ . □<br>d.Guaranteed by design, not subject to production testing. □<br>e.L = 10mH, $I_{AS} = 5A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25 \text{ C}$ □ |              |   |     |      |      |          |



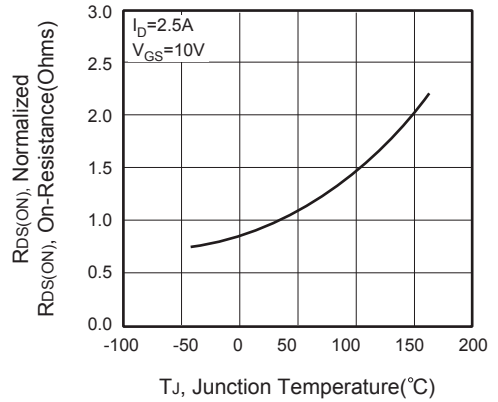
**Figure 1. Output Characteristics**



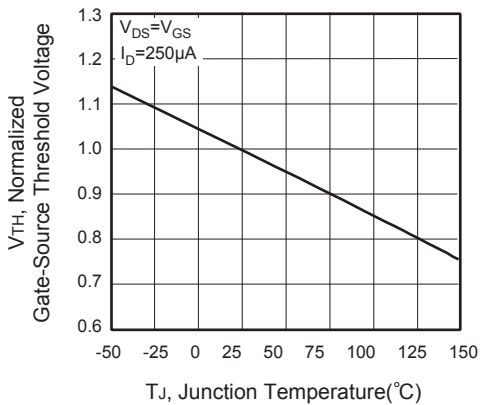
**Figure 2. Transfer Characteristics**



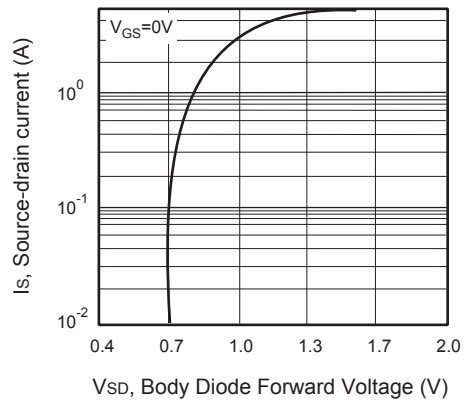
**Figure 3. Capacitance**



**Figure 4. On-Resistance Variation with Temperature**



**Figure 5. Gate Threshold Variation with Temperature**



**Figure 6. Body Diode Forward Voltage Variation with Source Current**

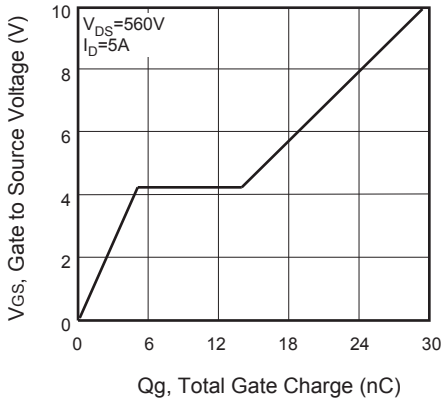


Figure 7. Gate Charge

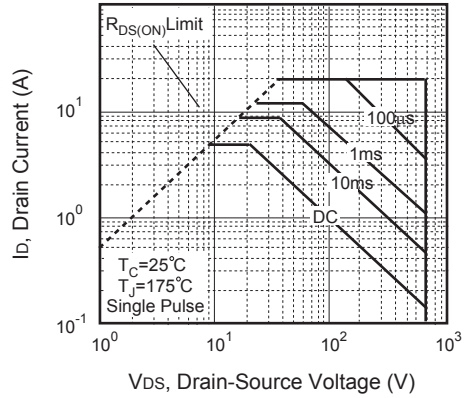


Figure 8. Maximum Safe Operating Area

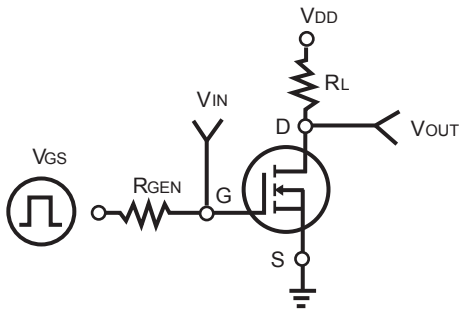


Figure 9. Switching Test Circuit

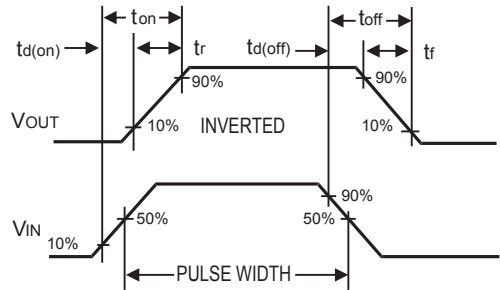


Figure 10. Switching Waveforms

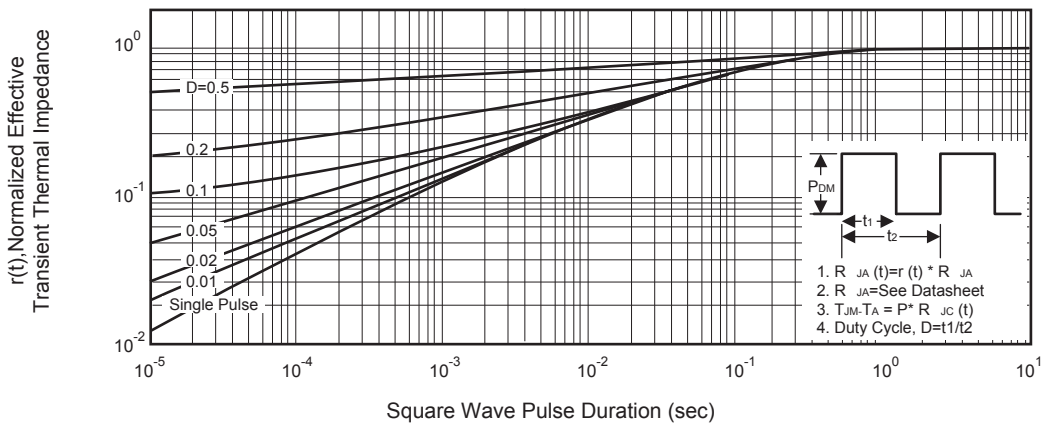


Figure 11. Normalized Thermal Transient Impedance Curve