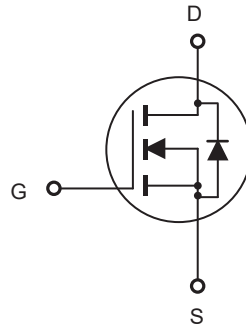


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 100V, 62A,  $R_{DS(ON)} = 12m\Omega @V_{GS} = 10V$ .  
 $R_{DS(ON)} = 15m\Omega @V_{GS} = 4.5V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- RoHS compliant.
- TO-251 & TO-252 package.



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

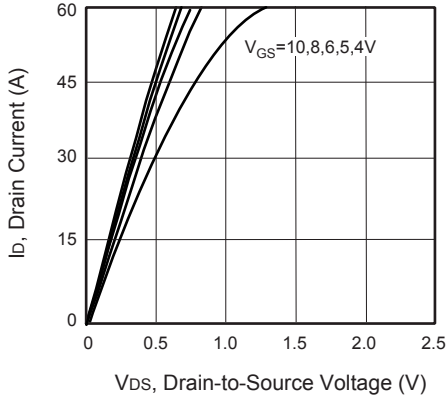
| Parameter   | Symbol         | Limit      | Units               |
|---|----------------|------------|---------------------|
| Drain-Source Voltage  | $V_{DS}$       | 100        | V                   |
| Gate-Source Voltage   | $V_{GS}$       | $\pm 20$   | V                   |
| Drain Current-Continuous @ $T_C = 25^\circ\text{C}$<br>@ $T_C = 100^\circ\text{C}$        | $I_D$          | 62         | A                   |
|   |                | 39         | A                   |
| Drain Current-Pulsed <sup>a</sup>   | $I_{DM}$       | 248        | A                   |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$<br>- Derate above $25^\circ\text{C}$ | $P_D$          | 83         | W                   |
|   |                | 0.66       | W/ $^\circ\text{C}$ |
| Single Pulsed Avalanche Energy <sup>d</sup>   | $E_{AS}$       | 180.5      | mJ                  |
| Single Pulsed Avalanche Current <sup>d</sup>  | $I_{AS}$       | 19         | A                   |
| Operating and Store Temperature Range   | $T_J, T_{stg}$ | -55 to 150 | $^\circ\text{C}$    |

### Thermal Characteristics

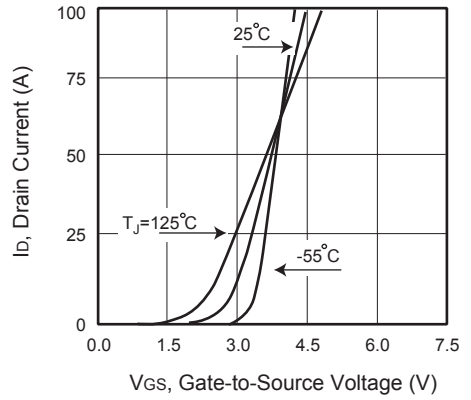
| Parameter                               | Symbol          | Limit | Units                     |
|---|-----------------|-------|---------------------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 1.5   | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 50    | $^\circ\text{C}/\text{W}$ |

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

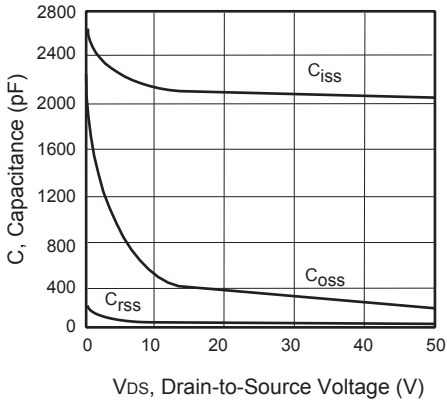
| Parameter  | Symbol       | Test Condition  | Min | Typ  | Max  | Units     |
|--|--------------|---|-----|------|------|-----------|
| <b>Off Characteristics</b>   |              |   |     |      |      |           |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                     | 100 |      |      | V         |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS} = 100, V_{GS} = 0V$                                       |     |      | 1    | $\mu A$   |
| Gate Body Leakage Current, Forward   | $I_{GSSF}$   | $V_{GS} = 20V, V_{DS} = 0V$                                       |     |      | 100  | nA        |
| Gate Body Leakage Current, Reverse   | $I_{GSSR}$   | $V_{GS} = -20V, V_{DS} = 0V$                                      |     |      | -100 | nA        |
| <b>On Characteristics<sup>b</sup></b>  |              |   |     |      |      |           |
| Gate Threshold Voltage   | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                                 | 1   |      | 3    | V         |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 40A$   |     | 9.5  | 12   | $m\Omega$ |
|  |              | $V_{GS} = 4.5V, I_D = 20A$  |     | 11   | 15   | $m\Omega$ |
| <b>Dynamic Characteristics<sup>c</sup></b>   |              |   |     |      |      |           |
| Input Capacitance  | $C_{iss}$    | $V_{DS} = 50V, V_{GS} = 0V,$<br>$f = 1.0\text{ MHz}$              |     | 2070 |      | pF        |
| Output Capacitance   | $C_{oss}$    |   |     | 205  |      | pF        |
| Reverse Transfer Capacitance   | $C_{rss}$    |   |     | 2    |      | pF        |
| <b>Switching Characteristics<sup>c</sup></b>   |              |   |     |      |      |           |
| Turn-On Delay Time   | $t_{d(on)}$  | $V_{DD} = 50V, I_D = 11.5A,$<br>$V_{GS} = 10V, R_{GEN} = 3\Omega$ |     | 17   |      | ns        |
| Turn-On Rise Time  | $t_r$        |   |     | 5    |      | ns        |
| Turn-Off Delay Time  | $t_{d(off)}$ |   |     | 47   |      | ns        |
| Turn-Off Fall Time   | $t_f$        |   |     | 10   |      | ns        |
| Total Gate Charge  | $Q_g$        | $V_{DS} = 50V, I_D = 11.5A,$<br>$V_{GS} = 4.5V$                   |     | 17   |      | nC        |
| Gate-Source Charge   | $Q_{gs}$     |   |     | 4    |      | nC        |
| Gate-Drain Charge  | $Q_{gd}$     |   |     | 8    |      | nC        |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>  |              |   |     |      |      |           |
| Drain-Source Diode Forward Current   | $I_S$        |   |     |      | 62   | A         |
| Drain-Source Diode Forward Voltage <sup>b</sup>  | $V_{SD}$     | $V_{GS} = 0V, I_S = 20A$  |     |      | 1.2  | V         |
| <b>Notes :</b><br>a.Repetitive Rating : Pulse width limited by maximum junction temperature.<br>b.Pulse Test : Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$ .<br>c.Guaranteed by design, not subject to production testing.<br>d. $L = 1mH, I_{AS} = 19A, V_{DD} = 25V, R_G = 25\Omega$ , Starting $T_J = 25^\circ\text{C}$ |              |   |     |      |      |           |



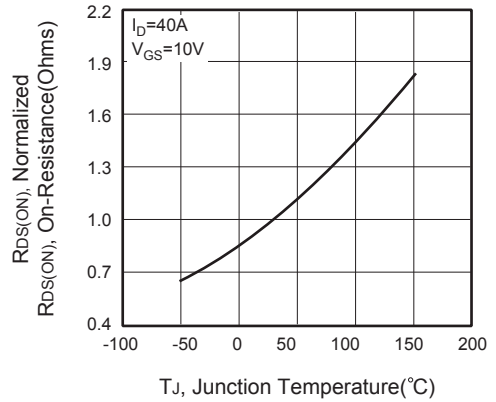
**Figure 1. Output Characteristics**



**Figure 2. Transfer Characteristics**



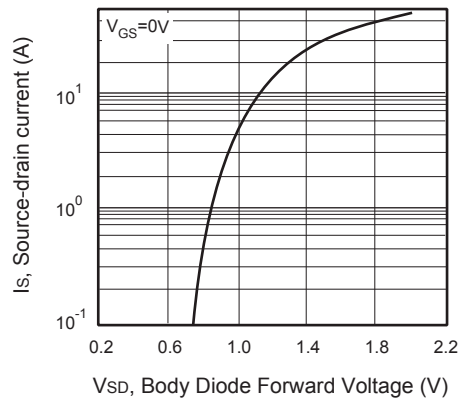
**Figure 3. Capacitance**



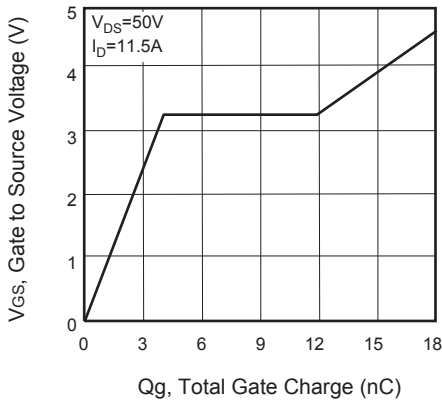
**Figure 4. On-Resistance Variation with Temperature**



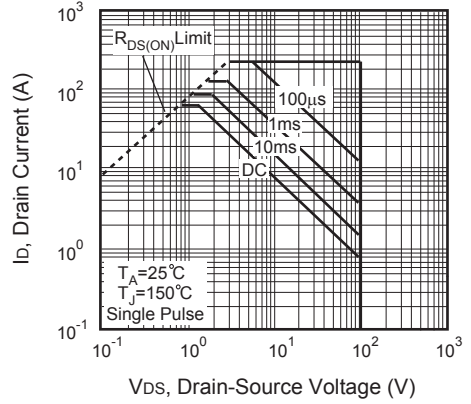
**Figure 5. Gate Threshold Variation with Temperature**



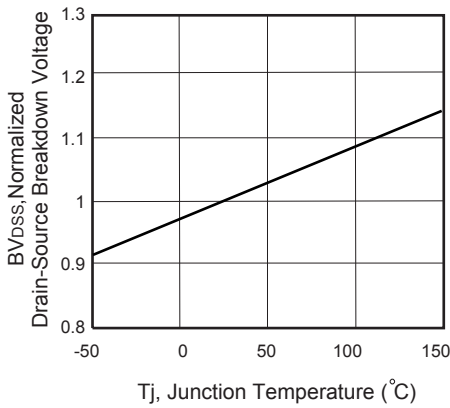
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



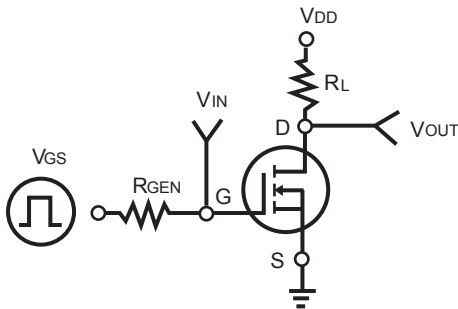
**Figure 7. Gate Charge**



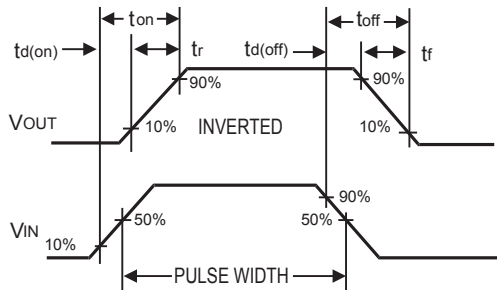
**Figure 8. Maximum Safe Operating Area**



**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



**Figure 11. Switching Waveforms**

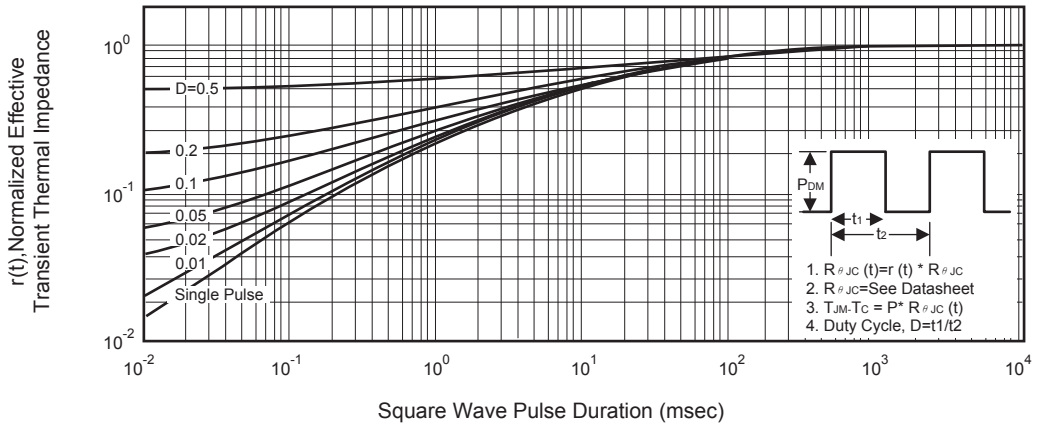


Figure 12. Normalized Thermal Transient Impedance Curve