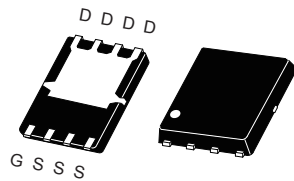


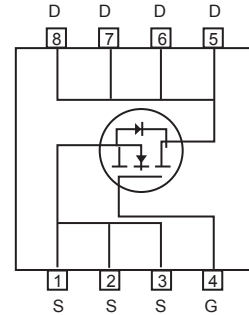
## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 30V, 85A,  $R_{DS(ON)} = 4.0m\Omega$  @ $V_{GS} = 10V$ .  
 $R_{DS(ON)} = 6.0m\Omega$  @ $V_{GS} = 4.5V$ .
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- RoHS compliant.
- Surface mount Package.



PR-PACK (5\*6)



### ABSOLUTE MAXIMUM RATINGS $T_A = 25^\circ C$ unless otherwise noted

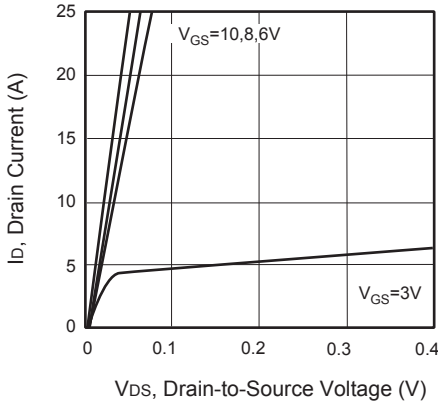
| Parameter                                    | Symbol         | Limit      | Units      |
|--|----------------|------------|------------|
| Drain-Source Voltage                         | $V_{DS}$       | 30         | V          |
| Gate-Source Voltage                          | $V_{GS}$       | $\pm 20$   | V          |
| Drain Current-Continuous                     | $I_D$          | 85         | A          |
| Drain Current-Pulsed <sup>a</sup>            | $I_{DM}$       | 340        | A          |
| Maximum Power Dissipation                    | $P_D$          | 48         | W          |
| Single Pulsed Avalanche Energy <sup>e</sup>  | $E_{AS}$       | 125        | mJ         |
| Single Pulsed Avalanche Current <sup>e</sup> | $I_{AS}$       | 50         | A          |
| Operating and Store Temperature Range        | $T_J, T_{stg}$ | -55 to 150 | $^\circ C$ |

### Thermal Characteristics

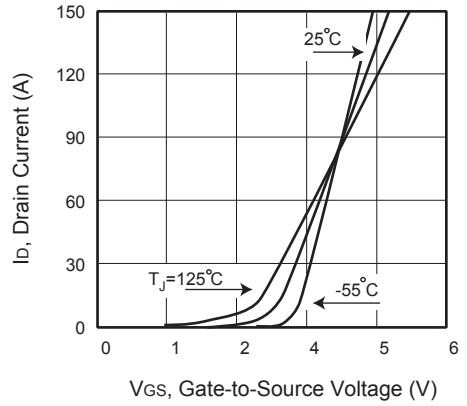
| Parameter  | Symbol          | Limit | Units        |
|--|-----------------|-------|--------------|
| Thermal Resistance, Junction-to-Case                 | $R_{\theta JC}$ | 2.6   | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient <sup>b</sup> | $R_{\theta JA}$ | 20    | $^\circ C/W$ |

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

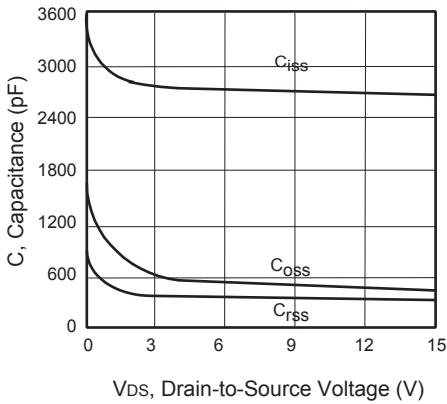
| Parameter   | Symbol       | Test Condition   | Min | Typ  | Max  | Units     |
|---|--------------|--|-----|------|------|-----------|
| <b>Off Characteristics</b>  |              |  |     |      |      |           |
| Drain-Source Breakdown Voltage  | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                              | 30  |      |      | V         |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS} = 30V, V_{GS} = 0V$                                |     |      | 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>c</sup></b>  |              |  |     |      |      |           |
| Gate Threshold Voltage  | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                          | 1   |      | 3    | V         |
| Static Drain-Source   | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 18A$                                  |     | 3.0  | 4.0  | $m\Omega$ |
| On-Resistance   |              | $V_{GS} = 4.5V, I_D = 15A$                                 |     | 4.0  | 6.0  | $m\Omega$ |
| Gate input resistance   | $R_g$        | $f=1MHz, \text{open Drain}$                                |     | 1.8  |      | $\Omega$  |
| <b>Dynamic Characteristics <sup>d</sup></b>   |              |  |     |      |      |           |
| Input Capacitance   | $C_{iss}$    | $V_{DS} = 15V, V_{GS} = 0V, f = 1.0 MHz$                   |     | 2695 |      | pF        |
| Output Capacitance  | $C_{oss}$    |  |     | 500  |      | pF        |
| Reverse Transfer Capacitance  | $C_{rss}$    |  |     | 380  |      | pF        |
| <b>Switching Characteristics <sup>d</sup></b>   |              |  |     |      |      |           |
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{DD} = 15V, I_D = 10A, V_{GS} = 10V, R_{GEN} = 1\Omega$ |     | 26   |      | ns        |
| Turn-On Rise Time   | $t_r$        |  |     | 8    |      | ns        |
| Turn-Off Delay Time   | $t_{d(off)}$ |  |     | 69   |      | ns        |
| Turn-Off Fall Time  | $t_f$        |  |     | 22   |      | ns        |
| Total Gate Charge   | $Q_g$        | $V_{DS} = 15V, I_D = 10A, V_{GS} = 10V$                    |     | 68   |      | nC        |
| Gate-Source Charge  | $Q_{gs}$     |  |     | 7    |      | nC        |
| Gate-Drain Charge   | $Q_{gd}$     |  |     | 15   |      | nC        |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>   |              |  |     |      |      |           |
| Drain-Source Diode Forward Current <sup>b</sup>   | $I_S$        |  |     |      | 40   | A         |
| Drain-Source Diode Forward Voltage <sup>c</sup>   | $V_{SD}$     | $V_{GS} = 0V, I_S = 18A$                                   |     |      | 1.2  | V         |
| <b>Notes :</b> □<br>a.Repetitive Rating : Pulse width limited by maximum junction temperature.□<br>b.Surface Mounted on FR4 Board, $t \leq 10 \text{ sec.}$ □<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 = 0.1mH, $I_{AS} = 50A, V_{DD} = 24V, R_G = 25\Omega, \text{Starting } T_J = 25 \text{ C}$ |              |  |     |      |      |           |



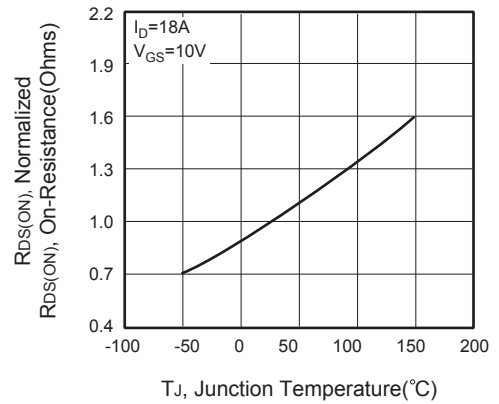
**Figure 1. Output Characteristics**



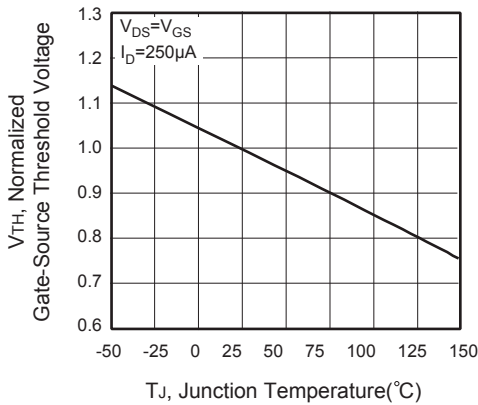
**Figure 2. Transfer Characteristics**



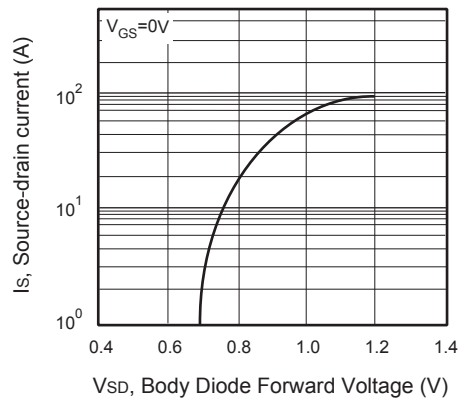
**Figure 3. Capacitance**



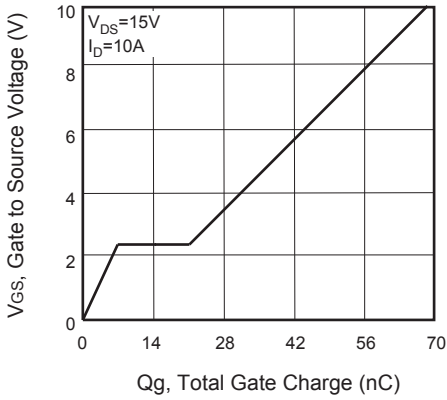
**Figure 4. On-Resistance Variation with Temperature**



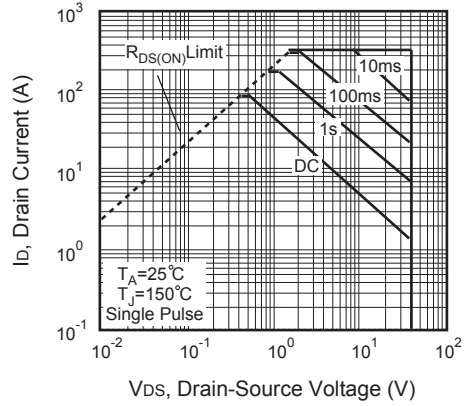
**Figure 5. Gate Threshold Variation with Temperature**



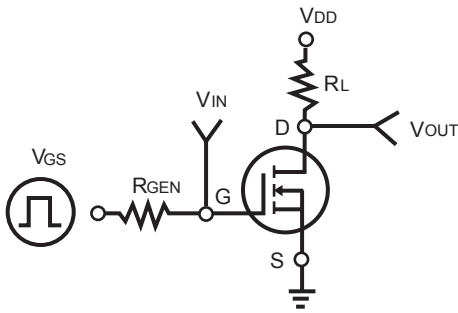
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



**Figure 7. Gate Charge**



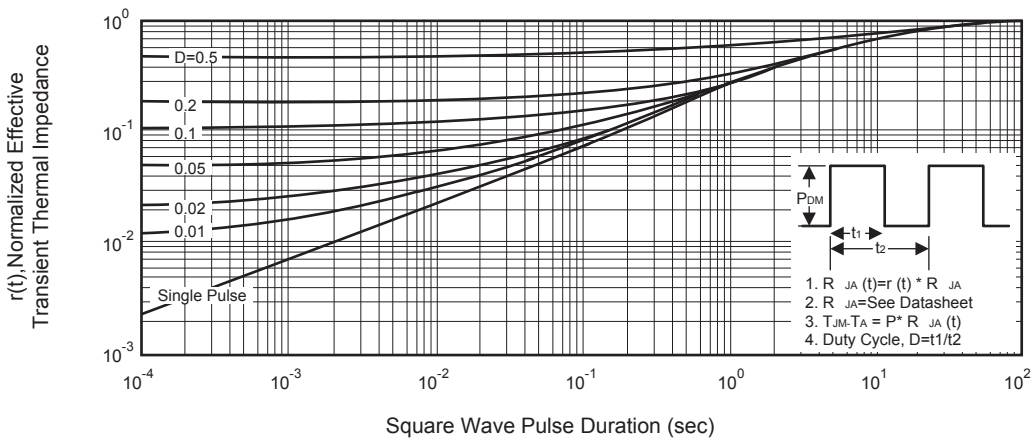
**Figure 8. Maximum Safe Operating Area**



**Figure 9. Switching Test Circuit**



**Figure 10. Switching Waveforms**



**Figure 11. Normalized Thermal Transient Impedance Curve**