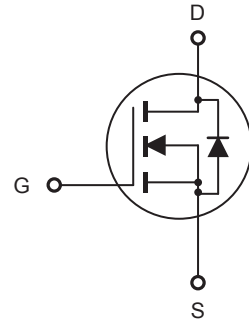
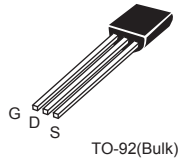
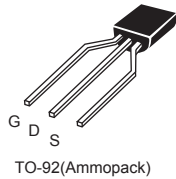


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 650V, 0.35A,  $R_{DS(ON)} = 10.5 \Omega$  @ $V_{GS} = 10V$ .
- High dense cell design for extremely low  $R_{DS(ON)}$ .
- Rugged and reliable.
- RoHS compliant.
- TO-92(Bulk) & TO-92(Ammopack) package.



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

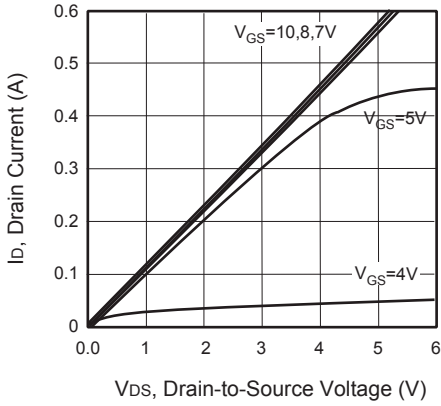
| Parameter                             | Symbol         | Limit      | Units      |
|---------------------------------------|----------------|------------|------------|
| Drain-Source Voltage                  | $V_{DS}$       | 650        | V          |
| Gate-Source Voltage                   | $V_{GS}$       | $\pm 30$   | V          |
| Drain Current-Continuous              | $I_D$          | 0.35       | A          |
| Drain Current-Pulsed <sup>a</sup>     | $I_{DM}$       | 1.4        | A          |
| Maximum Power Dissipation             | $P_D$          | 3.1        | W          |
| Operating and Store Temperature Range | $T_J, T_{stg}$ | -55 to 150 | $^\circ C$ |

### Thermal Characteristics

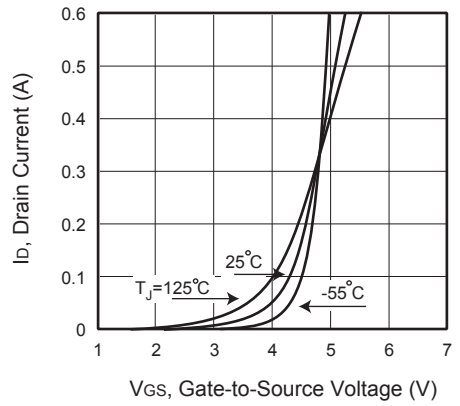
| Parameter   | Symbol          | Limit | Units        |
|---|-----------------|-------|--------------|
| Thermal Resistance, Junction-to-Lead <sup>b</sup> | $R_{\theta JL}$ | 40    | $^\circ C/W$ |

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

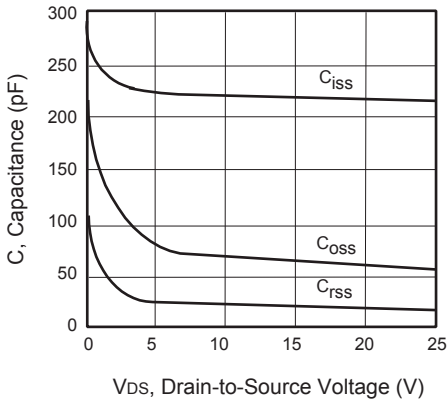
| Parameter  | Symbol       | Test Condition  | Min | Typ | Max  | Units    |
|--|--------------|---|-----|-----|------|----------|
| <b>Off Characteristics</b>   |              |   |     |     |      |          |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                   | 650 |     |      | V        |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS} = 650V, V_{GS} = 0V$                                    |     |     | 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</b>  |              |   |     |     |      |          |
| Gate Threshold Voltage   | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                               | 2.5 |     | 4.5  | V        |
| Static Drain-Source On-Resistance  | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 0.35A$                                     |     | 8.5 | 10.5 | $\Omega$ |
| <b>Dynamic Characteristics <sup>c</sup></b>  |              |   |     |     |      |          |
| Input Capacitance  | $C_{iss}$    | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$                 |     | 220 |      | pF       |
| Output Capacitance   | $C_{oss}$    |   |     | 60  |      | pF       |
| Reverse Transfer Capacitance   | $C_{rss}$    |   |     | 20  |      | pF       |
| <b>Switching Characteristics <sup>c</sup></b>  |              |   |     |     |      |          |
| Turn-On Delay Time   | $t_{d(on)}$  | $V_{DD} = 300V, I_D = 0.35A, V_{GS} = 10V, R_{GEN} = 4.7\Omega$ |     | 17  |      | ns       |
| Turn-On Rise Time  | $t_r$        |   |     | 13  |      | ns       |
| Turn-Off Delay Time  | $t_{d(off)}$ |   |     | 31  |      | ns       |
| Turn-Off Fall Time   | $t_f$        |   |     | 68  |      | ns       |
| Total Gate Charge  | $Q_g$        | $V_{DS} = 480V, I_D = 0.35A, V_{GS} = 10V$                      |     | 7.7 |      | nC       |
| Gate-Source Charge   | $Q_{gs}$     |   |     | 1.0 |      | nC       |
| Gate-Drain Charge  | $Q_{gd}$     |   |     | 4.3 |      | nC       |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>  |              |   |     |     |      |          |
| Drain-Source Diode Forward Current   | $I_S$        |   |     |     | 0.35 | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>  | $V_{SD}$     | $V_{GS} = 0V, I_S = 0.35A$                                      |     |     | 1.5  | 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. □ |              |   |     |     |      |          |



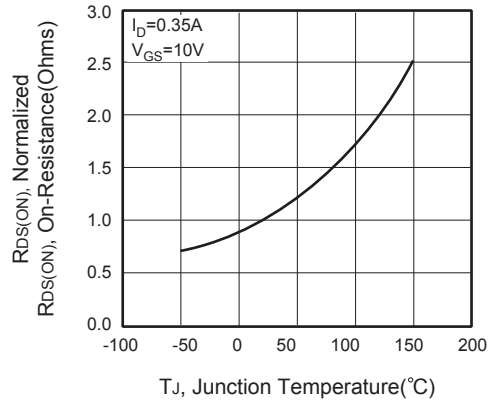
**Figure 1. Output Characteristics**



**Figure 2. Transfer Characteristics**



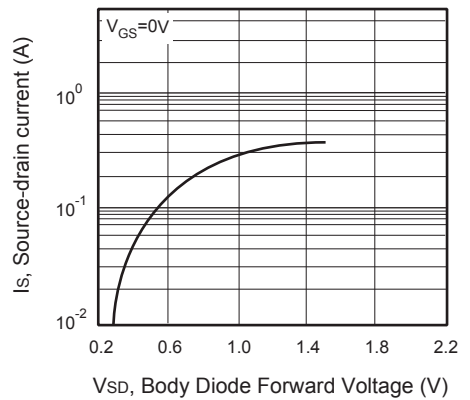
**Figure 3. Capacitance**



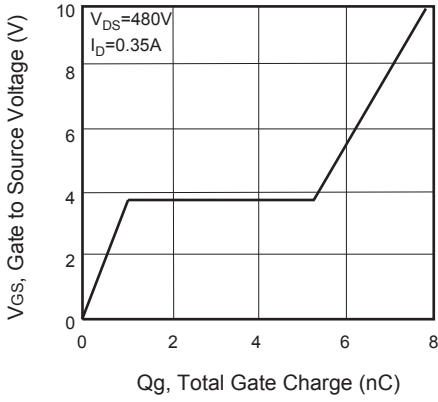
**Figure 4. On-Resistance Variation with Temperature**



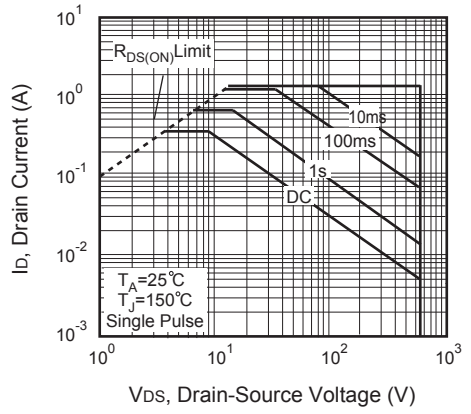
**Figure 5. Gate Threshold Variation with Temperature**



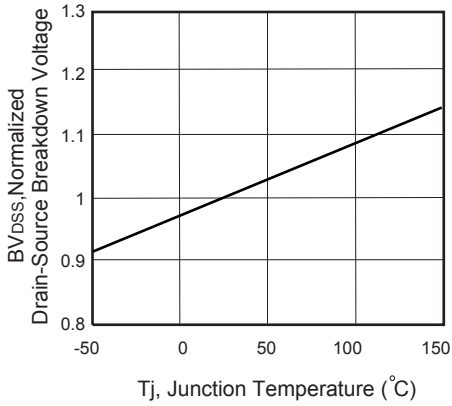
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



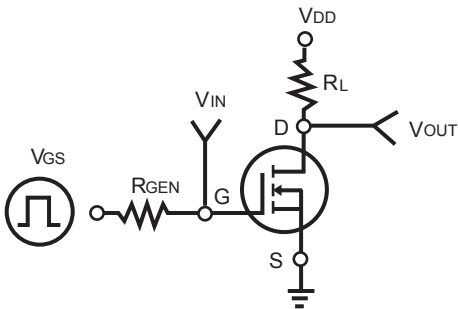
**Figure 7. Gate Charge**



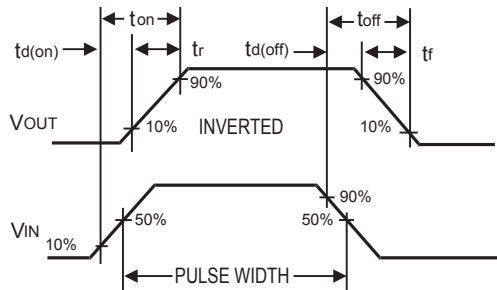
**Figure 8. Maximum Safe Operating Area**



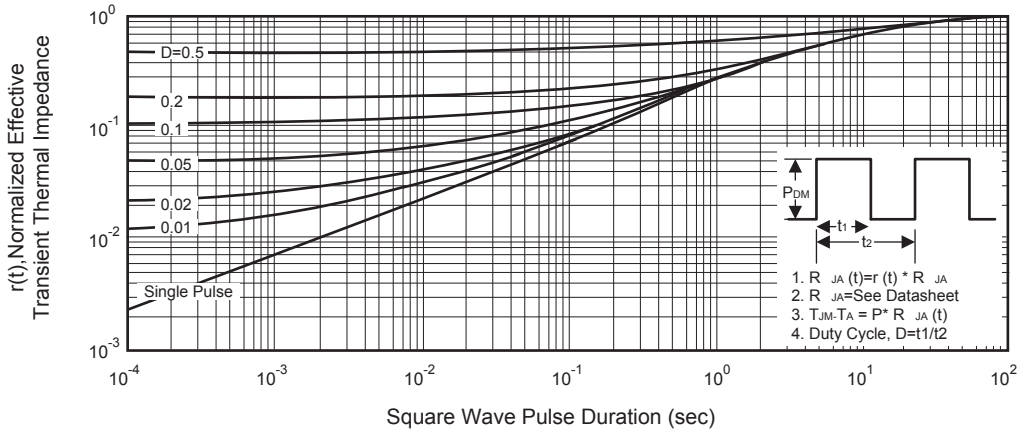
**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



**Figure 11. Switching Waveforms**



**Figure 12. Normalized Thermal Transient Impedance Curve**