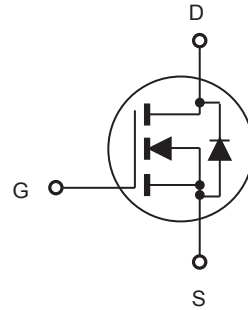


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

- 100V, 69A,  $R_{DS(ON)} = 11m\Omega$  @  $V_{GS} = 10V$   
 $R_{DS(ON)} = 15m\Omega$  @  $V_{GS} = 4.5V$
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- RoHS compliant.
- TO-220 & TO-263 package.



### ABSOLUTE MAXIMUM RATINGS $T_C = 25^\circ C$ 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 @ $T_C = 25^\circ C$<br>@ $T_C = 100^\circ C$        | $I_D$          | 69         | A             |
|   |                | 43         | A             |
| Drain Current-Pulsed <sup>a</sup>   | $I_{DM}$       | 276        | A             |
| Maximum Power Dissipation @ $T_C = 25^\circ C$<br>- Derate above $25^\circ C$ | $P_D$          | 104        | W             |
|   |                | 0.83       | W/ $^\circ C$ |
| 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 | $^\circ C$    |

### Thermal Characteristics

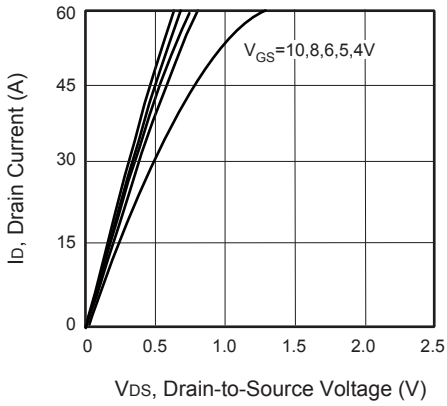
| Parameter                               | Symbol          | Limit | Units        |
|---|-----------------|-------|--------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 1.2   | $^\circ C/W$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5  | $^\circ C/W$ |



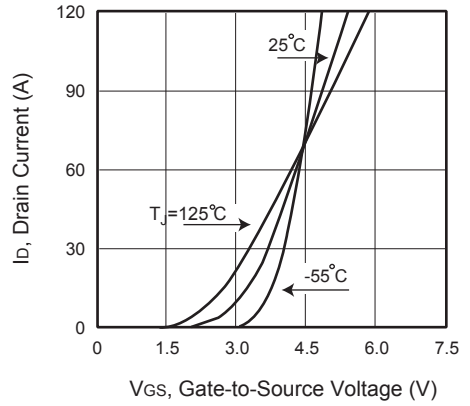
# CEP70N10L/CEB70N10L

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

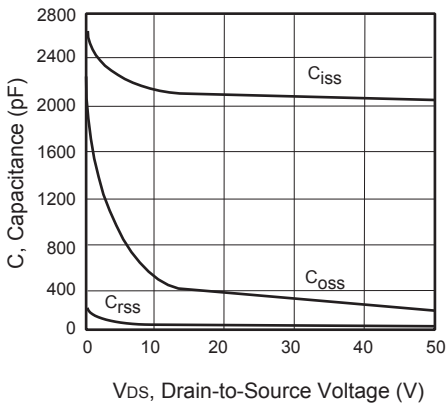
| Parameter   | Symbol       | Test Condition   | Min | Typ  | Max  | Units     |
|---|--------------|--|-----|------|------|-----------|
| <b>Off Characteristics</b>  |              |  |     |      |      |           |
| Drain-Source Breakdown Voltage  | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                | 100 |      |      | V         |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS} = 100V, V_{GS} = 0V$                                 |     |      | 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    | 11   | $m\Omega$ |
|   |              | $V_{GS} = 4.5V, I_D = 20A$                                   |     | 10.5 | 15   | $m\Omega$ |
| <b>Dynamic Characteristics<sup>c</sup></b>  |              |  |     |      |      |           |
| Input Capacitance   | $C_{iss}$    | $V_{DS} = 50V, V_{GS} = 0V, f = 1.0\text{ MHz}$              |     | 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  | $t_{d(on)}$  | $V_{DD} = 50V, I_D = 11.5A, V_{GS} = 10V, R_{GEN} = 3\Omega$ |     | 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   | $Q_g$        | $V_{DS} = 50V, I_D = 11.5A, V_{GS} = 4.5V$                   |     | 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  | $I_S$        |  |     |      | 69   | 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, $I_{AS} = 19A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25\text{ C}$ |              |  |     |      |      |           |



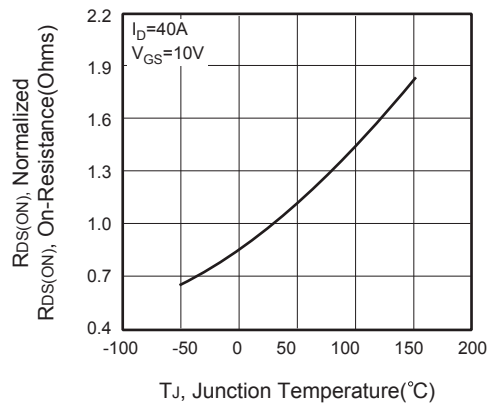
**Figure 1. Output Characteristics**



**Figure 2. Transfer Characteristics**



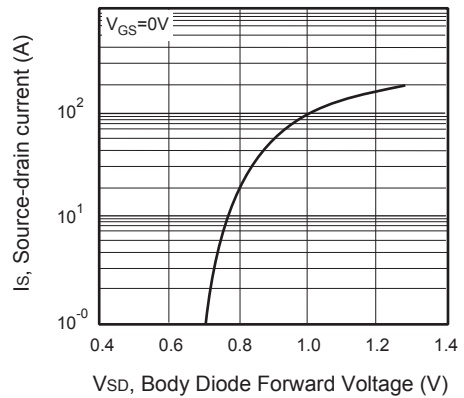
**Figure 3. Capacitance**



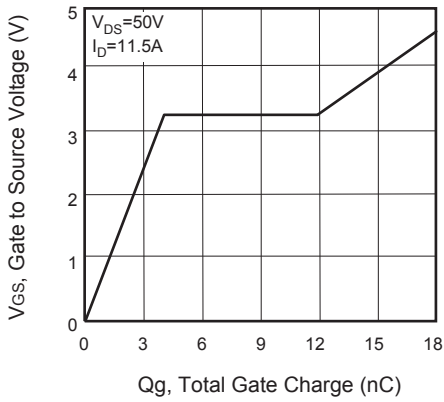
**Figure 4. On-Resistance Variation with Temperature**



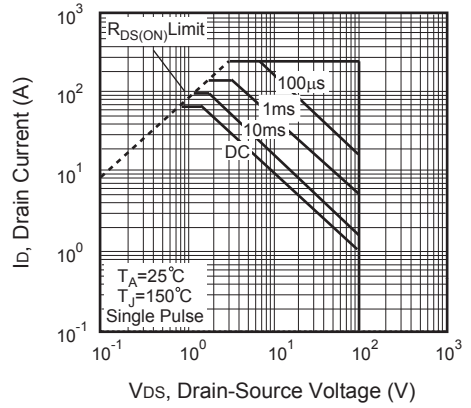
**Figure 5. Gate Threshold Variation with Temperature**



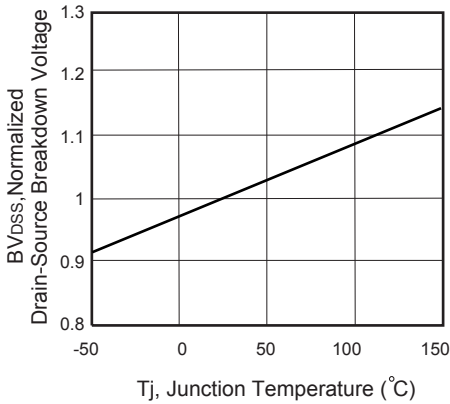
**Figure 6. Body Diode Forward Voltage Variation with Source Current**



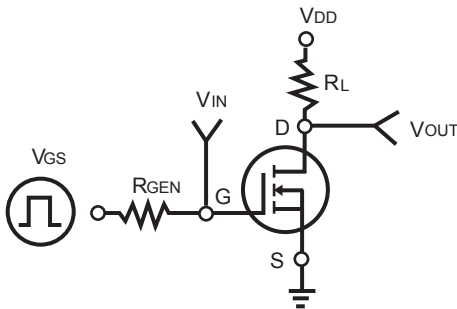
**Figure 7. Gate Charge**



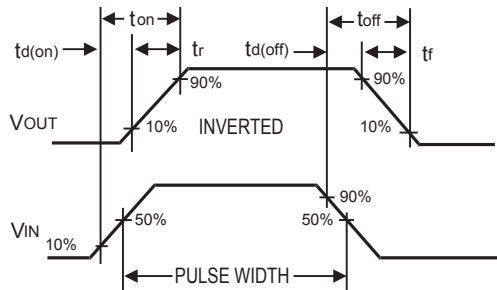
**Figure 8. Maximum Safe Operating Area**



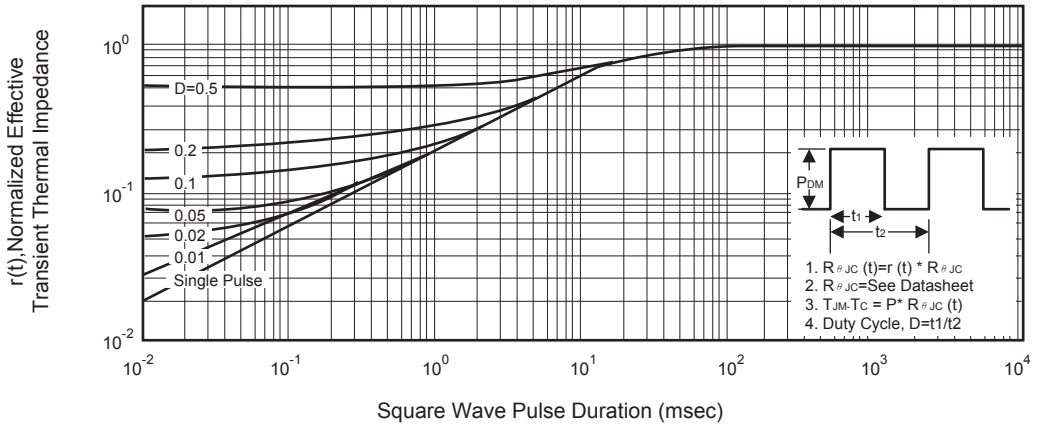
**Figure 9. Breakdown Voltage Variation VS Temperature**



**Figure 10. Switching Test Circuit**



**Figure 11. Switching Waveforms**



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