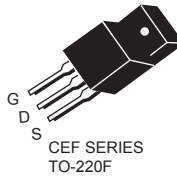
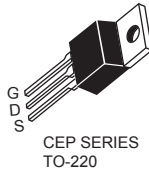


## N-Channel Enhancement Mode Field Effect Transistor

### FEATURES

| Type      | V <sub>DSS</sub> | R <sub>DS(ON)</sub> | I <sub>D</sub>    | @V <sub>GS</sub> |
|-----------|------------------|---------------------|-------------------|------------------|
| CEP200N15 | 150V             | 4.6mΩ               | 192A              | 10V              |
| CEB200N15 | 150V             | 4.6mΩ               | 192A              | 10V              |
| CEF200N15 | 150V             | 4.6mΩ               | 192A <sup>d</sup> | 10V              |

- Super high dense cell design for extremely low R<sub>DS(ON)</sub>.
- High power and current handling capability.
- RoHS compliant.



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

| Parameter  | Symbol                            | Limit      |                  | Units |
|--|-----------------------------------|------------|------------------|-------|
|  |                                   | TO-220/263 | TO-220F          |       |
| Drain-Source Voltage   | V <sub>DS</sub>                   | 150        |                  | V     |
| Gate-Source Voltage  | V <sub>GS</sub>                   | ± 20       |                  | V     |
| Drain Current-Continuous @ T <sub>C</sub> = 25°C<br>@ T <sub>C</sub> = 100°C | I <sub>D</sub>                    | 192        | 192 <sup>d</sup> | A     |
|  |                                   | 122        | 122 <sup>d</sup> | A     |
| Drain Current-Pulsed <sup>a</sup>  | I <sub>DM</sub> <sup>e</sup>      | 768        | 768 <sup>d</sup> | A     |
| Maximum Power Dissipation @ T <sub>C</sub> = 25°C<br>- Derate above 25°C     | P <sub>D</sub>                    | 357        | 89               | W     |
|  |                                   | 2.85       | 0.71             | W/°C  |
| Single Pulsed Avalanche Energy <sup>h</sup>                                  | E <sub>AS</sub>                   | 720        |                  | mJ    |
| Single Pulsed Avalanche Current <sup>h</sup>                                 | I <sub>AS</sub>                   | 60         |                  | A     |
| Operating and Store Temperature Range  | T <sub>J</sub> , T <sub>stg</sub> | -55 to 150 |                  | °C    |

### Thermal Characteristics

| Parameter                               | Symbol           | Limit |     | Units |
|---|------------------|-------|-----|-------|
| Thermal Resistance, Junction-to-Case    | R <sub>θJC</sub> | 0.35  | 1.4 | °C/W  |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | 62.5  | 65  | °C/W  |



# CEP200N15/CEB200N15 CEF200N15

## 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  | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                               | 150 |      |      | V          |
| Zero Gate Voltage Drain Current   | $I_{DSS}$    | $V_{DS} = 150V, V_{GS} = 0V$                                |     |      | 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  | $V_{GS(th)}$ | $V_{GS} = V_{DS}, I_D = 250\mu A$                           | 2   |      | 4    | V          |
| Static Drain-Source On-Resistance   | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$                                   |     | 3.8  | 4.6  | m $\Omega$ |
| <b>Dynamic Characteristics<sup>c</sup></b>  |              |   |     |      |      |            |
| Input Capacitance   | $C_{iss}$    | $V_{DS} = 75V, V_{GS} = 0V, f = 1.0\text{ MHz}$             |     | 3190 |      | pF         |
| Output Capacitance  | $C_{oss}$    |   |     | 730  |      | pF         |
| Reverse Transfer Capacitance  | $C_{rss}$    |   |     | 15   |      | pF         |
| <b>Switching Characteristics<sup>c</sup></b>  |              |   |     |      |      |            |
| Turn-On Delay Time  | $t_{d(on)}$  | $V_{DD} = 75V, I_D = 20A, V_{GS} = 10V, R_{GEN} = 10\Omega$ |     | 30   |      | ns         |
| Turn-On Rise Time   | $t_r$        |   |     | 25   |      | ns         |
| Turn-Off Delay Time   | $t_{d(off)}$ |   |     | 80   |      | ns         |
| Turn-Off Fall Time  | $t_f$        |   |     | 46   |      | ns         |
| Total Gate Charge   | $Q_g$        | $V_{DS} = 75V, I_D = 20A, V_{GS} = 10V$                     |     | 64   |      | nC         |
| Gate-Source Charge  | $Q_{gs}$     |   |     | 18   |      | nC         |
| Gate-Drain Charge   | $Q_{gd}$     |   |     | 12   |      | nC         |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>   |              |   |     |      |      |            |
| Drain-Source Diode Forward Current  | $I_S^f$      |   |     |      | 192  | A          |
| Drain-Source Diode Forward Voltage <sup>b</sup>   | $V_{SD}$     | $V_{GS} = 0V, I_S = 20A^g$                                  |     |      | 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.<br>d.Limited only by maximum temperature allowed .<br>e.Pulse width limited by safe operating area .<br>f.Full package $I_{S(max)} = 96A$ .<br>g.Full package $V_{SD}$ test condition $I_S = 96A$ .<br>h.L = 0.4mH, $I_{AS} = 60A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25\text{ C}$ . |              |   |     |      |      |            |



# CEP200N15/CEB200N15 CEF200N15

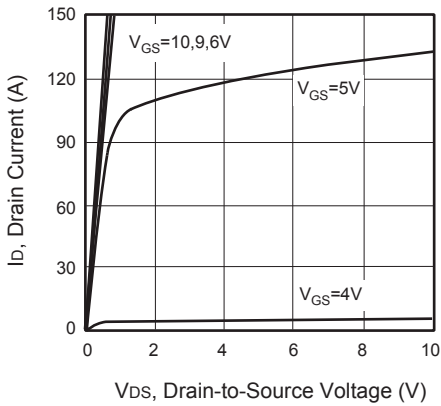


Figure 1. Output Characteristics

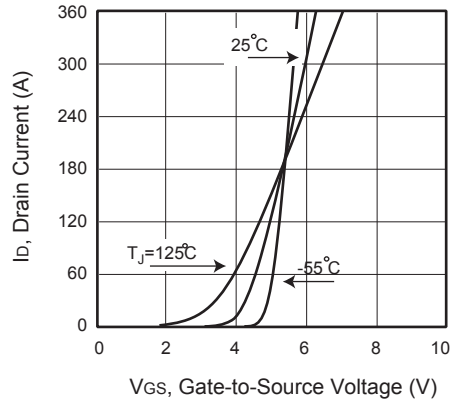


Figure 2. Transfer Characteristics

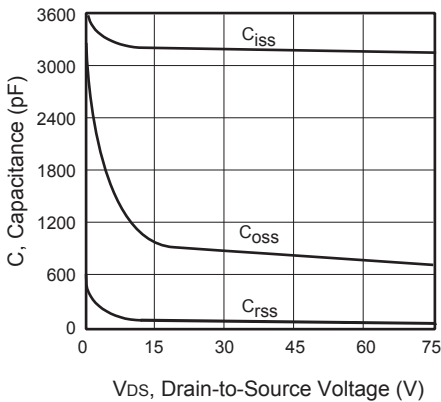


Figure 3. Capacitance

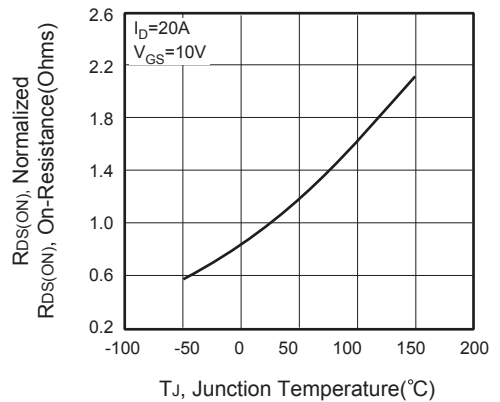


Figure 4. On-Resistance Variation with Temperature

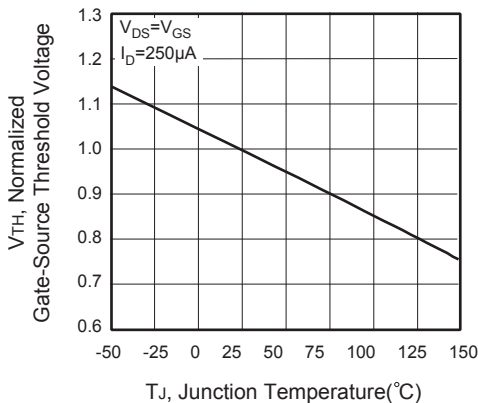


Figure 5. Gate Threshold Variation with Temperature

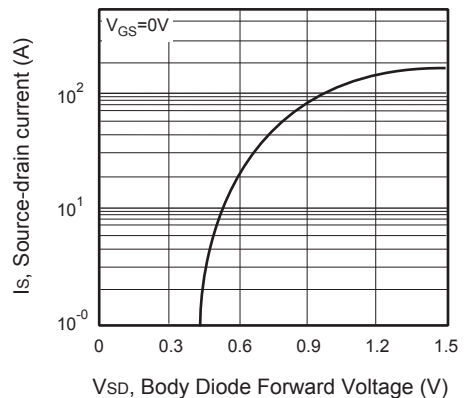
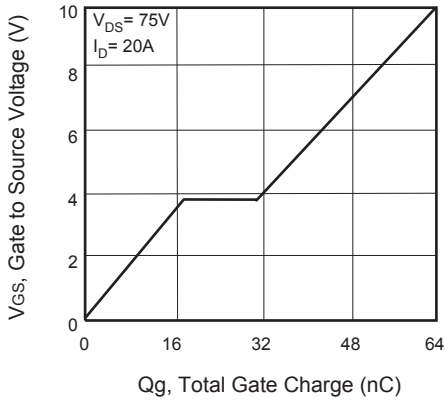
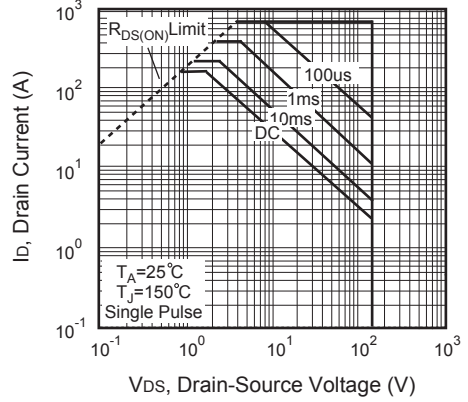


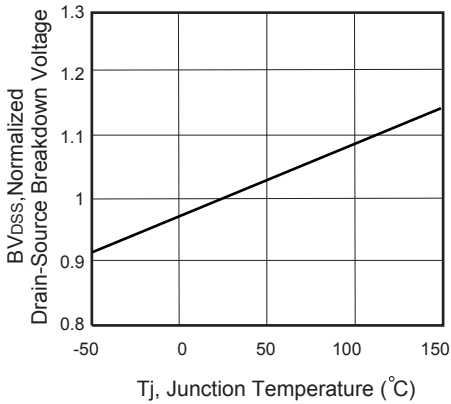
Figure 6. Body Diode Forward Voltage Variation with Source Current



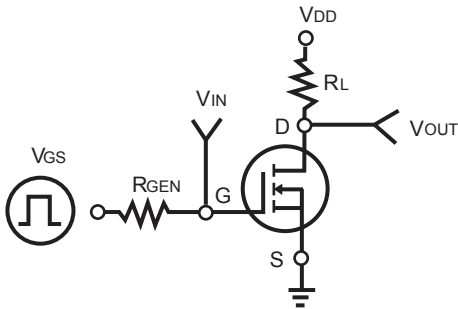
**Figure 7. Gate Charge**



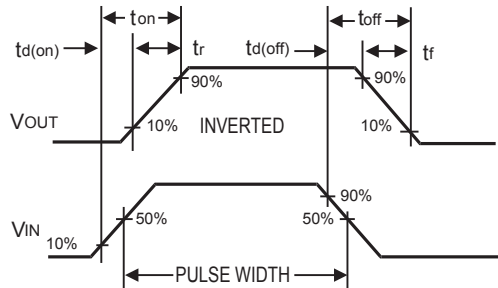
**Figure 8. Maximum Safe Operating Area**



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



**Figure 10. Switching Test Circuit**



**Figure 11. Switching Waveforms**



# CEP200N15/CEB200N15 CEF200N15

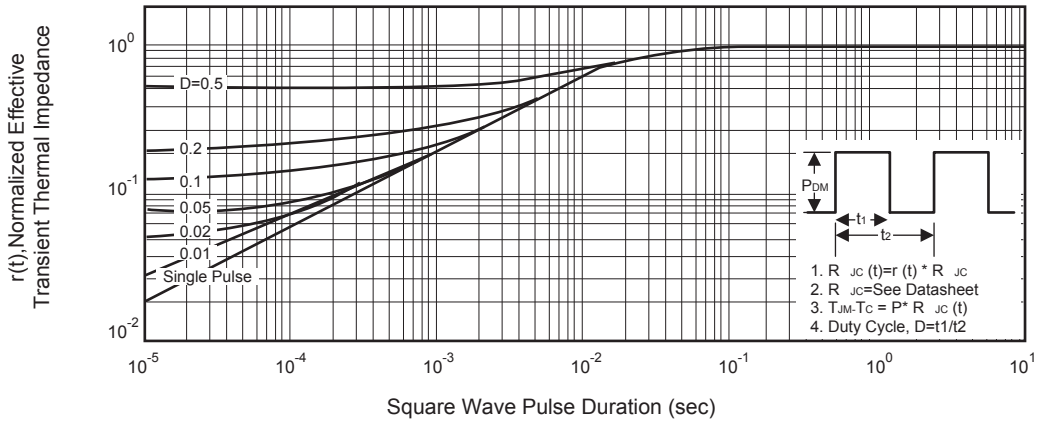


Figure 12. Normalized Thermal Transient Impedance Curve