



# CEPF630B/CEBF630B CEIF630B/CEFF630B

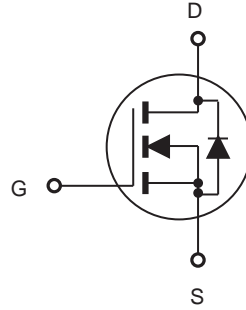
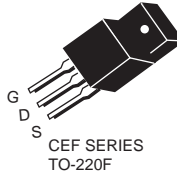
## N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

### FEATURES

| Type     | V <sub>DSS</sub> | R <sub>DS(ON)</sub> | I <sub>D</sub>  | @V <sub>GS</sub> |
|----------|------------------|---------------------|-----------------|------------------|
| CEPF630B | 200V             | 0.4Ω                | 9A              | 10V              |
| CEBF630B | 200V             | 0.4Ω                | 9A              | 10V              |
| CEIF630B | 200V             | 0.4Ω                | 9A              | 10V              |
| CEFF630B | 200V             | 0.4Ω                | 9A <sup>e</sup> | 10V              |

- Super high dense cell design for extremely low R<sub>DS(ON)</sub>.
- High power and current handling capability.
- Lead free product is acquired.
- TO-220 & TO-263 & TO-262 package & TO-220F full-pak for through hole.



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

| Parameter  | Symbol                            | Limit          |                 | Units |
|--|-----------------------------------|----------------|-----------------|-------|
|  |                                   | TO-220/263/262 | TO-220F         |       |
| Drain-Source Voltage   | V <sub>DS</sub>                   | 200            |                 | V     |
| Gate-Source Voltage  | V <sub>GS</sub>                   | ±30            |                 | V     |
| Drain Current-Continuous   | I <sub>D</sub>                    | 9              | 9 <sup>e</sup>  | A     |
| Drain Current-Pulsed <sup>a</sup>  | I <sub>DM</sub> <sup>f</sup>      | 36             | 36 <sup>e</sup> | A     |
| Maximum Power Dissipation @ T <sub>C</sub> = 25°C<br>- Derate above 25°C | P <sub>D</sub>                    | 74             | 35              | W     |
|  |                                   | 0.59           | 0.28            | W/°C  |
| Single Pulsed Avalanche Energy <sup>d</sup>                              | E <sub>AS</sub>                   | 150            | 150             | mJ    |
| Single Pulsed Avalanche Current <sup>d</sup>                             | I <sub>AS</sub>                   | 9              | 9               | 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> | 1.7   | 3.6 | °C/W  |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | 62.5  | 65  | °C/W  |



# CEPF630B/CEBF630B CEIF630B/CEFF630B

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

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| Parameter  | Symbol       | Test Condition  | Min | Typ  | Max  | Units    |
|--|--------------|---|-----|------|------|----------|
| <b>Off Characteristics</b>   |              |   |     |      |      |          |
| Drain-Source Breakdown Voltage   | $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                               | 200 |      |      | V        |
| Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS} = 200V, V_{GS} = 0V$                                |     |      | 25   | $\mu A$  |
| 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<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  | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 4.5A$                                  |     | 0.34 | 0.4  | $\Omega$ |
| Forward Transconductance   | $g_{FS}$     | $V_{DS} = 40V, I_D = 4.5A$                                  |     | 7    |      | S        |
| <b>Dynamic Characteristics<sup>c</sup></b>   |              |   |     |      |      |          |
| Input Capacitance  | $C_{iss}$    | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$             |     | 550  |      | pF       |
| Output Capacitance   | $C_{oss}$    |   |     | 100  |      | pF       |
| Reverse Transfer Capacitance   | $C_{rss}$    |   |     | 30   |      | pF       |
| <b>Switching Characteristics<sup>c</sup></b>   |              |   |     |      |      |          |
| Turn-On Delay Time   | $t_{d(on)}$  | $V_{DD} = 100V, I_D = 9A, V_{GS} = 10V, R_{GEN} = 25\Omega$ |     | 25   | 50   | ns       |
| Turn-On Rise Time  | $t_r$        |   |     | 84   | 150  | ns       |
| Turn-Off Delay Time  | $t_{d(off)}$ |   |     | 72   | 130  | ns       |
| Turn-On Fall Time  | $t_f$        |   |     | 77   | 140  | ns       |
| Total Gate Charge  | $Q_g$        | $V_{DS} = 160V, I_D = 9A, V_{GS} = 10V$                     |     | 22   | 29   | nC       |
| Gate-Source Charge   | $Q_{gs}$     |   |     | 3    |      | nC       |
| Gate-Drain Charge  | $Q_{gd}$     |   |     | 12   |      | nC       |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b>  |              |   |     |      |      |          |
| Drain-Source Diode Forward Current   | $I_S^g$      |   |     |      | 9    | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>  | $V_{SD}$     | $V_{GS} = 0V, I_S = 9A$                                     |     |      | 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.L = 3mH, $I_{AS} = 9A, V_{DD} = 50V, R_G = 25\Omega$ , Starting $T_J = 25^\circ\text{C}$ .<br>e.Limited only by maximum temperature allowed .<br>f.Pulse width limited by safe operating area .<br>g.Full package $I_{S(max)} = 6A$ . |              |   |     |      |      |          |



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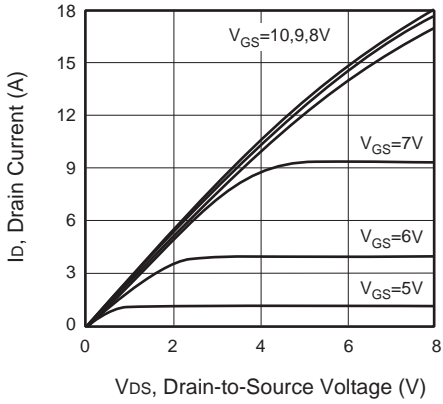


Figure 1. Output Characteristics

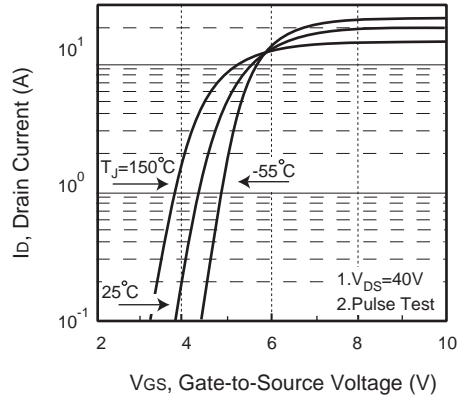


Figure 2. Transfer Characteristics

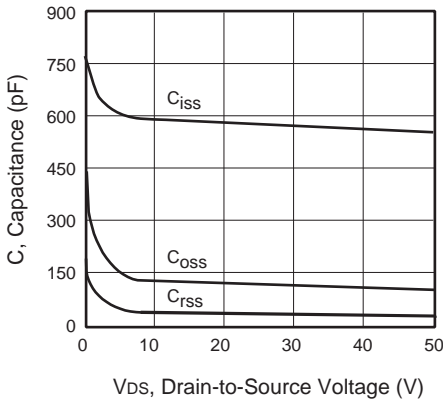


Figure 3. Capacitance

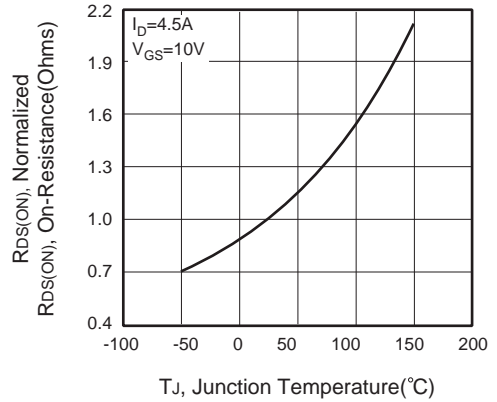


Figure 4. On-Resistance Variation with Temperature

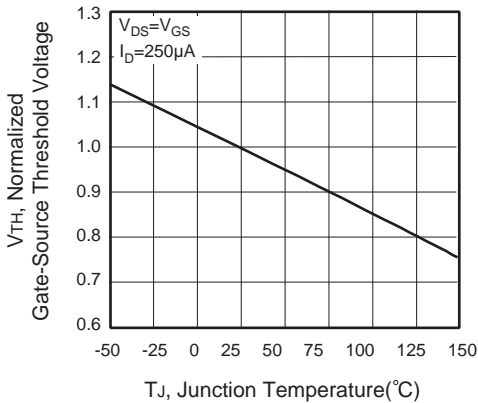


Figure 5. Gate Threshold Variation with Temperature

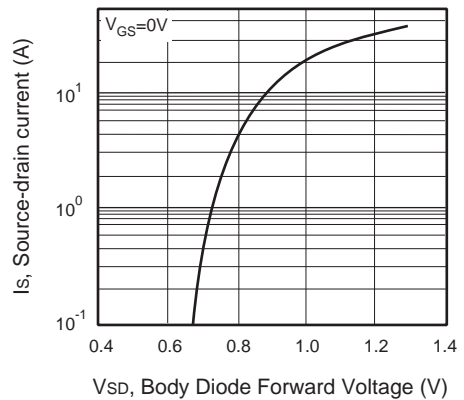


Figure 6. Body Diode Forward Voltage Variation with Source Current



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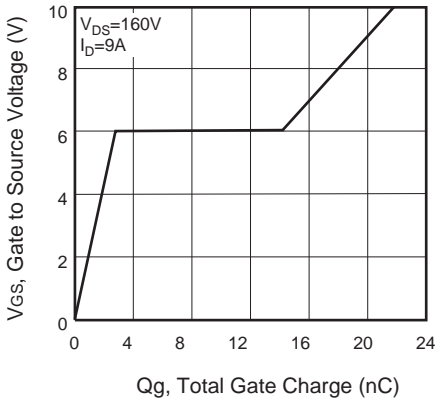


Figure 7. Gate Charge

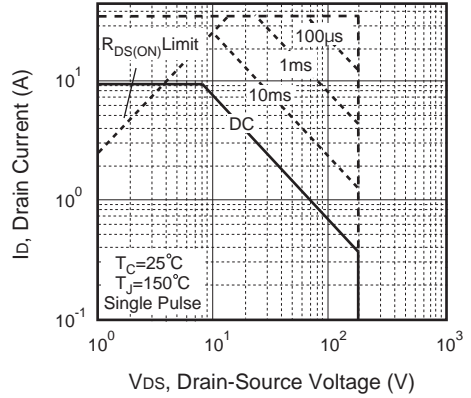


Figure 8. Maximum Safe Operating Area

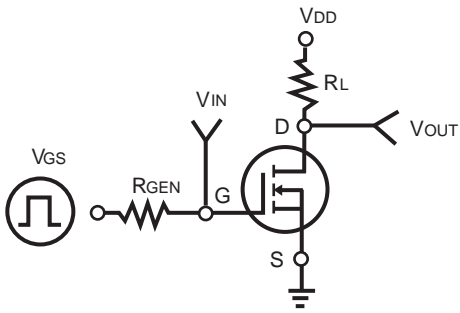


Figure 9. Switching Test Circuit



Figure 10. Switching Waveforms

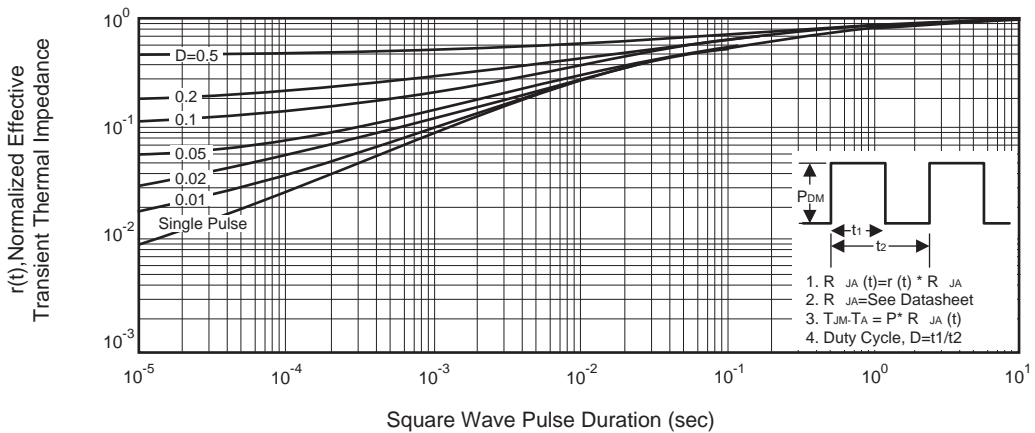


Figure 11. Normalized Thermal Transient Impedance Curve