



# CEP02N7G/CEB02N7G CEF02N7G

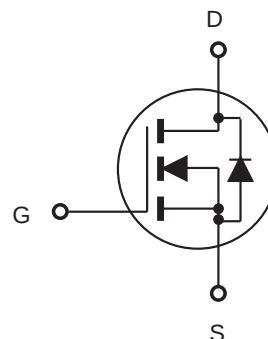
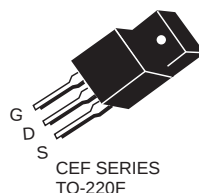
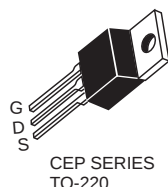
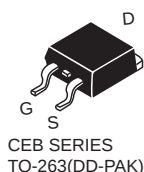
## N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

### FEATURES

| Type     | $V_{DS}$ | $R_{DS(ON)}$  | $I_D$             | @ $V_{GS}$ |
|----------|----------|---------------|-------------------|------------|
| CEP02N7G | 700V     | 6.75 $\Omega$ | 1.9A              | 10V        |
| CEB02N7G | 700V     | 6.75 $\Omega$ | 1.9A              | 10V        |
| CEF02N7G | 700V     | 6.75 $\Omega$ | 1.9A <sup>d</sup> | 10V        |

- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- Lead free product is acquired.



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

| Parameter                                                                                 | Symbol         | Limit      |                  | Units               |
|-------------------------------------------------------------------------------------------|----------------|------------|------------------|---------------------|
|                                                                                           |                | TO-220/263 | TO-220F          |                     |
| Drain-Source Voltage                                                                      | $V_{DS}$       | 700        |                  | V                   |
| Gate-Source Voltage                                                                       | $V_{GS}$       | $\pm 30$   |                  | V                   |
| Drain Current-Continuous                                                                  | $I_D$          | 1.9        | 1.9 <sup>d</sup> | A                   |
| Drain Current-Pulsed <sup>a</sup>                                                         | $I_{DM}^e$     | 8          | 8 <sup>d</sup>   | A                   |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$<br>- Derate above $25^\circ\text{C}$ | $P_D$          | 60         | 33               | W                   |
|                                                                                           |                | 0.48       | 0.26             | W/ $^\circ\text{C}$ |
| Operating and Store Temperature Range                                                     | $T_J, T_{stg}$ | -55 to 150 |                  | $^\circ\text{C}$    |

### Thermal Characteristics

| Parameter                               | Symbol          | Limit |     | Units              |
|-----------------------------------------|-----------------|-------|-----|--------------------|
| Thermal Resistance, Junction-to-Case    | $R_{\theta JC}$ | 2.1   | 3.9 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5  | 65  | $^\circ\text{C/W}$ |

This is preliminary information on a new product in development now .  
Details are subject to change without notice .

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<http://www.cetsemi.com>



# CEP02N7G/CEB02N7G

## CEF02N7G

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

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| Parameter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Symbol             | Test Condition                                              | Min | Typ | Max  | Units    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-------------------------------------------------------------|-----|-----|------|----------|
| Off Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                                                             |     |     |      |          |
| Drain-Source Breakdown Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $BV_{DSS}$         | $V_{GS} = 0V, I_D = 250\mu A$                               | 700 |     |      | V        |
| Zero Gate Voltage Drain Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $I_{DSS}$          | $V_{DS} = 700V, V_{GS} = 0V$                                |     |     | 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       |
| On Characteristics <sup>b</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                                                             |     |     |      |          |
| Gate Threshold Voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | $V_{GS(th)}$       | $V_{GS} = V_{DS}, I_D = 250\mu A$                           | 2   |     | 4    | V        |
| Static Drain-Source On-Resistance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $R_{DS(on)}$       | $V_{GS} = 10V, I_D = 1A$                                    |     | 5.4 | 6.75 | $\Omega$ |
| Dynamic Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                                             |     |     |      |          |
| Forward Transconductance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $g_{FS}$           | $V_{DS} = 50V, I_D = 1A$                                    |     | 1.5 |      | S        |
| Input Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $C_{iss}$          | $V_{DS} = 25V, V_{GS} = 0V, f = 1.0\text{ MHz}$             |     | 305 |      | pF       |
| Output Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $C_{oss}$          |                                                             |     | 55  |      | pF       |
| Reverse Transfer Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $C_{rss}$          |                                                             |     | 15  |      | pF       |
| Switching Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                             |     |     |      |          |
| Turn-On Delay Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $t_{d(on)}$        | $V_{DD} = 300V, I_D = 2A, V_{GS} = 10V, R_{GEN} = 18\Omega$ |     | 14  |      | ns       |
| Turn-On Rise Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $t_r$              |                                                             |     | 14  |      | ns       |
| Turn-Off Delay Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $t_{d(off)}$       |                                                             |     | 20  |      | ns       |
| Turn-Off Fall Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $t_f$              |                                                             |     | 10  |      | ns       |
| Total Gate Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $Q_g$              | $V_{DS} = 480V, I_D = 2A, V_{GS} = 10V$                     |     | 7.5 |      | nC       |
| Gate-Source Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $Q_{gs}$           |                                                             |     | 1.9 |      | nC       |
| Gate-Drain Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $Q_{gd}$           |                                                             |     | 3.6 |      | nC       |
| Drain-Source Diode Characteristics and Maximum Ratings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                             |     |     |      |          |
| Drain-Source Diode Forward Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $I_S$ <sup>f</sup> |                                                             |     |     | 1.9  | A        |
| Drain-Source Diode Forward Voltage <sup>b</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $V_{SD}$           | $V_{GS} = 0V, I_S = 1A$ <sup>g</sup>                        |     |     | 1.5  | V        |
| <div>Notes :</div> <div>a.Repetitive Rating : Pulse width limited by maximum junction temperature .</div> <div>b.Pulse Test : Pulse Width <math>\leq 300\mu s</math>, Duty Cycle <math>\leq 2\%</math> .</div> <div>c.Guaranteed by design, not subject to production testing.</div> <div>d.Limited only by maximum temperature allowed .</div> <div>e.Pulse width limited by safe operating area .</div> <div>f.Full package <math>I_{S(max)} = 1.5A</math> .</div> <div>g.Full package <math>V_{SD}</math> test condition <math>I_S = 1.5A</math> .</div> |                    |                                                             |     |     |      |          |



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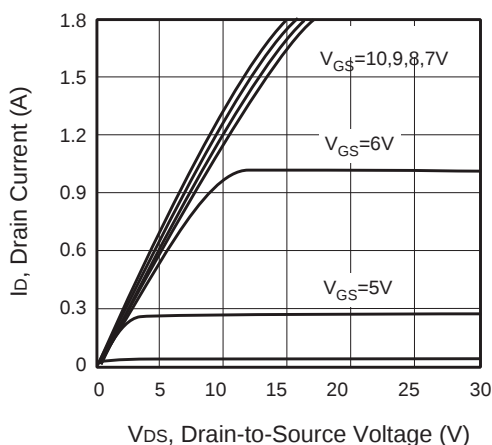


Figure 1. Output Characteristics

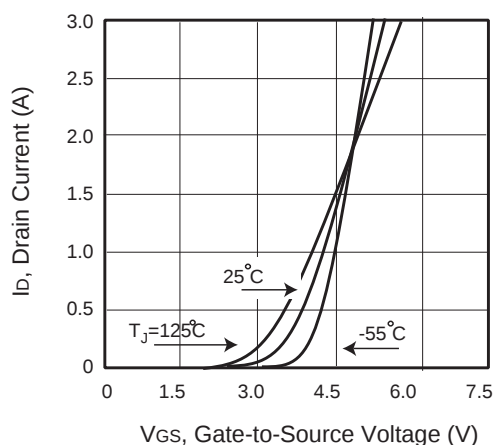


Figure 2. Transfer Characteristics

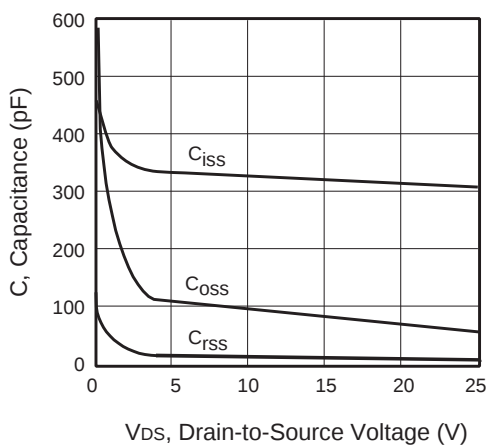


Figure 3. Capacitance

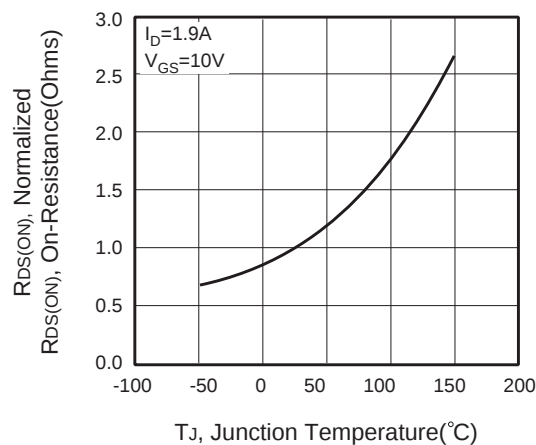


Figure 4. On-Resistance Variation with Temperature

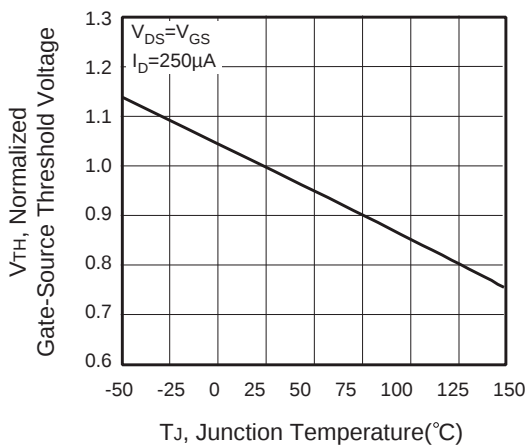


Figure 5. Gate Threshold Variation with Temperature

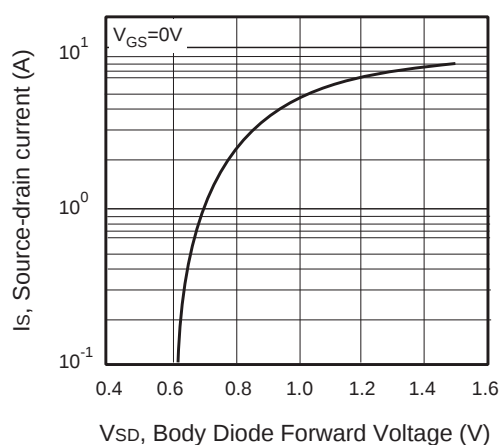


Figure 6. Body Diode Forward Voltage Variation with Source Current



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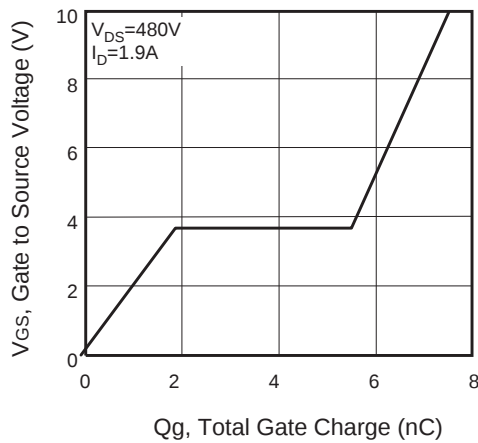


Figure 7. Gate Charge

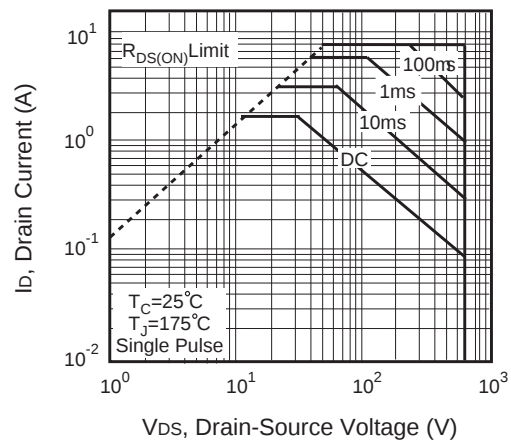


Figure 8. Maximum Safe Operating Area

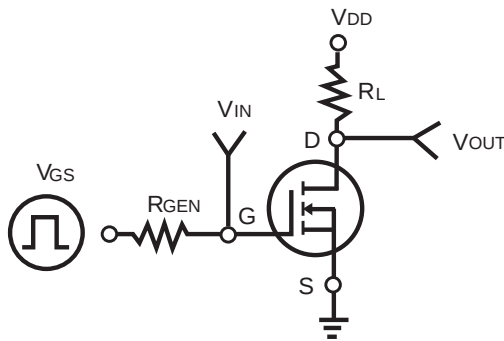


Figure 9. Switching Test Circuit

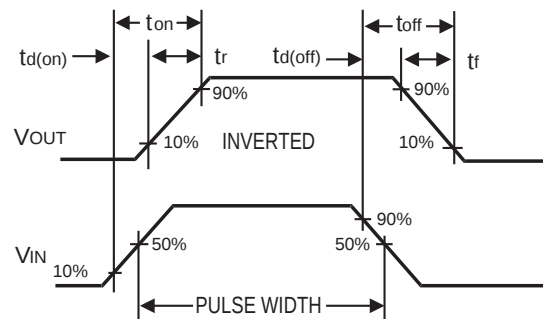


Figure 10. Switching Waveforms

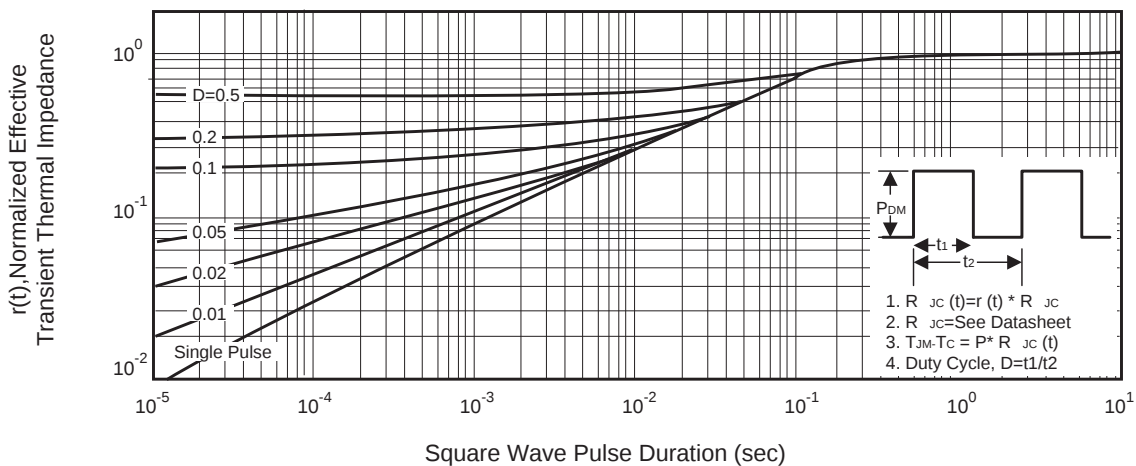


Figure 11. Normalized Thermal Transient Impedance Curve