



# CEP655N/CEB655N CEI655N/CEF655N

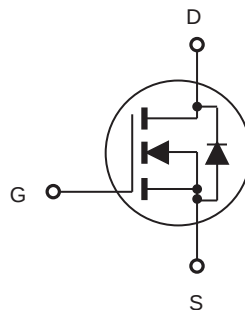
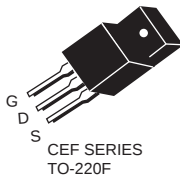
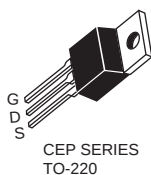
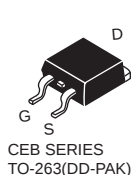
## N-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

### FEATURES

| Type    | V <sub>DSS</sub> | R <sub>DS(ON)</sub> | I <sub>D</sub>   | @V <sub>GS</sub> |
|---------|------------------|---------------------|------------------|------------------|
| CEP655N | 150V             | 0.153Ω              | 15A              | 10V              |
| CEB655N | 150V             | 0.153Ω              | 15A              | 10V              |
| CEI655N | 150V             | 0.153Ω              | 15A              | 10V              |
| CEF655N | 150V             | 0.153Ω              | 15A <sup>d</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>                   | 150            |                 | V     |
| Gate-Source Voltage                                                                       | V <sub>GS</sub>                   | ±25            |                 | V     |
| Drain Current-Continuous                                                                  | I <sub>D</sub>                    | 15             | 15 <sup>d</sup> | A     |
| Drain Current-Pulsed <sup>a</sup>                                                         | I <sub>DM</sub> <sup>e</sup>      | 60             | 60 <sup>d</sup> | A     |
| Maximum Power Dissipation @ $T_C = 25^\circ\text{C}$<br>- Derate above $25^\circ\text{C}$ | P <sub>D</sub>                    | 83             | 39              | W     |
|                                                                                           |                                   | 0.56           | 0.26            | W/°C  |
| Operating and Store Temperature Range                                                     | T <sub>J</sub> , T <sub>stg</sub> | -55 to 175     |                 | °C    |

### Thermal Characteristics

| Parameter                               | Symbol           | Limit |     | Units |
|-----------------------------------------|------------------|-------|-----|-------|
| Thermal Resistance, Junction-to-Case    | R <sub>θJC</sub> | 1.8   | 3.8 | °C/W  |
| Thermal Resistance, Junction-to-Ambient | R <sub>θJA</sub> | 62.5  | 65  | °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>



# CEP655N/CEB655N CEI655N/CEF655N

## 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | $BV_{DSS}$         | $V_{GS} = 0V, I_D = 250\mu A$                                    | 150 |      |      | V          |
| Zero Gate Voltage Drain Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $I_{DSS}$          | $V_{DS} = 150V, V_{GS} = 0V$                                     |     |      | 1    | $\mu A$    |
| Gate Body Leakage Current, Forward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $I_{GSSF}$         | $V_{GS} = 25V, V_{DS} = 0V$                                      |     |      | 100  | nA         |
| Gate Body Leakage Current, Reverse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $I_{GSSR}$         | $V_{GS} = -25V, V_{DS} = 0V$                                     |     |      | -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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $R_{DS(on)}$       | $V_{GS} = 10V, I_D = 8.2A$                                       |     | 118  | 153  | m $\Omega$ |
| Forward Transconductance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | $g_{FS}$           | $V_{DS} = 40V, I_D = 8.2A$                                       |     | 5    |      | S          |
| Dynamic Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                    |                                                                  |     |      |      |            |
| Input Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $C_{ISS}$          | $V_{DS} = 25V, V_{GS} = 0V,$<br>$f = 1.0\text{ MHz}$             |     | 750  |      | pF         |
| Output Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $C_{OSS}$          |                                                                  |     | 175  |      | pF         |
| Reverse Transfer Capacitance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $C_{RSS}$          |                                                                  |     | 70   |      | pF         |
| Switching Characteristics <sup>c</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                                  |     |      |      |            |
| Turn-On Delay Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $t_{d(on)}$        | $V_{DD} = 75V, I_D = 15A,$<br>$V_{GS} = 10V, R_{GEN} = 25\Omega$ |     | 17   | 35   | ns         |
| Turn-On Rise Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $t_r$              |                                                                  |     | 48   | 100  | ns         |
| Turn-Off Delay Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | $t_{d(off)}$       |                                                                  |     | 40   | 80   | ns         |
| Turn-Off Fall Time                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $t_f$              |                                                                  |     | 46   | 90   | ns         |
| Total Gate Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $Q_g$              | $V_{DS} = 120V, I_D = 15A,$<br>$V_{GS} = 10V$                    |     | 26   | 34   | nC         |
| Gate-Source Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $Q_{gs}$           |                                                                  |     | 6    |      | nC         |
| Gate-Drain Charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | $Q_{gd}$           |                                                                  |     | 12.5 |      | nC         |
| Drain-Source Diode Characteristics and Maximum Ratings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                    |                                                                  |     |      |      |            |
| Drain-Source Diode Forward Current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | $I_S$ <sup>f</sup> |                                                                  |     |      | 15   | A          |
| Drain-Source Diode Forward Voltage <sup>b</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | $V_{SD}$           | $V_{GS} = 0V, I_S = 15A$ <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)} = 10A</math> .</div> <div>g.Full package <math>V_{SD}</math> test condition <math>I_S = 10A</math> .</div> |                    |                                                                  |     |      |      |            |



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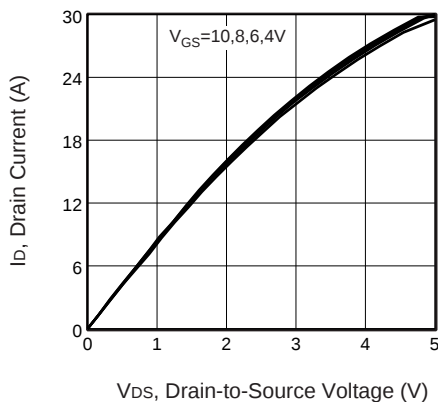


Figure 1. Output Characteristics

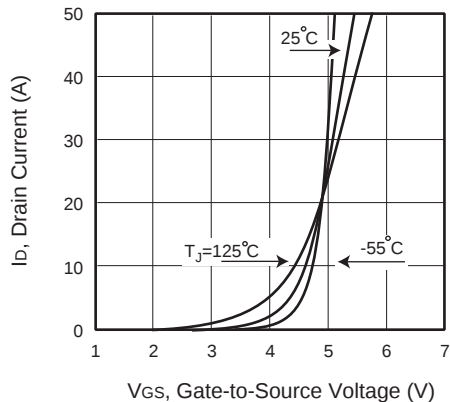


Figure 2. Transfer Characteristics

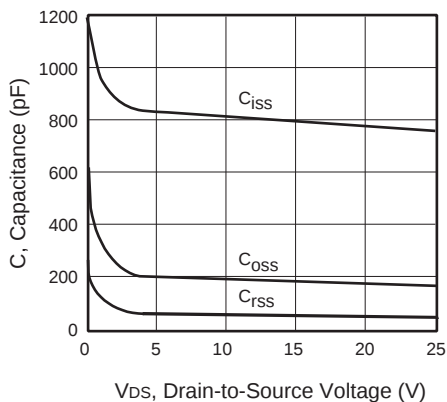


Figure 3. Capacitance

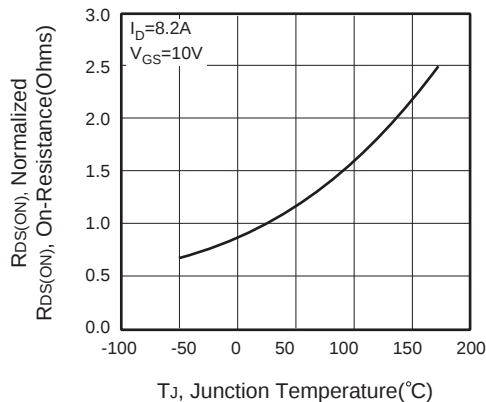


Figure 4. On-Resistance Variation with Temperature

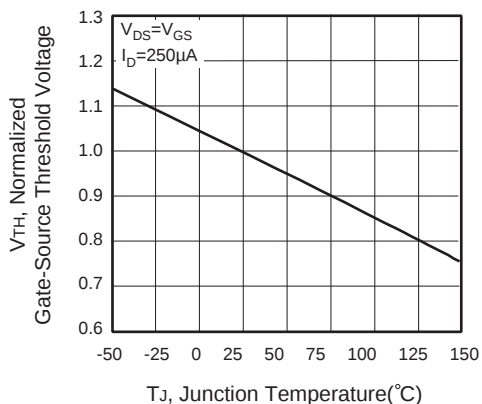


Figure 5. Gate Threshold Variation with Temperature

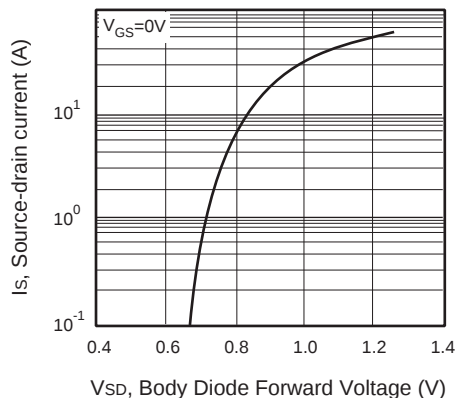


Figure 6. Body Diode Forward Voltage Variation with Source Current



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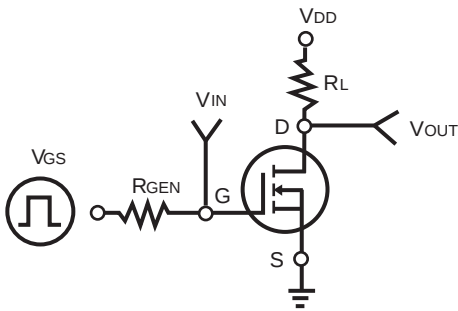
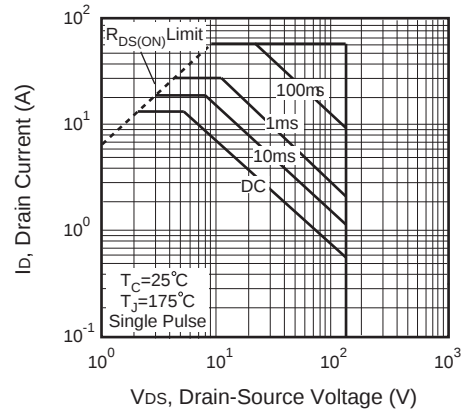
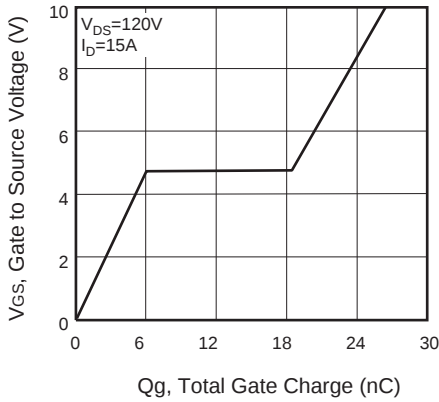


Figure 9. Switching Test Circuit

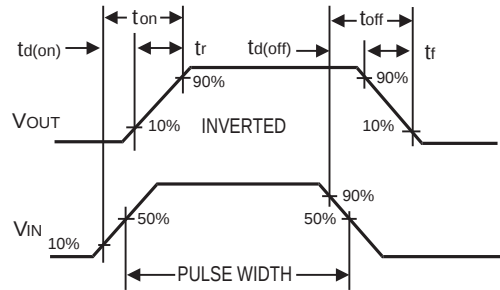


Figure 10. Switching Waveforms

