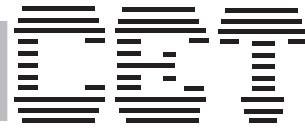


# CEP05P03/CEB05P03

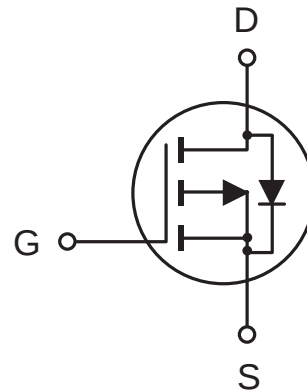


4

## Single P-Channel Enhancement Mode MOSFET

### FEATURES

- -30V , -4.9A ,  $R_{DS(ON)}=70m\Omega$  @  $V_{GS}=-10V$   
 $R_{DS(ON)}=120m\Omega$  @  $V_{GS}=-4.5V$
- Super high dense cell design for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.
- TO-220 package for through hole.



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

| Parameter                                                     | Symbol         | Limit      | Unit             |
|---------------------------------------------------------------|----------------|------------|------------------|
| Drain-Source Voltage                                          | $V_{DS}$       | -30        | V                |
| Gate-Source Voltage                                           | $V_{GS}$       | $\pm 20$   | V                |
| Drain Current-Continuous @ $T_J=125^\circ\text{C}$<br>-Pulsed | $I_D$          | $\pm 4.9$  | A                |
|                                                               | $I_{DM}$       | $\pm 30$   | A                |
| Drain-Source Diode Forward Current                            | $I_S$          | -1.7       | A                |
| Maximum Power Dissipation                                     | $P_D$          | 50         | W                |
| Operating Junction and Storage Temperature Range              | $T_J, T_{STG}$ | -55 to 150 | $^\circ\text{C}$ |

### THERMAL CHARACTERISTICS

|                                         |                 |      |                    |
|-----------------------------------------|-----------------|------|--------------------|
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5 | $^\circ\text{C/W}$ |
|-----------------------------------------|-----------------|------|--------------------|

# CEP05P03/CEB05P03

## ELECTRICAL CHARACTERISTICS (Tc=25°C unless otherwise noted)

4

| Parameter                              | Symbol              | Condition                                                                                             | Min | Typ  | Max  | Unit |
|----------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------|-----|------|------|------|
| OFF CHARACTERISTICS                    |                     |                                                                                                       |     |      |      |      |
| Drain-Source Breakdown Voltage         | BV <sub>DSS</sub>   | V <sub>GS</sub> = 0V, I <sub>D</sub> =-250μA                                                          | -30 |      |      | V    |
| Zero Gate Voltage Drain Current        | I <sub>DSS</sub>    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                                            |     |      | -1   | μA   |
| Gate-Body Leakage                      | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> =0V                                                           |     |      | ±100 | nA   |
| ON CHARACTERISTICS <sup>a</sup>        |                     |                                                                                                       |     |      |      |      |
| Gate Threshold Voltage                 | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> = -250μA                                            | -1  | -1.5 | -3   | V    |
| Drain-Source On-State Resistance       | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-10V, I <sub>D</sub> =-4.9A                                                          |     | 42   | 70   | mΩ   |
|                                        |                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-2.0A                                                         |     | 78   | 120  | mΩ   |
| On-State Drain Current                 | I <sub>D(ON)</sub>  | V <sub>DS</sub> =-5V, V <sub>GS</sub> =-10V                                                           | -20 |      |      | A    |
| Forward Transconductance               | g <sub>FS</sub>     | V <sub>DS</sub> =-15V, I <sub>D</sub> =-4.9A                                                          | 5   |      |      | S    |
| DYNAMIC CHARACTERISTICS <sup>b</sup>   |                     |                                                                                                       |     |      |      |      |
| Input Capacitance                      | C <sub>ISS</sub>    | V <sub>DS</sub> = -15V, V <sub>GS</sub> = 0V<br>f =1.0MHz                                             |     | 1040 |      | pF   |
| Output Capacitance                     | C <sub>OSS</sub>    |                                                                                                       |     | 420  |      | pF   |
| Reverse Transfer Capacitance           | C <sub>RSS</sub>    |                                                                                                       |     | 150  |      | pF   |
| SWITCHING CHARACTERISTICS <sup>b</sup> |                     |                                                                                                       |     |      |      |      |
| Turn-On Delay Time                     | t <sub>D(ON)</sub>  | V <sub>DD</sub> = -15V,<br>I <sub>D</sub> = -1A,<br>V <sub>GEN</sub> = -10V,<br>R <sub>GEN</sub> = 6Ω |     | 8    | 15   | ns   |
| Rise Time                              | t <sub>r</sub>      |                                                                                                       |     | 11   | 20   | ns   |
| Turn-Off Delay Time                    | t <sub>D(OFF)</sub> |                                                                                                       |     | 23   | 40   | ns   |
| Fall time                              | t <sub>f</sub>      |                                                                                                       |     | 14   | 25   | ns   |
| Total Gate Charge                      | Q <sub>g</sub>      | V <sub>DS</sub> = -15V, I <sub>D</sub> = -4.9A,<br>V <sub>GS</sub> = -10V                             |     | 22.5 | 29   | nC   |
| Gate-Source Charge                     | Q <sub>gs</sub>     |                                                                                                       |     | 2    |      | nC   |
| Gate-Drain Charge                      | Q <sub>gd</sub>     |                                                                                                       |     | 6    |      | nC   |

# CEP05P03/CEB05P03

4

## ELECTRICAL CHARACTERISTICS ( $T_c=25^\circ\text{C}$ unless otherwise noted)

| Parameter                                             | Symbol   | Condition                                | Min | Typ   | Max  | Unit |
|-------------------------------------------------------|----------|------------------------------------------|-----|-------|------|------|
| <b>DRAIN-SOURCE DIODE CHARACTERISTICS<sup>a</sup></b> |          |                                          |     |       |      |      |
| Diode Forward Voltage                                 | $V_{SD}$ | $V_{GS} = 0\text{V}, I_S = -1.7\text{A}$ |     | -0.79 | -1.2 | V    |

### Notes

- a. Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2\%$ .  
b. Guaranteed by design, not subject to production testing.

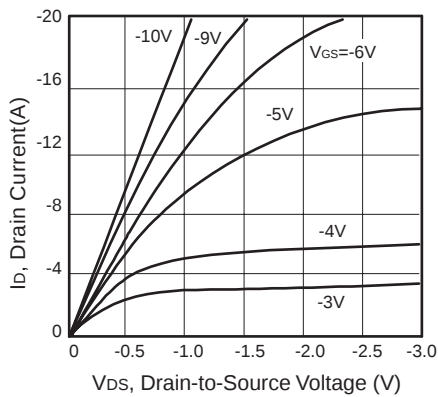


Figure 1. Output Characteristics

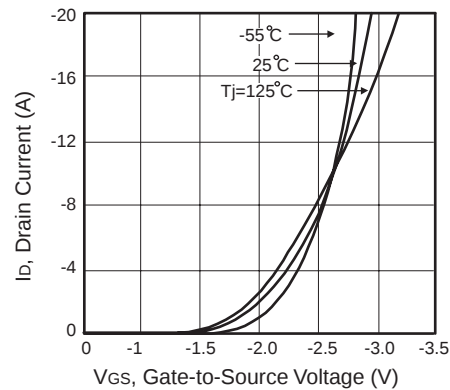


Figure 2. Transfer Characteristics

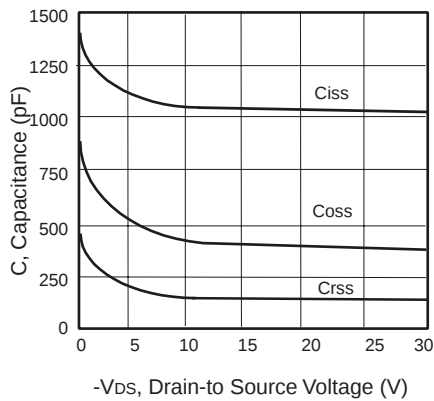


Figure 3. Capacitance

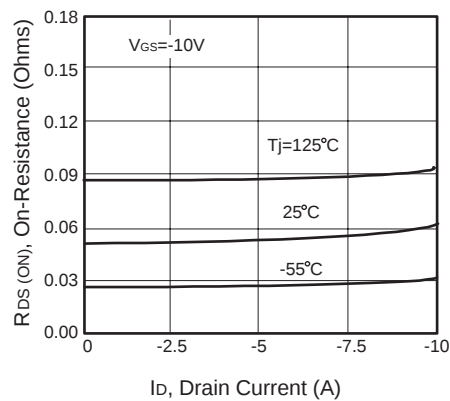
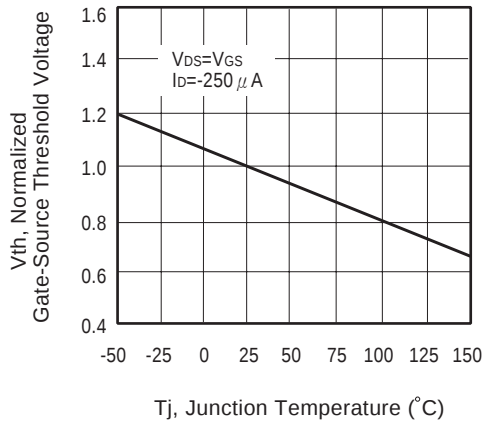


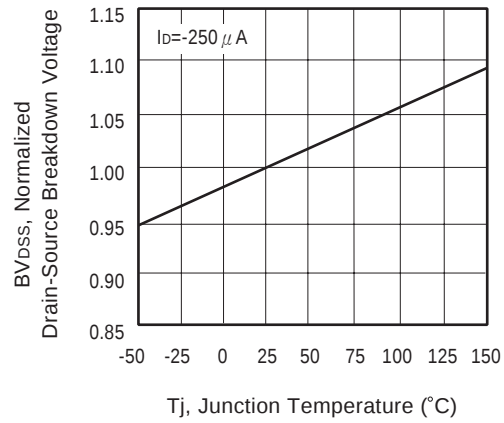
Figure 4. On-Resistance Variation with Drain Current and Temperature

# CEP05P03/CEB05P03

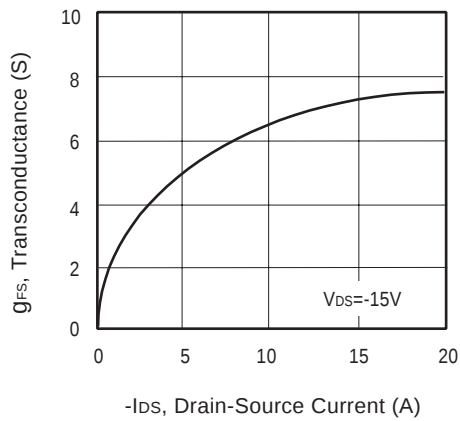
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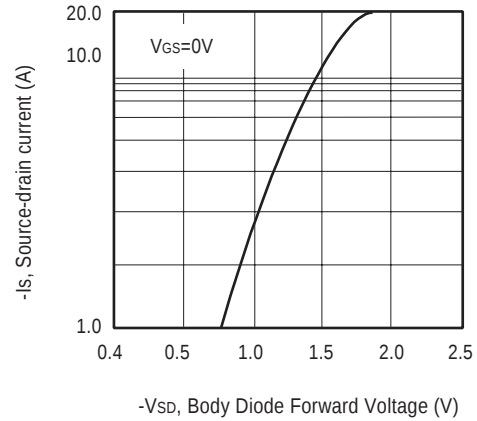
**Figure 5. Gate Threshold Variation with Temperature**



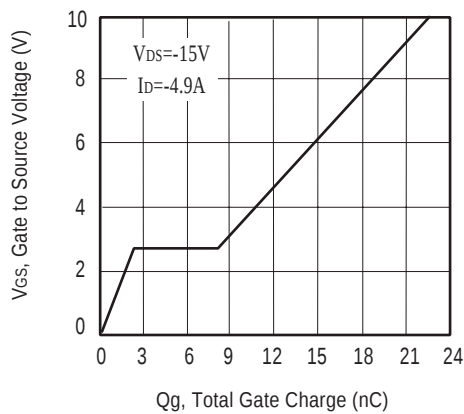
**Figure 6. Breakdown Voltage Variation with Temperature**



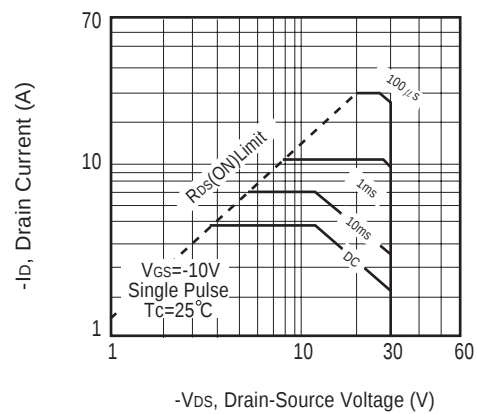
**Figure 7. Transconductance Variation with Drain Current**



**Figure 8. Body Diode Forward Voltage Variation with Source Current**



**Figure 9. Gate Charge**



**Figure 10. Maximum Safe Operating Area**

# CEP05P03/CEB05P03

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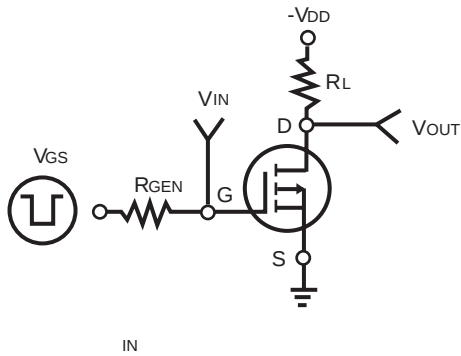


Figure 11. Switching Test Circuit

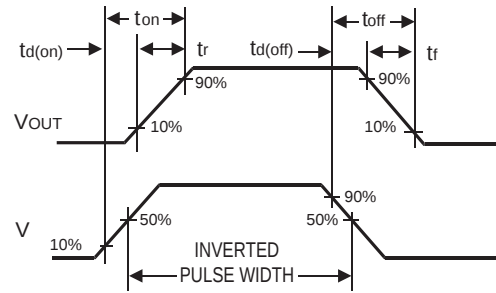


Figure 12. Switching Waveforms

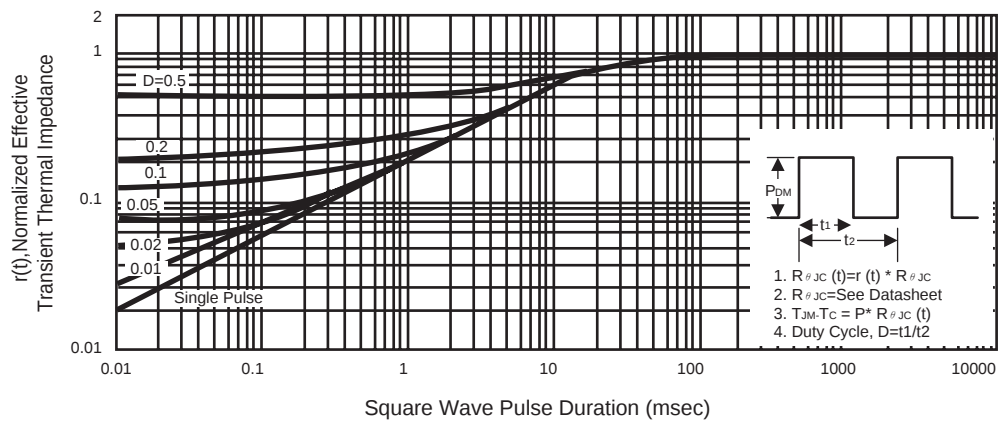


Figure 13. Normalized Thermal Transient Impedance Curve