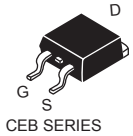
# CEP03N8/CEB03N8
# CEF03N8

## N-Channel Enhancement Mode Field Effect Transistor

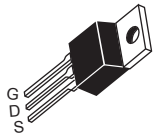
## FEATURES

| Type | $V_{DSS}$ | $R_{DS(ON)}$ | $I_D$ | @$V_{GS}$ |
|---|---|---|---|---|
| CEP03N8 | 800V | 4.8Ω | 3A | 10V |
| CEB03N8 | 800V | 4.8Ω | 3A | 10V |
| CEF03N8 | 800V | 4.8Ω | 3A [d] | 10V |

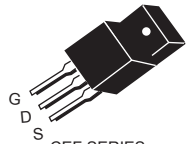
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Lead-free plating ; RoHS compliant.



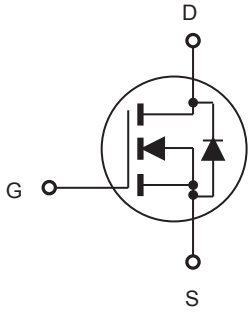
CEB SERIES
TO-263(DD-PAK)



CEP SERIES
TO-220



CEF SERIES
TO-220F




## ABSOLUTE MAXIMUM RATINGS $T_C$ = 25°C unless otherwise noted

| Parameter | Symbol | Limit | | Units |
|---|---|---|---|---|
| | | TO-220/263 | TO-220F | |
| Drain-Source Voltage | $V_{DS}$ | 800 | | V |
| Gate-Source Voltage | $V_{GS}$ | ±30 | | V |
| Drain Current-Continuous @ $T_C$ = 25°C | $I_D$ | 3 | 3 [d] | A |
| @ $T_C$ = 100°C | | 2 | 2 [d] | A |
| Drain Current-Pulsed [a] | $I_{DM}$ [e] | 12 | 12 [d] | A |
| Maximum Power Dissipation @ $T_C$ = 25°C | $P_D$ | 125 | 47 | W |
| - Derate above 25°C | | 0.8 | 0.3 | W/°C |
| Single Pulsed Avalanche Energy [h] | $E_{AS}$ | 32 | | mJ |
| Single Pulsed Avalanche Current [h] | $I_{AS}$ | 3 | | A |
| Operating and Store Temperature Range | $T_J$,$T_{stg}$ | -55 to 175 | | °C |

## Thermal Characteristics

| Parameter | Symbol | Limit | | Units |
|---|---|---|---|---|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 1.2 | 3.2 | °C/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 62.5 | 62.5 | °C/W |

## Electrical Characteristics $T_C$ = 25°C unless otherwise noted

| Parameter | Symbol | Test Condition | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 800 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 800V, $V_{GS}$ = 0V | | | 1 | μA |
| 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** [b] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250μA | 2 | | 4 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 1.5A | | 3.8 | 4.8 | Ω |
| Gate input resistance | $R_g$ | f=1MHz,open Drain | | 3.3 | | Ω |
| **Dynamic Characteristics** [c] | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 25V, $V_{GS}$ = 0V, f = 1.0 MHz | | 690 | | pF |
| Output Capacitance | $C_{oss}$ | | | 70 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 15 | | pF |
| **Switching Characteristics** [c] | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 450V, $I_D$ = 2.2A, $V_{GS}$ = 10V, $R_{GEN}$ = 25Ω | | 20 | 40 | ns |
| Turn-On Rise Time | $t_r$ | | | 34 | 68 | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 44 | 88 | ns |
| Turn-Off Fall Time | $t_f$ | | | 28 | 56 | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 720V, $I_D$ = 2.2A, $V_{GS}$ = 10V | | 16 | 20 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 3 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 7 | | nC |
| **Drain-Source Diode Characteristics and Maximun Ratings** | | | | | | |
| Drain-Source Diode Forward Current | $I_S$ | | | | 3 | A |
| Drain-Source Diode Forward Voltage [b] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = 3A | | | 1.2 | V |
| Reverse Recovery Time | $T_{rr}$ | $I_D$ = 5A, di/dt = 100A/us | | | 429 | ns |
| Reverse Recovery Charge | $Q_{rr}$ | $I_D$ = 5A, di/dt = 100A/us | | | 1.3 | nC |

**Notes :**
a.Repetitive Rating : Pulse width limited by maximum junction temperature .
b.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2% .
c.Guaranteed by design, not subject to production testing.
d.Limited only by maximum temperature allowed .
e.Pulse width limited by safe operating area .
h.L = 7mH, $I_{AS}$ =3A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25 C

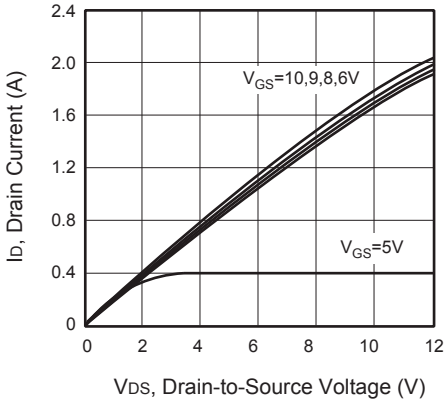



**Figure 1. Output Characteristics**

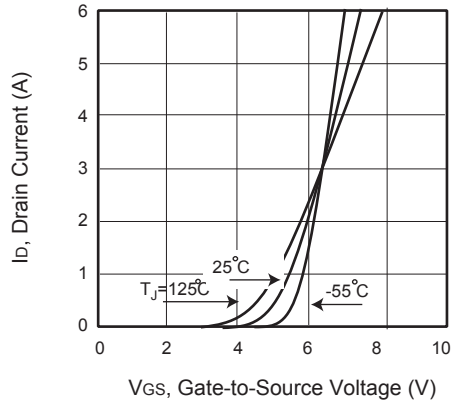



**Figure 2. Transfer Characteristics**

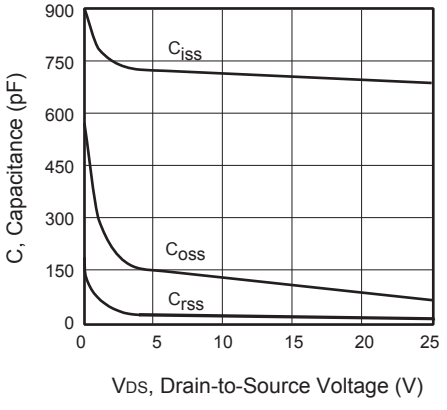



**Figure 3. Capacitance**

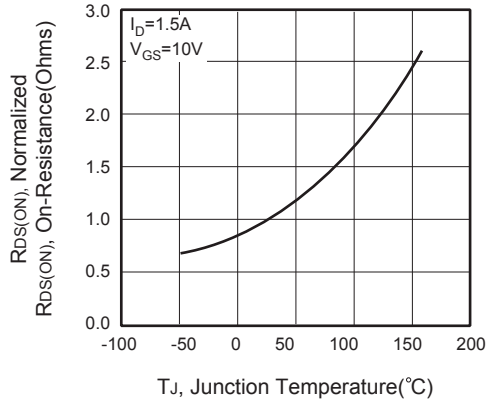



**Figure 4. On-Resistance Variation with Temperature**

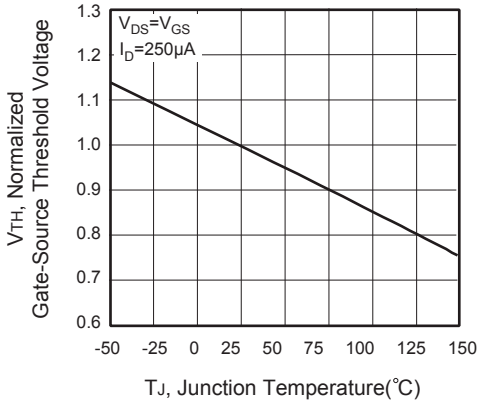



**Figure 5. Gate Threshold Variation with Temperature**

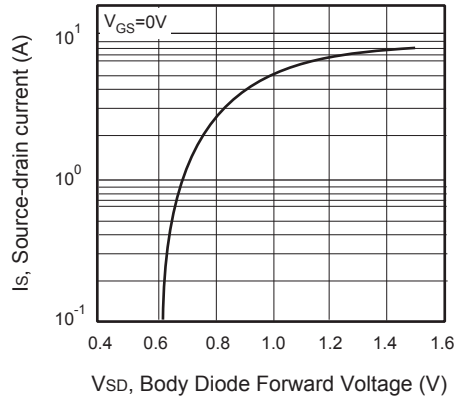



**Figure 6. Body Diode Forward Voltage Variation with Source Current**

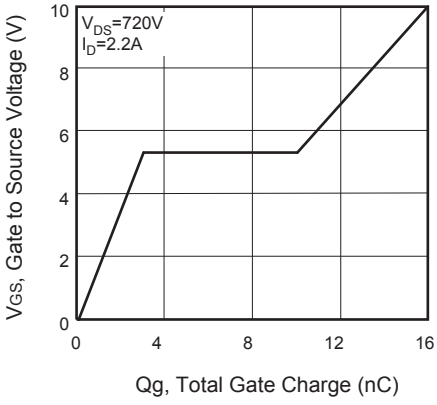



**Figure 7. Gate Charge**

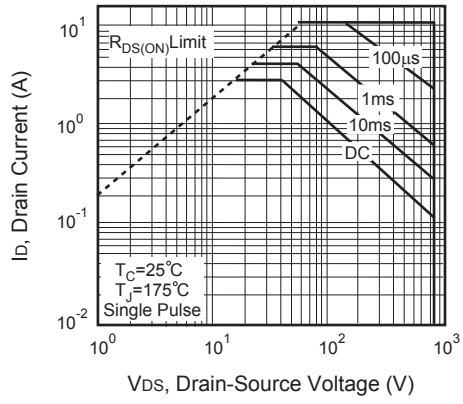



**Figure 8. Maximum Safe Operating Area**

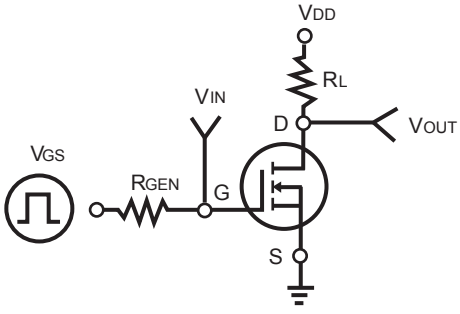



**Figure 9. Switching Test Circuit**

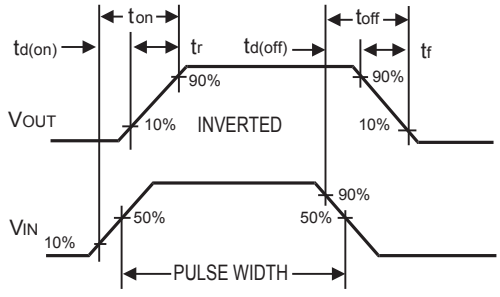



**Figure 10. Switching Waveforms**

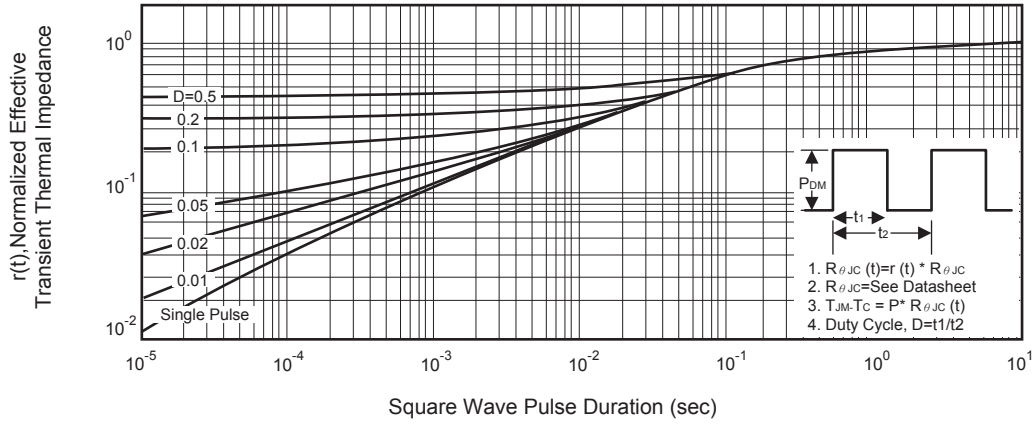



**Figure 11. Normalized Thermal Transient Impedance Curve**