# CEM8912

CET

## Dual N-Channel Enhancement Mode Field Effect Transistor

**5**

## FEATURES

- 30V , 7A , $R_{DS(ON)}$=28m$\Omega$  @$V_{GS}$=10V.
  $R_{DS(ON)}$=45m$\Omega$  @$V_{GS}$=4.5V.
- Super high dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- Surface Mount Package.

SO-8

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D1 [8]  D1 [7]  D2 [6]  D2 [5]



[1] S1  [2] G1  [3] S2  [4] G2

## ABSOLUTE MAXIMUM RATINGS  (T$_A$=25℃ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous[a] @T$_J$=125℃ | $I_D$ | ±7 | A |
| -Pulsed[b] | $I_{DM}$ | ±30 | A |
| Drain-Source Diode Forward Current[a] | $I_S$ | 2.3 | A |
| Maximum Power Dissipation[a] | $P_D$ | 2 | W |
| Operating Junction and Storage Temperature Range | $T_J$, $T_{STG}$ | -55  to 150 | °C |

## THERMAL CHARACTERISTICS

| | Symbol | Limit | Unit |
|---|---|---|---|
| Thermal Resistance, Junction-to-Ambient[a] | R$\theta$JA | 62.5 | °C/W |

## ELECTRICAL CHARACTERISTICS (T$_A$=25$^\circ$C unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ$^C$ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | BV$_{DSS}$ | V$_{GS}$=0V, I$_D$=250µA | 30 | | | V |
| Zero Gate Voltage Drain Current | I$_{DSS}$ | V$_{DS}$=30V, V$_{GS}$=0V | | | 1 | µA |
| Gate-Body Leakage | I$_{GSS}$ | V$_{GS}$=±20V, V$_{DS}$=0V | | | ±100 | nA |
| **ON CHARACTERISTICS$^b$** | | | | | | |
| Gate Threshold Voltage | V$_{GS(th)}$ | V$_{DS}$=V$_{GS}$, I$_D$=250µA | 1 | 1.5 | 3 | V |
| Drain-Source On-State Resistance | R$_{DS(ON)}$ | V$_{GS}$=10V, I$_D$=7.0A | | 24 | 28 | mΩ |
| | | V$_{GS}$=4.5V, I$_D$=3.5A | | 32 | 45 | mΩ |
| On-State Drain Current | I$_{D(ON)}$ | V$_{DS}$=5V, V$_{GS}$=10V | 20 | | | A |
| Forward Transconductance | g$_{FS}$ | V$_{DS}$=15V, I$_D$=7A | 5 | 10 | | S |
| **DYNAMIC CHARACTERISTICS$^c$** | | | | | | |
| Input Capacitance | C$_{ISS}$ | V$_{DS}$=15V, V$_{GS}$=0V f=1.0MHz | | 804 | | pF |
| Output Capacitance | C$_{OSS}$ | | | 328 | | pF |
| Reverse Transfer Capacitance | C$_{RSS}$ | | | 79 | | pF |
| **SWITCHING CHARACTERISTICS$^c$** | | | | | | |
| Turn-On Delay Time | t$_{D(ON)}$ | V$_D$=25V, I$_D$=1A, V$_{GS}$=10V, R$_{GEN}$=6Ω | | 16 | 24 | ns |
| Rise Time | t$_r$ | | | 7 | 14 | ns |
| Turn-Off Delay Time | t$_{D(OFF)}$ | | | 47 | 60 | ns |
| Fall Time | t$_f$ | | | 10 | 15 | ns |
| Total Gate Charge | Q$_g$ | V$_{DS}$=15V, I$_D$=2A, V$_{GS}$=10V | | 20 | 24 | nC |
| Gate-Source Charge | Q$_{gs}$ | | | 3 | | nC |
| Gate-Drain Charge | Q$_{gd}$ | | | 6 | | nC |

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

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| Parameter | Symbol | Condition | Min | Typ$^c$ | Max | Unit |
|---|---|---|---|---|---|---|
| DRAIN-SOURCE DIODE CHARACTERISTICS $^b$ | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$ = 0V, Is =2.3A | | 0.7 | 1.2 | V |

Notes

a.Surface Mounted on FR4 Board, t ≤10sec.
b.Pulse Test:Pulse Width ≤300 μ s, Duty Cycle ≤ 2%.
c.Guaranteed by design, not subject to production testing.
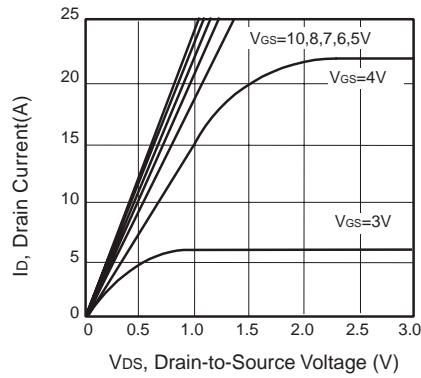


**Figure 1. Output Characteristics**
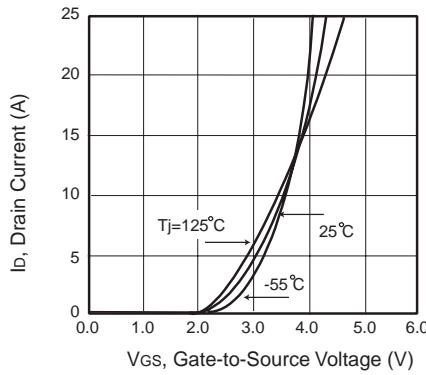


**Figure 2. Transfer Characteristics**
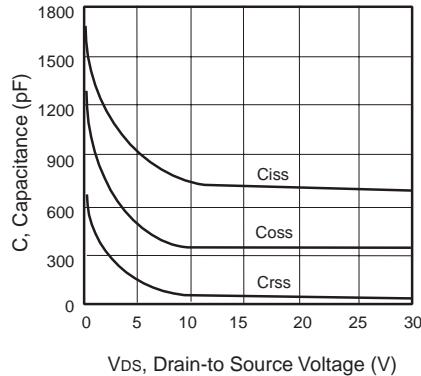


**Figure 3. Capacitance**
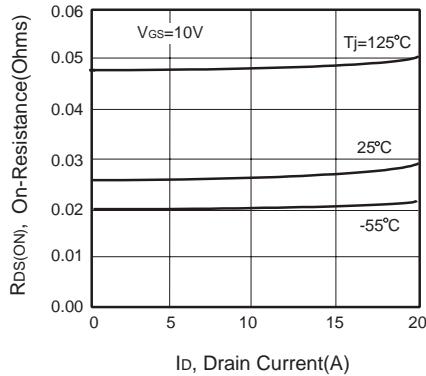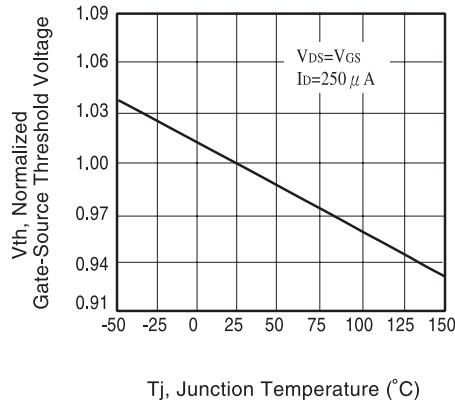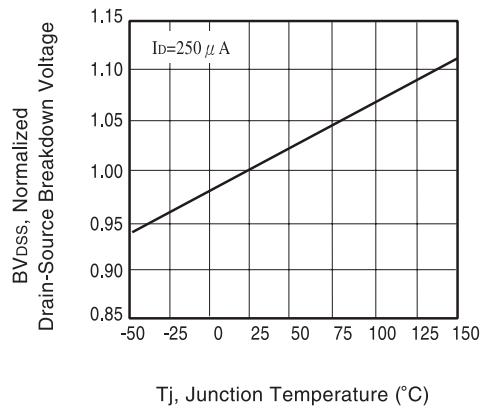


**Figure 4. On-Resistance Variation with Drain Current and Temperature**

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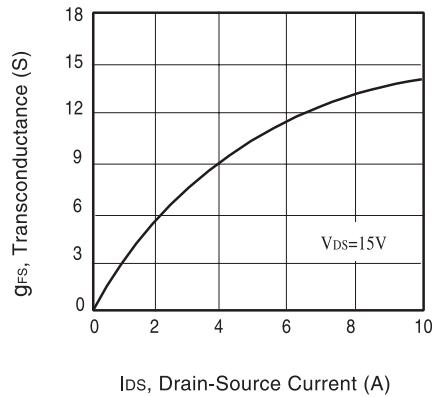
**5**
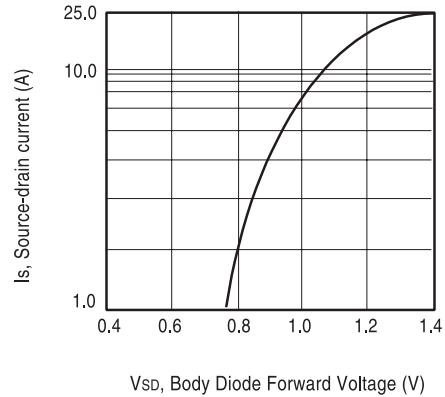


**Figure 5. Gate Threshold Variation with Temperature**

$V_{DS}=V_{GS}$
$I_D=250\,\mu A$

Vth, Normalized Gate-Source Threshold Voltage

Tj, Junction Temperature (°C)
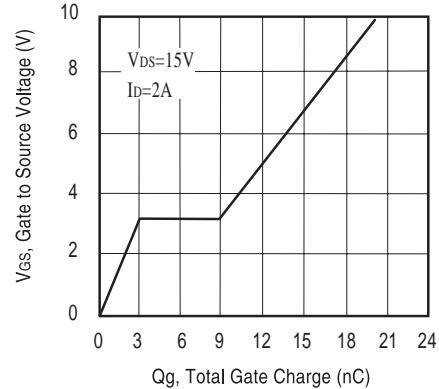


**Figure 6. Breakdown Voltage Variation with Temperature**

$I_D=250\,\mu A$

BVDSS, Normalized Drain-Source Breakdown Voltage

Tj, Junction Temperature (°C)
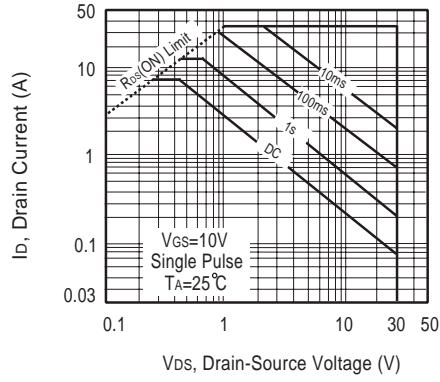


**Figure 7. Transconductance Variation with Drain Current**

$V_{DS}=15V$

gFS, Transconductance (S)

IDS, Drain-Source Current (A)



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

Is, Source-drain current (A)

VSD, Body Diode Forward Voltage (V)



**Figure 9. Gate Charge**

$V_{DS}=15V$
$I_D=2A$

VGS, Gate to Source Voltage (V)

Qg, Total Gate Charge (nC)



**Figure 10. Maximum Safe Operating Area**

$R_{DS(ON)}$ Limit
10ms
100ms
1s
DC
$V_{GS}=10V$
Single Pulse
$T_A=25°C$

ID, Drain Current (A)

VDS, Drain-Source Voltage (V)

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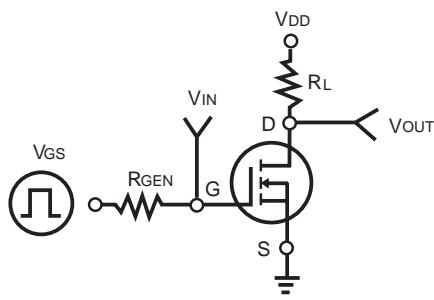
Figure 11. Switching Test Circuit
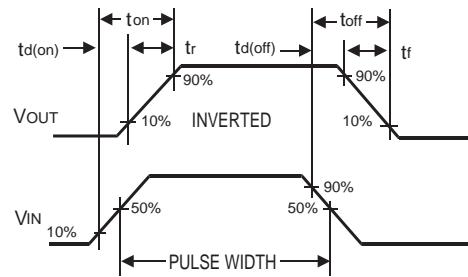


Figure 12. Switching Waveforms
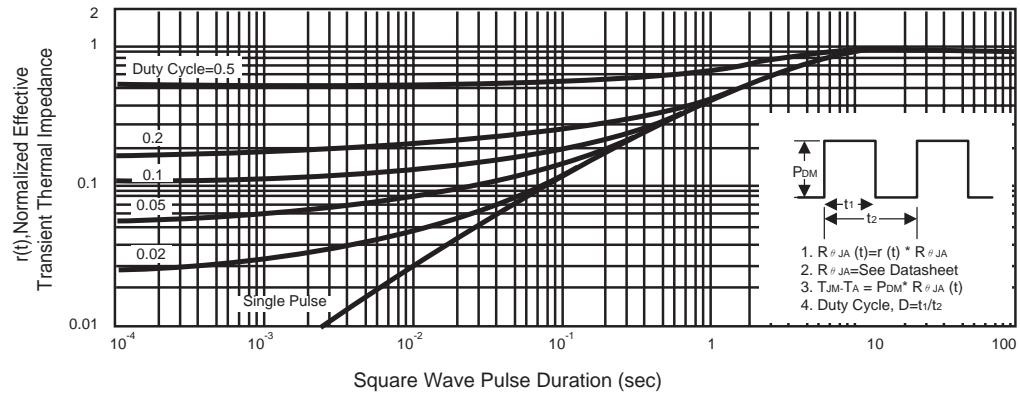


Figure 13. Normalized Thermal Transient Impedance Curve