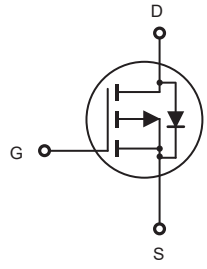
# CEZC2P07

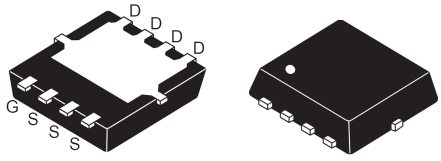
## P-Channel Enhancement Mode Field Effect Transistor

PRELIMINARY

## FEATURES

- -20V, -40A, $R_{DS(ON)}$ = 9.5mΩ @$V_{GS}$ = -4.5V.
  $R_{DS(ON)}$ = 13mΩ @$V_{GS}$ = -2.5V.
  $R_{DS(ON)}$ = 20mΩ @$V_{GS}$ = -1.8V.
- Super High dense cell design for extremely low $R_{DS(ON)}$.
- High power and current handing capability.
- RoHS compliant.




P-PAK 3X3

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

| Parameter | Symbol | Limit | Units |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | -20 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Drain Current-Continuous | $I_D$ @$R_{\theta JC}$ | -40 | A |
| | $I_D$ @$R_{\theta JA}$ | -13 | A |
| Drain Current-Pulsed [a] | $I_{DM}$ @$R_{\theta JC}$ | -160 | A |
| | $I_{DM}$ @$R_{\theta JA}$ | -52 | A |
| Maximum Power Dissipation | $P_D$ | 25 | W |
| Operating and Store Temperature Range | $T_J$,$T_{stg}$ | -55 to 150 | °C |

## Thermal Characteristics

| Parameter | Symbol | Limit | Units |
|---|---|---|---|
| Thermal Resistance, Junction-to-Case [b] | $R_{\theta Jc}$ | 5 | °C/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 50 | °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 | -20 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = -20V, $V_{GS}$ = 0V | | | -1 | μA |
| Gate Body Leakage Current, Forward | $I_{GSSF}$ | $V_{GS}$ = 12V, $V_{DS}$ = 0V | | | 100 | nA |
| Gate Body Leakage Current, Reverse | $I_{GSSR}$ | $V_{GS}$ = -12V, $V_{DS}$ = 0V | | | -100 | nA |
| **On Characteristics** [c] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = -250μA | -0.4 | | -1 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = -4.5V, $I_D$ = -6A | | 7.7 | 9.5 | mΩ |
| | | $V_{GS}$ = -2.5V, $I_D$ = -3A | | 10.8 | 13 | mΩ |
| | | $V_{GS}$ = -1.8V, $I_D$ = -1A | | 15 | 20 | mΩ |
| **Dynamic Characteristics** [d] | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = -10V, $V_{GS}$ = 0V, f = 1.0 MHz | | 2805 | | pF |
| Output Capacitance | $C_{oss}$ | | | 490 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 410 | | pF |
| **Switching Characteristics** [d] | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = -10V, $I_D$ = -10A, $V_{GS}$= -4.5V, $R_{GEN}$= 3Ω | | 28 | | ns |
| Turn-On Rise Time | $t_r$ | | | 15 | | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 66 | | ns |
| Turn-Off Fall Time | $t_f$ | | | 94 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = -10V, $I_D$ = -10A, $V_{GS}$ = -4.5V | | 37 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 4 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 11 | | nC |
| **Drain-Source Diode Characteristics and Maximun Ratings** | | | | | | |
| Drain-Source Diode Forward Current | $I_S$ | | | | -20 | A |
| Drain-Source Diode Forward Voltage [c] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = -1A | | | -1.2 | V |

**Notes :**
a.Repetitive Rating : Pulse width limited by maximum junction temperature.
b.Surface Mounted on FR4 Board, t ≤ 10 sec.
c.Pulse Test : Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
d.Guaranteed by design, not subject to production testing.

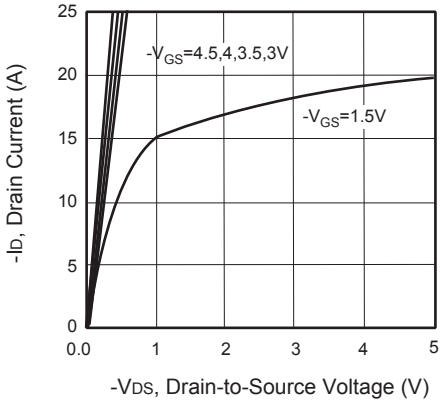



**Figure 1. Output Characteristics**

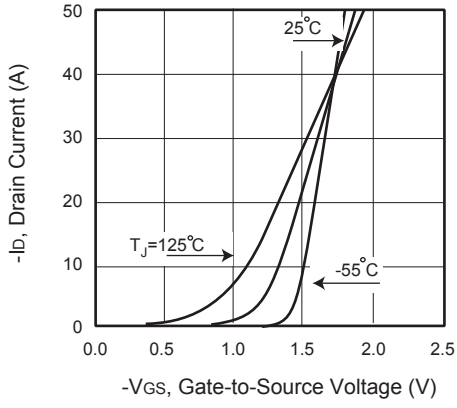



**Figure 2. Transfer Characteristics**

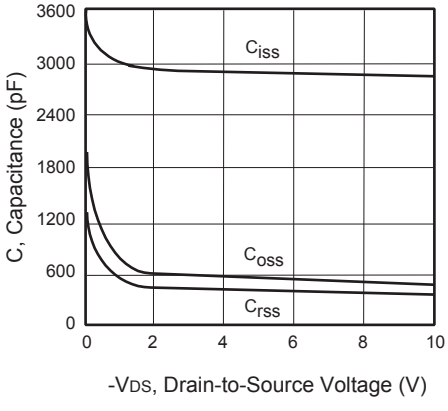



**Figure 3. Capacitance**

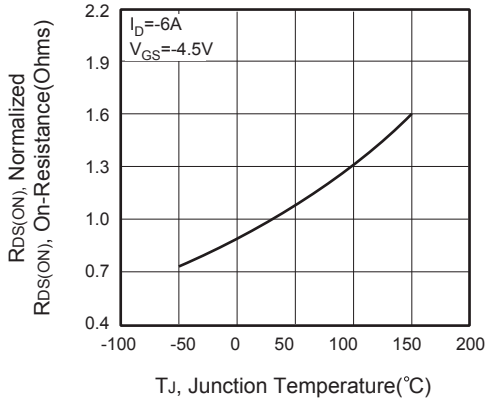



**Figure 4. On-Resistance Variation with Temperature**

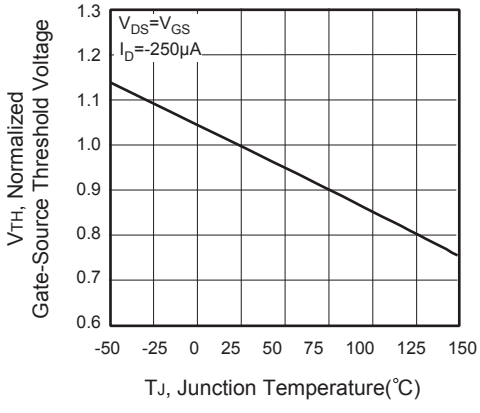



**Figure 5. Gate Threshold Variation with Temperature**

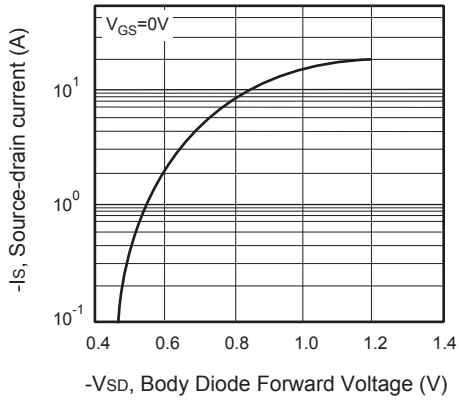



**Figure 6. Body Diode Forward Voltage Variation with Source Current**

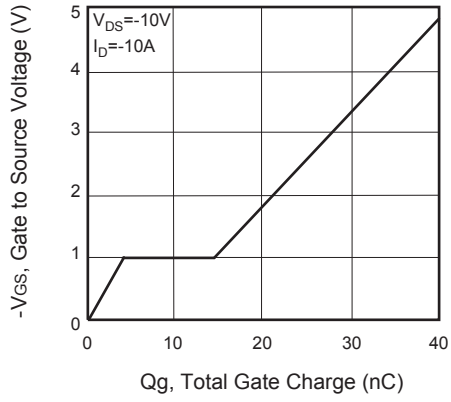



**Figure 7. Gate Charge**

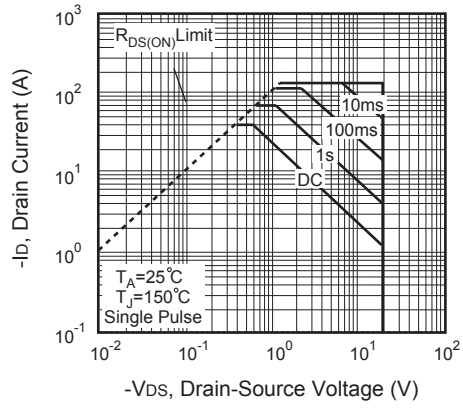



**Figure 8. Maximum Safe Operating Area**

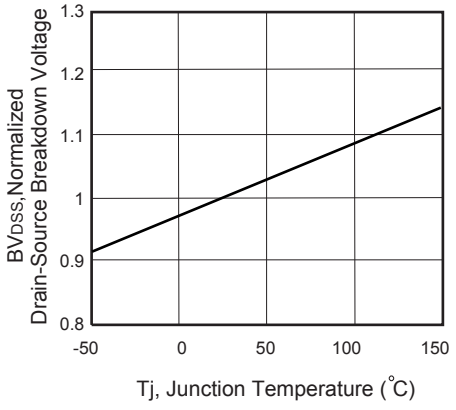



**Figure 9. Breakdown Voltage Variation VS Temperature**

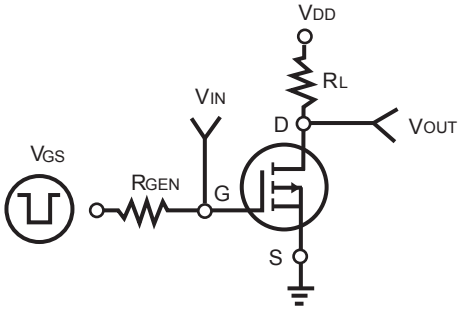



**Figure 10. Switching Test Circuit**

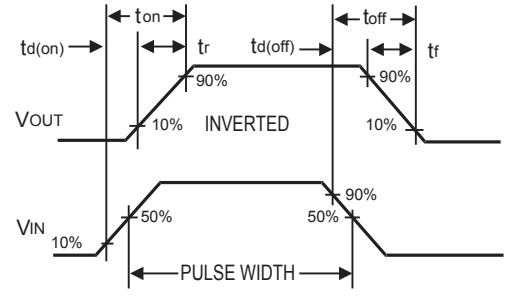



**Figure 11. Switching Waveforms**

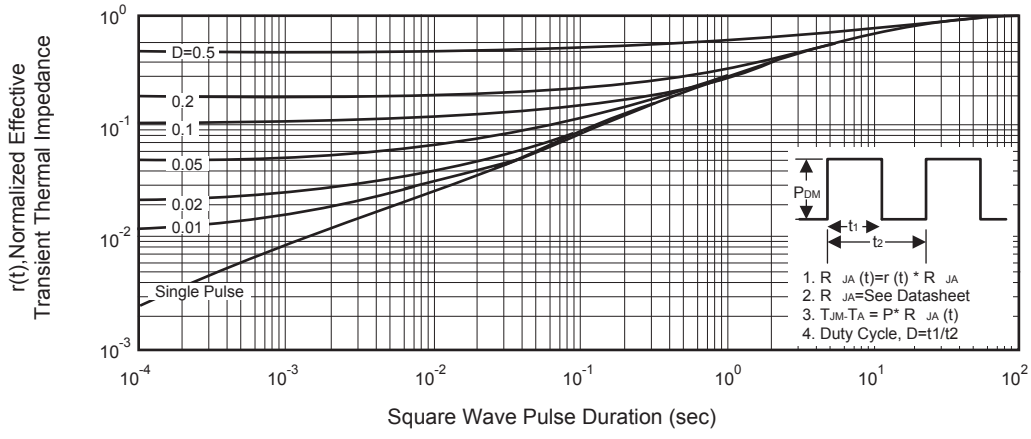
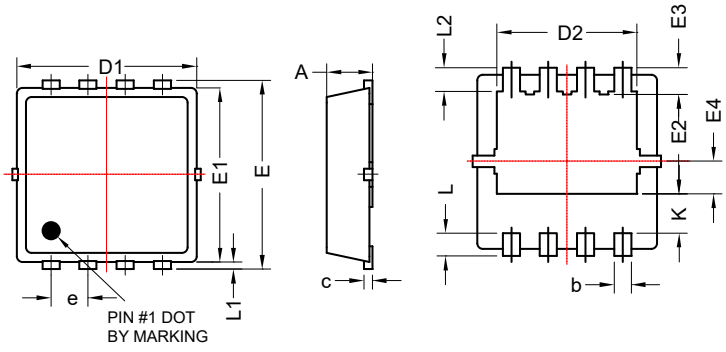
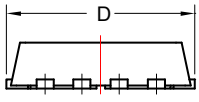


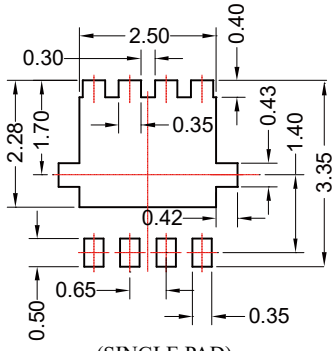

**Figure 12. Normalized Thermal Transient Impedance Curve**

**P-PAK 3X3** 產品外觀尺寸圖 (Product Outline Dimension)

SINGLE PAD 尺寸圖




(SINGLE PAD)

(Lead Pattern Recommendation)

| SYMBOLS | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.7 | 0.85 | 0.028 | 0.033 |
| b | 0.20 | 0.40 | 0.008 | 0.016 |
| c | 0.10 | 0.25 | 0.004 | 0.010 |
| D | 3.15 | 3.45 | 0.124 | 0.136 |
| D1 | 3.00 | 3.25 | 0.118 | 0.128 |
| D2 | 2.29 | 2.65 | 0.090 | 0.104 |
| E | 3.15 | 3.45 | 0.124 | 0.136 |
| E1 | 2.90 | 3.20 | 0.114 | 0.126 |
| E2 | 1.54 | 1.94 | 0.061 | 0.076 |
| E3 | 0.28 | 0.65 | 0.011 | 0.026 |
| E4 | 0.37 | 0.77 | 0.015 | 0.030 |
| e | 0.65(BSC) | | 0.026(BSC) | |
| K | 0.50 | 0.89 | 0.02 | 0.035 |
| L | 0.30 | 0.50 | 0.012 | 0.020 |
| L1 | 0.06 | 0.20 | 0.002 | 0.008 |
| L2 | 0.27 | 0.57 | 0.011 | 0.022 |