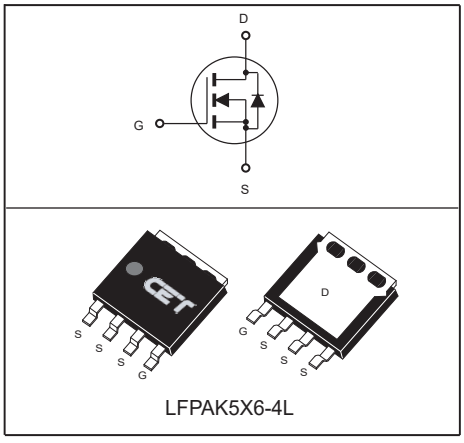
# CEZF08C4

## N-Channel Enhancement Mode Field Effect Transistor

## FEATURES

- High power and current handing capability.
- Reliable and rugged.
- Pb-free lead plating ; RoHS compliant.
- Halogen Free.
- Surface mount Package.

| $V_{DSS}$ | $R_{DS(ON)\ typ}$ @$V_{GS}$ | $I_D$ |
|---|---|---|
| 45V | 0.58mΩ@$V_{GS}$ = 10V | 292A |
| 45V | 0.85mΩ@$V_{GS}$ = 4.5V | 233A |



LFPAK5X6-4L

## APPLICATIONS

- DC to DC converter.
- Motor drive control.
- SMPS.

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

| Parameter | | Symbol | Limit | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 45 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $I_D$ @$R_{\theta JC}$ | $T_C$ =25°C | 292 | A |
| | | $T_C$ =70°C | 244 | A |
| | $I_D$ @$R_{\theta JA}$ | $T_A$ =25°C | 77 | A |
| | | $T_A$ =70°C | 65 | A |
| Drain Current-Pulsed [a] | $I_{DM}$ @$R_{\theta JC}$ | $T_C$ =25°C | 1168 | A |
| | $I_{DM}$ @$R_{\theta JA}$ | $T_A$ =25°C | 308 | A |
| Maximum Power Dissipation | | $P_D$ | 107 | W |
| Single Pulsed Avalanche Energy [d] | | $E_{AS}$ | 140 | mJ |
| Single Pulsed Avalanche Current [d] | | $I_{AS}$ | 53 | 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 | $R_{\theta JC}$ | 1.4 | °C/W |
| Thermal Resistance, Junction-to-Ambient | $R_{\theta JA}$ | 20 | °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 | 45 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 40V, $V_{GS}$ = 0V | | | 1 | μA |
| Gate Body Leakage Current, Forward | $I_{GSSF}$ | $V_{GS}$ = 20V, $V_{DS}$ = 0V | | | 100 | nA |
| Gate Body Leakage Current, Reverse | $I_{GSSR}$ | $V_{GS}$ = -20V, $V_{DS}$ = 0V | | | -100 | nA |
| **On Characteristics** [b] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$ = $V_{DS}$, $I_D$ = 250μA | 1 | | 3 | V |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | | 0.58 | 0.7 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 15A | | 0.85 | 1.1 | mΩ |
| Gate input resistance | $R_g$ | f=1MHz,open Drain | | 2 | | Ω |
| **Dynamic Characteristics** [c] | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0V, f = 1.0 MHz | | 5495 | | pF |
| Output Capacitance | $C_{oss}$ | | | 2825 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 210 | | pF |
| **Switching Characteristics** [c] | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 20V, $I_D$ = 20A, $V_{GS}$ = 10V, $R_{GEN}$ = 4.5Ω | | 24 | | ns |
| Turn-On Rise Time | $t_r$ | | | 11 | | ns |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 76 | | ns |
| Turn-Off Fall Time | $t_f$ | | | 27 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 20V, $I_D$ = 20A, $V_{GS}$ = 10V | | 80 | | nC |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 20V, $I_D$ = 20A, $V_{GS}$ = 4.5V | | 43 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 11 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 17 | | nC |
| **Drain-Source Diode Characteristics and Maximun Ratings** | | | | | | |
| Drain-Source Diode Forward Current | $I_S$ | | | | 89 | A |
| Drain-Source Diode Forward Voltage [b] | $V_{SD}$ | $V_{GS}$ = 0V, $I_S$ = 1A | | | 1.2 | V |
| Reverse Recovery Time | $T_{rr}$ | $I_F$ = 20A, di /dt = 100A/us | | 65 | | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | | 97 | | 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.L = 0.1mH, $I_{AS}$ =53A, $V_{DD}$ = 50V, $R_G$ = 25Ω, Starting $T_J$ = 25°C.

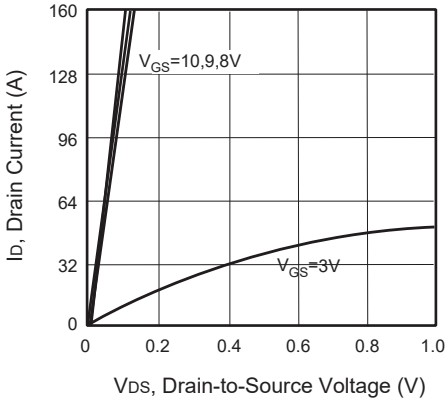



**Figure 1. Output Characteristics**

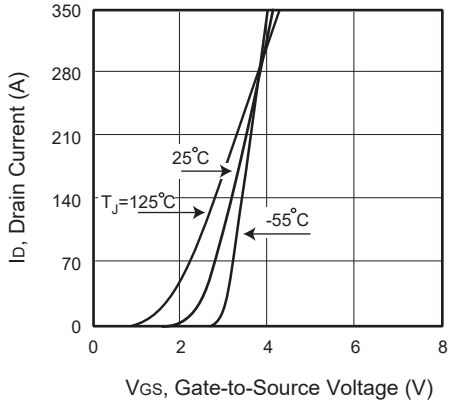



**Figure 2. Transfer Characteristics**

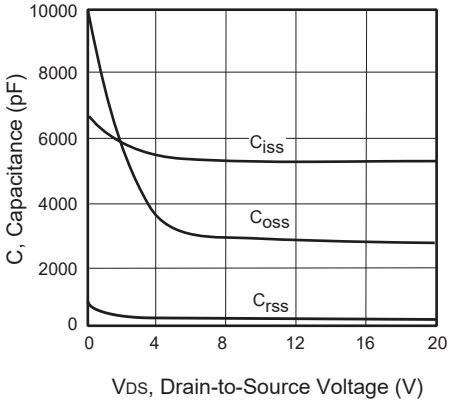



**Figure 3. Capacitance**

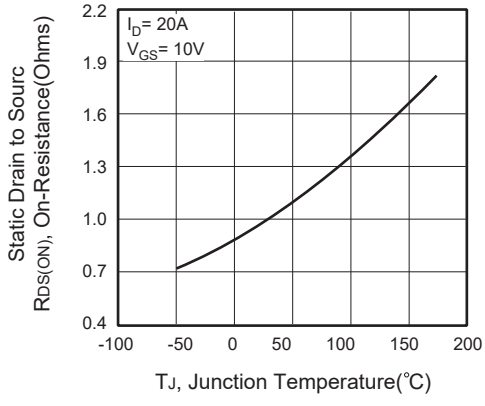



**Figure 4. On-Resistance Variation with Temperature**

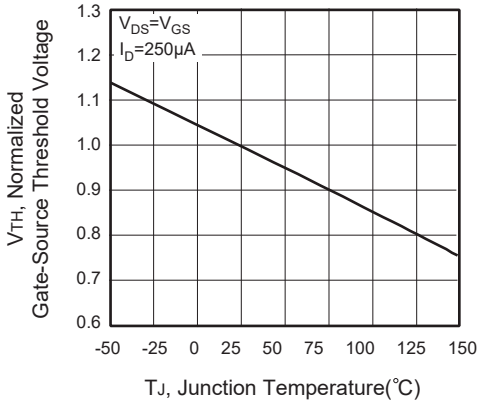



**Figure 5. Gate Threshold Variation with Temperature**

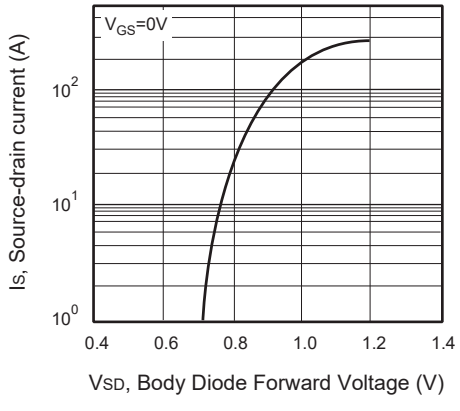



**Figure 6. Body Diode Forward Voltage Variation with Source Current**

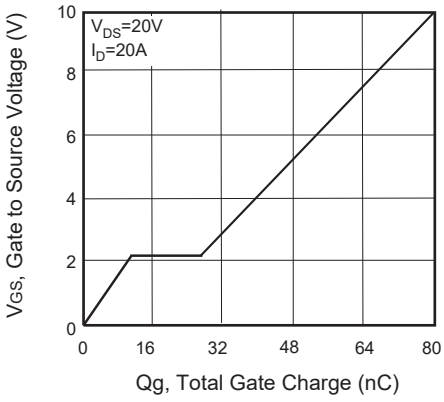



**Figure 7. Gate Charge**

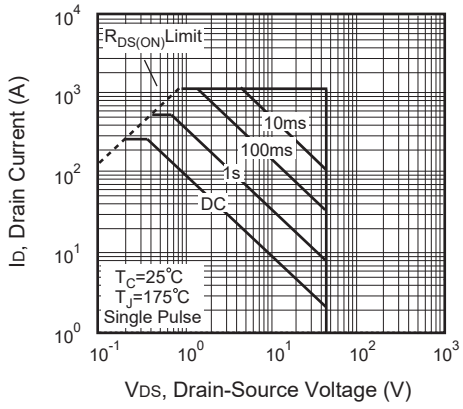



**Figure 8. Maximum Safe Operating Area**

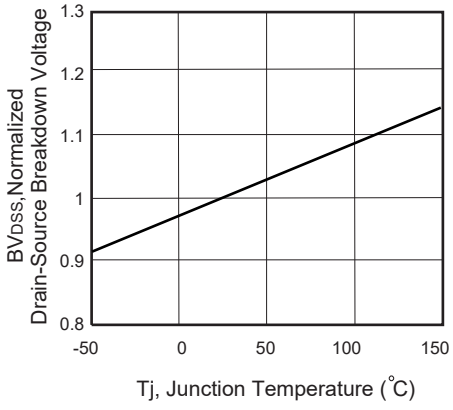



**Figure 9. Breakdown Voltage Variation VS Temperature**

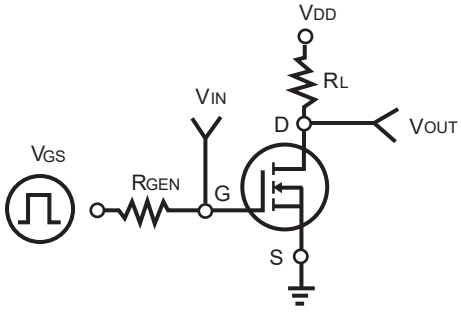



**Figure 10. Switching Test Circuit**

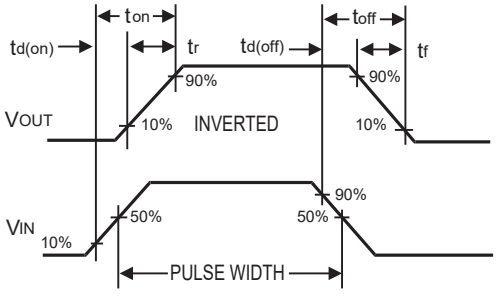



**Figure 11. Switching Waveforms**

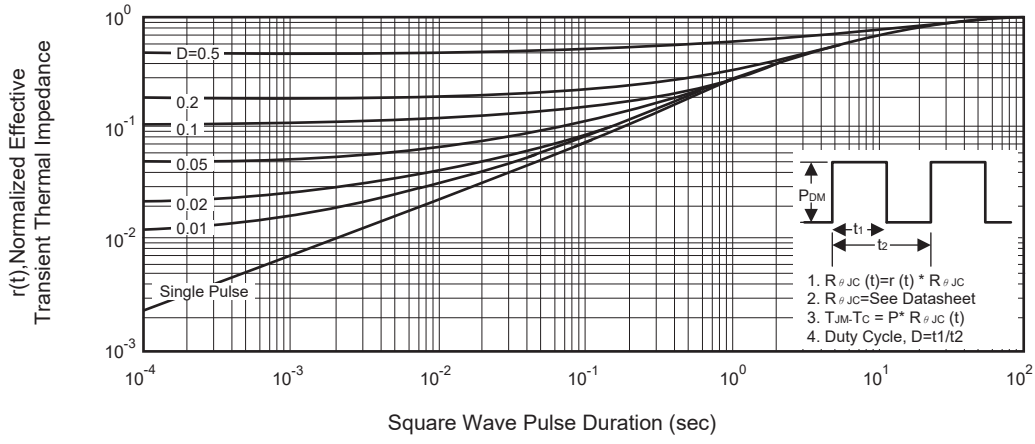
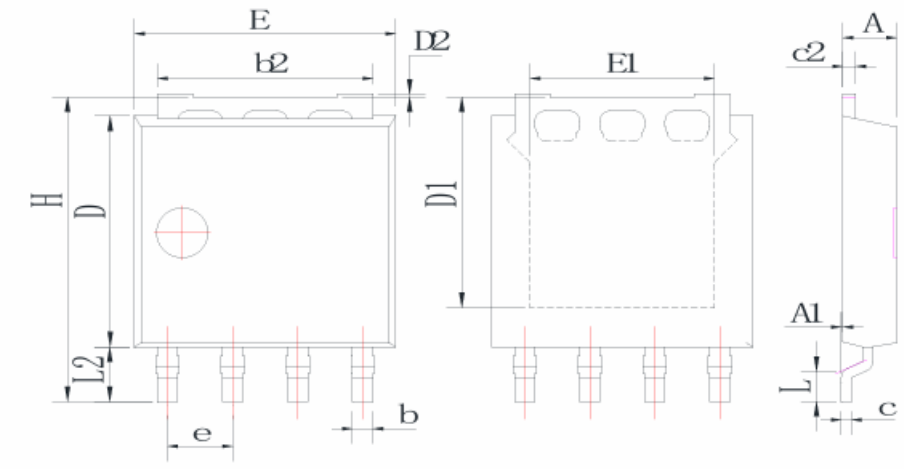



**Figure 12. Normalized Thermal Transient Impedance Curve**

**LFPAK 5X6** 產品外觀尺寸圖 (Product Outline Dimension)




| SYMBOLS | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 1.000 | 1.100 | 0.039 | 0.043 |
| A1 | 0.000 | 0.150 | 0.000 | 0.006 |
| b | 0.350 | 0.500 | 0.014 | 0.020 |
| b2 | 4.010 | 4.410 | 0.158 | 0.174 |
| c | 0.180 | 0.250 | 0.007 | 0.010 |
| c2 | 0.230 | 0.300 | 0.009 | 0.012 |
| D | 4.440 | 4.700 | 0.175 | 0.185 |
| D1 | 4.100 | 4.400 | 0.161 | 0.173 |
| D2 | ~ | 0.200 | 0.000 | 0.008 |
| e | 1.220 | 1.320 | 0.048 | 0.052 |
| E | 5.000 | 5.250 | 0.197 | 0.207 |
| E1 | 3.500 | 3.700 | 0.138 | 0.146 |
| H | 6.050 | 6.250 | 0.238 | 0.246 |
| L | 0.400 | 0.800 | 0.016 | 0.031 |
| L2 | 0.900 | 0.130 | 0.035 | 0.005 |