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# FDMC6679AZ

## P-Channel PowerTrench® MOSFET

**-30 V, -20 A, 10 mΩ**

### Features

- Max $r_{DS(on)}$ = 10 mΩ at $V_{GS}$ = -10 V, $I_D$ = -11.5 A
- Max $r_{DS(on)}$ = 18 mΩ at $V_{GS}$ = -4.5 V, $I_D$ = -8.5 A
- HBM ESD protection level of 8 kV typical(note 3)
- Extended $V_{GSS}$ range (-25 V) for battery applications
- High performance trench technology for extremely low $r_{DS(on)}$
- High power and current handling capability
- Termination is Lead-free and RoHS Compliant

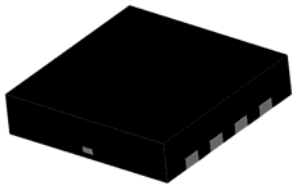
### General Description

The FDMC6679AZ has been designed to minimize losses in load switch applications. Advancements in both silicon and package technologies have been combined to offer the lowest $r_{DS(on)}$ and ESD protection.

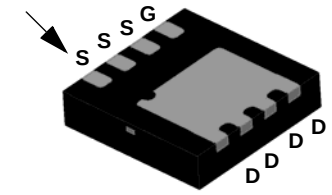
### Applications

- Load Switch in Notebook and Server
- Notebook Battery Pack Power Management

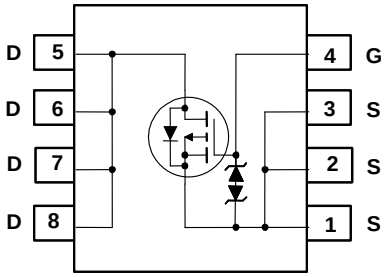
**Top**



**Bottom**




**MLP 3.3x3.3**




## MOSFET Maximum Ratings $T_A$ = 25 °C unless otherwise noted

| Symbol | Parameter | | | Ratings | Units |
|---|---|---|---|---|---|
| $V_{DS}$ | Drain to Source Voltage | | | -30 | V |
| $V_{GS}$ | Gate to Source Voltage | | | ±25 | V |
| $I_D$ | Drain Current -Continuous | $T_C$ = 25 °C | | -20 | A |
| | -Continuous | $T_A$ = 25 °C | (Note 1a) | -11.5 | |
| | -Pulsed | | | -32 | |
| $P_D$ | Power Dissipation | $T_C$ = 25 °C | | 41 | W |
| | Power Dissipation | $T_A$ = 25 °C | (Note 1a) | 2.3 | |
| $T_J$, $T_{STG}$ | Operating and Storage Junction Temperature Range | | | -55 to +150 | °C |

### Thermal Characteristics

| | | | |
|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 3.0 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (Note 1a) | 53 | |

### Package Marking and Ordering Information

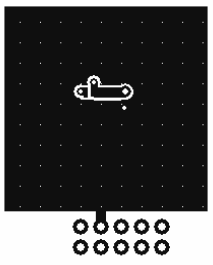
| Device Marking | Device | Package | Reel Size | Tape Width | Quantity |
|---|---|---|---|---|---|
| FDMC6679AZ | FDMC6679AZ | MLP 3.3x3.3 | 13 ” | 12 mm | 3000 units |

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

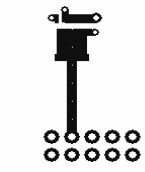
| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $BV_{DSS}$ | Drain to Source Breakdown Voltage | $I_D$ = -250 μA, $V_{GS}$ = 0 V | -30 | | | V |
| $\frac{\Delta BV_{DSS}}{\Delta T_J}$ | Breakdown Voltage Temperature Coefficient | $I_D$ = -250 μA, referenced to 25 °C | | 29 | | mV/°C |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = -24 V, $V_{GS}$ = 0 V, | | | -1 | μA |
| | | $T_J$ = 125 °C | | | -100 | |
| $I_{GSS}$ | Gate to Source Leakage Current | $V_{GS}$ = ±25 V, $V_{DS}$ = 0 V | | | ±10 | μA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate to Source Threshold Voltage | $V_{GS}$ = $V_{DS}$, $I_D$ = -250 μA | -1 | -1.8 | -3 | V |
| $\frac{\Delta V_{GS(th)}}{\Delta T_J}$ | Gate to Source Threshold Voltage Temperature Coefficient | $I_D$ = -250 μA, referenced to 25 °C | | -7 | | mV/°C |
| $r_{DS(on)}$ | Static Drain to Source On Resistance | $V_{GS}$ = -10 V, $I_D$ = -11.5 A | | 8.6 | 10 | mΩ |
| | | $V_{GS}$ = -4.5 V, $I_D$ = -8.5 A | | 12 | 18 | |
| | | $V_{GS}$ = -10 V, $I_D$ = -11.5 A, $T_J$ = 125 °C | | 12 | 15 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$ = -5 V, $I_D$ = -11.5 A | | 46 | | S |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = -15 V, $V_{GS}$ = 0 V, f = 1 MHz | | 2985 | 3970 | pF |
| $C_{oss}$ | Output Capacitance | | | 570 | 755 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 500 | 750 | pF |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$ = -15 V, $I_D$ = -11.5 A, $V_{GS}$ = -10 V, $R_{GEN}$ = 6 Ω | | 12 | 21 | ns |
| $t_r$ | Rise Time | | | 14 | 25 | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 63 | 100 | ns |
| $t_f$ | Fall Time | | | 46 | 73 | ns |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 0 V to -10 V; $V_{DD}$ = -15 V, $I_D$ = -11.5 A | | 65 | 91 | nC |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 0 V to -5 V; $V_{DD}$ = -15 V, $I_D$ = -11.5 A | | 37 | 52 | nC |
| $Q_{gs}$ | Gate to Source Charge | $V_{DD}$ = -15 V, $I_D$ = -11.5 A | | 8.7 | | nC |
| $Q_{gd}$ | Gate to Drain “Miller” Charge | $V_{DD}$ = -15 V, $I_D$ = -11.5 A | | 17 | | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| $V_{SD}$ | Source to Drain Diode Forward Voltage | $V_{GS}$ = 0 V, $I_S$ = -11.5 A (Note 2) | | 0.83 | 1.30 | V |
| | | $V_{GS}$ = 0 V, $I_S$ = -1.6 A (Note 2) | | 0.71 | 1.20 | |
| $t_{rr}$ | Reverse Recovery Time | $I_F$ = -11.5 A, di/dt = 100 A/μs | | 31 | 49 | ns |
| $Q_{rr}$ | Reverse Recovery Charge | | | 16 | 28 | nC |

NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 $in^2$ pad 2 oz copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a. 53 °C/W when mounted on a 1 $in^2$ pad of 2 oz copper



b.125 °C/W when mounted on a minimum pad of 2 oz copper

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0 %.

3. The diode connected between the gate and source servers only as protection against ESD. No gate overvoltage rating is implied.

## Typical Characteristics $T_J$ = 25 °C unless otherwise noted

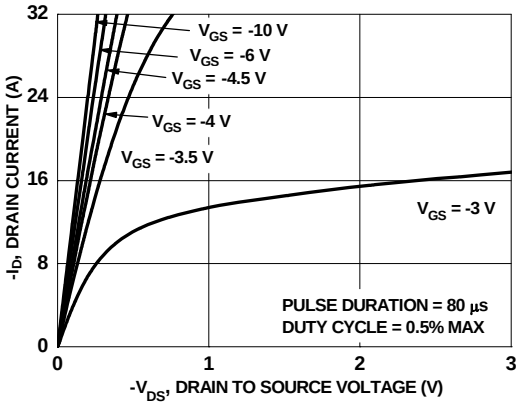



**Figure 1. On Region Characteristics**

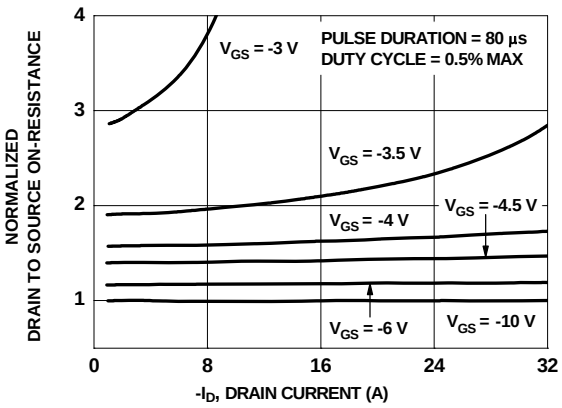



**Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage**

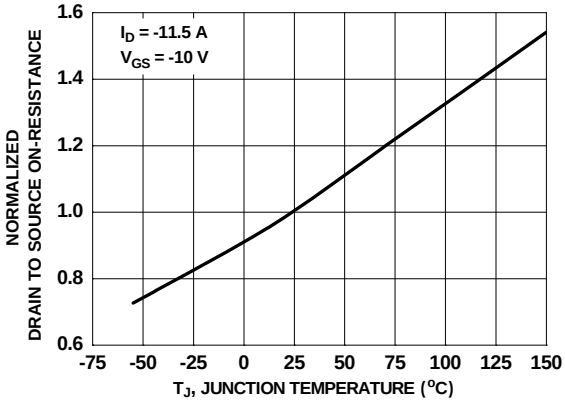



**Figure 3. Normalized On Resistance vs. Junction Temperature**

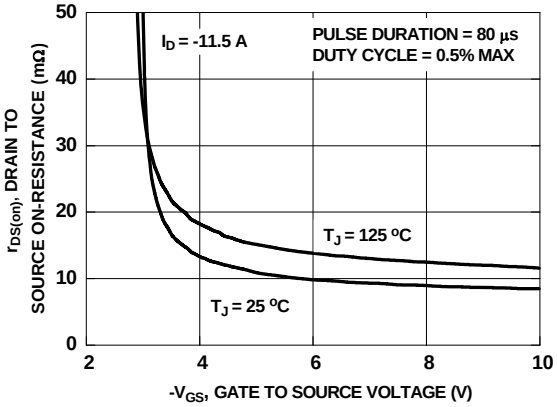



**Figure 4. On-Resistance vs. Gate to Source Voltage**

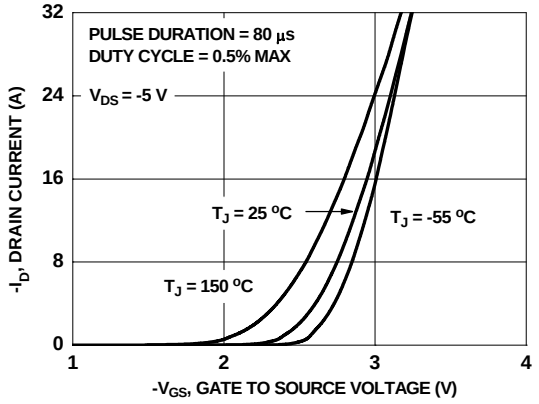



**Figure 5. Transfer Characteristics**

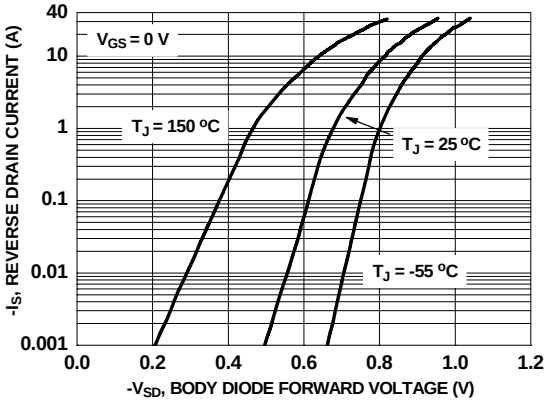



**Figure 6. Source to Drain Diode Forward Voltage vs. Source Current**

## Typical Characteristics $T_J$ = 25 °C unless otherwise noted

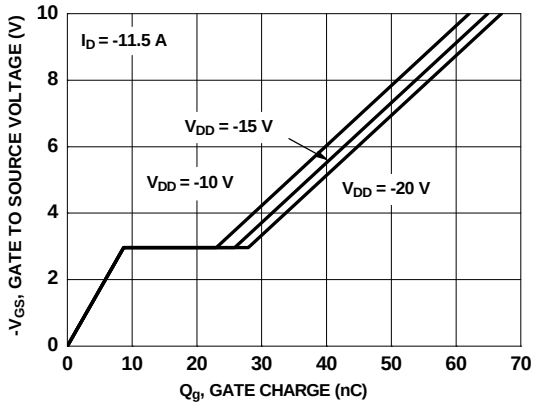



**Figure 7. Gate Charge Characteristics**

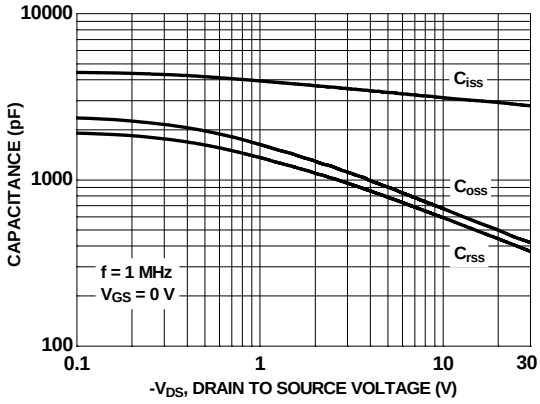



**Figure 8. Capacitance vs. Drain to Source Voltage**

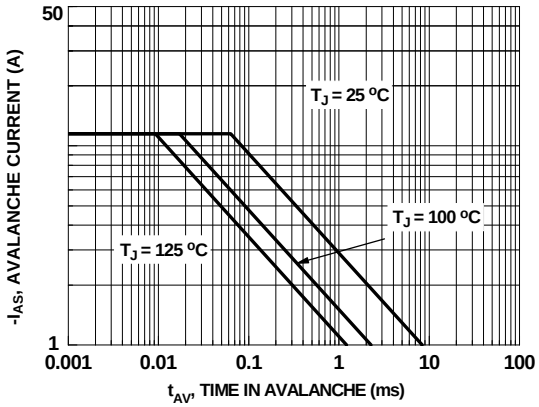



**Figure 9. Unclamped Inductive Switching Capability**

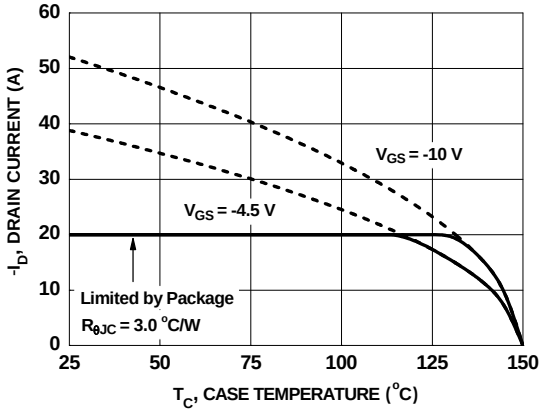



**Figure 10. Maximum Continuous Drain Current vs. Case Temperature**

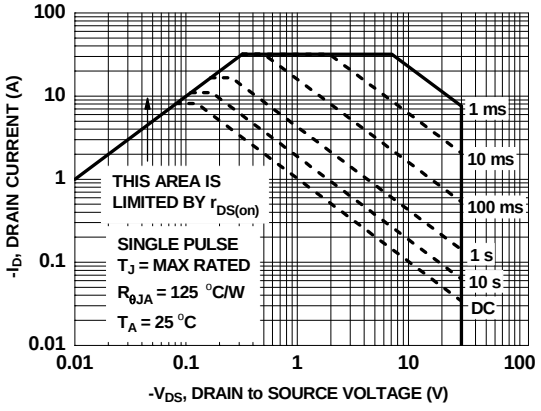



**Figure 11. Forward Bias Safe Operating Area**

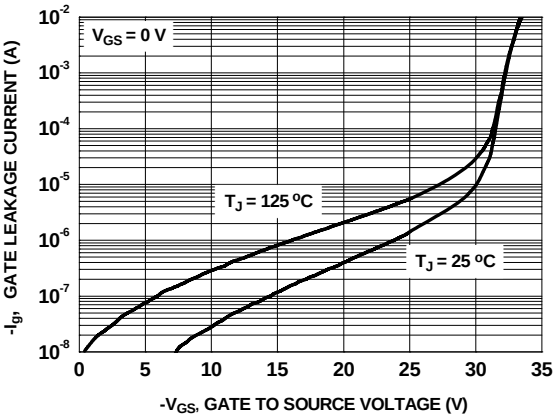



**Figure 12. Igss vs. Vgss**

## Typical Characteristics $T_J$ = 25 °C unless otherwise noted

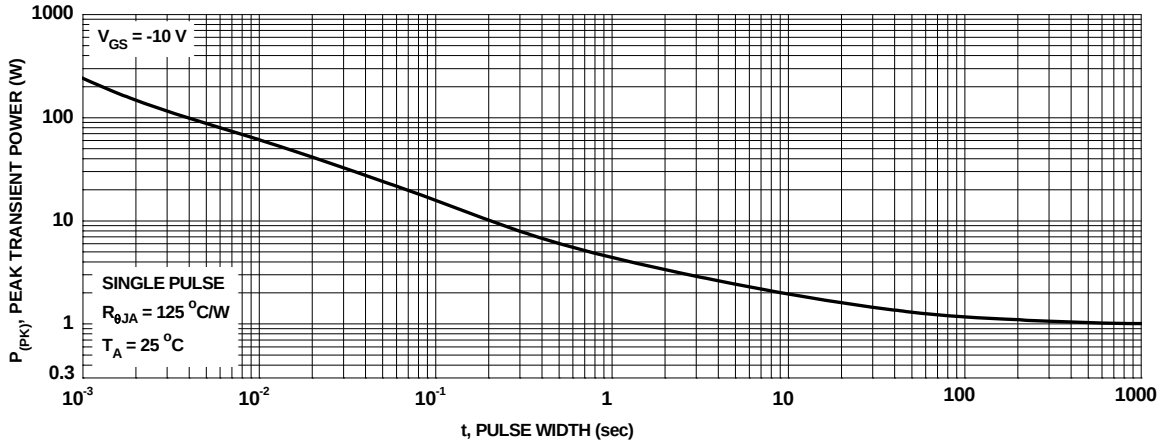



**Figure 13. Single Pulse Maximum Power Dissipation**

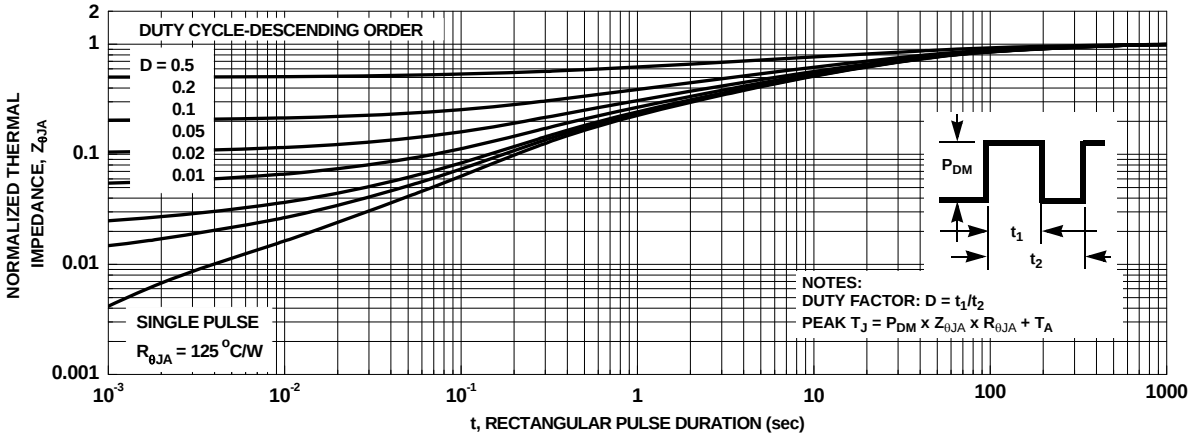
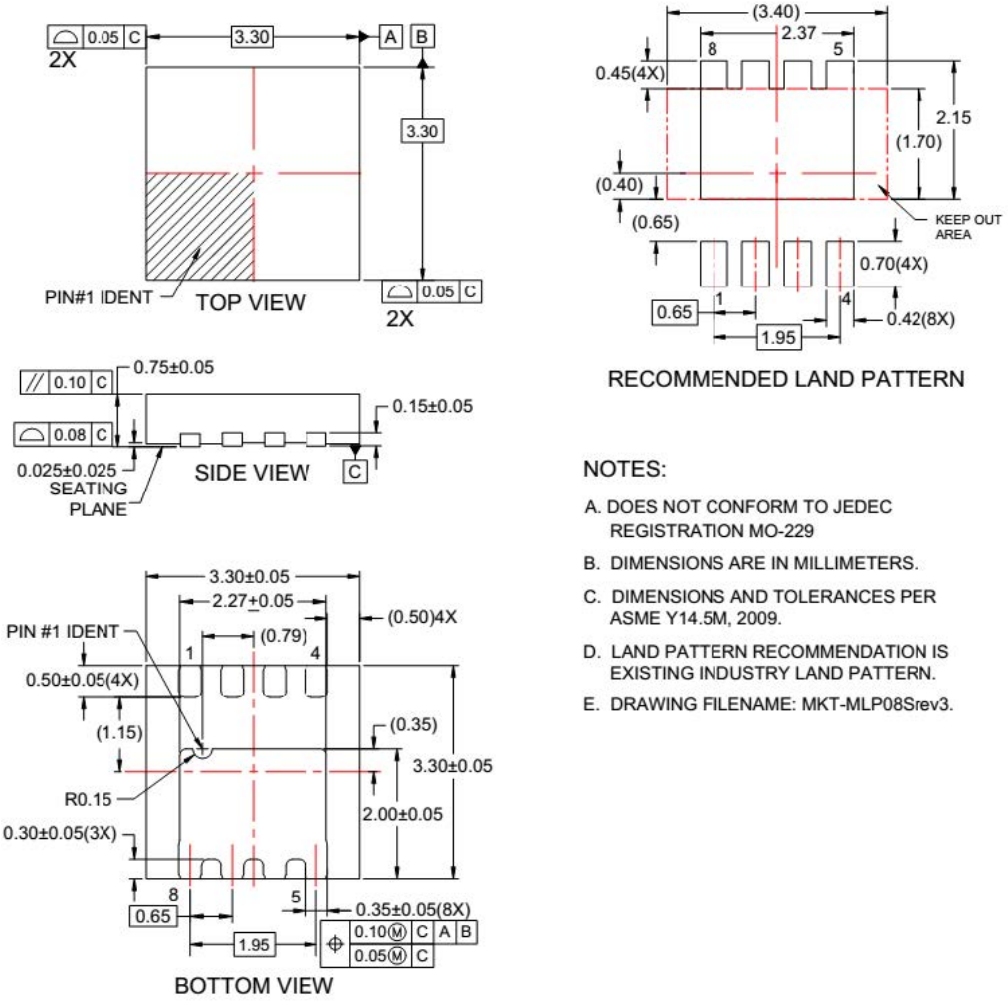



**Figure 14. Junction-to-Ambient Transient Thermal Response Curve**

## Dimensional Outline and Pad Layout




NOTES:

A. DOES NOT CONFORM TO JEDEC REGISTRATION MO-229

B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.

D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.

E. DRAWING FILENAME: MKT-MLP08Srev3.

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