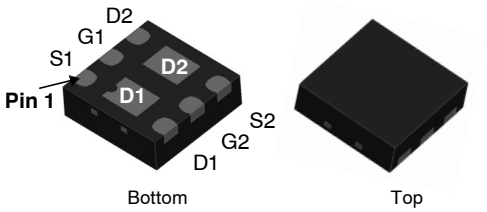
MOSFET – Dual P-Channel POWERTRENCH®

-20 V, -2.6 A, 142 mΩ

FDME1023PZT



UDFN6 1.6×1.6 0.5P
(MicroFET™ 1.6×1.6 Thin)
CASE 517DW

Description

This device is designed specifically as a single package solution for the battery charges switch in cellular handset and other ultra−portable applications. It features two independent P−Channel MOSFETs with low on−state resistance for minimum conduction losses. When connected in the typical common source configuration, bi−directional current flow is possible.

The MicroFET 1.6×1.6 **Thin** package offers exceptional thermal performance for it's physical size and is well suited to switching and linear mode applications.

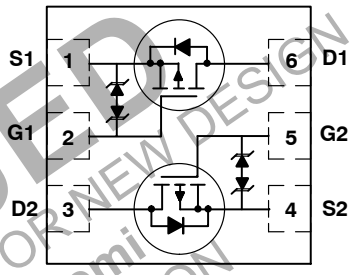
Features

- Max $R_{DS(on)}$ = 142 mΩ at V_{GS} = −4.5 V, I_D = −2.3 A
- Max $R_{DS(on)}$ = 213 mΩ at V_{GS} = −2.5 V, I_D = −1.8 A
- Max $R_{DS(on)}$ = 331 mΩ at V_{GS} = −1.8 V, I_D = −1.5 A
- Max $R_{DS(on)}$ = 530 mΩ at V_{GS} = −1.5 V, I_D = −1.2 A
- Low Profile: 0.55 mm Maximum in the New Package MicroFET 1.6 x 1.6 **Thin**
- HBM ESD Protection Level > 1600 V (Note 3)
- This Device is Pb−Free, Halide Free and RoHS Compliant

Typical Applications

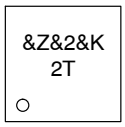
- Load Switch
- Battery Charging
- Battery Disconnect Switch

ELECTRICAL CONNECTION



Dual P−Channel MOSFET
(Top View)

MARKING DIAGRAM



&Z = Assembly Plant Code
&2 = 2−Digit Date Code (Year and Week)
&K = 2−Digit Lot Run Code
2T = Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 6 of this data sheet.

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Symbol	Parameter		Value	Unit
V_{DS}	Drain to Source Voltage		−20	V
V_{GS}	Gate to Source Voltage		±8	V
I_D	Drain Current – Continuous (Note 1a) – Pulsed	T_A = 25°C	 −2.6 −6	A
P_D	Power Dissipation for Single Operation – (Note 1a) – (Note 1b)	 T_A = 25°C T_A = 25°C	 1.4 0.6	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range		−55 to +150	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation) (Note 1a)	90	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Single Operation) (Note 1b)	195	

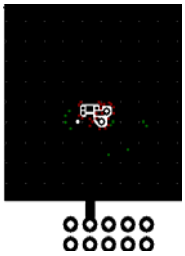
ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise noted

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	−20	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = −250 μA, referenced to 25°C	–	−12	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = −16 V, V_{GS} = 0 V	–	–	−1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±8 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	−0.4	−0.6	−1.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = −250 μA, referenced to 25°C	–	2	–	mV/°C
$R_{DS(on)}$	Drain to Source On Resistance	V_{GS} = −4.5 V, I_D = −2.3 A	–	95	142	mΩ
		V_{GS} = −2.5 V, I_D = −1.8 A	–	120	213	
		V_{GS} = −1.8 V, I_D = −1.5 A	–	150	331	
		V_{GS} = −1.5 V, I_D = −1.2 A	–	190	530	mΩ
		V_{GS} = −4.5 V, I_D = −2.3 A, T_J = 125°C	–	128	190	mΩ
g_{FS}	Forward Transconductance	V_{DS} = −4.5 V, I_D = −2.3 A	–	7	–	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = −10 V, V_{GS} = 0 V, f =1 MHz	–	305	405	pF
C_{oss}	Output Capacitance		–	55	75	pF
C_{rss}	Reverse Transfer Capacitance		–	50	75	pF
Switching Characteristics						
$t_{d(on)}$	Turn−On Delay Time	V_{DD} = −10 V, I_D = −1 A, V_{GS} = −4.5 V, R_{GEN} = 6 Ω	–	4.7	10	ns
t_r	Rise Time		–	4.8	10	ns
$t_{d(off)}$	Turn−Off Delay Time		–	33	53	ns
t_f	Fall Time		–	16	29	ns
Q_g	Total Gate Charge	V_{DD} = −10 V, I_D = −2.3 A, V_{GS} = −4.5 V	–	5.5	7.7	nC
Q_{gs}	Gate to Source Gate Charge		–	0.6	–	nC
Q_{gd}	Gate to Drain “Miller” Charge		–	1.4	–	nC
Drain−Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = −0.9 A (Note 2)	–	−0.8	−1.2	V
t_{rr}	Reverse Recovery Time	I_F = −2.3 A, di/dt = 100 A/μs	–	16	29	ns
Q_{rr}	Reverse Recovery Charge		–	4.4	10	nC

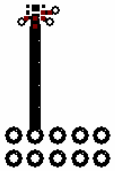
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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 $R_{\theta JA}$ is determined by the user's board design.



a. 90°C/W when mounted on a 1 in^2 pad of 2 oz copper



b. 195°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 gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted)

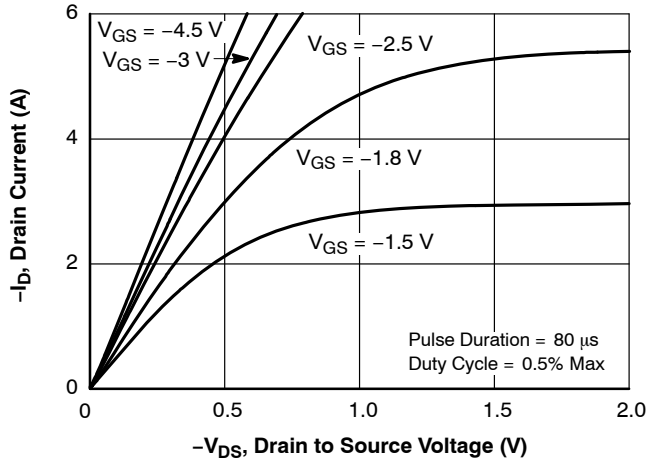


Figure 1. On Region Characteristics

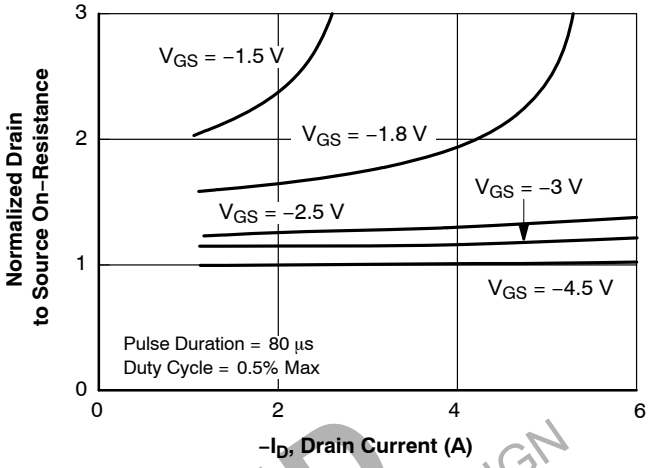


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

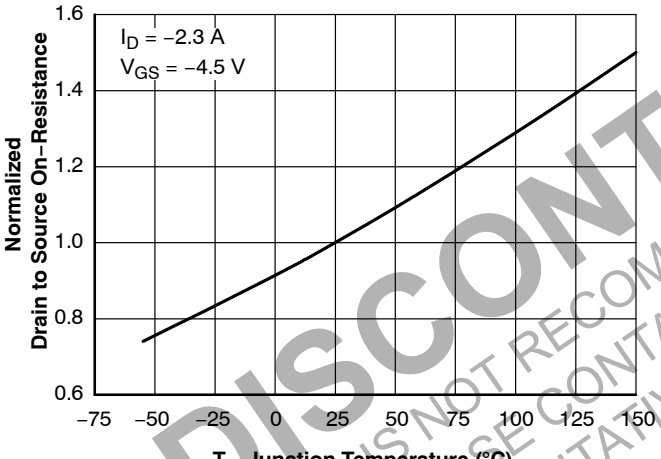


Figure 3. Normalized On Resistance vs. Junction Temperature

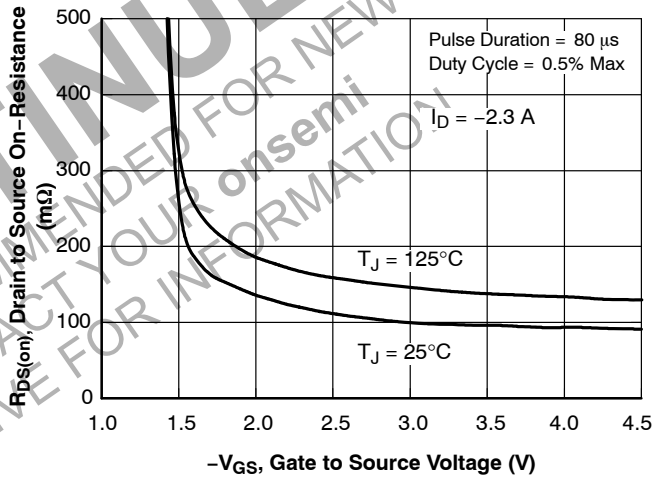


Figure 4. On−Resistance vs. Gate to Source Voltage

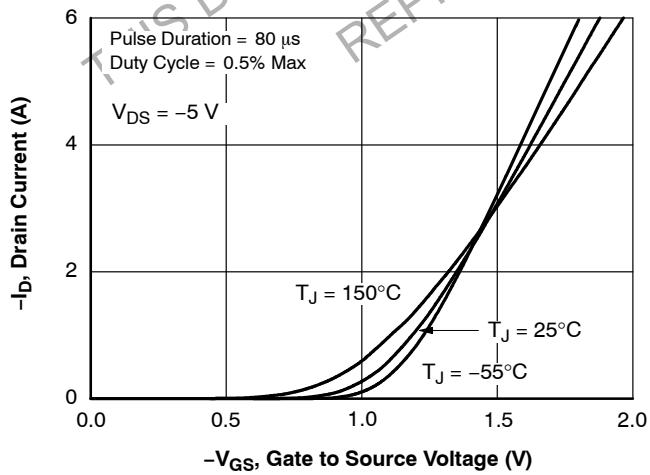


Figure 5. Transfer Characteristics

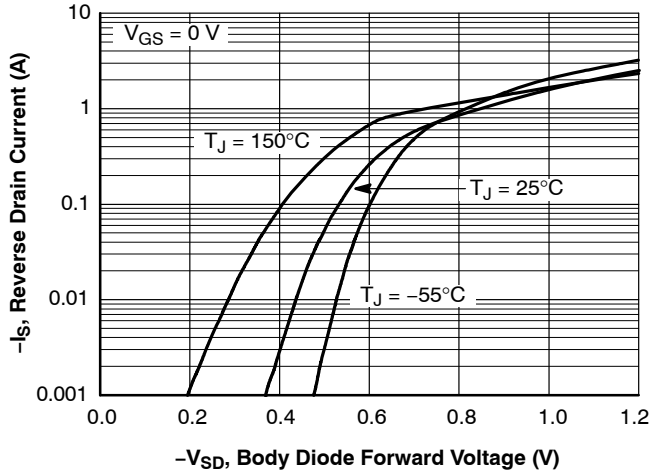


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (continued)

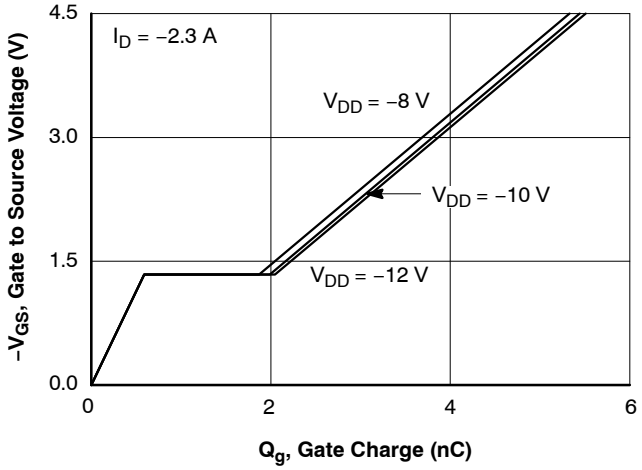


Figure 8. Gate Charge Characteristics

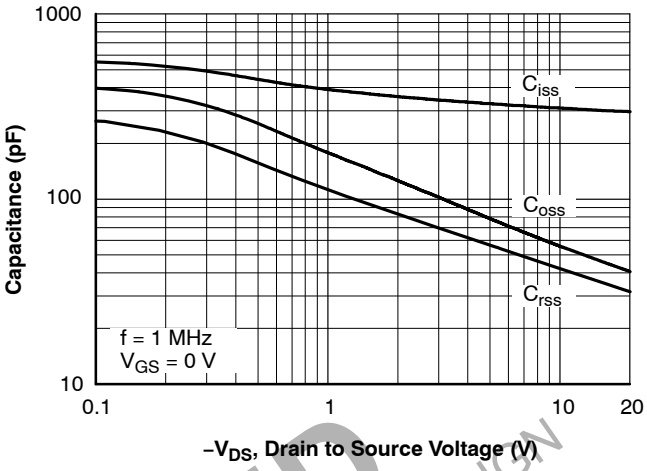


Figure 9. Capacitance vs. Drain to Source Voltage

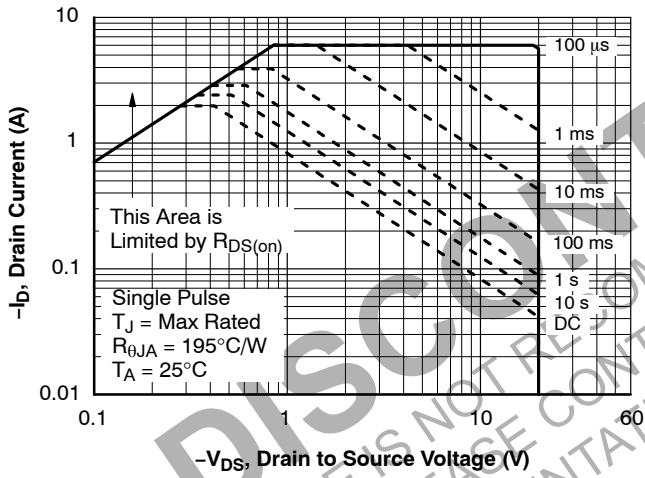


Figure 7. Forward Bias Safe Operating Area

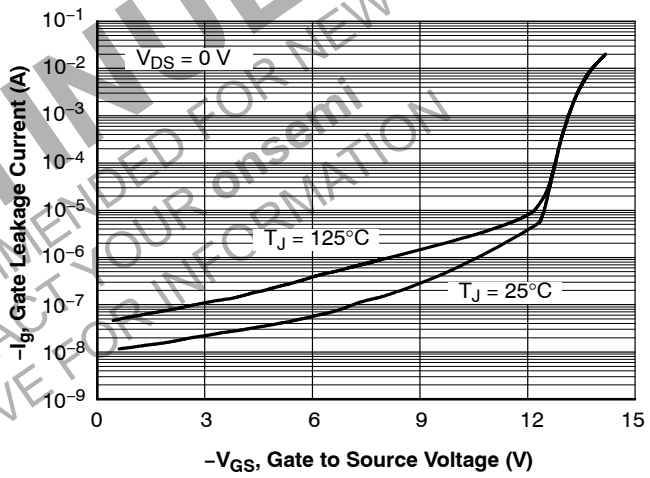


Figure 10. Gate Leakage Current vs. Gate to Source Voltage

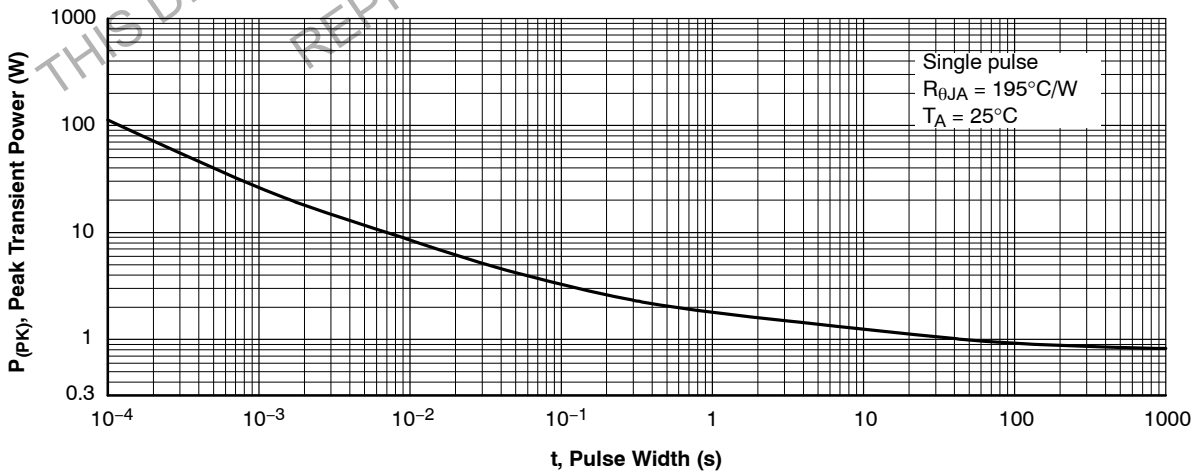


Figure 11. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS (T_J = 25°C unless otherwise noted) (continued)

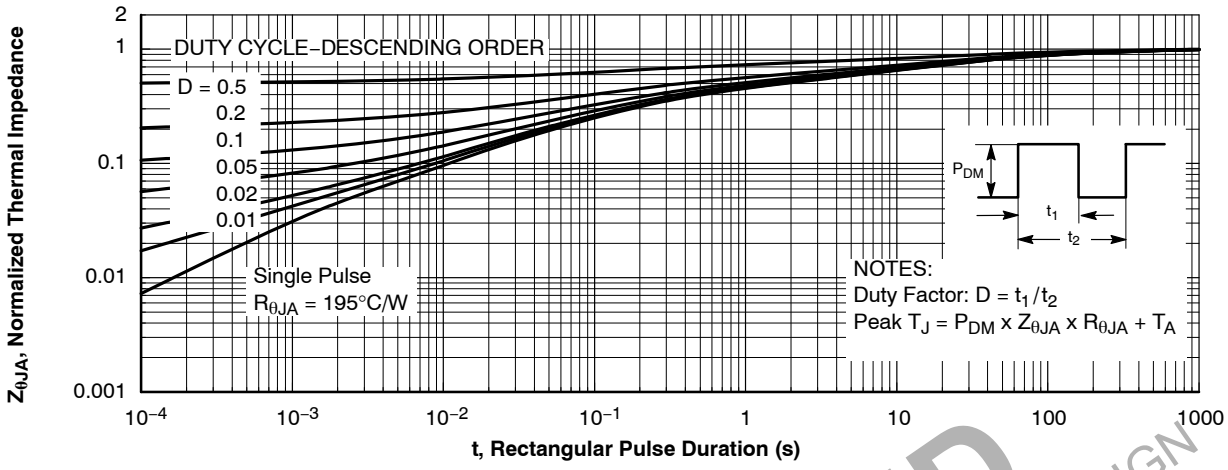


Figure 12. Junction−to−Ambient Transient Thermal Response Curve

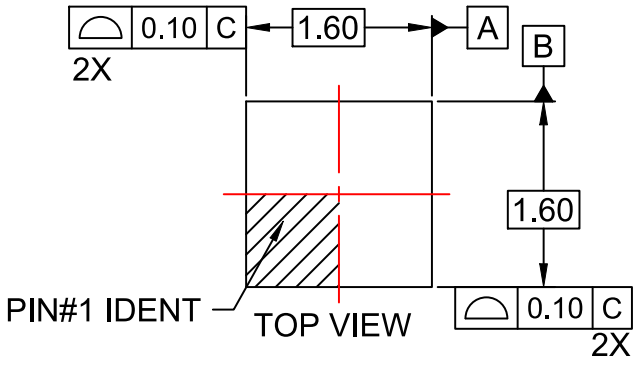
PACKAGE MARKING AND ORDERING INFORMATION

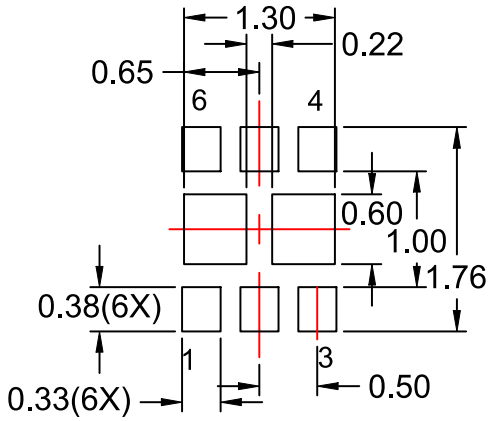
Device	Device Marking	Package Type	Reel Size	Tape Width	Shipping†
FDME1023PZT	2T	UDFN6 1.6×1.6 0.5P (MicroFET 1.6×1.6 **Thin**) (Pb−Free/Halide Free)	7”	8 mm	5000 / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

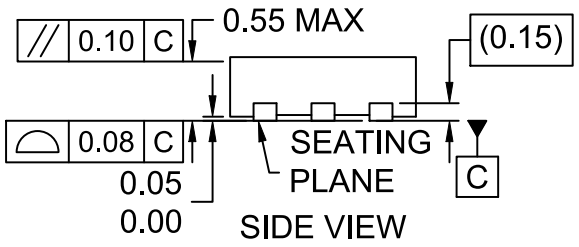
UDFN6 1.6x1.6, 0.5P
CASE 517DW
ISSUE O

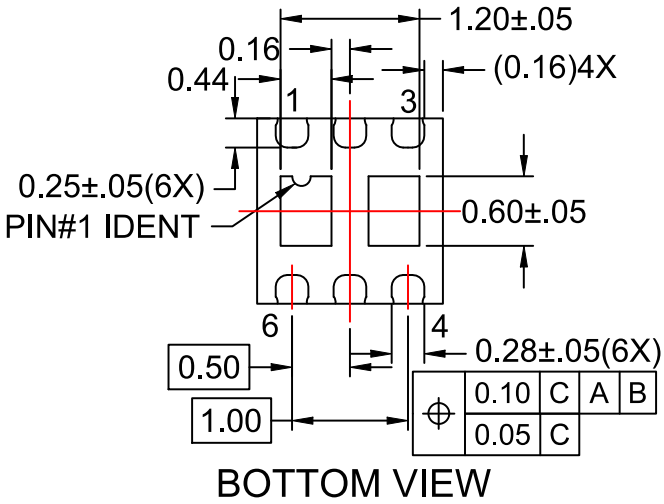
DATE 31 OCT 2016





RECOMMENDED
LAND PATTERN





NOTES:

A. PACKAGE DOES NOT CONFORM TO ANY JEDEC STANDARD.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
D. LAND PATTERN RECOMMENDATION IS EXISTING INDUSTRY LAND PATTERN.

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