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FAIRCHILD

July 2014

FDMA3027PZ

Dual P-Channel PowerTrench® MOSFET

-30 V, -3.3 A, 87 mΩ

Features

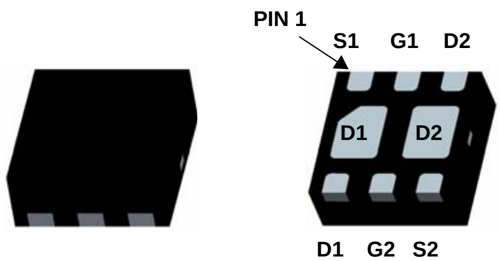
- Max $r_{DS(on)}$ = 87 mΩ at V_{GS} = -10 V, I_D = -3.3 A
- Max $r_{DS(on)}$ = 152 mΩ at V_{GS} = -4.5 V, I_D = -2.3 A
- HBM ESD protection level > 2 KV typical (Note 3)
- Low profile - 0.8 mm maximum - in the new package MicroFET 2x2 mm
- RoHS Compliant

General Description

This device is designed specifically as a single package solution for dual switching requirements such as gate driver for larger Mosfets. It features two independent P-Channel MOSFETs with low on-state resistance for minimum conduction losses. The MicroFET 2x2 package offers exceptional thermal performance for its physical size and is well suited to linear mode applications. G-S zener has been added to enhance ESD voltage level.

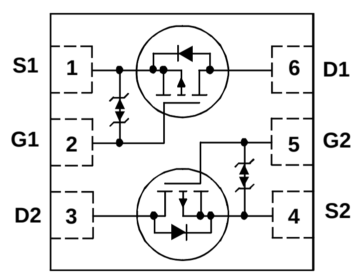
Applications

- Load Switch
- Discrete Gate Driver



Top Bottom

MicroFET 2x2



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	(Note 1a)	-3.3	A
	-Pulsed		-15	
P_D	Power Dissipation	(Note 1a)	1.4	W
	Power Dissipation	(Note 1b)	0.7	
T_J, T_{STG}	Operating and Storage Junction Temperature Range		-55 to +150	°C

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance for Single Operation, Junction to Ambient	(Note 1a)	86	°C/W
	Thermal Resistance for Single Operation, Junction to Ambient	(Note 1b)	173	
	Thermal Resistance for Dual Operation, Junction to Ambient	(Note 1c)	69	
	Thermal Resistance for Dual Operation, Junction to Ambient	(Note 1d)	151	
	Thermal Resistance for Single Operation, Junction to Ambient	(Note 1e)	160	
	Thermal Resistance for Dual Operation, Junction to Ambient	(Note 1f)	133	

Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
327	FDMA3027PZ	MicroFET 2X2	7 ”	8 mm	3000 units

Electrical Characteristics T_J = 25 °C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units

Off Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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		-22		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = -24 V, V_{GS} = 0 V			-1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±25 V, V_{DS} = 0 V			±10	μA

On Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = -250 μA	-1	-1.9	-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		5		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = -10 V, I_D = -3.3 A		69	87	mΩ
		V_{GS} = -4.5 V, I_D = -2.3 A		108	152	
		V_{GS} = -10 V, I_D = -3.3 A, T_J = 125 °C		97	122	
g_{FS}	Forward Transconductance	V_{DS} = -5 V, I_D = -3.3 A		6		S

Dynamic Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
C_{iss}	Input Capacitance	V_{DS} = -15 V, V_{GS} = 0 V, f = 1 MHz		324	435	pF
C_{oss}	Output Capacitance			59	80	pF
C_{rss}	Reverse Transfer Capacitance			53	80	pF
R_g	Gate Resistance			12		Ω

Switching Characteristics

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = -15 V, I_D = -3.3 A, V_{GS} = -10 V, R_{GEN} = 6 Ω			5.2	11	ns
t_r	Rise Time				3	10	ns
$t_{d(off)}$	Turn-Off Delay Time				17	31	ns
t_f	Fall Time				11	25	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to -10 V	V_{DD} = -15 V, I_D = -3.3 A		7.2	10	nC
	Total Gate Charge	V_{GS} = 0 V to -5 V			4.1	6	nC
Q_{gs}	Gate to Source Charge				1.0		nC
Q_{gd}	Gate to Drain "Miller" Charge				1.9		nC

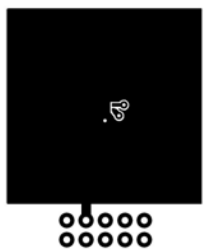
Drain-Source Diode Characteristics

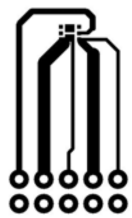
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = -3.3 A (Note 2)		-0.94	-1.3	V
t_{rr}	Reverse Recovery Time	I_F = -3.3 A, di/dt = 100 A/μs		20	32	ns
Q_{rr}	Reverse Recovery Charge			10	18	nC

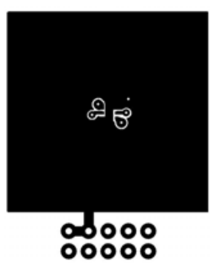
Electrical Characteristics T_J = 25 °C unless otherwise noted

Notes:

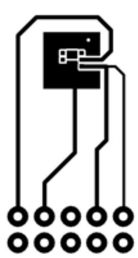
1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 oz. copper pad on a 1.5 x 1.5 in. board of FR-4 material. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
   (a) $R_{\theta JA}$ = 86 °C/W when mounted on a 1 in^2 pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For single operation.
   (b) $R_{\theta JA}$ = 173 °C/W when mounted on a minimum pad of 2 oz copper. For single operation.
   (c) $R_{\theta JA}$ = 69 ^{o}C/W when mounted on a 1 in^2 pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For dual operation.
   (d) $R_{\theta JA}$ = 151 ^{o}C/W when mounted on a minimum pad of 2 oz copper. For dual operation.
   (e) $R_{\theta JA}$ = 160 ^{o}C/W when mounted on a 30 mm^2 pad of 2 oz copper. For single operation.
   (f) $R_{\theta JA}$ = 133 ^{o}C/W when mounted on a 30 mm^2 pad of 2 oz copper. For dual operation.

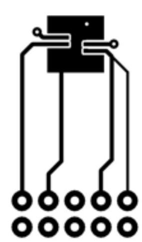

a. 86 °C/W when mounted on a 1 in^2 pad of 2 oz copper


b. 173 °C/W when mounted on a minimum pad of 2 oz copper


c. 69 °C/W when mounted on a 1 in^2 pad of 2 oz copper


d. 151 °C/W when mounted on a minimum pad of 2 oz copper


e. 160 °C/W when mounted on 30 mm^2 pad of 2 oz copper


f. 133 °C/W when mounted on 30 mm^2 pad of 2 oz copper

2. Pulse Test : Pulse Width < 300 us, 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

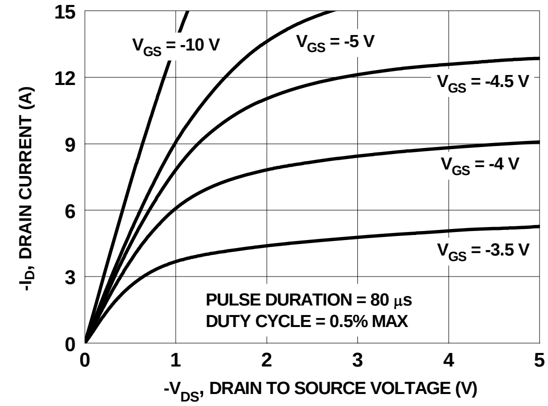


Figure 1. On-Region Characteristics

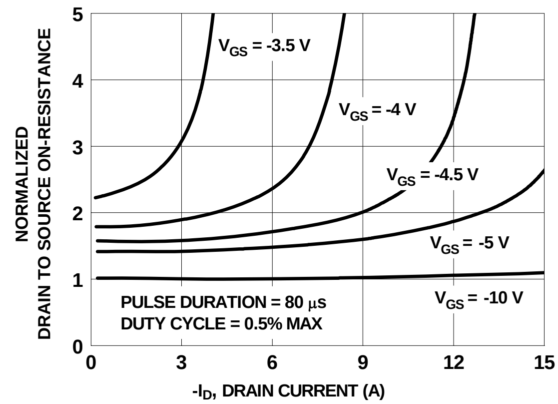


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

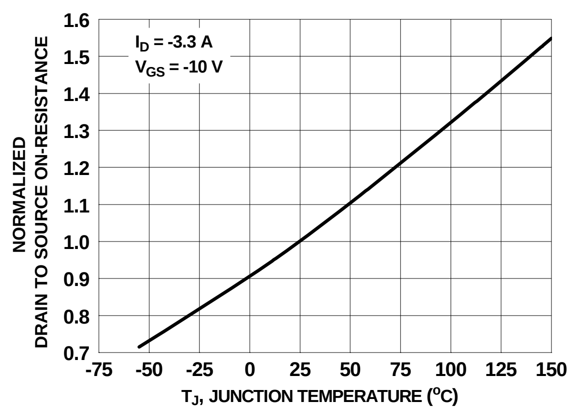


Figure 3. Normalized On-Resistance vs Junction Temperature

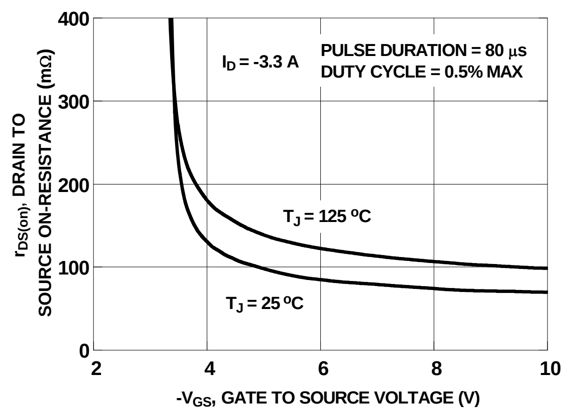


Figure 4. On-Resistance vs Gate to Source Voltage

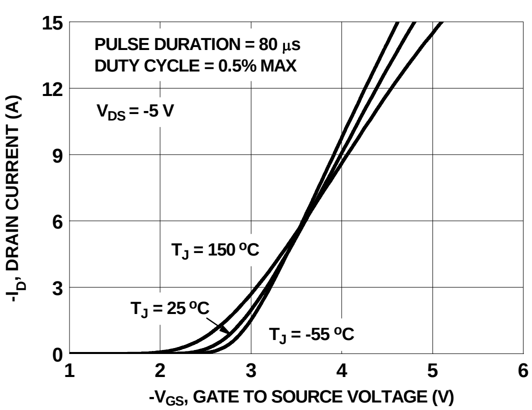


Figure 5. Transfer Characteristics

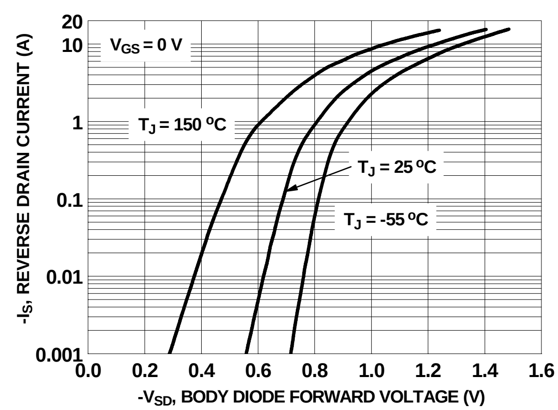


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted

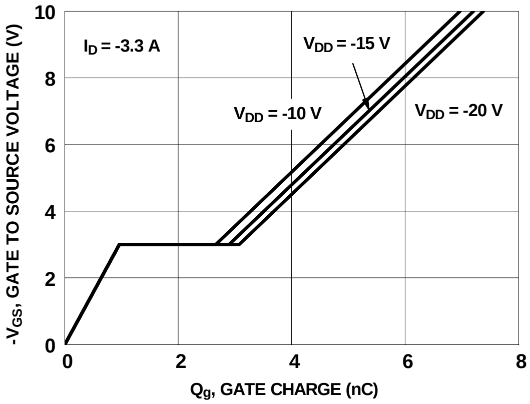


Figure 7. Gate Charge Characteristics

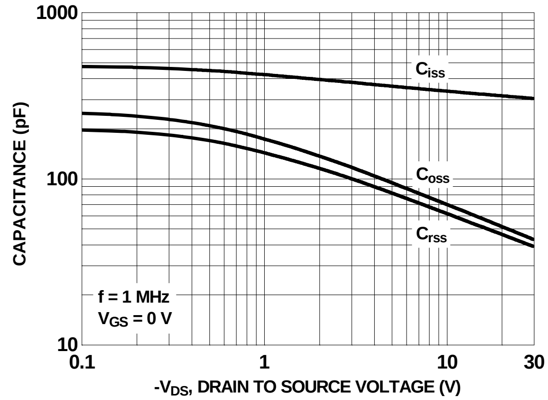


Figure 8. Capacitance vs Drain to Source Voltage

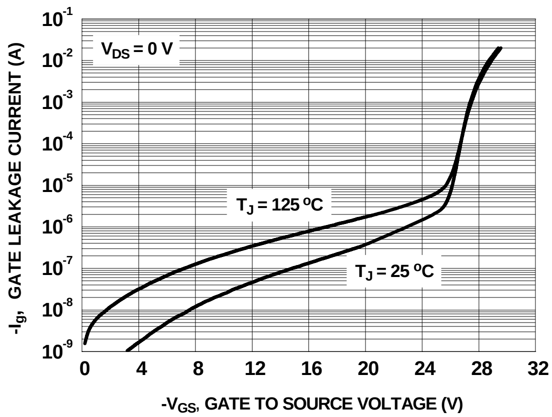


Figure 9. Gate Leakage Current vs Gate to Source Voltage

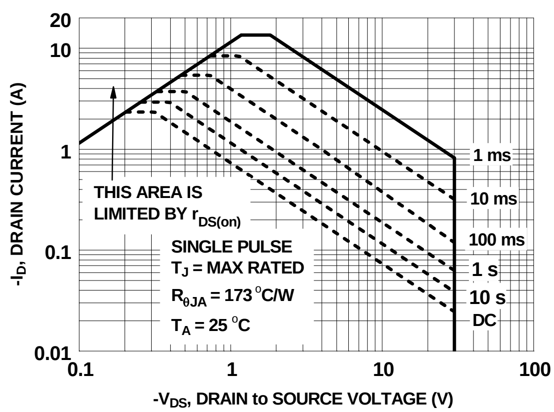


Figure 10. Forward Bias Safe Operating Area

Figure 11. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted

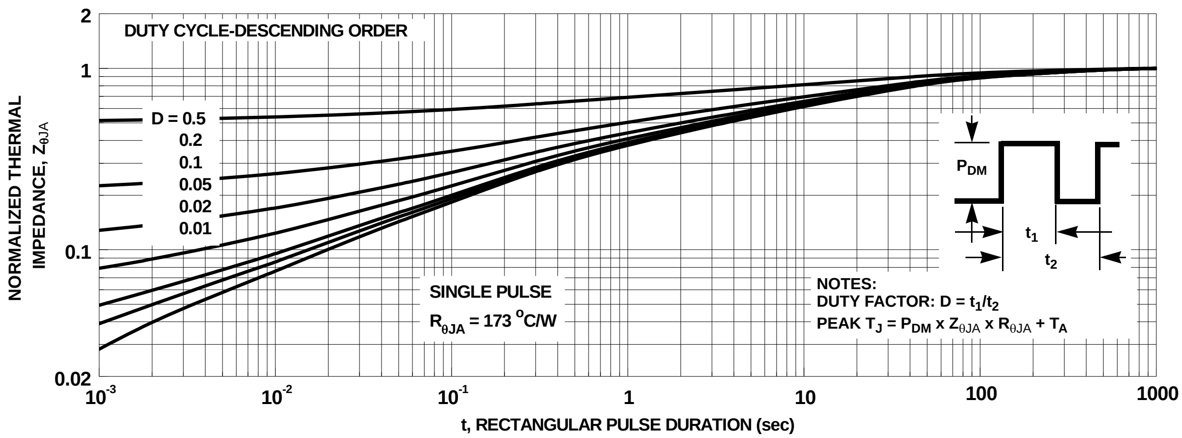
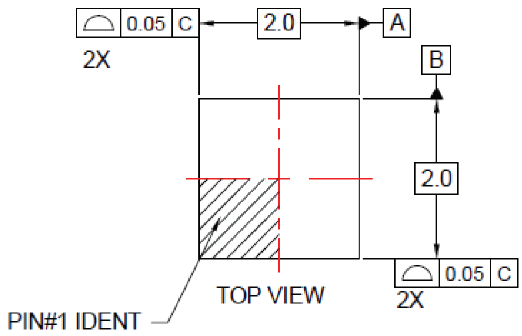
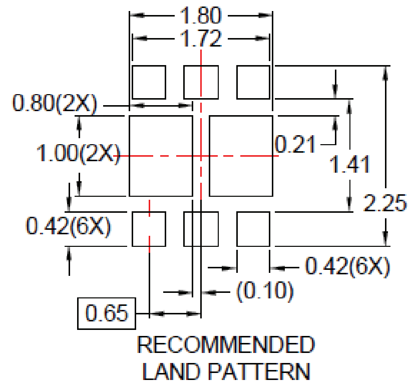
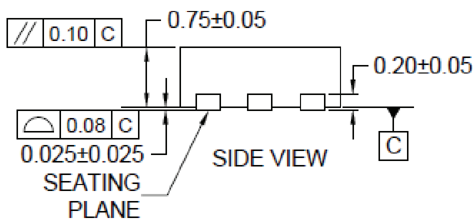


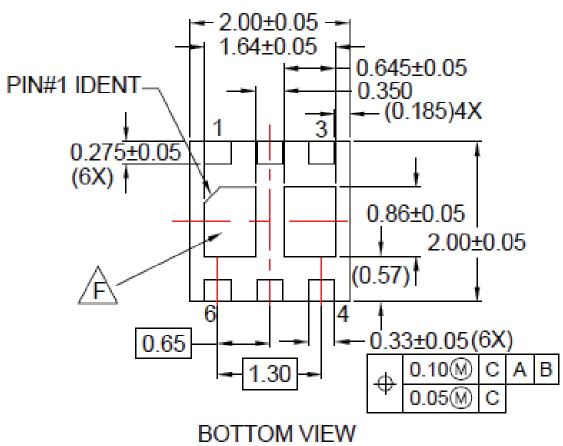
Figure 12. Junction-to-Ambient Transient Thermal Response Curve

Dimensional Outline and Pad Layout









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No Identification Needed	Full Production	Datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice to improve the design.
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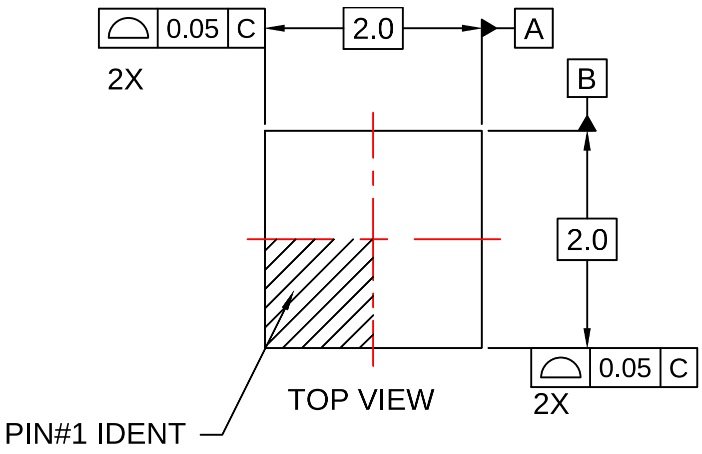

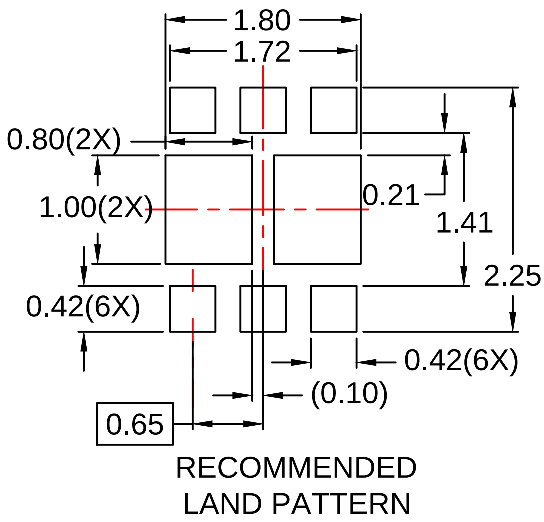

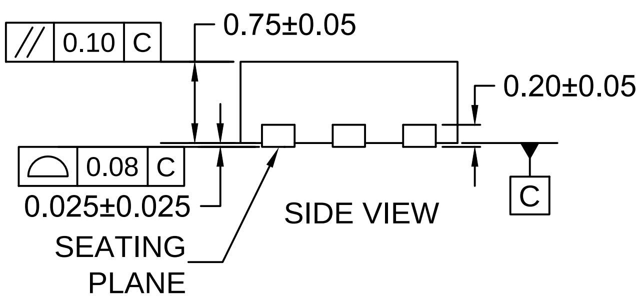

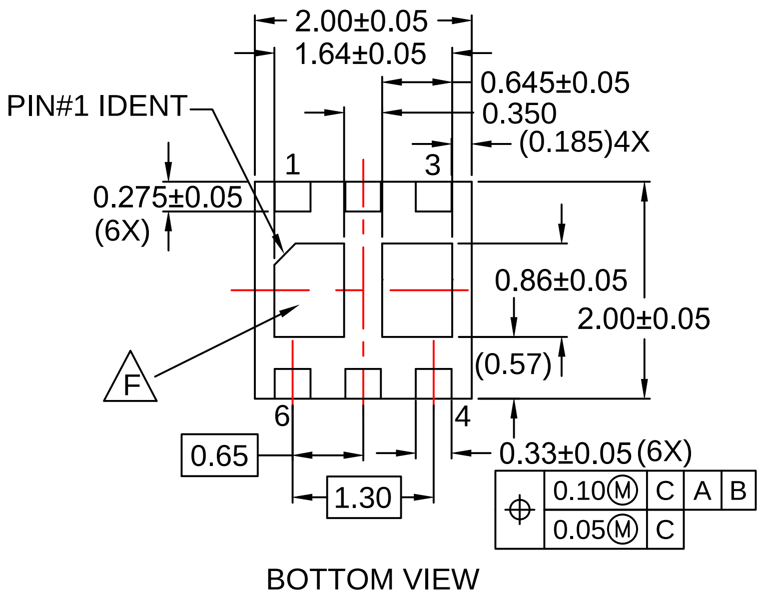

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