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FDMA3028N

Dual N-Channel PowerTrench[®] MOSFET 30 V, 3.8 A, 68 mΩ

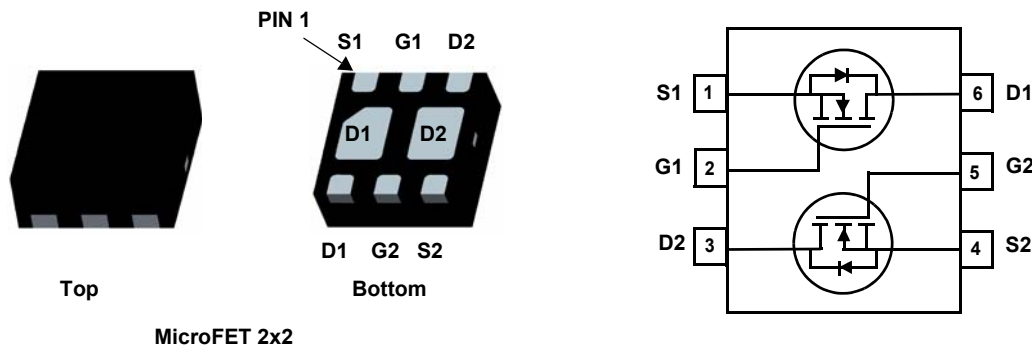


Features

- Max. $R_{DS(on)}$ = 68 mΩ at $V_{GS} = 4.5\text{ V}$, $I_D = 3.8\text{ A}$
- Max. $R_{DS(on)}$ = 88 mΩ at $V_{GS} = 2.5\text{ V}$, $I_D = 3.4\text{ A}$
- Max. $R_{DS(on)}$ = 123 mΩ at $V_{GS} = 1.8\text{ V}$, $I_D = 2.9\text{ A}$
- 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 in cellular handset and other ultra-portable applications. It features two independent N-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.



MOSFET Maximum Ratings $T_A = 25\text{ °C}$ unless otherwise noted

Symbol	Parameter	Rated	Units
V_{DS}	Drain to Source Voltage	30	V
V_{GS}	Gate to Source Voltage	± 12	V
I_D	Drain Current -Continuous (Note 1a)	3.8	A
	-Pulsed	16	
P_D	Power Dissipation (Note 1a)	1.5	W
	Power Dissipation (Note 1b)	0.7	
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +150	$^{\circ}\text{C}$

Thermal Characteristics

$R_{\theta JA}$	Thermal Resistance for Single Operation, Junction to Ambient	(Note 1a)	86	$^{\circ}\text{C/W}$
	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
328	FDMA3028N	MicroFET 2X2	7"	8 mm	3000 units

Electrical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
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Off Characteristics

BV_{DSS}	Drain to Source Breakdown Voltage	$I_D = 250\text{ }\mu\text{A}$, $V_{GS} = 0\text{ V}$	30			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^\circ\text{C}$		23		mV/ $^\circ\text{C}$
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS} = 24\text{ V}$, $V_{GS} = 0\text{ V}$			1	μA
I_{GSS}	Gate to Source Leakage Current	$V_{GS} = \pm 12\text{ V}$, $V_{DS} = 0\text{ V}$			± 100	nA

On Characteristics

$V_{GS(th)}$	Gate to Source Threshold Voltage	$V_{GS} = V_{DS}$, $I_D = 250\text{ }\mu\text{A}$	0.6	0.9	1.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	$I_D = 250\text{ }\mu\text{A}$, referenced to $25\text{ }^\circ\text{C}$		-3		mV/ $^\circ\text{C}$
$r_{DS(on)}$	Static Drain to Source On Resistance	$V_{GS} = 4.5\text{ V}$, $I_D = 3.8\text{ A}$		46	68	m Ω
		$V_{GS} = 2.5\text{ V}$, $I_D = 3.4\text{ A}$		56	88	
		$V_{GS} = 1.8\text{ V}$, $I_D = 2.9\text{ A}$		80	123	
		$V_{GS} = 4.5\text{ V}$, $I_D = 3.8\text{ A}$, $T_J = 125\text{ }^\circ\text{C}$		72	108	
g_{FS}	Forward Transconductance	$V_{DS} = 5\text{ V}$, $I_D = 3.8\text{ A}$		15		S

Dynamic Characteristics

C_{iss}	Input Capacitance	$V_{DS} = 15\text{ V}$, $V_{GS} = 0\text{ V}$, $f = 1\text{ MHz}$		282	375	pF
C_{oss}	Output Capacitance			40	55	pF
C_{rss}	Reverse Transfer Capacitance			29	45	pF
R_g	Gate Resistance			2.4		Ω

Switching Characteristics

$t_{d(on)}$	Turn-On Delay	$V_{DD} = 15\text{ V}$, $I_D = 3.8\text{ A}$, $V_{GS} = 4.5\text{ V}$, $R_{GEN} = 6\text{ }\Omega$		5.3	11	ns
t_r	Rise Time			3	10	ns
$t_{d(off)}$	Turn-Off Delay			15	27	ns
t_f	Fall Time			2.5	10	ns
$Q_{g(TOT)}$	Total Gate Charge		$V_{DD} = 15\text{ V}$, $I_D = 3.8\text{ A}$		3.7	5.2
Q_{gs}	Gate to Source Charge	$V_{GS} = 5\text{ V}$		0.4		nC
Q_{gd}	Gate to Drain "Miller" Charge			1		nC

Drain-Source Diode Characteristics

V_{SD}	Source to Drain Diode Forward Voltage	$V_{GS} = 0\text{ V}$, $I_S = 1.3\text{ A}$ (Note 2)		0.7	1.2	V
t_{rr}	Reverse Recovery Time	$I_F = 3.8\text{ A}$, $di/dt = 100\text{ A}/\mu\text{s}$		12	22	ns
Q_{rr}	Reverse Recovery Charge			3.3	10	nC

Electrical Characteristics $T_J = 25\text{ }^\circ\text{C}$ unless otherwise noted

Notes:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in² 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.

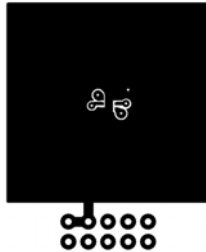
- (a) $R_{\theta JA} = 86\text{ }^\circ\text{C/W}$ when mounted on a 1 in² pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For single operation.
- (b) $R_{\theta JA} = 173\text{ }^\circ\text{C/W}$ when mounted on a minimum pad of 2 oz copper. For single operation.
- (c) $R_{\theta JA} = 69\text{ }^\circ\text{C/W}$ when mounted on a 1 in² pad of 2 oz copper, 1.5 " x 1.5 " x 0.062 " thick PCB. For dual operation.
- (d) $R_{\theta JA} = 151\text{ }^\circ\text{C/W}$ when mounted on a minimum pad of 2 oz copper. For dual operation.
- (e) $R_{\theta JA} = 160\text{ }^\circ\text{C/W}$ when mounted on a 30mm² pad of 2 oz copper. For single operation.
- (f) $R_{\theta JA} = 133\text{ }^\circ\text{C/W}$ when mounted on a 30mm² pad of 2 oz copper. For dual operation.



a. 86 °C/W when mounted on a 1 in² pad of 2 oz copper



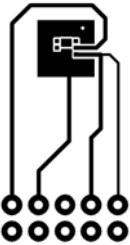
b. 173 °C/W when mounted on a minimum pad of 2 oz copper



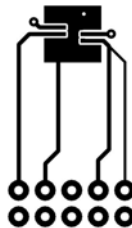
c. 69 °C/W when mounted on a 1 in² pad of 2 oz copper



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



e. 160 °C/W when mounted on 30mm² pad of 2 oz copper



f. 133 °C/W when mounted on 30mm² of 2 oz copper

2. Pulse Test : Pulse Width < 300 us, Duty Cycle < 2.0%

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

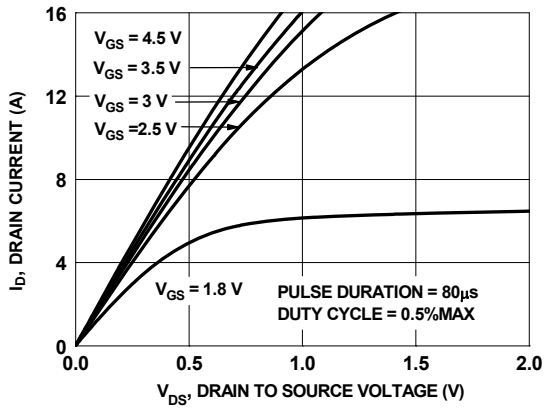


Figure 1. On Region Characteristics

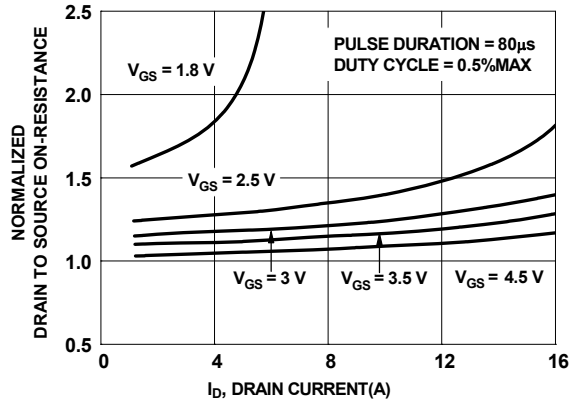


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

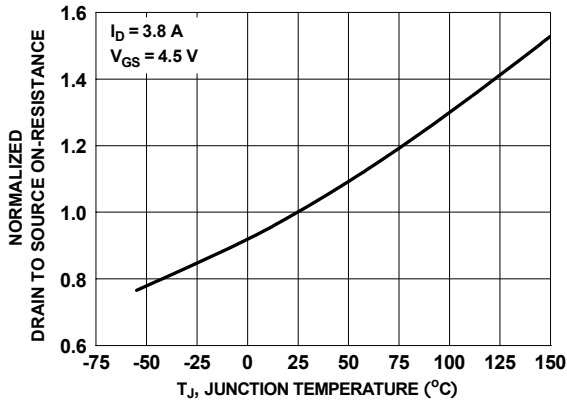


Figure 3. Normalized On Resistance vs. Junction Temperature

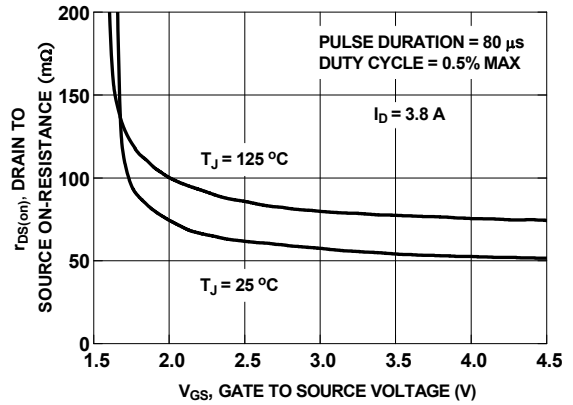


Figure 4. On-Resistance vs Gate to Source Voltage

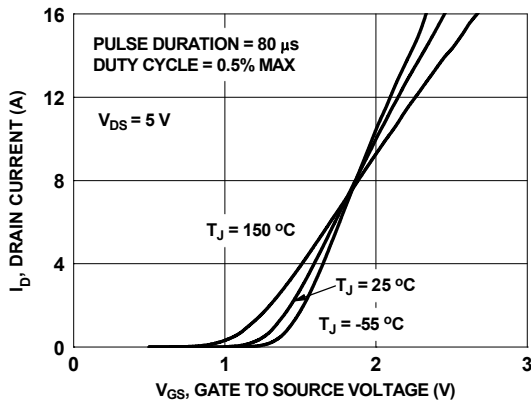


Figure 5. Transfer Characteristics

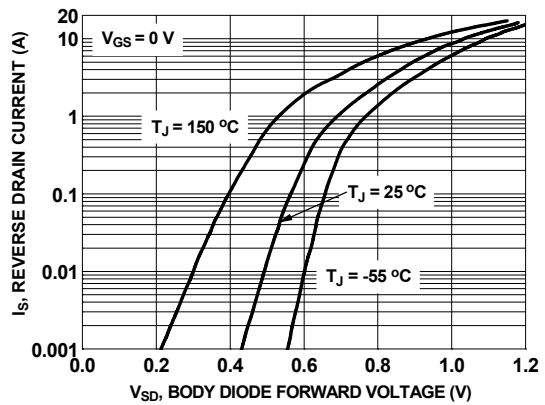


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics $T_J = 25^\circ\text{C}$ unless otherwise noted

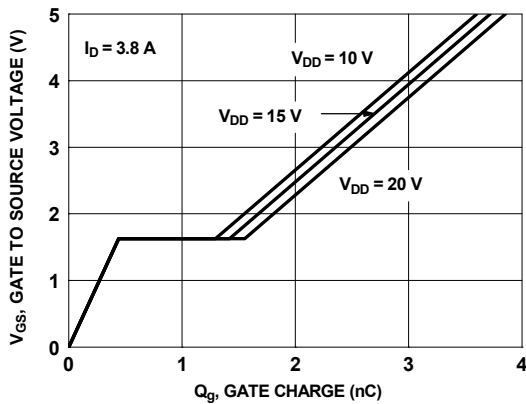


Figure 7. Gate Charge Characteristics

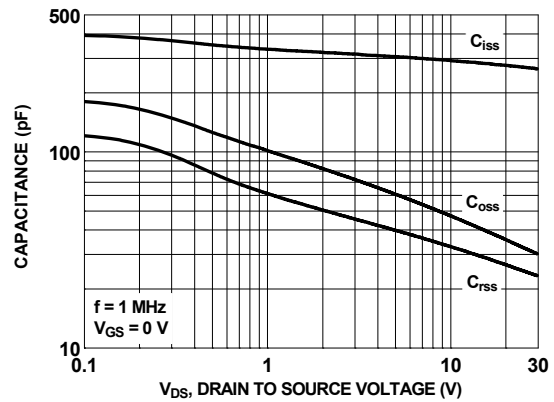


Figure 8. Capacitance vs. Drain to Source Voltage

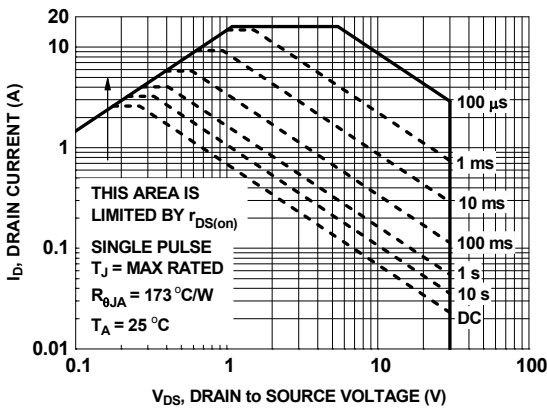


Figure 9. Forward Bias Safe Operating Area

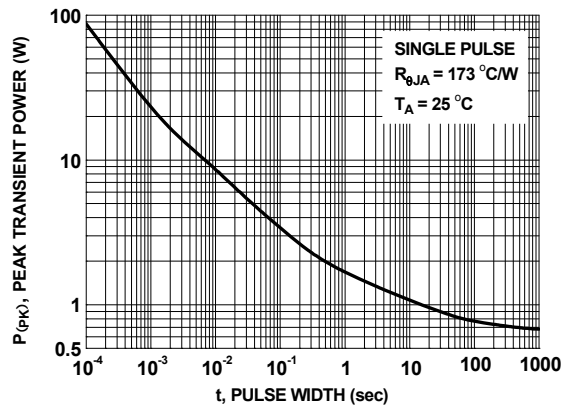


Figure 10. Single-Pulse Maximum Power Dissipation

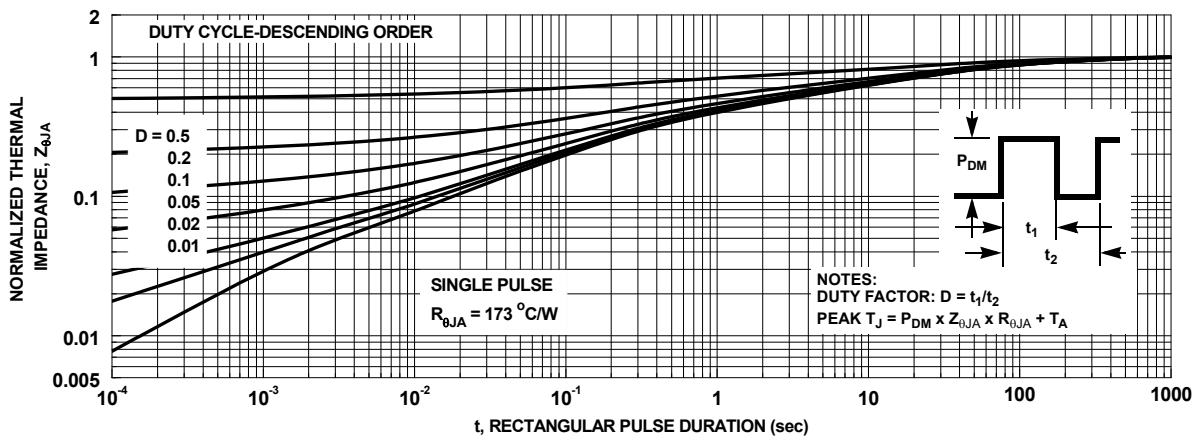
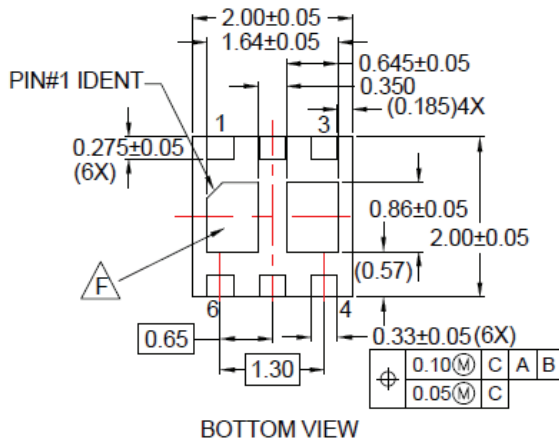
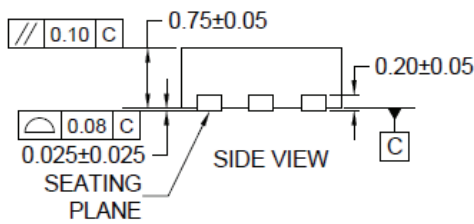
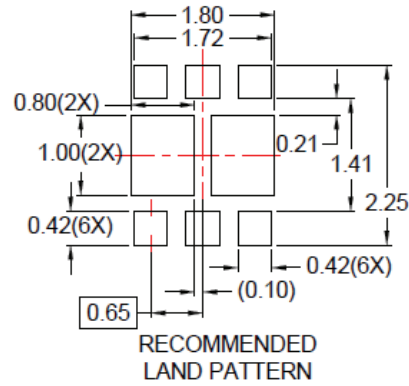
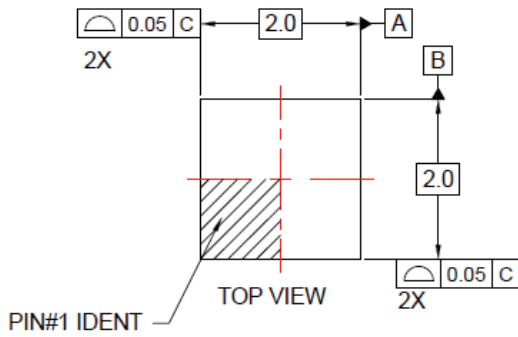


Figure 11. Junction-to-Ambient Transient Thermal Response Curve

Dimensional Outline and Pad Layout



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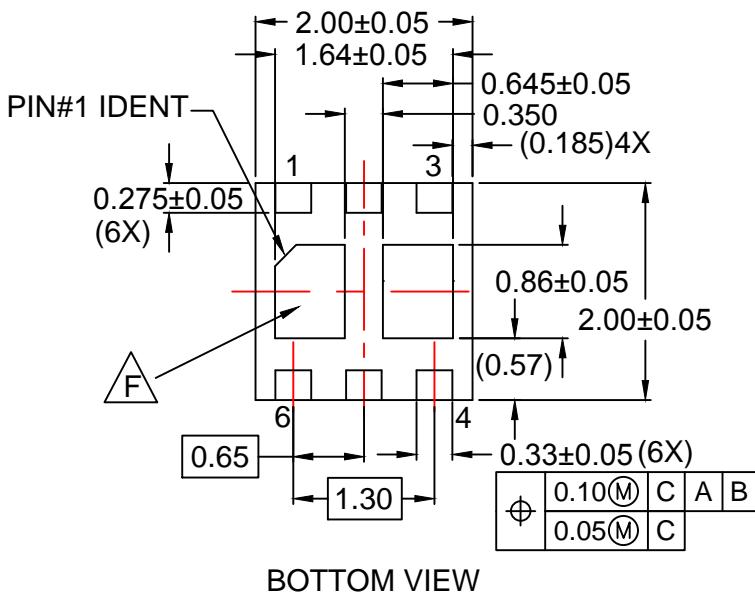
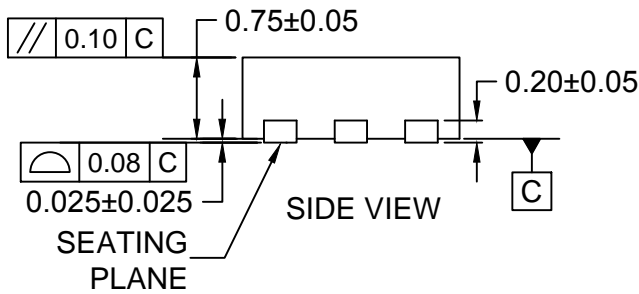
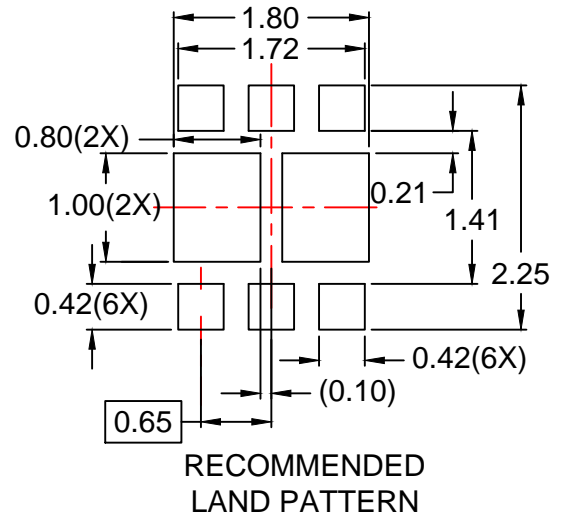
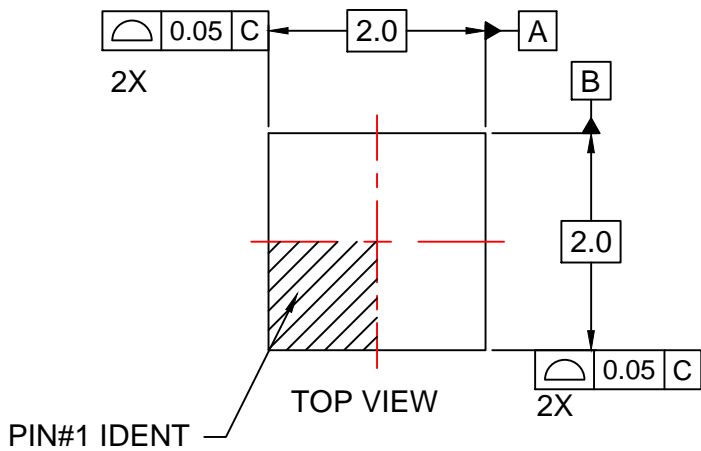
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