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FAIRCHILD

FDMC86260

N-Channel Shielded Gate PowerTrench® MOSFET

150 V, 25 A, 34 mΩ

September 2016

Features

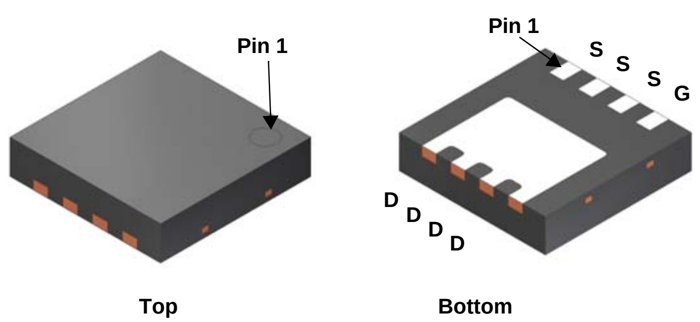
- Shielded Gate MOSFET Technology
- Max $r_{DS(on)}$ = 34 mΩ at V_{GS} = 10 V, I_D = 5.4 A
- Max $r_{DS(on)}$ = 44 mΩ at V_{GS} = 6 V, I_D = 4.8 A
- High Performance Technology for Extremely Low $r_{DS(on)}$
- 100% UIL Tested
- Termination is Lead-free
- RoHS Compliant

General Description

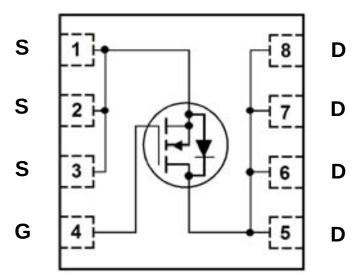
This N-Channel MOSFET is produced using Fairchild Semiconductor's advanced PowerTrench® process that incorporates Shielded Gate technology. This process has been optimized for the on-state resistance and yet maintain superior switching performance.

Application

- DC-DC Conversion



Power 33



MOSFET Maximum Ratings T_A = 25 °C unless otherwise noted.

Symbol	Parameter	Ratings	Units
V_{DS}	Drain to Source Voltage	150	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current -Continuous T_C = 25 °C (Note 5)	25	A
	-Continuous T_C = 100°C (Note 5)	16	
	-Continuous T_A = 25 °C (Note 1a)	5.4	
	-Pulsed (Note 4)	135	
E_{AS}	Single Pulse Avalanche Energy (Note 3)	121	mJ
P_D	Power Dissipation T_C = 25 °C	54	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 (Note 1)	2.3	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	53	

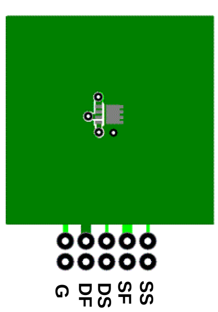
Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMC86260	FDMC86260	Power33	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	150			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		110		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 120 V, V_{GS} = 0 V			1	μA
I_{GSS}	Gate to Source Leakage Current	V_{GS} = ±20 V, V_{DS} = 0 V			±100	nA
On Characteristics						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	2	2.7	4	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-9		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 5.4 A		27	34	mΩ
		V_{GS} = 6 V, I_D = 4.8 A		31	44	
		V_{GS} = 10 V, I_D = 5.4 A, T_J = 125 °C		55	69	
g_{FS}	Forward Transconductance	V_{DD} = 10 V, I_D = 5.4 A		19		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 75 V, V_{GS} = 0 V, f = 1 MHz		1000	1330	pF
C_{oss}	Output Capacitance			105	140	pF
C_{rss}	Reverse Transfer Capacitance			4.8	10	pF
R_g	Gate Resistance		0.1	0.6	1.8	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 75 V, I_D = 5.4 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		9.5	19	ns
t_r	Rise Time			2	10	ns
$t_{d(off)}$	Turn-Off Delay Time			17	30	ns
t_f	Fall Time			3.3	10	ns
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 10 V; V_{DD} = 75 V, I_D = 5.4 A		15	21	nC
$Q_{g(TOT)}$	Total Gate Charge	V_{GS} = 0 V to 6 V		9.7	14	nC
Q_{gs}	Total Gate Charge			4.0		nC
Q_{gd}	Gate to Drain “Miller” Charge			3.1		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 5.4 A (Note 2)		0.77	1.3	V
		V_{GS} = 0 V, I_S = 1.9 A (Note 2)		0.72	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 5.4 A, di/dt = 100 A/μs		64	102	ns
Q_{rr}	Reverse Recovery Charge			85	137	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. E_{AS} of 121 mJ is based on starting T_J = 25 °C, L = 3 mH, I_{AS} = 9 A, V_{DD} = 150 V, V_{GS} = 10 V. 100% test at L = 0.1 mH, I_{AS} = 22 A.
4. Pulsed Id please refer to Fig 11 SOA graph for more details.
5. Computed continuous current limited to Max Junction Temperature only, actual continuous current will be limited by thermal & electro-mechanical application board design.

Typical Characteristics T_J = 25 °C unless otherwise noted.

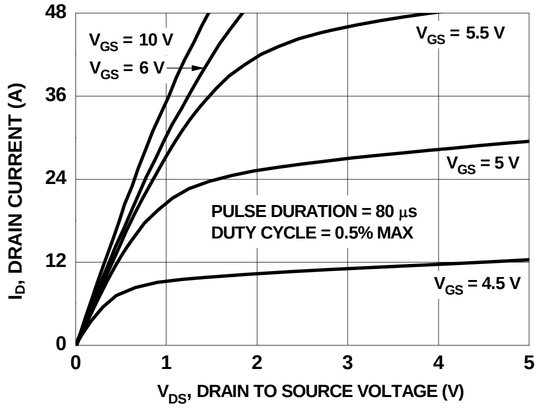


Figure 1. On-Region Characteristics

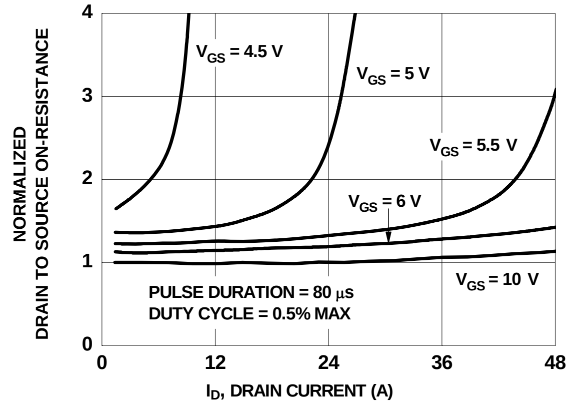


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

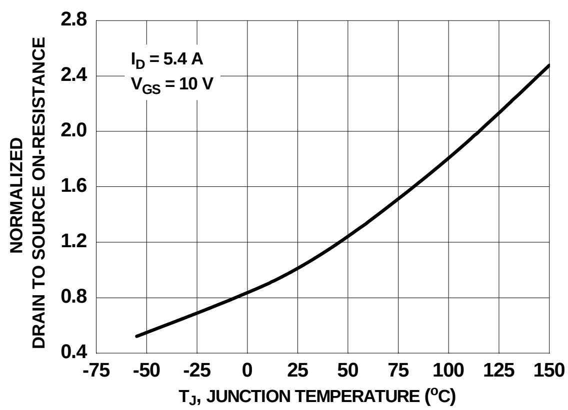


Figure 3. Normalized On-Resistance vs. Junction Temperature

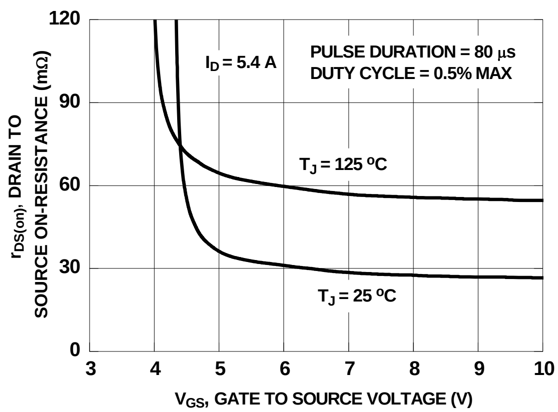


Figure 4. On-Resistance vs. Gate to Source Voltage

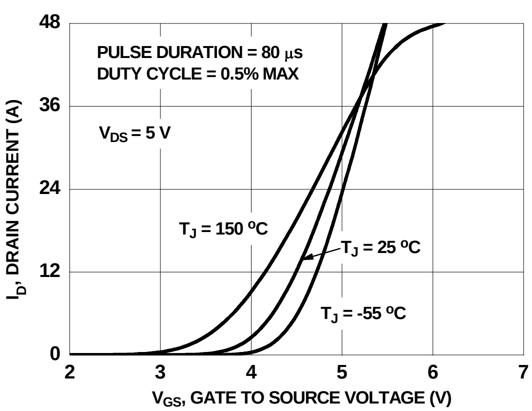


Figure 5. Transfer Characteristics

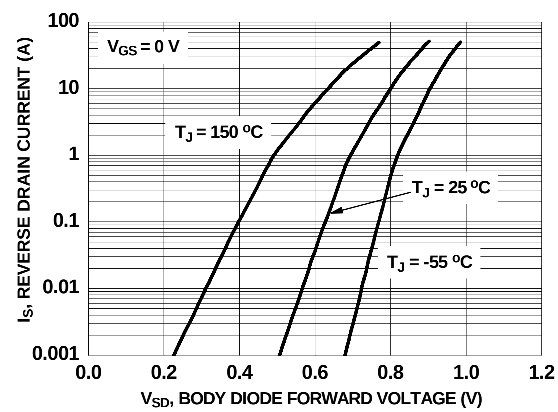


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted.

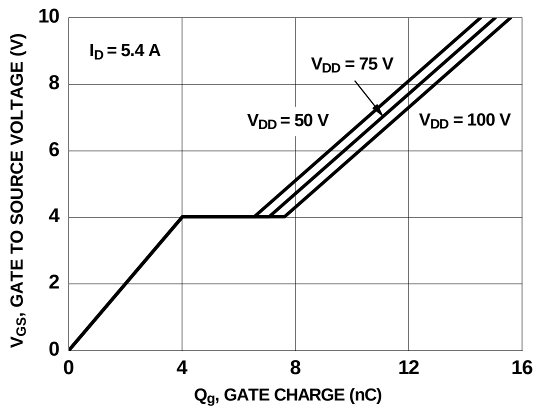


Figure 7. Gate Charge Characteristics

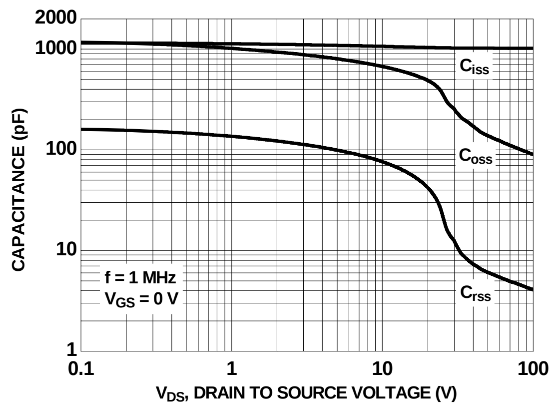


Figure 8. Capacitance vs. Drain to Source Voltage

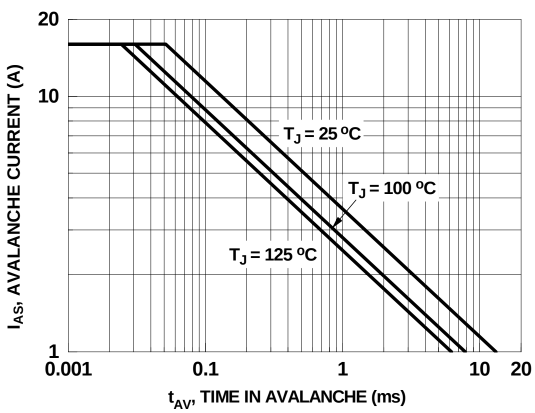


Figure 9. Unclamped Inductive Switching Capability

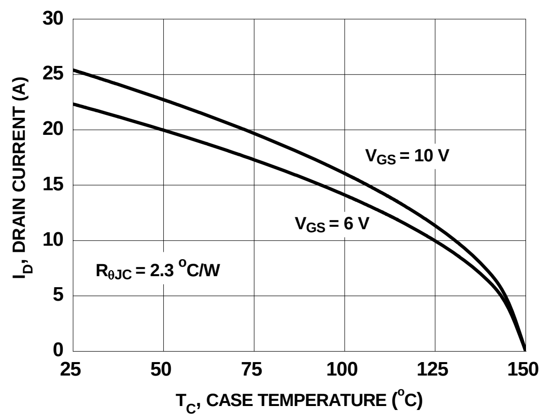


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

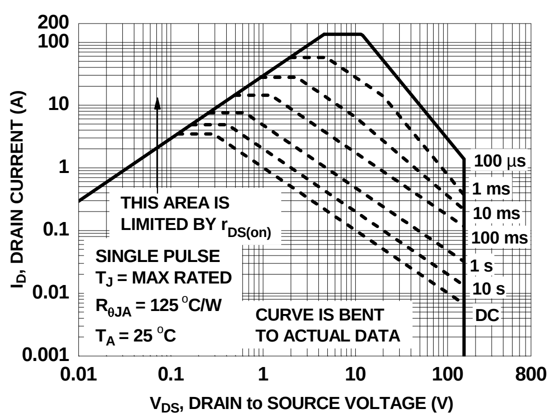


Figure 11. Forward Bias Safe Operating Area

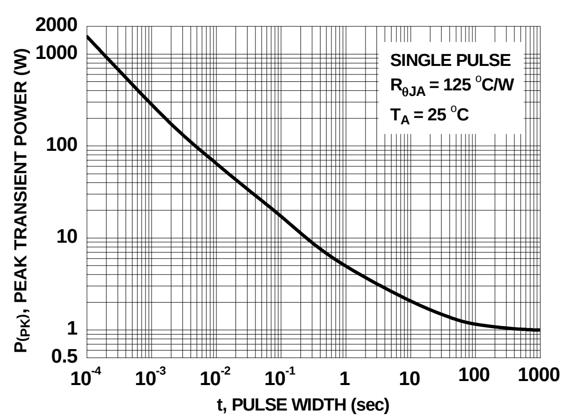


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted.

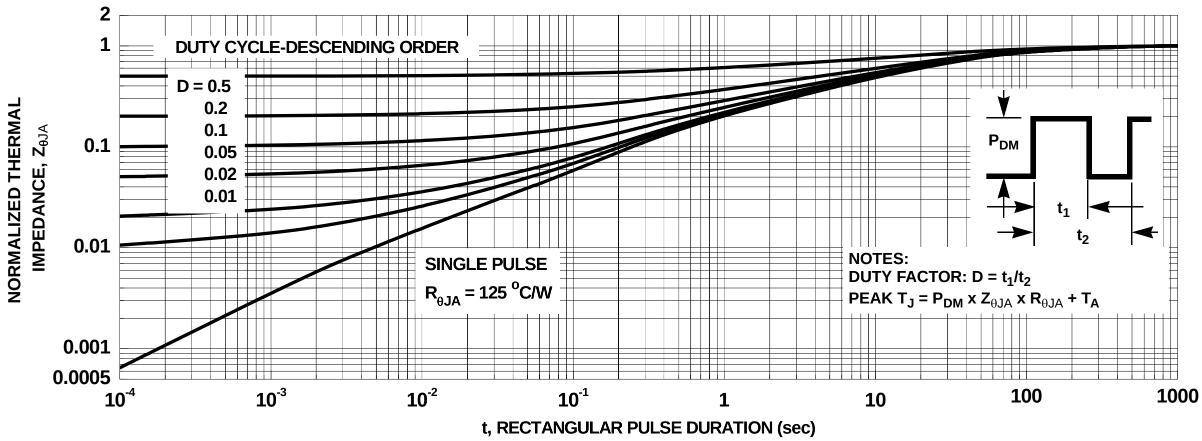
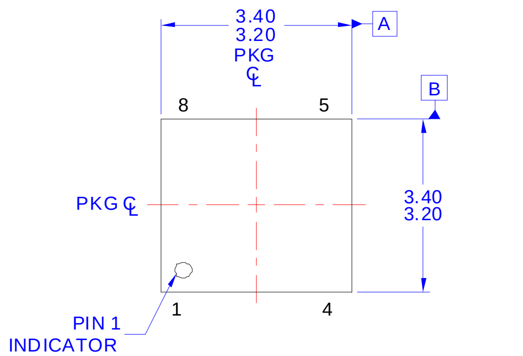
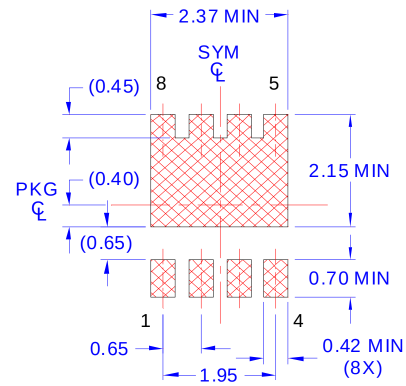


Figure 13. Junction-to-Ambient Transient Thermal Response Curve

Dimensional Outline and Pad Layout





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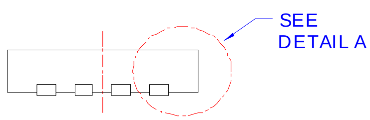

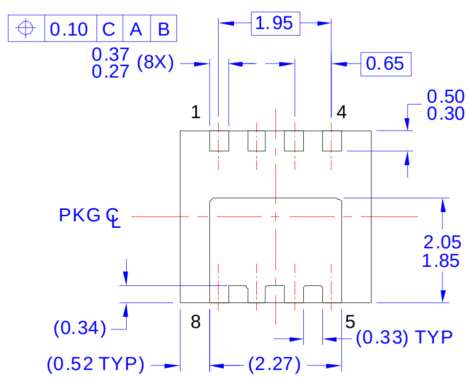

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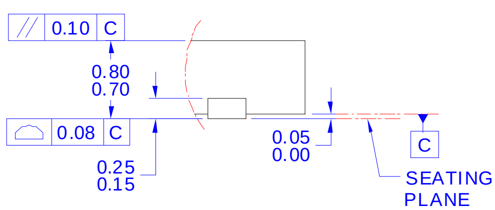

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Obsolete	Not In Production	Datasheet contains specifications on a product that is discontinued by Fairchild Semiconductor. The datasheet is for reference information only.

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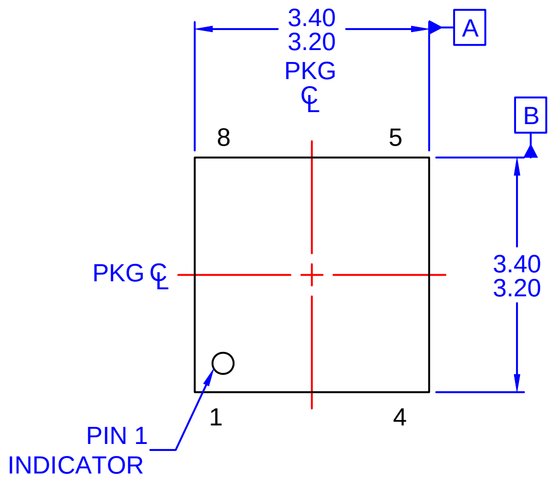

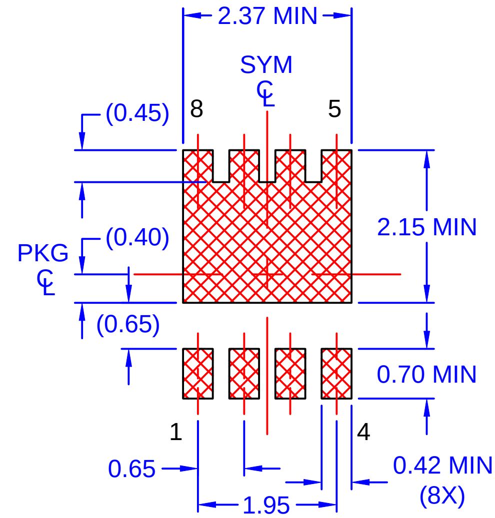

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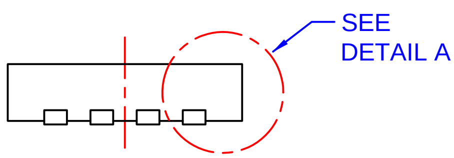

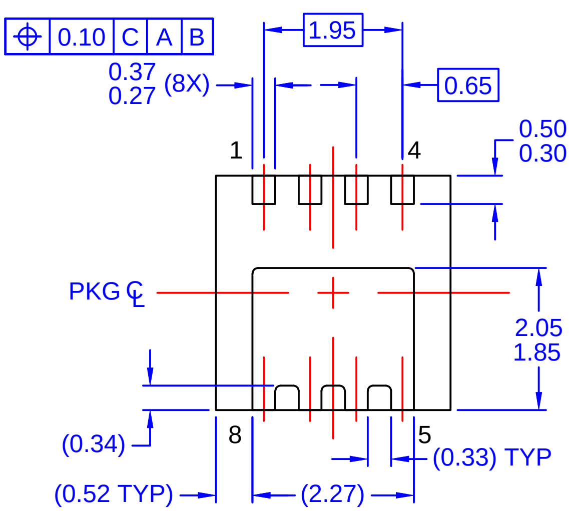

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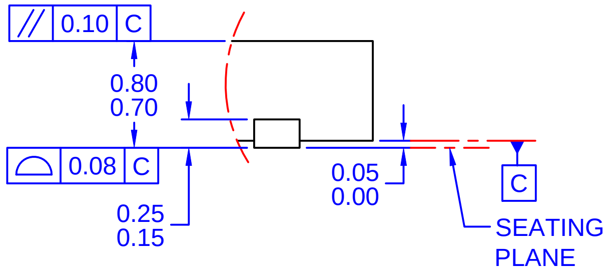

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