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ON Semiconductor®

FDMS4D4N08C

N-Channel Shielded Gate PowerTrench® MOSFET

80 V, 123 A, 4.3 mΩ

Features

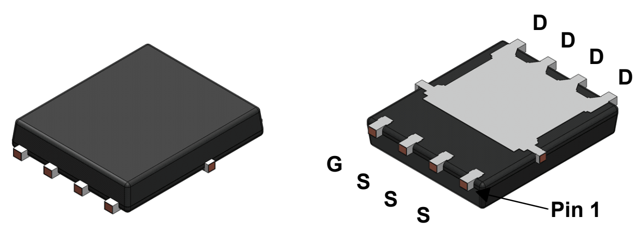
- Shielded Gate MOSFET Technology
- Max $r_{DS(on)}$ = 4.3 mΩ at V_{GS} = 10 V, I_D = 44 A
- Max $r_{DS(on)}$ = 10.4 mΩ at V_{GS} = 6 V, I_D = 22 A
- 50% Lower Qrr than Other MOSFET Suppliers
- Lowers Switching Noise/EMI
- MSL1 Robust Package Design
- 100% UIL Tested
- RoHS Compliant

General Description

This N-Channel MV MOSFET is produced using ON Semiconductor's advanced PowerTrench® process that incorporates Shielded Gate technology. This process has been optimized to minimise on-state resistance and yet maintain superior switching performance with best in class soft body diode.

Applications

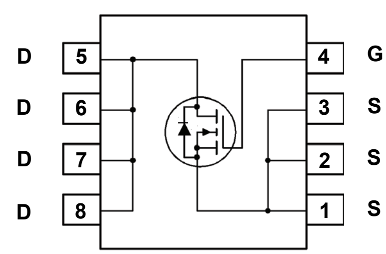
- Primary DC-DC MOSFET
- Synchronous Rectifier in DC-DC and AC-DC
- Motor Drive
- Solar



Top

Bottom

Power 56



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

Symbol	Parameter			Ratings	Units
V_{DS}	Drain to Source Voltage			80	V
V_{GS}	Gate to Source Voltage			±20	V
I_D	Drain Current -Continuous	T_C = 25 °C	(Note 5)	123	A
	-Continuous	T_C = 100 °C	(Note 5)	78	
	-Continuous	T_A = 25 °C	(Note 1a)	17	
	-Pulsed		(Note 4)	498	
E_{AS}	Single Pulse Avalanche Energy		(Note 3)	486	mJ
P_D	Power Dissipation	T_C = 25 °C		125	W
	Power Dissipation	T_A = 25 °C	(Note 1a)	2.5	
T_J, T_{STG}	Operating and Storage Junction Temperature Range			-55 to +150	°C

Thermal Characteristics

Symbol	Parameter		Ratings	Units
$R_{\theta JC}$	Thermal Resistance, Junction to Case		1.0	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	(Note 1a)	50	

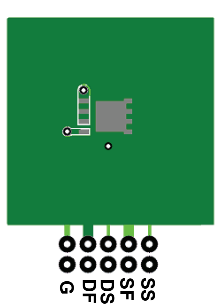
Package Marking and Ordering Information

Device Marking	Device	Package	Reel Size	Tape Width	Quantity
FDMS4D4N08C	FDMS4D4N08C	Power 56	13 ”	12 mm	3000 units

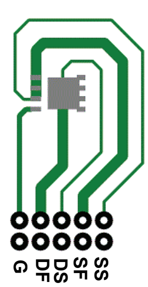
Electrical Characteristics T_J = 25 °C unless otherwise noted.

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	80			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		63		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 64 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	2.0	3.0	4.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		-8.2		mV/°C
$r_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 44 A		3.7	4.3	mΩ
		V_{GS} = 6 V, I_D = 22 A		5.7	10.4	
		V_{GS} = 10 V, I_D = 44 A, T_J = 125 °C		5.9	7.2	
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 44 A		98		S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = 40 V, V_{GS} = 0 V, f = 1 MHz		2920	4090	pF
C_{oss}	Output Capacitance			1045	1465	pF
C_{rss}	Reverse Transfer Capacitance			35	50	pF
R_g	Gate Resistance		0.1	1.3	2.5	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 40 V, I_D = 44 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		17	31	ns
t_r	Rise Time			7	15	ns
$t_{d(off)}$	Turn-Off Delay Time			25	40	ns
t_f	Fall Time			5	10	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V		40	56	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to 6 V; V_{DD} = 40 V, I_D = 44 A		25	35	nC
Q_{gs}	Gate to Source Charge			13		nC
Q_{gd}	Gate to Drain "Miller" Charge			8		nC
Q_{oss}	Output Charge	V_{DD} = 40 V, V_{GS} = 0 V		60		nC
Q_{sync}	Total Gate Charge Sync.	V_{DS} = 0 V, I_D = 44 A		35		nC
Drain-Source Diode Characteristics						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.1 A (Note 2)		0.7	1.2	V
		V_{GS} = 0 V, I_S = 44 A (Note 2)		0.8	1.3	
t_{rr}	Reverse Recovery Time	I_F = 22 A, di/dt = 300 A/μs		26	42	ns
Q_{rr}	Reverse Recovery Charge			44	71	nC
t_{rr}	Reverse Recovery Time	I_F = 22 A, di/dt = 1000 A/μs		20	32	ns
Q_{rr}	Reverse Recovery Charge			106	169	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. $R_{\theta CA}$ is determined by the user's board design.



50 °C/W when mounted on a 1 in^2 pad of 2 oz copper



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 486 mJ is based on starting T_J = 25 °C; N-ch: L = 3 mH, I_{AS} = 18 A, V_{DD} = 80 V, V_{GS} =10 V. 100% test at L = 0.1 mH, I_{AS} = 51 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.

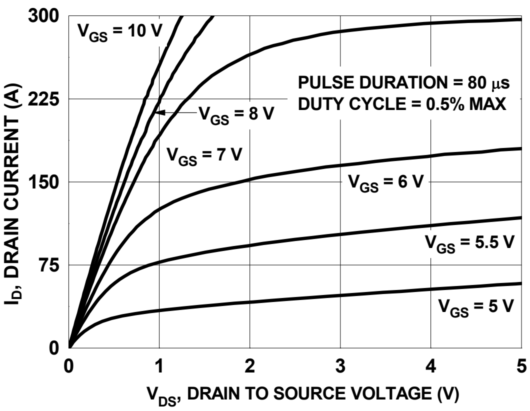


Figure 1. On Region Characteristics

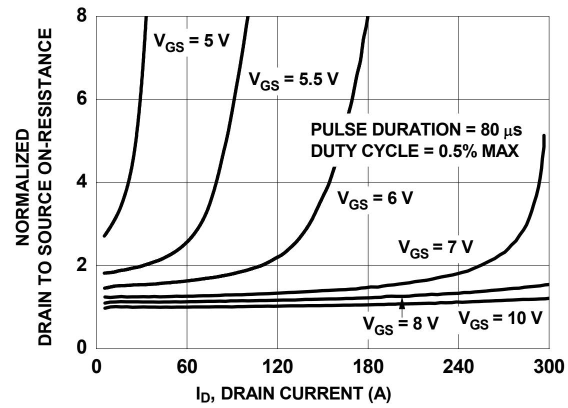


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

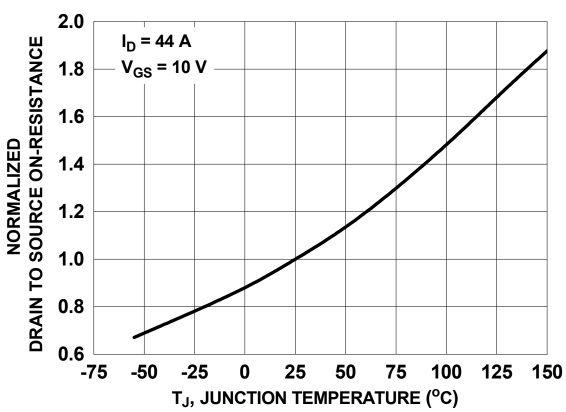


Figure 3. Normalized On Resistance vs. Junction Temperature

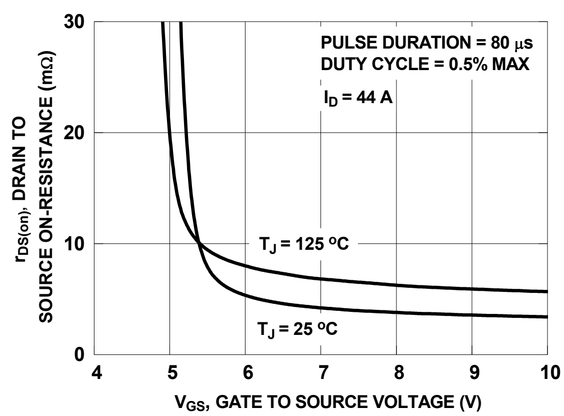


Figure 4. On-Resistance vs. Gate to Source Voltage

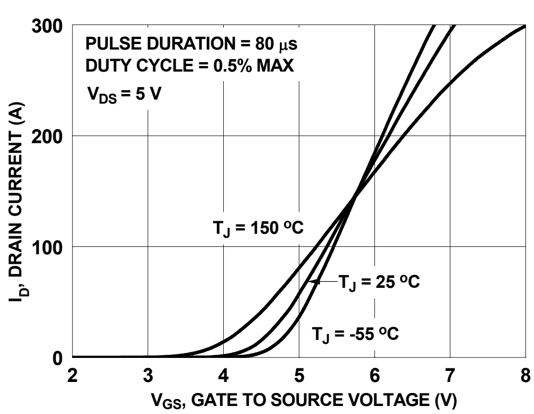


Figure 5. Transfer Characteristics

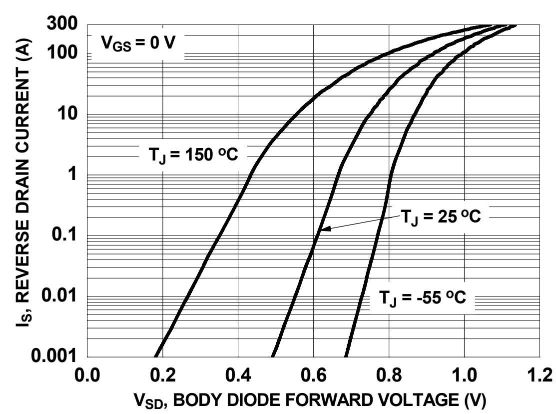


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

Typical Characteristics T_J = 25 °C unless otherwise noted.

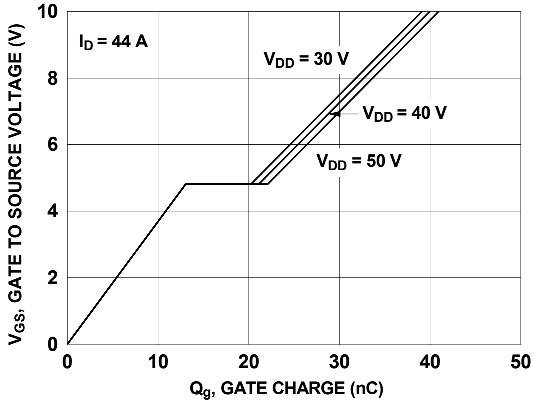


Figure 7. Gate Charge Characteristics

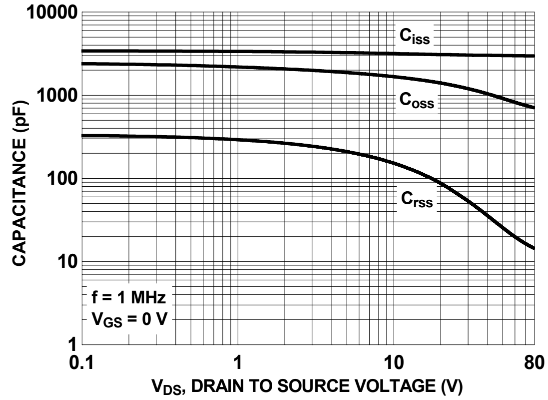


Figure 8. Capacitance vs. Drain to Source Voltage

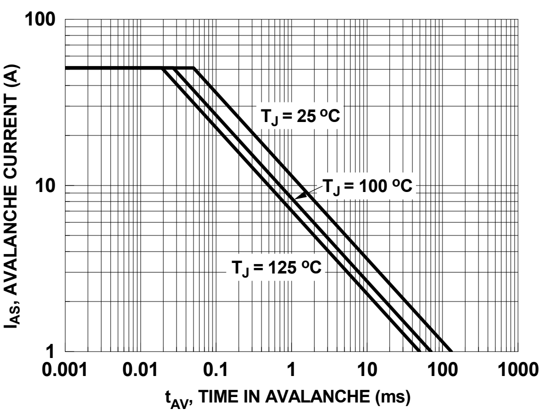


Figure 9. Unclamped Inductive Switching Capability

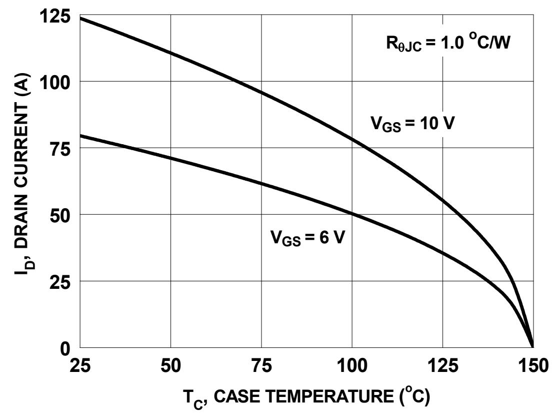


Figure 10. Maximum Continuous Drain Current vs Case Temperature

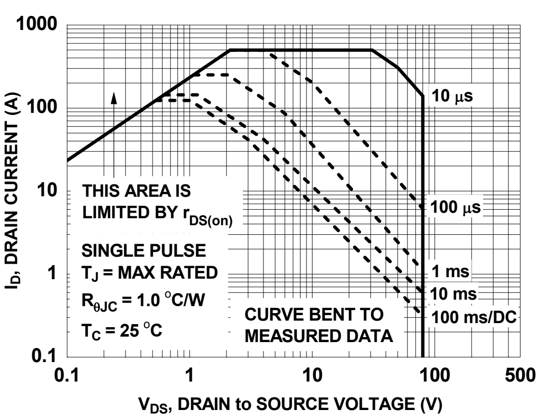


Figure 11. Forward Bias Safe Operating Area

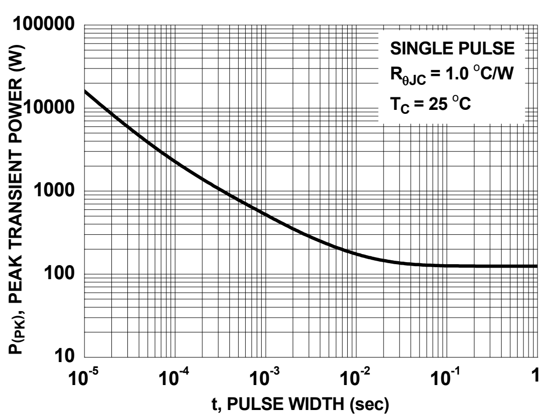


Figure 12. Single Pulse Maximum Power Dissipation

Typical Characteristics T_J = 25 °C unless otherwise noted.

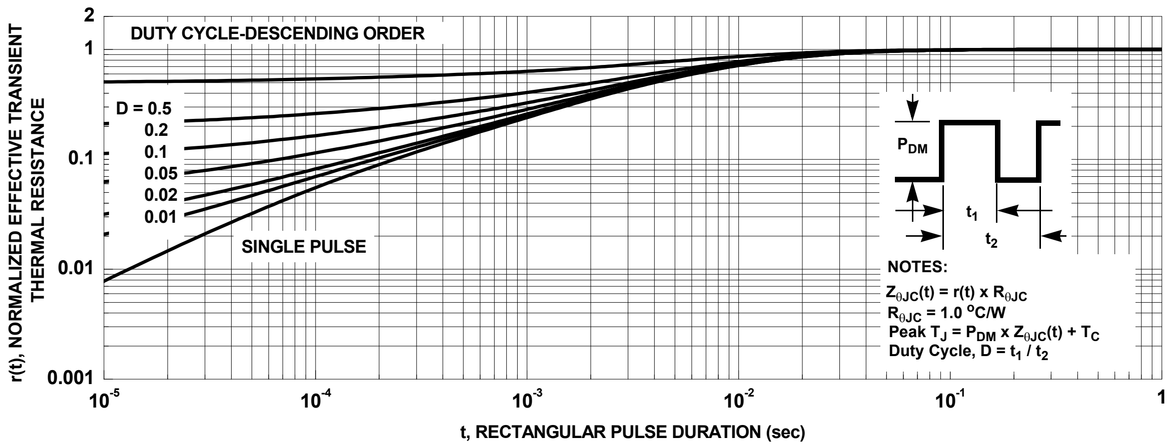
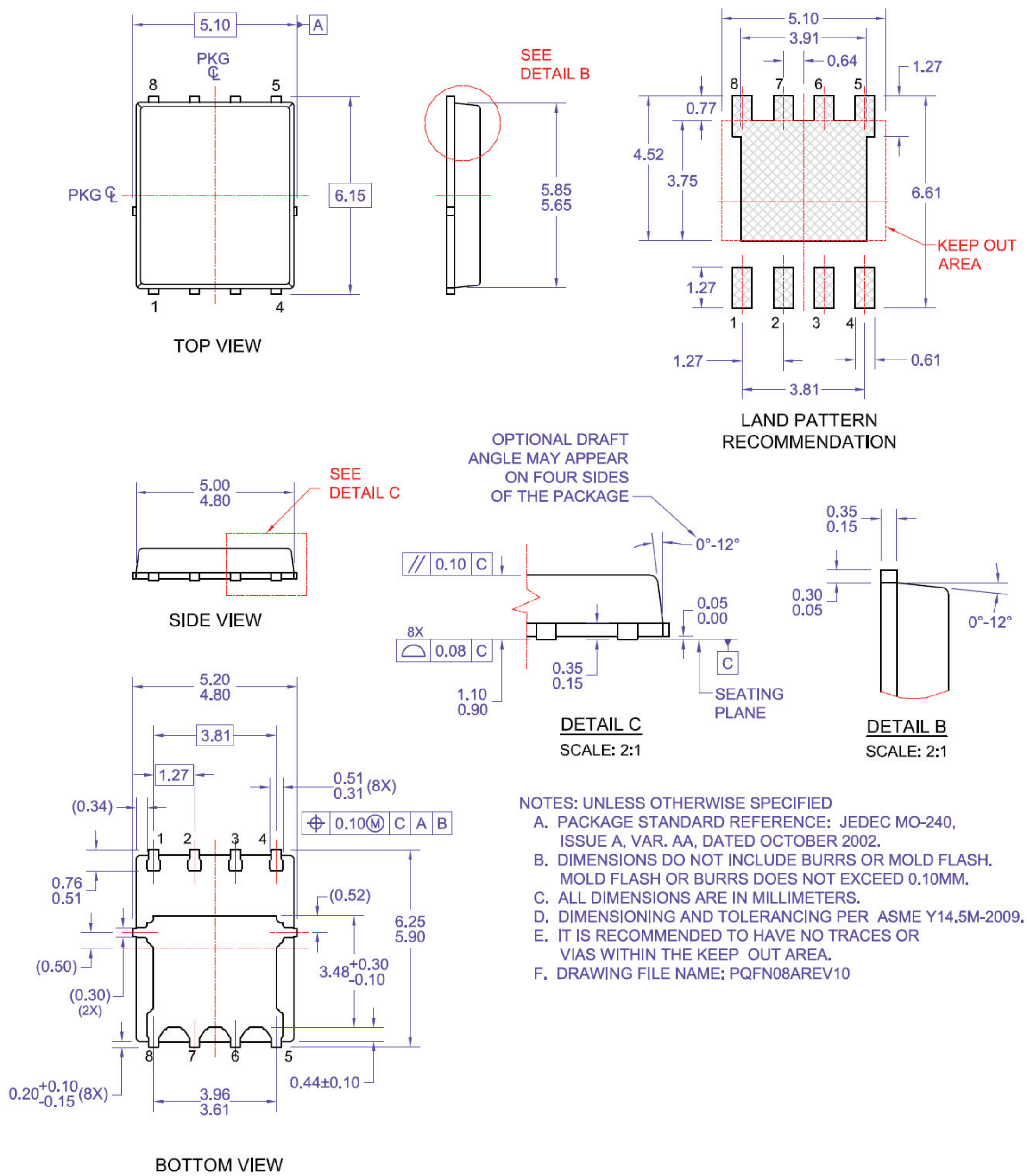


Figure 13. Junction-to-Case Transient Thermal Response Curve

Dimensional Outline and Pad Layout



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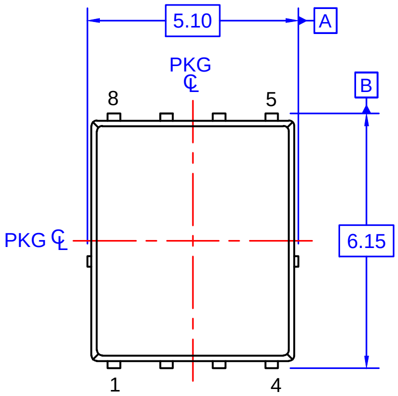
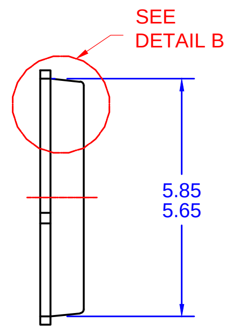
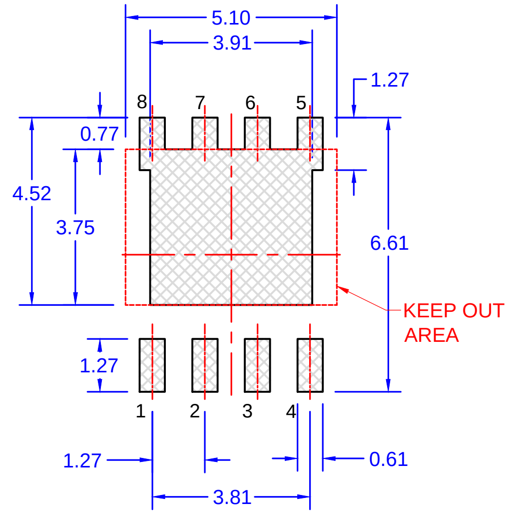
D. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-2009.
E. IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.
F. DRAWING FILE NAME: PQFN08AREV10

PQFN8 5X6, 1.27P
CASE 483AE
ISSUE A

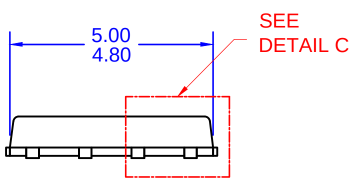


TOP VIEW

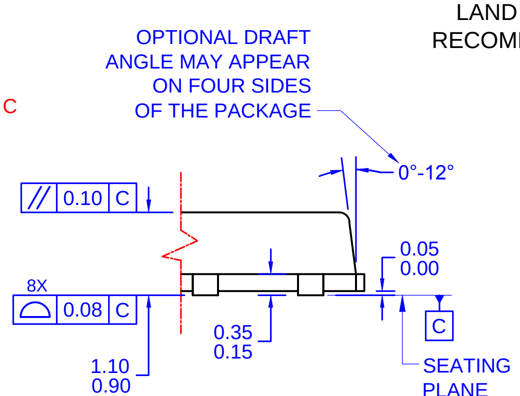




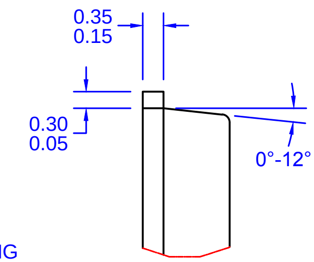
LAND PATTERN
RECOMMENDATION



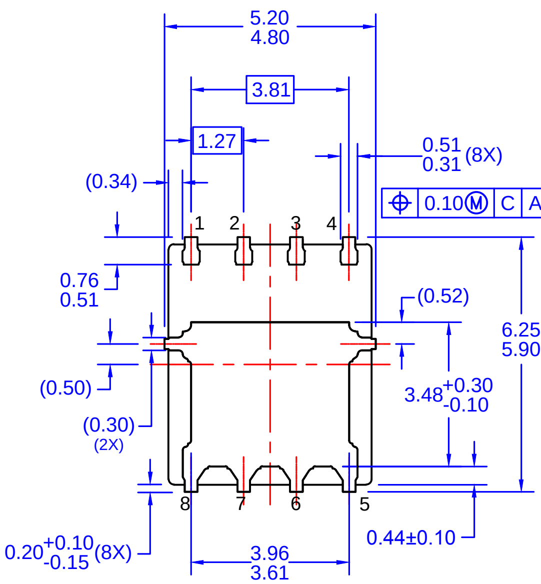
SIDE VIEW



DETAIL C
SCALE: 2:1



DETAIL B
SCALE: 2:1



BOTTOM VIEW

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

Офис по работе с юридическими лицами:

105318, г.Москва, ул.Щербаковская д.3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:
moschip.ru
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