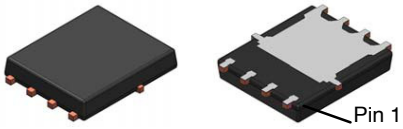
MOSFET – N-Channel, POWERTRENCH®

80 V, 122 A, 3.9 mΩ

FDMS86300, FDMS86300-NC



Top Bottom

PQFN8 5x6, 1.27P
(Power 56)
CASE 483AE

General Description

This N-Channel MOSFET has been designed specifically to improve the overall efficiency and to minimize switch node ringing of DC/DC converters using either synchronous or conventional switching PWM controllers. It has been optimized for low gate charge, low $R_{DS(on)}$, fast switching speed and body diode reverse recovery performance.

Features

- Max $R_{DS(ON)}$ = 3.9 mΩ @ V_{GS} = 10 V, I_D = 13 A
- Max $R_{DS(ON)}$ = 5.5 mΩ @ V_{GS} = 8 V, I_D = 15.5 A
- Advanced Package and Silicon Combination for Low $R_{DS(on)}$ and High Efficiency
- Next Generation Enhanced Body Diode Technology, Engineered for Soft Recovery
- MSL1 Robust Package Design
- 100% UIL Tested
- RoHS Compliant

Applications

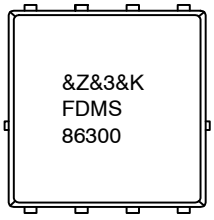
- OringFET / Load Switch
- DC-DC Conversion

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain to Source Voltage	80	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current Continuous (Package Limited) T_C = 25 °C Continuous (Silicon Limited) T_C = 100 °C Continuous (Note 1a) T_A = 25 °C Pulsed (Note 4)	 122 78 19 556	A
E_{AS}	Single Pulse Avalanche Energy (Note 3)	252	mJ
P_D	Power Dissipation T_C = 25 °C (Note 1a) T_A = 25 °C	 104 2.5	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	−55 to +150	°C

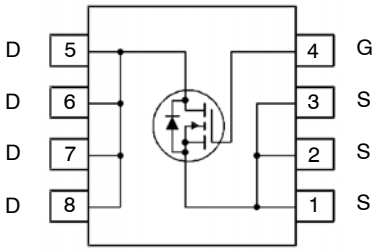
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

MARKING DIAGRAM



&Z	= Assembly Plant Code
&3	= Data Code (Year & Week)
&K	= Lot Code
FDMS86300	= Specific Device Code

PIN CONNECTIONS



ORDERING INFORMATION

Device	Package	Shipping†
FDMS86300	PQFN8	3000 / Tape & Reel
FDMS86300-NC	PQFN8	3000 / Tape & Reel

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

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THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.2	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

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

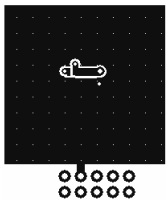
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	80			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25 °C		39		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS} = 0 V, V_{DS} = 64 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	2.5	3.4	4.5	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25 °C		−11		mV/°C
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 19 A		3.2	3.9	mΩ
		V_{GS} = 8 V, I_D = 15.5 A		3.8	5.5	
		V_{GS} = 10 V, I_D = 19 A, T_J = 125 °C		5.0	5.8	
g_{FS}	Forward Transconductance	V_{DD} = 10 V, I_D = 19 A		60		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 40 V, V_{GS} = 0 V, f = 1 MHz		5325	7082	pF
C_{oss}	Output Capacitance			957	1272	pF
C_{rss}	Reverse Transfer Capacitance			26	63	pF
R_g	Gate Resistance			1.2		Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 40 V, I_D = 19 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		31	50	ns
t_r	Rise Time			26	43	ns
$t_{d(off)}$	Turn-Off Delay Time			36	58	ns
t_f	Fall Time			9	18	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V, V_{DD} = 40 V, I_D = 19 A		72	86	nC
		V_{GS} = 0 V to 8 V, V_{DD} = 40 V, I_D = 19 A		59	71	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 40 V, I_D = 19 A		28.2		nC
Q_{gd}	Gate to Drain “Miller” Charge			14.9		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.1 A (Note 2)		0.71	1.2	V
		V_{GS} = 0 V, I_S = 19 A (Note 2)		0.81	1.3	
t_{rr}	Reverse Recovery Time	I_F = 19 A, di/dt = 100 A/μs		57	90	ns
Q_{rr}	Reverse Recovery Charge			50	80	nC
t_{rr}	Reverse Recovery Time	I_F = 19 A, di/dt = 300 A/μs		48	77	ns
Q_{rr}	Reverse Recovery Charge			103	165	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.

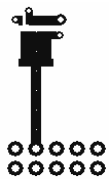
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NOTES:

1. $R_{\theta JA}$ is determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5 × 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.) 50 °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 252 mJ is based on starting T_J = 25 °C, L = 0.3 mH, I_{AS} = 41 A, V_{DD} = 72 V, V_{GS} = 10 V.
4. Pulse Id limited by junction temperature, td ≤100 μs, please refer to SOA curve for more details.

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

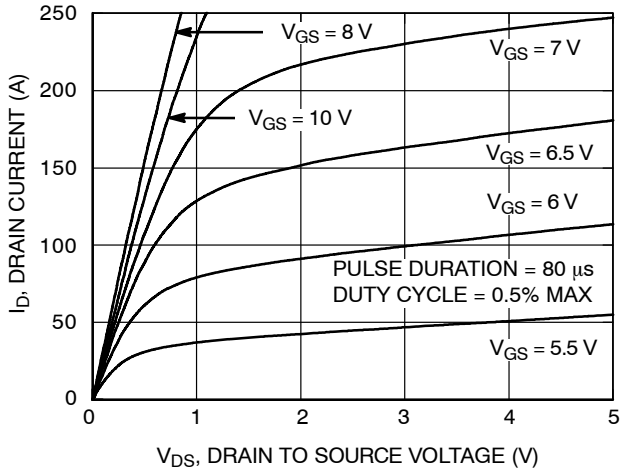


Figure 1. On-Region Characteristics

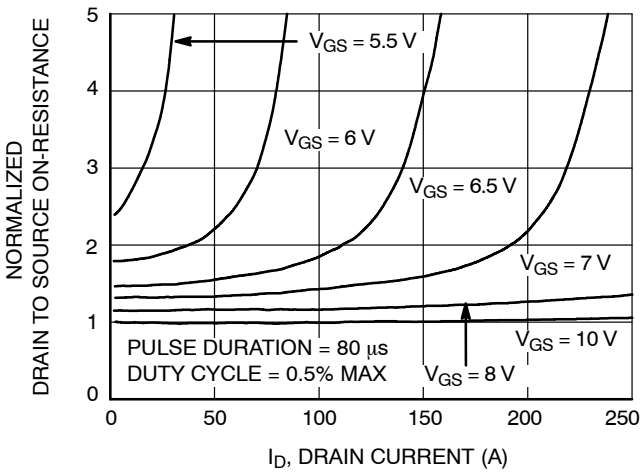


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

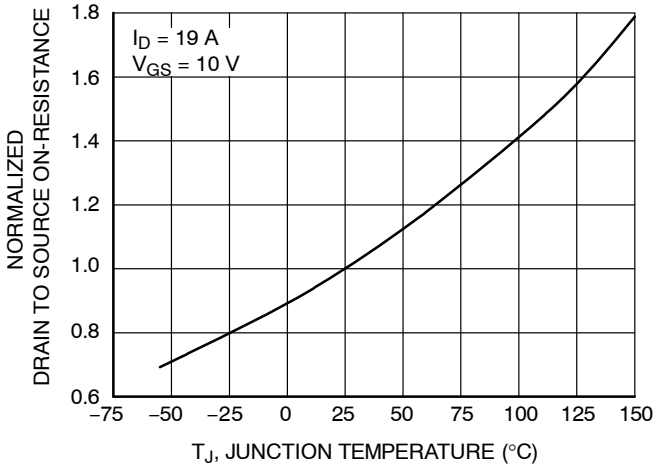


Figure 3. Normalized On-Resistance vs. Junction Temperature

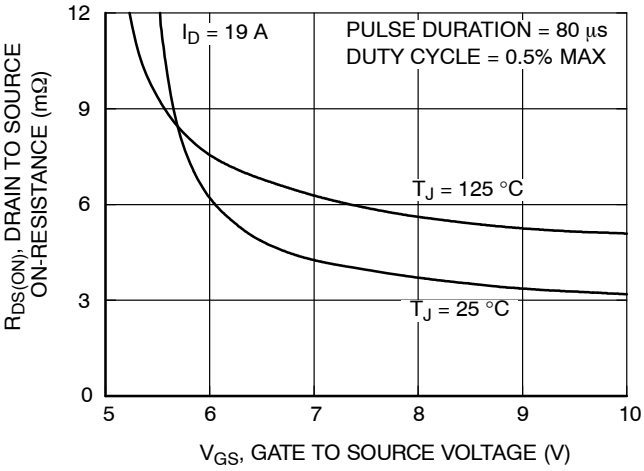


Figure 4. On-Resistance vs. Gate to Source Voltage

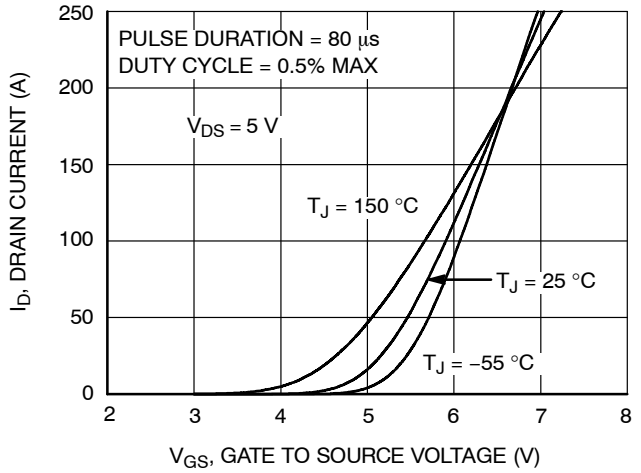


Figure 5. Transfer Characteristics

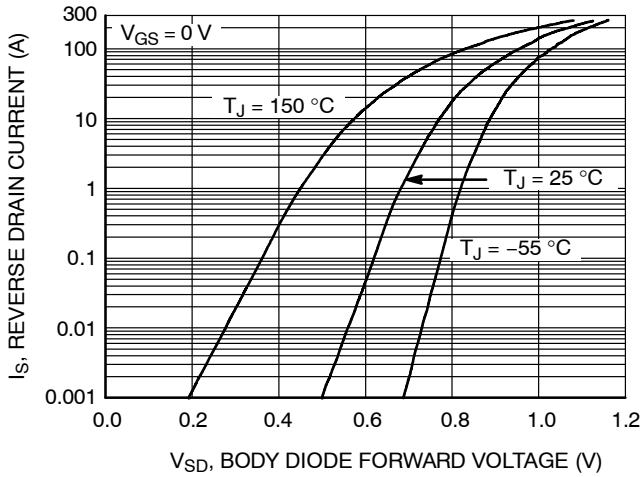


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

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

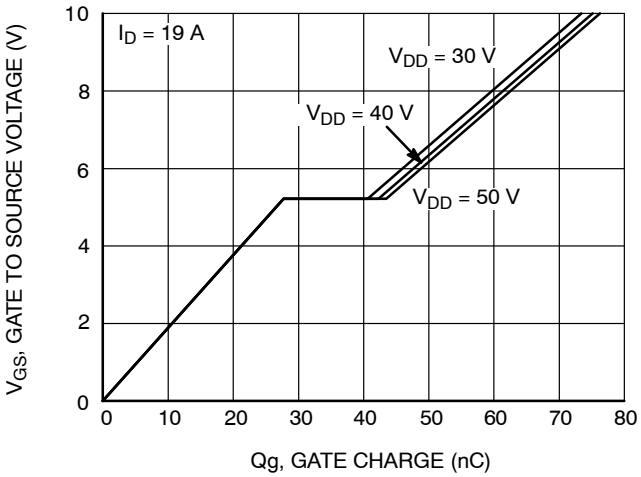


Figure 7. Gate Charge Characteristics

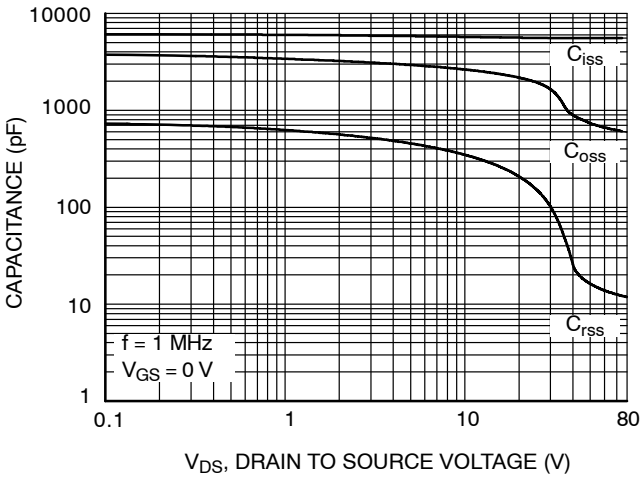


Figure 8. Capacitance vs. Drain to Source Voltage

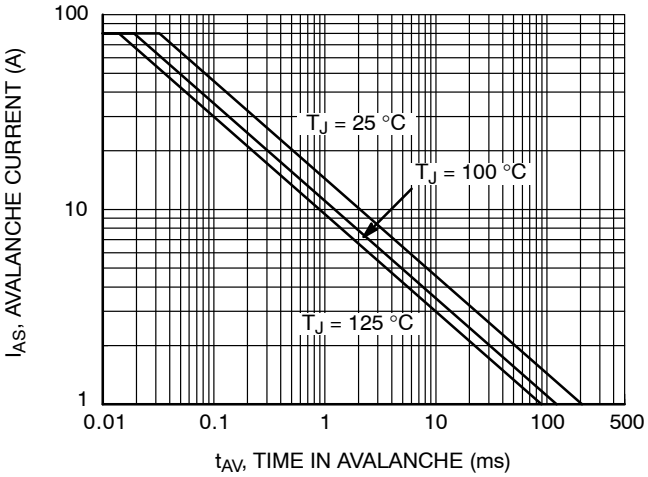


Figure 9. Unclamped Inductive Switching Capability

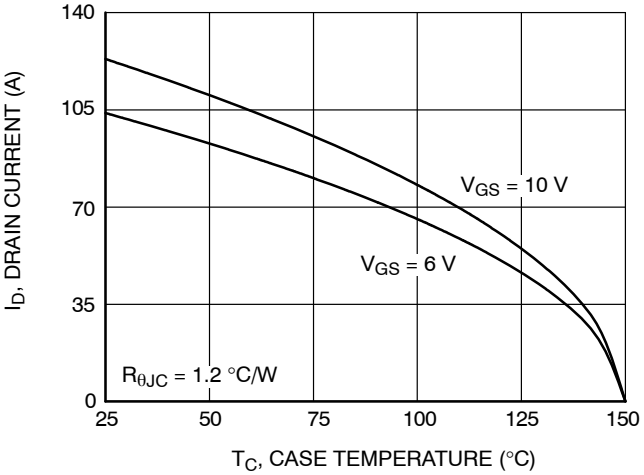


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

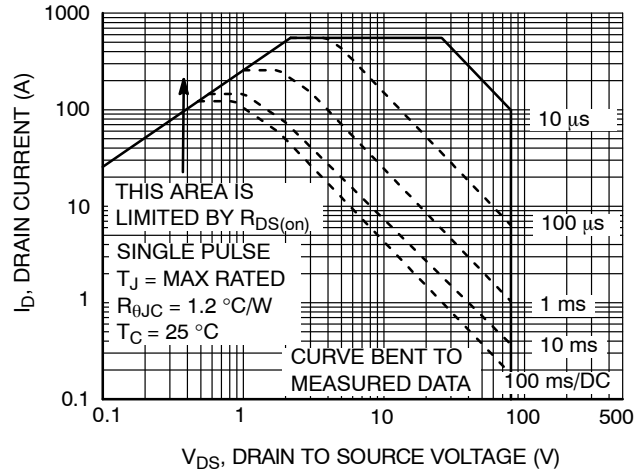


Figure 11. Forward Bias Safe Operating Area

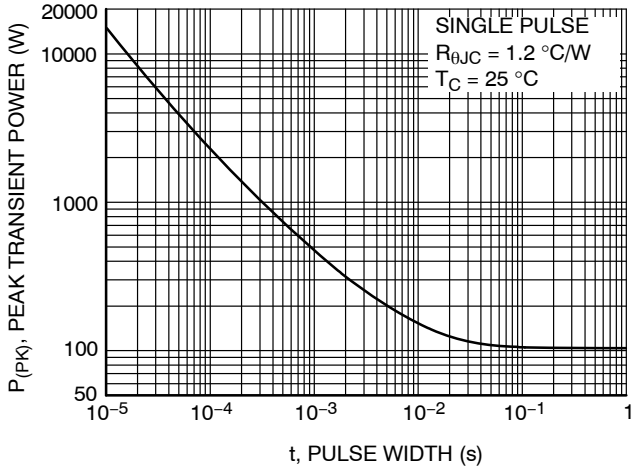


Figure 12. Single Pulse Maximum Power Dissipation

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

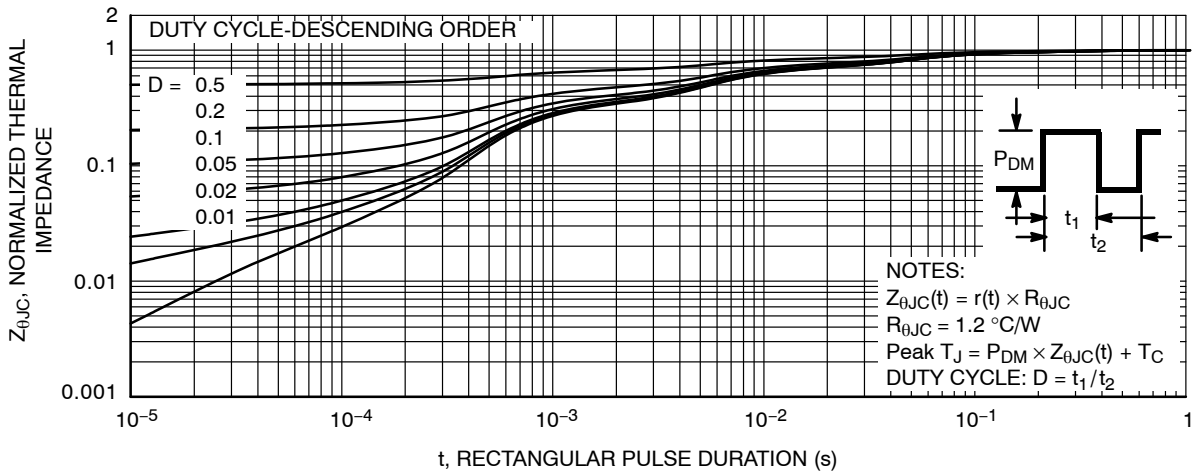


Figure 13. Junction-to-Case Transient Thermal Response Curve

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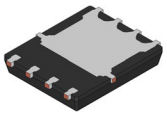
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REVISION HISTORY

Revision	Description of Changes	Date
2	Document converted to **onsemi** format; OPN FDMS86300-NC added.	11/2/2026

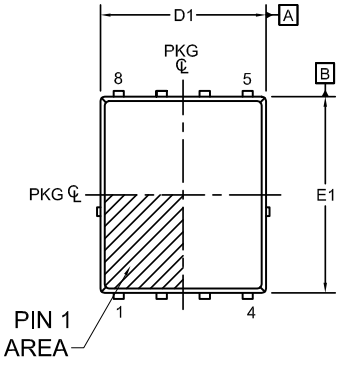
This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

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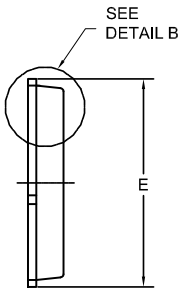


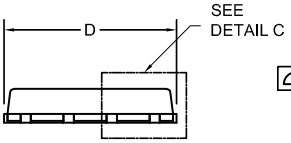
PQFN8 5X6, 1.27P
CASE 483AE
ISSUE C

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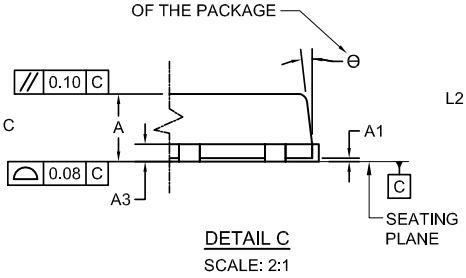


TOP VIEW

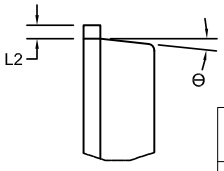




SIDE VIEW



DETAIL C
SCALE: 2:1

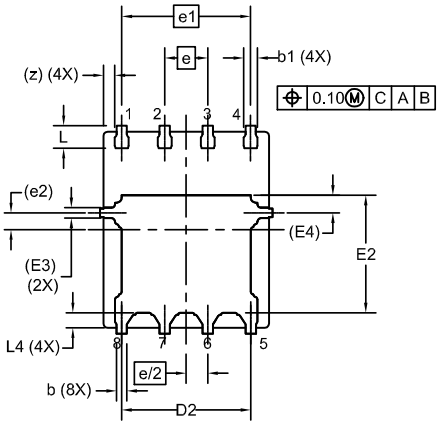


DETAIL B
SCALE: 2:1

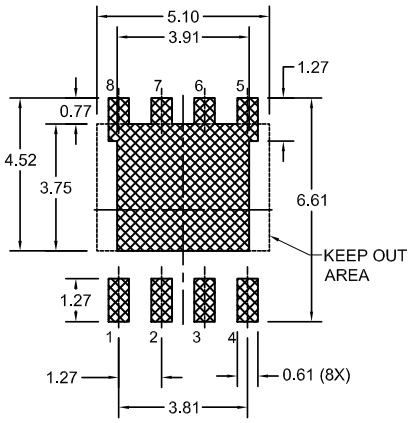
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2009.
2. CONTROLLING DIMENSION: MILLIMETERS
3. COPLANARITY APPLIES TO THE EXPOSED PADS AS WELL AS THE TERMINALS.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.
5. SEATING PLANE IS DEFINED BY THE TERMINALS. "A1" IS DEFINED AS THE DISTANCE FROM THE SEATING PLANE TO THE LOWEST POINT ON THE PACKAGE BODY.
6. IT IS RECOMMENDED TO HAVE NO TRACES OR VIAS WITHIN THE KEEP OUT AREA.

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.90	1.00	1.10
A1	0.00	-	0.05
b	0.21	0.31	0.41
b1	0.31	0.41	0.51
A3	0.15	0.25	0.35
D	4.90	5.00	5.20
D1	4.80	4.90	5.00
D2	3.61	3.82	3.96
E	5.90	6.15	6.25
E1	5.70	5.80	5.90
E2	3.38	3.48	3.78
E3	0.30 REF		
E4	0.52 REF		
e	1.27 BSC		
e/2	0.635 BSC		
e1	3.81 BSC		
e2	0.50 REF		
L	0.51	0.66	0.76
L2	0.05	0.18	0.30
L4	0.34	0.44	0.54
z	0.34 REF		
Θ	0°	-	12°



BOTTOM VIEW



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