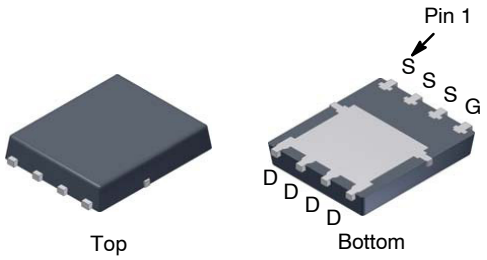
MOSFET – N-Channel, POWERTRENCH®, SyncFET™

30 V, 22 A, 5.0 mΩ

FDMS0312AS, FDMS0312AS-NC

V_{DS}	$R_{DS(ON)}$ MAX	I_D MAX
30 V	5.0 mΩ @ 10 V	22 A
	6.2 mΩ @ 4.5 V	



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

General Description

The FDMS0312AS has been designed to minimize losses in power conversion application. Advancements in both silicon and package technologies have been combined to offer the lowest $R_{DS(on)}$ while maintaining excellent switching performance. This device has the added benefit of an efficient monolithic Schottky body diode.

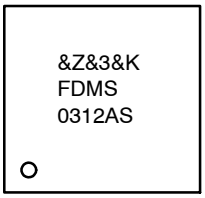
Features

- Max $R_{DS(on)}$ = 5.0 mΩ at V_{GS} = 10 V, I_D = 18 A
- Max $R_{DS(on)}$ = 6.2 mΩ at V_{GS} = 4.5 V, I_D = 16 A
- Advanced Package and Silicon Combination for Low $R_{DS(on)}$ and High Efficiency
- SyncFET Schottky Body Diode
- MSL1 Robust Package Design
- 100% UIL Tested
- This Device is Pb-Free, Halide Free and is RoHS Compliant

Applications

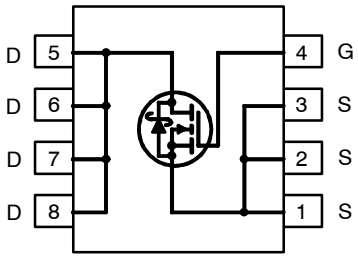
- Synchronous Rectifier for DC-DC Converters
- Notebook Vcore/GPU Low Side Switch
- Networking Point of Load Low Side Switch
- Telecom Secondary Side Rectification

MARKING DIAGRAM



&Z = Assembly Plant Code
&3 = 3-Digit Date Code
&K = 2-Digit Lot Run Traceability Code
FDMS0312AS = Specific Device Code

PIN CONNECTIONS



ORDERING INFORMATION

Device	Package	Shipping†
FDMS0312AS	PQFN8 (Pb-Free, Halide Free)	3000 / Tape & Reel
FDMS0312AS-NC		

† 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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MAXIMUM RATINGS (T_C = 25 °C unless otherwise noted)

Symbol	Parameter			Value	Unit
V_{DS}	Drain to Source Voltage			30	V
V_{GS}	Gate to Source Voltage (Note 4)			±20	V
I_D	Drain Current	Continuous (Package limited)	T_C = 25 °C	22	A
		Continuous (Silicon limited)	T_C = 25 °C	70	
		Continuous (Note 1a)	T_A = 25 °C	18	
		Pulsed		100	
E_{AS}	Single Pulse Avalanche Energy (Note 3)			33	mJ
P_D	Power Dissipation		T_C = 25 °C	36	W
			T_A = 25 °C (Note 1a)	2.5	
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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case	3.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

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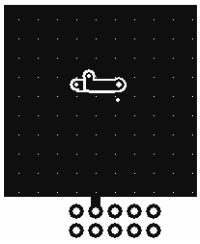
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ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)

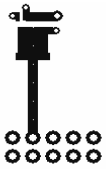
Symbol	Parameter	Test Condition	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 1 mA, V_{GS} = 0 V	30	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 10 mA, referenced to 25 °C	–	18	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 24 V, V_{GS} = 0 V	–	–	500	μA
I_{GSS}	Gate to Source Leakage Current, Forward	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 = 1 mA	1.2	1.5	3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = 10 mA, referenced to 25 °C	–	−4	–	mV/°C
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = 10 V, I_D = 18 A	–	4.2	5.0	mΩ
		V_{GS} = 4.5 V, I_D = 16 A	–	5.4	6.2	
		V_{GS} = 10 V, I_D = 18 A, T_J = 125 °C	–	5.3	6.8	
g_{FS}	Forward Transconductance	V_{DS} = 5 V, I_D = 18 A	–	92	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 15 V, V_{GS} = 0 V, f = 1 MHz	–	1365	1815	pF
C_{oss}	Output Capacitance		–	550	730	pF
C_{rss}	Reverse Transfer Capacitance		–	70	105	pF
R_g	Gate Resistance		–	0.5	2.5	Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 15 V, I_D = 18 A, V_{GS} = 10 V, R_{GEN} = 6 Ω	–	10	19	ns
t_r	Rise Time		–	2.3	10	ns
$t_{d(off)}$	Turn-Off Delay Time		–	25	40	ns
t_f	Fall Time		–	6	12	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V, V_{DD} = 15 V, I_D = 18 A	–	23	31	nC
		V_{GS} = 0 V to 4.5 V, V_{DD} = 15 V, I_D = 18 A	–	11	16	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 15 V, I_D = 18 A	–	3.3	–	nC
Q_{gd}	Gate to Drain “Miller” Charge	V_{DD} = 15 V, I_D = 18 A	–	3.7	–	nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 2 A (Note 2)	–	0.63	0.8	V
		V_{GS} = 0 V, I_S = 18 A (Note 2)	–	0.8	1.2	
t_{rr}	Reverse Recovery Time	I_F = 18 A, di/dt = 300 A/μs	–	23	36	ns
Q_{rr}	Reverse Recovery Charge		–	20	32	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.

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 33 mJ is based on starting T_J = 25 °C, L = 0.3 mH, I_{AS} = 15 A, V_{DD} = 27 V, V_{GS} = 10 V.
4. As an N-ch device, the negative Vgs rating is for low duty cycle pulse occurrence only. No continuous rating is implied.

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TYPICAL CHARACTERISTICS

(T_J = 25°C unless otherwise noted)

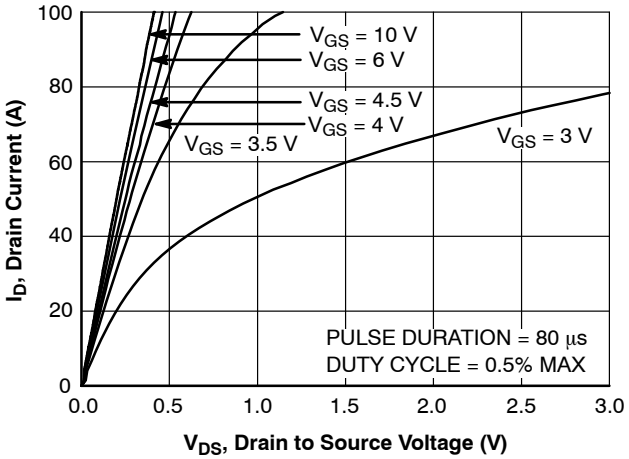


Figure 1. On Region Characteristics

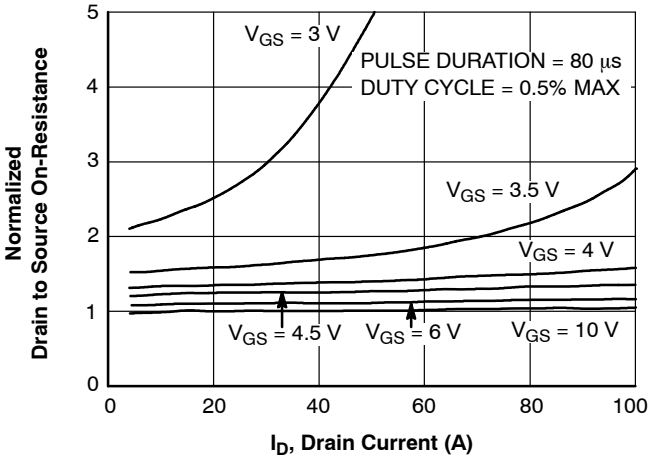


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

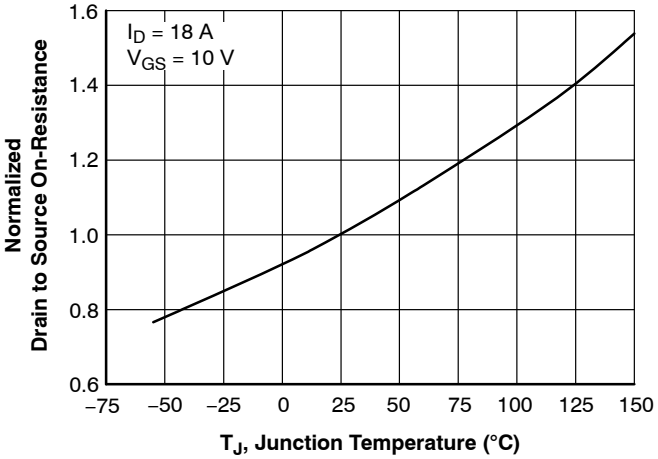


Figure 3. Normalized On Resistance vs. Junction Temperature

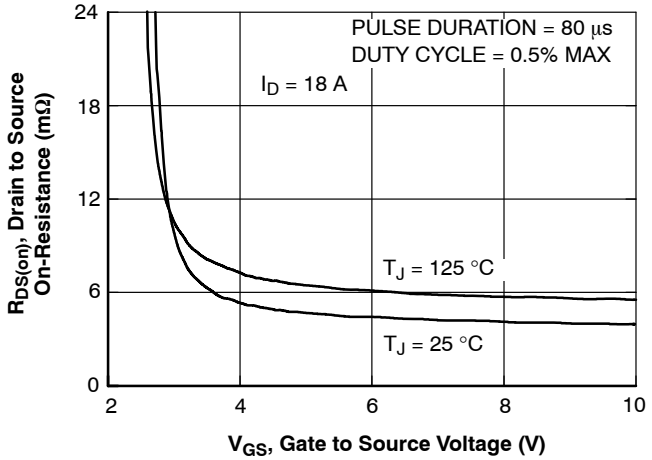


Figure 4. On-Resistance vs. Gate to Source Voltage

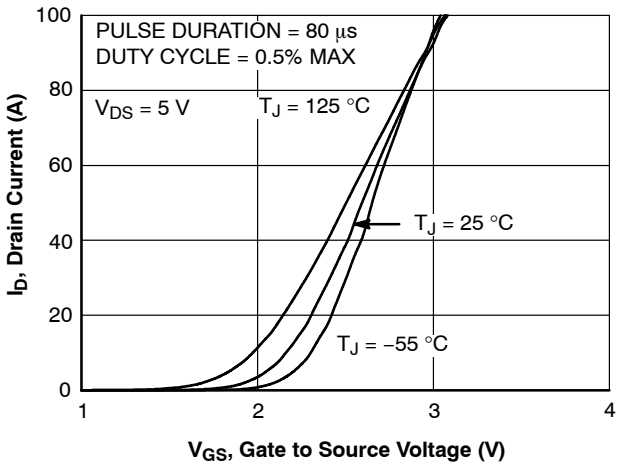


Figure 5. Transfer Characteristics

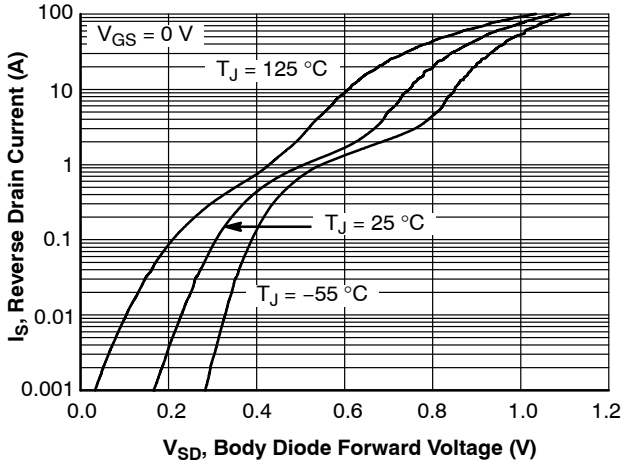


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

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TYPICAL CHARACTERISTICS (continued)

(T_J = 25 °C unless otherwise noted)

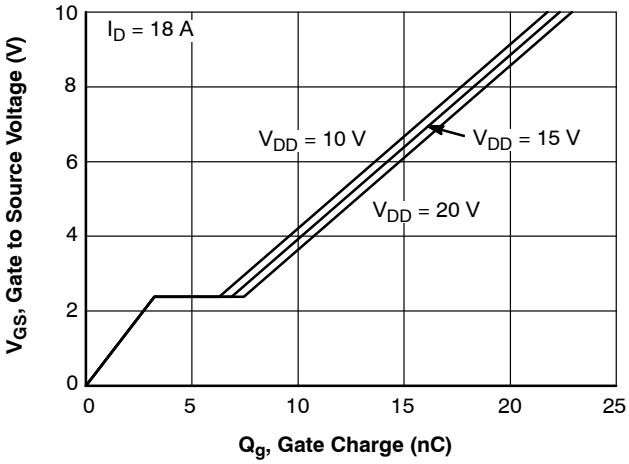


Figure 7. Gate Charge Characteristics

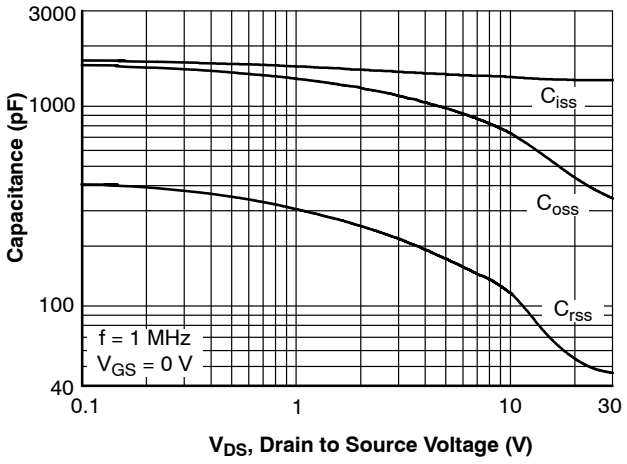


Figure 8. Capacitance vs. Drain to Source Voltage

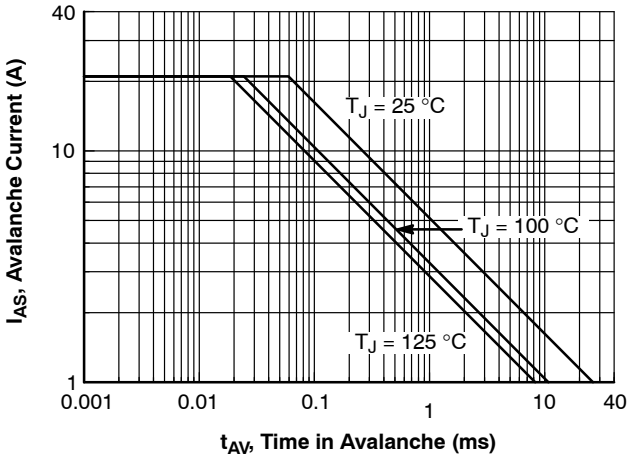


Figure 9. Unclamped Inductive Switching Capability

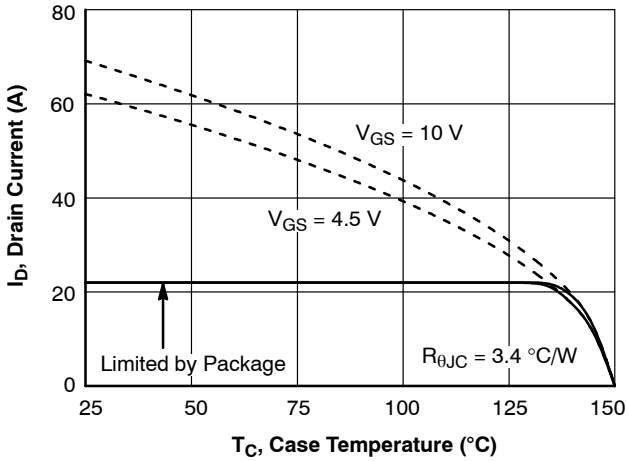


Figure 10. Maximum Continuous Drain Current vs. Case Temperature

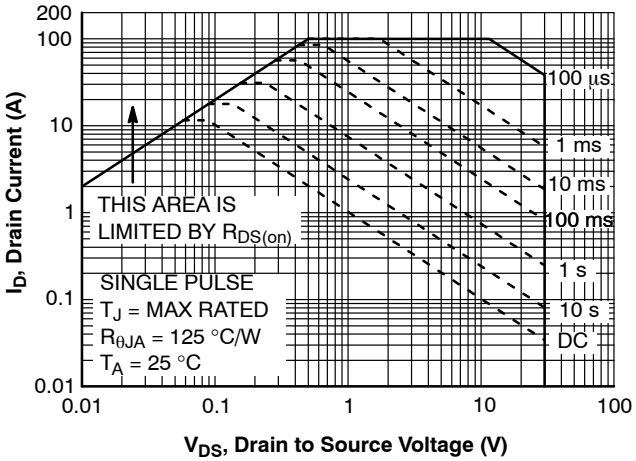


Figure 11. Forward Bias Safe Operating Area

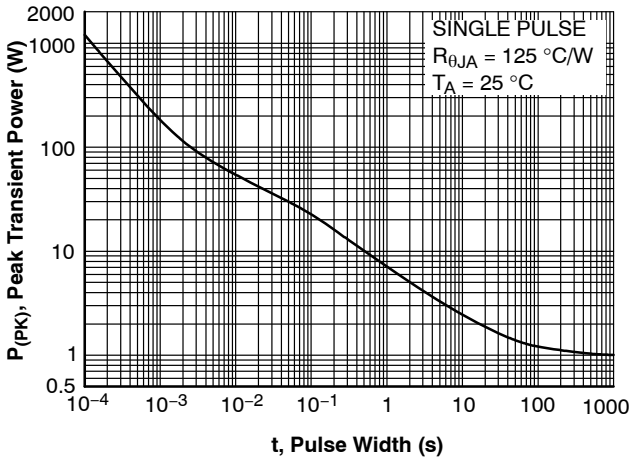


Figure 12. Single Pulse Maximum Power Dissipation

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TYPICAL CHARACTERISTICS (continued)

(T_J = 25 °C unless otherwise noted)

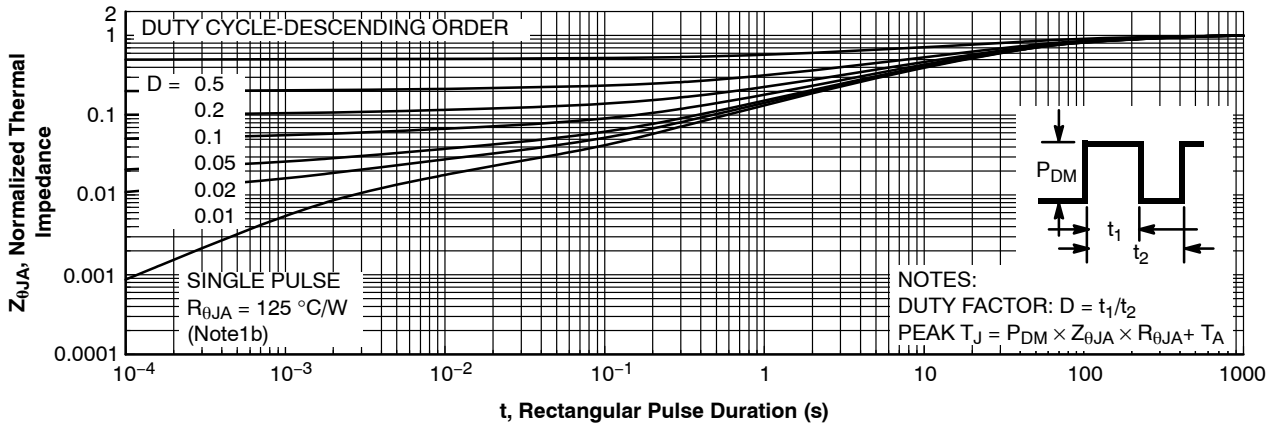


Figure 13. Junction-to-Ambient Transient Thermal Response Curve

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TYPICAL CHARACTERISTICS (continued)

SyncFET Schottky Body Diode Characteristics

onsemi's SyncFET process embeds a Schottky diode in parallel with POWERTRENCH MOSFET. This diode exhibits similar characteristics to a discrete external Schottky diode in parallel with a MOSFET. Figure 14 shows the reverse recovery characteristic of the FDMS0312AS.

Schottky barrier diodes exhibit significant leakage at high temperature and high reverse voltage. This will increase the power in the device.

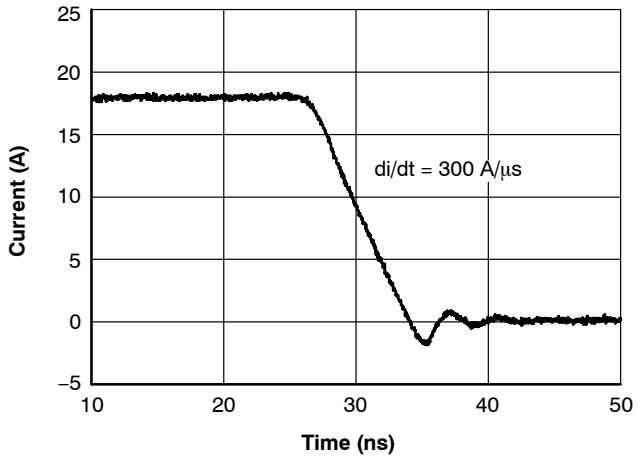


Figure 14. FDMS0312AS SyncFET Body Diode Reverse Recovery Characteristic

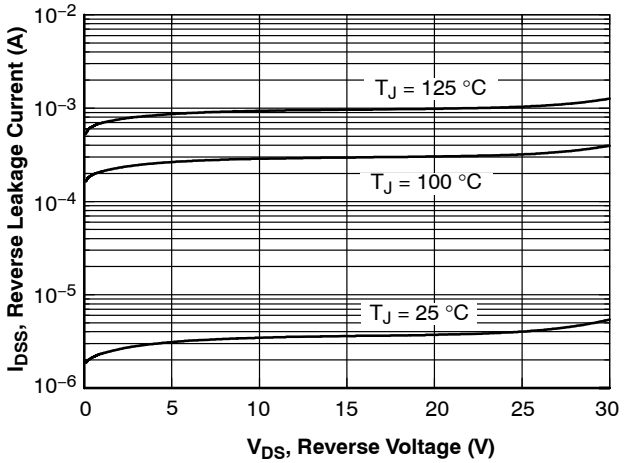


Figure 15. SyncFET Body Diode Reverse Leakage vs. Drain-Source Voltage

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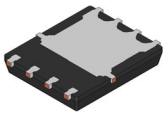
REVISION HISTORY

Revision	Description of Changes	Date
4	Added -NC OPN.	6/1/2026

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.

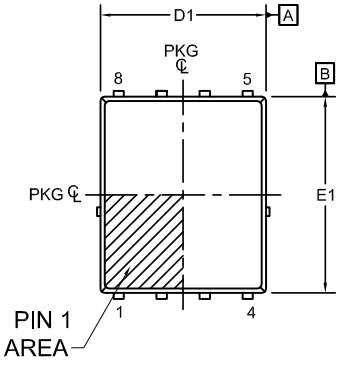
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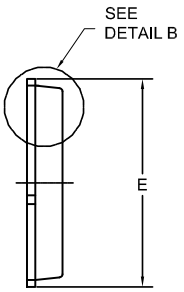


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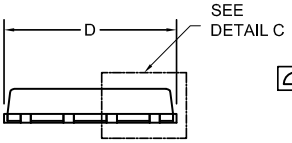
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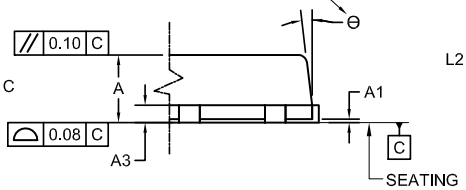
TOP VIEW



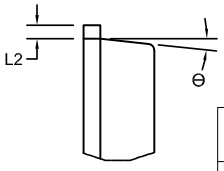
OPTIONAL DRAFT
ANGLE MAY APPEAR
ON FOUR SIDES
OF THE PACKAGE



SIDE VIEW



DETAIL C
SCALE: 2:1

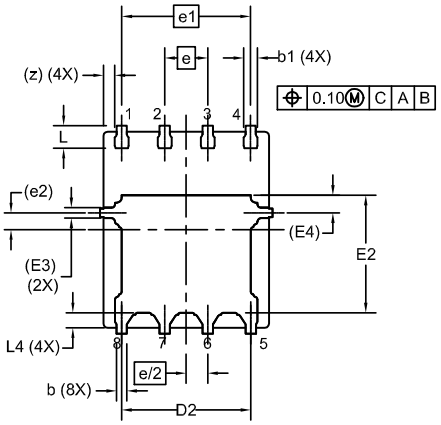


DETAIL B
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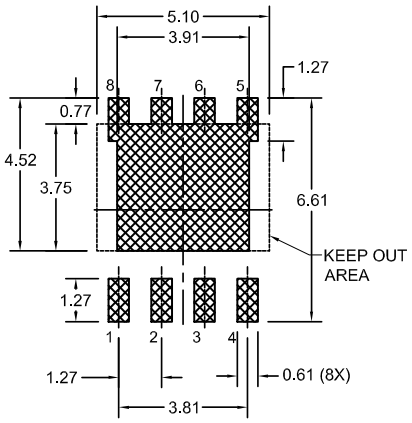
NOTES:

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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