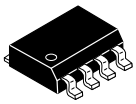
MOSFET – N-Channel, POWERTRENCH®

40 V, 7.6 A, 29 mΩ

FDS8449, FDS8449-G



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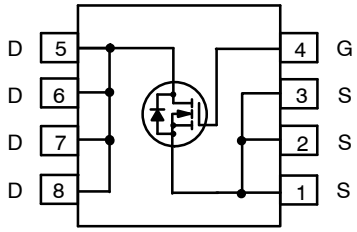


General Description

These N−Channel MOSFETs are produced using **onsemi**'s advanced POWERTRENCH process that has been especially tailored to minimize on−state resistance and yet maintain superior switching performance.

Features

- 7.6 A, 40 V $R_{DS(on)}$ = 29 mΩ @ V_{GS} = 10 V
  $R_{DS(on)}$ = 36 mΩ @ V_{GS} = 4.5 V
- High Power Handling Capability in a Widely Used Surface Mount Package
- Pb−Free, Halide Free and RoHS Compliant

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C unless otherwise noted.

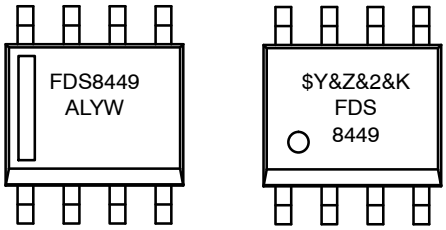
Symbol	Parameter	Ratings	Unit
V_{DSS}	Drain to Source Voltage	40	V
V_{GSS}	Gate to Source Voltage	±20	V
I_D	Drain Current – Continuous (Note 1a) – Pulsed	 7.6 50	A
P_D	Power Dissipation for Single Operation (Note 1a) (Note 1b)	 2.5 1	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	−55 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.

THERMAL CHARACTERISTICS

Symbol	Parameter	Ratings	Unit
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1b)	125	°C/W
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	25	°C/W

MARKING DIAGRAM



FDS8449 FDS8449−G

FDS8449	= Specific Device Code
A	= Assembly Site
L	= Wafer Lot Number
YW	= Assembly Start Week
$Y	= **onsemi** Logo
&Z	= Assembly Plant Code
&2	= 2−Digit Code Format
&K	= 2−Digits Lot Run Traceability Code

ORDERING INFORMATION

Device	Package	Shipping†
FDS8449	SOIC8 (Pb−Free/ Halide Free)	2500 / Tape & Reel
FDS8449−G	SOIC8 (Pb−Free/ Halide Free)	2500 / 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.

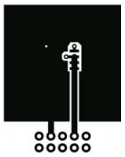
ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
DRAIN−SOURCE AVALANCHE RATINGS (Note 3)						
E_{AS}	Drain to Source Avalanche Energy	V_{DD} = 40 V, I_D = 7.3 A, L = 1 mH	–	–	27	mJ
I_{AS}	Drain to Source Avalanche Current		–	7.3	–	A
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = 250 μA, V_{GS} = 0 V	40	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	34	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 32 V, V_{GS} = 0 V	–	–	1	μA
I_{GSS}	Gate−Body Leakage	V_{GS} = ±20 V, V_{DS} = 0 V	–	–	±100	nA
ON CHARACTERISTICS (Note 2)						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250 μA	1	1.9	3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate Threshold Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	−5	–	mV/°C
$R_{DS(on)}$	Static Drain to Source On−Resistance	I_D = 7.6 A, V_{GS} = 10 V,	–	21	29	mΩ
		I_D = 6.8 A, V_{GS} = 4.5 V	–	26	36	
		I_D = 7.6 A, V_{GS} = 10 V, T_J = 125°C	–	29	43	
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 7.6 A	–	21	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 20 V, V_{GS} = 0 V, f = 1.0 MHz	–	760	–	pF
C_{oss}	Output Capacitance		–	100	–	
C_{rss}	Reverse Transfer Capacitance		–	60	–	
R_G	Gate Resistance	f = 1.0 MHz	–	1.2	–	Ω
SWITCHING CHARACTERISTICS (Note 2)						
$t_{d(on)}$	Turn−On Delay Time	V_{DD} = 20 V, I_D = 1 A, V_{GS} = 10 V, R_{GS} = 6 Ω	–	9	18	ns
t_r	Turn−On Rise Time		–	5	10	
$t_{d(off)}$	Turn−Off Delay Time		–	23	17	
t_f	Turn−Off Fall Time		–	3	6	
Q_g	Total Gate Charge	V_{DS} = 20 V, I_D = 7.6 A, V_{GS} = 5 V	–	7.7	11	nC
Q_{gs}	Gate−Source Charge		–	2.4	–	
Q_{gd}	Gate−Drain Charge		–	2.8	–	
DRAIN−SOURCE DIODE CHARACTERISTICS						
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0 V, I_S = 2.1 A (Note 2)	–	0.76	1.2	V
t_{rr}	Diode Reverse Recovery Time	I_F = 7.6 A, d_{IF}/d_t = 100 A/μs	–	17	–	ns
Q_{rr}	Diode Reverse Recovery Charge		–	7	–	nC

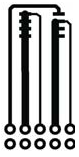
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

1. $R_{\theta JA}$ is the sum of the junction−to−case and case−to−ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ 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.

2. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2.0%
3. BV(avalanche) Single−Pulse rating is guaranteed if device is operated within the UIS SOA boundary of the device.

TYPICAL CHARACTERISTICS

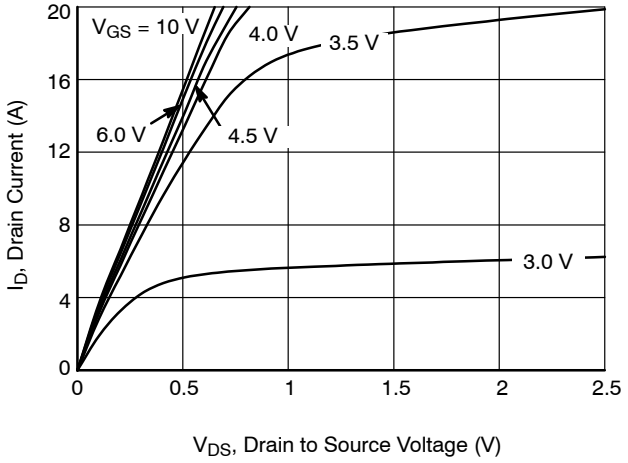


Figure 1. On Region Characteristics

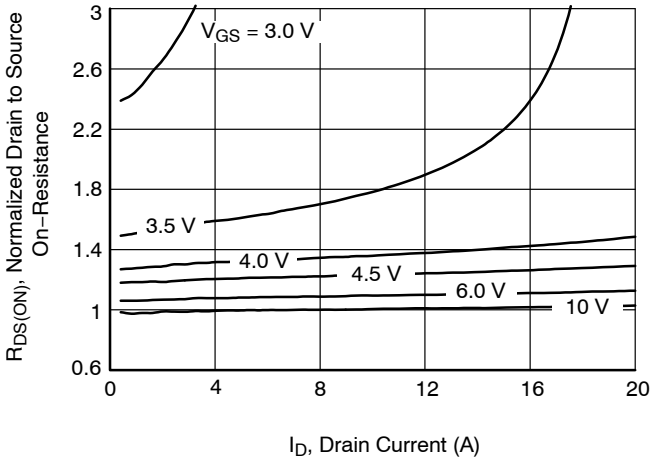


Figure 2. On−Resistance Variation with Drain Current and Gate Voltage

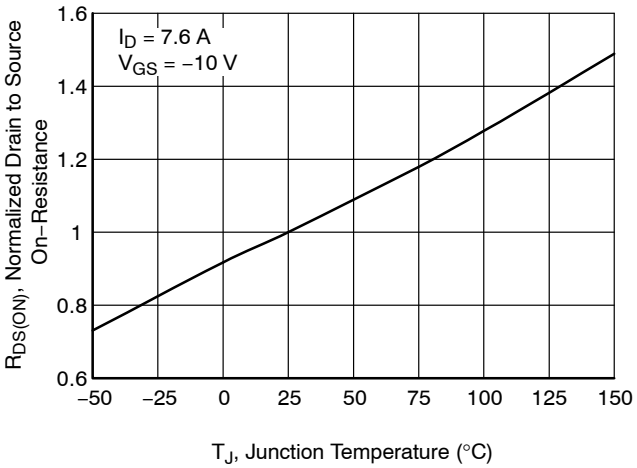


Figure 3. On−Resistance Variation with Temperature

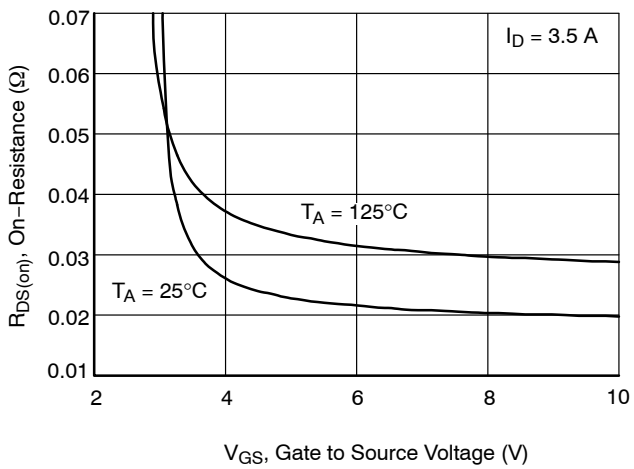


Figure 4. On−Resistance Variation with Gate−to−Source Voltage

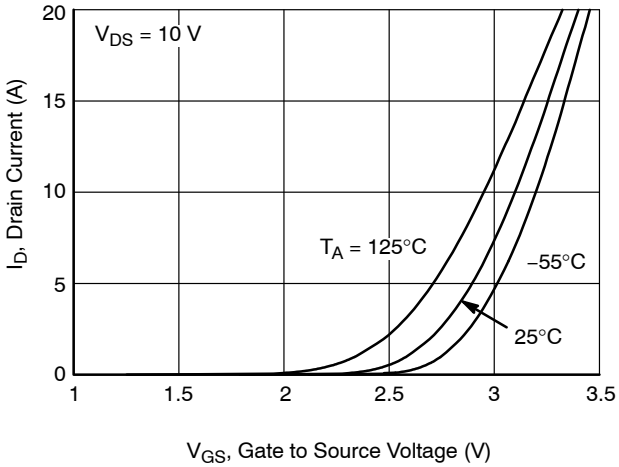


Figure 5. Transfer Characteristics

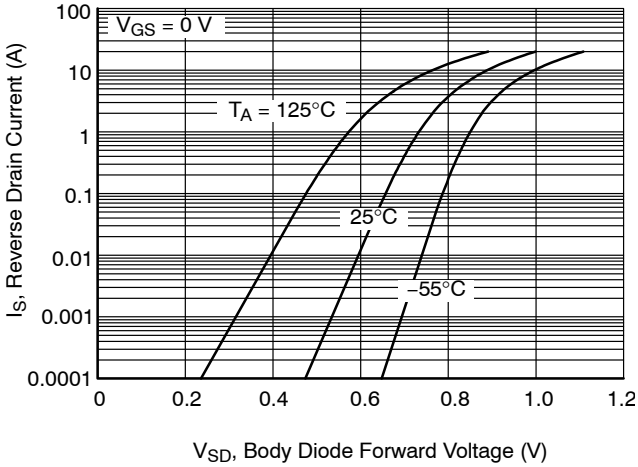


Figure 6. Body Diode Forward Voltage Variation with Source Current and Temperature

TYPICAL CHARACTERISTICS (continued)

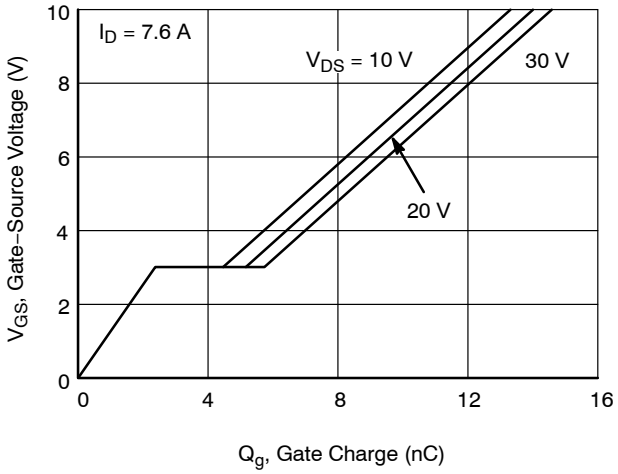


Figure 7. Gate Charge Characteristics

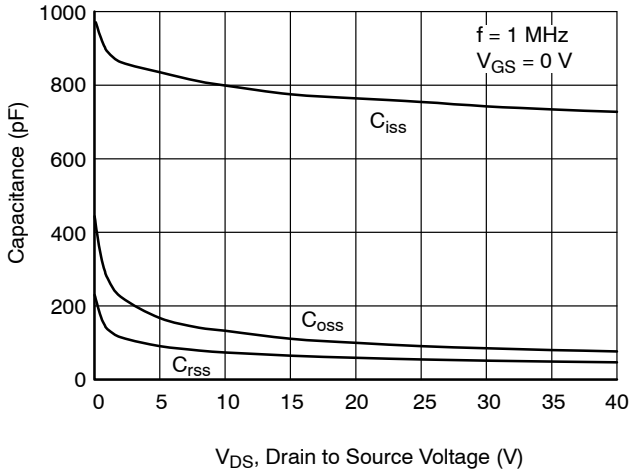


Figure 8. Capacitance Characteristics

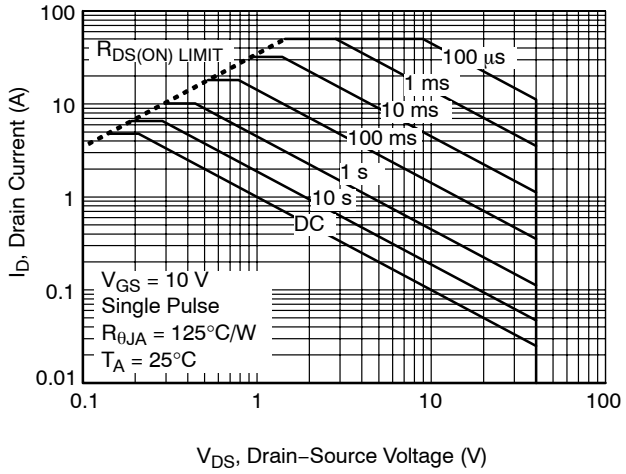


Figure 9. Maximum Safe Operating Area

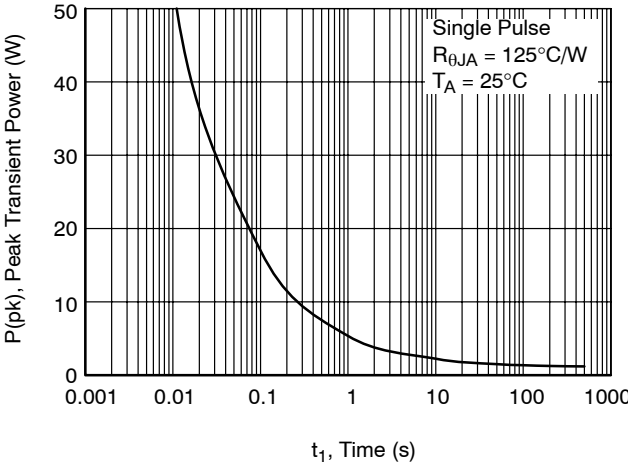


Figure 10. Single Pulse Maximum Power Dissipation

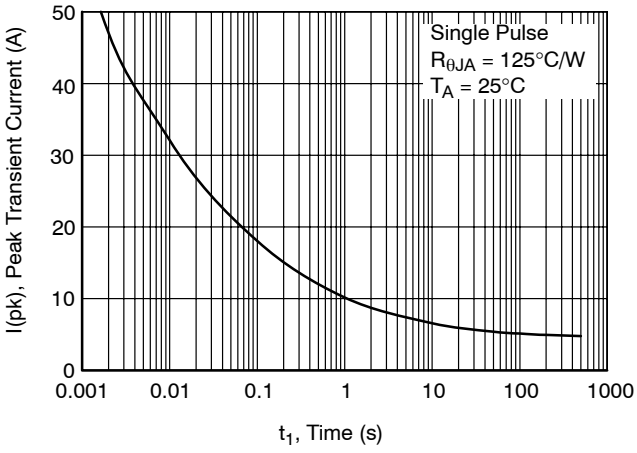


Figure 11. Single Pulse Maximum Peak Current

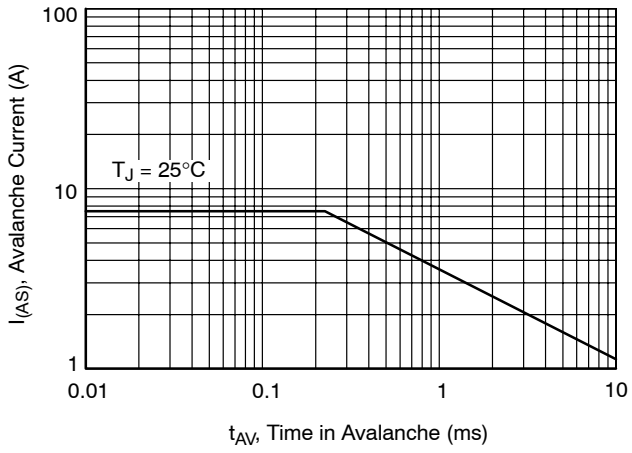


Figure 12. Unclamped Inductive Switching Capability

TYPICAL CHARACTERISTICS (continued)

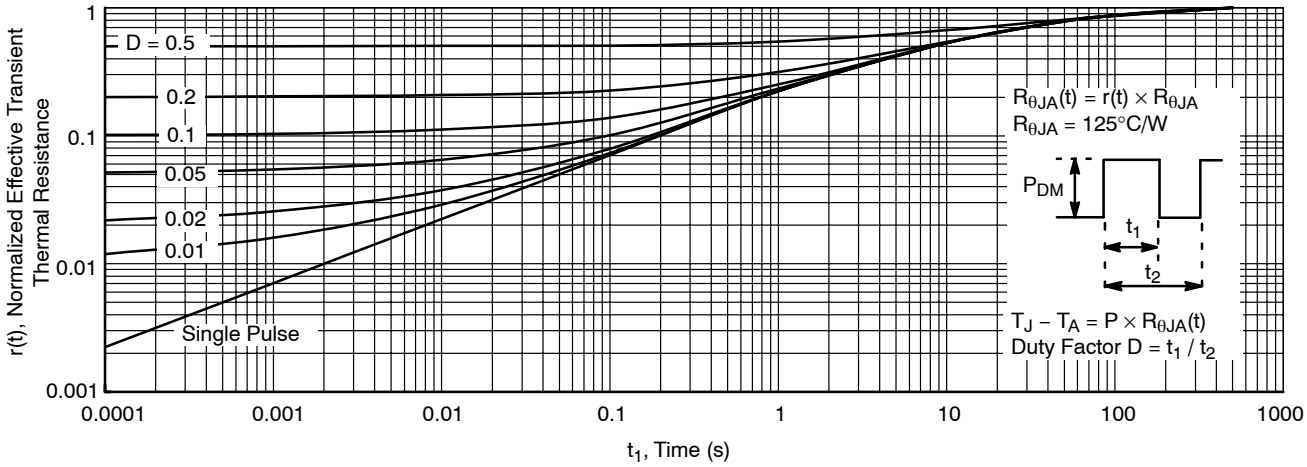


Figure 13. Transient Thermal Response Curve

NOTE: Transient thermal response will change depending on the circuit board design.

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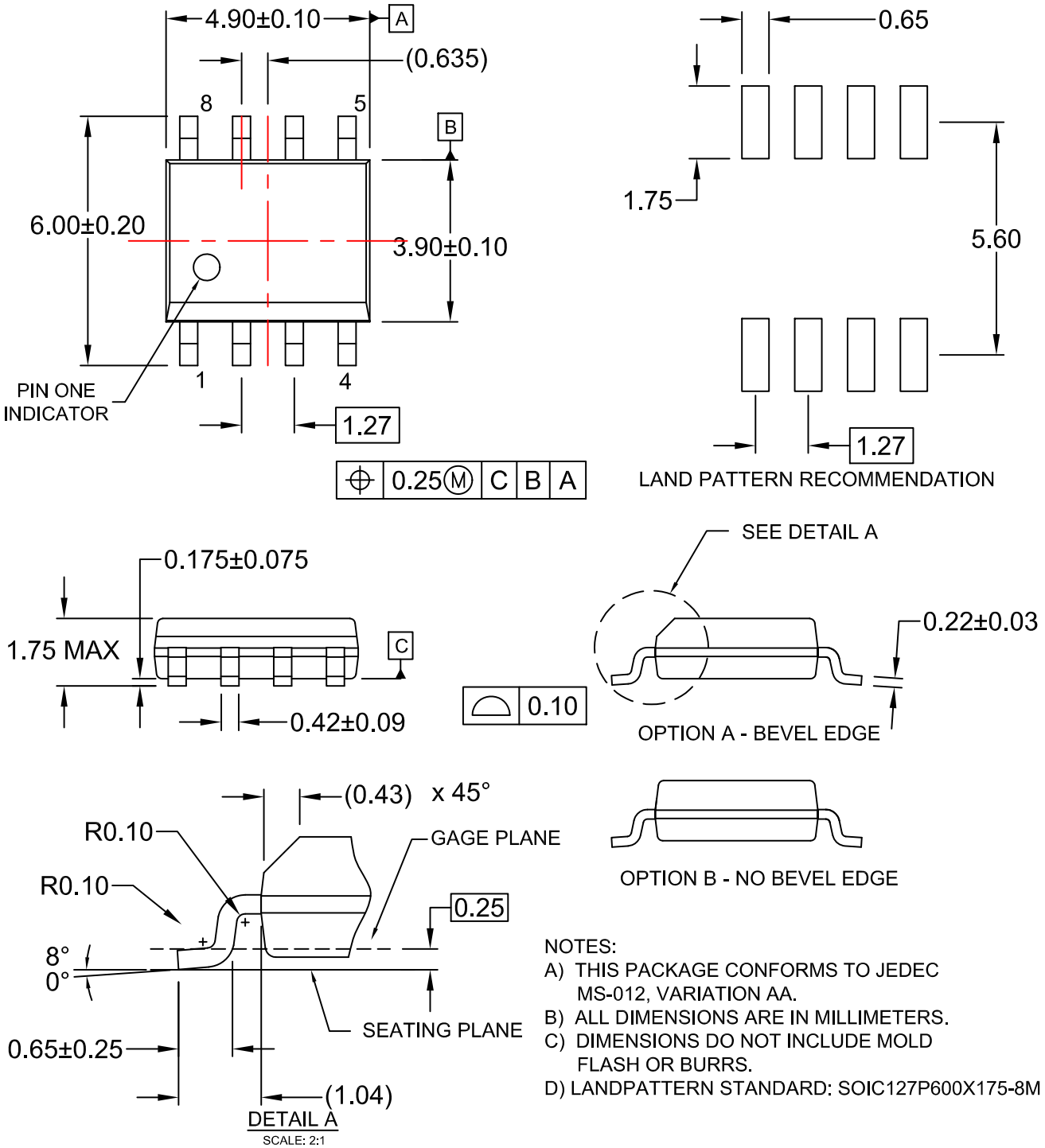

NOTES:
A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M

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