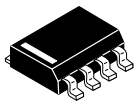
MOSFET – P-Channel, POWERTRENCH®

-30 V, -14.5 A, 7.8 mΩ

FDS6673BZ, FDS6673BZ-G



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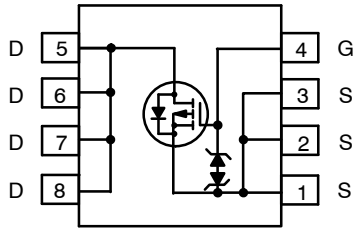


General Description

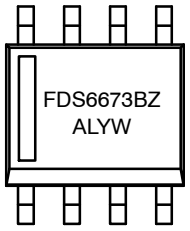
This P−Channel MOSFET is produced using **onsemi**'s advanced Power Trench process that has been especially tailored to minimize the on−state resistance.

This device is well suited for Power Management and load switching applications common in Notebook Computers and Portable Battery Packs.

Features

- Max $R_{DS(on)}$ = 7.8 mΩ @ V_{GS} = −10 V, I_D = −14.5 A
- Max $R_{DS(on)}$ = 12 mΩ @ V_{GS} = −4.5 V, I_D = −12 A
- Extended V_{GS} Range (−25 V) for Battery Applications
- HBM ESD Protection Level of 6.5 kV Typical (Note 3)
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- Pb−Free, Halide Free and RoHS Compliant

MARKING DIAGRAM



FDS6673BZ	= Specific Device Code
A	= Assembly Side
L	= Wafer Lot Number
YW	= Assembly Start Week

ABSOLUTE MAXIMUM RATINGS

T_A = 25°C unless otherwise noted.

Symbol	Parameter	Ratings	Unit
V_{DS}	Drain to Source Voltage	−30	V
V_{GS}	Gate to Source Voltage	±25	V
I_D	Drain Current – Continuous (Note 1a) – Pulsed	 −14.5 −75	A
P_D	Maximum Power dissipation (Note 1a) (Note 1b) (Note 1c)	 2.5 1.2 1.0	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
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	25	°C/W

ORDERING INFORMATION

Device	Package	Shipping†
FDS6673BZ	SOIC8 (Pb−Free/ Halide Free)	2500 / Tape & Reel
FDS6673BZ−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.

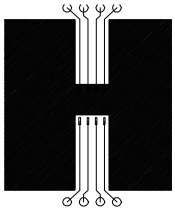
ELECTRICAL CHARACTERISTICS T_A = 25°C unless otherwise noted.

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = −250 μA, V_{GS} = 0 V	−30	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = −250 μA, Referenced to 25°C	–	−20	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = −24 V, V_{GS} = 0 V	–	–	−1	μA
I_{GSS}	Gate−Body Leakage	V_{GS} = ±25 V, V_{DS} = 0 V	–	–	±10	μA
ON CHARACTERISTICS (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{DS} = V_{GS}, I_D = −250 μA	−1	−1.9	−3	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = −250 μA, Referenced to 25°C	–	8.1	–	mV/°C
$R_{DS(on)}$	Drain to Source On−Resistance	I_D = −14.5 A, V_{GS} = −10 V,	–	6.5	7.8	mΩ
		I_D = −12 A, V_{GS} = −4.5 V	–	9.6	12	
		I_D = −14.5 A, V_{GS} = −10 V, T_J = 125°C	–	9.7	12	
g_{FS}	Forward Transconductance	V_{DS} = −5 V, I_D = −14.5 A	–	60	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = −15 V, V_{GS} = 0 V, f = 1.0 MHz	–	3500	4700	pF
C_{oss}	Output Capacitance		–	600	800	
C_{rss}	Reverse Transfer Capacitance		–	600	900	
SWITCHING CHARACTERISTICS (Note 2)						
$t_{d(on)}$	Turn−On Delay Time	V_{DD} = −15 V, I_D = −1 A, V_{GS} = −10 V, R_{GS} = 6 Ω	–	14	26	ns
t_r	Rise Time		–	16	29	
$t_{d(off)}$	Turn−Off Delay Time		–	225	36	
t_f	Fall Time		–	105	167	
Q_g	Total Gate Charge	V_{DS} = −15 V, I_D = −14.5 A, V_{GS} = −10 V	–	88	124	nC
Q_g	Total Gate Charge	V_{DS} = −15 V, I_D = −14.5 A, V_{GS} = −5 V	–	46	65	nC
Q_{gs}	Gate−Source Charge		–	8	–	
Q_{gd}	Gate−Drain Charge		–	23.5	–	
DRAIN−SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS						
V_{SD}	Drain to Source Diode Forward Voltage	V_{GS} = 0 V, I_S = −2.1 A	–	−0.7	−1.2	V
t_{rr}	Reverse Recovery Time	I_F = 14.5 A, di/dt = 100 A/μs	–	–	45	ns
Q_{rr}	Reverse Recovery Charge	I_F = 14.5 A, di/dt = 100 A/μs	–	–	34	nC

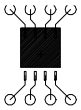
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

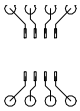
1. $R_{\theta JA}$ is the sum of the junction−to−case and case−to−ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user's board design.



a) 50°C/W (10 sec) when mounted on a 1 in^2 pad of 2 oz. copper.



b) 105°C/W when mounted on a 0.04 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. The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.

TYPICAL CHARACTERISTICS

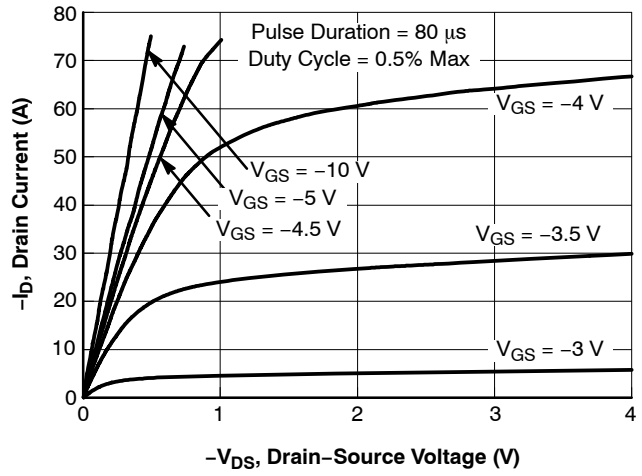


Figure 1. On Region Characteristics

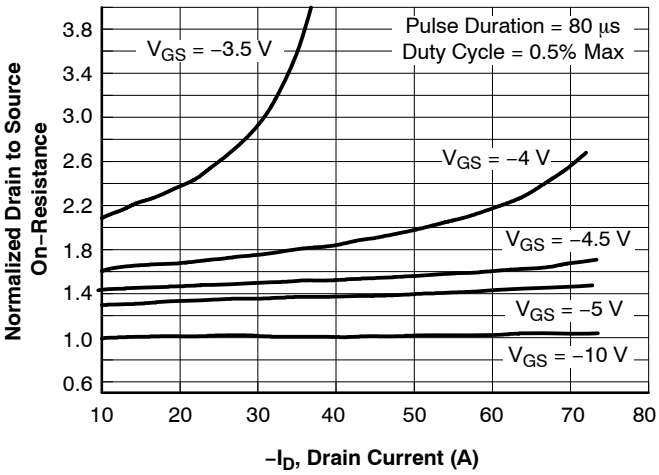


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

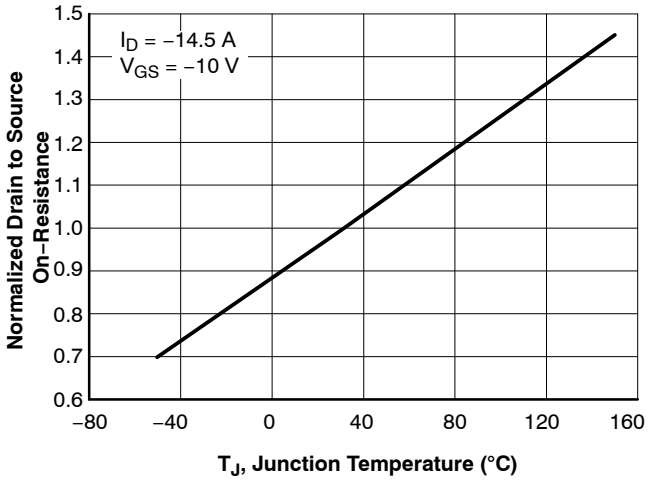


Figure 3. Normalized On−Resistance vs. Junction Temperature

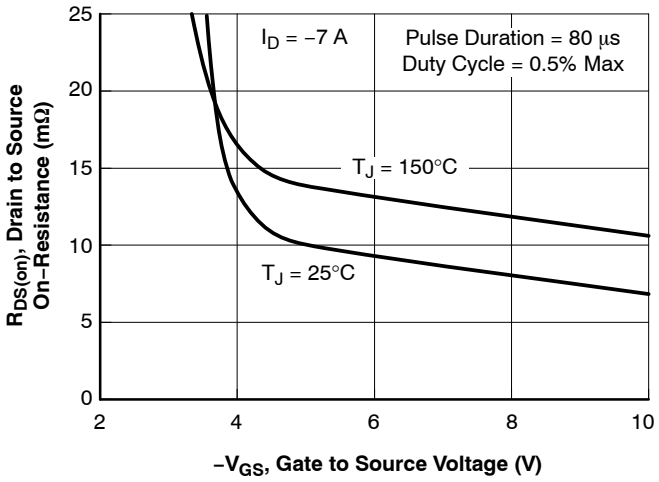


Figure 4. On−Resistance vs. Gate to Source Voltage

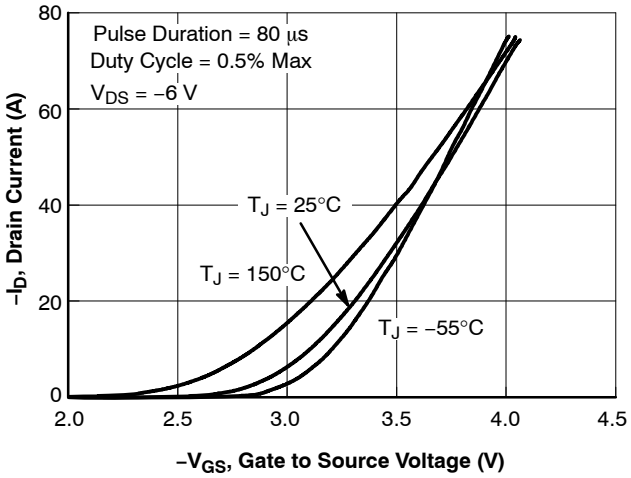


Figure 5. Transfer Characteristics

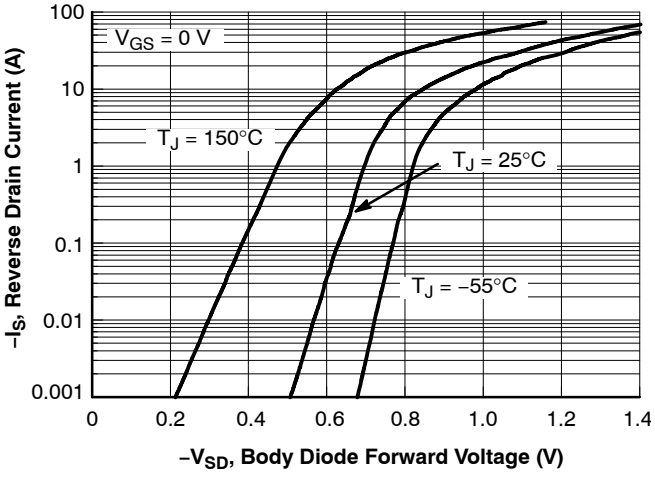


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

TYPICAL CHARACTERISTICS (continued)

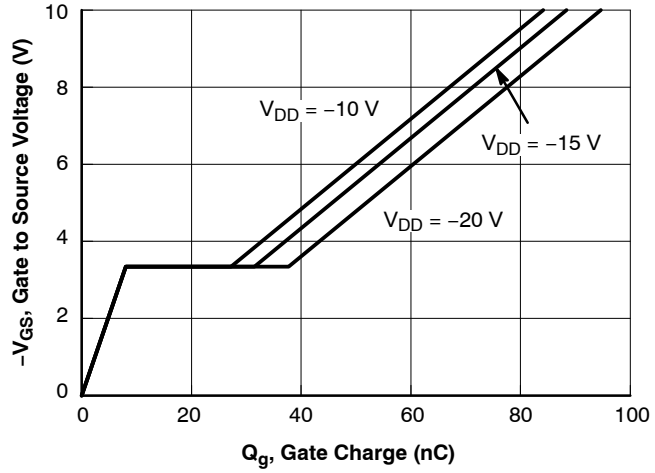


Figure 7. Gate Charge Characteristics

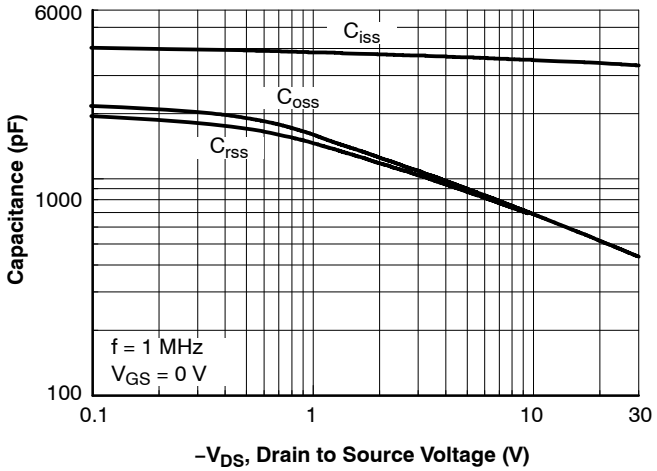


Figure 8. Capacitance vs. Drain to Source Voltage

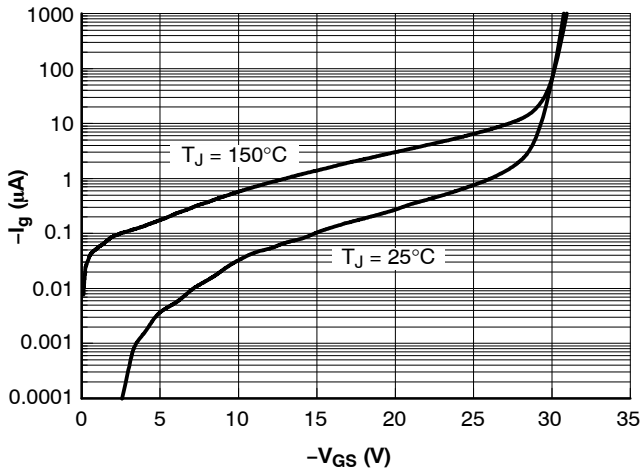


Figure 9. I_g vs. V_{GS}

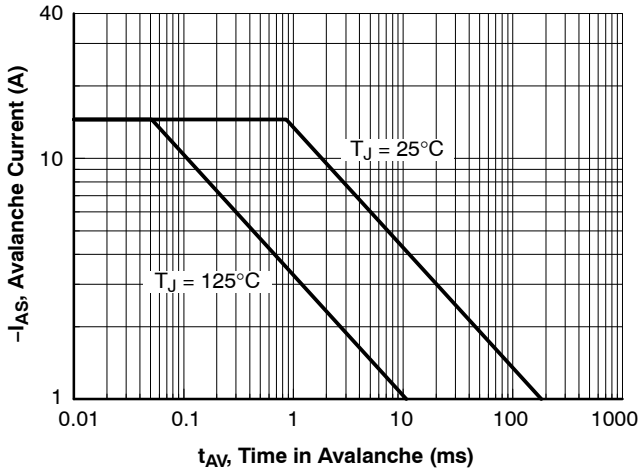


Figure 10. Unclamped Inductive Switching Capability

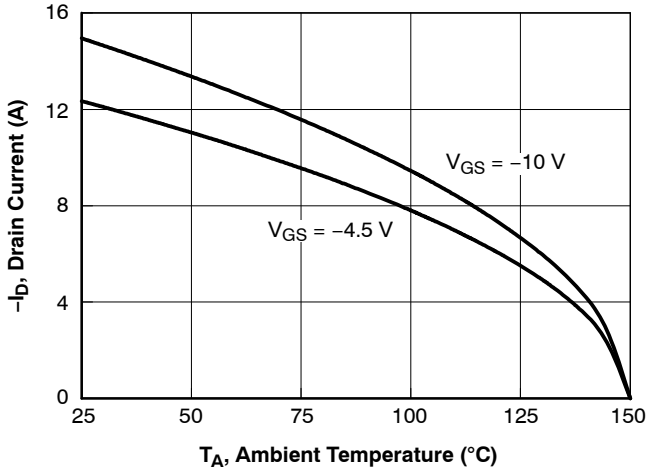


Figure 11. Maximum Continuous Drain Current vs Ambient Temperature

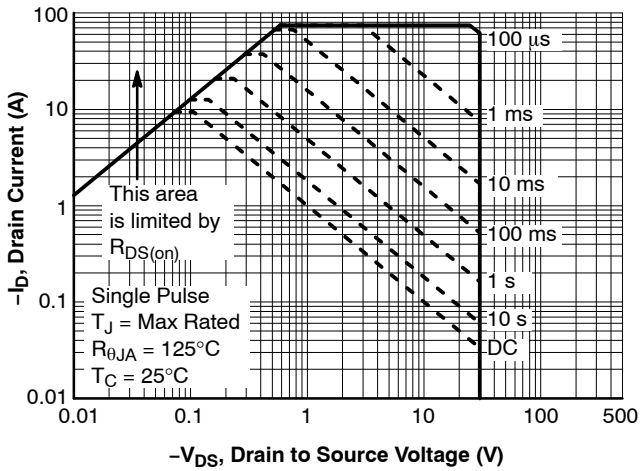


Figure 12. Single Pulse Maximum Power Dissipation

TYPICAL CHARACTERISTICS (continued)

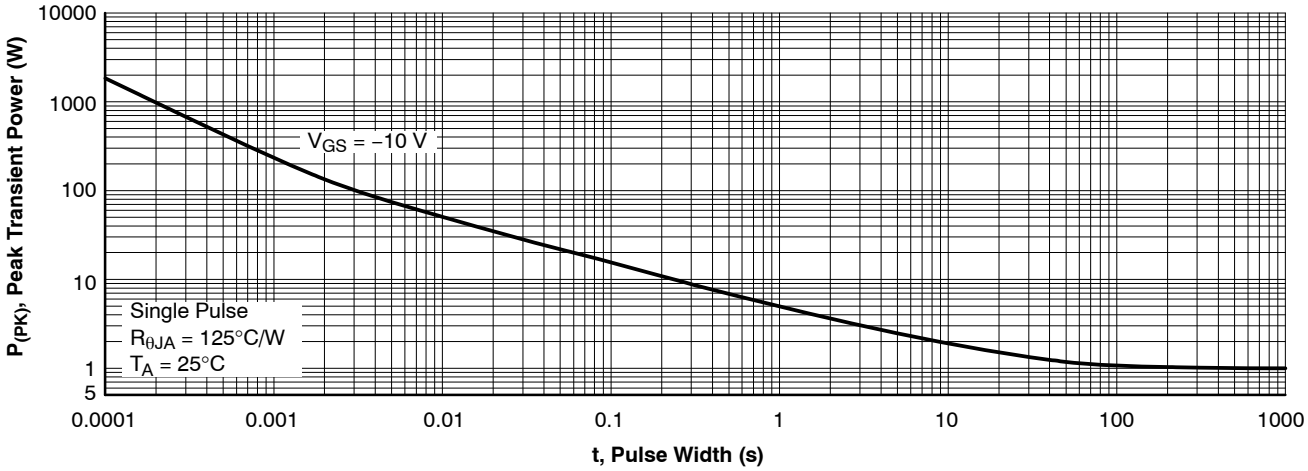


Figure 13. Single Pulse Maximum Power Dissipation

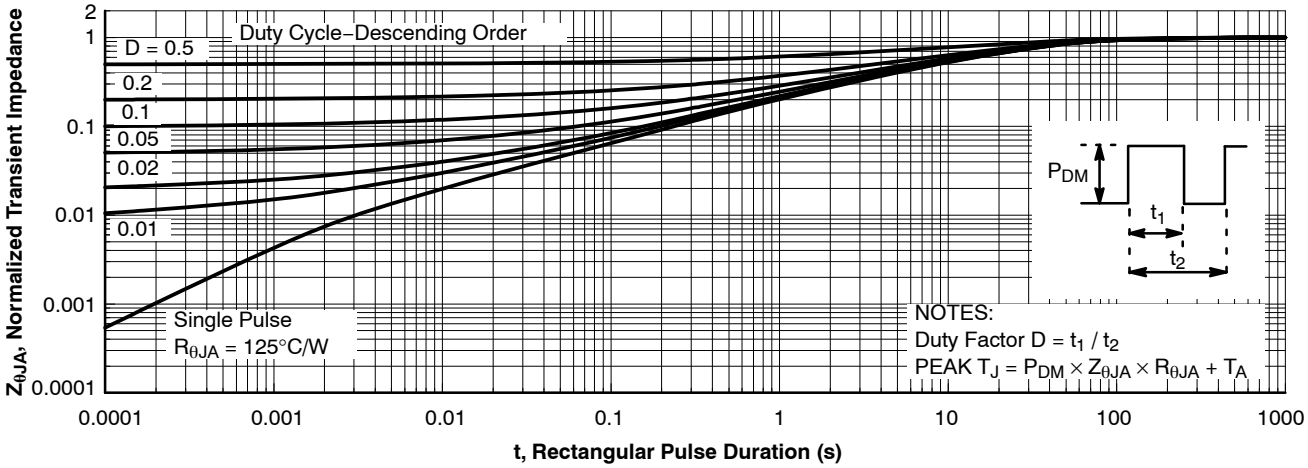


Figure 14. Junction−to−Ambient Transient Thermal Response Curve

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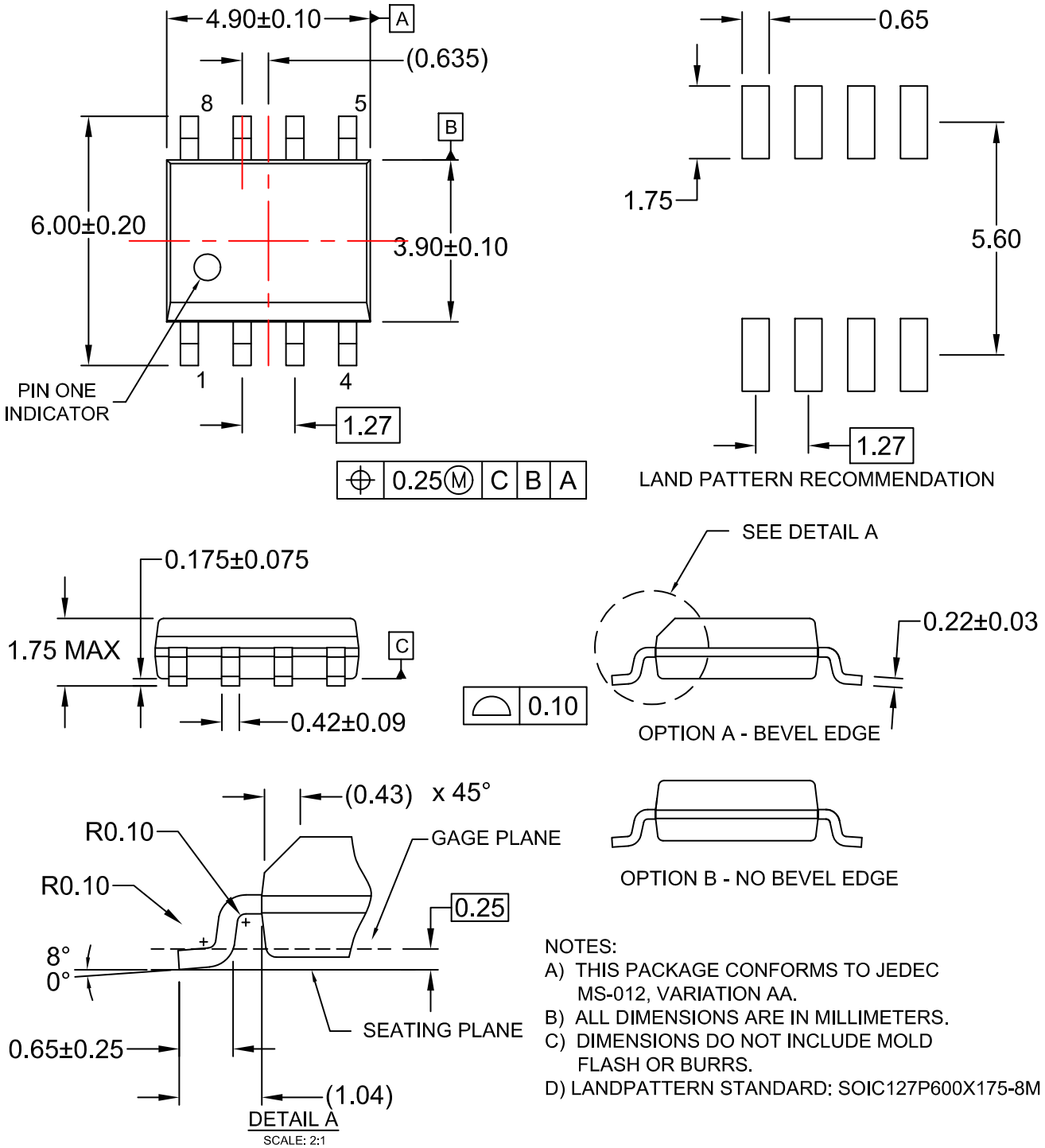
ISSUE A

DATE 24 AUG 2017



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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