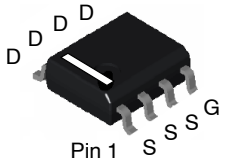
MOSFET – P-Channel, POWERTRENCH®

-30 V, -11 A, 13 mΩ

FDS6675BZ



SOIC8
CASE 751EB

Description

This P-Channel MOSFET is produced using **onsemi**'s advanced POWERTRENCH 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 $R_{DS(on)}$ = 13 mΩ at V_{GS} = −10 V, I_D = −11 A
- Max $R_{DS(on)}$ = 21.8 mΩ at V_{GS} = −4.5 V, I_D = −9 A
- Extended V_{GS} Range (−25 V) for Battery Applications
- HBM ESD Protection Level of 5.4 kV Typical (Note 3)
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- This Device is Pb-Free and RoHS Compliant

Specifications

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

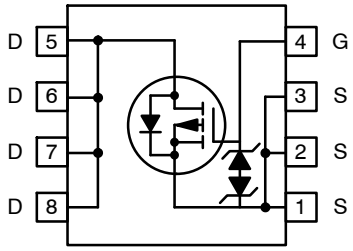
Symbol	Parameter	Ratings	Unit
V_{DS}	Drain to Source Voltage	−30	V
V_{GS}	Gate to Source Voltage	±25	V
I_D	Drain Current – Continuous (Note 1a) – Pulsed	 −11 −55	A
P_D	Power Dissipation for Single Operation (Note 1a) (Note 1b) (Note 1c)	 2.5 1.2 1.0	W
T_J, T_{STG}	Operating and Storage Junction Temperature 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
$R_{\theta JC}$	Thermal Resistance, Junction to Case	25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

ELECTRICAL CONNECTION



MARKING DIAGRAM

FDS6675BZ = Specific Device Code
A = Assembly Site
L = Wafer Lot Number
YW = Assembly Start Week

ORDERING INFORMATION

Device	Package	Shipping†
FDS6675BZ	SOIC8 (Pb-Free)	2,500 / 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.

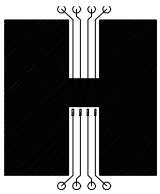
Table 1. ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
BV_{DSS}	Drain to Source Breakdown Voltage	I_D = −250 μA, V_{GS} = 0 V	−30			V
ΔBV_{DSS} / ΔT_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 to Source Leakage Current	V_{GS} = ±25 V, V_{DS} = 0 V			±10	μA
ON CHARACTERISTICS						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = −250 μA	−1	−2	−3	V
$\Delta V_{GS(th)}$ / ΔT_J	Gate to Source Threshold Voltage Temperature Coefficient	I_D = −250 μA, referenced to 25 °C		15.7		mV/°C
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = −10 V, I_D = −11 A		10.8	13.0	mΩ
		V_{GS} = −4.5 V, I_D = −9 A		17.4	21.8	
		V_{GS} = −10 V, I_D = −11 A, T_J = 125 °C		15.0	18.8	
g_{FS}	Forward Transconductance	V_{DS} = −5 V, I_D = −11 A		34		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = −15 V, V_{GS} = 0 V, f = 1 MHz		1855	2470	pF
C_{oss}	Output Capacitance			335	450	pF
C_{rss}	Reverse Transfer Capacitance			330	500	pF
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = −15 V, I_D = −11 A, V_{GS} = −10 V, R_{GS} = 6 Ω		3.0	10	ns
t_r	Rise Time			7.8	16	ns
$t_{d(off)}$	Turn-Off Delay Time			120	200	ns
t_f	Fall Time			60	100	ns
Q_g	Total Gate Charge	V_{DS} = −15 V, V_{GS} = −10 V, I_D = −11 A		44	62	nC
Q_g	Total Gate Charge	V_{DS} = −15 V, V_{GS} = −5 V, I_D = −11 A		25	35	nC
Q_{gs}	Gate to Source Charge			7.2		nC
Q_{gd}	Gate to Drain “Miller” Charge			11.4		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0V, I_S = −2.1 A		−0.7	−1.2	V
t_{rr}	Reverse Recovery Time	I_F = −11 A, di/dt = 100 A/μs			42	ns
Q_{rr}	Reverse Recovery Charge	I_F = −11 A, di/dt = 100 A/μs			30	nC

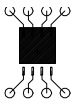
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTES:

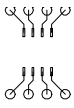
1. $R_{\theta JA}$ is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. $R_{\theta JC}$ is guaranteed by design while $R_{\theta CA}$ is determined by the user’s board design.



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



b. 105°C/W when mounted on a 0.04 in^2 pad of 2 oz copper.



c. 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

(T_J = 25 °C unless otherwise noted)

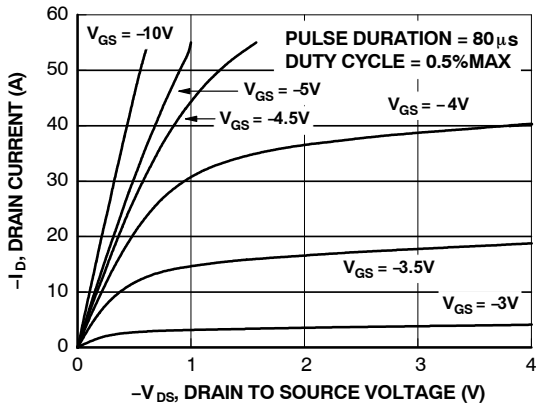


Figure 1. On-Region Characteristics

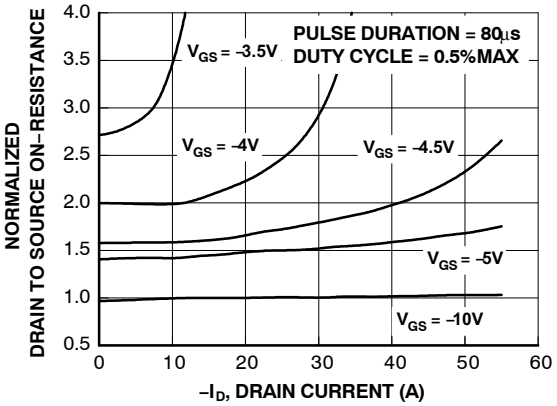


Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

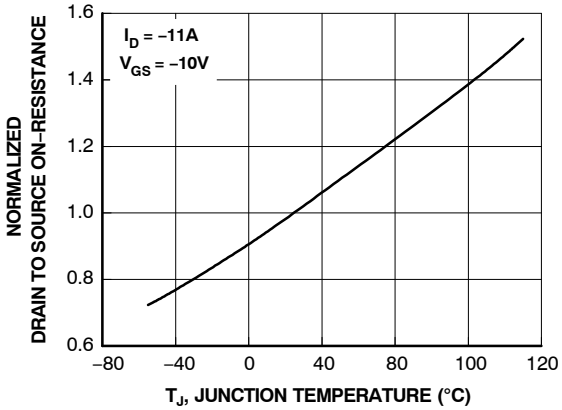


Figure 3. Normalized On-Resistance vs Junction Temperature

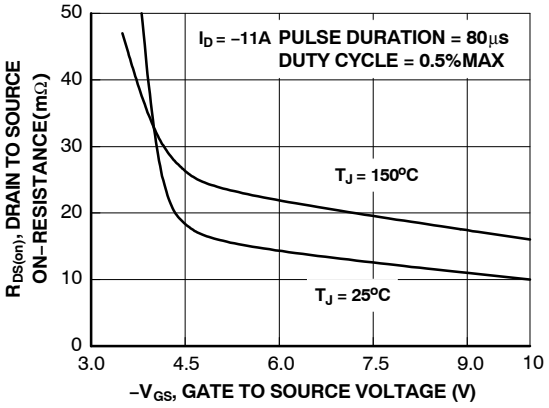


Figure 4. On-Resistance vs Gate to Source Voltage

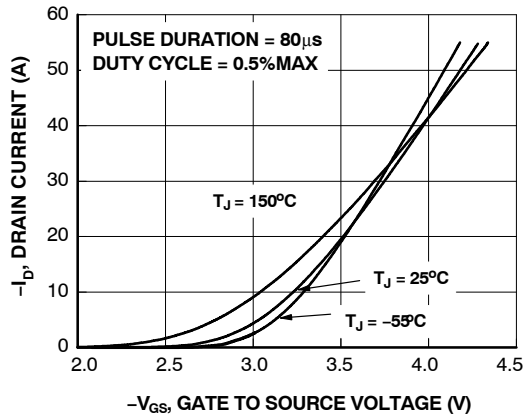


Figure 5. Transfer Characteristics

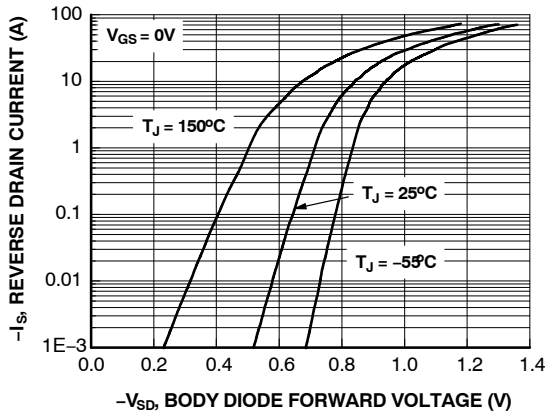


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

TYPICAL CHARACTERISTICS (continued)

(T_J = 25 °C unless otherwise noted)

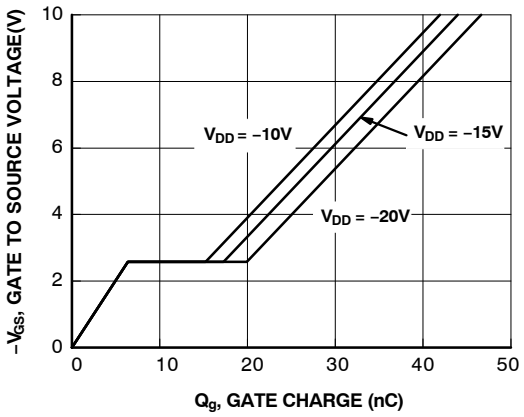


Figure 7. Gate Charge Characteristics

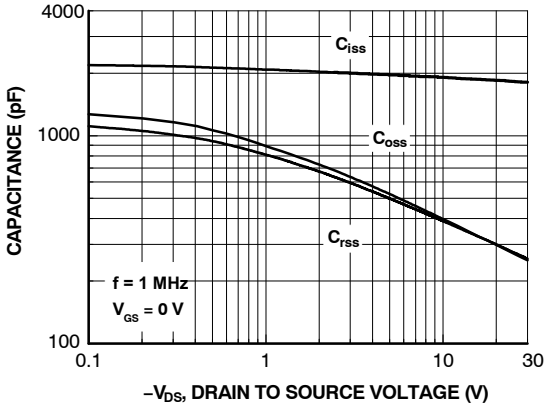


Figure 8. Capacitance vs Drain to Source Voltage

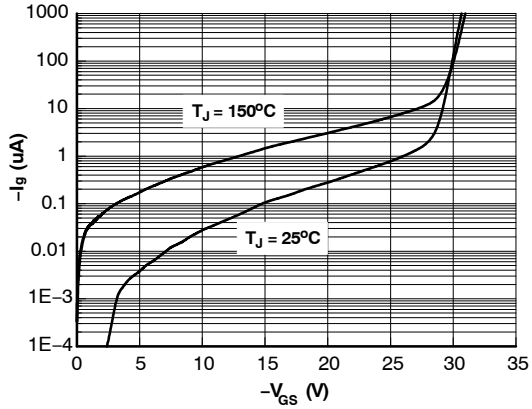


Figure 9. I_g vs V_{GS}

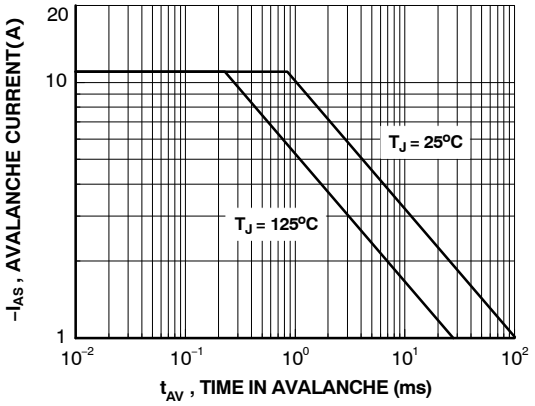


Figure 10. Unclamped Inductive Switching Capability

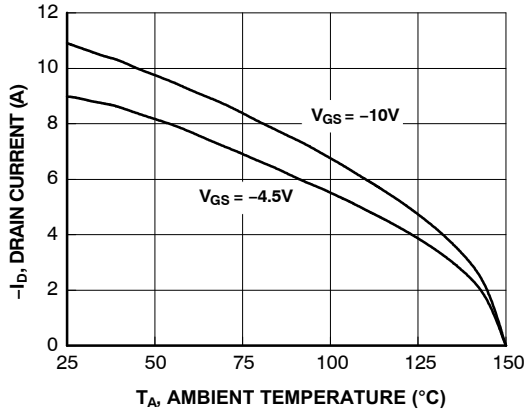


Figure 11. Maximum Continuous Drain Current vs Ambient Temperature

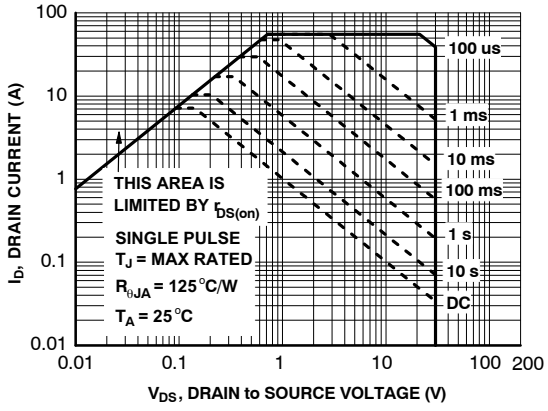


Figure 12. Forward Bias Safe Operating Area

TYPICAL CHARACTERISTICS (continued)

(T_J = 25 °C unless otherwise noted)

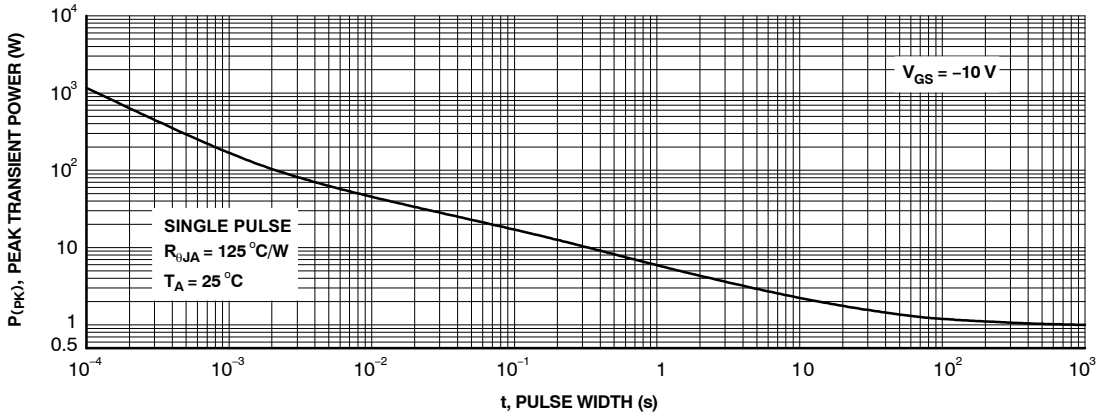


Figure 13. Single Pulse Maximum Power Dissipation

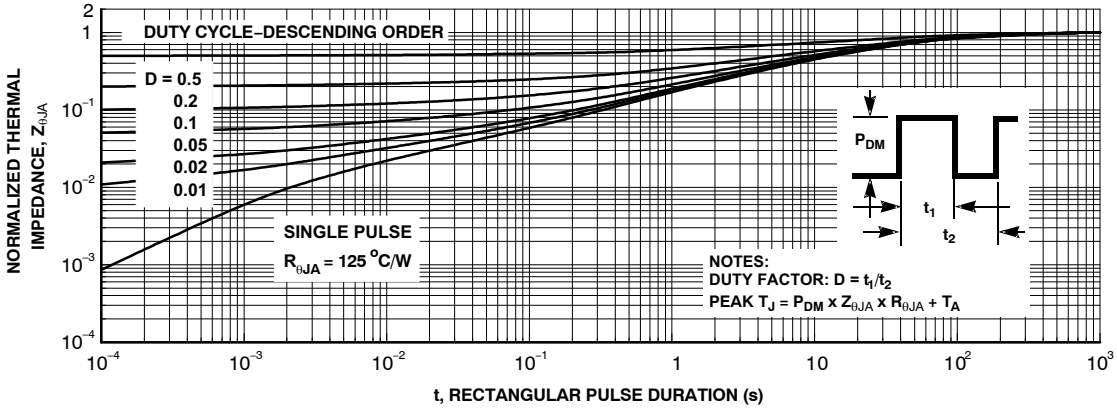


Figure 14. Junction To Ambient Transient Thermal Response Curve

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ISSUE A

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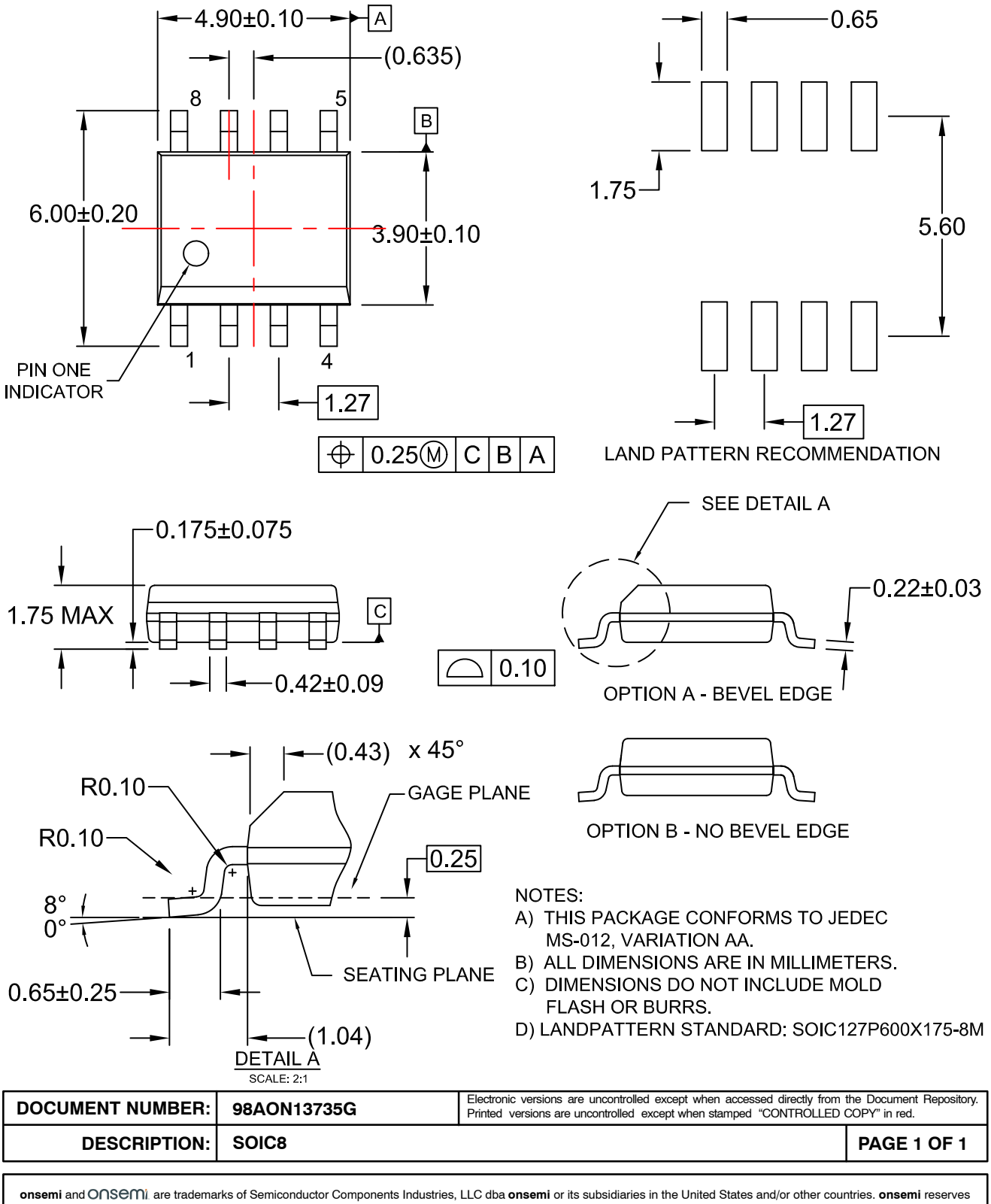

NOTES:
A) THIS PACKAGE CONFORMS TO JEDEC MS-012, VARIATION AA.
B) ALL DIMENSIONS ARE IN MILLIMETERS.
C) DIMENSIONS DO NOT INCLUDE MOLD FLASH OR BURRS.
D) LANDPATTERN STANDARD: SOIC127P600X175-8M

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