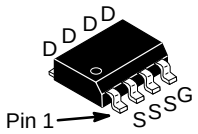
MOSFET – N-Channel, POWERTRENCH®

60 V, 18 A, 4.5 mΩ

FDS86540

V_{DS} MAX	$r_{DS(on)}$ MAX	I_D MAX
60 V	4.5 mΩ @ 10 V	18 A
	5.4 mΩ @ 8 V	



SOIC8
(SO-8)
CASE 751EB

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.

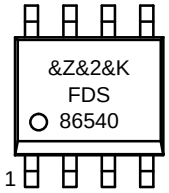
Features

- Max $r_{DS(on)}$ = 4.5 mΩ at V_{GS} = 10 V, I_D = 18 A
- Max $r_{DS(on)}$ = 5.4 mΩ at V_{GS} = 8 V, I_D = 16.5 A
- High Performance Trench Technology for Extremely Low $r_{DS(on)}$
- High Power and Current Handling Capability in a Widely Used Surface Mount Package
- 100% UIL Tested
- This Device is Pb-Free, Halide Free and is RoHS Compliant

Applications

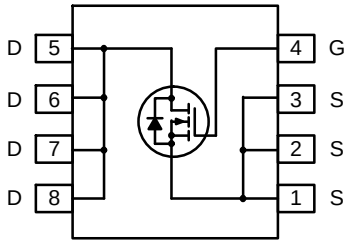
- Primary Switch in Isolated DC-DC
- Synchronous Rectifier
- Load Switch

MARKING DIAGRAM



&Z = Assembly Plant Code
&3 = 3-Digit Date Code
&K = 2-Digits Lot Run Traceability Code
FDS86540 = Device Code

PIN CONNECTIONS



ORDERING INFORMATION

See detailed ordering and shipping information on page 5 of this data sheet.

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

Symbol	Parameter		Ratings	Unit
V_{DS}	Drain to Source Voltage		60	V
V_{GS}	Gate to Source Voltage		±20	V
I_D	Drain Current	− Continuous	18	A
		− Pulsed	120	
E_{AS}	Single Pulse Avalanche Energy (Note 3)		194	mJ
P_D	Power Dissipation	T_C = 25 °C (Note 1)	5.0	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	Ratings	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case (Note 1)	25	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	50	

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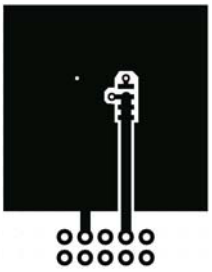
ELECTRICAL CHARACTERISTICS (T_J = 25 °C unless otherwise noted)

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	60			V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, referenced to 25 °C		28		mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 48 V, V_{GS} = 0 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	3.1	4	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 = 18 A		3.7	4.5	mΩ
		V_{GS} = 8 V, I_D = 16.5 A		4.2	5.4	
		V_{GS} = 10 V, I_D = 18 A, T_J = 125 °C		5.9	7	
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 18 A		69		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 30 V, V_{GS} = 0 V, f = 1MHz		4820	6410	pF
C_{oss}	Output Capacitance			1610	2145	pF
C_{rss}	Reverse Transfer Capacitance			67	130	pF
R_g	Gate Resistance			0.6		Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn-On Delay Time	V_{DD} = 30 V, I_D = 18 A, V_{GS} = 10 V, R_{GEN} = 6 Ω		28	45	ns
t_r	Rise Time			15	27	ns
$t_{d(off)}$	Turn-Off Delay Time			33	53	ns
t_f	Fall Time			7.1	15	ns
Q_g	Total Gate Charge	V_{GS} = 0 V to 10 V, V_{DD} = 30 V, I_D = 18 A		65	90	nC
Q_g	Total Gate Charge	V_{GS} = 0 V to 8 V, V_{DD} = 30 V, I_D = 18 A		53	75	nC
Q_{gs}	Gate to Source Charge	V_{DD} = 30 V, I_D = 18 A		22		nC
Q_{gd}	Gate to Drain “Miller” Charge			13		nC
DRAIN-SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source-Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = 18 A (Note 2)		0.8	1.3	V
		V_{GS} = 0 V, I_S = 2 A (Note 2)		0.7	1.2	
t_{rr}	Reverse Recovery Time	I_F = 18 A, di/dt = 100 A/μs		57	92	ns
Q_{rr}	Reverse Recovery Charge			44	71	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 determined with the device mounted on a 1 in^2 pad 2 oz copper pad on a 1.5 x 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.

2. Pulse Test: Pulse Width < 300 μs, Duty cycle < 2.0%.
3. Starting T_J = 25 °C, L = 0.3 mH, I_{AS} = 36 A, V_{DD} = 54 V, V_{GS} = 10 V.

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TYPICAL CHARACTERISTICS

(T_J = 25 °C UNLESS OTHERWISE NOTED)

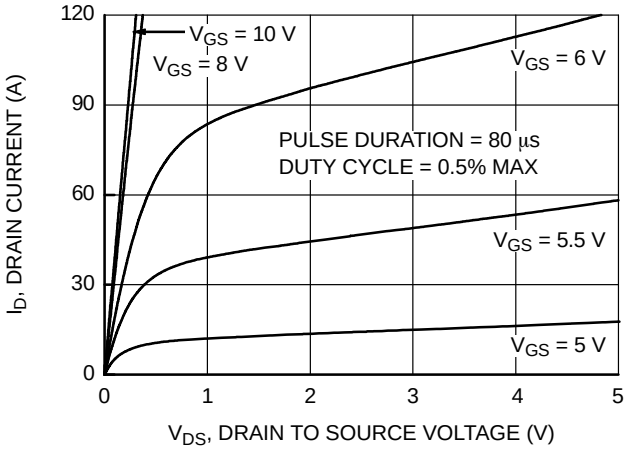


Figure 1. On-Region Characteristics

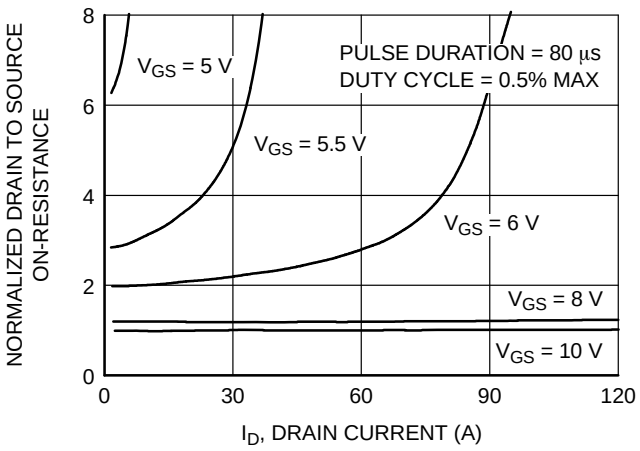


Figure 2. Normalized On-Resistance vs. Drain Current and Gate Voltage

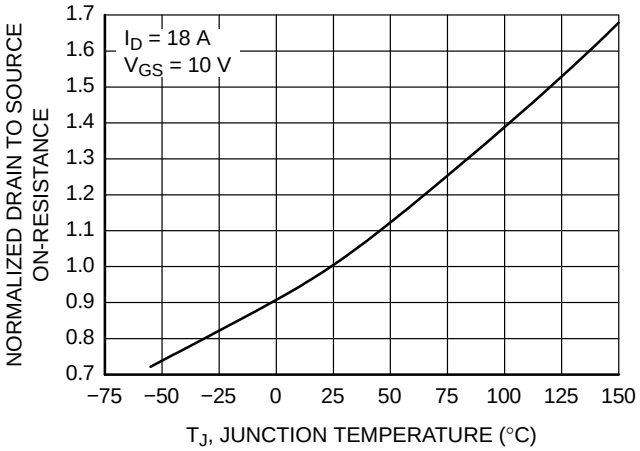


Figure 3. Normalized On- Resistance vs. Junction Temperature

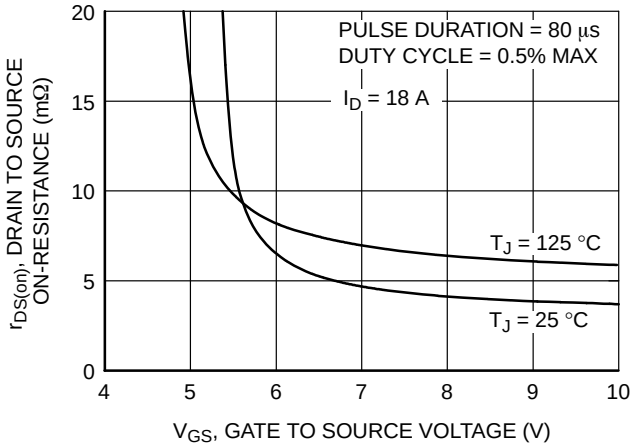


Figure 4. On-Resistance vs. Gate to Source Voltage

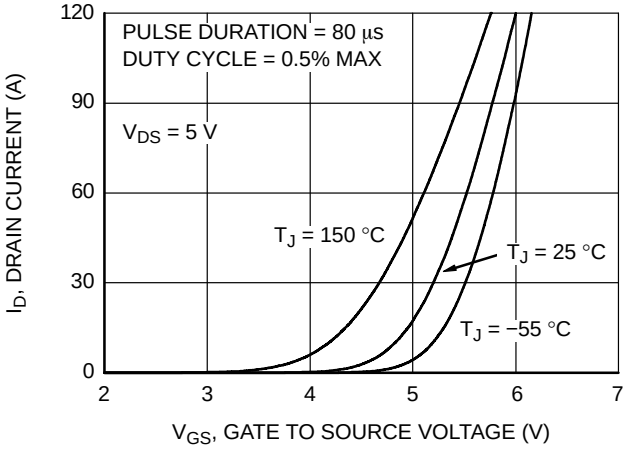


Figure 5. Transfer Characteristics

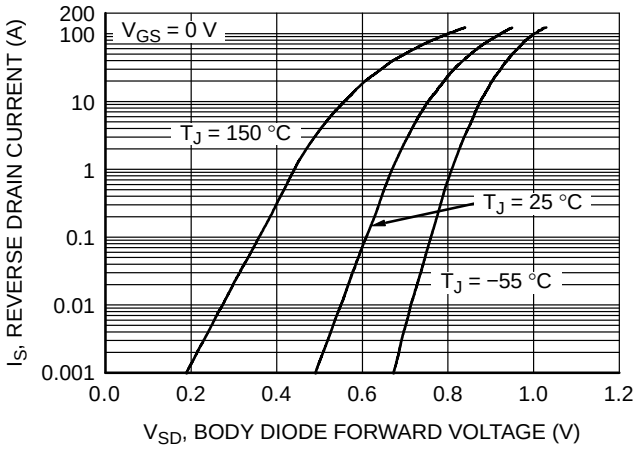


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

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TYPICAL CHARACTERISTICS

(T_J = 25 °C UNLESS OTHERWISE NOTED) (CONTINUED)

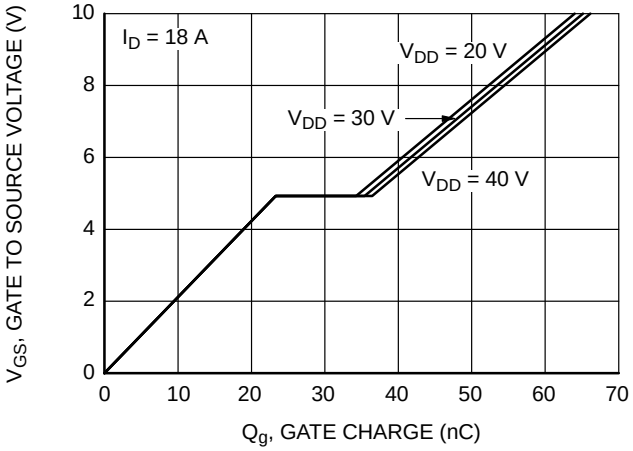


Figure 7. Gate Charge Characteristics

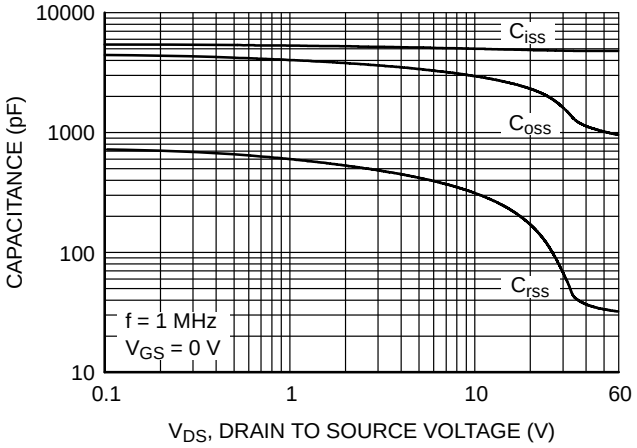


Figure 8. Capacitance vs. Drain to Source Voltage

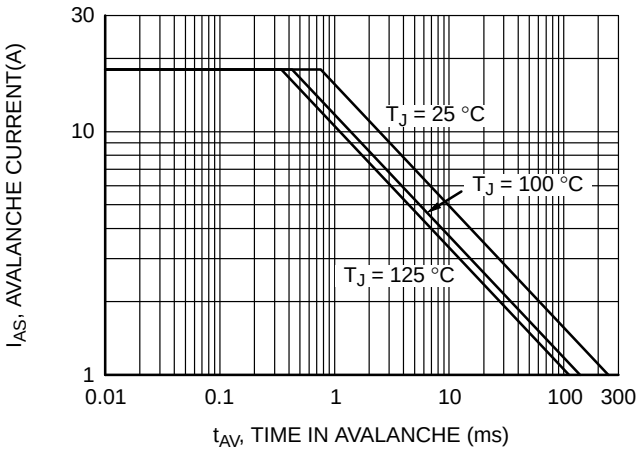


Figure 9. Unclamped Inductive Switching Capability

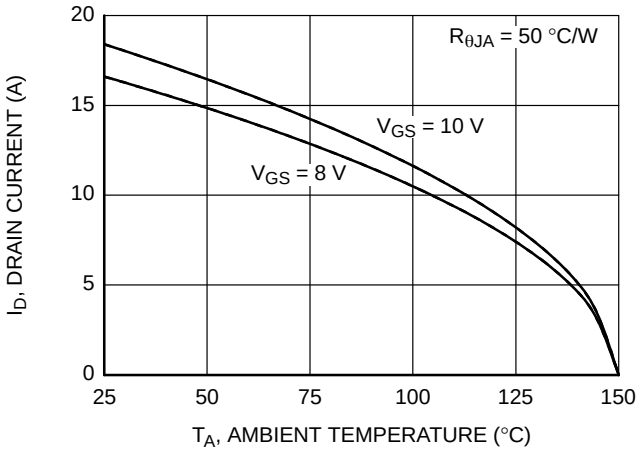


Figure 10. Maximum Continuous Drain Current vs. Ambient Temperature

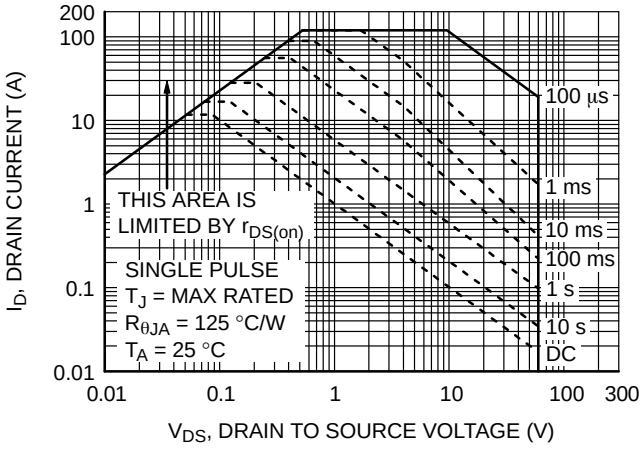


Figure 11. Forward Bias Safe Operating Area

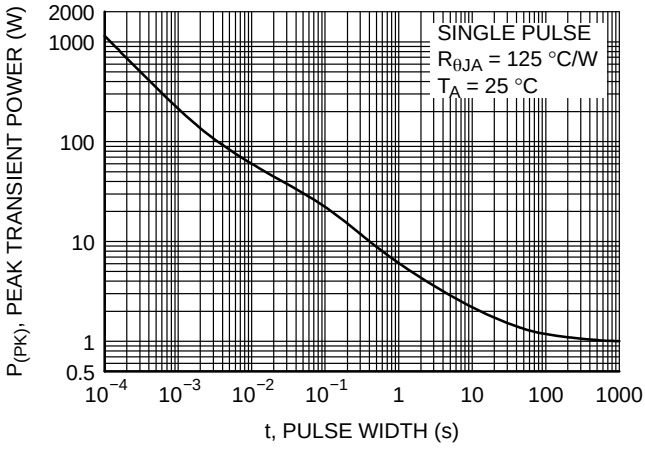


Figure 12. Single Pulse Maximum Power Dissipation

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TYPICAL CHARACTERISTICS

(T_J = 25 °C UNLESS OTHERWISE NOTED) (CONTINUED)

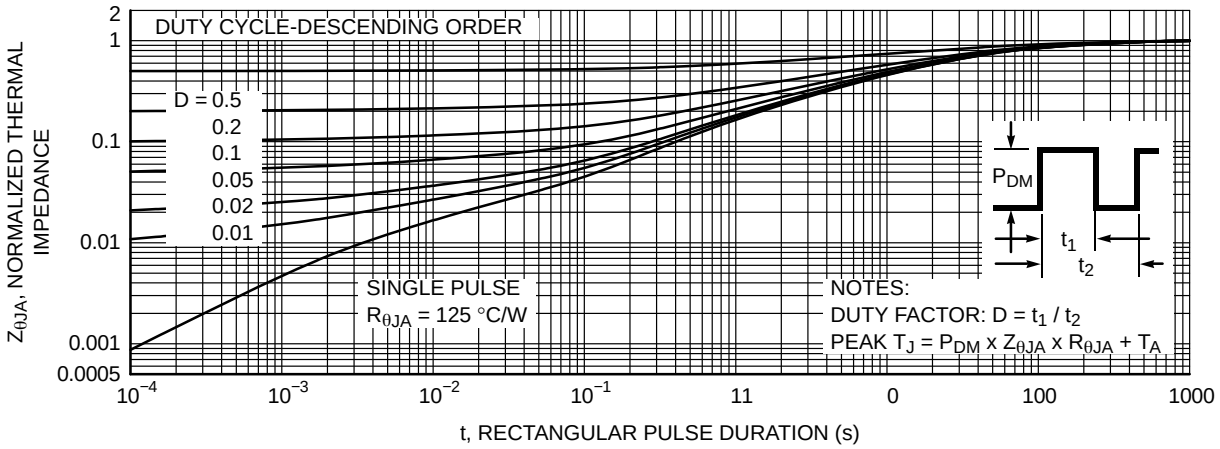


Figure 13. Junction-to-Ambient Transient Thermal Response Curve

PACKAGE MARKING AND ORDERING INFORMATION

Device	Device Marking	Package	Reel Size	Tape Width	Shipping†
FDS86540	FDS86540	SOIC8 (SO-8) (Pb-Free, Halide Free)	13”	12 mm	2500 / Tape & Reel

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

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REVISION HISTORY

Revision	Description of Changes	Date
3	Converted the document to **onsemi** format.	6/1/2026

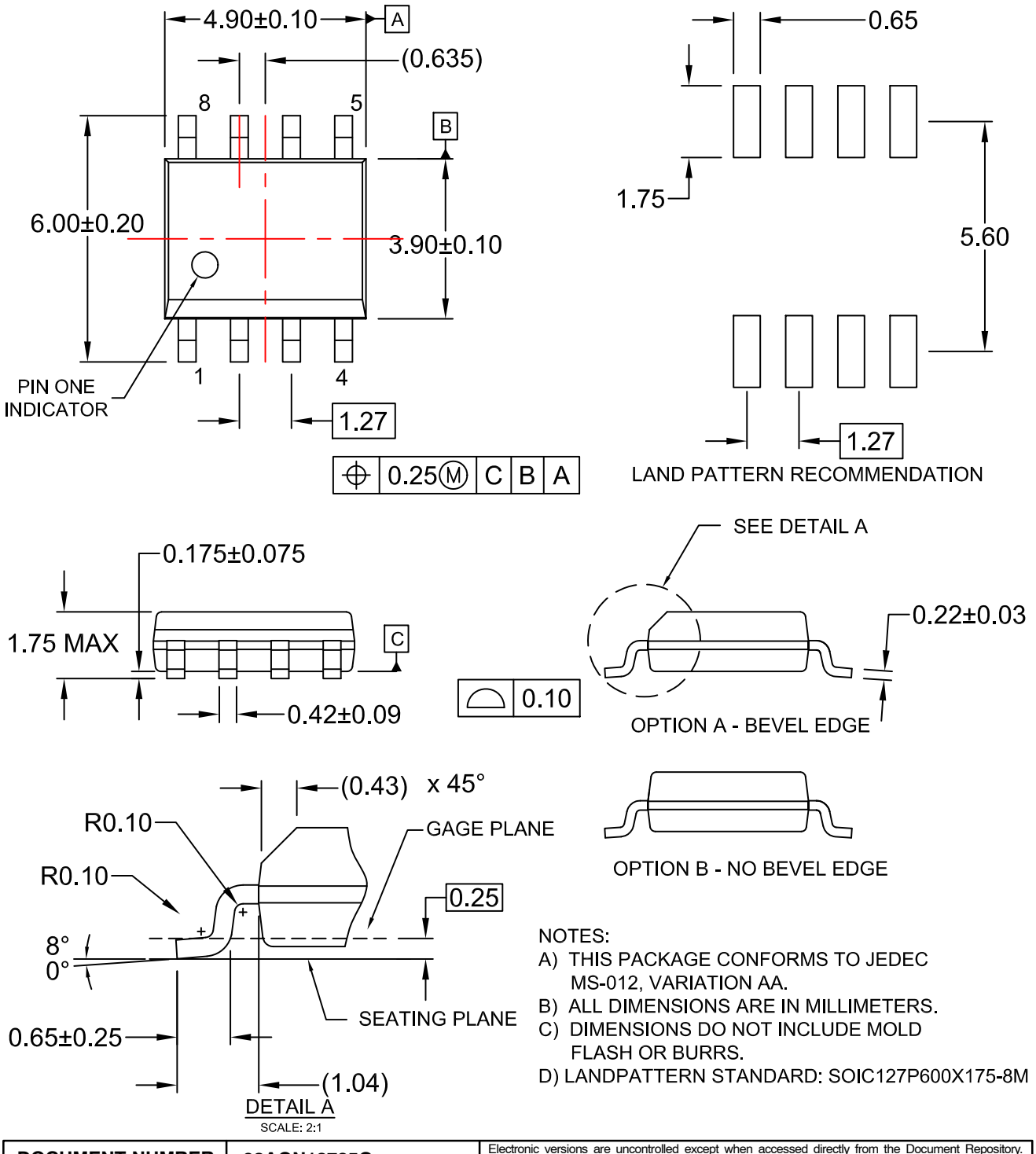
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SOIC8
CASE 751EB
ISSUE A

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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