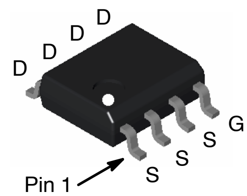
MOSFET – N-Channel, UltraFET Trench

200 V, 3.9 A, 70 mΩ

FDS2672



SOIC8
CASE 751EB

General Description

This single N−Channel MOSFET is produced using **onsemi**'s advanced UltraFET Trench process that has been especially tailored to minimize the on−state resistance and yet maintain superior switching performance.

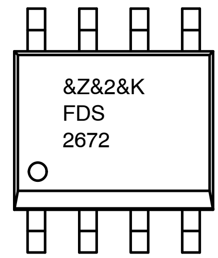
Features

- Max $r_{DS(on)}$ = 70 mΩ at V_{GS} = 10 V, I_D = 3.9 A
- Max $r_{DS(on)}$ = 80 mΩ at V_{GS} = 6 V, I_D = 3.5 A
- Fast Switching Speed
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- These Device is Pb−Free, Halide Free and are RoHS Compliant

Applications

- DC−DC Conversion

MARKING DIAGRAM



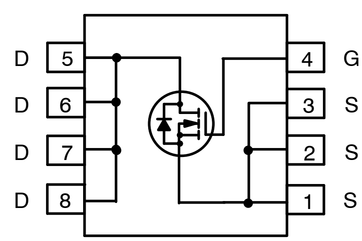
&Z	=	Assembly Plant Code
&2	=	Numeric Date Code
&K	=	Lot Code
FDS2672	=	Specific Device Code

ABSOLUTE MAXIMUM RATINGS T_A = 25°C unless otherwise noted

Symbol	Parameter	Value	Unit
V_{DS}	Drain to Source Voltage	200	V
V_{GS}	Gate to Source Voltage	±20	V
I_D	Drain Current – Continuous (Note 1a) – Pulsed	 3.9 50	A
E_{AS}	Single Pulse Avalanche Energy (Note 3)	37.5	mJ
P_D	Power Dissipation (Note 1a) (Note 1b)	 2.5 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.

PIN ASSIGNMENT



THERMAL CHARACTERISTICS

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

ORDERING INFORMATION

Device	Package	Shipping
FDS2672	SOIC8 (Pb−Free)	2500 / Tape & Reel

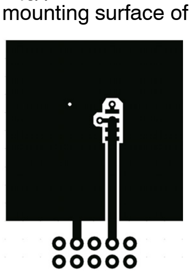
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

ELECTRICAL CHARACTERISTICS T_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	200	–	–	V
$\frac{\Delta BV_{DSS}}{\Delta T_J}$	Breakdown Voltage Temperature Coefficient	I_D = 250 μA, Referenced to 25°C	–	206	–	mV/°C
I_{DSS}	Zero Gate Voltage Drain Current	V_{DS} = 200 V, V_{GS} = 0 V V_{DS} = 200 V, V_{GS} = 0 V, T_J = 55°C	–	–	1 10	μA
I_{GSSF}	Gate to Source Leakage Current	V_{GS} = ±20 V	–	–	±100	nA
ON CHARACTERISTICS (Note 2)						
$V_{GS(th)}$	Gate to Source Threshold Voltage	V_{GS} = V_{DS}, I_D = 250 μA	2	2.9	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
$r_{DS(on)}$	Drain to Source On–Resistance	V_{GS} = 10 V, I_D = 3.9 A V_{GS} = 6 V, I_D = 3.5 A, V_{GS} = 10 V, I_D = 3.9 A, T_J = 125°C	– – –	58 63 124	70 80 148	mΩ
g_{FS}	Forward Transconductance	V_{DS} = 10 V, I_D = 3.9 A	–	15	–	S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{DS} = 100 V, V_{GS} = 0 V, f = 1 MHz	–	1905	2535	pF
C_{oss}	Output Capacitance		–	100	135	pF
C_{rss}	Reverse Transfer Capacitance		–	30	45	pF
R_g	Gate Resistance	f = 1 MHz	–	0.7	–	Ω
SWITCHING CHARACTERISTICS						
$t_{d(on)}$	Turn–On Delay Time	V_{DD} = 100 V, I_D = 3.9 A, V_{GS} = 10 V, R_{GS} = 6 Ω	–	22	35	ns
t_r	Rise Time		–	10	20	ns
$t_{d(off)}$	Turn–Off Delay Time		–	35	56	ns
t_f	Fall Time		–	10	20	ns
$Q_{g(TOT)}$	Total Gate Charge at 10 V	V_{DS} = 100 V, I_D = 3.9 A	–	33	46	nC
Q_{gs}	Gate to Source Gate Charge		–	11	–	nC
Q_{gd}	Gate to Drain Charge		–	7	–	nC
DRAIN–SOURCE DIODE CHARACTERISTICS						
V_{SD}	Source to Drain Diode Voltage	V_{GS} = 0 V, I_S = 3.9 A	–	0.75	1.2	V
t_{rr}	Reverse Recovery Time	I_F = 3.9 A, d_{if} / d_t = 100 A/ μs	–	67	101	ns
Q_{rr}	Reverse Recovery Change		–	179	269	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 s) 62.5°C/W steady state when mounted on a 1in^2 pad of 2 oz copper.

b) 125°C/W when mounted on a minimum pad.

Scale 1:1 on letter size paper

2. Pulse Test: Pulse Width < 300 μs, Duty Cycle < 2%.
3. Starting T_J = 25°C, L = 3 mH, I_{AS} = 5 A, V_{DD} = 100 V, V_{GS} = 10 V.

TYPICAL CHARACTERISTICS (T_J = 25°C UNLESS OTHERWISE NOTED)

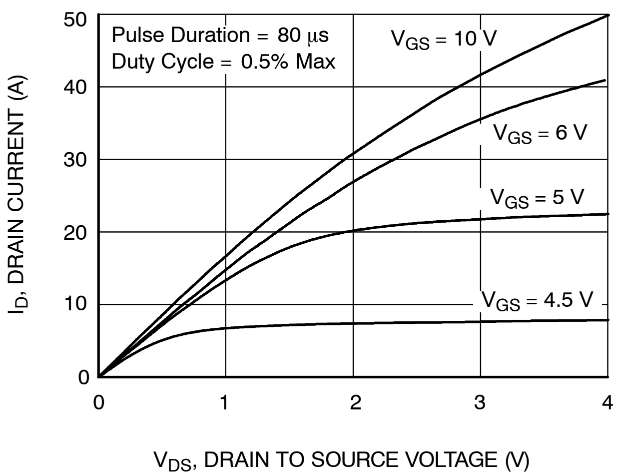


Figure 1. On−Region Characteristics

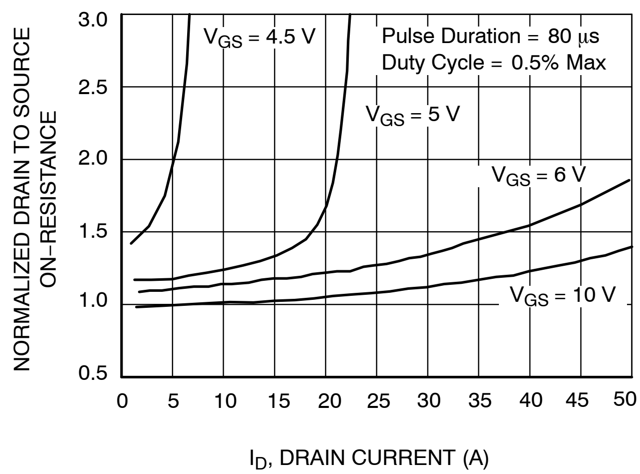


Figure 2. Normalized On−Resistance vs. Drain Current and Gate Voltage

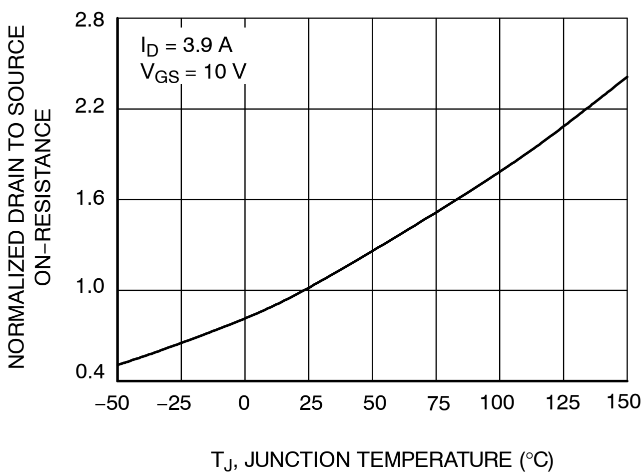


Figure 3. Normalized On−Resistance vs. Junction Temperature

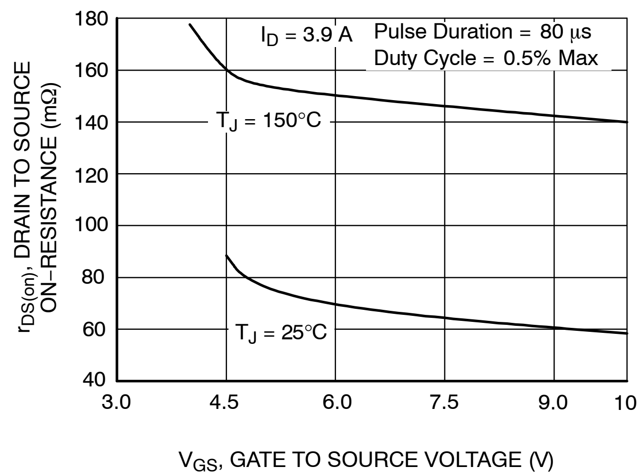


Figure 4. On−Resistance vs. Gate to Source Voltage

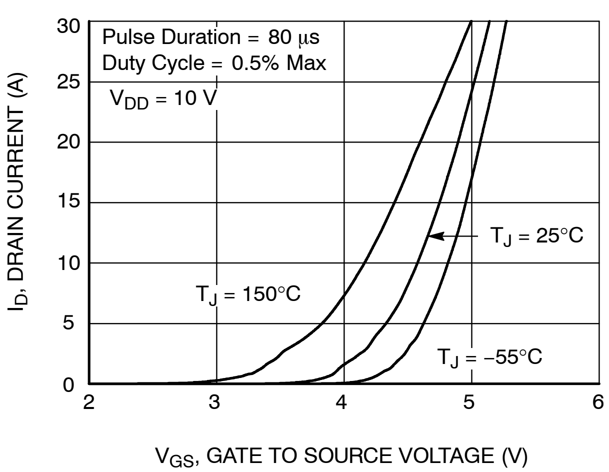


Figure 5. Transfer Characteristics

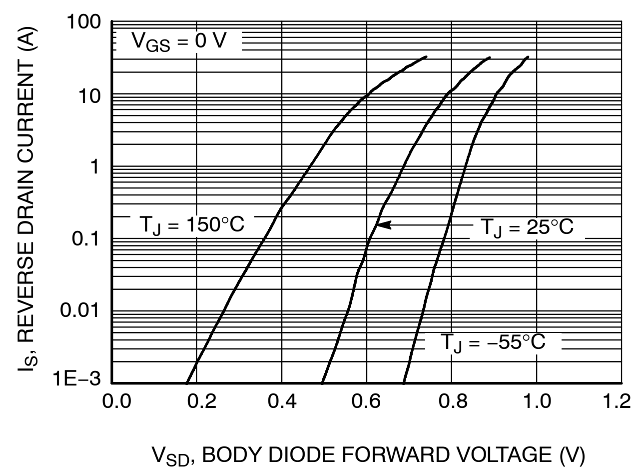


Figure 6. Source to Drain Diode Forward Voltage vs. Source Current

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

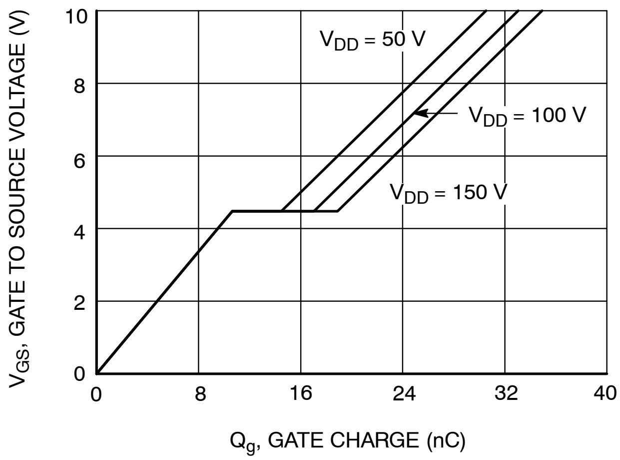


Figure 7. Gate Charge Characteristics

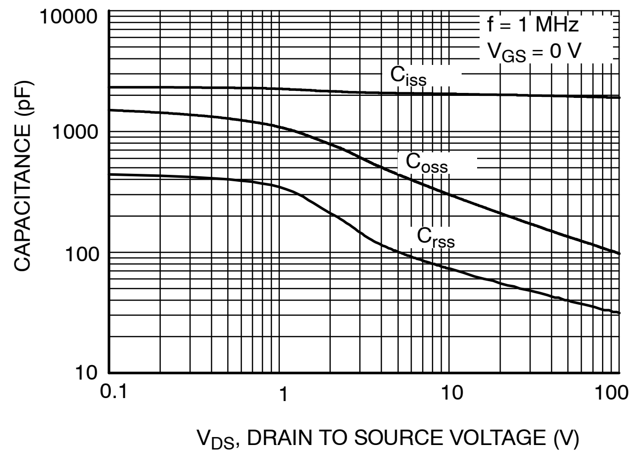


Figure 8. Capacitance vs. Drain to Source Voltage

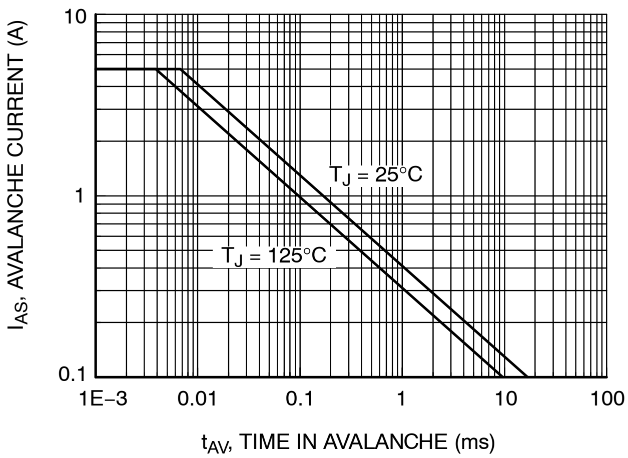


Figure 9. Unclamped Inductive Switching Capability

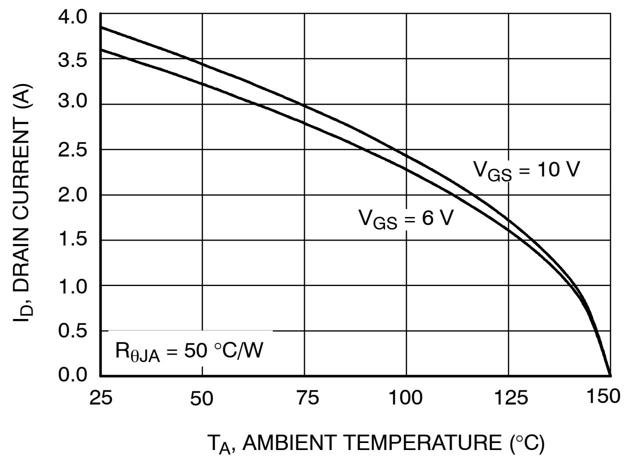


Figure 10. Ambient Continuous Drain Current vs Case Temperaturee

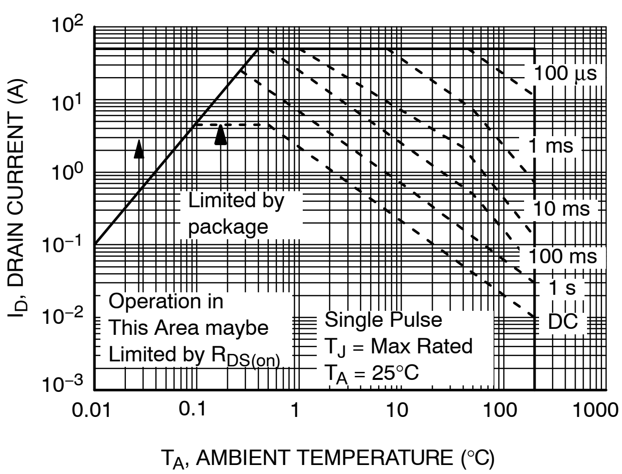


Figure 11. Forward Bias Safe Operating Area

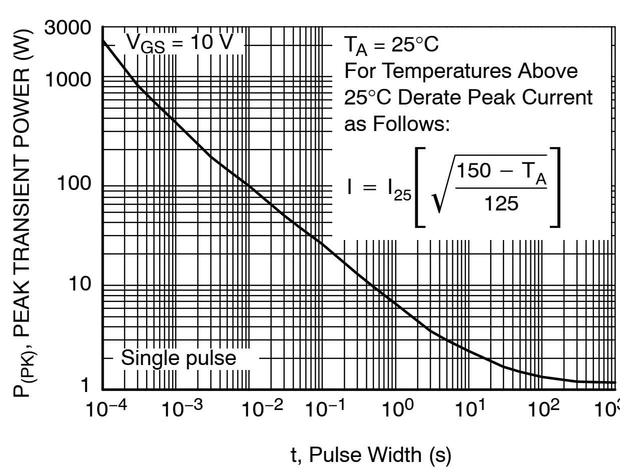


Figure 12. Single Pulse Maximum Power Dissipation

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

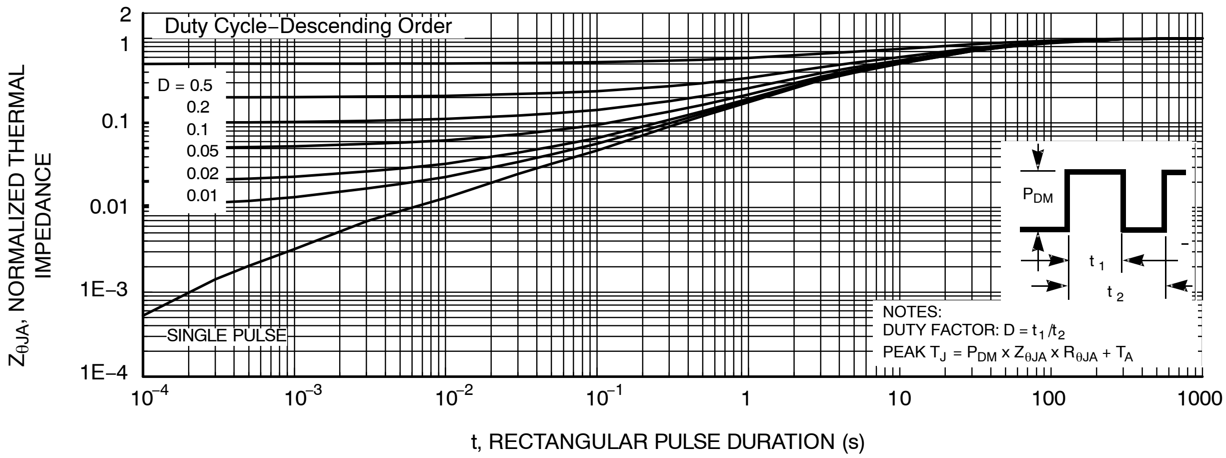


Figure 13. Transient Thermal Response Curve

Thermal characterization performed using the conditions described in Note 1b.
Transient thermal response will change depending on the circuit board design.

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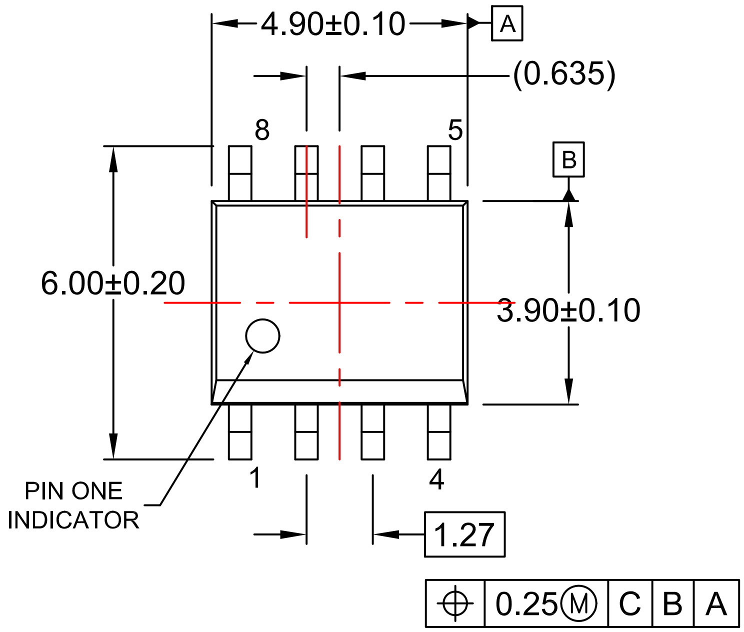
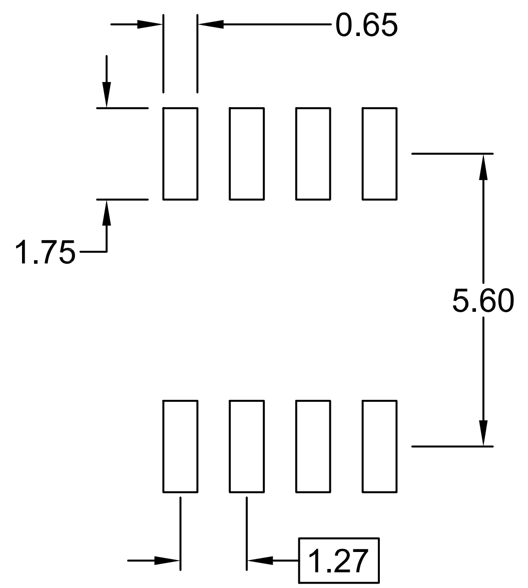
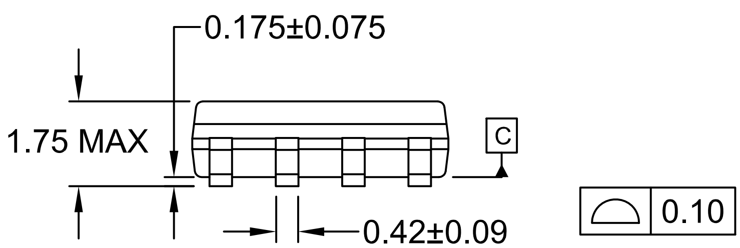
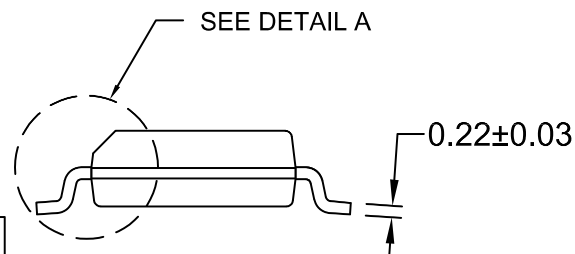
DATE 24 AUG 2017



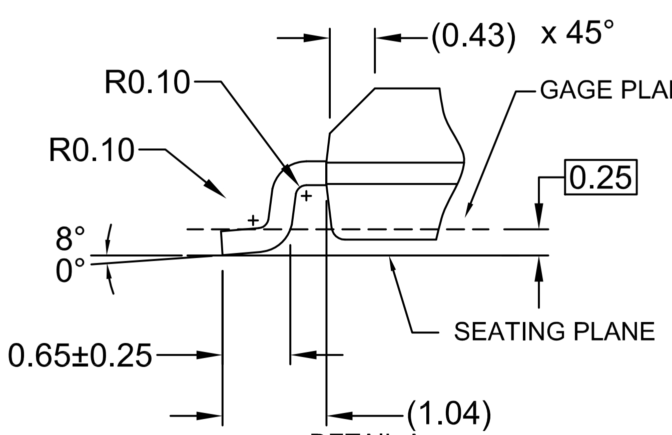


LAND PATTERN RECOMMENDATION

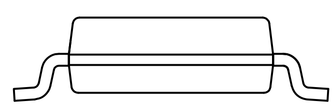




OPTION A - BEVEL EDGE



DETAIL A
SCALE: 2:1



OPTION B - NO BEVEL EDGE

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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