FDMC6675BZ

P-Channel POWERTRENCH® MOSFET

−30 V, −20 A, 14.4 mΩ

Description

The FDMC6675BZ has been designed to minimize losses in load switch applications. Advancements in both silicon and package technologies have been combined to offer the lowest $R_{DS(on)}$ and ESD protection.

Features

- Max $R_{DS(on)}$ = 14.4 mΩ at V_{GS} = −10 V, I_D = −9.5 A
- Max $R_{DS(on)}$ = 27.0 mΩ at V_{GS} = −4.5 V, I_D = −6.9 A
- HBM ESD Protection Level of 8 kV Typical (Note 3)
- Extended V_{GSS} Range (−25 V) for Battery Applications
- High Performance Trench Technology for Extremely Low $R_{DS(on)}$
- High Power and Current Handling Capability
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

Typical Applications

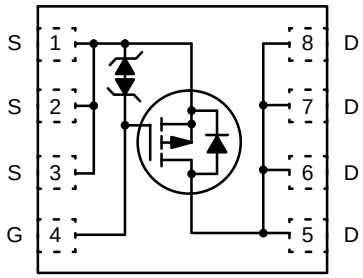
- Load Switch in Notebook and Server
- Notebook Battery Pack Power Management

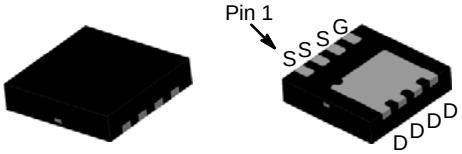
ON Semiconductor®

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V_{DS}	$R_{DS(on)}$ MAX	$I_{D\ MAX}$
−30 V	14.4 mΩ @ 10 V	−20 A

P−Channel





Top Bottom

WDFN8 3.3x3.3, 0.65P
CASE 511DR

MARKING DIAGRAM



$Y	= ON Semiconductor Logo
&Z	= Assembly Plant Code
&2	= Numeric Date Code
&K	= Lot Code
FDMC6675BZ	= Specific Device Code

ORDERING INFORMATION

See detailed ordering and shipping information on page 2 of this data sheet.

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MOSFET MAXIMUM RATINGS (T_A = 25°C, Unless otherwise specified)

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	T_C = 25°C	−20	A
		− Continuous	T_A = 25°C (Note 1a)	−9.5	
		− Pulsed		−32	
P_D	Power Dissipation		T_C = 25°C	36	W
	Power Dissipation		T_A = 25°C (Note 1a)	2.3	
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	3.4	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Note 1a)	53	

PACKAGE MARKING AND ORDERING INFORMATION

Device Marking	Device	Package	Reel Size	Tape Width	Shipping (Qty / Packing)†
FDMC6675BZ	FDMC6675BZ	WDFN8 3.3x3.3, 0.65P (MLP) (Pb−Free/Halogen Free)	13″	12 mm	3000 / 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.

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	−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 V_{DS} = −24 V, V_{GS} = 0 V, T_J = 125°C	− −	− −	−1 −100	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	−1.0	−1.9	−3.0	V
$\frac{\Delta V_{GS(th)}}{\Delta T_J}$	Gate to Source Threshold Voltage Temperature Coefficient	I_D = −250 μA, referenced to 25°C	−	−6.0	−	mV/°C
$R_{DS(on)}$	Static Drain to Source On Resistance	V_{GS} = −10 V, I_D = −9.5 A	−	10.7	14.4	mΩ
		V_{GS} = −4.5 V, I_D = −6.9 A	−	17.4	27.0	
		V_{GS} = −10 V, I_D = −9.5 A, T_J = 125°C	−	15.2	20.5	
g_{FS}	Forward Transconductance	V_{DD} = −5 V, I_D = −9.5 A	−	28	−	S

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

DYNAMIC CHARACTERISTICS

C_{iss}	Input Capacitance	V_{DS} = −15 V, V_{GS} = 0 V, f = 1 MHz	−	2154	2865	pF
C_{oss}	Output Capacitance		−	392	525	pF
C_{rss}	Reverse Transfer Capacitance		−	349	525	pF

SWITCHING CHARACTERISTICS

$t_{d(on)}$	Turn−On Delay Time	V_{DD} = −15 V, I_D = −9.5 A, V_{GS} = −10 V, R_{GEN} = 6 Ω	−	11	20	ns
t_r	Rise Time		−	10	20	
$t_{d(off)}$	Turn−off Delay Time		−	44	71	
t_f	Fall Time		−	26	42	
Q_g	Total Gate Charge	V_{GS} = 0V to −10 V, V_{DD} = −15 V, I_D = −9.5 A	−	46	65	nC
Q_g	Total Gate Charge	V_{GS} = 0V to −5 V, V_{DD} = −15 V, I_D = −9.5 A	−	26	37	nC
Q_{gs}	Gate to Source Charge	V_{DD} = −15 V, I_D = −9.5 A	−	6.4	−	nC
Q_{gd}	Gate to Drain "Miller" Charge	V_{DD} = −15 V, I_D = −9.5 A	−	13	−	nC

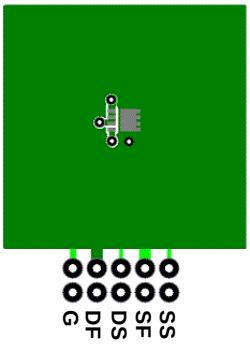
DRAIN−SOURCE DIODE CHARACTERISTICS

V_{SD}	Source to Drain Diode Forward Voltage	V_{GS} = 0 V, I_S = −9.5 A (Note 2)	−	−0.89	−1.3	V
		V_{GS} = 0 V, I_S = −1.6 A (Note 2)	−	−0.73	−1.2	V
t_{rr}	Reverse Recovery Time	I_F = −9.5 A, di/dt = 100 A/μs	−	24	38	ns
Q_{rr}	Reverse Recovery Charge		−	15	27	nC

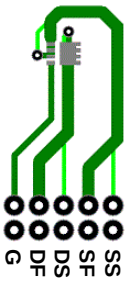
Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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 × 1.5 in. board of FR−4 material. $R_{\theta CA}$ is determined by the user's board design.



a) 53°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. 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)

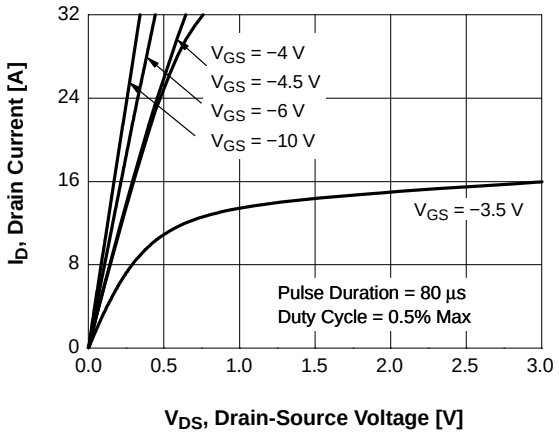


Figure 1. On-Region Characteristics

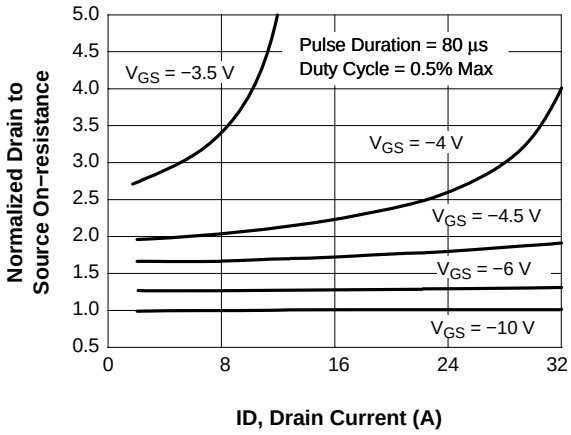


Figure 2. Normalized On−Resistance vs Drain Current and Gate Voltage

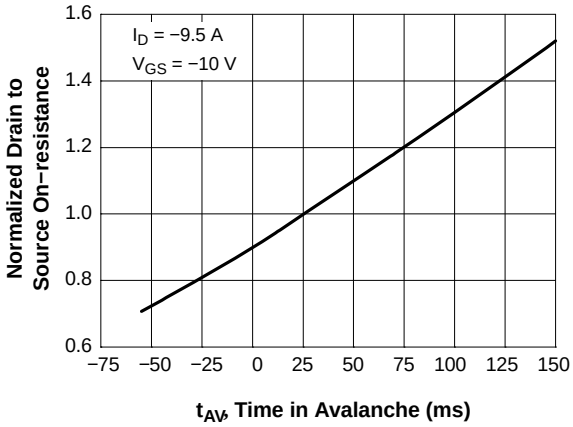


Figure 3. Normalized On Resistance vs Junction Temperature

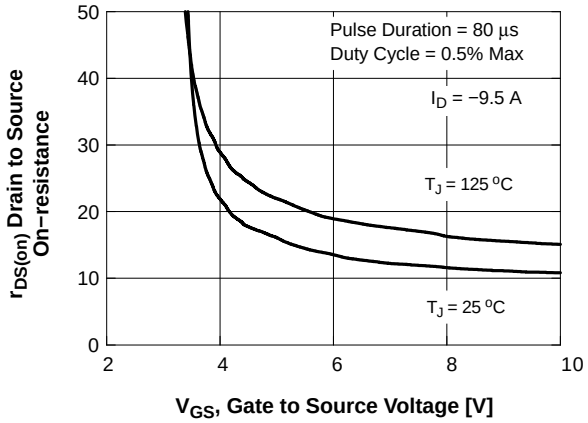


Figure 4. On−Resistance vs Gate to Source Voltage

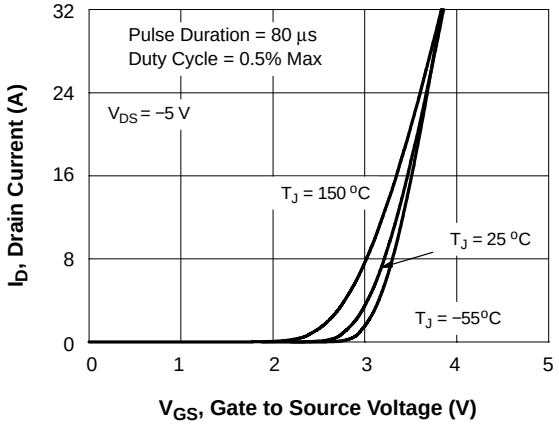


Figure 5. Transfer Characteristics

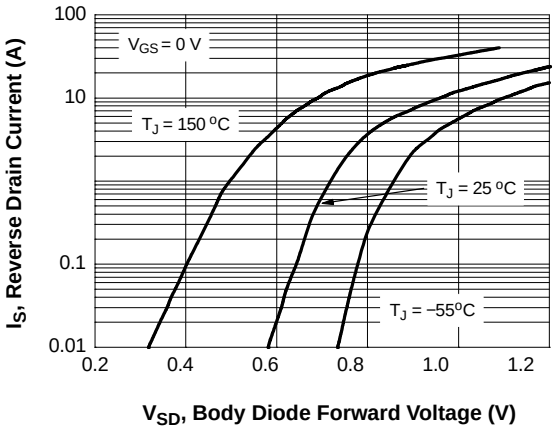


Figure 6. Source to Drain Diode Forward Voltage vs Source Current

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(T_J = 25 °C unless otherwise noted)

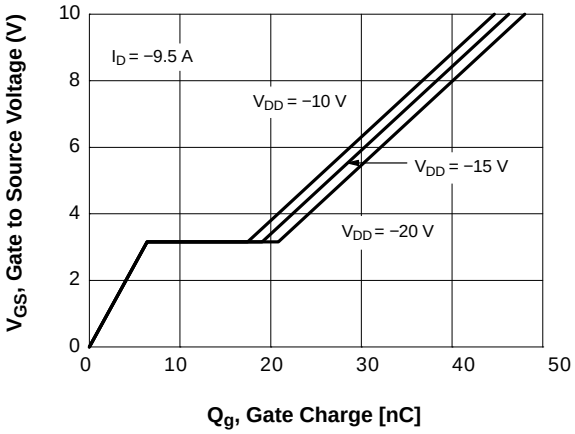


Figure 7. Gate Charge Characteristics

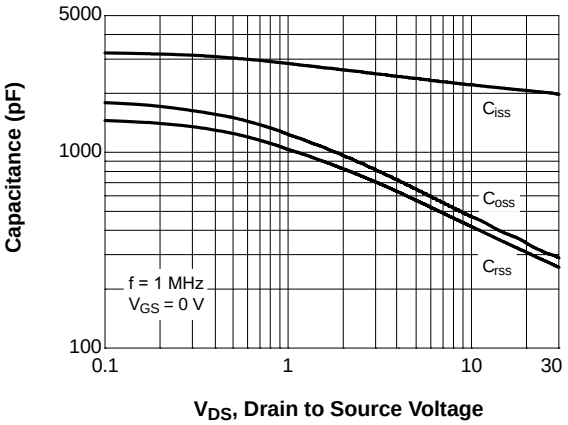


Figure 8. Capacitance vs Drain to Source Voltage

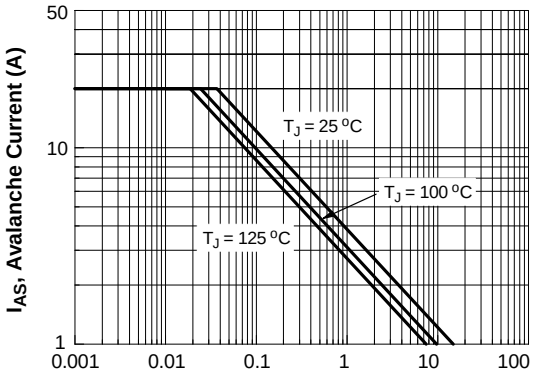


Figure 9. Unclamped Inductive Switching Capability

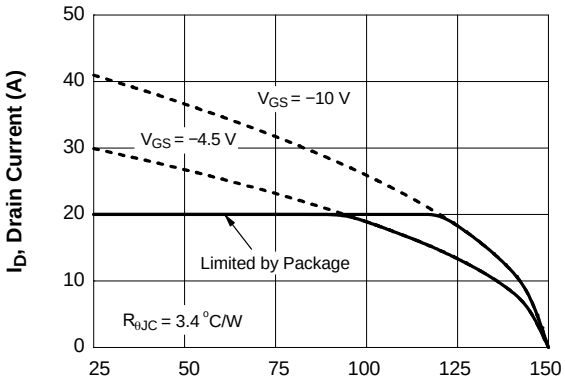


Figure 10. Maximum Continuous Drain Current vs Case Temperature

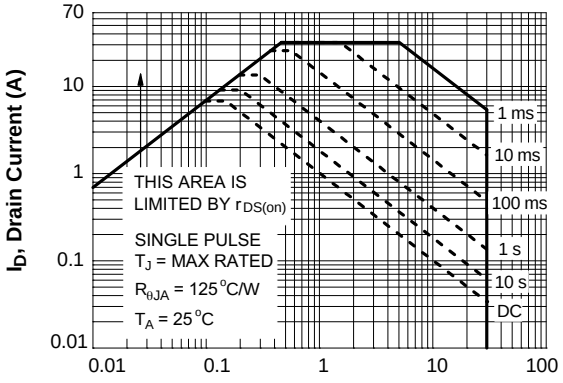


Figure 11. Forward Bias Safe Operating Area

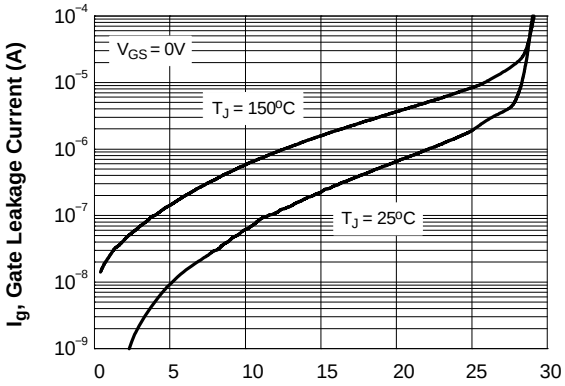


Figure 12. I_{gss} vs V_{gss}

TYPICAL PERFORMANCE CHARACTERISTICS (Continued)

(T_J = 25 °C unless otherwise noted)

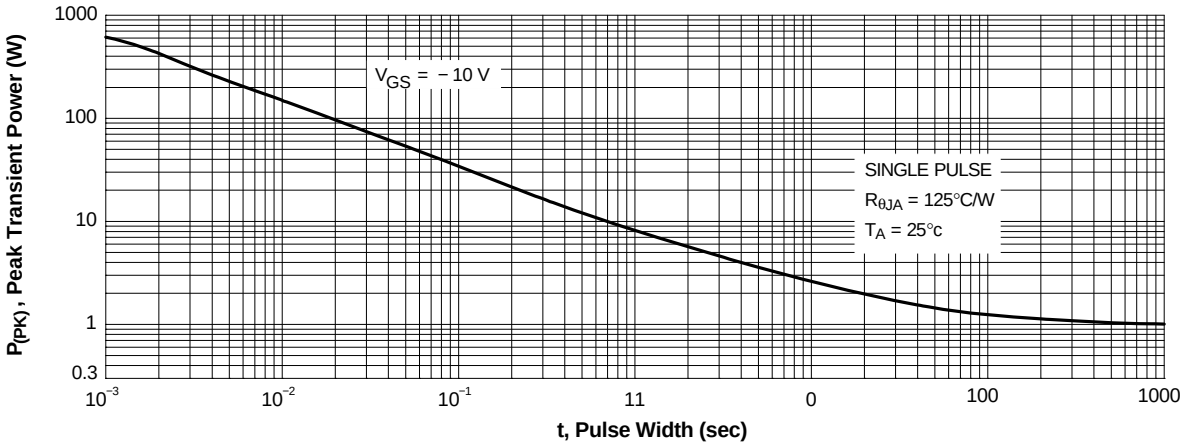


Figure 13. Single Pulse Maximum Power Dissipation

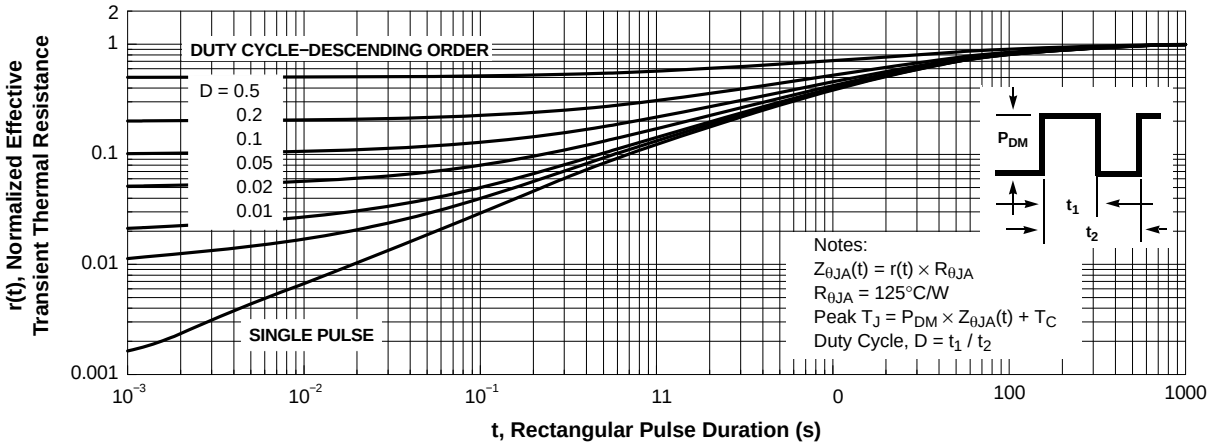
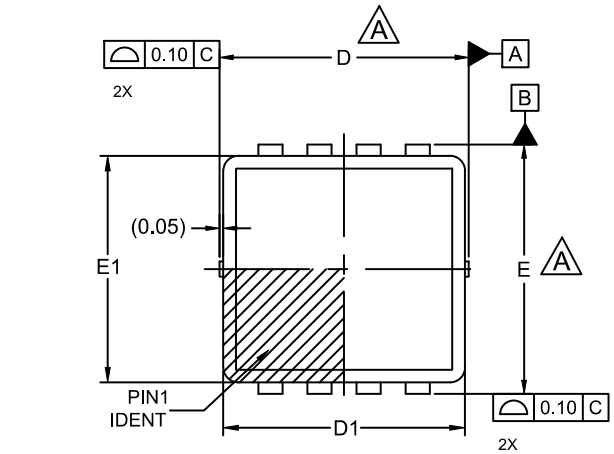


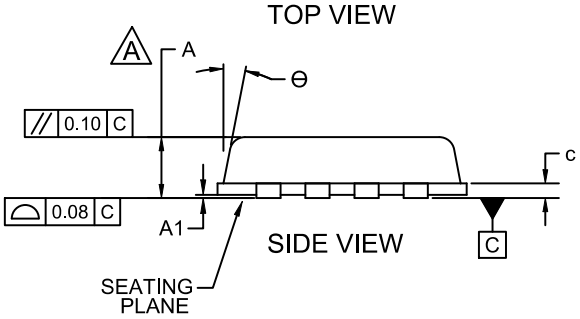
Figure 14. Junction−to−Ambient Transient Thermal Response Curve

PACKAGE DIMENSIONS

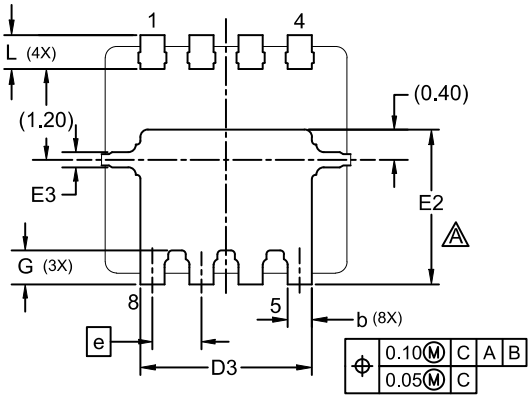
WDFN8 3.3x3.3, 0.65P
CASE 511DR
ISSUE A



TOP VIEW



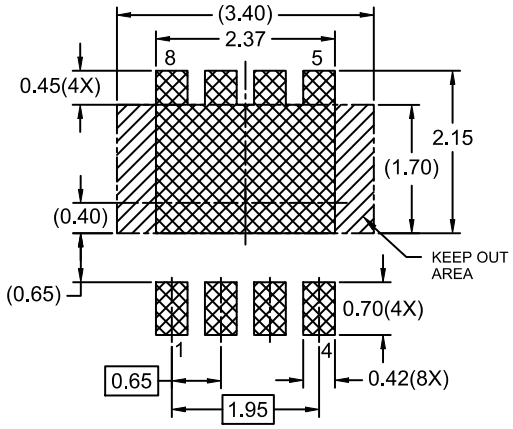
SIDE VIEW



BOTTOM VIEW

NOTES:
A. DIMENSIONS ARE IN MILLIMETERS.
B. DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 2009.
C. SEATING PLANE IS DEFINED BY TERMINAL TIPS ONLY
D. BODY DIMENSIONS DO NOT INCLUDE MOLD FLASH PROTRUSIONS NOR GATE BURRS. MOLD FLASH PROTRUSION OR GATE BURR DOES NOT EXCEED 0.150MM.

DIM	MILLIMETERS		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	-	0.05
b	0.27	0.32	0.37
c	0.15	0.20	0.25
D	3.20	3.30	3.40
D1	3.10	3.20	3.30
D3	2.17	2.27	2.37
E	3.20	3.30	3.40
E1	2.90	3.00	3.10
E2	1.95	2.05	2.15
E3	0.15	0.20	0.25
e	0.65 BSC		
G	0.40	0.45	0.50
L	0.40	0.45	0.50
θ	0	-	12



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