

IRF9Z24STRLPBF-VB Datasheet

P-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

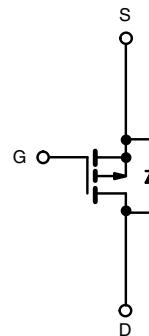
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)	Q_g (Typ)
- 60	0.064 at $V_{GS} = -10$ V	- 30	12
	0.077 at $V_{GS} = -4.5$ V	- 28	

FEATURES

- TrenchFET® Power MOSFET
- 100 % UIS Tested

APPLICATIONS

- Load Switch



P-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_C = 25$ °C, unless otherwise noted

Parameter	Symbol	Limit	Unit
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ($T_J = 175$ °C)	I_D	- 30	A
$T_C = 100$ °C		- 20	
Pulsed Drain Current	I_{DM}	- 90	
Continuing Source Current (Diode Conduction)	I_S	- 28	
Avalanche Current	I_{AS}	- 31	
Single Pulse Avalanche Energy	E_{AS}	7.2	mJ
Maximum Power Dissipation	P_D	60 ^a	W
$T_A = 25$ °C		6 ^b	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 175	°C

THERMAL RESISTANCE RATINGS

Parameter	Symbol	Typical	Maximum	Unit
Junction-to-Ambient ^b	R_{thJA}	20	25	°C/W
Steady State		62	75	
Junction-to-Case	R_{thJC}	5	6	

Notes:

a. See SOA curve for voltage derating.
 b. Surface Mounted on 1" x 1" FR-4 board.

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted						
Parameter	Symbol	Test Conditions	Min	Typ ^a	Max	Unit
Static						
Drain-Source Breakdown Voltage	$V_{(\text{BR})\text{DSS}}$	$V_{\text{GS}} = 0 \text{ V}, I_D = -250 \mu\text{A}$	- 60			V
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{DS}} = V_{\text{GS}}, I_D = -250 \mu\text{A}$	- 1.0	- 2.0	- 3.0	
Gate-Body Leakage	I_{GSS}	$V_{\text{DS}} = 0 \text{ V}, V_{\text{GS}} = \pm 20 \text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}$			- 1	μA
		$V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 125^\circ\text{C}$			- 50	
		$V_{\text{DS}} = -60 \text{ V}, V_{\text{GS}} = 0 \text{ V}, T_J = 175^\circ\text{C}$			- 150	
On-State Drain Current ^b	$I_{\text{D}(\text{on})}$	$V_{\text{DS}} = -5 \text{ V}, V_{\text{GS}} = -10 \text{ V}$	- 10			A
Drain-Source On-State Resistance ^b	$r_{\text{DS}(\text{on})}$	$V_{\text{GS}} = -10 \text{ V}, I_D = -5 \text{ A}$		0.064		Ω
		$V_{\text{GS}} = -10 \text{ V}, I_D = -5 \text{ A}, T_J = 125^\circ\text{C}$		0.110		
		$V_{\text{GS}} = -10 \text{ V}, I_D = -5 \text{ A}, T_J = 175^\circ\text{C}$		0.250		
		$V_{\text{GS}} = -4.5 \text{ V}, I_D = -2 \text{ A}$		0.077		
Forward Transconductance ^b	g_{fs}	$V_{\text{DS}} = -15 \text{ V}, I_D = -5 \text{ A}$		8		S
Dynamic						
Input Capacitance	C_{iss}	$V_{\text{DS}} = -25 \text{ V}, V_{\text{GS}} = 0 \text{ V}, f = 1 \text{ MHz}$		1000		pF
Output Capacitance	C_{oss}			210		
Reverse Transfer Capacitance	C_{rss}			110		
Total Gate Charge	Q_g	$V_{\text{DS}} = -30 \text{ V}, V_{\text{GS}} = -10 \text{ V}, I_D = -8.4 \text{ A}$		12.5	19	nC
Gate-Source Charge	Q_{gs}			2.3		
Gate-Drain Charge	Q_{gd}			3.2		
Gate Resistance	R_g		$f = 1 \text{ MHz}$	8.0		Ω
Turn-On Delay Time ^c	$t_{\text{d}(\text{on})}$	$V_{\text{DD}} = -30 \text{ V}, R_L = 3.57 \Omega$ $I_D \approx -8.4 \text{ A}, V_{\text{GEN}} = -10 \text{ V}, R_G = 2.5 \Omega$		5	10	ns
Rise Time ^c	t_r			14	25	
Turn-Off Delay Time ^c	$t_{\text{d}(\text{off})}$			15	25	
Fall Time ^c	t_f			7	12	
Source-Drain Diode Ratings and Characteristics ($T_C = 25^\circ\text{C}$) ^b						
Pulsed Current	I_{SM}				- 30	A
Forward Voltage ^b	V_{SD}	$I_F = -2 \text{ A}, V_{\text{GS}} = 0 \text{ V}$		- 0.9	- 1.3	V
Reverse Recovery Time	t_{rr}	$I_F = -8 \text{ A}, \text{di/dt} = 100 \text{ A}/\mu\text{s}$		50	80	ns
Reverse Recovery Time	Q_{rr}			80	120	nC

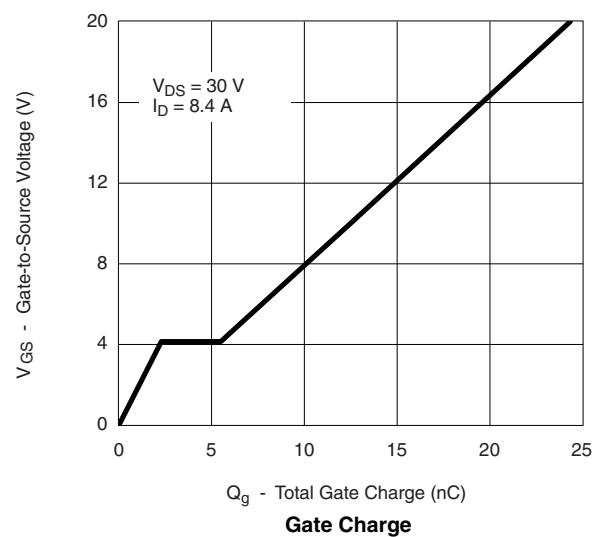
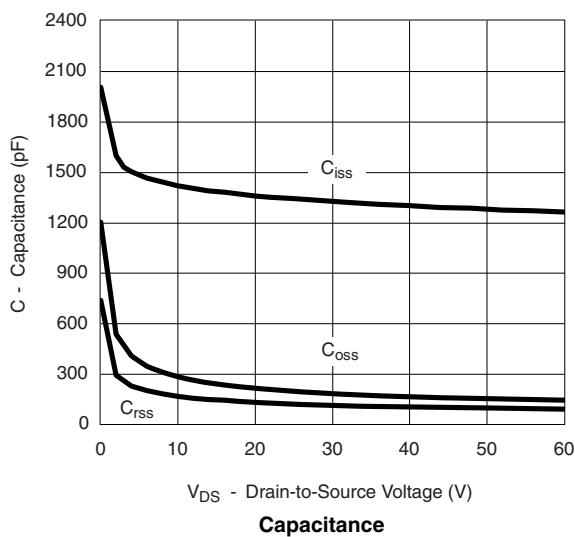
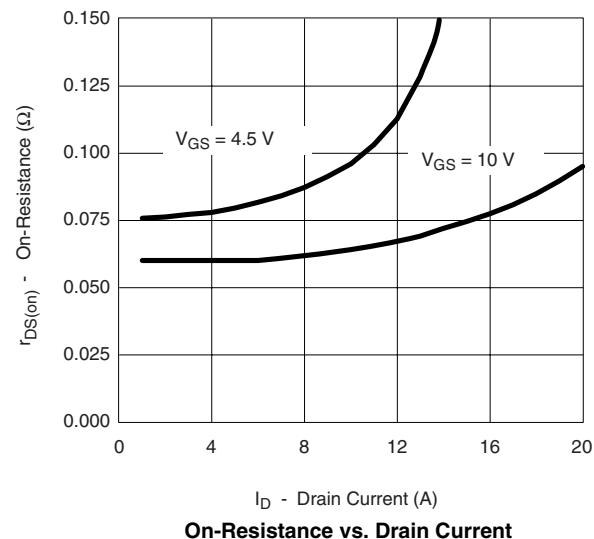
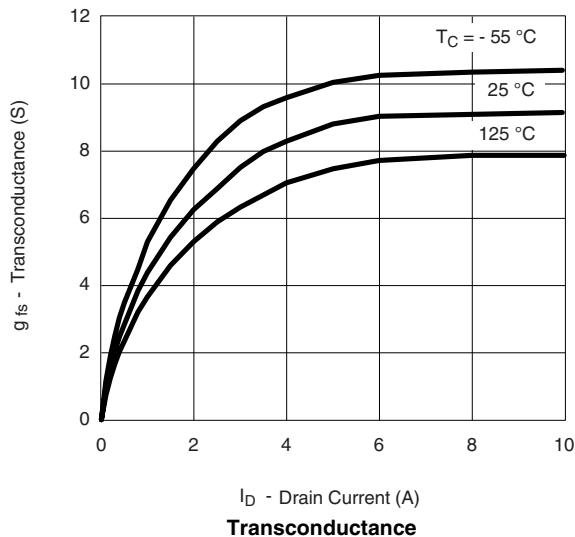
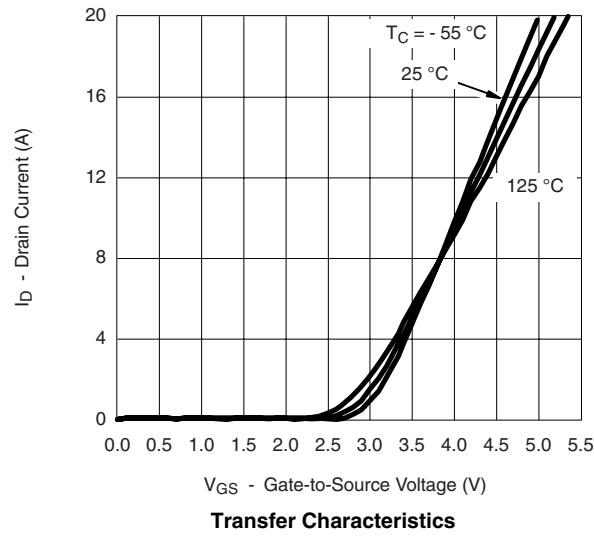
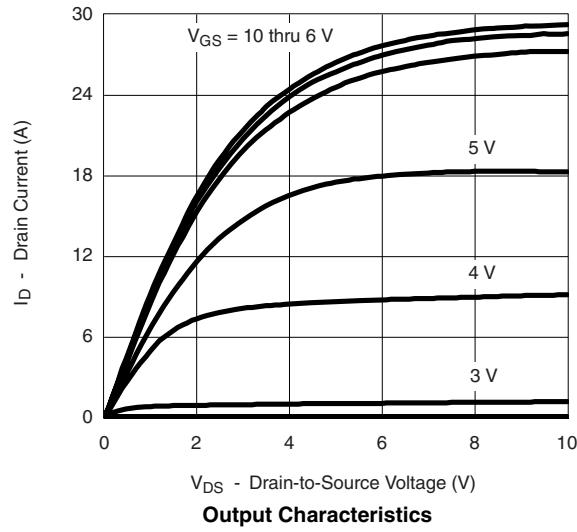
Notes:

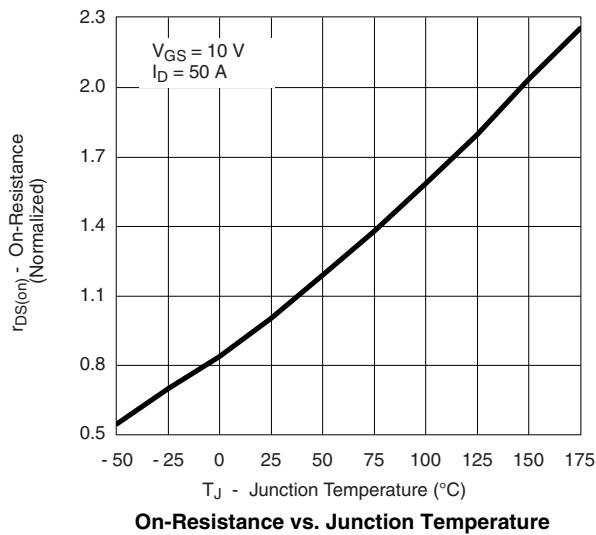
a. Guaranteed by design, not subject to production testing.

b. Pulse test; pulse width $\leq 300 \mu\text{s}$, duty cycle $\leq 2\%$.

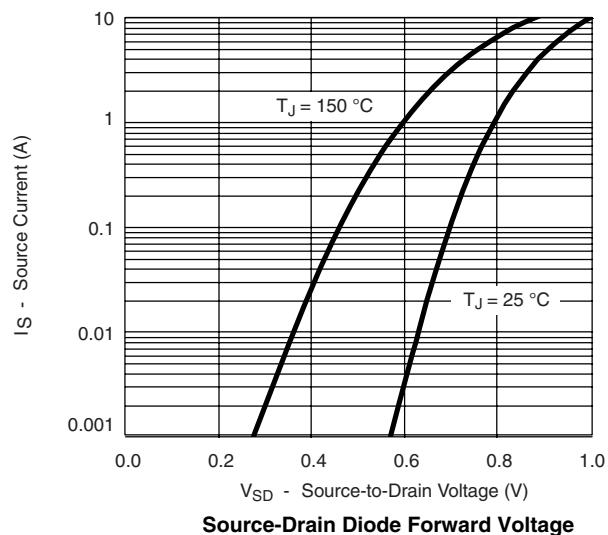
c. Independent of operating temperature.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

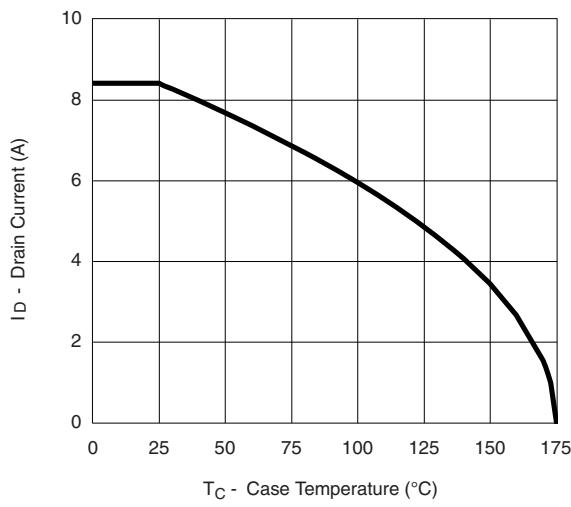
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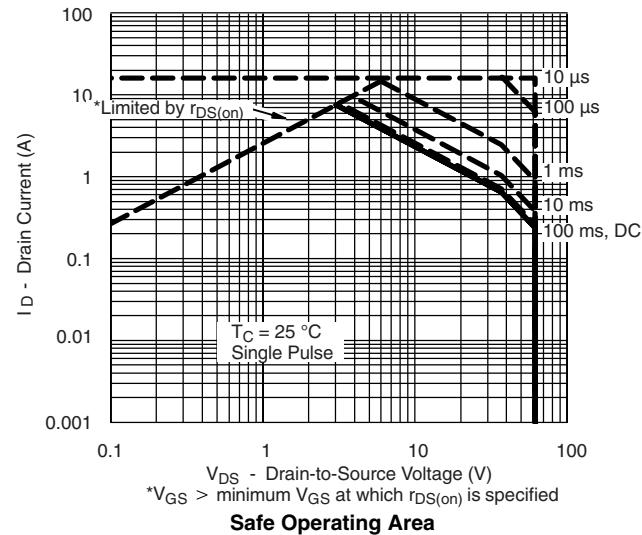
On-Resistance vs. Junction Temperature



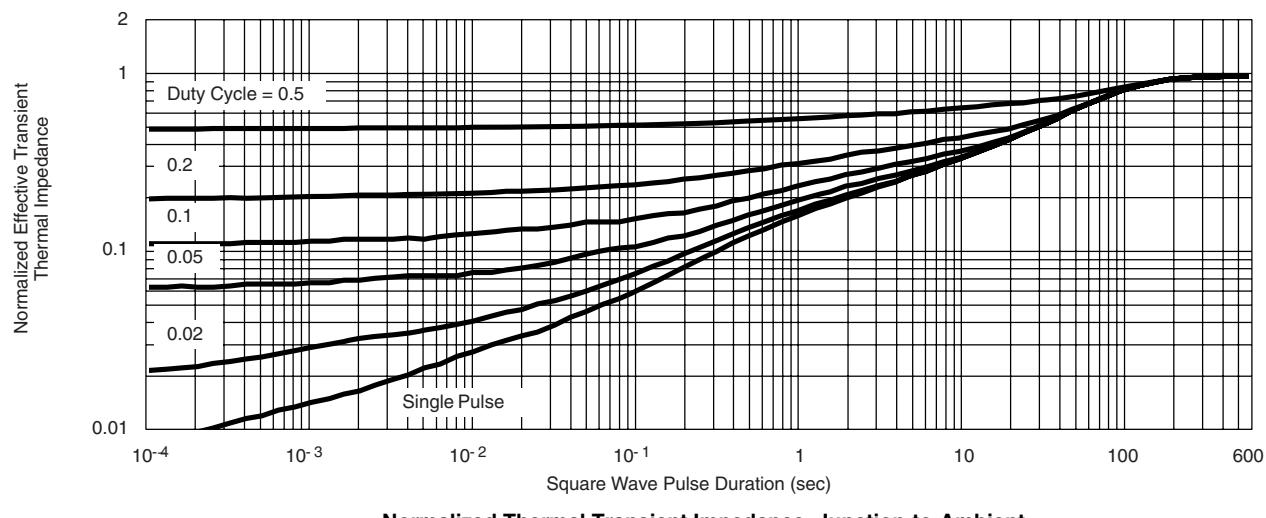
Source-Drain Diode Forward Voltage

THERMAL RATINGS


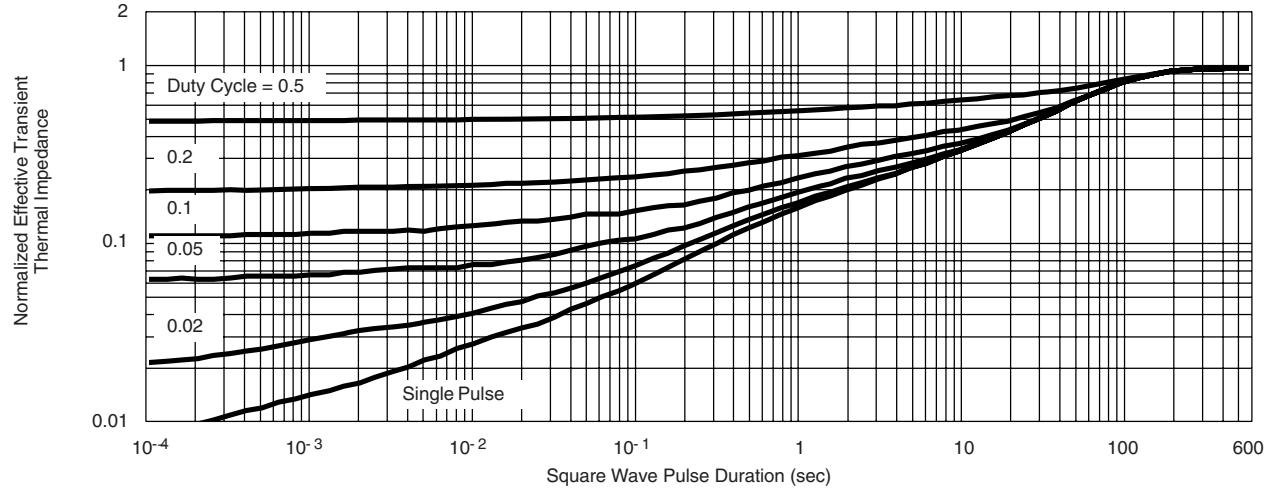
Drain Current vs. Case Temperature



Safe Operating Area

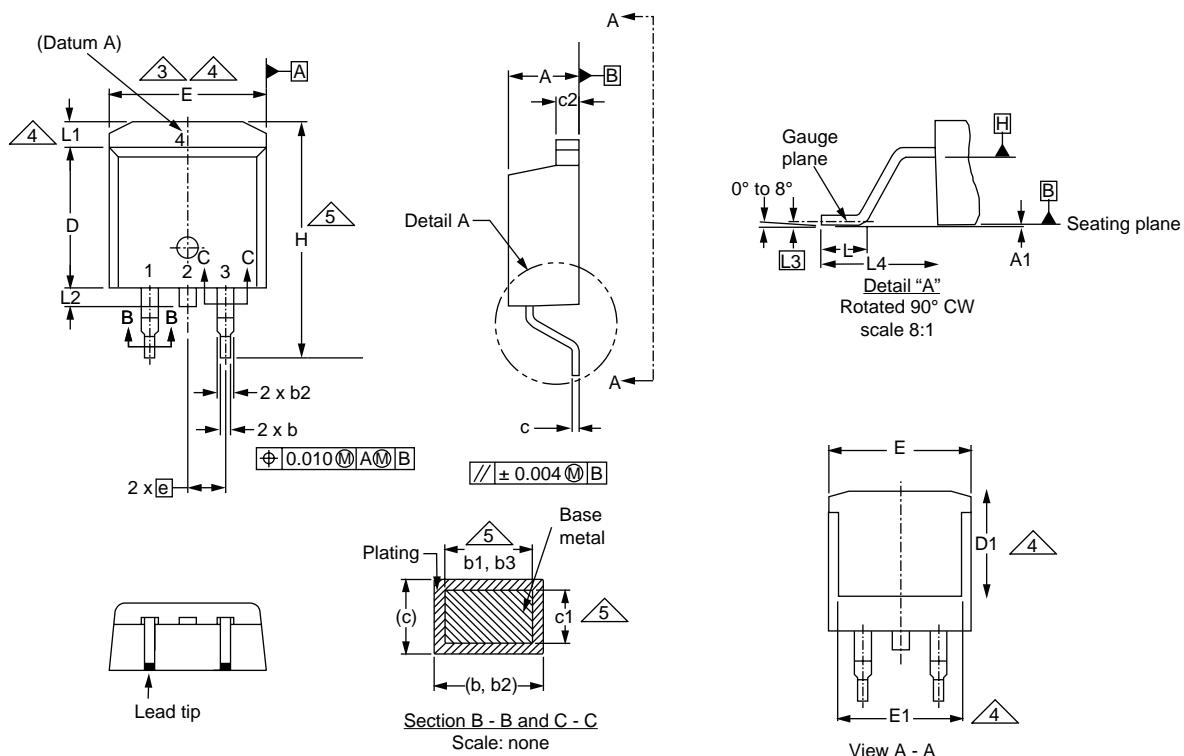
THERMAL RATINGS

Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Case

TO-263AB



DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
A	4.06	4.83	0.160	0.190
A1	0.00	0.25	0.000	0.010
b	0.51	0.99	0.020	0.039
b1	0.51	0.89	0.020	0.035
b2	1.14	1.78	0.045	0.070
b3	1.14	1.73	0.045	0.068
c	0.38	0.74	0.015	0.029
c1	0.38	0.58	0.015	0.023
c2	1.14	1.65	0.045	0.065
D	8.38	9.65	0.330	0.380

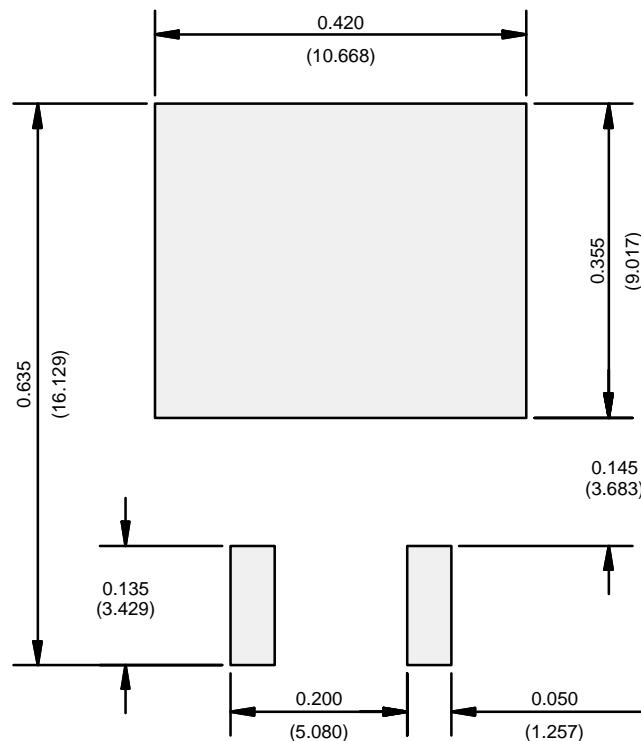
ECN: S-82110-Rev. A, 15-Sep-08

DWG: 5970

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-1994.
2. Dimensions are shown in millimeters (inches).
3. Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outmost extremes of the plastic body at datum A.
4. Thermal PAD contour optional within dimension E, L1, D1 and E1.
5. Dimension b1 and c1 apply to base metal only.
6. Datum A and B to be determined at datum plane H.
7. Outline conforms to JEDEC outline to TO-263AB.

DIM.	MILLIMETERS		INCHES	
	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

RECOMMENDED MINIMUM PADS FOR D²PAK: 3-Lead

Recommended Minimum Pads
Dimensions in Inches/(mm)

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