

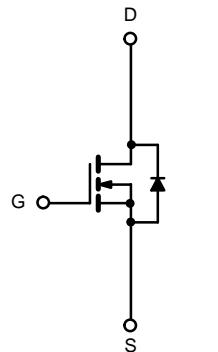
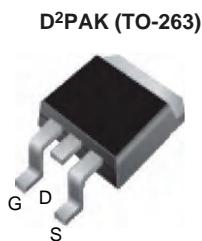
# PSMN7R0-100BS,118-VB Datasheet

## N-Channel 100 V (D-S) 175 °C MOSFET

PRODUCT SUMMARY		
$V_{DS}$ (V)	$R_{DS(on)}$ ( $\Omega$ )	$I_D$ (A)
100	0.004 at $V_{GS} = 10$ V	140 <sup>a</sup>

### FEATURES

- Trench Power MOSFET
- New Package with Low Thermal Resistance
- 100 %  $R_g$  Tested



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

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	$V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	
Continuous Drain Current ( $T_J = 175$ °C)	$I_D$	140 <sup>a</sup>	A
$T_C = 25$ °C		87 <sup>a</sup>	
Pulsed Drain Current	$I_{DM}$	440	
Avalanche Current	$I_{AR}$	75	
Repetitive Avalanche Energy <sup>b</sup>	$E_{AR}$	280	mJ
Maximum Power Dissipation <sup>b</sup>	$P_D$	375 <sup>c</sup>	W
$T_C = 25$ °C		3.75	
Operating Junction and Storage Temperature Range	$T_J, T_{stg}$	- 55 to 175	°C

### THERMAL RESISTANCE RATINGS

Parameter	Symbol	Limit	Unit
Junction-to-Ambient	$R_{thJA}$	40	°C/W
Junction-to-Case (Drain)	$R_{thJC}$	0.4	

Notes:

a. Package limited.

b. Duty cycle  $\leq 1$  %.

c. See SOA curve for voltage derating.

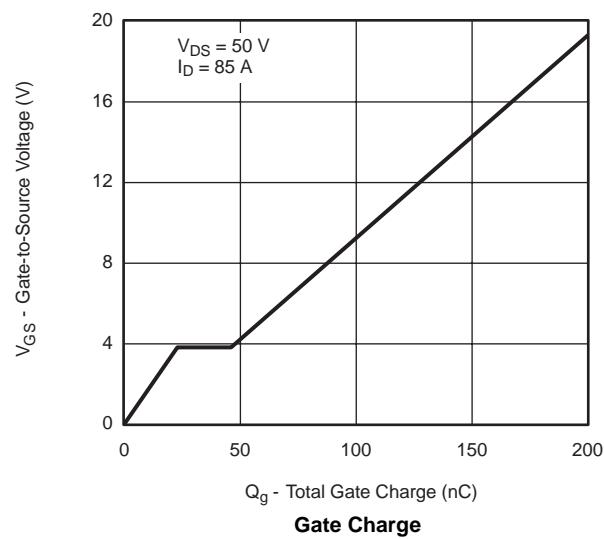
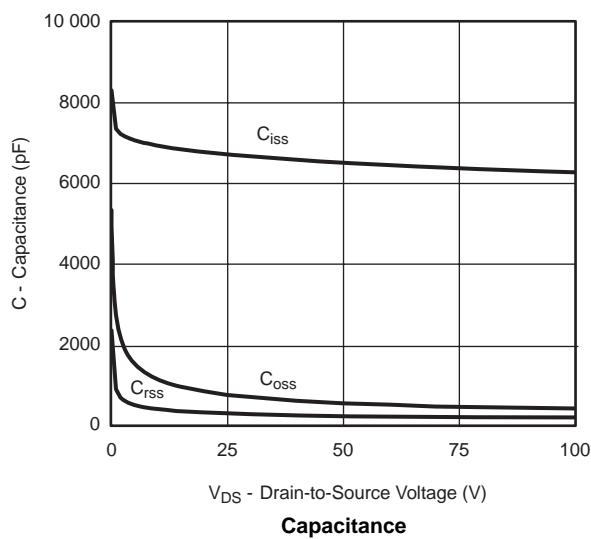
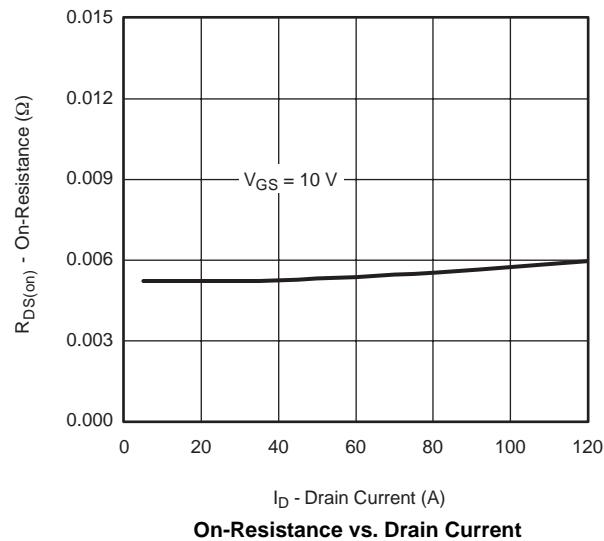
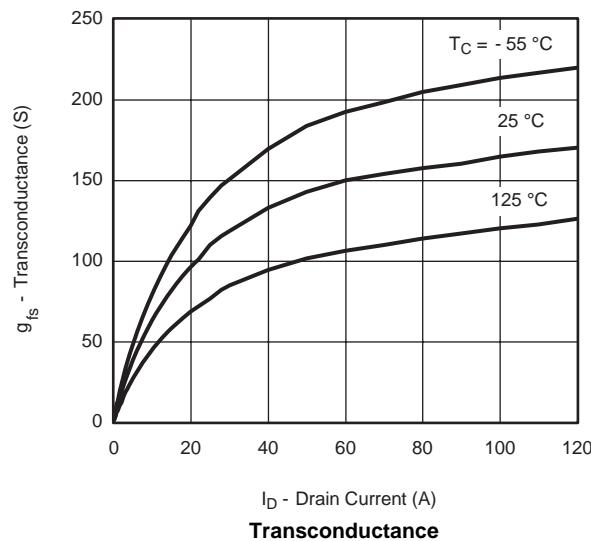
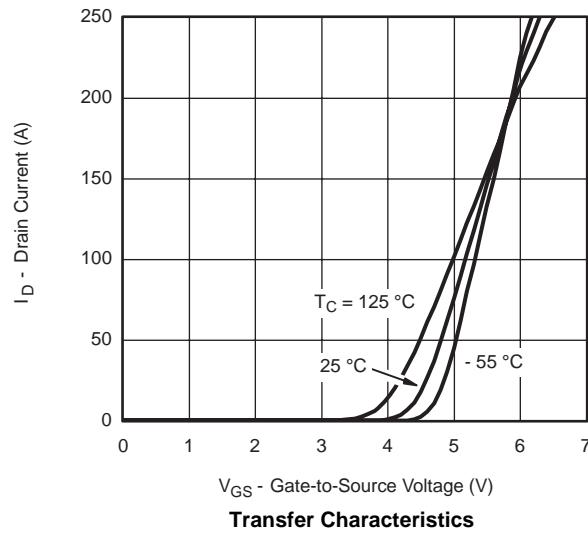
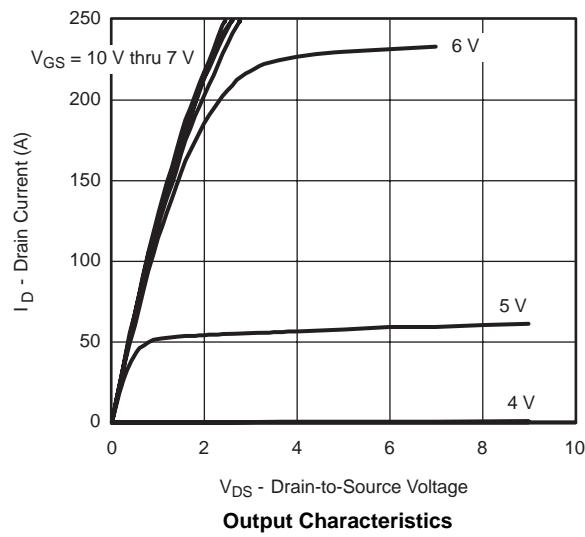
d. When mounted on 1" square PCB (FR-4 material).

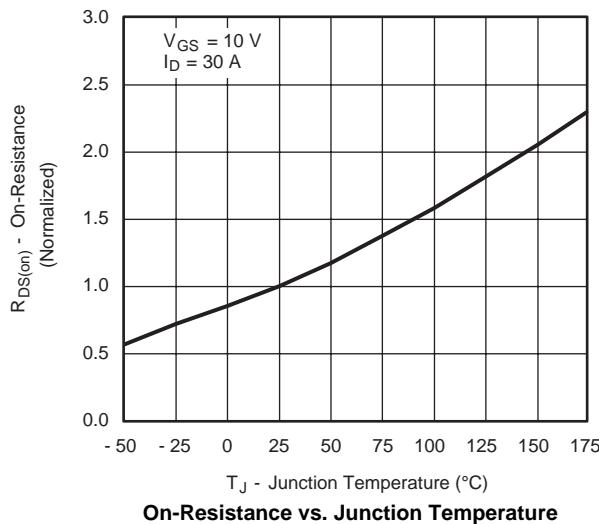
<b>SPECIFICATIONS</b> $T_J = 25^\circ\text{C}$ , unless otherwise noted						
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Static</b>						
Drain-Source Breakdown Voltage	$V_{DS}$	$V_{DS} = 0 \text{ V}, I_D = 250 \mu\text{A}$	100			V
Gate-Threshold Voltage	$V_{GS(\text{th})}$	$V_{DS} = V_{GS}, I_D = 250 \mu\text{A}$	2		4	
Gate-Body Leakage	$I_{GSS}$	$V_{DS} = 0 \text{ V}, V_{GS} = \pm 20 \text{ V}$			$\pm 100$	nA
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}$			1	
		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 125^\circ\text{C}$			50	$\mu\text{A}$
		$V_{DS} = 100 \text{ V}, V_{GS} = 0 \text{ V}, T_J = 175^\circ\text{C}$			250	
On-State Drain Current <sup>a</sup>	$I_{D(\text{on})}$	$V_{DS} \geq 5 \text{ V}, V_{GS} = 10 \text{ V}$	120			A
Drain-Source On-State Resistance <sup>a</sup>	$R_{DS(\text{on})}$	$V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}$		0.004		
		$V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 125^\circ\text{C}$		0.017		$\Omega$
		$V_{GS} = 10 \text{ V}, I_D = 30 \text{ A}, T_J = 175^\circ\text{C}$		0.025		
Forward Transconductance <sup>a</sup>	$g_{fs}$	$V_{DS} = 15 \text{ V}, I_D = 30 \text{ A}$	25			S
<b>Dynamic<sup>b</sup></b>						
Input Capacitance	$C_{iss}$	$V_{GS} = 0 \text{ V}, V_{DS} = 25 \text{ V}, f = 1 \text{ MHz}$		5500		pF
Output Capacitance	$C_{oss}$			750		
Reverse Transfer Capacitance	$C_{rss}$			280		
Total Gate Charge <sup>c</sup>	$Q_g$	$V_{DS} = 50 \text{ V}, V_{GS} = 10 \text{ V}, I_D = 85 \text{ A}$		110	160	nC
Gate-Source Charge <sup>c</sup>	$Q_{gs}$			24		
Gate-Drain Charge <sup>c</sup>	$Q_{gd}$			24		
Gate Resistance	$R_g$		1.0		6.2	$\Omega$
Turn-On Delay Time <sup>c</sup>	$t_{d(\text{on})}$	$V_{DD} = 50 \text{ V}, R_L = 0.6 \Omega$ $I_D \geq 85 \text{ A}, V_{GEN} = 10 \text{ V}, R_g = 2.5 \Omega$		20	30	ns
Rise Time <sup>c</sup>	$t_r$			125	200	
Turn-Off Delay Time <sup>c</sup>	$t_{d(\text{off})}$			55	85	
Fall Time <sup>c</sup>	$t_f$			130	195	
<b>Source-Drain Diode Ratings and Characteristics</b> $T_C = 25^\circ\text{C}^b$						
Continuous Current	$I_S$				140	A
Pulsed Current	$I_{SM}$				240	
Forward Voltage <sup>a</sup>	$V_{SD}$	$I_F = 85 \text{ A}, V_{GS} = 0 \text{ V}$		1.0	1.5	V
Reverse Recovery Time	$t_{rr}$	$I_F = 50 \text{ A}, dI/dt = 100 \text{ A}/\mu\text{s}$		70	140	ns
Peak Reverse Recovery Charge	$I_{RM(\text{REC})}$			5.5	10	A
Reverse Recovery Charge	$Q_{rr}$			0.19	0.35	$\mu\text{C}$

Notes:

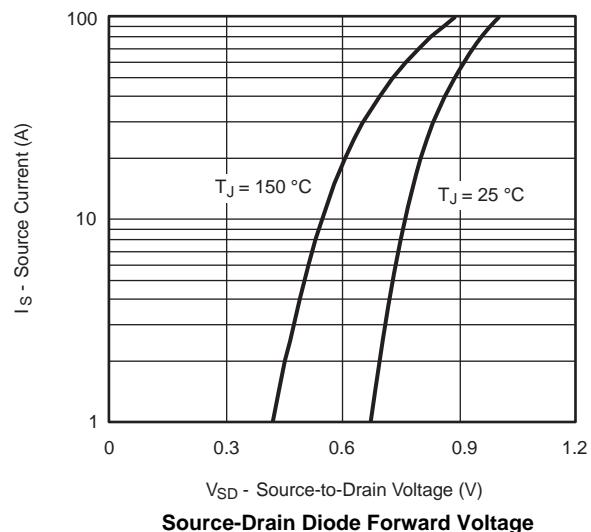
- a. Pulse test; pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .
- b. Guaranteed by design, not subject to production testing.
- c. Independent of operating temperature.

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.

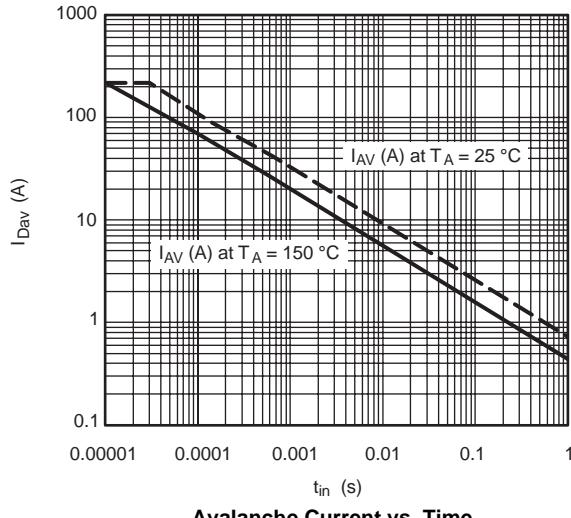
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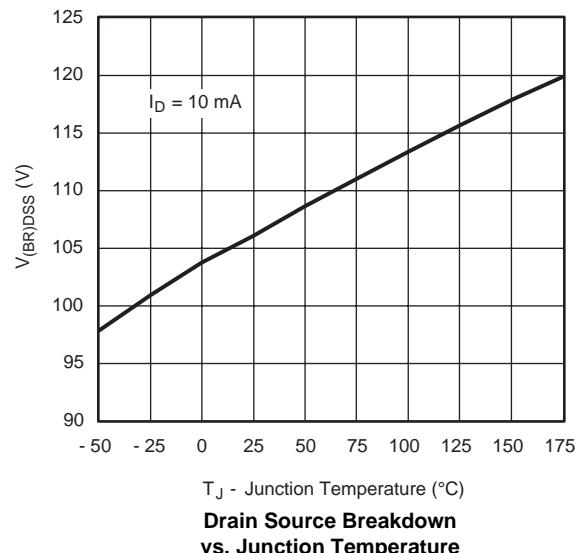
On-Resistance vs. Junction Temperature



Source-Drain Diode Forward Voltage

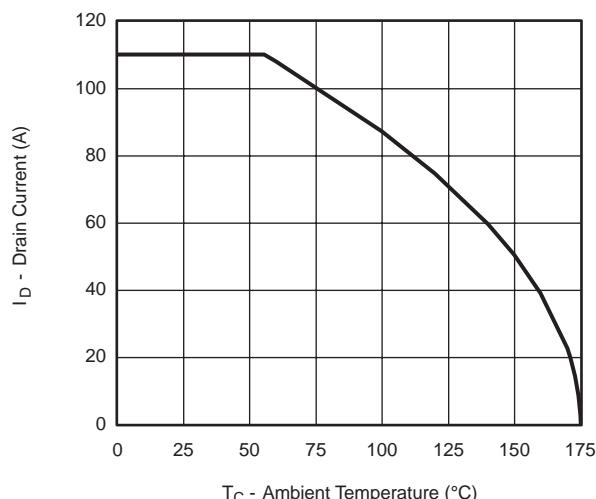


Avalanche Current vs. Time

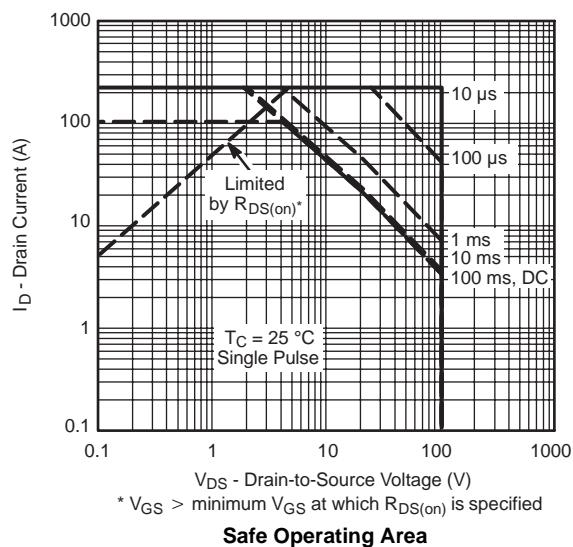


Drain Source Breakdown vs. Junction Temperature

## THERMAL RATINGS

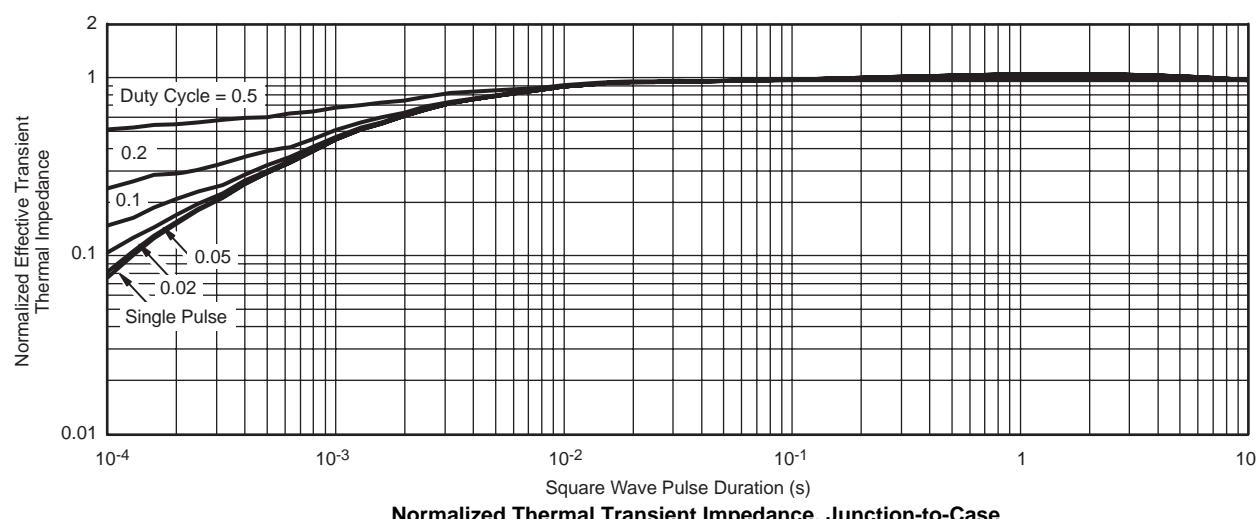


Maximum Avalanche and Drain Current  
vs. Case Temperature



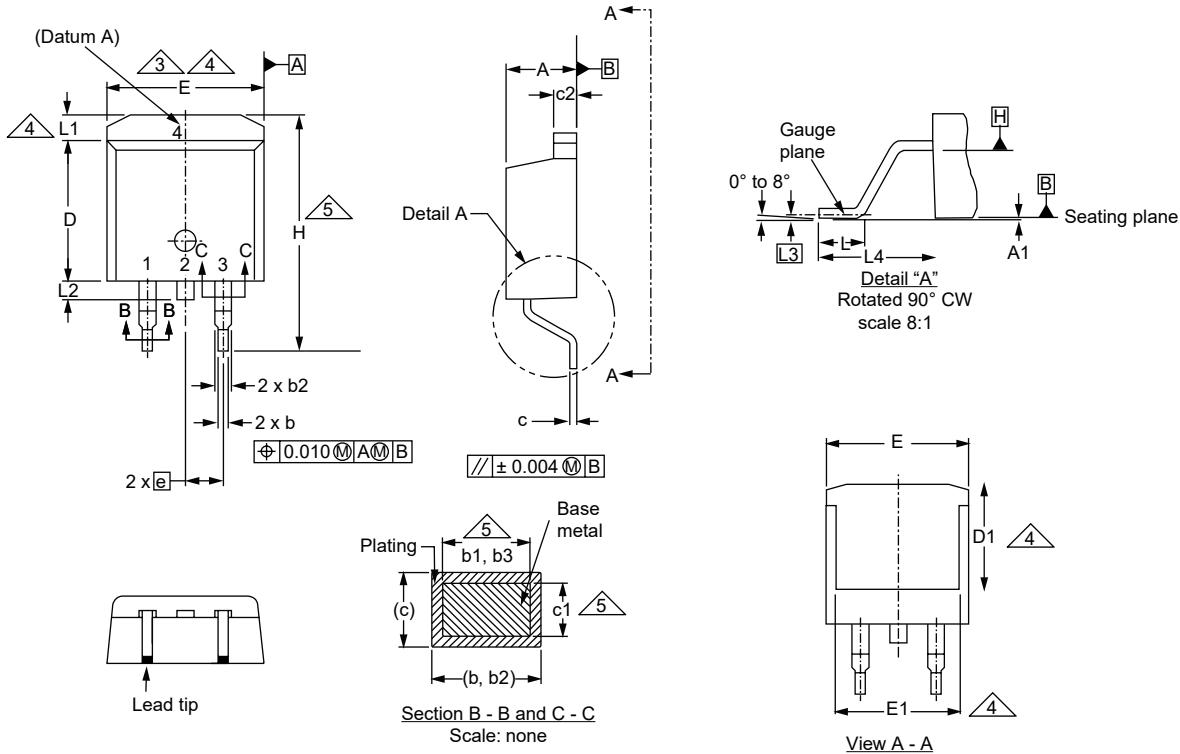
\*  $V_{GS} >$  minimum  $V_{GS}$  at which  $R_{DS(on)}$  is specified

## Safe Operating Area



Normalized Thermal Transient Impedance, Junction-to-Case

## **TO-263AB (HIGH VOLTAGE)**



	MILLIMETERS		INCHES	
DIM.	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

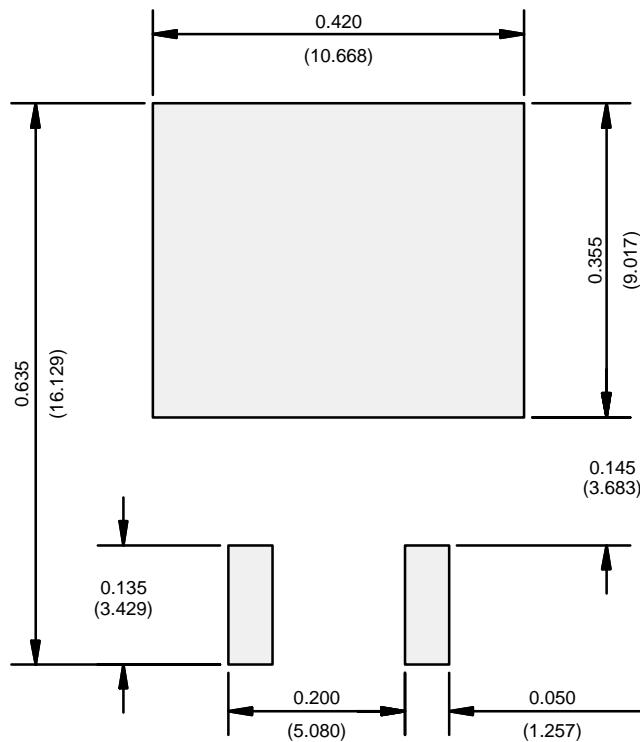
	MILLIMETERS		INCHES	
DIM.	MIN.	MAX.	MIN.	MAX.
D1	6.86	-	0.270	-
E	9.65	10.67	0.380	0.420
E1	6.22	-	0.245	-
e	2.54 BSC		0.100 BSC	
H	14.61	15.88	0.575	0.625
L	1.78	2.79	0.070	0.110
L1	-	1.65	-	0.066
L2	-	1.78	-	0.070
L3	0.25 BSC		0.010 BSC	
L4	4.78	5.28	0.188	0.208

ECN: S-82110-Rev. A, 15-Sep-08  
DWG: 5970

## Notes

Notes

1. Dimensioning and tolerancing per ASME Y14.5M-2018.
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-263AB.

**RECOMMENDED MINIMUM PADS FOR D<sup>2</sup>PAK: 3-Lead**

Recommended Minimum Pads  
Dimensions in Inches/(mm)

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