

# AZ100EL16VS

## ECL/PECL Differential Receiver with Variable Output Swing

### FEATURES

- 250ps Propagation Delay
- High Bandwidth Output Transitions
- 75k $\Omega$  Internal Input Pulldown Resistors
- Functionally Equivalent to ON Semiconductor MC100EL16
- Variable Output Swing
- Available in a 3x3mm MLP Package

### PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
MLP 8	AZ100EL16VSL	AZM16P <Date Code>	1,2
SOIC 8	AZ100EL16VSD	AZM100 EL16VS	1,3
TSSOP 8	AZ100EL16VST	AZH16VS	1,3

- 1 Add R1 at end of part number for 7 inch (1K parts), R2 for 13 inch (2.5K parts) Tape & Reel.
- 2 Date Code "YWW"
- 3 Date Code "YWW" on underside of part.

### DESCRIPTION

The AZ100EL16VS is a differential receiver with variable output swing. The EL16VS has functionality and output transition times similar to the EL16, with an input that controls the amplitude of the Q/Q outputs. Maximum swing is achieved by leaving the  $V_{CTRL}$  pin open or tied to  $V_{EE}$ .

The operational range of the EL16VS control input,  $V_{CTRL}$ , is from  $V_{BB}$  (full swing) to  $V_{CC}$  (min. swing). Simple control of the output swing can be obtained by a variable resistor between the  $V_{BB}$  and  $V_{CC}$  pins, with the wiper driving  $V_{CTRL}$ . Typical application circuits and results are described in this Data Sheet.

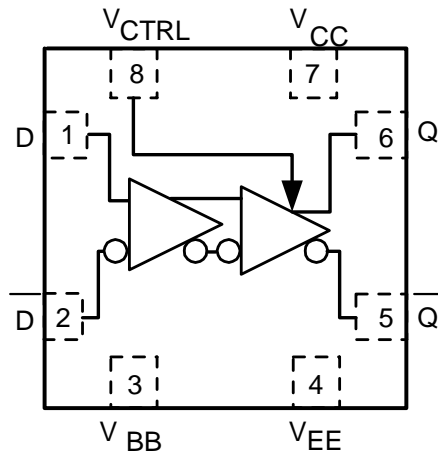
The EL16VS provides a  $V_{BB}$  output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the  $V_{BB}$  reference should be connected to one side of the D/D differential input pair. The input signal is then fed to the other D/D input. The  $V_{BB}$  pin can support 1.0mA sink/source current. When used, the  $V_{BB}$  pin should be bypassed to ground via a 0.01 $\mu$ F capacitor.

Under open input conditions (pulled to  $V_{EE}$ ) internal input clamps will force the Q output LOW.

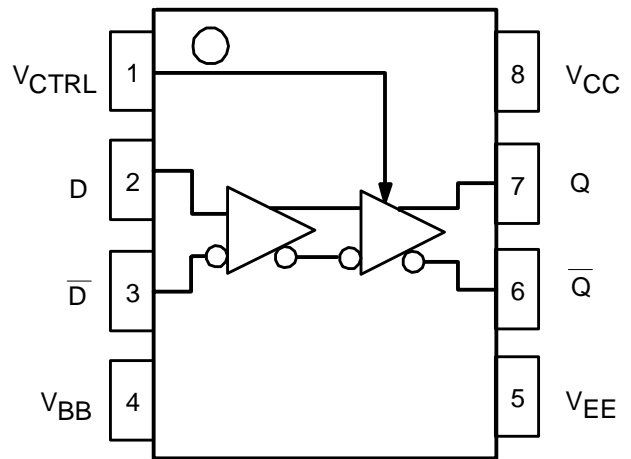
NOTE: Specifications in ECL/PECL tables are valid when thermal equilibrium is established.

# AZ100EL16VS

## LOGIC DIAGRAM AND PINOUT ASSIGNMENT



8 MLP (TOP VIEW)



8 SOIC & 8 TSSOP

### PIN DESCRIPTION

PIN	FUNCTION
D, D	Data Inputs
V <sub>CTRL</sub>	Output Swing Control
Q, Q	Data Outputs
V <sub>BB</sub>	Reference Voltage Output
V <sub>CC</sub>	Positive Supply

**Absolute Maximum Ratings are those values beyond which device life may be impaired.**

Symbol	Characteristic	Rating	Unit
V <sub>CC</sub>	PECL Power Supply (V <sub>EE</sub> = 0V)	0 to +8.0	Vdc
V <sub>I</sub>	PECL Input Voltage (V <sub>EE</sub> = 0V)	0 to +6.0	Vdc
V <sub>EE</sub>	ECL Power Supply (V <sub>CC</sub> = 0V)	-8.0 to 0	Vdc
V <sub>I</sub>	ECL Input Voltage (V <sub>CC</sub> = 0V)	-6.0 to 0	Vdc
I <sub>OUT</sub>	Output Current --- Continuous --- Surge	50 100	mA
T <sub>A</sub>	Operating Temperature Range	-40 to +85	°C
T <sub>STG</sub>	Storage Temperature Range	-65 to +150	°C

**100K ECL DC Characteristics** (V<sub>EE</sub> = -4.2V to -5.5V, V<sub>CC</sub> = GND; V<sub>CTRL</sub> = V<sub>BB</sub>)

Symbol	Characteristic	-40°C		0°C		25°C		85°C		Unit				
		Min	Typ	Min	Typ	Min	Typ	Min	Typ					
V <sub>OH</sub>	Output HIGH Voltage <sup>2</sup>	-1085		-880	-1025	-880	-1025	-955	-880	-1025	-880	mV		
V <sub>OL</sub>	Output LOW Voltage <sup>2</sup> V <sub>CTRL</sub> = V <sub>BB</sub> <sup>1</sup>	-1890		-1620	-1870	-1680	-1870	-1775	-1680	-1870	-1680	mV		
V <sub>OL</sub>	Output LOW Voltage <sup>2</sup> V <sub>CTRL</sub> = V <sub>CC</sub>	-1180		-975	-1135	-990	-1135	-1065	-990	-1135	-990	mV		
V <sub>IH</sub>	Input HIGH Voltage	-1165		-880	-1165	-880	-1165		-880	-1165	-880	mV		
V <sub>IL</sub>	Input LOW Voltage	-1810		-1475	-1810	-1475	-1810		-1475	-1810	-1475	mV		
V <sub>BB</sub>	Reference Voltage	-1420		-1260	-1420	-1260	-1420		-1260	-1420	-1260	mV		
I <sub>IH</sub>	Input HIGH Current D, D V <sub>CTRL</sub>			150 40		150 40			150 40		150 40	μA		
I <sub>IL</sub>	Input LOW Current	0.5			0.5		0.5			0.5		μA		
I <sub>EE</sub>	Power Supply Current		18	25		18	25		18	25		21	26	mA

- If V<sub>CTRL</sub> is Open Circuit, use the V<sub>OH</sub> (Max & Min) and V<sub>OL</sub> (V<sub>CTRL</sub> = V<sub>REF</sub> : Max only) limits.
- Each output is terminated through a 50Ω resistor to V<sub>CC</sub> - 2V.

# AZ100EL16VS

## 100K PECL DC Characteristics ( $V_{EE} = \text{GND}$ , $V_{CC} = +5.0\text{V}$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$V_{OH}$	Output HIGH Voltage <sup>1,3</sup>	3915		4120	3975		4120	3975	4045	4120	3975		4120	mV
$V_{OL}$	Output LOW Voltage <sup>1,3</sup> $V_{CTRL} = V_{BB}^2$	3110		3380	3130		3320	3130	3225	3320	3130		3320	mV
$V_{OL}$	Output LOW Voltage <sup>1,3</sup> $V_{CTRL} = V_{CC}$	3820		4025	3865		4010	3865	3935	4010	3865		4010	mV
$V_{IH}$	Input HIGH Voltage <sup>1</sup>	3835		4120	3835		4120	3835		4120	3835		4120	mV
$V_{IL}$	Input LOW Voltage <sup>1</sup>	3190		3525	3190		3525	3190		3525	3190		3525	mV
$V_{BB}$	Reference Voltage <sup>1</sup>	3580		3740	3580		3740	3580		3740	3580		3740	mV
$I_{IH}$	Input HIGH Current D, D $V_{CTRL}$			150 40			150 40			150 40			150 40	μA
$I_{IL}$	Input LOW Current	0.5			0.5			0.5			0.5			μA
$I_{EE}$	Power Supply Current		18	25		18	25		18	25		21	26	mA

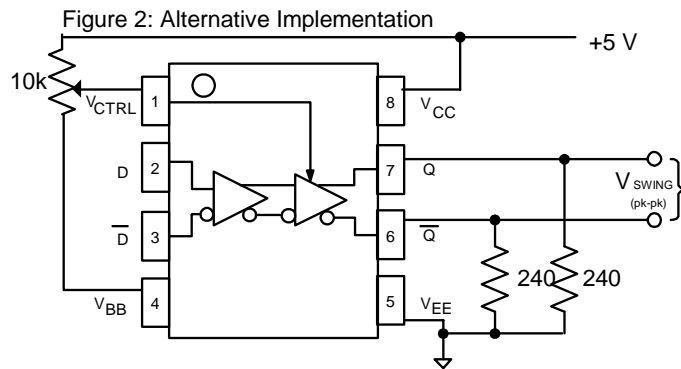
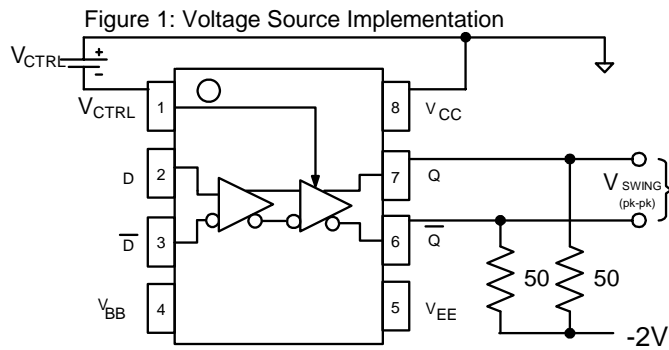
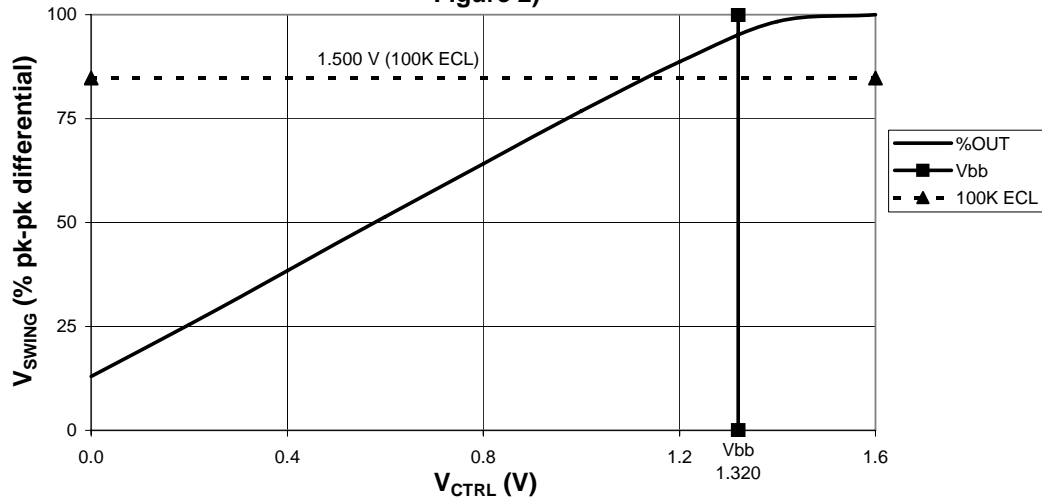
- For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.
- If  $V_{CTRL}$  is Open Circuit, use the  $V_{OH}$  (Max & Min) and  $V_{OL}$  ( $V_{CTRL} = V_{REF}$ : Max only) limits.
- Each output is terminated through a 50Ω resistor to  $V_{CC} - 2\text{V}$ .

## AC Characteristics ( $V_{EE} = -4.2\text{V}$ to $-5.5\text{V}$ ; $V_{CC} = \text{GND}$ or $V_{EE} = \text{GND}$ ; $V_{CC} = +4.2\text{V}$ to $+5.5\text{V}$ )

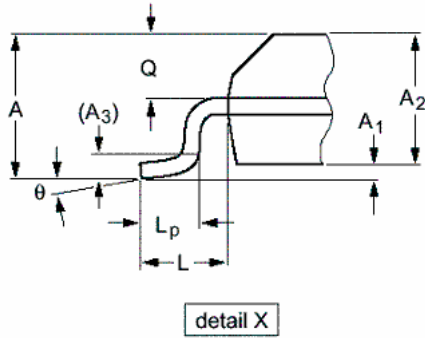
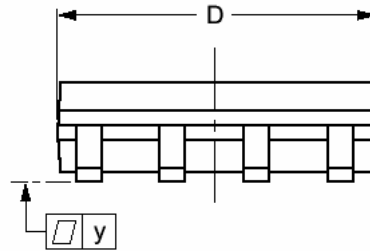
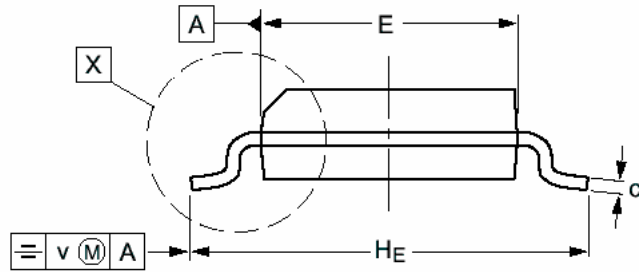
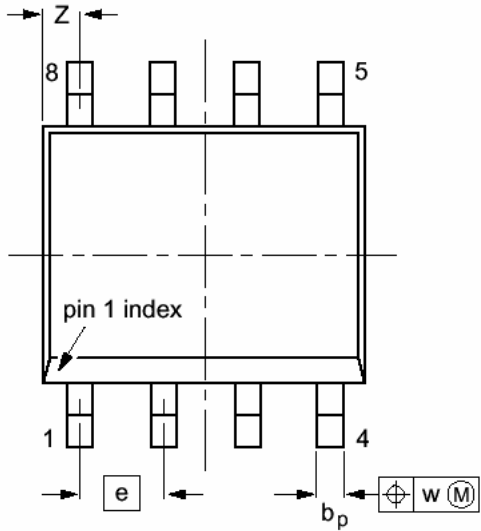
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$t_{PLH} / t_{PHL}$	Input to Output Delay (Diff) (SE)		250 250		175 125	250 250	325 375	175 125	250 250	325 375	205 155	280 280	355 405	ps
$t_{SKEW}$	Duty Cycle Skew <sup>1</sup> (Diff)		5			5	20		5	20		5	20	ps
$V_{PP}(\text{AC})$	Minimum Input Swing <sup>2</sup>	150			150			150			150			mV
$V_{CMR}$	Common Mode Range <sup>3</sup>	$V_{CC} - 2.0$		$V_{CC} - 0.4$	$V_{CC} - 2.0$		$V_{CC} - 0.4$	$V_{CC} - 2.0$		$V_{CC} - 0.4$	$V_{CC} - 2.0$		$V_{CC} - 0.4$	V
$t_r / t_f$	Rise/Fall Time 20 – 80%	100		350	100		350	100		350	100		350	ps

- Duty cycle skew is the difference between a  $t_{PLH}$  and  $t_{PHL}$  propagation delay through a device.
- $V_{PP}$  is the minimum peak-to-peak differential input swing for which AC parameters are guaranteed.
- The  $V_{CMR}$  range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between  $V_{PP}(\text{min})$  and 1V.

Typical Voltage Output Swing at +25C,  $V_{EE}$  Nom (see Figure 1 and Figure 2)



**PACKAGE DIAGRAM  
SOIC 8**

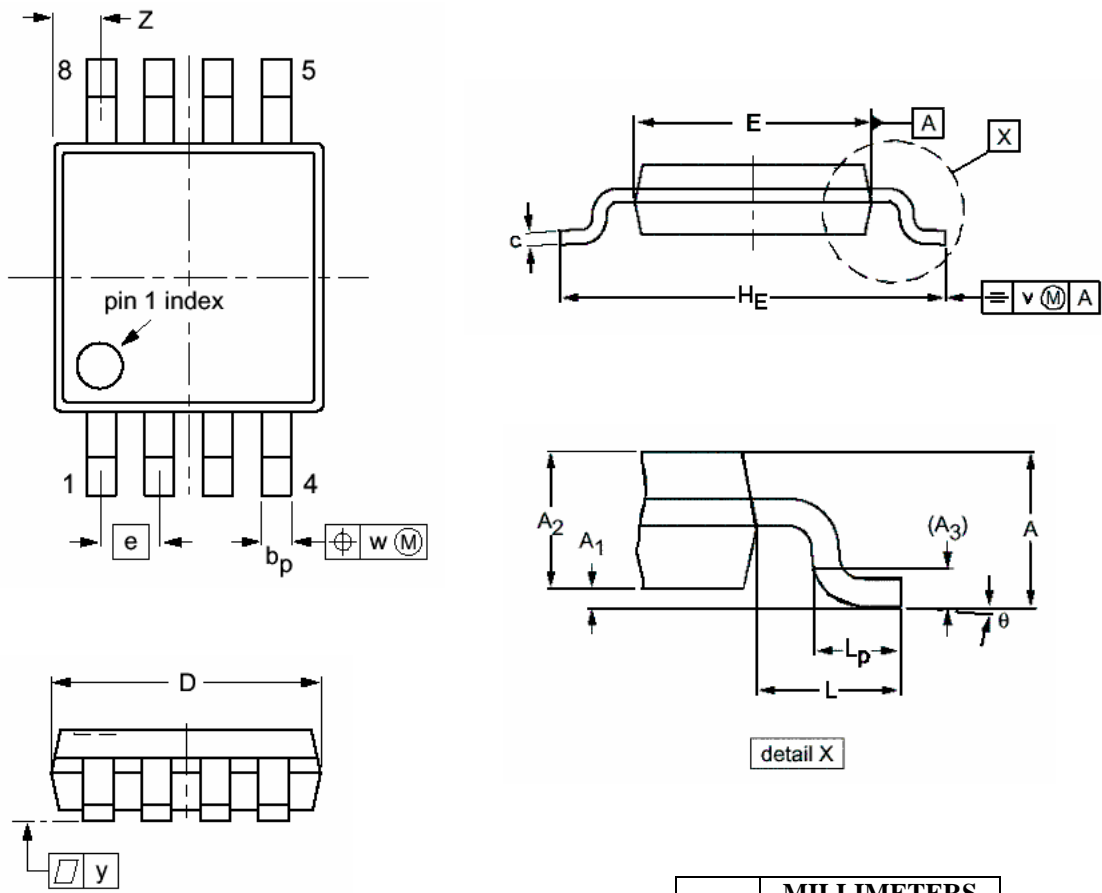


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.32	12.57	0.485	0.495
A <sub>1</sub>	0.10	0.25	0.004	0.010
A <sub>2</sub>	1.25	1.45	0.049	0.057
A <sub>3</sub>	0.25		0.01	
b <sub>p</sub>	0.36	0.49	0.014	0.019
c	0.19	0.25	0.0075	0.0100
D	4.8	5.0	0.19	0.20
E	3.8	4.0	0.15	0.16
e	1.27		0.050	
H <sub>E</sub>	5.80	6.20	0.228	0.244
L	1.05		0.041	
L <sub>p</sub>	0.40	1.00	0.016	0.039
Q	0.60	0.70	0.024	0.028
v	0.25		0.01	
w	0.25		0.01	
y	0.10		0.004	
Z	0.30	0.70	0.012	0.028
θ	0°	8°	0°	8°

NOTES:

1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

**PACKAGE DIAGRAM  
TSSOP 8**

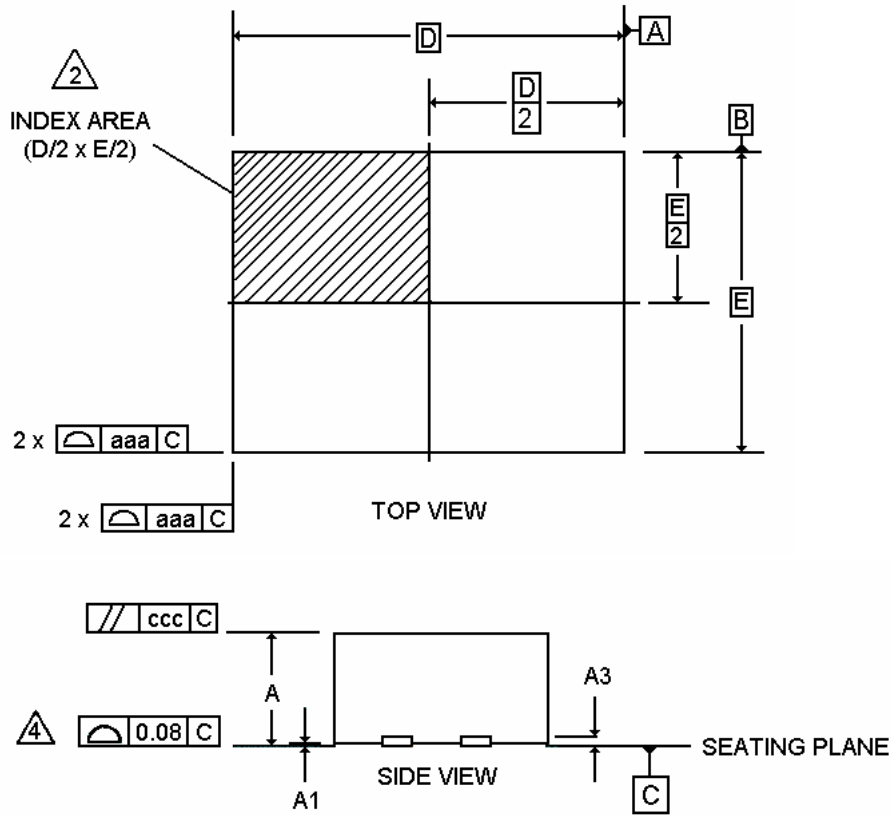


- NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
  2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
  3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

DIM	MILLIMETERS	
	MIN	MAX
<b>A</b>		1.10
<b>A<sub>1</sub></b>	0.05	0.15
<b>A<sub>2</sub></b>	0.80	0.95
<b>A<sub>3</sub></b>	0.25	
<b>b<sub>p</sub></b>	0.25	0.45
<b>c</b>	0.15	0.28
<b>D</b>	2.90	3.10
<b>E</b>	2.90	3.10
<b>e</b>	0.65	
<b>H<sub>E</sub></b>	4.70	5.10
<b>L</b>	0.94	
<b>L<sub>p</sub></b>	0.40	0.70
<b>v</b>	0.10	
<b>w</b>	0.10	
<b>y</b>	0.10	
<b>Z</b>	0.35	0.70
<b>θ</b>	0°	6°

AZ100EL16VS

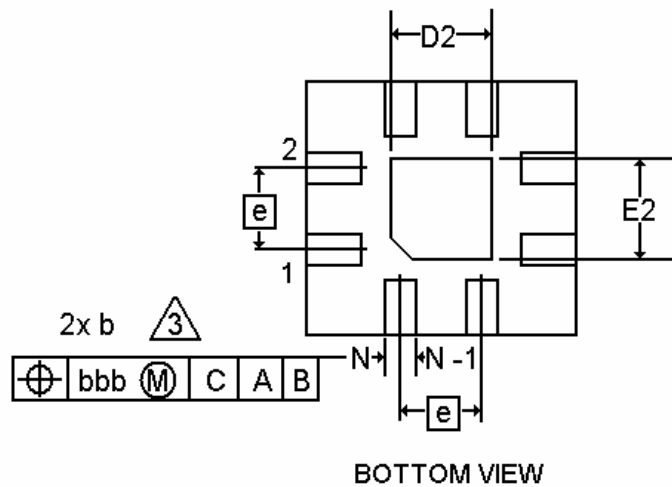
**PACKAGE DIAGRAM  
MLP 8**



**NOTES**

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME T14-1994.
2. THE TERMINAL #1 AND PAD NUMBERING CONVENTION SHALL CONFORM TO JESD 95-1 SPP-012.
3. DIMENSION *b* APPLIES TO METALLIZED PAD AND IS MEASURED BETWEEN 0.25 AND 0.30mm FROM PAD TIP.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.25 REF	
<i>b</i>	0.30	0.35
D	2.90	3.10
D2	1.65	1.95
E	2.90	3.10
E2	1.65	1.95
<i>e</i>	0.65 BSC	
L	0.35	0.45
aaa	0.25	
bbb	0.10	
ccc	0.10	



## AZ100EL16VS

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