AZ10LVEL16
AZ100LVEL16

ARIZONA MICROTEK, INC.

ECL/PECL Differential Receiver

FEATURES

- Green and RoHS Compliant / Lead (Pb) Free Packages available
- 250ps Propagation Delay
- High Bandwidth Output Transitions
- Operating Range of 3.0V to 5.5V
- Internal Input Pulldown Resistors
- Direct Replacement For ON Semiconductor MC10EL16, MC100EL16, & MC100LVEL16
- IBIS Model Files Available on Arizona Microtek Website

DESCRIPTION

The AZ10/100LVEL16 is a differential receiver. The device is functionally equivalent to the E116 device with higher performance capabilities. With output transition times significantly faster than the E116, the LVEL16 is ideally suited for interfacing with high frequency sources.

The LVEL16 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/$\overline{D}$ differential input pair. The input signal is then fed to the other D/$\overline{D}$ input. The V_{BB} pin can support 1.5 mA sink/source current. When used, the V_{BB} pin should be bypassed to ground via a 0.01 μF capacitor.

Under open input conditions internal input clamps will force the Q output LOW.

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

PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
SOIC 8	AZ10LVEL16D	AZM10 LVEL16	1,2
SOIC 8	AZ100LVEL16D	AZM100 LVEL16	1,2
SOIC 8 RoHS Compliant / Lead (Pb) Free	AZ100LVEL16D+	AZM100+ LVEL16	1,2
TSSOP 8	AZ10LVEL16T	AZT LV16	1,2
TSSOP 8 RoHS Compliant / Lead (Pb) Free	AZ10LVEL16T+	AZT+ LV16	1,2
TSSOP 8	AZ100LVEL16T	AZH LV16	1,2
TSSOP 8 RoHS Compliant / Lead (Pb) Free	AZ100LVEL16T+	AZH+ LV16	1,2
MLP 8 (2x2) Green / RoHS Compliant / Lead (Pb) Free	AZ100LVEL16NG	Q6G <Date Code>	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 format: "Y" or "YY" for year followed by "WW" for week on underside of part.
3   Date code format: "Y" for year followed by "WW" for week.

PIN DESCRIPTION

PIN	FUNCTION
D, $\overline{D}$	Data Inputs
Q, $\overline{Q}$	Data Outputs
V_{BB}	Reference Voltage Output
V_{CC}	Positive Supply
V_{EE}	Negative Supply
NC	No Connect

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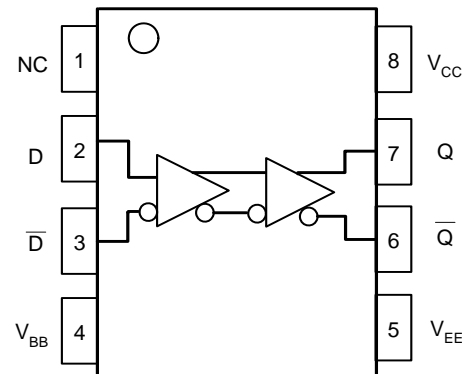
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Absolute Maximum Ratings are those values beyond which device life may be impaired.

Symbol	Characteristic		Rating	Unit
V_{CC}	PECL Power Supply	(V_{EE} = 0V)	0 to +8.0	Vdc
V_I	PECL Input Voltage	(V_{EE} = 0V)	0 to +6.0	Vdc
V_{EE}	ECL Power Supply	(V_{CC} = 0V)	-8.0 to 0	Vdc
V_I	ECL Input Voltage	(V_{CC} = 0V)	-6.0 to 0	Vdc
I_{OUT}	Output Current --- Continuous --- Surge		50 100	mA
T_A	Operating Temperature Range		-40 to +85	°C
T_{STG}	Storage Temperature Range		-65 to +150	°C

10K ECL DC Characteristics (V_{EE} = -3.0V to -5.5V, V_{CC} = GND)

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[1]	-1080		-890	-1020		-840	-980		-810	-910		-720	mV
V_{OL}	Output LOW Voltage[1]	-1950		-1650	-1950		-1630	-1950		-1630	-1950		-1595	mV
V_{IH}	Input HIGH Voltage	-1230		-890	-1170		-840	-1130		-810	-1060		-720	mV
V_{IL}	Input LOW Voltage	-1950		-1500	-1950		-1480	-1950		-1480	-1950		-1445	mV
V_{BB}	Reference Voltage	-1430		-1300	-1380		-1270	-1350		-1250	-1310		-1190	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	22	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

10K LVPECL DC Characteristics (V_{EE} = GND, V_{CC} = +3.3V)

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[1,2]	2220		2410	2280		2460	2320		2490	2390		2580	mV
V_{OL}	Output LOW Voltage[1,2]	1350		1650	1350		1670	1350		1670	1350		1705	mV
V_{IH}	Input HIGH Voltage[1]	2070		2410	2130		2460	2170		2490	2240		2580	mV
V_{IL}	Input LOW Voltage[1]	1350		1800	1350		1820	1350		1820	1350		1855	mV
V_{BB}	Reference Voltage[1]	1870		2000	1920		2030	1950		3050	1990		1390	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	22	mA

1. For supply voltages other that 3.3V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

10K PECL DC Characteristics (V_{EE} = GND, V_{CC} = +5.0V)

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[1,2]	3920		4110	3980		4160	4020		4190	4090		4280	mV
V_{OL}	Output LOW Voltage[1,2]	3050		3350	3050		3370	3050		3370	3050		3405	mV
V_{IH}	Input HIGH Voltage[1]	3770		4110	3830		4160	3870		4190	3940		4280	mV
V_{IL}	Input LOW Voltage[1]	3050		3500	3050		3520	3050		3520	3050		3555	mV
V_{BB}	Reference Voltage[1]	3570		3700	3620		3730	3650		3750	3690		3810	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	22	mA

1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

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100K ECL DC Characteristics (V_{EE} = -3.0V to -5.5V, V_{CC} = GND)

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[1]	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage[1]	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	-1810	-1705	-1620	mV
V_{IH}	Input HIGH Voltage	-1165		-880	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage	-1810		-1475	-1810		-1475	-1810		-1475	-1810		-1475	mV
V_{BB}	Reference Voltage	-1380		-1260	-1380		-1260	-1380		-1260	-1380		-1260	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	24	mA

1. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

100K LVPECL DC Characteristics (V_{EE} = GND, V_{CC} = +3.3V)

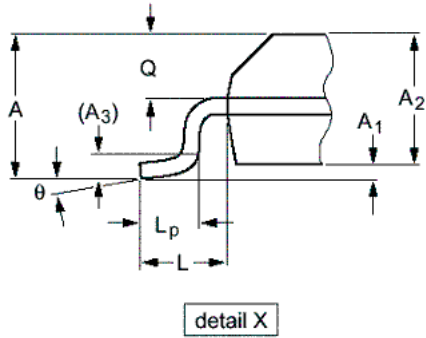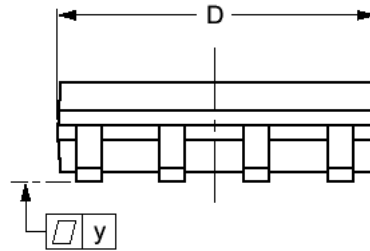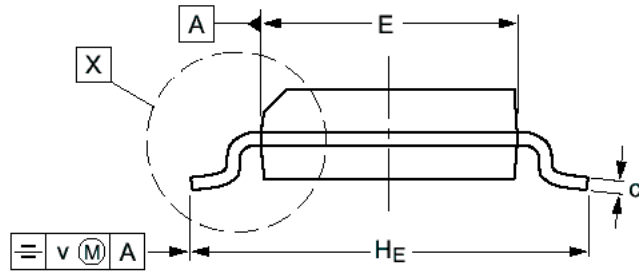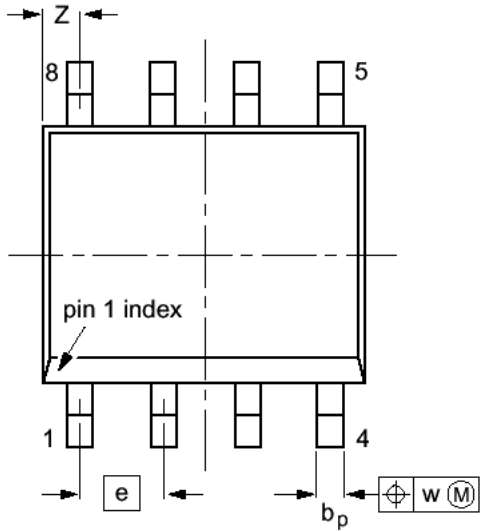| Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
V_{OH}	Output HIGH Voltage[1,2]	2215	2295	2420	2275	2345	2420	2275	2345	2420	2275	2345	2420	mV
V_{OL}	Output LOW Voltage[1,2]	1470	1605	1745	1490	1595	1680	1490	1595	1680	1490	1595	1680	mV
V_{IH}	Input HIGH Voltage[1]	2135		2420	2135		2420	2135		2420	2135		2420	mV
V_{IL}	Input LOW Voltage[1]	1490		1825	1490		1825	1490		1825	1490		1825	mV
V_{BB}	Reference Voltage[1]	1920		2040	1920		2040	1920		2040	1920		2040	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	24	mA

1. For supply voltages other that 3.3V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

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

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[1,2]	3915	3995	4120	3975	4045	4120	3975	4045	4120	3975	4045	4120	mV
V_{OL}	Output LOW Voltage[1,2]	3170	3305	3445	3190	3295	3380	3190	3295	3380	3190	3295	3380	mV
V_{IH}	Input HIGH Voltage[1]	3835		4120	3835		4120	3835		4120	3835		4120	mV
V_{IL}	Input LOW Voltage[1]	3190		3525	3190		3525	3190		3525	3190		3525	mV
V_{BB}	Reference Voltage[1]	3620		3740	3620		3740	3620		3740	3620		3740	mV
I_{IL}	Input LOW Current	-150			-150			-150			-150			µA
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{EE}	Power Supply Current		18	22		18	22		18	22		18	24	mA

1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

AC Characteristics (V_{EE} = -3.0V to -5.5V; V_{CC} = GND or V_{EE} = GND; V_{CC} = +3.0V to +5.5V)

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}	Propagation Delay to Output (Diff)	125	250	375	175	250	325	175	250	325	205	280	355	ps
	(SE)	75	250	425	125	250	375	125	250	375	155	280	405	
t_{SKEW}	Duty Cycle Skew[1] (Diff)		5			5	20		5	20		5	20	ps
V_{PP} (AC)	Input Swing[2]	150		1000	150		1000	150		1000	150		1000	mV
V_{CMR}	Common Mode Range[3] V_{PP} < 500mV	V_{EE} + 1.2		V_{CC} - 0.4	V_{EE} + 1.1		V_{CC} - 0.4	V_{EE} + 1.1		V_{CC} - 0.4	V_{EE} + 1.1		V_{CC} - 0.4	V
	V_{PP} ≥ 500mV	1.5		0.4	1.4		0.4	1.4		0.4	1.4		0.4	
t_r / t_f	Output Rise/Fall Times Q (20% - 80%)	100		260	100		260	100		260	100		260	ps

1. Duty cycle skew is the difference between a t_{PLH} and t_{PHL} propagation delay through a device.
2. V_{PP} is the peak-to-peak differential input swing range for which AC parameters are guaranteed. The device has a DC gain of ≈ 40.
3. 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.
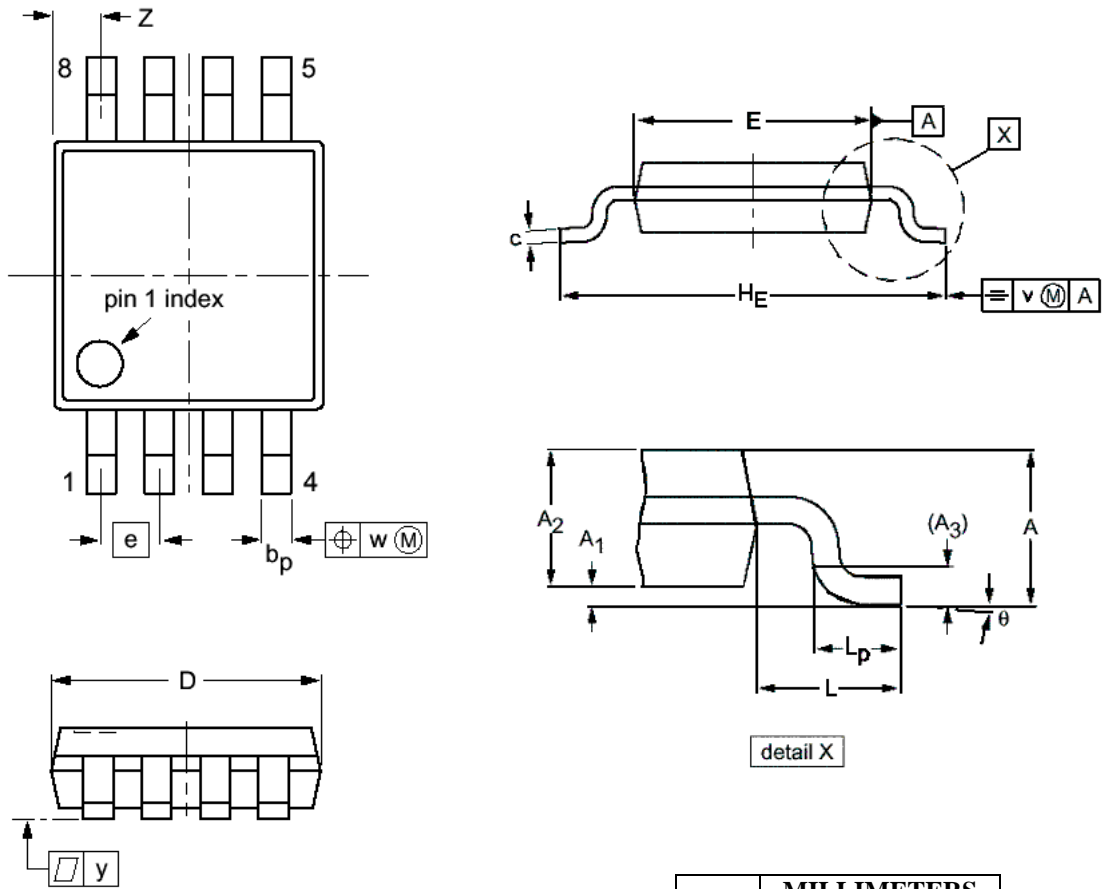
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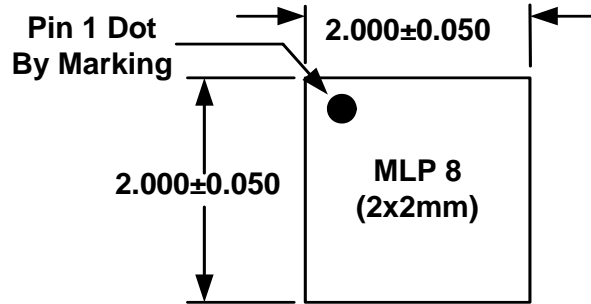
PACKAGE DIAGRAM
SOIC 8

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detail X

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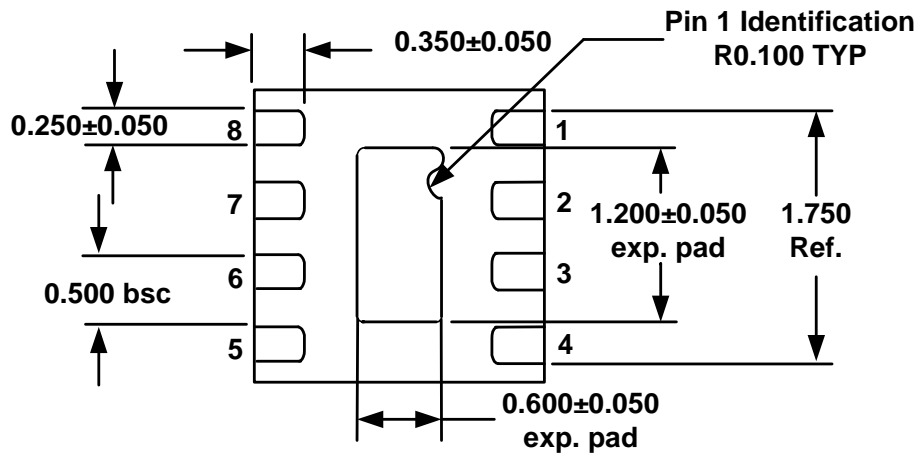3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

DIM	MILLIMETERS		INCHES	
	MIN	**MAX**	**MIN**	**MAX**
A		1.75		0.069
A$_1$	0.10	0.25	0.004	0.010
A$_2$	1.25	1.45	0.049	0.057
A$_3$	0.25		0.01	
b$_p$	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$_E$	5.80	6.20	0.228	0.244
L	1.05		0.041	
L$_p$	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°

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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.

detail X

DIM	MILLIMETERS	
	MIN	MAX
A		1.10
A_1	0.05	0.15
A_2	0.80	0.95
A_3	0.25	
b_p	0.25	0.45
c	0.15	0.28
D	2.90	3.10
E	2.90	3.10
e	0.65	
H_E	4.70	5.10
L	0.94	
L_p	0.40	0.70
v	0.10	
w	0.10	
y	0.10	
Z	0.35	0.70
θ	0°	6°

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PACKAGE DIAGRAM
MLP 8 2x2mm

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Pin 1 Dot
By Marking

2.000±0.050

2.000±0.050

MLP 8
(2x2mm)

TOP VIEW

0.350±0.050

Pin 1 Identification
R0.100 TYP

0.250±0.050

8

1

7

2

6

3

5

4

1.200±0.050
exp. pad

1.750
Ref.

0.500 bsc

0.600±0.050
exp. pad

BOTTOM VIEW

0.750±0.050

0.000-0.050

1   2   3   4

0.203±0.025
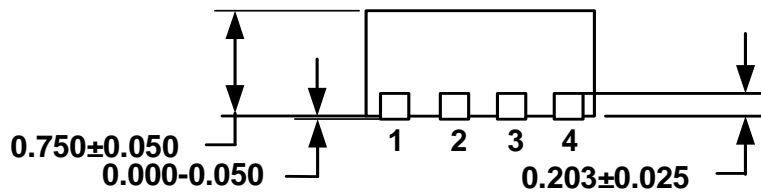
SIDE VIEW

Note: All dimensions are in mm

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