ARIZONA MICROTEK, INC.

AZ10LVEL32
AZ100LVEL32

ECL/PECL ÷ 2 Divider

FEATURES

- Operating Range of 3.0V to 5.5V
- 470ps Propagation Delay
- 3.0GHz Toggle Frequency
- High Bandwidth Output Transitions
- Direct Replacement for ON Semiconductor MC10EL/LVEL32 & MC100EL/LVEL32

PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
SOIC 8 Green / RoHS Compliant / Lead (Pb) Free	AZ100LVEL32DG	AZM100G LVEL32	1,2
TSSOP 8 Green / RoHS Compliant / Lead (Pb) Free	AZ100LVEL32TG	AZHG LV32	1,2
MLP 8 (2x2) Green / RoHS Compliant / Lead (Pb) Free	AZ100LVEL32NG	C2G <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.

DESCRIPTION

The AZ10/100LVEL32 is an integrated ÷2 divider. The reset pin is asynchronous and is asserted on the rising edge. Upon power-up, the internal flip-flop will attain a random logic state; the reset allows for the synchronization of multiple LVEL32's in a system.

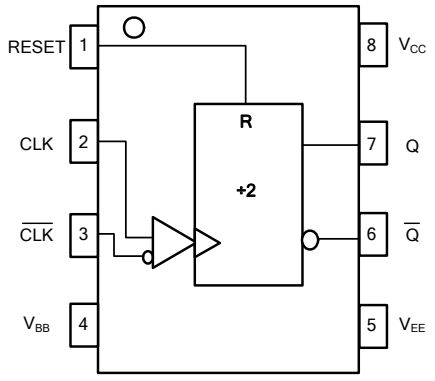
The LVEL32 provides a V_{BB} output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the V_{BB} reference should be connected to one side of the CLK/$\overline{CLK}$ differential input pair. The input signal is then fed to the other CLK/$\overline{CLK}$ input. The V_{BB} pin should be used only as a bias for the LVEL32 as its sink/source capability is limited. When used, the V_{BB} pin should be bypassed to ground via a 0.01μF capacitor.

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

PIN DESCRIPTION

PIN	FUNCTION
CLK, $\overline{CLK}$	Clock Inputs
RESET	Asynchronous Reset
V_{BB}	Reference Voltage Output
Q, $\overline{Q}$	Data Outputs
V_{CC}	Positive Supply
V_{EE}	Negative Supply

LOGIC DIAGRAM AND PINOUT ASSIGNMENT



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 +6.0	Vdc
V_I	PECL Input Voltage (V_{EE} = 0V)	0 to +6.0	Vdc
V_{EE}	ECL Power Supply (V_{CC} = 0V)	-6.0 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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage	-1430		-1300	-1380		-1270	-1350		-1250	-1310		-1190	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		25	30	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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage[1]	1870		2000	1920		2030	1950		2050	1990		2110	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		25	30	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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage[1]	3570		3700	3620		3730	3650		3750	3690		3810	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		25	30	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.

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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage	-1380		-1260	-1380		-1260	-1380		-1260	-1380		-1260	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		29	35	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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage[1]	1920		2040	1920		2040	1920		2040	1920		2040	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		29	35	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
I_{IH}	Input HIGH Current			150			150			150			150	µA
I_{IL}	Input LOW Current CLK, $\overline{CLK}$ RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V_{BB}	Output Reference Voltage[1]	3620		3740	3620		3740	3620		3740	3620		3740	mV
I_{EE}	Power Supply Current		25	30		25	30		25	30		29	35	mA

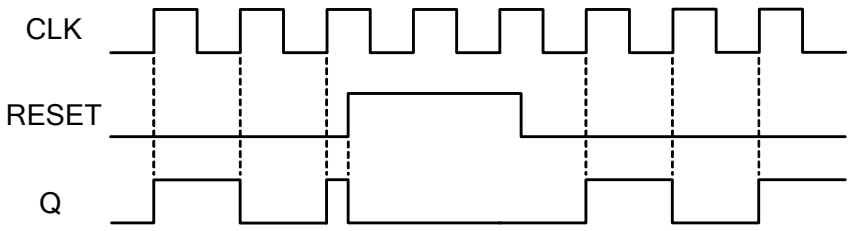
1. For supply voltages other that 5.0V, use the ECL table values and ADD supply voltage value.
2. Each output is terminated through a 50Ω resistor to V_{CC} – 2V.

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

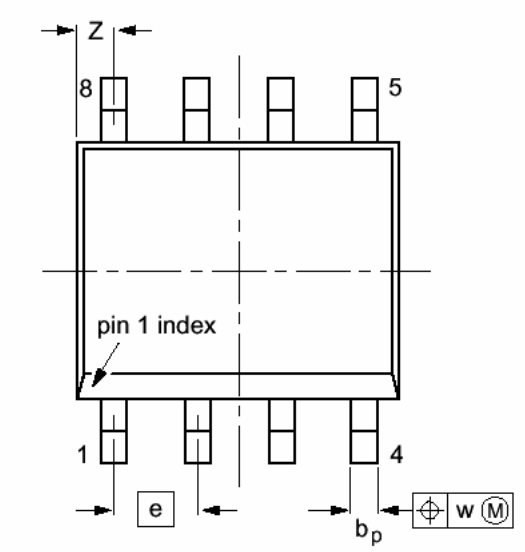
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{max}	Maximum Toggle Frequency	2.2	3.0		2.6	3.0		2.6	3.0		2.6	3.0		GHz
t_{PLH}/t_{PHL}	Propagation Delay CLK, $\overline{CLK}$ to Q/$\overline{Q}$ RESET to Q/$\overline{Q}$	 360 390	 450 540	 540 690	 370 440	 460 540	 550 640	 380 440	 470 540	 560 640	 400 450	 490 550	 580 650	ps
V_{PP} (AC)	Input Swing[1]	150		1000	150		1000	150		1000	150		1000	mV
V_{CMR}	Common Mode Range[2] V_{PP} < 500 mv $V_{PP} \geq$ 500 mv	V_{EE} + 1.2 1.4		V_{CC} - 0.4 0.4	V_{EE} + 1.1 1.3		V_{CC} - 0.4 0.4	V_{EE} + 1.1 1.3		V_{CC} - 0.4 0.4	V_{EE} + 1.1 1.3		V_{CC} - 0.4 0.4	V
t_r / t_f	Output Rise/Fall Times Q/$\overline{Q}$ (20% - 80%)	100		260	100		260	100		260	100		260	ps

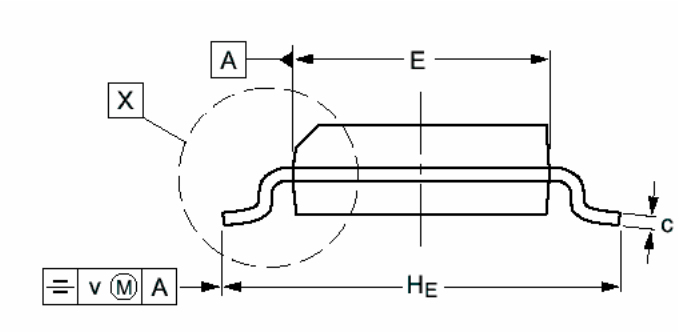
1. V_{PP} is the peak-to-peak differential input swing range for which AC parameters are guaranteed.
2. V_{CMR} is defined as the range within which the V_{IH} level may vary, with the device still meeting the propagation delay specification. The V_{IL} level must be such that V_{PP} is within the differential input swing range specified.

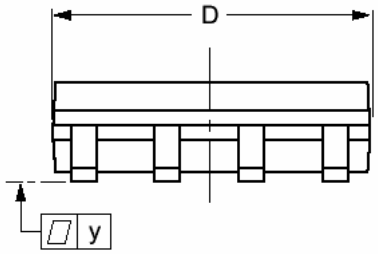
Figure 1: Timing Diagram

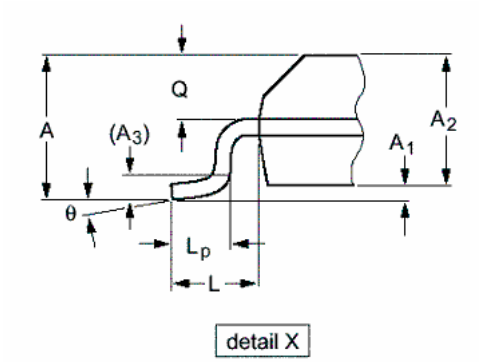


PACKAGE DIAGRAM
SOIC 8





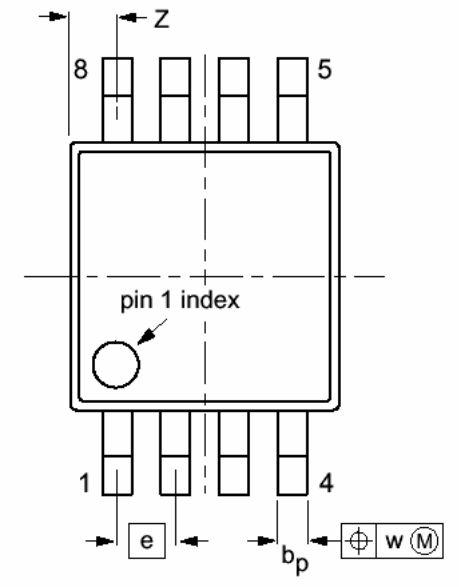


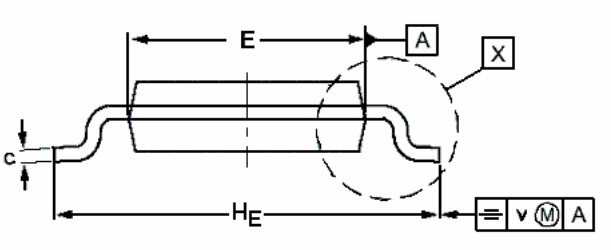


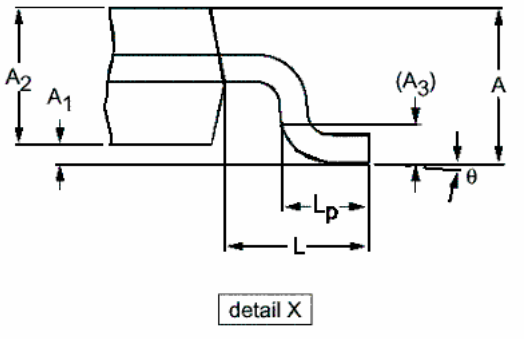
NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

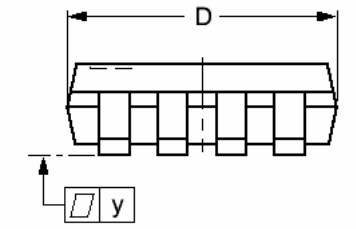
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A		1.75		0.069
A_1	0.10	0.25	0.004	0.010
A_2	1.25	1.45	0.049	0.057
A_3	0.25		0.01	
b_p	0.36	0.49	0.014	0.019
c	0.19	0.25	0.0075	0.0100
D	4.8	5.0	0.19	0.20
E	3.8	4.0	0.15	0.16
e	1.27		0.050	
H_E	5.80	6.20	0.228	0.244
L	1.05		0.041	
L_p	0.40	1.00	0.016	0.039
Q	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^O	8^O	0^O	8^O

PACKAGE DIAGRAM
TSSOP 8





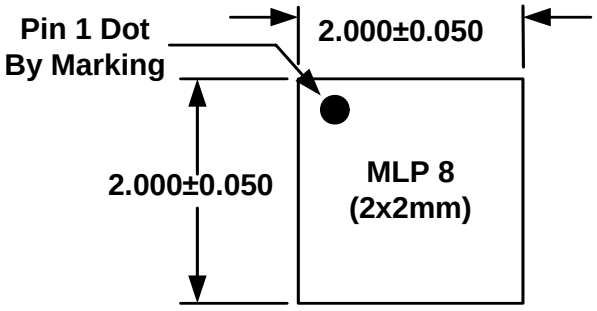




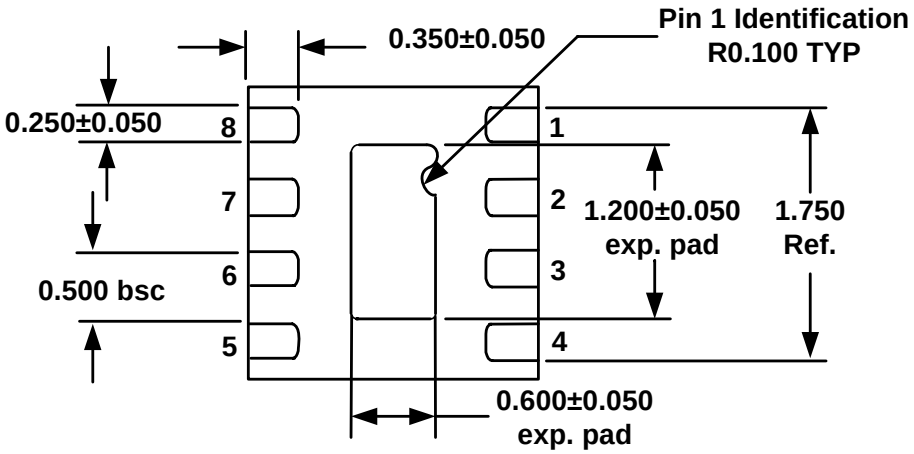
NOTES:
1. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
2. MAXIMUM MOLD PROTRUSION FOR D IS 0.15mm.
3. MAXIMUM MOLD PROTRUSION FOR E IS 0.25mm.

DIM	MILLIMETERS	
	MIN	MAX
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^O	6^O

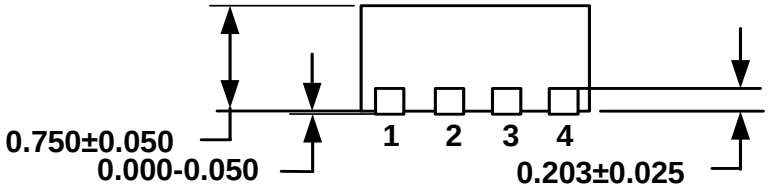
PACKAGE DIAGRAM
MLP 8 2x2mm



TOP VIEW



BOTTOM VIEW



SIDE VIEW

Note: All dimensions are in mm

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