

# 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.

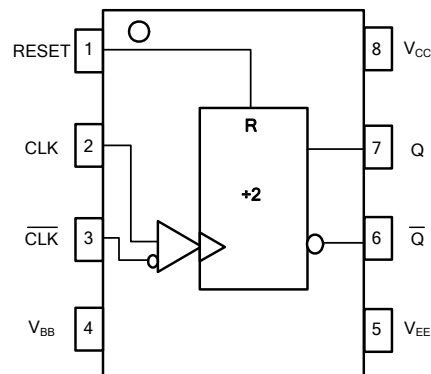
The LVEL32 provides a  $V_{BB}$  output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the  $V_{BB}$  reference should be connected to one side of the CLK/CLK differential input pair. The input signal is then fed to the other CLK/CLK input. 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, CLK	Clock Inputs
RESET	Asynchronous Reset
$V_{BB}$	Reference Voltage Output
Q, Q	Data Outputs
$V_{CC}$	Positive Supply
$V_{EE}$	Negative Supply

## LOGIC DIAGRAM AND PINOUT ASSIGNMENT



**AZ10LVEL32**  
**AZ100LVEL32**

**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 +6.0	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)	-6.0 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

**10K ECL DC Characteristics (V<sub>EE</sub> = -3.0V to -5.5V, V<sub>CC</sub> = 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 <sub>OH</sub>	Output HIGH Voltage <sup>1</sup>	-1080		-890	-1020		-840	-980		-810	-910		-720	mV
V <sub>OL</sub>	Output LOW Voltage <sup>1</sup>	-1950		-1650	-1950		-1630	-1950		-1630	-1950		-1595	mV
V <sub>IH</sub>	Input HIGH Voltage	-1230		-890	-1170		-840	-1130		-810	-1060		-720	mV
V <sub>IL</sub>	Input LOW Voltage	-1950		-1500	-1950		-1480	-1950		-1480	-1950		-1445	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150			150	µA
I <sub>IL</sub>	Input LOW Current CLK, CLK RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V <sub>BB</sub>	Output Reference Voltage	-1430		-1300	-1380		-1270	-1350		-1250	-1310		-1190	mV
I <sub>EE</sub>	Power Supply Current		25	30		25	30		25	30		25	30	mA

- Each output is terminated through a 50Ω resistor to V<sub>CC</sub> - 2V.

**10K LVPECL DC Characteristics (V<sub>EE</sub> = GND, V<sub>CC</sub> = +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 <sub>OH</sub>	Output HIGH Voltage <sup>1,2</sup>	2220		2410	2280		2460	2320		2490	2390		2580	mV
V <sub>OL</sub>	Output LOW Voltage <sup>1,2</sup>	1350		1650	1350		1670	1350		1670	1350		1705	mV
V <sub>IH</sub>	Input HIGH Voltage <sup>1</sup>	2070		2410	2130		2460	2170		2490	2240		2580	mV
V <sub>IL</sub>	Input LOW Voltage <sup>1</sup>	1350		1800	1350		1820	1350		1820	1350		1855	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150			150	µA
I <sub>IL</sub>	Input LOW Current CLK, CLK RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V <sub>BB</sub>	Output Reference Voltage <sup>1</sup>	1870		2000	1920		2030	1950		2050	1990		2110	mV
I <sub>EE</sub>	Power Supply Current		25	30		25	30		25	30		25	30	mA

- For supply voltages other than 3.3V, use the ECL table values and ADD supply voltage value.
- Each output is terminated through a 50Ω resistor to V<sub>CC</sub> - 2V.

**10K PECL DC Characteristics (V<sub>EE</sub> = GND, V<sub>CC</sub> = +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 <sub>OH</sub>	Output HIGH Voltage <sup>1,2</sup>	3920		4110	3980		4160	4020		4190	4090		4280	mV
V <sub>OL</sub>	Output LOW Voltage <sup>1,2</sup>	3050		3350	3050		3370	3050		3370	3050		3405	mV
V <sub>IH</sub>	Input HIGH Voltage <sup>1</sup>	3770		4110	3830		4160	3870		4190	3940		4280	mV
V <sub>IL</sub>	Input LOW Voltage <sup>1</sup>	3050		3500	3050		3520	3050		3520	3050		3555	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150			150	µA
I <sub>IL</sub>	Input LOW Current CLK, CLK RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			µA
V <sub>BB</sub>	Output Reference Voltage <sup>1</sup>	3570		3700	3620		3730	3650		3750	3690		3810	mV
I <sub>EE</sub>	Power Supply Current		25	30		25	30		25	30		25	30	mA

- For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.
- Each output is terminated through a 50Ω resistor to V<sub>CC</sub> - 2V.

**AZ10LVEL32**  
**AZ100LVEL32**

**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 <sup>1</sup>	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	-1025	-955	-880	mV
$V_{OL}$	Output LOW Voltage <sup>1</sup>	-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, 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** ( $V_{EE} = GND$ ,  $V_{CC} = +3.3V$ )

Symb	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>1,2</sup>	2215	2295	2420	2275	2345	2420	2275	2345	2420	2275	2345	2420	mV
$V_{OL}$	Output LOW Voltage <sup>1,2</sup>	1470	1605	1745	1490	1595	1680	1490	1595	1680	1490	1595	1680	mV
$V_{IH}$	Input HIGH Voltage <sup>1</sup>	2135		2420	2135		2420	2135		2420	2135		2420	mV
$V_{IL}$	Input LOW Voltage <sup>1</sup>	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, CLK RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			μA
$V_{BB}$	Output Reference Voltage <sup>1</sup>	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 than 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 <sup>1,2</sup>	3915	3995	4120	3975	4045	4120	3975	4045	4120	3975	4045	4120	mV
$V_{OL}$	Output LOW Voltage <sup>1,2</sup>	3170	3305	3445	3190	3295	3380	3190	3295	3380	3190	3295	3380	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
$I_{IH}$	Input HIGH Current			150			150			150			150	μA
$I_{IL}$	Input LOW Current CLK, CLK RESET	-150 0.5			-150 0.5			-150 0.5			-150 0.5			μA
$V_{BB}$	Output Reference Voltage <sup>1</sup>	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 than 5.0V, use the ECL table values and ADD supply voltage value.

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

# AZ10LVEL32

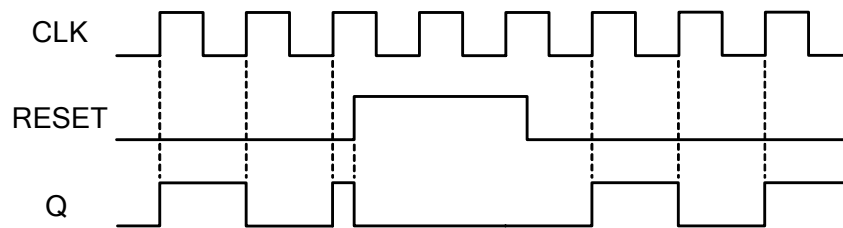
## AZ100LVEL32

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

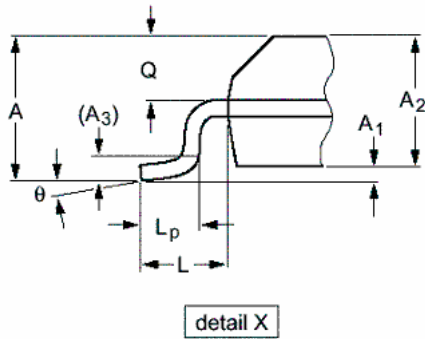
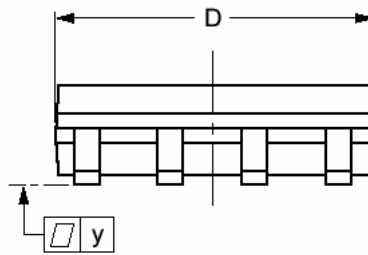
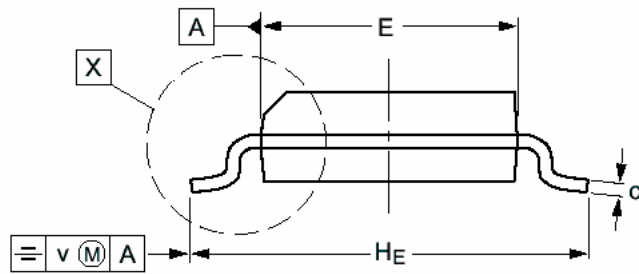
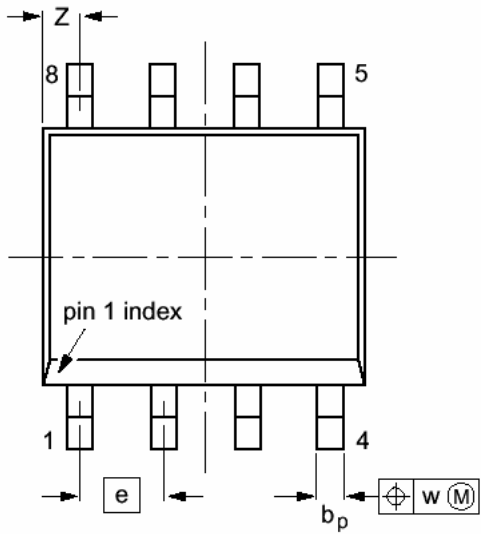
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{max}$	Maximum Toggle Frequency	2.2	3.0		2.6	3.0		2.6	3.0		2.6	3.0		GHz
$t_{PLH}/t_{PHL}$	Propagation Delay CLK, $\overline{CLK}$ to Q/ $\overline{Q}$ RESET to Q/ $\overline{Q}$	360 390	450 540	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 <sup>1</sup>	150		1000	150		1000	150		1000	150		1000	mV
$V_{CMR}$	Common Mode Range <sup>2</sup> $V_{PP} < 500$ 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

- $V_{PP}$  is the peak-to-peak differential input swing range for which AC parameters are guaranteed.
- $V_{CMR}$  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**

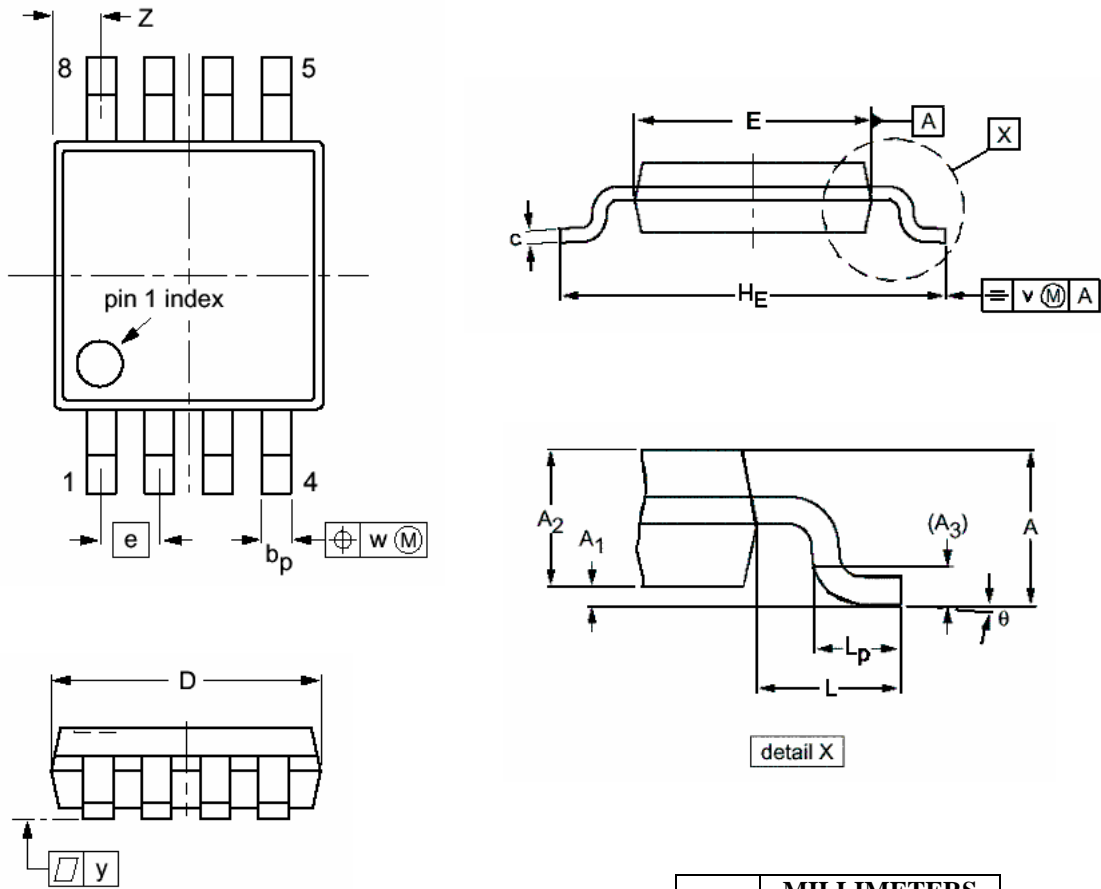


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A		1.75	0.069	
A <sub>1</sub>	0.10	0.25	0.004	0.010
A <sub>2</sub>	1.25	1.45	0.049	0.057
A <sub>3</sub>	0.25		0.01	
b <sub>p</sub>	0.36	0.49	0.014	0.019
c	0.19	0.25	0.0075	0.0100
D	4.8	5.0	0.19	0.20
E	3.8	4.0	0.15	0.16
e	1.27		0.050	
H <sub>E</sub>	5.80	6.20	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
A		1.10
A <sub>1</sub>	0.05	0.15
A <sub>2</sub>	0.80	0.95
A <sub>3</sub>	0.25	
b <sub>p</sub>	0.25	0.45
c	0.15	0.28
D	2.90	3.10
E	2.90	3.10
e	0.65	
H <sub>E</sub>	4.70	5.10
L	0.94	
L <sub>p</sub>	0.40	0.70
v	0.10	
w	0.10	
y	0.10	
Z	0.35	0.70
θ	0°	6°



**AZ10LVEL32**  
**AZ100LVEL32**

-

Arizona Microtek, Inc. reserves the right to change circuitry and specifications at any time without prior notice. Arizona Microtek, Inc. makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Arizona Microtek, Inc. assume any liability arising out of the application or use of any product or circuit and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Arizona Microtek, Inc. does not convey any license rights nor the rights of others. Arizona Microtek, Inc. products are not designed, intended or authorized for use as components in systems intended to support or sustain life, or for any other application in which the failure of the Arizona Microtek, Inc. product could create a situation where personal injury or death may occur. Should Buyer purchase or use Arizona Microtek, Inc. products for any such unintended or unauthorized application, Buyer shall indemnify and hold Arizona Microtek, Inc. and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Arizona Microtek, Inc. was negligent regarding the design or manufacture of the part.