

# AZ10EL32 AZ100EL32

## ECL/PECL ÷ 2 Divider

### FEATURES

- 510ps Propagation Delay
- 3.0GHz Toggle Frequency
- High Bandwidth Output Transitions
- 75k $\Omega$  Internal Input Pulldown Resistors
- Direct Replacement for ON Semiconductor MC10EL32 & MC100EL32

### PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
SOIC 8	AZ10EL32D	AZM10 EL32	1,2
SOIC 8	AZ100EL32D	AZM100 EL32	1,2
SOIC 8 RoHS Compliant / Lead (Pb) Free	AZ100EL32D+	AZM100+ EL32	1,2
TSSOP 8	AZ10EL32T	AZT EL32	1,2
TSSOP 8	AZ100LVEL32T	AZH EL32	1,2

- 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.

### DESCRIPTION

The AZ10/100EL32 is an integrated  $\div 2$  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 EL32's in a system.

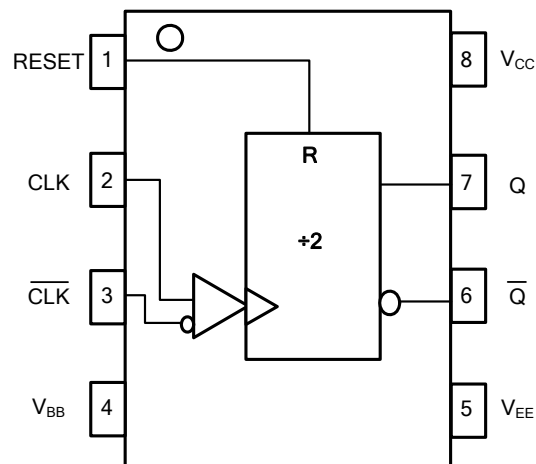
The EL32 provides a  $V_{BB}$  output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the  $V_{BB}$  reference should be connected to one side of the CLK/CLK differential input pair. The input signal is then fed to the other CLK/CLK input. The  $V_{BB}$  pin should be used only as a bias for the EL32 as its sink/source capability is limited. When used, the  $V_{BB}$  pin should be bypassed to ground via a 0.01 $\mu$ F capacitor.

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

### LOGIC DIAGRAM AND PINOUT ASSIGNMENT

#### 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



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**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

**10K ECL DC Characteristics (V<sub>EE</sub> = -4.75V 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	0.5			0.5			0.5			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 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	0.5			0.5			0.5			0.5			μA
V <sub>BB</sub>	Output Reference Voltage	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.

**100K ECL DC Characteristics (V<sub>EE</sub> = -4.2V 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>	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	-1025	-955	-880	mV
V <sub>OL</sub>	Output LOW Voltage <sup>1</sup>	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	-1810	-1705	-1620	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
I <sub>IH</sub>	Input HIGH Current			150			150			150			150	μA
I <sub>IL</sub>	Input LOW Current	0.5			0.5			0.5			0.5			μA
V <sub>BB</sub>	Output Reference Voltage	-1380		-1260	-1380		-1260	-1380		-1260	-1380		-1260	mV
I <sub>EE</sub>	Power Supply Current		25	30		25	30		25	30		29	35	mA

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

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**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>1,2</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	0.5			0.5			0.5			0.5			μA
$V_{BB}$	Output Reference Voltage	3620		3740	3620		3740	3620		3740	3620		3740	mV
$I_{EE}$	Power Supply Current		25	30		25	30		25	30		29	35	mA

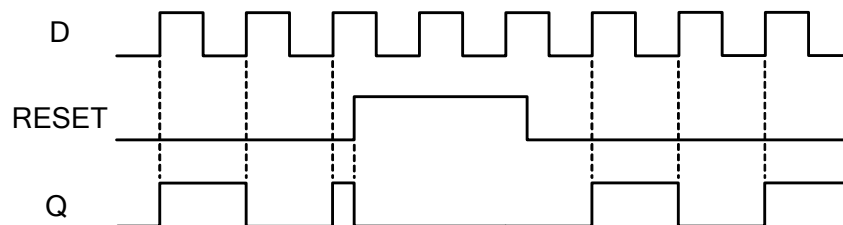
- For supply voltages other than 5.0V, use the ECL table values and ADD supply voltage value.
- Each output is terminated through a 50Ω resistor to  $V_{CC} - 2\text{V}$ .

**AC Characteristics** ( $V_{EE} = 10\text{E}(-4.75\text{V to } -5.5\text{V})$ ,  $100\text{E}(-4.2\text{V to } -5.5\text{V})$ ;  $V_{CC} = \text{GND}$  or  $V_{EE} = \text{GND}$ ,  $V_{CC} = 10\text{E}(+4.75\text{V to } +5.5\text{V})$ ,  $100\text{E}(+4.2\text{V to } +5.5\text{V})$ )

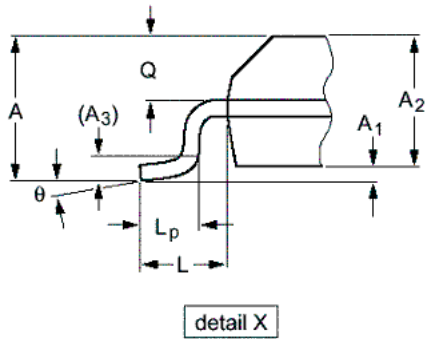
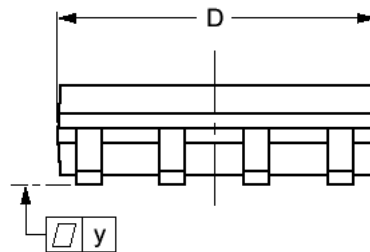
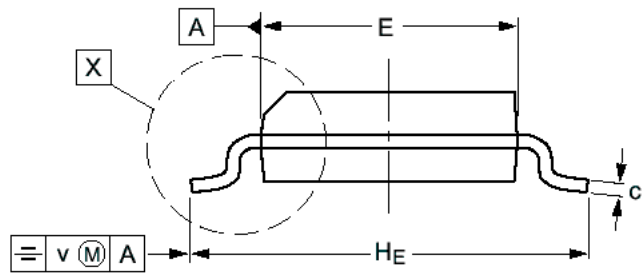
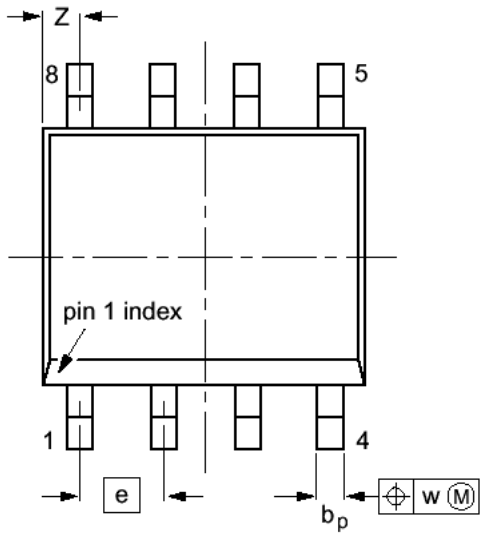
Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\text{max}}$	Maximum Toggle Frequency	2.2	3.0		2.6	3.0		2.6	3.0		2.6	3.0		GHz
$t_{\text{PLH}}/t_{\text{PHL}}$	Propagation Delay CLK to Q Reset to Q	360 390	500 540	640 690	410 440	500 540	590 640	420 440	510 540	600 640	450 450	540 550	630 650	ps
$V_{\text{PP}}(\text{AC})$	Minimum Input Swing <sup>1</sup>	150			150			150			150			mV
$V_{\text{CMR}}$	Common Mode Range <sup>2</sup>	$V_{\text{CC}} - 2.5$		$V_{\text{CC}} - 0.4$	$V_{\text{CC}} - 2.5$		$V_{\text{CC}} - 0.4$	$V_{\text{CC}} - 2.5$		$V_{\text{CC}} - 0.4$	$V_{\text{CC}} - 2.5$		$V_{\text{CC}} - 0.4$	V
$t_r / t_f$	Output Rise/Fall Times Q (20% - 80%)	100		350	100		350	100		350	100		350	ps

- $V_{\text{PP}}$  is the minimum peak-to-peak differential input swing for which AC parameters are guaranteed.
- $V_{\text{CMR}}$  is defined as the range within which the  $V_{\text{IH}}$  level may vary, with the device still meeting the propagation delay specification. The  $V_{\text{IL}}$  level must be such that the peak-to-peak voltage is less than 1.0V and greater than or equal to  $V_{\text{PP}}(\text{min})$ .

**Figure 1: Timing Diagram**



**PACKAGE DIAGRAM  
SOIC 8**

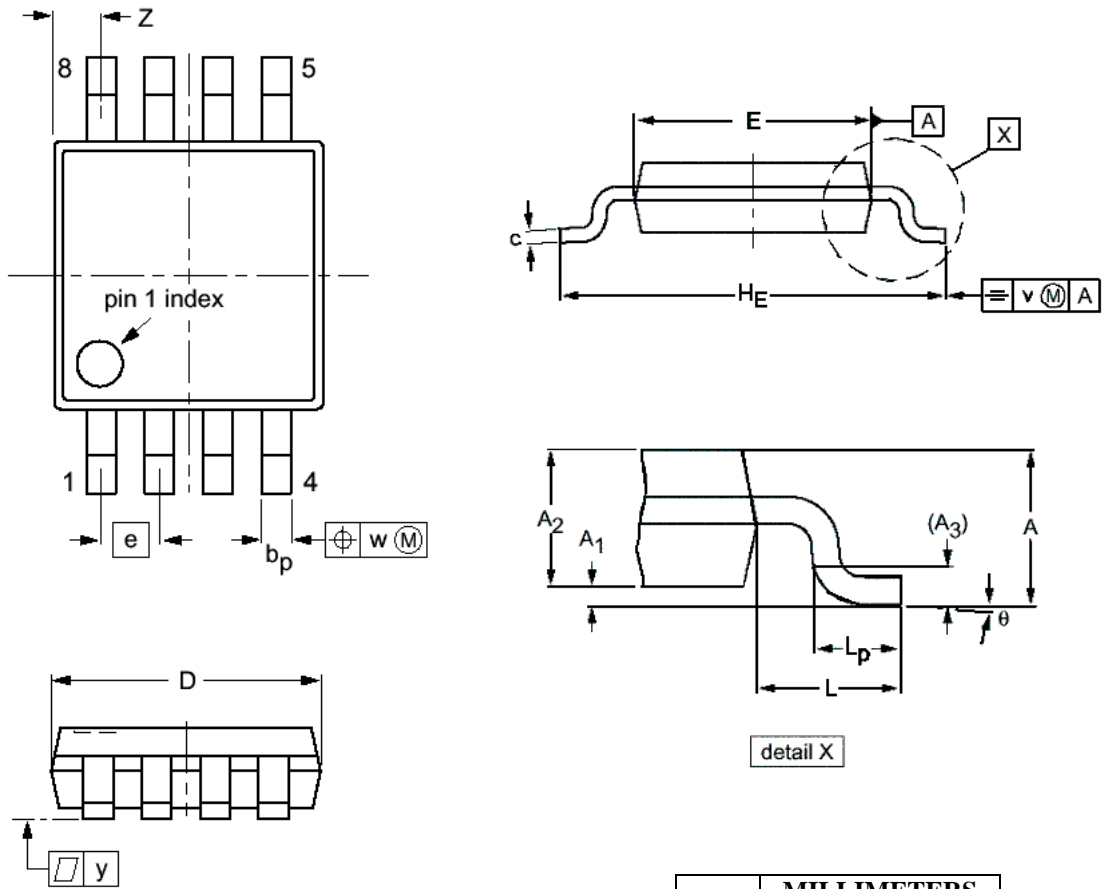


DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A		1.75	0.069	
A <sub>1</sub>	0.10	0.25	0.004	0.010
A <sub>2</sub>	1.25	1.45	0.049	0.057
A <sub>3</sub>	0.25		0.01	
b <sub>p</sub>	0.36	0.49	0.014	0.019
c	0.19	0.25	0.0075	0.0100
D	4.8	5.0	0.19	0.20
E	3.8	4.0	0.15	0.16
e	1.27		0.050	
H <sub>E</sub>	5.80	6.20	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°

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