

# AZ10E116 AZ100E116

## ECL/PECL Quint Differential Line Receiver

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### FEATURES

- 500ps Maximum Propagation Delay
- Dedicated  $V_{CCO}$  Pin for Each Receiver
- Operating Range of 4.2V to 5.46V
- 75k $\Omega$  Internal Input Pulldown Resistors
- Direct Replacement for ON Semiconductor MC10E116 & MC100E116

### PACKAGE AVAILABILITY

PACKAGE	PART NUMBER	MARKING	NOTES
PLCC 28	AZ10E116FN	AZM10E116 <Date Code>	1,2
PLCC 28	AZ100E116FN	AZM100E116 <Date Code>	1,2

1 Add R2 at end of part number for 13 inch (2.5K parts) Tape & Reel.

2 Date code format: "YY" for year followed by "WW" for week.

### DESCRIPTION

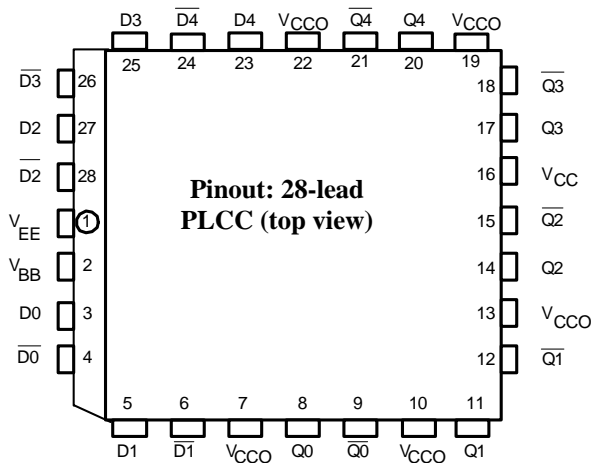
The AZ10/100E116 is a quint differential line receiver with emitter-follower outputs. The E116 provides a  $V_{BB}$  output for single-ended use or a DC bias reference for AC coupling to the device. For single-ended input applications, the  $V_{BB}$  reference should be connected to one side of the Dn/Dn differential input pair. The input signal is then fed to the other Dn/Dn input. The  $V_{BB}$  pin should be used only as a bias for the E116 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.

The receiver design features clamp circuitry to cause a defined state if both the inverting and non-inverting inputs are left open; in this case the Q output goes LOW, while the  $\bar{Q}$  output goes HIGH. This feature makes the device ideal for twisted pair applications.

If both inverting and non-inverting inputs are at an equal potential of  $> V_{CC} - 2.5V$ , the receiver does not go to a defined state. This condition may produce output voltage levels between HIGH and LOW.

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

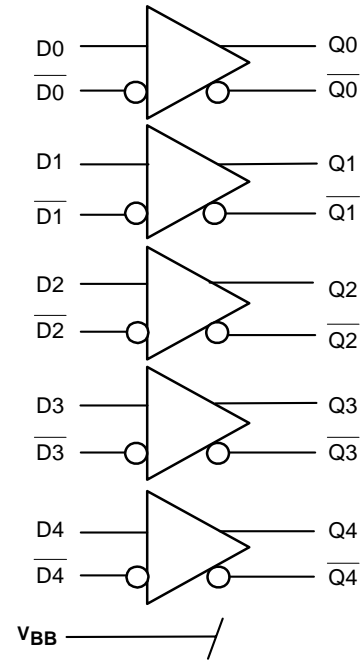
**AZ10E116**  
**AZ100E116**



**PIN DESCRIPTION**

PIN	FUNCTION
D0, $\overline{D0}$ -D4, $\overline{D4}$	Differential Input Pairs
Q0, $\overline{Q0}$ -Q4, $\overline{Q4}$	Differential Output Pairs
$V_{BB}$	Reference Voltage Output
$V_{CC}$ , $V_{CCO}$	Positive Supply
$V_{EE}$	Negative Supply

**LOGIC SYMBOL**



**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** ( $V_{EE} = -4.94V$  to  $-5.46V$ ,  $V_{CC} = V_{CCO} = GND$ )

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>	-1080		-890	-1020		-840	-980		-810	-910		-720	mV
$V_{OL}$	Output LOW Voltage <sup>1</sup>	-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
$I_{IH}$	Input HIGH Current			150			150			150			150	µA
$I_{IL}$	Input LOW Current	0.5		0.5			0.5			0.5			0.5	µA
$I_{EE}$	Power Supply Current		29	35		29	35		29	35		29	35	mA

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

**AZ10E116**  
**AZ100E116**

**10K PECL DC Characteristics** ( $V_{EE} = \text{GND}$ ,  $V_{CC} = V_{CCO} = +5.0\text{V}$ )

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>	3920		4110	3980		4160	4020		4190	4090		4280	mV
$V_{OL}$	Output LOW Voltage <sup>1,2</sup>	3050		3350	3050		3370	3050		3370	3050		3405	mV
$V_{IH}$	Input HIGH Voltage <sup>1</sup>	3770		4110	3830		4160	3870		4190	3940		4280	mV
$V_{IL}$	Input LOW Voltage <sup>1</sup>	3050		3500	3050		3520	3050		3520	3050		3555	mV
$V_{BB}$	Reference Voltage <sup>1</sup>	3570		3700	3620		3730	3650		3750	3690		3810	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
$I_{EE}$	Power Supply Current		29	35		29	35		29	35		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  $V_{CC} - 2\text{V}$ .

**100K ECL DC Characteristics** ( $V_{EE} = -4.2\text{V}$  to  $-5.46\text{V}$ ,  $V_{CC} = V_{CCO} = \text{GND}$ )

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
$V_{BB}$	Reference Voltage	-1380		-1260	-1380		-1260	-1380		-1260	-1380		-1260	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
$I_{EE}$	Power Supply Current		29	35		29	35		29	35		29	40	mA

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

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

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
$V_{BB}$	Reference Voltage <sup>1</sup>	3620		3740	3620		3740	3620		3740	3620		3740	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
$I_{EE}$	Power Supply Current		29	35		29	35		29	35		29	40	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  $V_{CC} - 2\text{V}$ .

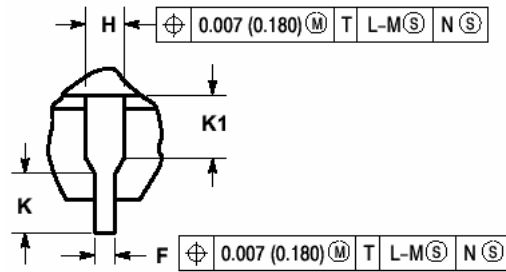
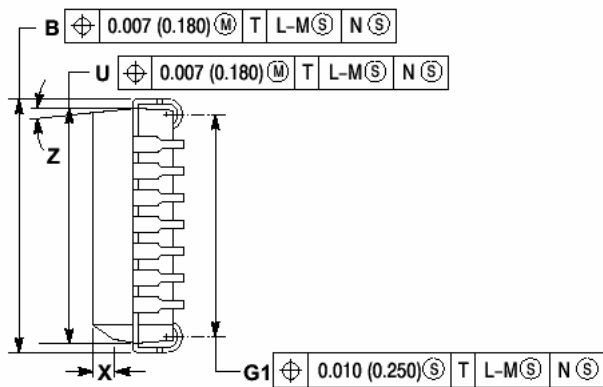
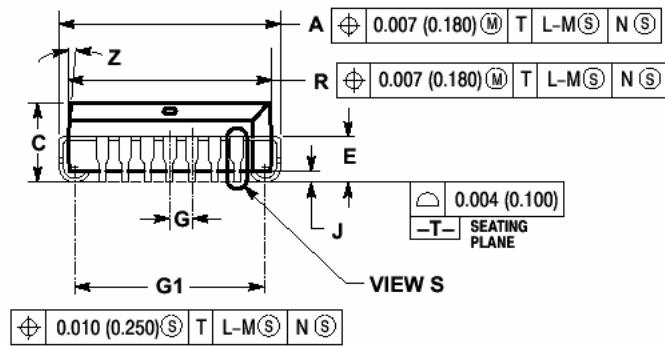
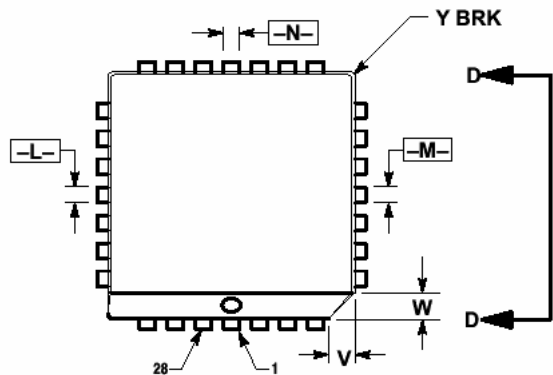
**AC Characteristics** ( $V_{EE} = 10\text{E}(-4.94\text{V}$  to  $-5.46\text{V})$ ,  $100\text{E}(-4.2\text{V}$  to  $-5.46\text{V})$ ;  $V_{CC} = V_{CCO} = \text{GND}$  or  $V_{EE} = \text{GND}$ ,  $V_{CC} = V_{CCO} = 10\text{E}(+4.94\text{V}$  to  $+5.46\text{V})$ ,  $100\text{E}(+4.2\text{V}$  to  $+5.46\text{V})$ )

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit	Condition
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
$t_{PLH}/t_{PHL}$	Propagation Delay to Output														
	D (Differential)	150	300	500	200	300	450	200	300	450	200	300	450	ps	
	D (Single-Ended)	150	300	550	150	300	500	150	300	500	150	300	500	ps	
$T_{SKEW}$	Within-Device Skew <sup>1</sup>		50			50			50			50		ps	
$T_{SKEW}$	Duty Cycle Skew <sup>2</sup>		±10			±10			±10			±10		ps	
$V_{PP}(\text{AC})$	Minimum Input Swing <sup>3</sup>	150			150			150			150			mV	
$V_{CMR}$	Common Mode Range <sup>4</sup>	$V_{CC} - 2.0$		$V_{CC} - 0.6$	$V_{CC} - 2.0$		$V_{CC} - 0.6$	$V_{CC} - 2.0$		$V_{CC} - 0.6$	$V_{CC} - 2.0$		$V_{CC} - 0.6$	V	
$t_r/t_f$	Rise/Fall Time	250		625	275		575	275		575	275		575	ps	20-80%

- Within-device skew is defined as identical transitions on similar paths through a device.
- Duty cycle skew is defined only for differential operation. The skews are measured from the crossover point of the inputs to the crossover point of the outputs.
- $V_{PP}$  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  $1\text{V}$ .

AZ10E116  
AZ100E116

**PACKAGE DIAGRAM  
PLCC 28**



VIEW D-D

VIEW S

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.32	12.57	0.485	0.495
B	12.32	12.57	0.485	0.495
C	4.20	4.57	0.165	0.180
E	2.29	2.79	0.090	0.110
F	0.33	0.48	0.013	0.019
G	1.27 BSC		0.050 BSC	
H	0.66	0.81	0.026	0.032
J	0.51		0.020	
K	0.64		0.025	
R	11.43	11.58	0.450	0.456
U	11.43	11.58	0.450	0.456
V	1.07	1.21	0.042	0.048
W	1.07	1.21	0.042	0.048
X	1.07	1.42	0.042	0.056
T		0.50		0.020
Z	2 <sup>0</sup>	10 <sup>0</sup>	2 <sup>0</sup>	10 <sup>0</sup>
G1	10.42	10.92	0.410	0.430
K1	1.02		0.040	

NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010mm (0.250in.) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012mm (0.300in.). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, THE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025mm (0.635in.).

**AZ10E116**  
**AZ100E116**

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