CYPRESS SEMICONDUCTOR

Combinatorial ECL 16P8 Programmable Logic Device

Features

- **Standard 16P8 pinout and architecture**
  - **— 16 inputs, 8 outputs**
  - **— User-programmable output polarity**
- **Ultra high speed/standard power**
  - **— t_{PD} = 4 ns (max.)**
  - **— I_{EE} = 240 mA (max.)**
- **Low-power version**
  - **— t_{PD} = 6 ns (max.)**
  - **— I_{EE} = 170 mA (max.)**
- **Both 10KH- and 100K-compatible I/O versions available**
- **Enhanced test features**
  - **— Additional test input terms**
  - **— Additional test product terms**
- **Security fuse**

Functional Description

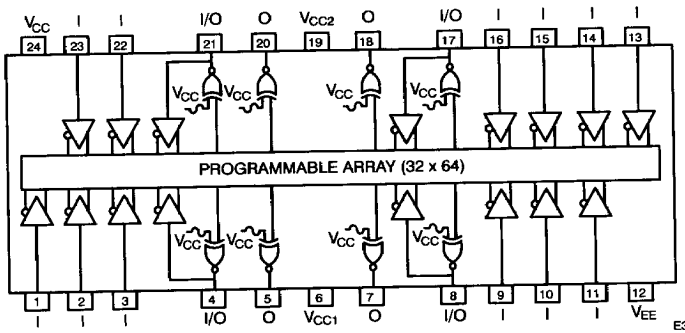
Cypress Semiconductor's PLD family offers the user the highest level of performance in ECL programmable logic devices. These PLDs are developed using an advanced STAR℠ bipolar process incorporating proven Ti-W fuses.

The CY10E301 is 10KH-compatible and the CY100E301 is 100K-compatible. These PLDs implement the familiar sum-of-products logic functions by selectively programming cell elements to configure the AND gates by disconnecting either the true or the complement input term. If all inputs are disconnected from an AND gate, then a logical true will exist at the output of this AND gate. An output polarity fuse is also provided to allow an active LOW to occur if this fuse is blown. A security feature provides the user protection for the implementation of proprietary logic. When invoked by blowing the security fuse, the contents of the array cannot be accessed in the verify mode.

The CY10E301 and CY100E301 can be programmed using Cypress's QuickPro II or other industry-standard programming equipment. Programming support information can be obtained from local Cypress Semiconductor sales offices.

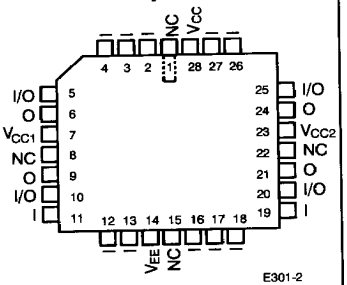
Logic Block Diagram

PDIP/CerDIP
Top View



Pin Configuration

PLCC/CLCC
Top View



Selection Guide

		10E301–4 100E301–4	10E301–5	10E301L–6 100E301L–6
Maximum Input to Output Propagation Delay Time (ns)		4	5	6
I_{EE} (mA)	Commercial	–240		–170
	Military		–240	

STAR is a trademark of Aspen Semiconductor.

Maximum Ratings

(Above which the useful life may be impaired. Exposure to absolute maximum-rated conditions for extended periods may affect device reliability. For user guidelines, not tested.)

Storage Temperature ..... −65°C to +150°C

Ambient Temperature with Power Applied ..... −55°C to +125°C

Supply Voltage V_{EE} to V_{CC} ..... −7.0V to +0.5V

Input Voltage ..... V_{EE} to +0.5V

Output Current ..... −50 mA

Operating Range Referenced to V_{CC} at Ground

Range	Version	Temperature	V_{CC}
Commercial (Standard, L)	10E	0°C to +75°C Ambient	−5.2V ± 5%
Commercial (Standard, L)	100E	0°C to +85°C Ambient	−4.5V ± 0.3V
Military	10E	−55°C to +125°C Case	−5.2V ± 5%

Electrical Characteristics Over the Operating Range[1]

Parameters	Description	Test Conditions	Temperature[2]	10E301 Min.	10E301 Max.	100E301 Min.	100E301 Max.	Units
V_{OH}	Output HIGH Voltage	10KH, R_L = 50Ω to −2V, V_{IN} = V_{IH} Min. or V_{IL} Max.	T_C = −55°C	−1140	−920			mV
			T_A = 0°C	−1020	−840			mV
			T_A = +25°C	−980	−810			mV
			T_A = +75°C	−920	−735			mV
			T_C = +125°C	−900	−700			mV
		100K, R_L = 50Ω to −2V, V_{IN} = V_{IH} Min. or V_{IL} Max.	T_A = 0°C to 85°C			−1025	−880	mV
V_{OL}	Output LOW Voltage	10KH, R_L = 50Ω to −2V, V_{IN} = V_{IH} Min. or V_{IL} Max.	T_C = −55°C	−1950	−1650			mV
			T_A = 0°C	−1950	−1630			mV
			T_A = +25°C	−1950	−1630			mV
			T_A = +75°C	−1950	−1600			mV
			T_C = +125°C	−1950	−1590			mV
		100K, R_L = 50Ω to −2V, V_{IN} = V_{IH} Min. or V_{IL} Max.	T_A = 0°C to 85°C			−1810	−1620	mV
V_{IH}	Input HIGH Voltage	10KH	T_C = −55°C	−1270	−920			mV
			T_A = 0°C	−1170	−840			mV
			T_A = +25°C	−1130	−810			mV
			T_A = +75°C	−1070	−735			mV
			T_C = +125°C	−1050	−700			mV
		100K	T_A = 0°C to 85°C			−1165	−880	mV
V_{IL}	Input LOW Voltage Supply Current (All inputs and outputs open)	10KH	T_C = −55°C	−1950	−1520			mV
			T_A = 0°C	−1950	−1480			mV
			T_A = +25°C	−1950	−1480			mV
			T_A = +75°C	−1950	−1450			mV
			T_C = +125°C	−1950	−1440			mV
		100K	T_A = 0°C to 85°C			−1810	−1475	mV
I_{IH}	Input HIGH Current	V_{IN} = V_{IH} Max.			220		220	μA
I_{IL}	Input LOW Current	V_{IN} = V_{IL} Min. (Except I/O Pins)		0.5		0.5		μA
I_{EE}		Commercial L (Low Power)		−170		−170		mA
		Commercial (Standard Power)		−240		−240		mA
		Military		−240				mA

Notes:

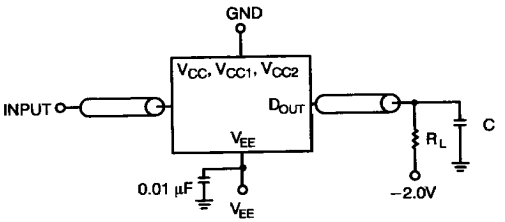
1. See AC Test Loads and Waveforms for test conditions.
2. Commercial grade is specified as ambient temperature with transverse air flow greater than 500 linear feet per minute. Military grade is specified as case temperature.

CYPRESS SEMICONDUCTOR

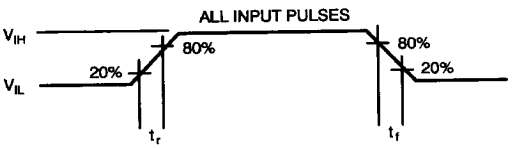
Capacitance[3]

Parameters	Description	Min.	Typ.	Max.	Units
C_{IN}	Input Capacitance		4	8	pF
C_{OUT}	Output Capacitance		6	10	pF

AC Test Load and Waveform[4, 5, 6, 7, 8, 9]



E301-3



E301-4

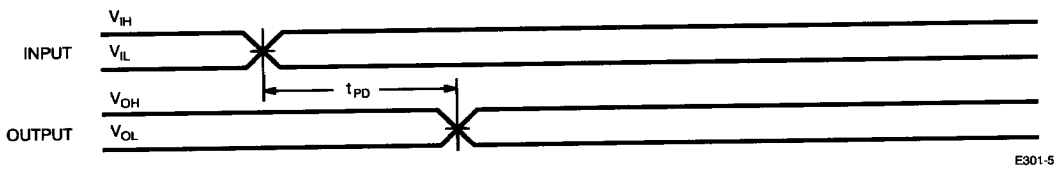
Notes:
3. Tested initially and after any design or process changes that may affect these parameters.
4. $V_{IL} = V_{IL}$ Min., $V_{IH} = V_{IH}$ Max. on 10E version.
5. $V_{IL} = -1.7V$, $V_{IH} = -0.9V$ on 100E version
6. $R_L = 50\Omega$, C < 5 pF (includes fixture and stray capacitance).
7. All coaxial cables should be 50Ω with equal lengths. The delay of the coaxial cables should be "nulled" out of the measurement.
8. $t_r = t_f = 0.7$ ns
9. All timing measurements are made from the 50% point of all waveforms.

Switching Characteristics Over the Operating Range[1]

Parameters	Description	10E301-4 100E301-4		10E301-5		10E301L-6 100E301L-6		Units
		Min.	Max.	Min.	Max.	Min.	Max.	
t_{PD}	Input to Output Propagation Delay		4.0		5.0		6.0	ns
t_r	Output Rise Time	0.35	1.5	0.35	1.5	0.35	1.5	ns
t_f	Output Fall Time	0.35	1.5	0.35	1.5	0.35	1.5	ns

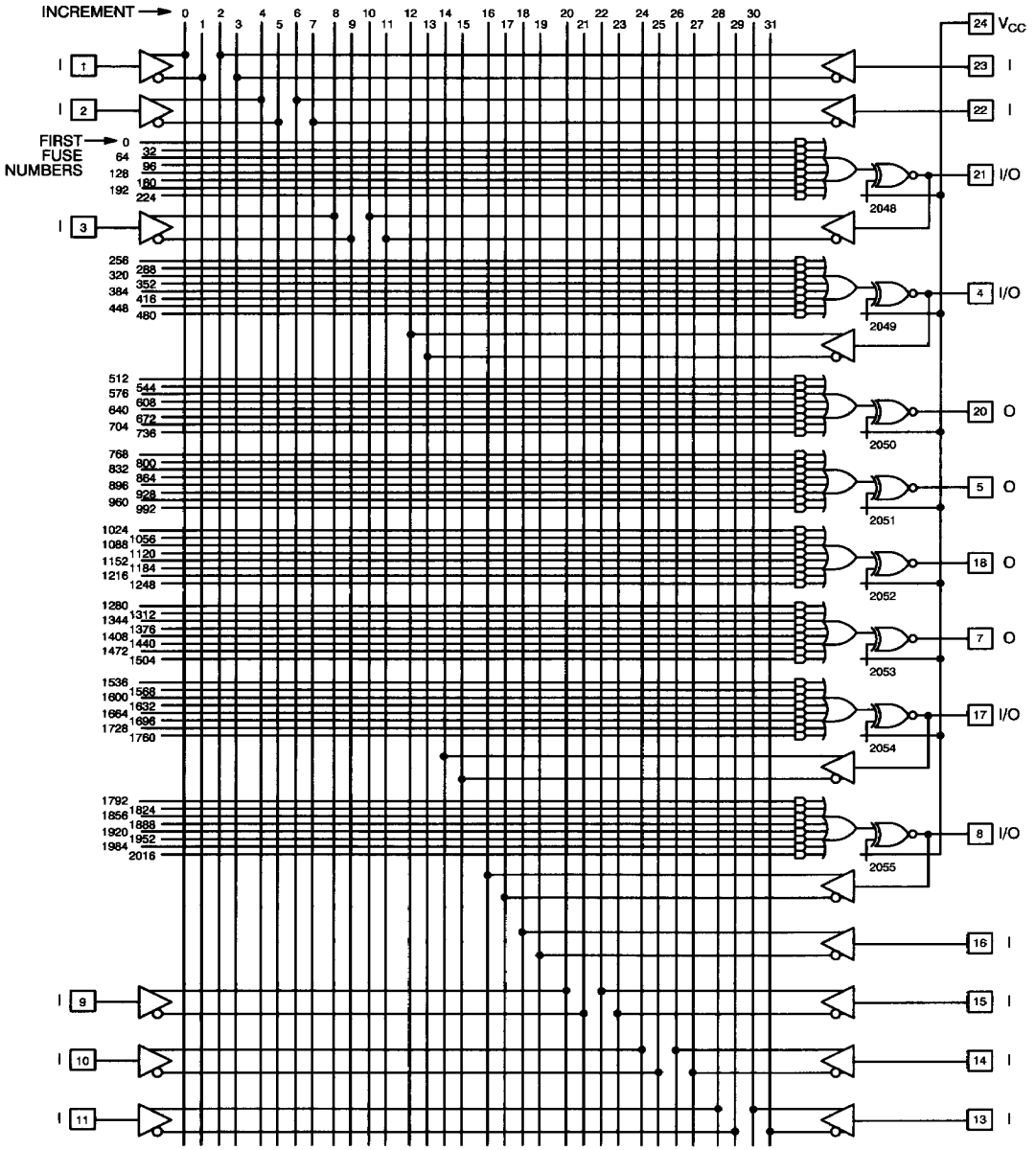
10
ECL

Switching Waveforms



E301-5

Functional Logic Diagram (DIP Pinout)



JEDEC fuse number = first fuse number + increment

CYPRESS SEMICONDUCTOR

Ordering Information

I/O	t_{PD} (ns)	I_{EE} (mA)	Ordering Code	Package Type	Operating Range
10KH	4	240	CY10E301–4DC	D14	Commercial
			CY10E301–4YC	Y64	
	5	240	CY10E301–5DMB	D14	Military
			CY10E301–5YMB	Y64	
	6	170	CY10E301L–6JC	J64	Commercial
			CY10E301L–6PC	P13A	
100K	4	240	CY100E301–4DC	D14	Commercial
			CY100E301–4YC	Y64	
	6	170	CY100E301L–6JC	J64	Commercial
			CY100E301L–6PC	P13A	

Document #: 3☐–A–00011–B