



# UNIVERSAL DEMULTIPLEXER/ DECODER

SY100S370

## FEATURES

- Max. propagation delay of 1200ps
- IEE min. of -92mA
- Industry standard 100K ECL levels
- Extended supply voltage option:  
VEE = -4.2V to -5.5V
- Voltage and temperature compensation for improved noise immunity
- Internal 75kΩ input pull-down resistors
- 60% faster than National or Signetics
- Approximately 40% lower power than Fairchild
- Function and pinout compatible with Fairchild F100K
- Available in 28-pin PLCC packages

## DESCRIPTION

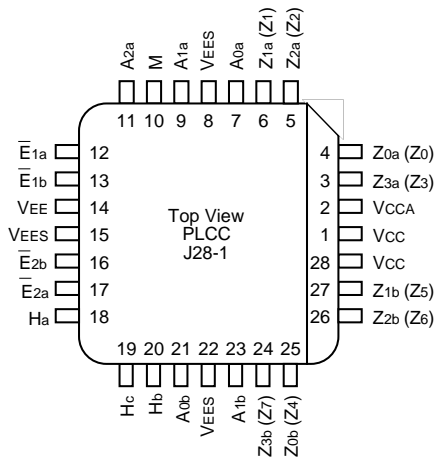
The SY100S370 is a universal demultiplexer/decoder that can be used as either a dual 1-of-4 decoder or as a single 1-of-8 decoder and is designed for use in high-performance ECL systems. The Mode control (M) input determines the function. In the dual 1-of-4 mode, each 4-input group has a pair of active-LOW Enable ( $\bar{E}$ ) inputs. The Enable pins are assigned such that in the single 1-of-8 mode they can be tied together in pairs to result in two active-LOW Enable inputs.  $\bar{E}_{1a}$  will be tied to  $\bar{E}_{1b}$  and  $\bar{E}_{2a}$  to  $\bar{E}_{2b}$ .

The auxiliary inputs ( $H_n$ ) are used to determine whether the outputs are active-HIGH or active-LOW. The address inputs for the dual 1-of-4 mode are  $A_{0a}$ ,  $A_{1a}$ ,  $A_{0b}$ .  $A_{2a}$  is unused. In the 1-of-8 mode, the address inputs are  $A_{0a}$ ,  $A_{1a}$ ,  $A_{2a}$ . The inputs on the device have 75kΩ pull-down resistors.

## PIN NAMES

Pin	Function
$A_{na}$ , $A_{nb}$	Address Inputs ( $n = 0, 1, 2$ )
$\bar{E}_{na}$ , $\bar{E}_{nb}$	Enable Inputs ( $n = 1, 2$ )
M	Mode Control Input
$H_a$	$Z_0 - Z_3$ ( $\bar{Z}_{0a} - \bar{Z}_{3a}$ ) Polarity Select Input
$H_b$	$Z_4 - Z_7$ ( $\bar{Z}_{0b} - \bar{Z}_{3b}$ ) Polarity Select Input
$H_c$	Common Polarity Select Input
$Z_0 - Z_7$	Single 1-of-8 Data Outputs
$Z_{na}$ , $Z_{nb}$	Dual 1-of-4 Data Outputs ( $n = 1...4$ )
VEES	VEE Substrate
VCCA	VCCO for ECL Outputs

**PACKAGE/ORDERING INFORMATION**



**Ordering Information**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100S370JC	J28-1	Commercial	SY100S370JC	Sn-Pb
SY100S370JCTR <sup>(1)</sup>	J28-1	Commercial	SY100S370JC	Sn-Pb
SY100S370JZ <sup>(2)</sup>	J28-1	Commercial	SY100S370JZ with Pb-Free bar-line indicator	Matte-Sn
SY100S370JZTR <sup>(1, 2)</sup>	J28-1	Commercial	SY100S370JZ with Pb-Free bar-line indicator	Matte-Sn

**Notes:**

1. Tape and Reel.
2. Pb-Free package is recommended for new designs.

**28-Pin PLCC (J28-1)**

**TRUTH TABLES<sup>(1)</sup>**

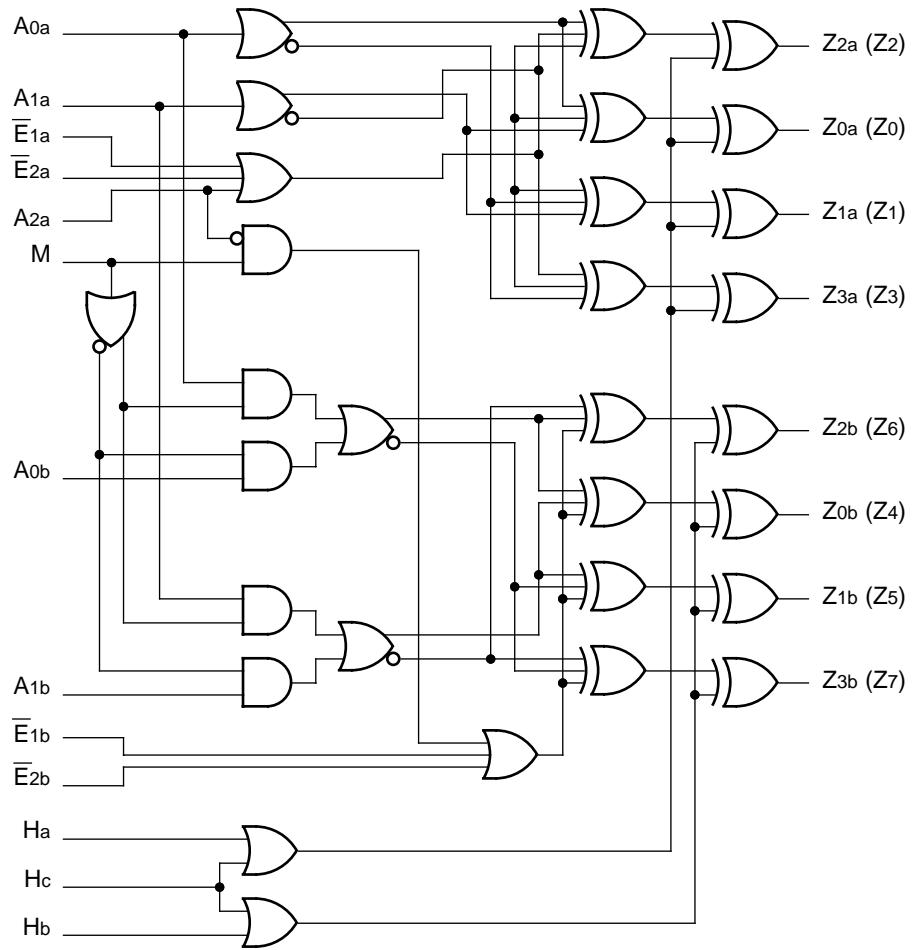
Dual 1-of-4 Mode (M = A2a = Hc = LOW)												
Inputs				Active HIGH Outputs (Ha and Hb Inputs HIGH)				Active LOW Outputs (Ha and Hb Inputs LOW)				
$\bar{E}1a, \bar{E}1b$	$\bar{E}2a, \bar{E}2b$	A1a, A1b	A0a, A0b	Z0a, Z0b	Z1a, Z1b	Z2a, Z2b	Z3a, Z3b	Z0a, Z0b	Z1a, Z1b	Z2a, Z2b	Z3a, Z3b	
H	X	X	X	L	L	L	L	H	H	H	H	
X	H	X	X	L	L	L	L	H	H	H	H	
L	L	L	L	H	L	L	L	L	H	H	H	
L	L	L	H	L	H	L	L	H	L	H	H	
L	L	H	L	L	L	H	L	H	H	L	H	
L	L	H	H	L	L	L	H	H	H	H	L	

Single 1-of-8 Mode (M = HIGH; A0b = A1b = Ha = Hb = LOW)												
Inputs					Active HIGH Outputs* (Hc Input HIGH)							
$\bar{E}1$	$\bar{E}2$	A2a	A1a	A0a	Z0	Z1	Z2	Z3	Z4	Z5	Z6	Z7
H	X	X	X	X	L	L	L	L	L	L	L	L
X	H	X	X	X	L	L	L	L	L	L	L	L
L	L	L	L	L	H	L	L	L	L	L	L	L
L	L	L	L	H	L	H	L	L	L	L	L	L
L	L	L	H	L	L	L	H	L	L	L	L	L
L	L	L	H	H	L	L	L	H	L	L	L	L
L	L	H	L	L	L	L	L	L	H	L	L	L
L	L	H	L	H	L	L	L	L	L	H	L	L
L	L	H	H	L	L	L	L	L	L	L	H	L
L	L	H	H	H	L	L	L	L	L	L	L	H

**Note:**

1. H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Don't Care  
\* for Hc = LOW, output states are complemented  
 $\bar{E}1 = \bar{E}1a$  and  $\bar{E}1b$  wired;  $\bar{E}2 = \bar{E}2a$  and  $\bar{E}2b$  wired

**BLOCK DIAGRAM**



### DC ELECTRICAL CHARACTERISTICS

$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified;  $V_{CC} = V_{CCA} = GND$

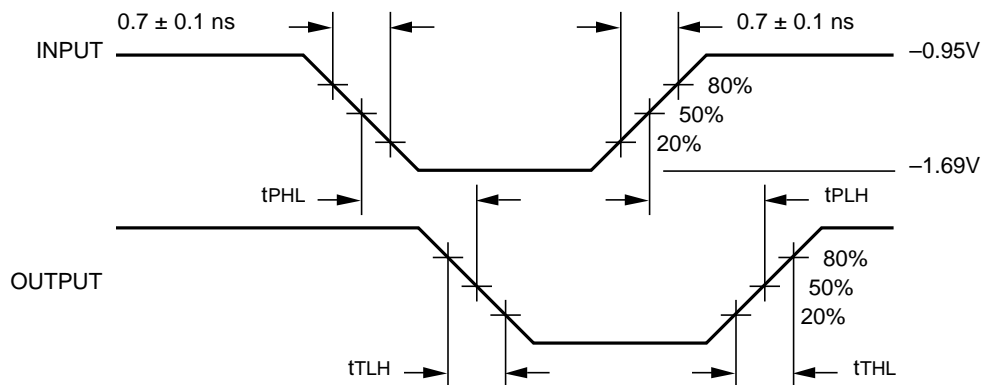
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
$I_{IH}$	Input HIGH Current Hc, A0a, A1a, A2a All Others	— —	— —	310 250	$\mu A$	$V_{IN} = V_{IH} (Max.)$
$I_{EE}$	Power Supply Current	-92	-73	-46	mA	Inputs Open

### AC ELECTRICAL CHARACTERISTICS

$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified;  $V_{CC} = V_{CCA} = GND$

Symbol	Parameter	$T_A = 0^{\circ}C$		$T_A = +25^{\circ}C$		$T_A = +85^{\circ}C$		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.		
$t_{PLH}$ $t_{PHL}$	Propagation Delay $\bar{E}_{na}, \bar{E}_{nb}$ to Output	300	1200	300	1200	300	1200	ps	
$t_{PLH}$ $t_{PHL}$	Propagation Delay A <sub>na</sub> , A <sub>nb</sub> to Output	500	1500	500	1500	500	1500	ps	
$t_{PLH}$ $t_{PHL}$	Propagation Delay H <sub>a</sub> , H <sub>b</sub> , H <sub>c</sub> to Output	500	1500	500	1500	500	1500	ps	
$t_{PLH}$ $t_{PHL}$	Propagation Delay M to Output	600	2100	600	2100	600	2100	ps	
$t_{TLH}$ $t_{THL}$	Transition Time 20% to 80%, 80% to 20%	300	900	300	900	300	900	ps	

### TIMING DIAGRAM

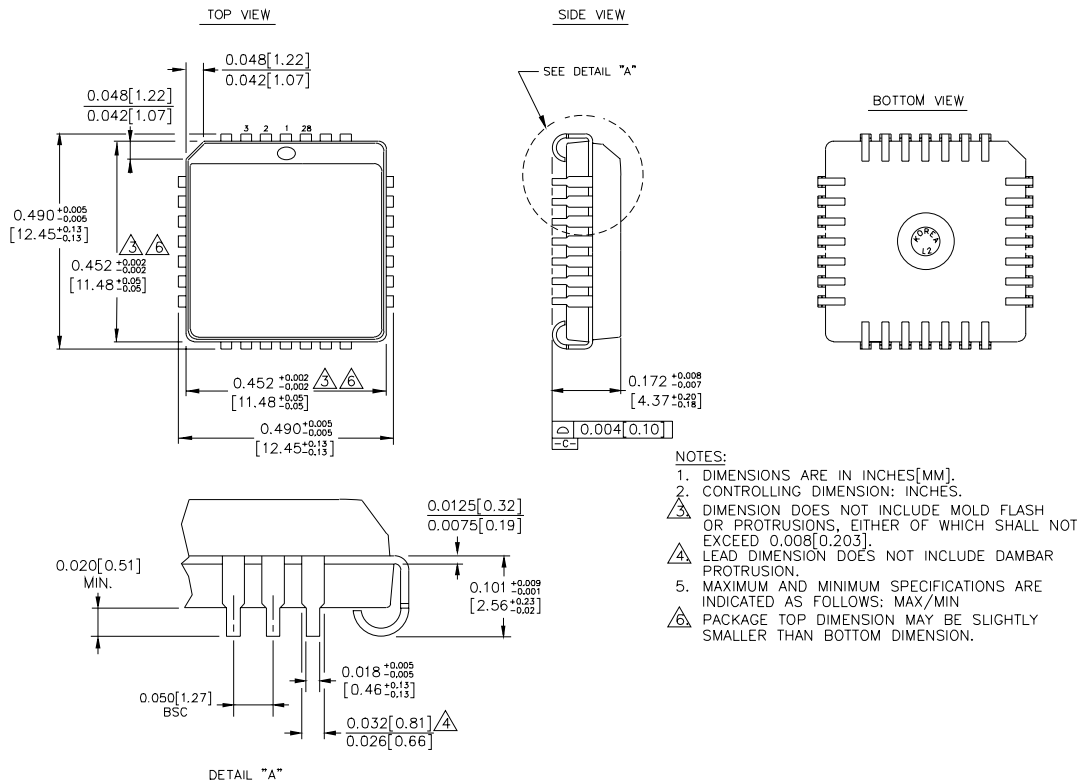


Propagation Delay and Transition Times

**Note:**

$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified;  $V_{CC} = V_{CCA} = GND$

**28-PIN PLCC (J28-1)**



Rev. 03

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