



# 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 24-pin CERPAC and 28-pin PLCC packages

## DESCRIPTION

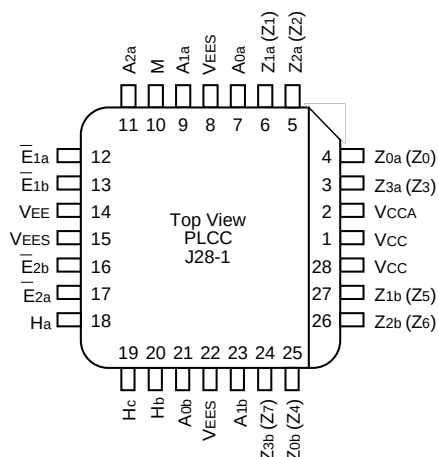
The SY100S370 is a universal demultiplexer/decoder that can be used as either a dual 1-of-4 decoder or as a single 1-of-8 decoder and is designed for use in high-performance ECL systems. The Mode control (M) input determines the function. In the dual 1-of-4 mode, each 4-input group has a pair of active-LOW 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.

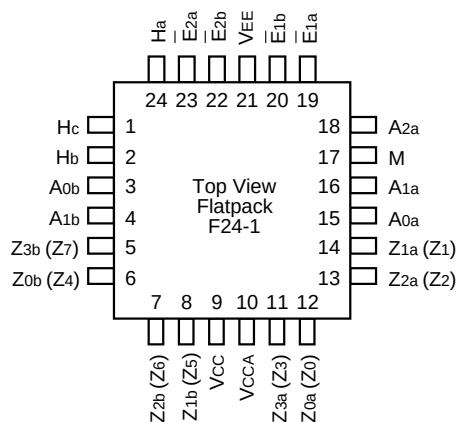
## PIN NAMES

| 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



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



**24-Pin Cerpack (F24-1)**

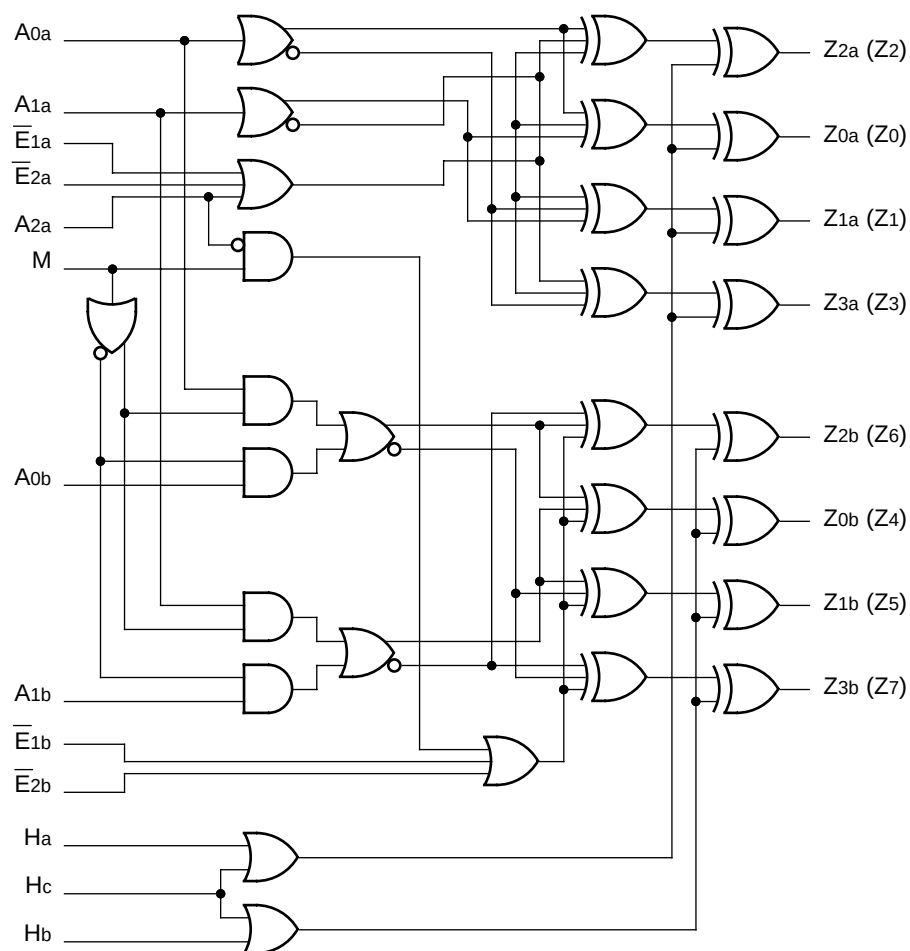
## Ordering Information

| Part Number                     | Package Type | Operating Range | Package Marking                             | Lead Finish |
|---------------------------------|--------------|-----------------|---------------------------------------------|-------------|
| SY100S370FC                     | F24-1        | Commercial      | SY100S370FC                                 | Sn-Pb       |
| SY100S370FCTR <sup>(1)</sup>    | F24-1        | Commercial      | SY100S370FC                                 | Sn-Pb       |
| 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.

## BLOCK DIAGRAM



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

| Dual 1-of-4 Mode (M = A2a = Hc = LOW) |                        |          |          |                                                |          |          |          |                                              |          |          |          |
|---------------------------------------|------------------------|----------|----------|------------------------------------------------|----------|----------|----------|----------------------------------------------|----------|----------|----------|
| Inputs                                |                        |          |          | Active HIGH Outputs<br>(Ha and Hb Inputs HIGH) |          |          |          | Active LOW Outputs<br>(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**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<br>Hc, A0a, A1a, A2a<br>All Others | —<br>— | —<br>— | 310<br>250 | $\mu A$ | $V_{IN} = V_{IH} (Max.)$ |
| $I_{EE}$ | Power Supply Current                                  | -92    | -73    | -46        | mA      | Inputs Open              |

## AC ELECTRICAL CHARACTERISTICS

### CERPACK

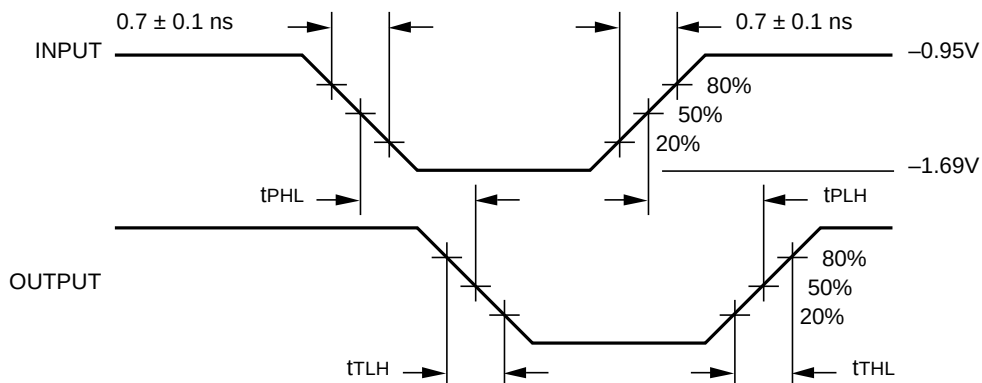
$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified;  $V_{CC} = V_{CCA} = GND$

| 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. |      |           |
| tPLH<br>tPHL | Propagation Delay<br>$\bar{E}_{na}, \bar{E}_{nb}$ to Output | 300                | 1300 | 300                  | 1300 | 300                  | 1300 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>$A_{na}, A_{nb}$ to Output             | 500                | 1600 | 500                  | 1600 | 500                  | 1600 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>$H_a, H_b, H_c$ to Output              | 500                | 1600 | 500                  | 1600 | 500                  | 1600 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>M to Output                            | 600                | 2100 | 600                  | 2100 | 600                  | 2100 | ps   |           |
| TLH<br>THL   | Transition Time<br>20% to 80%, 80% to 20%                   | 300                | 900  | 300                  | 900  | 300                  | 900  | ps   |           |

### PLCC

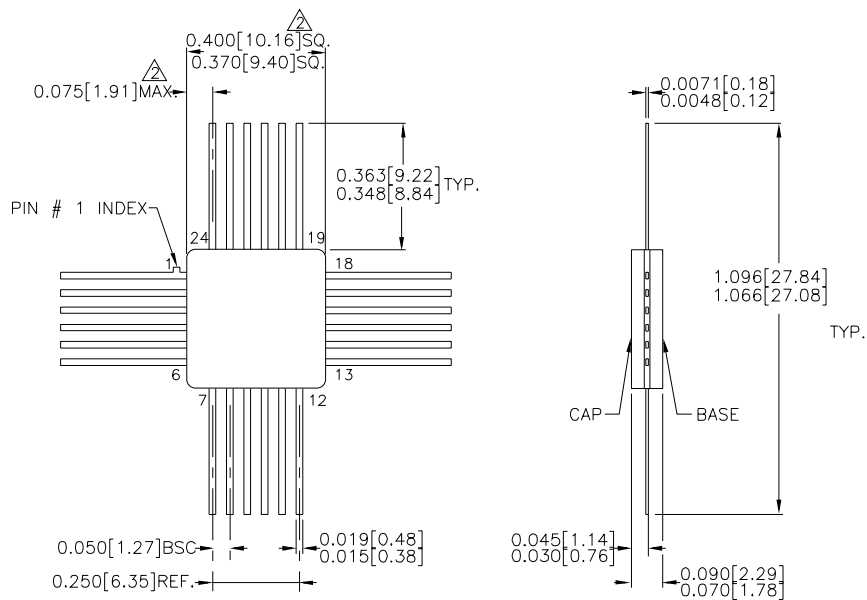
$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified;  $V_{CC} = V_{CCA} = GND$

| 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. |      |           |
| tPLH<br>tPHL | Propagation Delay<br>$\bar{E}_{na}, \bar{E}_{nb}$ to Output | 300                | 1200 | 300                  | 1200 | 300                  | 1200 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>$A_{na}, A_{nb}$ to Output             | 500                | 1500 | 500                  | 1500 | 500                  | 1500 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>$H_a, H_b, H_c$ to Output              | 500                | 1500 | 500                  | 1500 | 500                  | 1500 | ps   |           |
| tPLH<br>tPHL | Propagation Delay<br>M to Output                            | 600                | 2100 | 600                  | 2100 | 600                  | 2100 | ps   |           |
| TLH<br>THL   | Transition Time<br>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;  $V_{CC} = V_{CCA} = GND$

## 24-PIN CERPACK (F24-1)

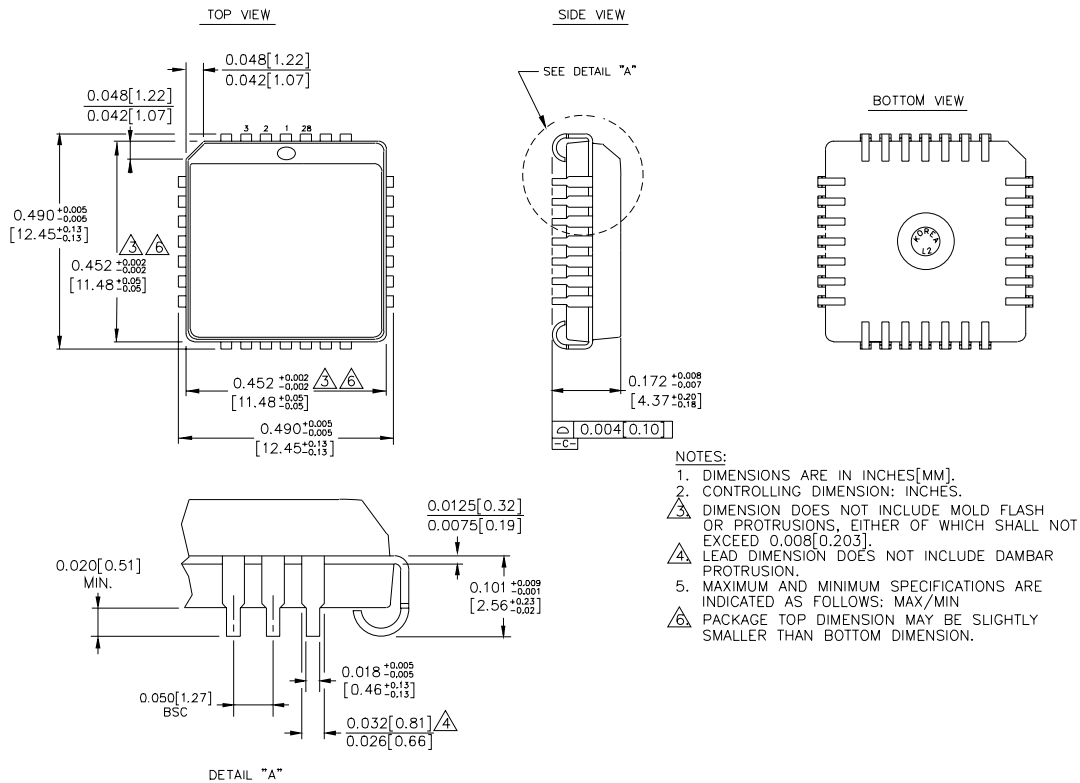


### NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. THIS DIMENSION INCLUDES GLASS PROTRUSION AND CAP TO BASE ALIGNMENT TOLERANCES.
3. DIMENSIONS SHOWN ARE MAX/MIN, WHERE NOTED.

Rev. 03

## 28-PIN PLCC (J28-1)



Rev. 03

**MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA**

TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

The information furnished by Micrel in this datasheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use. Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is at Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2006 Micrel, Incorporated.