



# LOW-POWER HEX ECL-to-TTL TRANSLATOR

SY100S325

## FEATURES

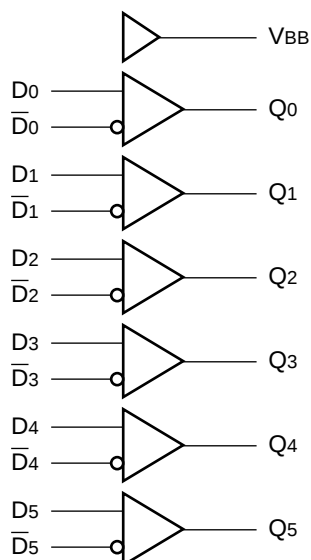
- Max. propagation delay of 3.7ns
- IEE min. of -37mA
- TTL outputs
- Extended supply voltage option:  
VEE = -4.2V to -5.5V
- 25% faster than National's 325
- Differential inputs with built-in offset
- Voltage and temperature compensation for improved noise immunity
- VBB output for single-ended use
- Internal 75KΩ input pull-down resistors
- Function and pinout compatible with Fairchild F100K
- Available in 28-pin PLCC package

## DESCRIPTION

The SY100S325 are hex translators for converting 100K ECL logic levels to TTL logic levels. Inputs can be used as inverting, non-inverting or differential receivers. An internal reference voltage generator provides VBB for single-ended operation or for use in Schmitt trigger applications. All inputs have 75KΩ pull-down resistors. The outputs will go LOW when the inputs are either open or have the same potential.

When used in single-ended operation, the apparent input threshold of the true inputs is 20mV to 40mV higher (positive) than the threshold of the complementary inputs. The VTTL and VEE power may be applied in either order.

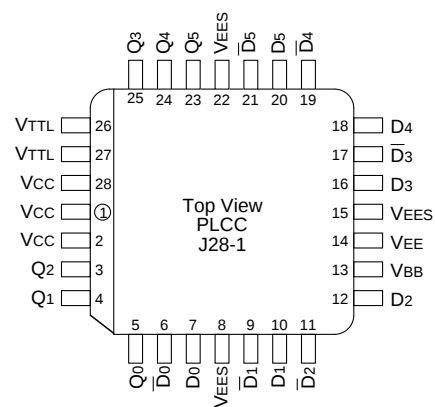
## BLOCK DIAGRAM



## PIN NAMES

| Pin   | Function              |
|-------|-----------------------|
| D0-D5 | Data Inputs           |
| D0-D5 | Inverting Data Inputs |
| Q0-Q5 | Data Outputs          |
| VEES  | VEE Substrate         |
| VTTL  | TTL Vcc Power Supply  |
| VCCA  | Vcco for ECL Outputs  |

PACKAGE/ORDERING INFORMATION



28-Pin PLCC (J28-1)

Ordering Information

| Part Number                     | Package Type | Operating Range | Package Marking                             | Lead Finish |
|---------------------------------|--------------|-----------------|---------------------------------------------|-------------|
| SY100S325JC                     | J28-1        | Commercial      | SY100S325JC                                 | Sn-Pb       |
| SY100S325JCTR <sup>(1)</sup>    | J28-1        | Commercial      | SY100S325JC                                 | Sn-Pb       |
| SY100S325JY <sup>(2)</sup>      | J28-1        | Industrial      | SY100S325JY with Pb-Free bar-line indicator | Matte-Tin   |
| SY100S325JYTR <sup>(1, 2)</sup> | J28-1        | Industrial      | SY100S325JY with Pb-Free bar-line indicator | Matte-Tin   |

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

## DC ELECTRICAL CHARACTERISTICS

$V_{EE} = -4.2V$  to  $-4.8V$  unless otherwise specified,  $V_{CC} = V_{CCA} = GND$ ,  $V_{TTL} = +4.5V$  to  $+5.5V$

| Symbol | Parameter                       | Min.  | Typ.  | Max.  | Unit | Condition                                                    |                                      |
|--------|---------------------------------|-------|-------|-------|------|--------------------------------------------------------------|--------------------------------------|
| VOH    | Output HIGH Voltage             | 2.5   | —     | —     | V    | IOH = −2.0mA                                                 | VIN = VIH (Max.)<br>VIN = VIL (Min.) |
| VOL    | Output LOW Voltage              | —     | —     | 0.5   | V    | IOL = 24mA                                                   |                                      |
| VDIFF  | Input Voltage Differential      | 150   | —     | —     | mV   | Required for Full Output Swing                               |                                      |
| VCM    | Common Mode Voltage             | —     | —     | 1.0   | V    | Permissible ±VCM with Respect to VBB                         |                                      |
| IIH    | Input HIGH Current              | —     | —     | 350   | μA   | VIN = VIH (Max.), D0–D5 = VBB, <u>D0–D5</u> = VIL (Min.)     |                                      |
| IIL    | Input LOW Current               | 0.5   | —     | —     | μA   | VIN = VIH (Min.), D0–D5 = VBB                                |                                      |
| Ios    | Output Short Circuit Current    | −150  | −80   | −60   | mA   | VOUT = GND                                                   |                                      |
| IEE    | VEE Power Supply Current        | −37   | −24   | −17   | mA   | D0–D5 = VBB                                                  |                                      |
| ITTL   | VTTL Power Supply Current       | —     | 42    | 65    | mA   | D0–D5 = VBB                                                  |                                      |
| VBB    | Ouptut Reference Voltage        | −1380 | −1320 | −1260 | mV   | IVBB = −2.1mA                                                |                                      |
| VIH    | Single-Ended Input HIGH Voltage | −1165 | —     | −880  | mV   | Guaranteed HIGH Signal for All Inputs (with One Tied to VBB) |                                      |
| VIL    | Single-Ended Input LOW Voltage  | −1810 | —     | −1475 | mV   | Guaranteed LOW Signal for All Inputs (with One Tied to VBB)  |                                      |

## AC ELECTRICAL CHARACTERISTICS

$V_{EE} = -4.2V$  to  $-5.5V$  unless otherwise specified,  $V_{CC} = V_{CCA} = GND$ ,  $V_{TTL} = +4.5V$  to  $+5.5V$

| Symbol                 | Parameter                           | Min. | Typ. | Max. | Unit | Condition               |
|------------------------|-------------------------------------|------|------|------|------|-------------------------|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>Data to Output | 900  | 2100 | 2900 | ps   | $C_L = 15pF$ , Figure 2 |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>Data to Output | 900  | 3100 | 3700 | ps   | $C_L = 50pF$ , Figure 2 |

## SWITCHING WAVEFORM

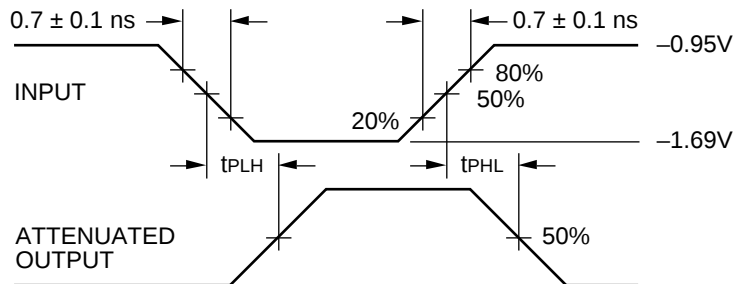


Figure 1. Propagation Delay

**Note:**

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

## TEST CIRCUITS

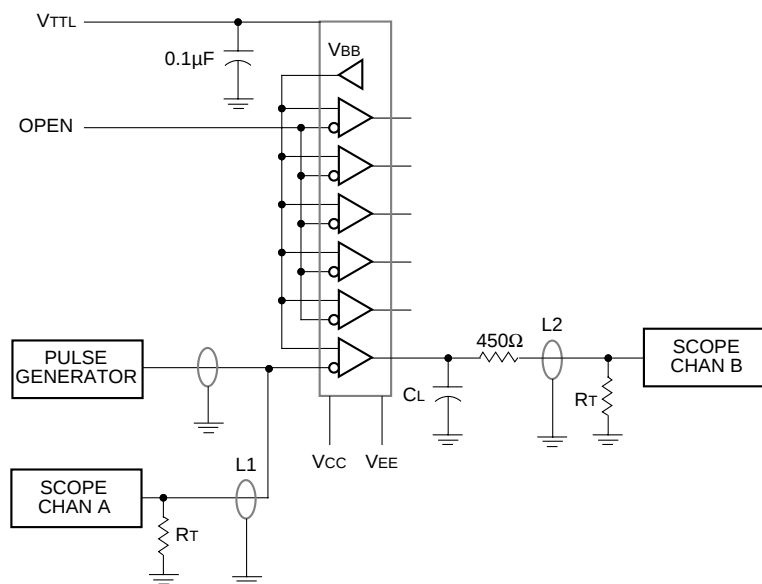


Figure 2. AC Test Circuit for 15pF Loading

**Notes:**

$V_{CC} = 0V$ ,  $V_{EE} = -4.5V$ ,  $V_{TTL} = +5V$

L1 and L2 = equal length 50Ω impedance lines

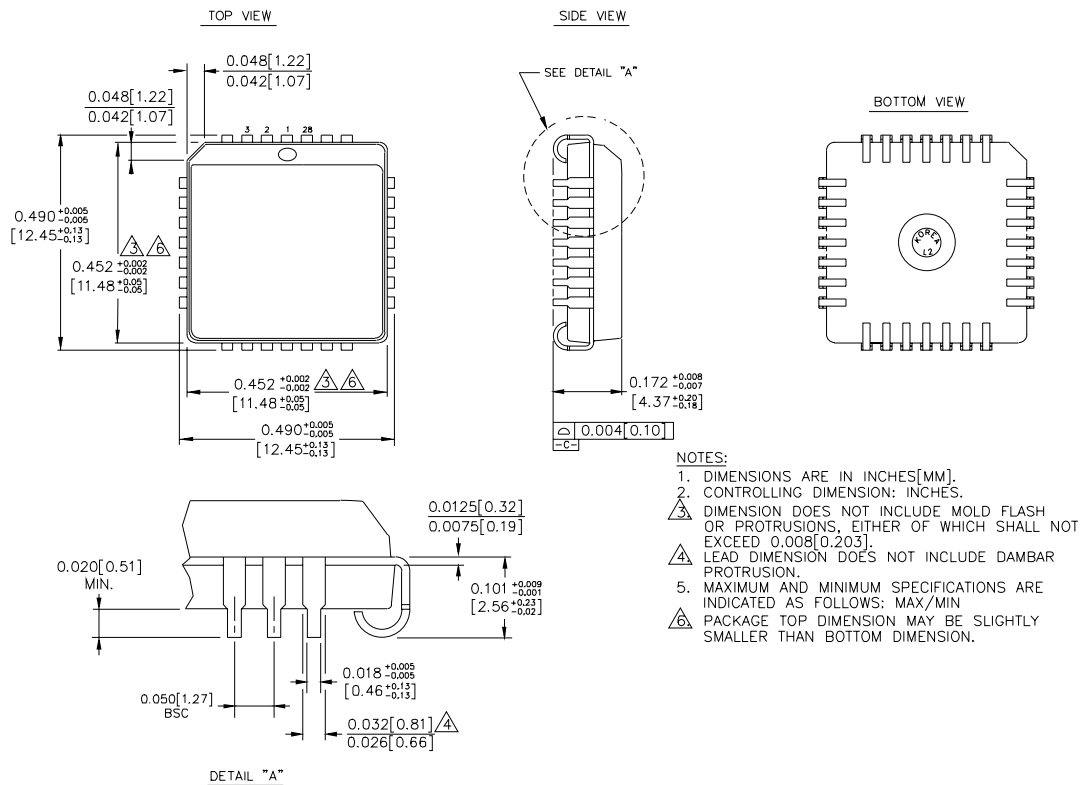
$R_T = 50\Omega$  terminator internal to scope

Decoupling 0.1μF from GND to  $V_{CC}$ ,  $V_{EE}$  and  $V_{TTL}$

All unused outputs are loaded with 500Ω to GND

$C_L$  = Fixture and stray capacitance = 3pF

## 28-PIN PLCC (J28-1)



Rev. 03

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