

**FEATURES**

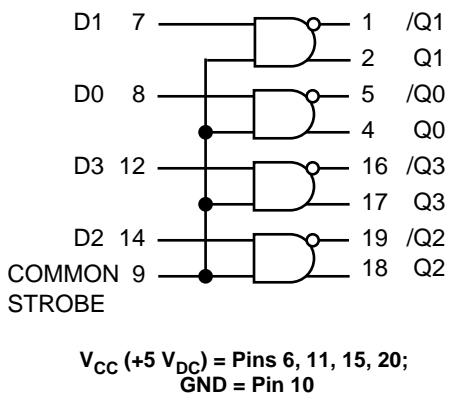
- Single 5V power supply
- All  $V_{CC}$  pins isolated on chip
- Differentially drive balanced lines
- $t_{pd}$  1.3ns typical
- Fully compatible with MC10H352
- Available in 20-pin PLCC package

**DESCRIPTION**

The SY10H352 is a quad translator for interfacing data between a CMOS logic section and the PECL section of digital systems when only a +5.0V VDC power supply is available. The SY10H352 has CMOS compatible inputs and PECL complementary open-emitter outputs that allow use as an inverting/non-inverting translator or as a differential line driver. When the common strobe input is at a low logic level, it forces all true outputs to the PECL low logic state ( $\approx +3.2V$ ) and all inverting outputs to the PECL high logic state ( $\approx +4.1V$ ).

The SY10H352 can also be used with the SY10H350 to transmit and receive CMOS information differentially via balanced twisted pair lines.

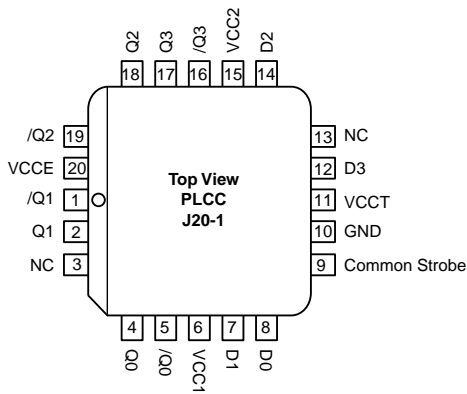
**BLOCK DIAGRAM**



**PIN NAMES**

| Pin           | Function             |
|---------------|----------------------|
| D0 – D3       | Inputs               |
| Q0 – Q3       | Outputs              |
| /Q0 – /Q3     | Inverted outputs     |
| VCC1          | PECL $V_{CC}$ (5.0V) |
| VCCE          | PECL $V_{CC}$ (5.0V) |
| VCCT          | CMOS $V_{CC}$ (5.0V) |
| VCC2          | PECL $V_{CC}$ (5.0V) |
| Common Strobe | Common Strobe        |
| GND           | Ground               |

**PACKAGE/ORDERING INFORMATION**



**20-Pin PLCC (J20-1)**

**Ordering Information<sup>(1)</sup>**

| Part Number                    | Package Type | Operating Range | Package Marking                            | Lead Finish |
|--------------------------------|--------------|-----------------|--|-------------|
| SY10H352JC                     | J20-1        | Commercial      | SY10H352JC                                 | Sn-Pb       |
| SY10H352JCTR <sup>(2)</sup>    | J20-1        | Commercial      | SY10H352JC                                 | Sn-Pb       |
| SY10H352JZ <sup>(3)</sup>      | J20-1        | Commercial      | SY10H352JZ with Pb-Free bar-line indicator | Matte-Sn    |
| SY10H352JZTR <sup>(2, 3)</sup> | J20-1        | Commercial      | SY10H352JZ with Pb-Free bar-line indicator | Matte-Sn    |

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at T<sub>A</sub> = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

| Symbol             | Parameter                               | Value        | Unit |
|--------------------|---|--------------|------|
| V <sub>CC</sub>    | Power Supply Voltage                    | -0.5 to +7.0 | V    |
| I <sub>OUT</sub>   | Output Current<br>-Continuous<br>-Surge | 50<br>100    | mA   |
| T <sub>LEAD</sub>  | Lead Temperature<br>(soldering, 20sec.) | +260         | °C   |
| T <sub>store</sub> | Storage Temperature                     | -65 to +150  | °C   |
| T <sub>A</sub>     | Operating Temperature                   | 0 to +85     | °C   |

**TRUTH TABLE**

| CS   | D    | Q | /Q |
|------|------|---|----|
| H    | L    | L | H  |
| H    | H    | H | L  |
| H    | Open | H | L  |
| L    | X    | L | H  |
| Open | L    | L | H  |
| Open | H    | H | L  |
| Open | Open | H | L  |

**Note:**

1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**DC ELECTRICAL CHARACTERISTICS**

V<sub>CC1</sub> = V<sub>CC2</sub> = V<sub>CC</sub> = V<sub>CE</sub> = V<sub>CT</sub> = 4.75V to 5.25V

| Symbol              | Parameter   | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      |      | T <sub>A</sub> = +85°C |      | Unit | Condition               |
|---------------------|---|----------------------|------|------------------------|------|------|------------------------|------|------|-------------------------|
|                     |   | Min.                 | Max. | Min.                   | Typ. | Max. | Min.                   | Max. |      |                         |
| I <sub>CC</sub>     | Power Supply Current ECL <sup>(1)</sup><br>TTL <sup>(2)</sup> | —                    | 45   | —                      | —    | 45   | —                      | 45   | mA   | No output loads         |
|                     |   | —                    | 15   | —                      | —    | 15   | —                      | 15   |      |                         |
| I <sub>R</sub>      | Reverse Current<br>(Pins 7, 8, 12, 14)                        | —                    | 20   | —                      | —    | 20   | —                      | 20   | μA   |                         |
| I <sub>INH</sub>    | Reverse Current, (Pin 9)                                      | —                    | 80   | —                      | —    | 80   | —                      | 80   | μA   |                         |
| I <sub>F</sub>      | Forward Current<br>(Pins 7, 8, 12, 14)                        | —                    | -0.6 | —                      | —    | -0.6 | —                      | -0.6 | mA   |                         |
| I <sub>INL</sub>    | Forward Current, (Pin 9)                                      | —                    | -2.4 | —                      | —    | -2.4 | —                      | -2.4 | mA   |                         |
| V <sub>BR(in)</sub> | Input Breakdown Voltage                                       | 5.5                  | —    | 5.5                    | —    | —    | 5.5                    | —    | V    |                         |
| V <sub>I</sub>      | Input Clamp Voltage   | —                    | -1.5 | —                      | —    | -1.5 | —                      | -1.5 | V    | I <sub>IN</sub> = -18mA |
| V <sub>OH</sub>     | Output HIGH Voltage <sup>(3)</sup>                            | 3.98                 | 4.16 | 4.02                   | —    | 4.19 | 4.09                   | 4.28 | V    |                         |
| V <sub>OL</sub>     | Output LOW Voltage <sup>(3)</sup>                             | 3.05                 | 3.37 | 3.05                   | —    | 3.37 | 3.05                   | 3.37 | V    |                         |
| V <sub>IH</sub>     | Input HIGH Voltage  | 3.15                 | —    | 3.15                   | —    | —    | 3.15                   | —    | V    |                         |
| V <sub>IL</sub>     | Input LOW Voltage   | —                    | 1.5  | —                      | —    | 1.5  | —                      | 1.5  | V    |                         |

**Notes:**

1. Total I<sub>CC</sub> at V<sub>CC1</sub>, V<sub>CC2</sub> and V<sub>CE</sub>.
2. I<sub>CC</sub> at I<sub>CT</sub>.
3. These values are for V<sub>CC</sub> = 5.0V. Level Specifications will vary 1:1 V<sub>CC</sub>.

**AC ELECTRICAL CHARACTERISTICS**

VCC1 = VCC2 = VCCE = VCCT = 4.75V to 5.25V

| Symbol                           | Parameter                              | TA = 0°C |      | TA = +25°C |      |      | TA = +85°C |      | Unit | Condition     |
|----------------------------------|--|----------|------|------------|------|------|------------|------|------|---------------|
|                                  |  | Min.     | Max. | Min.       | Typ. | Max. | Min.       | Max. |      |               |
| t <sub>PD</sub>                  | Propagation Delay <sup>(1)</sup>       | 0.4      | 1.9  | 0.4        | —    | 2.0  | 0.4        | 2.1  | ns   | 50Ω to VCC-2V |
| t <sub>r</sub><br>t <sub>f</sub> | Output Rise/Fall Time<br>(20% to 80%)  | 0.4      | 1.9  | 0.4        | —    | 2.0  | 0.4        | 2.1  | ns   | 50Ω to VCC-2V |
| f <sub>MAX</sub>                 | Maximum Input Frequency <sup>(2)</sup> | 150      | —    | 150        | —    | —    | 150        | —    | MHz  | 50Ω to VCC-2V |

**Notes:**

1. Propagation delay is measured on this circuit from V<sub>CC2</sub> on the input waveform to the 50% point on the output waveform.
2. These parameters are guaranteed but not tested.

**SWITCHING WAVEFORM**

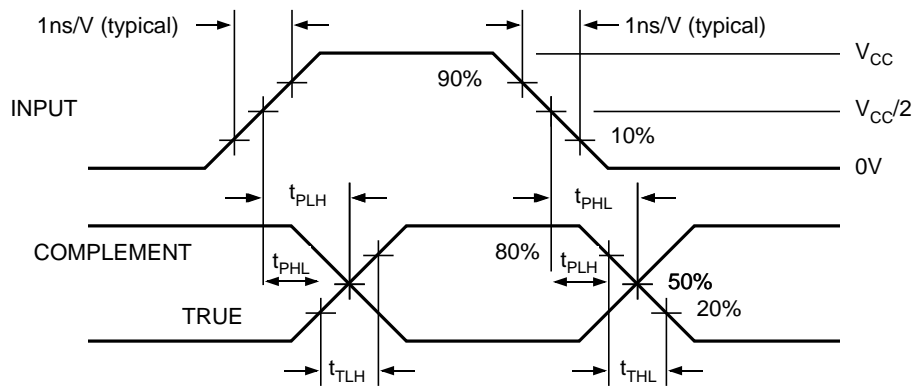
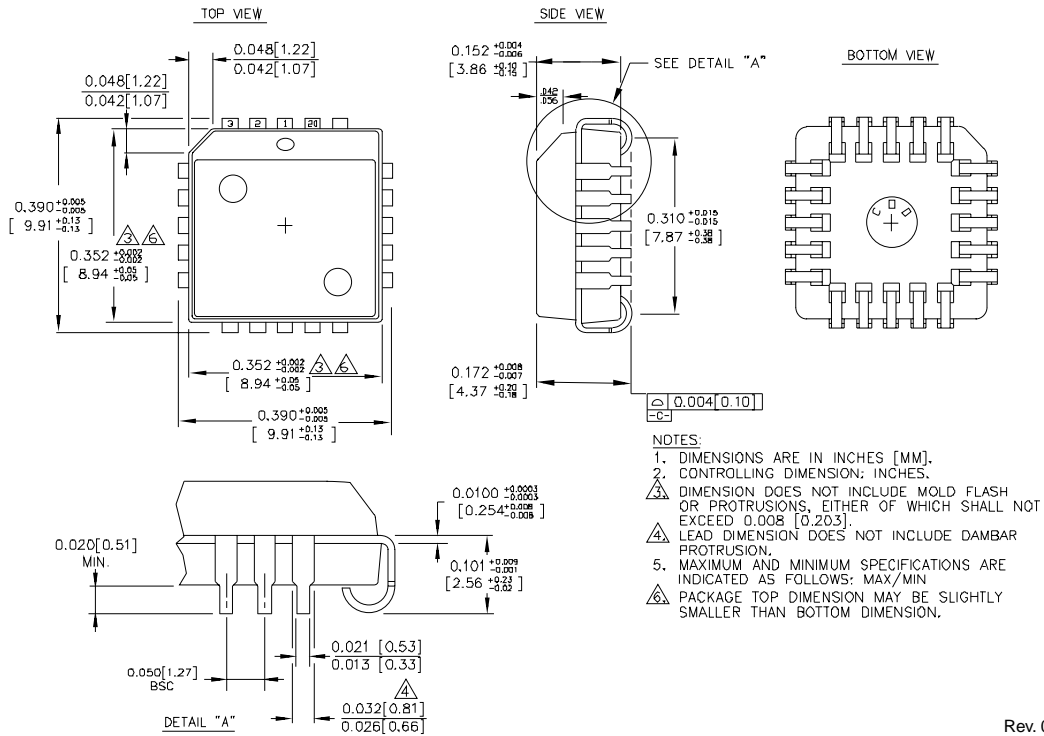


Figure 1. Propagation Delay and Transition Times

**20-PIN PLASTIC LEADED CHIP CARRIER (J20-1)**



Rev. 00

**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 data sheet 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.