



## DIFFERENTIAL ECL-to-TTL TRANSLATOR

SY100ELT25

### FEATURES

- 2.6ns typical propagation delay
- Differential ECL inputs
- 24mA TTL outputs
- Flow-through pinouts
- Available in 8-pin SOIC package

### DESCRIPTION

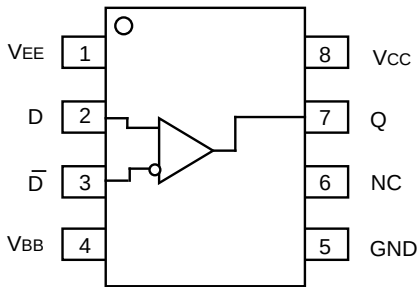
The SY100ELT25 is a differential ECL-to-TTL translator. Because ECL levels are used, a +5V, -5.2V (or -4.5V) and ground are required. The small outline 8-lead SOIC package and the single gate of the ELT25 makes it ideal for those applications where performance, space and low power are at a premium.

The VBB output allows the ELT25 to also be used in a single-ended input mode. In this mode the VBB output is tied to the  $\bar{D}$  input for a non-inverting buffer or the D input for an inverting buffer. If used the VBB pin should be bypassed to ground via a 0.01 $\mu$ F capacitor.

### PIN NAMES

| Pin | Function                |
|-----|-------------------------|
| Q   | TTL Output              |
| D   | Differential ECL Inputs |
| VCC | Positive Supply         |
| VEE | Negative Supply         |
| VBB | Reference Output        |
| GND | Ground                  |

PACKAGE/ORDERING INFORMATION



8-Pin SOIC (Z8-1)

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

| Part Number                      | Package Type | Operating Range | Package Marking                            | Lead Finish    |
|----------------------------------|--------------|-----------------|--------------------------------------------|----------------|
| SY100ELT25ZC                     | Z8-1         | Commercial      | XEL25                                      | Sn-Pb          |
| SY100ELT25ZCTR <sup>(2)</sup>    | Z8-1         | Commercial      | XEL25                                      | Sn-Pb          |
| SY100ELT25ZI                     | Z8-1         | Industrial      | XEL25                                      | Sn-Pb          |
| SY100ELT25ZITR <sup>(2)</sup>    | Z8-1         | Industrial      | XEL25                                      | Sn-Pb          |
| SY100ELT25ZG <sup>(3)</sup>      | Z8-1         | Industrial      | XEL25 with Pb-Free bar-line indicator      | Pb-Free NiPdAu |
| SY100ELT25ZGTR <sup>(2, 3)</sup> | Z8-1         | Industrial      | XEL25 with with Pb-Free bar-line indicator | Pb-Free NiPdAu |

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    |
| V <sub>IN</sub>    | ECL Input Voltage                       | V <sub>EE</sub> to GND+0.5      | V    |
| V <sub>OUT</sub>   | Voltage Applied to Output at HIGH State | −0.5 to +5.5                    | V    |
| I <sub>OUT</sub>   | Current Applied to Output at LOW State  | Twice the Rated I <sub>OL</sub> | mA   |
| T <sub>LEAD</sub>  | Lead Temperature (soldering, 20sec.)    | +260                            | °C   |
| T <sub>store</sub> | Storage Temperature                     | −65 to +150                     | °C   |
| T <sub>A</sub>     | Operating Temperature                   | −40 to +85                      | °C   |

**TRUTH TABLE**

| D    | $\bar{D}$ | Q |
|------|-----------|---|
| L    | H         | L |
| H    | L         | H |
| Open | Open      | 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>CC</sub> = 4.5V to 5.5V; V<sub>EE</sub> = −4.2V to −5.5V

| Symbol          | Parameter            | T <sub>A</sub> = −40°C |      | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      | T <sub>A</sub> = +85°C |      | Unit | Condition |
|-----------------|----------------------|------------------------|------|----------------------|------|------------------------|------|------------------------|------|------|-----------|
|                 |                      | Min.                   | Max. | Min.                 | Max. | Min.                   | Max. | Min.                   | Max. |      |           |
| I <sub>CC</sub> | Power Supply Current | —                      | 14   | —                    | 14   | 9                      | 14   | —                      | 14   | mA   | —         |
| I <sub>EE</sub> | Power Supply Current | —                      | 14   | —                    | 14   | 5.5                    | 14   | —                      | 14   | mA   | —         |

**AC ELECTRICAL CHARACTERISTICS**

V<sub>CC</sub> = 4.5V to 5.5V; V<sub>EE</sub> = −4.2V to −5.5V

| Symbol                               | Parameter                               | T <sub>A</sub> = −40°C |      | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      | T <sub>A</sub> = +85°C |      | Unit | Condition             |
|--------------------------------------|-----------------------------------------|------------------------|------|----------------------|------|------------------------|------|------------------------|------|------|-----------------------|
|                                      |                                         | Min.                   | Max. | Min.                 | Max. | Min.                   | Max. | Min.                   | Max. |      |                       |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>D to Output Q      | 1.7                    | 3.6  | 1.7                  | 3.6  | 1.7                    | 3.6  | 1.7                    | 3.6  | ns   | C <sub>L</sub> = 20pF |
| f <sub>MAX</sub>                     | Maximum Frequency                       | 150                    | —    | 150                  | —    | 150                    | —    | 150                    | —    | MHz  | C <sub>L</sub> = 20pF |
| t <sub>r</sub><br>t <sub>f</sub>     | Output Rise/Fall Time<br>(1.0V to 2.0V) | —                      | 1.5  | —                    | 1.5  | —                      | 1.5  | —                      | 1.5  | ns   | C <sub>L</sub> = 20pF |

**TTL DC ELECTRICAL CHARACTERISTICS**

V<sub>CC</sub> = 4.5V to 5.5V; V<sub>EE</sub> = −4.2V to −5.5V

| Symbol          | Parameter                    | T <sub>A</sub> = −40°C |      | T <sub>A</sub> = 0°C |      | T <sub>A</sub> = +25°C |      | T <sub>A</sub> = +85°C |      | Unit | Condition                |
|-----------------|------------------------------|------------------------|------|----------------------|------|------------------------|------|------------------------|------|------|--------------------------|
|                 |                              | Min.                   | Max. | Min.                 | Max. | Min.                   | Max. | Min.                   | Max. |      |                          |
| V <sub>OH</sub> | Output HIGH Voltage          | 2.4                    | —    | 2.4                  | —    | 2.4                    | —    | 2.4                    | —    | V    | I <sub>OH</sub> = −3.0mA |
| V <sub>OL</sub> | Output LOW Voltage           | —                      | 0.5  | —                    | 0.5  | —                      | 0.5  | —                      | 0.5  | V    | I <sub>OL</sub> = 24mA   |
| I <sub>OS</sub> | Output Short Circuit Current | −60                    | −200 | −60                  | −200 | −60                    | −200 | −60                    | −200 | mA   | V <sub>OUT</sub> = 0V    |

## ECL DC ELECTRICAL CHARACTERISTICS

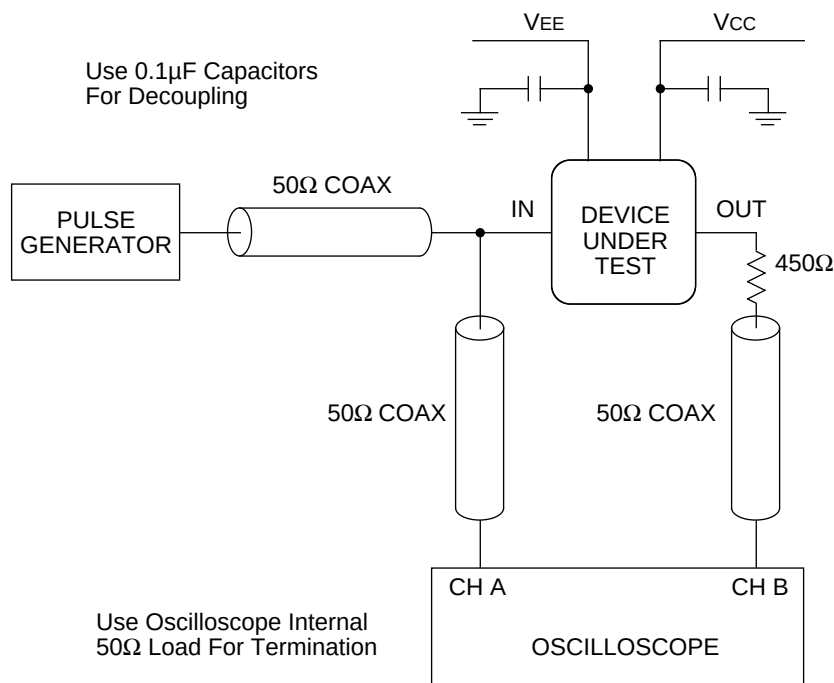
$V_{CC} = 4.5V$  to  $5.5V$ ;  $V_{EE} = -4.2V$  to  $-5.5V$

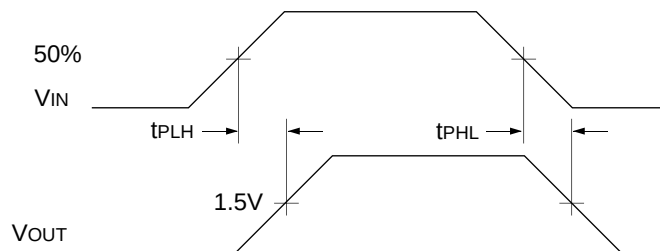
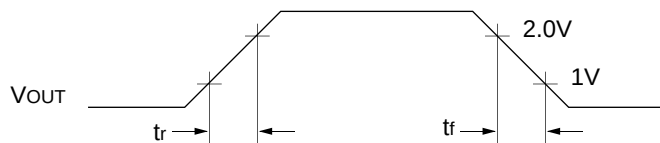
| Symbol    | Parameter                                 | $T_A = -40^{\circ}C$ |      |       | $T_A = 0^{\circ}C$ |      |       | $T_A = +25^{\circ}C$ |      |       | $T_A = +85^{\circ}C$ |      |       | Unit    |
|-----------|-------------------------------------------|----------------------|------|-------|--------------------|------|-------|----------------------|------|-------|----------------------|------|-------|---------|
|           |                                           | Min.                 | Typ. | Max.  | Min.               | Typ. | Max.  | Min.                 | Typ. | Max.  | Min.                 | Typ. | Max.  |         |
| $I_{IH}$  | Input HIGH Current                        | —                    | —    | 150   | —                  | —    | 150   | —                    | —    | 150   | —                    | —    | 150   | $\mu A$ |
| $I_{IL}$  | Input HIGH Current                        | 0.5                  | —    | —     | 0.5                | —    | —     | 0.5                  | —    | —     | 0.5                  | —    | —     | $\mu A$ |
| $V_{CMR}$ | Common Mode Range                         | $V_{EE}+2.2$         | —    | GND   | $V_{EE}+2.2$       | —    | GND   | $V_{EE}+2.2$         | —    | GND   | $V_{EE}+2.2$         | —    | GND   | V       |
| $V_{PP}$  | Minimum Peak-to-Peak Input <sup>(1)</sup> | 200                  | —    | —     | 200                | —    | —     | 200                  | —    | —     | 200                  | —    | —     | mV      |
| $V_{IH}$  | Input HIGH Voltage                        | -1165                | —    | -880  | -1165              | —    | -880  | -1165                | —    | -880  | -1165                | —    | -880  | mV      |
| $V_{IL}$  | Input LOW Voltage                         | -1810                | —    | -1475 | -1810              | —    | -1475 | -1810                | —    | -1475 | -1810                | —    | -1475 | mV      |
| $V_{BB}$  | Reference Output                          | -1.38                | —    | -1.26 | -1.38              | —    | -1.26 | -1.38                | —    | -1.26 | -1.38                | —    | -1.26 | mV      |

### NOTE:

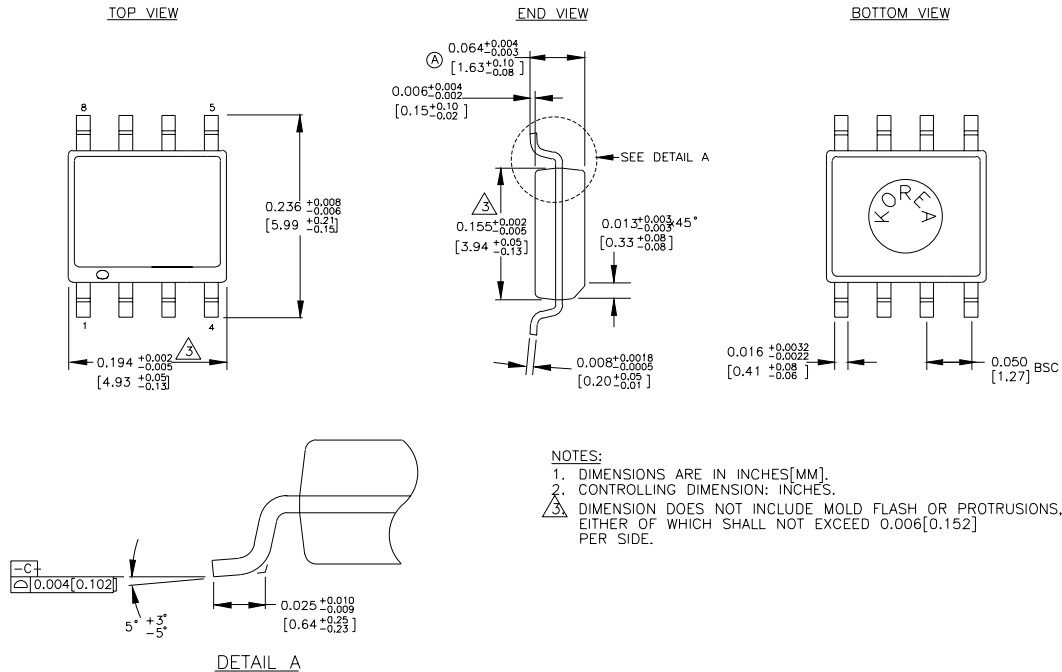
1. 200mV input guarantees full logic at output.

## TTL SWITCHING CIRCUIT



**ECL/TTL PROPAGATION DELAY — SINGLE ENDED****ECL/TTL WAVEFORMS: RISE AND FALL TIMES**

## 8-PIN SOIC .150" WIDE (Z8-1)



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.