

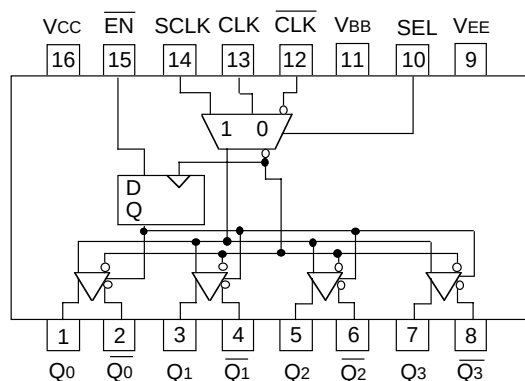
## FEATURES

- 50ps output-to-output skew
- Synchronous enable/disable
- Multiplexed clock input
- 75K $\Omega$  internal input pull-down resistors
- Available in 16-pin SOIC package



Precision Edge™

## PIN CONFIGURATION/BLOCK DIAGRAM



SOIC  
TOP VIEW

## DESCRIPTION

The SY10/100EL15 are low skew 1:4 clock distribution chips designed explicitly for low skew clock distribution applications. The device can be driven by either a differential or single-ended ECL or, if positive power supplies are used, PECL input signal. If a single-ended input is to be used the VBB output should be connected to the CLK input and bypassed to VCC via a 0.01 $\mu$ F capacitor. The VBB output is designed to act as the switching reference for the input of the EL15 under single-ended input conditions, as a result this pin can only source/sink up to 0.5mA of current.

The EL15 features a multiplexed clock input to allow for the distribution of a lower speed scan or test clock along with the high speed system clock. When LOW (or left open and pulled LOW by the input pull-down resistor) the SEL pin will select the differential clock input.

The common enable (EN) is synchronous so that the outputs will only be enabled/disabled when they are already in the LOW state. This avoids any chance of generating a runt clock pulse when the device is enabled/disabled as can happen with an asynchronous control. The internal flip flop is clocked on the falling edge of the input clock, therefore all associated specification limits are referenced to the negative edge of the clock input.

## PIN NAMES

| Pin  | Function                   |
|------|----------------------------|
| CLK  | Differential Clock Inputs  |
| SCLK | Synchronous Clock Input    |
| EN   | Synchronous Enable         |
| SEL  | Clock Select Input         |
| VBB  | Reference Output           |
| Q0-3 | Differential Clock Outputs |

## TRUTH TABLE

| CLK | SCLK | SEL | EN | Q  |
|-----|------|-----|----|----|
| L   | X    | L   | L  | L  |
| H   | X    | L   | L  | H  |
| X   | L    | H   | L  | L  |
| X   | H    | H   | L  | H  |
| X   | X    | X   | H  | L* |

\* On next negative transition of CLK or SCLK

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

| Symbol           | Rating                                  | Value        | Unit |
|------------------|-----------------------------------------|--------------|------|
| V <sub>EE</sub>  | Power Supply (V <sub>CC</sub> = 0V)     | –8.0 to 0    | VDC  |
| V <sub>I</sub>   | Input Voltage (V <sub>CC</sub> = 0V)    | 0 to –6.0    | VDC  |
| I <sub>OUT</sub> | Output Current<br>–Continuous<br>–Surge | 50<br>100    | mA   |
| T <sub>A</sub>   | Operating Temperature Range             | –40 to +85   | °C   |
| V <sub>EE</sub>  | Operating Range <sup>(1),(2)</sup>      | –5.7 to –4.2 | V    |

**NOTES:**

1. Absolute maximum rating, beyond which, device life may be impaired, unless otherwise specified on an individual data sheet.
2. Parametric values specified at:
 

|                 |                  |
|-----------------|------------------|
| 100EL15 Series: | –4.2V to –5.5V.  |
| 10EL15 Series   | –4.75V to –5.5V. |

**10EL DC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND<sup>(1)</sup>

| 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 |
|-----------------|--------------------------|------------------------|-------|----------------------|-------|------------------------|------|-------|------------------------|-------|------|
|                 |                          | Min.                   | Max.  | Min.                 | Max.  | Min.                   | Typ. | Max.  | Min.                   | Max.  |      |
| V <sub>OH</sub> | Output HIGH Voltage      | –1080                  | –890  | –1020                | –840  | –980                   | —    | –810  | –910                   | –720  | mV   |
| V <sub>OL</sub> | Output LOW Voltage       | –1950                  | –1650 | –1950                | –1630 | –1950                  | —    | –1630 | –1950                  | –1595 | mV   |
| V <sub>IH</sub> | Input HIGH Voltage       | –1230                  | –890  | –1170                | –840  | –1130                  | —    | –810  | –1060                  | –720  | mV   |
| V <sub>IL</sub> | Input LOW Voltage        | –1950                  | –1500 | –1950                | –1480 | –1950                  | —    | –1480 | –1950                  | –1445 | mV   |
| I <sub>IH</sub> | Input High Current       | —                      | 150   | —                    | 150   | —                      | —    | 150   | —                      | 150   | μA   |
| I <sub>IL</sub> | Input LOW Current        | 0.5                    | —     | 0.5                  | —     | 0.5                    | —    | —     | 0.5                    | —     | μA   |
| I <sub>EE</sub> | Power Supply Current     | —                      | 35    | —                    | 35    | —                      | 25   | 35    | —                      | 38    | mA   |
| V <sub>BB</sub> | Output Reference Voltage | –1.38                  | –1.26 | –1.38                | –1.26 | –1.38                  | —    | –1.26 | –1.38                  | –1.26 | V    |

**NOTE:**

1. 10EL circuits are designed to meet the DC specifications shown in the table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained. Outputs are terminated through a 50Ω resistor to –2.0V except where otherwise specified on the individual data sheets.

**PRODUCT ORDERING CODE**

| Ordering Code  | Package Type | Operating Range | Marking Code |
|----------------|--------------|-----------------|--------------|
| SY10EL15ZC     | Z16-2        | Commercial      | HEL15        |
| SY10EL15ZCTR*  | Z16-2        | Commercial      | HEL15        |
| SY100EL15ZC    | Z16-2        | Commercial      | XEL15        |
| SY100EL15ZCTR* | Z16-2        | Commercial      | XEL15        |

\*Tape and Reel

**Note 1.** Recommended for new designs.

| Ordering Code                 | Package Type | Operating Range | Marking Code |
|-------------------------------|--------------|-----------------|--------------|
| SY10EL15Z <sup>(1)</sup>      | Z16-2        | Industrial      | HEL15        |
| SY10EL15ZITR* <sup>(1)</sup>  | Z16-2        | Industrial      | HEL15        |
| SY100EL15Z <sup>(1)</sup>     | Z16-2        | Industrial      | XEL15        |
| SY100EL15ZITR* <sup>(1)</sup> | Z16-2        | Industrial      | XEL15        |

\*Tape and Reel

**100EL DC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND<sup>(1)</sup>

| 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 |
|------------------|------------------------------------|------------------------|-------|----------------------|-------|------------------------|-------|-------|------------------------|-------|------|
|                  |                                    | Min.                   | Max.  | Min.                 | Max.  | Min.                   | Typ.  | Max.  | Min.                   | Max.  |      |
| V <sub>OH</sub>  | Output HIGH Voltage <sup>(2)</sup> | -1085                  | -880  | -1025                | -880  | -1025                  | -955  | -880  | -1025                  | -880  | mV   |
| V <sub>OL</sub>  | Output LOW Voltage <sup>(2)</sup>  | -1830                  | -1555 | -1810                | -1620 | -1810                  | -1705 | -1620 | -1810                  | -1620 | mV   |
| V <sub>OHA</sub> | Output HIGH Voltage <sup>(3)</sup> | -1095                  | —     | -1035                | —     | -1035                  | —     | —     | -1035                  | —     | mV   |
| V <sub>OLA</sub> | Output LOW Voltage <sup>(3)</sup>  | —                      | -1555 | —                    | -1610 | —                      | —     | -1610 | —                      | -1610 | mV   |
| V <sub>IH</sub>  | Input HIGH Voltage                 | -1165                  | -880  | -1165                | -880  | -1165                  | —     | -880  | -1165                  | -880  | mV   |
| V <sub>IL</sub>  | Input LOW Voltage                  | -1810                  | -1475 | -1810                | -1475 | -1810                  | —     | -1475 | -1810                  | -1475 | mV   |
| I <sub>IH</sub>  | Input High Current                 | —                      | 150   | —                    | 150   | —                      | —     | 150   | —                      | 150   | μA   |
| I <sub>IL</sub>  | Input LOW Current <sup>(4)</sup>   | 0.5                    | —     | 0.5                  | —     | 0.5                    | —     | —     | 0.5                    | —     | μA   |
| I <sub>EE</sub>  | Power Supply Current               | —                      | 35    | —                    | 35    | —                      | 25    | 35    | —                      | 38    | mA   |
| V <sub>BB</sub>  | Output Reference Voltage           | -1.38                  | -1.26 | -1.38                | -1.26 | -1.38                  | —     | -1.26 | -1.38                  | -1.26 | V    |

**NOTES:**

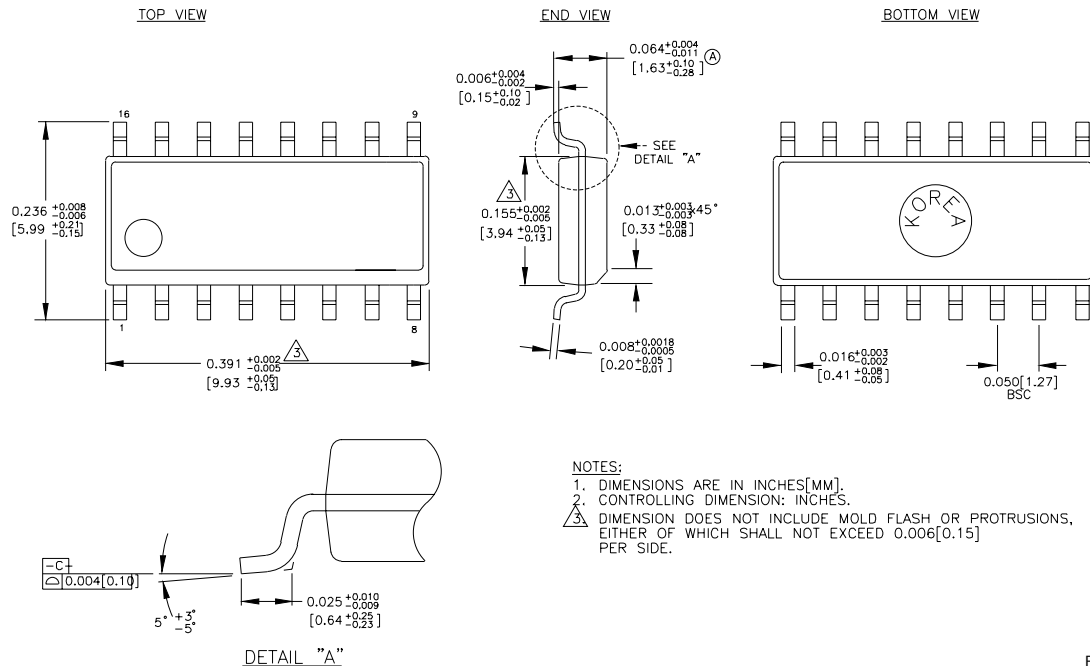
1. This table replaces the three traditionally seen in ECL 100K data books. The same DC parameter values at V<sub>EE</sub> = -4.5V now apply across the full V<sub>EE</sub> range of -4.2V to -5.5V. Outputs are terminated through a 50Ω resistor to -2.0V except where otherwise specified on the individual data sheets.
2. V<sub>IN</sub> = V<sub>IH</sub>(Max) or V<sub>IL</sub>(Min).
3. V<sub>IN</sub> = V<sub>IH</sub>(Min) or V<sub>IL</sub>(Max).
4. V<sub>IN</sub> = V<sub>IL</sub>(Max).

**AC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min) to V<sub>EE</sub> (Max); V<sub>CC</sub> = GND

| 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 |
|--------------------------------------|--------------------------------------------------------------------|------------------------|-------------------|----------------------|-------------------|------------------------|-------------|-------------------|------------------------|-------------------|------|
|                                      |                                                                    | Min.                   | Max.              | Min.                 | Max.              | Min.                   | Typ.        | Max.              | Min.                   | Max.              |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay<br>CLK to Q (Diff)<br>CLK to Q (SE)<br>SCLK to Q | 460<br>410<br>410      | 660<br>710<br>710 | 470<br>420<br>420    | 670<br>720<br>720 | 470<br>420<br>420      | —<br>—<br>— | 670<br>720<br>720 | 500<br>450<br>470      | 700<br>750<br>750 | ps   |
| t <sub>skew</sub>                    | Part-to-Part Skew <sup>(1)</sup><br>Within-Device Skew             | —<br>—                 | 200<br>50         | —<br>—               | 200<br>50         | —<br>—                 | —<br>—      | 200<br>50         | —<br>—                 | 200<br>50         | ps   |
| t <sub>S</sub>                       | Setup Time $\overline{EN}$                                         | 150                    | —                 | 150                  | —                 | 150                    | —           | —                 | 150                    | —                 | ps   |
| t <sub>H</sub>                       | Hold Time $\overline{EN}$                                          | 400                    | —                 | 400                  | —                 | 400                    | —           | —                 | 400                    | —                 | ps   |
| V <sub>PP</sub>                      | Minimum Input CLK Swing                                            | 250                    | —                 | 250                  | —                 | 250                    | —           | —                 | 250                    | —                 | mV   |
| V <sub>CMR</sub>                     | Common Mode CLK Range                                              | -2.0                   | -0.4              | -2.0                 | -0.4              | -2.0                   | —           | -0.4              | -2.0                   | -0.4              | V    |
| t <sub>r</sub><br>t <sub>f</sub>     | Output Rise/Fall Times Q<br>(20% – 80%)                            | —                      | —                 | 325                  | 575               | 325                    | —           | 575               | 325                    | 575               | ps   |

**NOTE:**

1. Skews are specified for identical LOW-to-HIGH or HIGH-to-LOW transitions.

**16 LEAD SOIC .150" WIDE (Z16-2)**

Rev. 02

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