

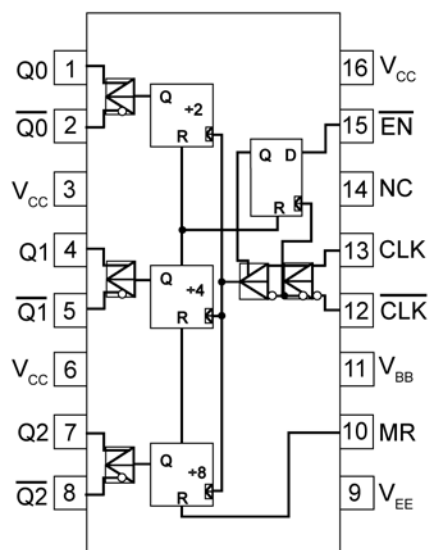
## Ordering Information

| Part Number                   | Package Type | Operating Range | Package Marking                                 | Lead Finish    |
|-------------------------------|--------------|-----------------|-------------------------------------------------|----------------|
| SY10EL34LZG                   | Z16-2        | Industrial      | SY10EL34LZG with<br>Pb-Free Bar Line Indicator  | Pb-Free NiPdAu |
| SY10EL34LZGTR <sup>(2)</sup>  | Z16-2        | Industrial      | SY10EL34LZG with<br>Pb-Free Bar Line Indicator  | Pb-Free NiPdAu |
| SY100EL34LZG                  | Z16-2        | Industrial      | SY100EL34LZG with<br>Pb-Free Bar Line Indicator | Pb-Free NiPdAu |
| SY100EL34LZGTR <sup>(2)</sup> | Z16-2        | Industrial      | SY100EL34LZG with<br>Pb-Free Bar Line Indicator | Pb-Free NiPdAu |
| SY10EL34ZG                    | Z16-2        | Industrial      | SY10EL34ZG with<br>Pb-Free Bar Line Indicator   | Pb-Free NiPdAu |
| SY10EL34ZGTR <sup>(2)</sup>   | Z16-2        | Industrial      | SY10EL34ZG with<br>Pb-Free Bar Line Indicator   | Pb-Free NiPdAu |
| SY100EL34ZG                   | Z16-2        | Industrial      | SY100EL34ZG with<br>Pb-Free Bar Line Indicator  | Pb-Free NiPdAu |
| SY100EL34ZGTR <sup>(2)</sup>  | Z16-2        | Industrial      | SY100EL34ZG with<br>Pb-Free Bar Line Indicator  | Pb-Free NiPdAu |

### Notes:

1. Contact factory for die availability. Dice are guaranteed at  $T_A = 25^\circ\text{C}$ , DC electricals only.
2. Tape and reel.

## Pin Configuration



16-Pin Narrow SOIC (Z16-2)

**DC Electrical Characteristics<sup>(1)</sup>** $V_{EE} = V_{EE}$  (minimum) to  $V_{EE}$  (maximum);  $V_{CC} = \text{GND}$ .

| Symbol                                      | Parameter                | Min.  | Typ. | Max.  | Units         |
|---------------------------------------------|--------------------------|-------|------|-------|---------------|
| <b><math>T_A = -40^\circ\text{C}</math></b> |                          |       |      |       |               |
| $I_{EE}$                                    | Power Supply Current     |       |      |       |               |
|                                             | 10EL                     | –     | –    | 49    | mA            |
|                                             | 100EL                    | –     | –    | 49    |               |
| $V_{BB}$                                    | Output Reference Voltage |       |      |       | V             |
|                                             | 10EL                     | –1.43 |      | –1.30 |               |
|                                             | 100EL                    | –1.38 |      | –1.26 |               |
| $I_{IH}$                                    | Input High Current       | –     | –    | 150   | $\mu\text{A}$ |
| <b><math>T_A = 0^\circ\text{C}</math></b>   |                          |       |      |       |               |
| $I_{EE}$                                    | Power Supply Current     |       |      |       |               |
|                                             | 10EL                     | –     | –    | 49    | mA            |
|                                             | 100EL                    | –     | –    | 49    |               |
| $V_{BB}$                                    | Output Reference Voltage |       |      |       | V             |
|                                             | 10EL                     | –1.38 |      | –1.27 |               |
|                                             | 100EL                    | –1.38 |      | –1.26 |               |
| $I_{IH}$                                    | Input High Current       | –     | –    | 150   | $\mu\text{A}$ |
| <b><math>T_A = +25^\circ\text{C}</math></b> |                          |       |      |       |               |
| $I_{EE}$                                    | Power Supply Current     |       |      |       |               |
|                                             | 10EL                     | –     | –    | 49    | mA            |
|                                             | 100EL                    | –     | –    | 49    |               |
| $V_{BB}$                                    | Output Reference Voltage |       |      |       | V             |
|                                             | 10EL                     | –1.35 |      | –1.25 |               |
|                                             | 100EL                    | –1.38 |      | –1.26 |               |
| $I_{IH}$                                    | Input High Current       | –     | –    | 150   | $\mu\text{A}$ |
| <b><math>T_A = +85^\circ\text{C}</math></b> |                          |       |      |       |               |
| $I_{EE}$                                    | Power Supply Current     |       |      |       |               |
|                                             | 10EL                     | –     | –    | 49    | mA            |
|                                             | 100EL                    | –     | –    | 54    |               |
| $V_{BB}$                                    | Output Reference Voltage |       |      |       | V             |
|                                             | 10EL                     | –1.31 |      | –1.19 |               |
|                                             | 100EL                    | –1.38 |      | –1.26 |               |
| $I_{IH}$                                    | Input High Current       | –     | –    | 150   | $\mu\text{A}$ |

**Note:**

- Parametric values specified at:
  - 5V Power Supply Range:
    - 100EL34 Series: –4.2V to –5.5V
    - 10EL34 Series: –4.75V to –5.5V
  - 3V Power Supply Range:
    - 10/100EL34L Series: –3.0V to –3.8V

**AC Electrical Characteristics<sup>(1)</sup>** $V_{EE} = V_{EE}$  (minimum) to  $V_{EE}$  (maximum);  $V_{CC} = \text{GND}$ .

| Symbol                                      | Parameter                                | Min. | Typ. | Max. | Units |
|---------------------------------------------|------------------------------------------|------|------|------|-------|
| <b><math>T_A = -40^\circ\text{C}</math></b> |                                          |      |      |      |       |
| $t_{PD}$                                    | Propagation Delay to Output<br>CLK<br>MR | 960  | 1100 | 1200 | ps    |
|                                             |                                          | 650  | 800  | 1010 |       |
| $t_{SKEW}$                                  | Within-Device Skew <sup>(2)</sup>        | –    | –    | 50   | ps    |
| $t_S$                                       | Set-Up Time ( $\overline{\text{EN}}$ )   | 400  | –    | –    | ps    |
| $t_H$                                       | Hold Time ( $\overline{\text{EN}}$ )     | 200  | –    | –    | ps    |
| $V_{PP}$                                    | Minimum Input Swing <sup>(3)</sup>       | 250  | –    | –    | mV    |
| $V_{CMR}$                                   | Common-Mode Range <sup>(4)</sup>         | –1.3 | –    | –0.4 | V     |
| $t_r$<br>$t_f$                              | Output Rise/Fall Times<br>Q (20% – 80%)  | 275  | 400  | 525  | ps    |
| <b><math>T_A = 0^\circ\text{C}</math></b>   |                                          |      |      |      |       |
| $t_{PD}$                                    | Propagation Delay to Output<br>CLK<br>MR | 960  | 1100 | 1200 | ps    |
|                                             |                                          | 650  | 800  | 1010 |       |
| $t_{SKEW}$                                  | Within-Device Skew <sup>(2)</sup>        | –    | –    | 50   | ps    |
| $t_S$                                       | Set-Up Time ( $\overline{\text{EN}}$ )   | 400  | –    | –    | ps    |
| $t_H$                                       | Hold Time ( $\overline{\text{EN}}$ )     | 200  | –    | –    | ps    |
| $V_{PP}$                                    | Minimum Input Swing <sup>(3)</sup>       | 250  | –    | –    | mV    |
| $V_{CMR}$                                   | Common-Mode Range <sup>(4)</sup>         | –1.4 | –    | –0.4 | V     |
| $t_r$<br>$t_f$                              | Output Rise/Fall Times<br>Q (20% – 80%)  | 275  | 400  | 525  | ps    |
| <b><math>T_A = +25^\circ\text{C}</math></b> |                                          |      |      |      |       |
| $t_{PD}$                                    | Propagation Delay to Output<br>CLK<br>MR | 960  | 1100 | 1200 | ps    |
|                                             |                                          | 650  | 800  | 1010 |       |
| $t_{SKEW}$                                  | Within-Device Skew <sup>(2)</sup>        | –    | –    | 50   | ps    |
| $t_S$                                       | Set-Up Time ( $\overline{\text{EN}}$ )   | 400  | –    | –    | ps    |
| $t_H$                                       | Hold Time ( $\overline{\text{EN}}$ )     | 200  | –    | –    | ps    |
| $V_{PP}$                                    | Minimum Input Swing <sup>(3)</sup>       | 250  | –    | –    | mV    |
| $V_{CMR}$                                   | Common-Mode Range <sup>(4)</sup>         | –1.4 | –    | –0.4 | V     |
| $t_r$<br>$t_f$                              | Output Rise/Fall Times<br>Q (20% – 80%)  | 275  | 400  | 525  | ps    |

**AC Electrical Characteristics<sup>(1)</sup> (Continued)** $V_{EE} = V_{EE}$  (minimum) to  $V_{EE}$  (maximum);  $V_{CC} = \text{GND}$ .

| Symbol                    | Parameter                                | Min. | Typ. | Max. | Units |
|---------------------------|------------------------------------------|------|------|------|-------|
| $T_A = +85^\circ\text{C}$ |                                          |      |      |      |       |
| $t_{PD}$                  | Propagation Delay to Output<br>CLK<br>MR | 960  | 1100 | 1200 | ps    |
|                           |                                          | 650  | 800  | 1010 |       |
| $t_{SKEW}$                | Within-Device Skew                       | –    | –    | 50   | ps    |
| $t_S$                     | Set-Up Time ( $\overline{\text{EN}}$ )   | 400  | –    | –    | ps    |
| $t_H$                     | Hold Time ( $\overline{\text{EN}}$ )     | 200  | –    | –    | ps    |
| $V_{PP}$                  | Minimum Input Swing <sup>(3)</sup>       | 250  | –    | –    | mV    |
| $V_{CMR}$                 | Common-Mode Range <sup>(4)</sup>         | –1.4 | –    | –0.4 | V     |
| $t_r$<br>$t_f$            | Output Rise/Fall Times<br>Q (20% – 80%)  | 275  | 400  | 525  | ps    |

**Notes:**

- Parametric values specified at:
  - 5V Power Supply Range:  
100EL34 Series: –4.2V to –5.5V  
10EL34 Series: –4.75V to –5.5V
  - 3V Power Supply Range:  
10/100EL34L Series: –3.0V to –3.8V
- Skew is measured between outputs under identical transitions.
- Minimum input swing for which AC parameters are guaranteed. The device will function reliably with differential inputs down to 100mV.
- The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between  $V_{PP}$  minimum and 1V. The lower end of the CMR range varies 1:1 with  $V_{EE}$ . The numbers in the specification table assume a nominal  $V_{EE} = -3.3\text{V}$ . Note for PECL operation, the  $V_{CMR(MIN)}$  will be fixed at  $3.3\text{V} - I_{VCMR(MIN)}$ .

**Truth Table**

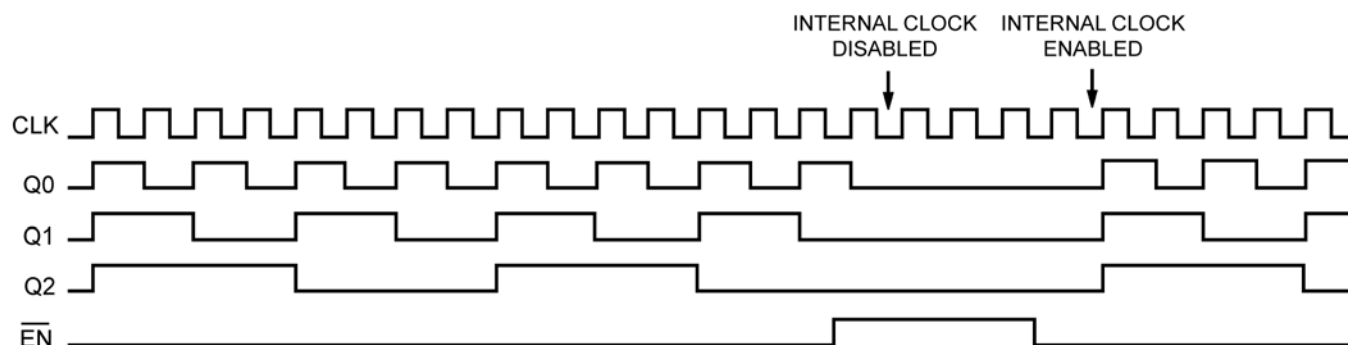
| CLK | $\overline{\text{EN}}$ | MR | Function        |
|-----|------------------------|----|-----------------|
| Z   | L                      | L  | Divide          |
| ZZ  | H                      | L  | Hold $Q_{0-2}$  |
| X   | X                      | H  | Reset $Q_{0-2}$ |

**Notes:**

Z = LOW-to-HIGH transition

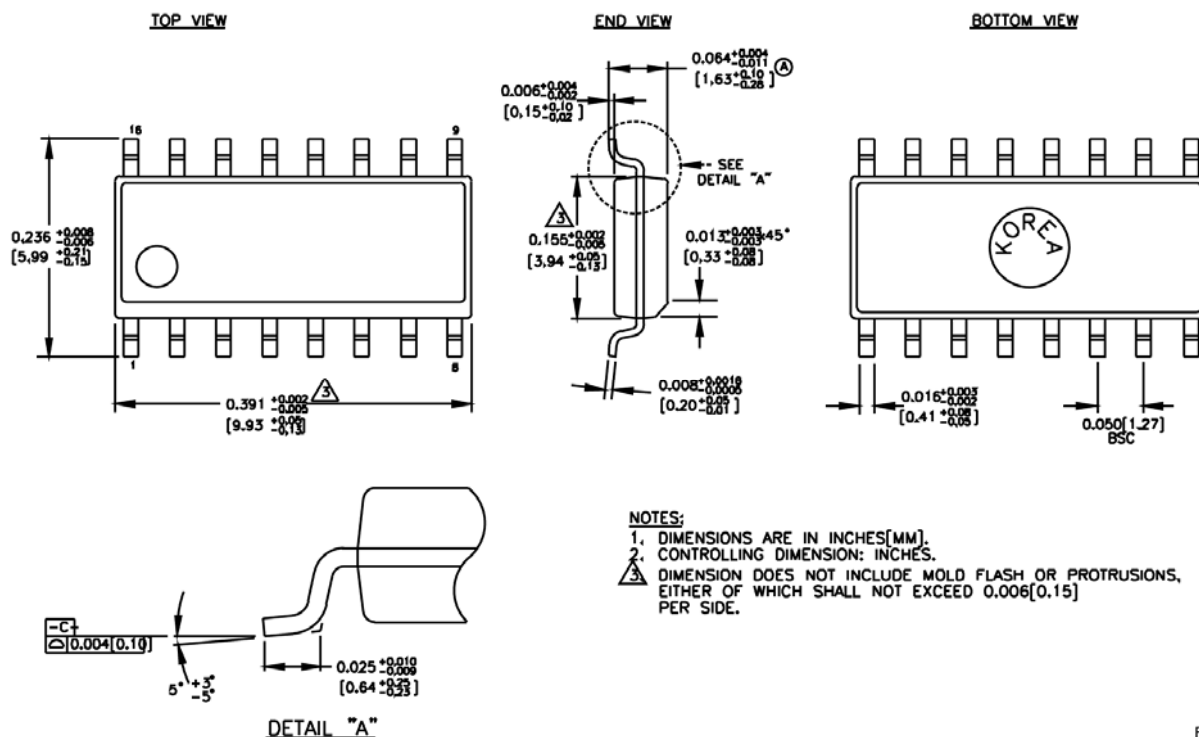
ZZ = HIGH-to-LOW transition

## Timing Diagram



The  $\overline{\text{EN}}$  signal will freeze the internal clocks to the flip-flops on the first falling edge of CLK after its assertion. The internal dividers will maintain their state during the internal clock freeze and will return to clocking once the internal clocks are unfrozen. The outputs will transition to their next states in the same manner, time and relationship as they would have had the  $\overline{\text{EN}}$  signal not been asserted.

## Package Information



Rev. 02

16-Pin .150" Wide SOIC (Z16-2)

**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>

Micrel makes no representations or warranties with respect to the accuracy or completeness of the information furnished in this data sheet. This information is not intended as a warranty and Micrel does not assume responsibility for its use. Micrel reserves the right to change circuitry, specifications and descriptions at any time without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Micrel's terms and conditions of sale for such products, Micrel assumes no liability whatsoever, and Micrel disclaims any express or implied warranty relating to the sale and/or use of Micrel products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right.

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 a Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2006 Micrel, Incorporated.