

**SY10EL34/L**
SY100EL34/L**5V/3.3V $\div 2$, $\div 4$, $\div 8$ Clock Generation Chip****Precision Edge®****General Description**

The SY10/100EL34/L are low-skew $\div 2$, $\div 4$, $\div 8$ clock generation chips designed explicitly for low-skew clock generation applications. The internal dividers are synchronous to each other; therefore, the common output edges are all precisely aligned. The devices can be driven by either a differential or single-ended ECL or, if positive power supplies are used, PECL input signal. In addition, by using the V_{BB} output, a sinusoidal source can be AC-coupled into the device. If a single-ended input is to be used, the V_{BB} output should be connected to the $\overline{CLK}$ input and bypassed to ground via a $0.01\mu F$ capacitor. The V_{BB} output is designed to act as the switching reference for the input of the EL34/L under single-ended input conditions. As a result, this pin can only source/ sink up to 0.5mA of current.

The common enable ($\overline{EN}$) is synchronous so that the internal dividers will only be enabled/disabled when the internal clock is already in the LOW state. This avoids any chance of generating a runt clock pulse on the internal clock when the device is enabled/disabled as can happen with an asynchronous control. An internal runt pulse could lead to losing synchronization between the internal divider stages. The internal enable flip-flop is clocked on the falling edge of the divider stages. The internal enable 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.

Upon start-up, the internal flip-flops will attain a random state; the master reset (MR) input allows for the synchronization of the internal dividers, as well as for multiple EL34/Ls in a system.

Data sheets and support documentation can be found on Micrel's web site at: www.micrel.com.

**Precision Edge®****Features**

- 3.3V and 5V power supply options
- 50ps output-to-output skew
- Synchronous enable/disable
- Master Reset for synchronization
- Internal $75K\Omega$ input pull-down resistors
- Available in 16-pin SOIC package

Pin Description

Pin Name	Pin Function
CLK	Differential clock inputs.
$\overline{EN}$	Synchronous enable.
MR	Master reset.
V_{BB}	Reference output.
Q_0	Differential $\div 2$ outputs.
Q_1	Differential $\div 4$ outputs.
Q_2	Differential $\div 8$ outputs.

Precision Edge is a registered trademark of Micrel, Inc.

Micrel Inc. • 2180 Fortune Drive • San Jose, CA 95131 • USA • tel +1 (408) 944-0800 • fax +1 (408) 474-1000 • <http://www.micrel.com>

December 2011

M9999-120611-I
hbwhelp@micrel.com or (408) 955-1690

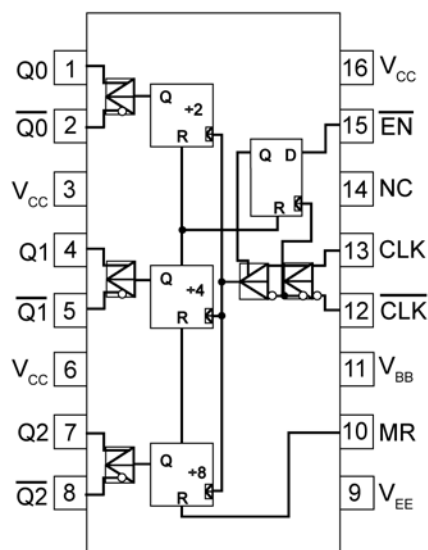
Ordering Information

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EL34LZG	Z16-2	Industrial	SY10EL34LZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY10EL34LZGTR ⁽²⁾	Z16-2	Industrial	SY10EL34LZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY100EL34LZG	Z16-2	Industrial	SY100EL34LZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY100EL34LZGTR ⁽²⁾	Z16-2	Industrial	SY100EL34LZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY10EL34ZG	Z16-2	Industrial	SY10EL34ZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY10EL34ZGTR ⁽²⁾	Z16-2	Industrial	SY10EL34ZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY100EL34ZG	Z16-2	Industrial	SY100EL34ZG with Pb-Free Bar Line Indicator	Pb-Free NiPdAu
SY100EL34ZGTR ⁽²⁾	Z16-2	Industrial	SY100EL34ZG with 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⁽¹⁾ $V_{EE} = V_{EE}$ (minimum) to V_{EE} (maximum); $V_{CC} = \text{GND}$.

Symbol	Parameter	Min.	Typ.	Max.	Units
$T_A = -40^\circ\text{C}$					
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	μA
$T_A = 0^\circ\text{C}$					
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	μA
$T_A = +25^\circ\text{C}$					
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	μA
$T_A = +85^\circ\text{C}$					
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	μA

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⁽¹⁾ $V_{EE} = V_{EE}$ (minimum) to V_{EE} (maximum); $V_{CC} = GND$.

Symbol	Parameter	Min.	Typ.	Max.	Units
T_A = -40°C					
t _{PD}	Propagation Delay to Output CLK MR	960	1100	1200	ps
		650	800	1010	
t _{SKEW}	Within-Device Skew ⁽²⁾	–	–	50	ps
t _S	Set-Up Time ($\overline{EN}$)	400	–	–	ps
t _H	Hold Time ($\overline{EN}$)	200	–	–	ps
V _{PP}	Minimum Input Swing ⁽³⁾	250	–	–	mV
V _{CMR}	Common-Mode Range ⁽⁴⁾	–1.3	–	–0.4	V
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	275	400	525	ps
T_A = 0°C					
t _{PD}	Propagation Delay to Output CLK MR	960	1100	1200	ps
		650	800	1010	
t _{SKEW}	Within-Device Skew ⁽²⁾	–	–	50	ps
t _S	Set-Up Time ($\overline{EN}$)	400	–	–	ps
t _H	Hold Time ($\overline{EN}$)	200	–	–	ps
V _{PP}	Minimum Input Swing ⁽³⁾	250	–	–	mV
V _{CMR}	Common-Mode Range ⁽⁴⁾	–1.4	–	–0.4	V
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	275	400	525	ps
T_A = +25°C					
t _{PD}	Propagation Delay to Output CLK MR	960	1100	1200	ps
		650	800	1010	
t _{SKEW}	Within-Device Skew ⁽²⁾	–	–	50	ps
t _S	Set-Up Time ($\overline{EN}$)	400	–	–	ps
t _H	Hold Time ($\overline{EN}$)	200	–	–	ps
V _{PP}	Minimum Input Swing ⁽³⁾	250	–	–	mV
V _{CMR}	Common-Mode Range ⁽⁴⁾	–1.4	–	–0.4	V
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	275	400	525	ps

AC Electrical Characteristics⁽¹⁾ (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 CLK 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 ⁽³⁾	250	–	–	mV
V_{CMR}	Common-Mode Range ⁽⁴⁾	–1.4	–	–0.4	V
t_r t_f	Output Rise/Fall Times 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

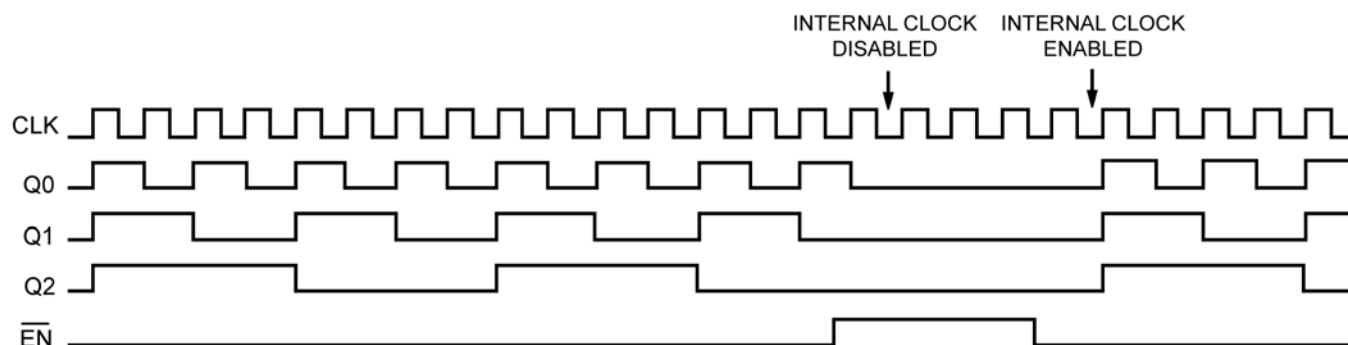
CLK	$\overline{\text{EN}}$	MR	Function
Z	L	L	Divide
ZZ	H	L	Hold Q_{0-2}
X	X	H	Reset Q_{0-2}

Notes:

Z = LOW-to-HIGH transition

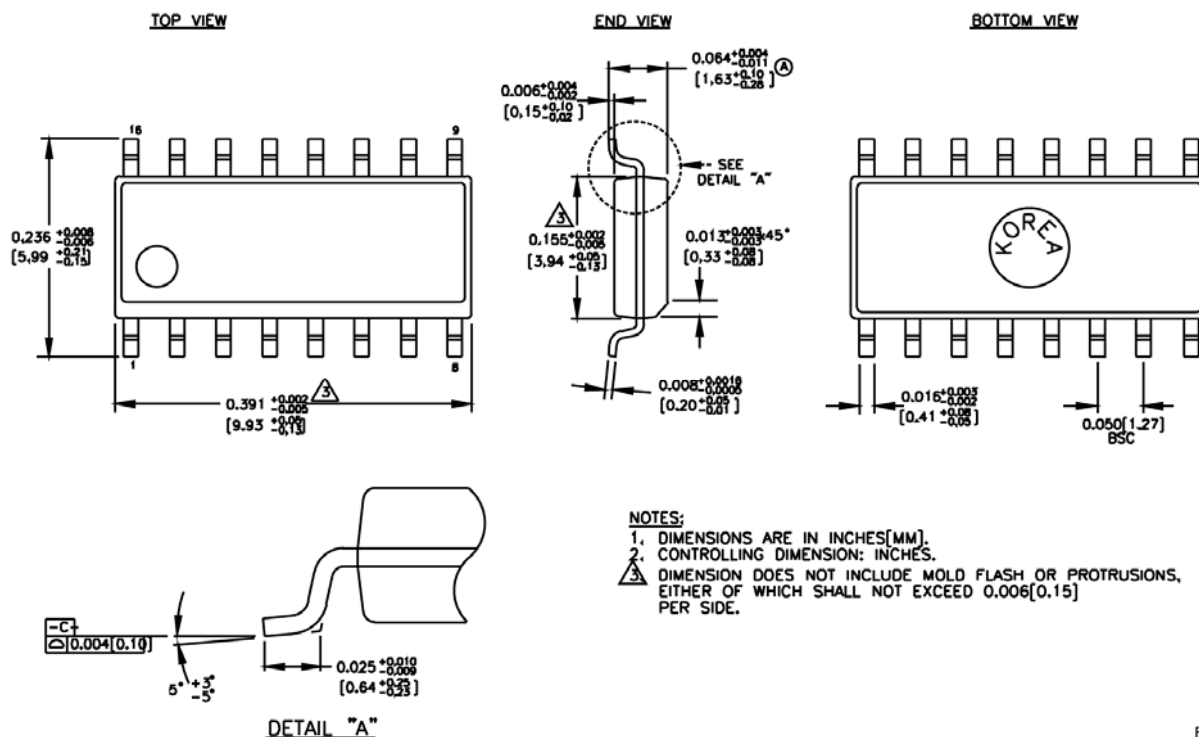
ZZ = HIGH-to-LOW transition

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.