SY100S834L

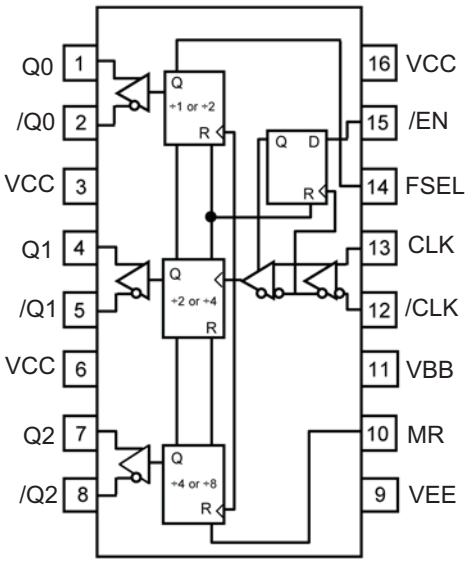
3.3V ÷2, ÷4, ÷8 Clock Generation Chip

Features

- 3.3V Power Supply
- 50 ps Output to Output Skew
- Synchronous Enable/Disable
- Master Reset for Synchronization
- Internal 75 kΩ Input Pull Down Resistors
- Available in 16-Pin SOIC Package

Package Type

SY100S834L
16-Lead Narrow SOIC (Z16-2)



General Description

The SY100S834L is a low skew ÷2, ÷4, ÷8 clock generation chip 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 VBB output, a sinusoidal source can be AC-coupled into the device. If a single-ended input is to be used, the VBB output should be connected to the input and bypassed to ground via a 0.01 µF capacitor. The VBB output is designed to act as the switching reference for the input of the SY100S834L under single-ended input conditions. As a result, this pin can only source/sink up to 0.5 mA of current.

The Function Select (FSEL) input is used to determine what clock generation chip function is. When FSEL input is LOW, SY100S834L functions as a divide by 2, by 4 and by 8 clock generation chip. However, if FSEL input is HIGH, it functions as a divide by 1, by 2 and by 4 clock generation chip. This latter feature will increase the clock frequency by two folds.

The common enable (/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 SY100S834Ls in a system.

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

PECL Power Supply Voltage (V_{CC}) (Note 1) ..... +8V
NECL Power Supply Voltage (V_{EE}) (Note 2) ..... –8V
PECL Mode Input Voltage (V_{IN}) (Note 3) ..... +6V
NECL Mode Input Voltage (V_{IN}) (Note 4) ..... –6V
Continuous Output Current (I_{OUT}) ..... 50 mA
Surge Output Current (I_{OUT}) ..... 100 mA

† Notice: Stresses above those listed under "Absolute Maximum ratings" may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Note 1: V_{EE} = 0V.
2: V_{CC} = 0V.
3: V_{EE} = 0V, $V_{IN} \le V_{CC}$.
4: V_{CC} = 0V, $V_{IN} \ge V_{EE}$.

DC ELECTRICAL CHARACTERISTICS (Note 1)

Electrical Characteristics: V_{CC} = 3.0V to 3.8V; V_{EE} = 0V or V_{EE} = –3.8V to –3.0V; V_{CC} = 0V; T_A = –40˚C to +85˚C, unless otherwise stated.

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Power Supply Current	I_{EE}	—	—	49	mA	T_A = –40°C to +25°C
		—	—	54		T_A = +85°C
Output High Voltage (Note 2)	V_{OH}	V_{CC} – 1.085	V_{CC} – 1.005	V_{CC} – 0.88	V	T_A = –40°C
		V_{CC} – 1.025	V_{CC} – 0.955	V_{CC} – 0.88		T_A = 0°C to +85°C
Output Low Voltage (Note 2)	V_{OL}	V_{CC} – 1.830	V_{CC} – 1.695	V_{CC} – 1.555	V	T_A = –40°C
		V_{CC} – 1.810	V_{CC} – 1.705	V_{CC} – 1.620		T_A = 0°C to +85°C
Input High Voltage (Single Ended)	V_{IH}	V_{CC} – 1.165	—	V_{CC} – 0.880	V	—
Input Low Voltage (Single Ended)	V_{IL}	V_{CC} – 1.810	—	V_{CC} – 1.475	V	—
Output Reference Voltage	V_{BB}	V_{CC} – 1.38	—	V_{CC} – 1.26	V	—
Common Mode Range (Note 3)	V_{IHCMR}	V_{CC} – 1.3	—	V_{CC} – 0.4	V	T_A = –40°C
		V_{CC} – 1.4	—	V_{CC} – 0.4		T_A = 0°C to +85°C
Input High Current	I_{IH}	—	—	150	µA	—
Input Low Current	I_{IL}	0.5	—	—	µA	V_{IN} = V_{IL} (Min)

Note 1: Devices are designed to meet the DC specifications shown in the above table after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained
2: Outputs are terminated through a 50Ω resistor to V_{CC} – 2.0V.
3: The CMR range is referenced to the most positive side of the differential input voltage. Normal operation is obtained if the high level falls within the specified range and the peak-to-peak voltage lies between 250 mV and 1V.

AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: V_{CC} = 3.0V to 3.8V; V_{EE} = 0V or V_{CC} = 4.2V to 5.5V; V_{EE} = 0V or V_{EE} = –3.8V to –3.0V; V_{CC} = 0V or V_{EE} = –5.5V to –4.2V; V_{CC} = 0V; T_A = –40°C to +85°C, unless otherwise stated.

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Maximum Toggle Frequency	f_{MAX}	800	—	—	MHz	—
Propagation Delay CLK to Q	t_{PD}	960	1100	1200	ps	—
Propagation Delay MR to Q	t_{PD}	650	800	1010	ps	—
Within-Device Skew (Note 1)	t_{SKEW}	—	—	50	ps	—
Set-Up Time (/EN-to-CLK)	t_s	400	—	—	ps	—
Hold Time (CLK-to-/EN)	t_h	200	—	—	ps	—
Input Swing (Note 2)	V_{PP}	250	—	1000	mV	—
Output Rise/Fall Time Q (20% to 80%)	t_r/t_f	275	400	525	ps	—

Note 1: Skew is measured between outputs under identical.

2: Input swing for which AC parameters are ensured.

TEMPERATURE SPECIFICATIONS

Parameters	Symbol	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Operating Temperature Range	T_A	–40	—	+85	°C	—
Storage Temperature	T_S	–65	—	+150	°C	—
Lead Temperature	T_{LEAD}	—	—	+260	°C	Soldering, 20 sec.
Package Thermal Resistance (SOIC)						
Junction-to-Ambient	θ_{JA}	—	—	—	°C/W	—
		—	—	—		—
Junction-to-Case	θ_{JC}	—	—	—	°C/W	—

2.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin Number	Pin Name	Description
1, 2	Q0, /Q0	Differential 2 or 1 outputs
3, 6, 16	VCC	Positive power supply
4, 5	Q1, /Q1	Differential 4 or 2 outputs
7, 8	Q2, /Q2	Differential 8 or 4 outputs
9	VEE	Negative power supply
10	MR	Master reset
11	VBB	Reference output
12, 13	CLK, /CLK	Differential clock inputs
14	FSEL	Function select, single-ended ECL logic.
15	/EN	Synchronous enable, single-ended ECL logic.

2.1 Truth Table

TABLE 2-2: TRUTH TABLE

CLK	/EN	MR	Function
Z	L	L	Divide
ZZ	H	L	Hold Q0 - Q2
X	X	H	Reset Q0 - Q2

Note: Z = Low-to-high transition.

Note: ZZ = High-to-low transition.

TABLE 2-3: FUNCTION SELECT TRUTH TABLE

FSEL	Q0 Outputs	Q1 Outputs	Q2 Outputs
L	Divide by 2	Divide by 4	Divide by 8
H	Divide by 1	Divide by 2	Divide by 4

3.0 TIMING DIAGRAM

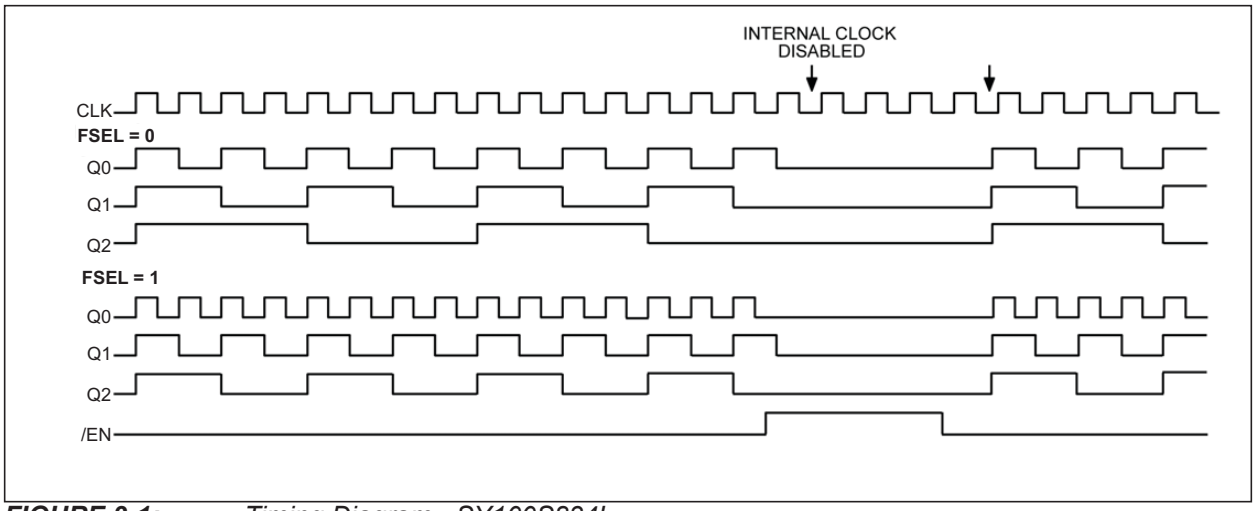


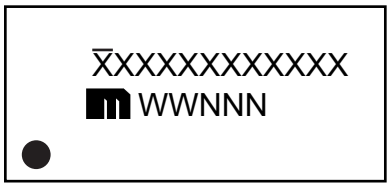
FIGURE 3-1: *Timing Diagram - SY100S834L.*

The /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 /EN signal not been asserted.

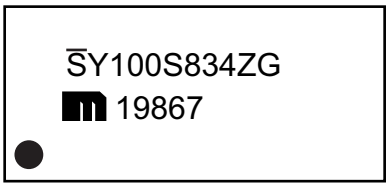
4.0 PACKAGING INFORMATION

4.1 Package Marking Information

16-Lead SOIC*



Example

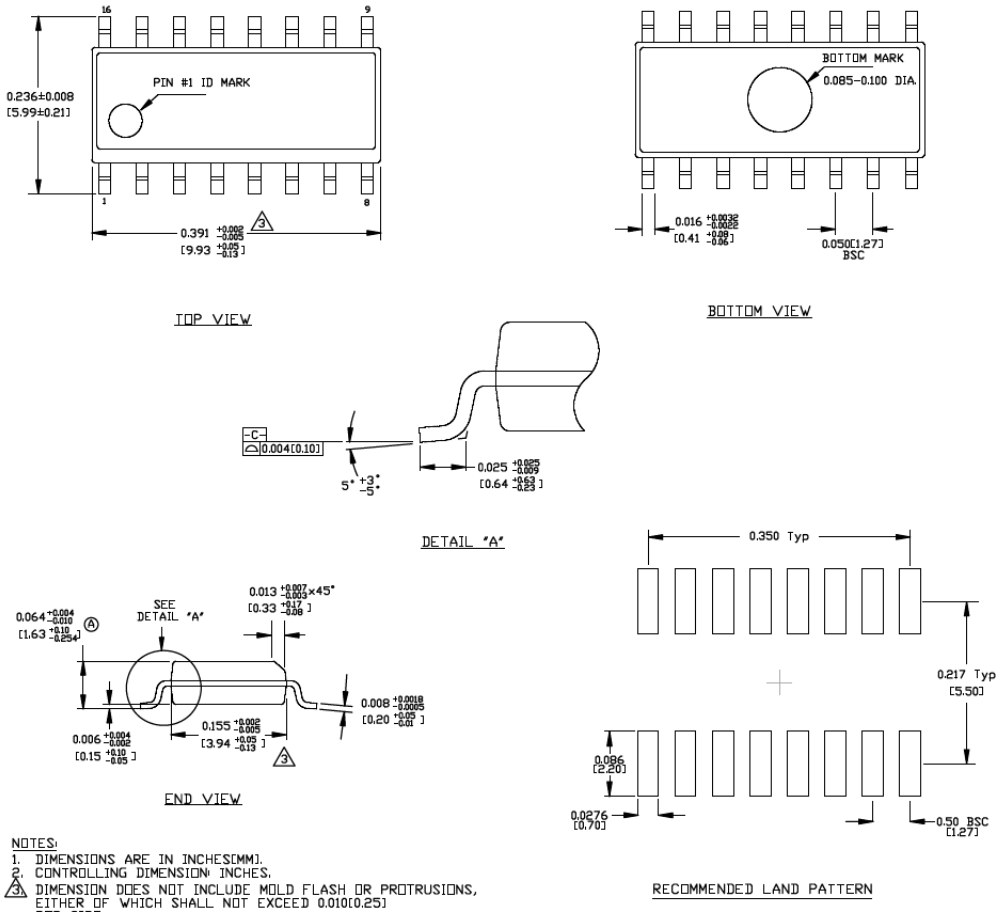


Legend:	XX...X	Product code or customer-specific information
	Y	Year code (last digit of calendar year)
	YY	Year code (last 2 digits of calendar year)
	WW	Week code (week of January 1 is week ‘01’)
	NNN	Alphanumeric traceability code
	(e3)	Pb-free JEDEC® designator for Matte Tin (Sn)
	*	This package is Pb-free. The Pb-free JEDEC designator ((e3)) can be found on the outer packaging for this package.
	●, ▲, ▼	Pin one index is identified by a dot, delta up, or delta down (triangle mark).
Note:	In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.	
	Underbar (_) and/or Overbar (¯) symbol may not be to scale.	

TITLE

16 LEAD SOICN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

DRAWING #	SOICN-16LD-PL-1	**UNIT**	INCH [MM]
Lead Frame	Copper	**Lead Finish**	Matte Tin



NOTES:
1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.010[0.25] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.

APPENDIX A: REVISION HISTORY

Revision A (May 2020)

- Converted Micrel document SY100S834L to Microchip data sheet DS20006353A.
- Minor text changes throughout.
- Removed all reference to the EOL SY100S834 version.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART NO.	-XX	X	X	-XX
Device	Voltage Option	Package	Temperature Range	Special Processing

Device:	SY100S834L: 3.3V ÷2, ÷4, ÷8 Clock Generation Chip		
Voltage Option:	L =	3.3V	
Package:	Z	=	16-Lead SOIC
Temperature Range:	G	=	–40˚C to +85˚C (NiPdAu Pb-Free)
Special Processing:	<blank>=		48/Tube
	TR	=	1,000/Reel

Examples:

a) SY100S834LZG: 3.3V, ÷2, ÷4, ÷8 Clock Generation Chip, 3.3V, –40˚C to +85˚C, 16-Lead SOIC, 48/Tube

b) SY100S834LZG-TR: 3.3V, ÷2, ÷4, ÷8 Clock Generation Chip, 3.3V, –40˚C to +85˚C, 16-Lead SOIC, 1,000/Reel

Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

NOTES:

Note the following details of the code protection feature on Microchip devices:

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as "unbreakable."

Code protection is constantly evolving. We at Microchip are committed to continuously improving the code protection features of our products. Attempts to break Microchip's code protection feature may be a violation of the Digital Millennium Copyright Act. If such acts allow unauthorized access to your software or other copyrighted work, you may have a right to sue for relief under that Act.

For information regarding Microchip's Quality Management Systems, please visit www.microchip.com/quality.

ISBN: 978-1-5224-6110-4

Worldwide Sales and Service

AMERICAS

Corporate Office
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-792-7200
Fax: 480-792-7277
Technical Support:
http://www.microchip.com/support
Web Address:
www.microchip.com

Atlanta
Duluth, GA
Tel: 678-957-9614
Fax: 678-957-1455

Austin, TX
Tel: 512-257-3370

Boston
Westborough, MA
Tel: 774-760-0087
Fax: 774-760-0088

Chicago
Itasca, IL
Tel: 630-285-0071
Fax: 630-285-0075

Dallas
Addison, TX
Tel: 972-818-7423
Fax: 972-818-2924

Detroit
Novi, MI
Tel: 248-848-4000

Houston, TX
Tel: 281-894-5983

Indianapolis
Noblesville, IN
Tel: 317-773-8323
Fax: 317-773-5453
Tel: 317-536-2380

Los Angeles
Mission Viejo, CA
Tel: 949-462-9523
Fax: 949-462-9608
Tel: 951-273-7800

Raleigh, NC
Tel: 919-844-7510

New York, NY
Tel: 631-435-6000

San Jose, CA
Tel: 408-735-9110
Tel: 408-436-4270

Canada - Toronto
Tel: 905-695-1980
Fax: 905-695-2078

ASIA/PACIFIC

Australia - Sydney
Tel: 61-2-9868-6733

China - Beijing
Tel: 86-10-8569-7000

China - Chengdu
Tel: 86-28-8665-5511

China - Chongqing
Tel: 86-23-8980-9588

China - Dongguan
Tel: 86-769-8702-9880

China - Guangzhou
Tel: 86-20-8755-8029

China - Hangzhou
Tel: 86-571-8792-8115

China - Hong Kong SAR
Tel: 852-2943-5100

China - Nanjing
Tel: 86-25-8473-2460

China - Qingdao
Tel: 86-532-8502-7355

China - Shanghai
Tel: 86-21-3326-8000

China - Shenyang
Tel: 86-24-2334-2829

China - Shenzhen
Tel: 86-755-8864-2200

China - Suzhou
Tel: 86-186-6233-1526

China - Wuhan
Tel: 86-27-5980-5300

China - Xian
Tel: 86-29-8833-7252

China - Xiamen
Tel: 86-592-2388138

China - Zhuhai
Tel: 86-756-3210040

ASIA/PACIFIC

India - Bangalore
Tel: 91-80-3090-4444

India - New Delhi
Tel: 91-11-4160-8631

India - Pune
Tel: 91-20-4121-0141

Japan - Osaka
Tel: 81-6-6152-7160

Japan - Tokyo
Tel: 81-3-6880- 3770

Korea - Daegu
Tel: 82-53-744-4301

Korea - Seoul
Tel: 82-2-554-7200

Malaysia - Kuala Lumpur
Tel: 60-3-7651-7906

Malaysia - Penang
Tel: 60-4-227-8870

Philippines - Manila
Tel: 63-2-634-9065

Singapore
Tel: 65-6334-8870

Taiwan - Hsin Chu
Tel: 886-3-577-8366

Taiwan - Kaohsiung
Tel: 886-7-213-7830

Taiwan - Taipei
Tel: 886-2-2508-8600

Thailand - Bangkok
Tel: 66-2-694-1351

Vietnam - Ho Chi Minh
Tel: 84-28-5448-2100

EUROPE

Austria - Wels
Tel: 43-7242-2244-39
Fax: 43-7242-2244-393

Denmark - Copenhagen
Tel: 45-4485-5910
Fax: 45-4485-2829

Finland - Espoo
Tel: 358-9-4520-820

France - Paris
Tel: 33-1-69-53-63-20
Fax: 33-1-69-30-90-79

Germany - Garching
Tel: 49-8931-9700

Germany - Haan
Tel: 49-2129-3766400

Germany - Heilbronn
Tel: 49-7131-72400

Germany - Karlsruhe
Tel: 49-721-625370

Germany - Munich
Tel: 49-89-627-144-0
Fax: 49-89-627-144-44

Germany - Rosenheim
Tel: 49-8031-354-560

Israel - Ra'anana
Tel: 972-9-744-7705

Italy - Milan
Tel: 39-0331-742611
Fax: 39-0331-466781

Italy - Padova
Tel: 39-049-7625286

Netherlands - Drunen
Tel: 31-416-690399
Fax: 31-416-690340

Norway - Trondheim
Tel: 47-7288-4388

Poland - Warsaw
Tel: 48-22-3325737

Romania - Bucharest
Tel: 40-21-407-87-50

Spain - Madrid
Tel: 34-91-708-08-90
Fax: 34-91-708-08-91

Sweden - Gothenberg
Tel: 46-31-704-60-40

Sweden - Stockholm
Tel: 46-8-5090-4654

UK - Wokingham
Tel: 44-118-921-5800
Fax: 44-118-921-5820