(÷1, ÷2/3) OR (÷2, ÷4/6) CLOCK GENERATION CHIP

Precision Edge®
SY100S838
SY100S838L

FEATURES

- 3.3V and 5V power supply options
- 50ps output-to-output skew
- Synchronous enable/disable
- Master Reset for synchronization
- Internal 75KΩ input pull-down resistors
- Available in 20-pin SOIC package

Precision Edge®

TRUTH TABLE

CLK	$\overline{EN}$	MR	Function
Z	L	L	Divide
ZZ	H	L	Hold Q_{0-3}
X	X	H	Reset Q_{0-3}

NOTES:
Z = LOW-to-HIGH transition
ZZ = HIGH-to-LOW transition

FSEL	DIVSEL	Q_0, Q_1 OUTPUTS	Q_2, Q_3 OUTPUTS
L	L	Divide by 2	Divide by 4
L	H	Divide by 2	Divide by 6
H	L	Divide by 1	Divide by 2
H	H	Divide by 1	Divide by 3

PIN NAMES

Pin	Function
CLK	Differential Clock Inputs
FSEL	Function Select Input
$\overline{EN}$	Synchronous Enable
MR	Master Reset
VBB	Reference Output
Q_0, Q_1	Differential ÷1 or ÷2 Outputs
Q_2, Q_3	Differential ÷2/3 or ÷4/6 Outputs
DIVSEL	Frequency Select Input

DESCRIPTION

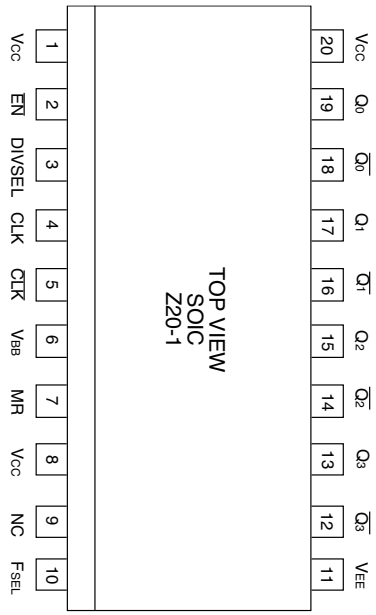
The SY100S838/L is a low skew (÷1, ÷2/3) or (÷2, ÷4/6) clock generation chip designed explicitly for low skew clock generation applications. The internal dividers are synchronous to each other, therefore, the common output edges are all precisely aligned. The devices can be driven by either a differential 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 CLK input and bypassed to ground via a 0.01μF capacitor. The VBB output is designed to act as the switching reference for the input of the SY100S838/L under single-ended input conditions. As a result, this pin can only source/sink up to 0.5mA of current.

The Function Select (FSEL) input is used to determine what clock generation chip function is. When FSEL input is LOW, SY100S838/L functions as a divide by 2 and by 4/6 clock generation chip. However, if FSEL input is HIGH, it functions as a divide by 1 and by 2/3 clock chip.

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 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 SY100S838/Ls in a system.

PACKAGE/ORDERING INFORMATION



20-Pin SOIC (Z20-1)

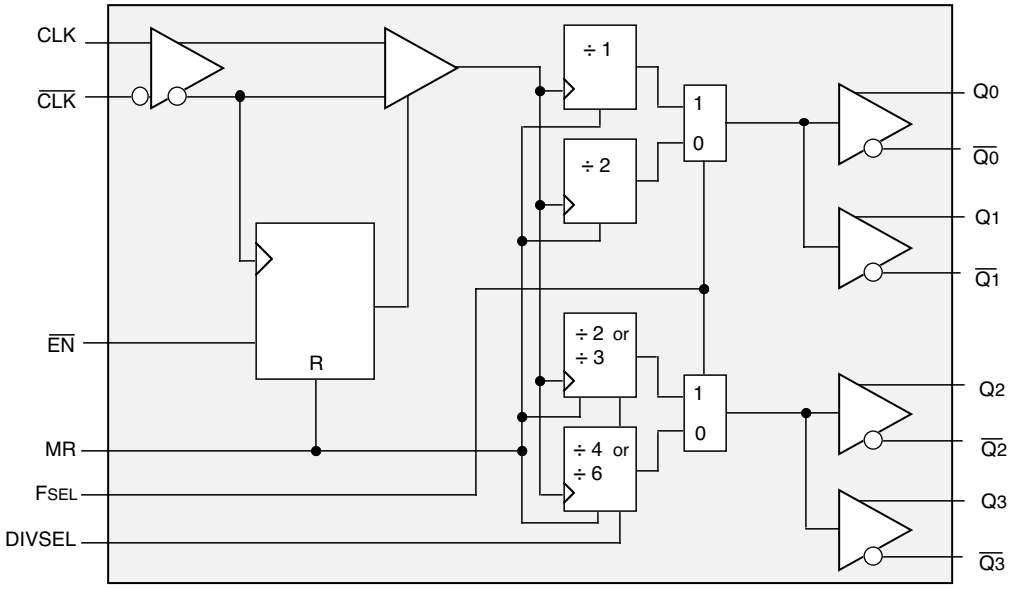
Ordering Information

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100S838ZC	Z20-1	Commercial	SY100S838ZC	Sn-Pb
SY100S838ZCTR[1]	Z20-1	Commercial	SY100S838ZC	Sn-Pb
SY100S838LZC	Z20-1	Commercial	SY100S838LZC	Sn-Pb
SY100S838LZCTR[1]	Z20-1	Commercial	SY100S838LZC	Sn-Pb
SY100S838ZI	Z20-1	Industrial	SY100S838ZI	Sn-Pb
SY100S838ZITR[1]	Z20-1	Industrial	SY100S838ZI	Sn-Pb
SY100S838LZI	Z20-1	Industrial	SY100S838LZI	Sn-Pb
SY100S838LZITR[1]	Z20-1	Industrial	SY100S838LZI	Sn-Pb
SY100S838ZG[2]	Z20-1	Industrial	SY100S838ZG with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100S838ZGTR[1, 2]	Z20-1	Industrial	SY100S838ZG with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100S838LZG[2]	Z20-1	Industrial	SY100S838LZG with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100S838LZGTR[1, 2]	Z20-1	Industrial	SY100S838LZG with Pb-Free bar-line indicator	NiPdAu Pb-Free

Notes:

1. Tape and Reel.
2. Pb-Free package is recommended for new designs.

BLOCK DIAGRAM



DC ELECTRICAL CHARACTERISTICS(1)

V_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = GND

Symbol	Parameter	T_A = –40°C			T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{EE}	Power Supply Current	35	50	65	35	50	65	35	50	65	35	54	75	mA
V_{BB}	Output Reference Voltage	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	V
I_{IH}	Input High Current	—	—	150	—	—	150	—	—	150	—	—	150	µA

Note:

1. Parametric values specified at: 5 volt Power Supply Range 100S838 Series: -4.2V to -5.5V.
   3 volt Power Supply Range 100S838L Series -3.0V to -3.8V.

AC ELECTRICAL CHARACTERISTICS[1]

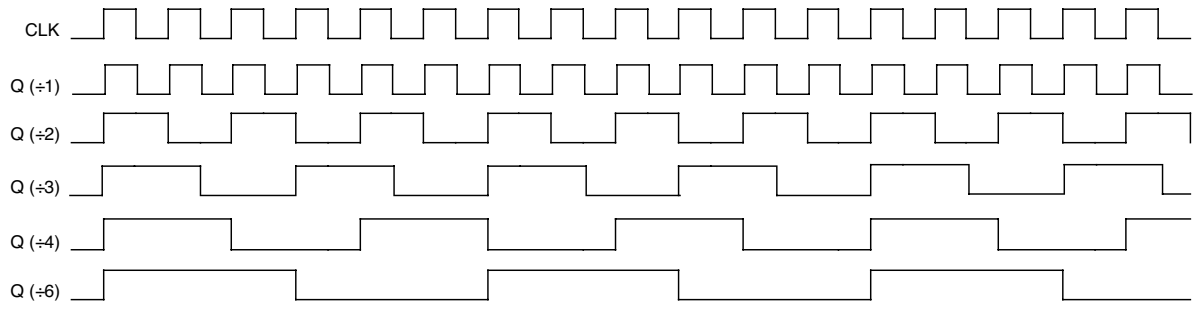
V_{EE} = V_{EE} (Min.) to V_{EE} (Max.); V_{CC} = GND

Symbol	Parameter	T_A = –40°C			T_A = 0°C			T_A = +25°C			T_A = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
f_{MAX}	Maximum Toggle Frequency	1000	—	—	1000	—	—	1000	—	—	1000	—	—	MHz
t_{PLH} t_{PHL}	Propagation Delay to Output													ps
	CLK → Output (Diff.)	950	—	1150	950	—	1150	970	—	1170	1050	—	1250	
	CLK → Output (S.E.)	900	—	1200	900	—	1200	920	—	1220	1000	—	1300	
	MR → Q	600	—	900	600	—	900	600	—	900	600	—	900	
tskew	Within-Device Skew[2] Q0 — Q3	—	—	50	—	—	50	—	—	50	—	—	50	ps
	Part-to-Part Q0 — Q3 (Diff.)	—	—	200	—	—	200	—	—	200	—	—	200	
t_S	Set-up Time $\overline{EN}$ → $\overline{CLK}$	300	150	—	300	150	—	300	150	—	300	150	—	ps
	DIVSEL → CLK	300	—	—	300	—	—	300	—	—	300	—	—	
t_H	Hold Time $\overline{CLK}$ → $\overline{EN}$	400	150	—	400	150	—	400	150	—	400	150	—	ps
	CLK → DIVSEL	400	200	—	400	200	—	400	200	—	400	200	—	
V_{PP}	Minimum Input Swing[3] CLK	250	—	—	250	—	—	250	—	—	250	—	—	mV
V_{CMR}	Common Mode Range[4] CLK	(4)	—	-0.55	(4)	—	-0.55	(4)	—	-0.55	(4)	—	-0.55	V
t_{RR}	Reset Recovery Time	—	—	100	—	—	100	—	—	100	—	—	100	ps
t_{PW}	Minimum Pulse Width CLK	800	—	—	800	—	—	800	—	—	800	—	—	ps
	MR	700	—	—	700	—	—	700	—	—	700	—	—	
tr tf	Output Rise/Fall Times Q (20% —80%)	280	—	550	280	—	550	280	—	550	280	—	550	ps

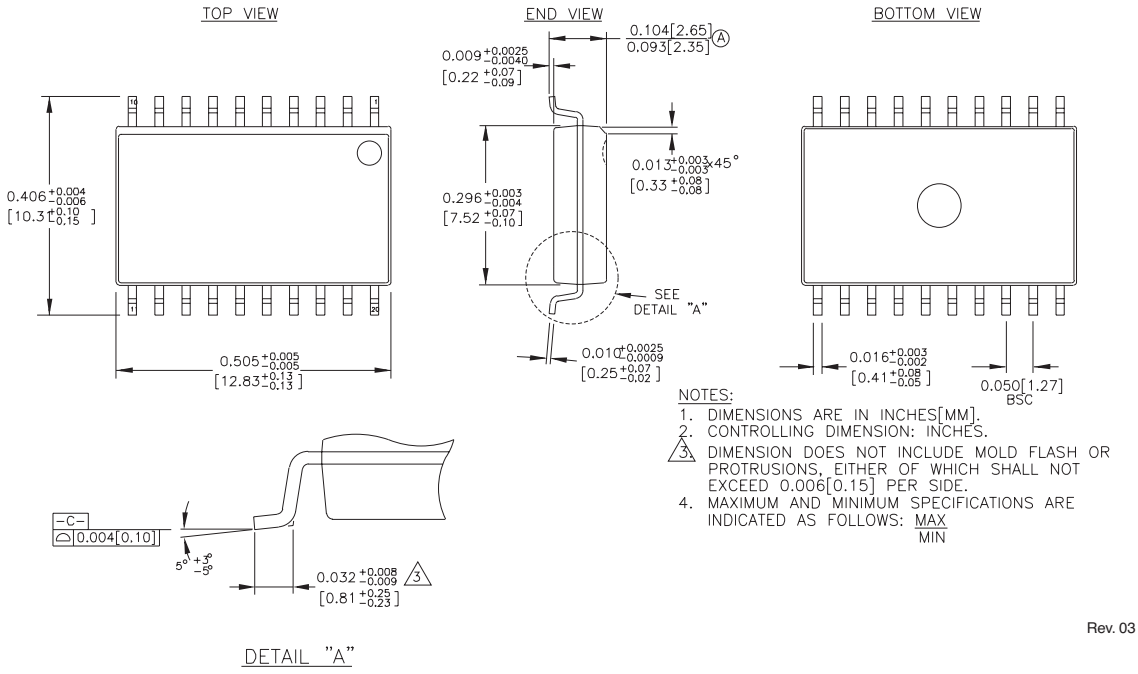
Notes:

1. Parametric values specified at: 5 volt Power Supply Range 100S838 Series: -4.2V to -5.5V.
   3 volt Power Supply Range 100S838L Series -3.0V to -3.8V.
2. Skew is measured between outputs under identical transitions.
3. Minimum input swing for which AC parameters are guaranteed. The device will function reliably with differential inputs down to 100mV.
4. 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} (min) and 1.0V. The lower end of the CMR range is dependent on V_{EE} and is equal to V_{EE} +1.65V.

TIMING DIAGRAM



20-PIN SOIC .300" WIDE (Z20-1)



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