SY100EL14V



5V/3.3V 1:5 Clock Distribution

General Description

The SY100EL14V is a low-skew, 1:5 clock distribution chip 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. The EL14V is suitable for operation in systems operating with 3.3V to 5.0V supplies. If a single-ended input is to be used, the V_{BB} output should be connected to the /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 EL14V under single-ended input conditions. As a result, this pin can only source/sink up to 0.5mA of current.

The EL14V 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/disable 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.

When both differential inputs are left open, CLK input will pull down to V_{EE} and /CLK input will bias around $V_{\text{CC}}/2$.

Datasheets and support documentation are available on Micrel's web site at: www.micrel.com.

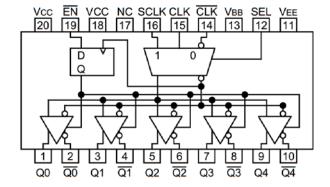
Features

- 3.3V and 5V power supply options
- 70fs_{RMS} typical additive phase jitter
- Typical 30ps output-to-output skew
- Max. 50ps output-to-output skew
- Synchronous enable/disable
- Multiplexed clock input
- 75kΩ internal input pull-down resistors
- Available in 20-pin SOIC package

Applications

- Processor clock distribution
- SONET clock distribution
- Fibre Channel clock distribution
- Gigabit Ethernet clock distribution

Block Diagram



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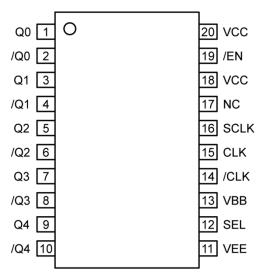
Ordering Information⁽¹⁾

Part Number	Package Type	Operating Range Package Marking Le		Lead Finish
SY100EL14VZG	Z20-1	Industrial	SY100EL14VZG with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL14VZG TR ⁽²⁾	Z20-1	Industrial	SY100EL14VZG with Pb-Free bar-line indicator	Pb-Free NiPdAu

Note:

- 1. Contact factory for die availability. Dice are guaranteed at T_A = 25°C, DC electricals only.
- 2. Tape and Reel.

Pin Configuration



20-Pin Narrow SOIC (Top View)

Pin Description

Pin	Function
CLK	Differential clock inputs
SCLK	Scan clock input
/EN	Synchronous enable
SEL	Clock select input
VBB	Reference output
Q0 – Q4	Differential clock outputs

Truth Table

CLK	SCLK	SEL	/EN	Q
L	Х	L	L	L
Н	Х	L	L	Н
Х	L	Н	L	L
Х	Н	Н	L	Н
Х	Х	Х	Н	L ⁽³⁾

Note:

3. On next negative transition of CLK or SCLK

Absolute Maximum Ratings⁽⁴⁾

Input Voltage (V _{IN}) ⁽⁶⁾	
$(V_{CC} = 0V, V_{IN} \text{ not more positive than})$	V _{CC}) –6V to +0V
$(V_{EE} = 0V, V_{IN} \text{ not more positive than})$	V_{CC}) +0V to +6V
Operating Range (V _{EE}) ⁽⁷⁾	5.7V to -3.0V
Output Current (I _{OUT}) Continuous	50mA
Surge	100mA
Lead Temperature (soldering, 20s)	260°C
Storage Temperature (T _s)	65 to +150°C
ESD Rating ⁽⁸⁾	>1.5kV
3	

Operating Ratings⁽⁵⁾

,	Supply Voltage (V _{CC}) PECL Operation	3.0V to 5.5V
	(V _{EE}) ECL Operation	3.0V to -5.5V
A	Ambient Temperature (T _A)	40°C to +85°C
	Junction Thermal Resistance	
	SOIC (θ _{JA})	58°C/W

DC Electrical Characteristics⁽⁹⁾

 $V_{EE} = V_{EE}$ (min) to V_{EE} (max); $V_{CC} = GND$, $T_A = -40^{\circ}C$ to +85°C, unless otherwise stated. Outputs are terminated through a 50 Ω resistor to V_{CC} -2.0V.

Symbol	Parameter	Condition	Min.	Тур.	Max.	Units	
V_{OH}	Output High Voltage ⁽¹⁰⁾	T _A = -40°C	V _{CC} - 1.085	V _{CC} - 1.005	V _{CC} - 0.880	V	
		$T_A = 0$ °C to +85°C	V _{CC} - 1.025	V _{CC} - 0.955	V _{CC} - 0.880	V	
.,	Output Low Voltage ⁽¹⁰⁾	$T_A = -40$ °C	V _{CC} - 1.830	V _{CC} - 1.695	V _{CC} – 1.555	V	
V_{OL}		$T_A = 0$ °C to +85°C	V _{CC} - 1.810	V _{CC} - 1.705	V _{CC} – 1.620	V	
\/	Output High Voltage ⁽¹⁰⁾	T _A = -40°C	V _{CC} - 1.095			V	
V_{OHA}		$T_A = 0$ °C to +85°C	V _{CC} - 1.035			V	
	Output Low Voltage ⁽¹⁰⁾	T _A = -40°C			V _{CC} – 1.555	V	
V_{OLA}		$T_A = 0$ °C to +85°C			V _{CC} - 1.610	V	
V_{IH}	Input High Voltage		V _{CC} - 1.165		$V_{CC} - 0.880$	V	
V _{IL}	Input Low Voltage		V _{CC} - 1.810		V _{CC} – 1.475	V	
I _{IL}	Input Low Current ⁽¹¹⁾	Input LOW Current /CLK	0.5 -300			μA	
I _{IH}	Input High Current				150	μΑ	
I _{EE}	Power Supply Current	$T_A = -40^{\circ}\text{C to } +25^{\circ}\text{C}$		32	40	A	
		T _A = +85°C		34	42	mA	
V_{BB}	Output Reference Voltage		V _{CC} - 1.380		V _{CC} - 1.260	V	

Notes:

- 4. Exceeding the absolute maximum ratings may damage the device.
- 5. The device is not guaranteed to function outside its operating ratings.
- 6. In PECL mode operation, $V_{IN}(max) = V_{CC}$.
- 7. Parametric values specified at 100EL14V series: -3.0V to -5.5V.
- 8. Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5kΩ in series with 100pF.
- 9. Specification for packaged product only
- 10. $V_{IN} = V_{IH}(max)$ or $V_{IL}(min)$.
- 11. $V_{IN} = V_{IL}(max)$.

AC Electrical Characteristics

 V_{EE} = V_{EE} (min) to V_{EE} (max); V_{CC} = GND, T_A = -40°C to +85°C, unless otherwise stated.

Symbol	Parameter	Condition		Min.	Тур.	Max.	Units
		T _A = -40°C	$T_A = -40$ °C			720	ps
	Propagation Delay	$T_A = 0$ °C	$T_A = 0$ °C			750	ps
	CLK to Q (Diff)	$T_A = +25^{\circ}C$	T _A = +25°C		680	780	ps
		T _A = +85°C		630		830	ps
		T _A = -40°C	$T_A = -40$ °C			770	ps
t _{PLH}	Propagation Delay	$T_A = 0$ °C		500		800	ps
t_{PHL}	CLK to Q (SE)	T _A = +25°C		530	680	830	ps
		T _A = +85°C		580		880	ps
		T _A = -40°C	T _A = -40°C			770	ps
	Propagation Delay	T _A = 0°C	T _A = 0°C			800	ps
	SCLK to Q	T _A = +25°C	T _A = +25°C		680	830	ps
		T _A = +85°C		580		880	ps
4	Part-to-Part Skew ⁽¹²⁾					200	ps
t _{skew}	Within-Device Skew					50	ps
t _S	Setup Time /EN			150			ps
t _H	Hold Time /EN			200			ps
V _{PP}	Minimum Input Swing, CLK			150			mV
	Common Mode Range ⁽¹³⁾	., 500 .,	T _A = -40°C	V _{CC} - 2.000		V _{CC} - 0.400	V
V_{CMR}		V _{PP} < 500mV	$T_A = 0$ °C to +85°C	V _{CC} - 2.100		V _{CC} - 0.400	
		\/ > 500m\/	T _A = -40°C	V _{CC} - 1.800		V _{CC} - 0.400	V
		V _{PP} ≥ 500mV	$T_A = 0$ °C to +85°C	V _{CC} - 1.900		V _{CC} - 0.400	
t _r /t _f	Output Rise/Fall Time Q (20% - 80%)	* *	$T_A = -40$ °C to +85°C Typical value at $T_A = +25$ °C		360	500	ps
t _{JITTER}	A 1 100		Carrier = 622MHz Integration Range: 12kHz to 20MHz		70		fs _{RMS}
	Additive Jitter		Carrier = 156.25MHz Integration Range: 12kHz to 20MHz		155		

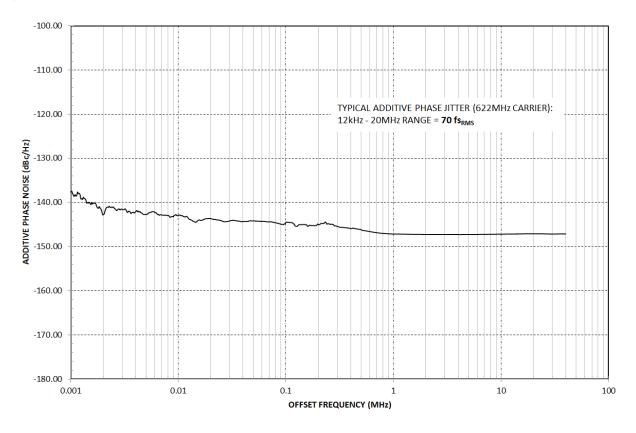
Notes:

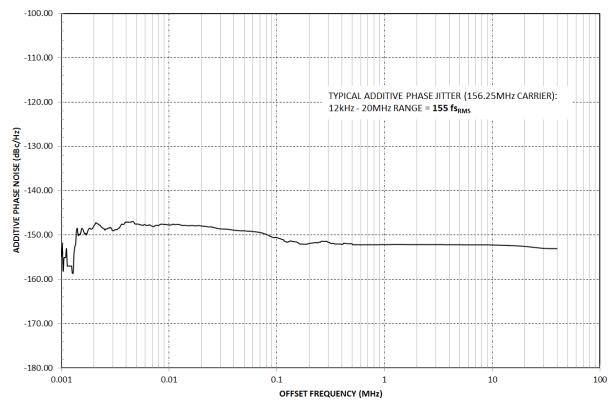
^{12.} Skews are specified for identical LOW-to-HIGH or HIGH-to-LOW transitions.

^{13.} The V_{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 1V. The lower end of the V_{CMR} range varies 1:1 with V_{EE}. The numbers in the specification table assume a nominal V_{EE} of 3.3V. For PECL operation, the V_{CMR}(min) will be fixed at 3.3V – |V_{CMR}(min)|.

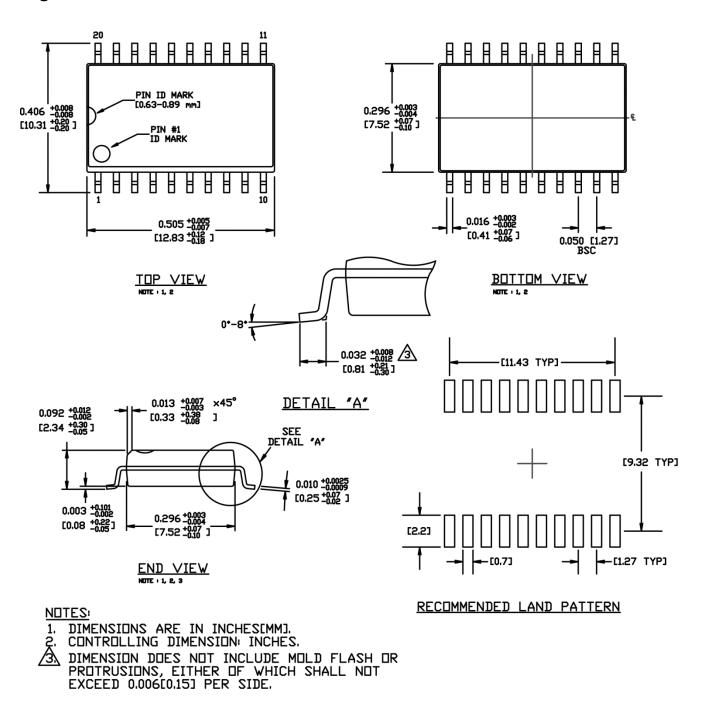
Additive Phase Noise

 V_{CC} = +5V, T_A = 25°.





Package Information⁽¹⁴⁾



20-Pin Narrow SOIC (Z20-1)

Note:

14. Package information is correct as of the publication date. For updates and most current information, go to www.micrel.com.

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