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**DIFFERENTIAL  
CLOCK D FLIP-FLOP****SY10EL51  
SY100EL51****FEATURES**

- 475ps propagation delay
- 2.8GHz toggle frequency
- Internal 75K $\Omega$  input pull-down resistors
- Available in 8-pin SOIC package

**DESCRIPTION**

The SY10/100EL51 are differential clock D flip-flops with reset. These devices are functionally similar to the E151 devices, with higher performance capabilities. With propagation delays and output transition times significantly faster than the E151, the EL51 is ideally suited for those applications which require the ultimate in AC performance.

The reset input is an asynchronous, level triggered signal. Data enters the master portion of the flip-flop when the clock is LOW and is transferred to the slave, and thus the outputs, upon a positive transition of the clock. The differential clock inputs of the EL51 allow the device to be used as a negative edge triggered flip-flop.

The differential input employs clamp circuitry to maintain stability under open input (pulled down to VEE) conditions.

**PIN NAMES**

Pin	Function
R	Reset Input
D	Data Input
CLK	Clock Input
Q	Data Output

**TRUTH TABLE<sup>(1)</sup>**

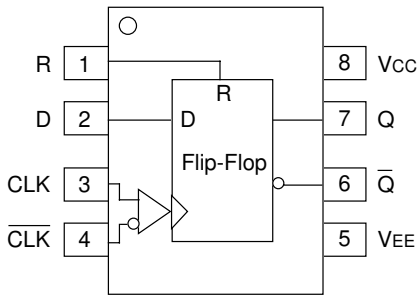
D	R	CLK	Q
L	L	Z	L
H	L	Z	H
X	H	X	L

**NOTE:**

1. Z = LOW-to-HIGH transition.

**PACKAGE/ORDERING INFORMATION**

**Ordering Information<sup>(1)</sup>**



**8-Pin SOIC (Z8-1)**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EL51ZC	Z8-1	Commercial	HEL51	Sn-Pb
SY10EL51ZCTR <sup>(2)</sup>	Z8-1	Commercial	HEL51	Sn-Pb
SY100EL51ZC	Z8-1	Commercial	XEL51	Sn-Pb
SY100EL51ZCTR <sup>(2)</sup>	Z8-1	Commercial	XEL51	Sn-Pb
SY10EL51ZI	Z8-1	Industrial	HEL51	Sn-Pb
SY10EL51ZITR <sup>(2)</sup>	Z8-1	Industrial	HEL51	Sn-Pb
SY100EL51ZI	Z8-1	Industrial	XEL51	Sn-Pb
SY100EL51ZITR <sup>(2)</sup>	Z8-1	Industrial	XEL51	Sn-Pb
SY10EL51ZG <sup>(3)</sup>	Z8-1	Industrial	HEL51 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY10EL51ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	HEL51 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL51ZG <sup>(3)</sup>	Z8-1	Industrial	XEL51 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL51ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEL51 with Pb-Free bar-line indicator	Pb-Free NiPdAu

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at T<sub>A</sub> = 25°C, DC Electricals only.
2. Tape and Reel.
3. Pb-Free package is recommended for new designs.

**DC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND

Symbol	Parameter	T <sub>A</sub> = -40°C			T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I <sub>EE</sub>	Power Supply Current													mA
	10EL	—	24	29	19	24	29	19	24	29	19	24	29	
	100EL	—	24	29	19	24	29	19	24	29	24	30	36	
V <sub>EE</sub>	Power Supply Voltage													V
	10EL	-4.75	-5.2	-5.5	-4.75	-5.2	-5.5	-4.75	-5.2	-5.5	-4.75	-5.2	-5.5	
	100EL	-4.20	-4.5	-5.5	-4.20	-4.5	-5.5	-4.20	-4.5	-5.5	-4.20	-4.5	-5.5	
I <sub>IH</sub>	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA

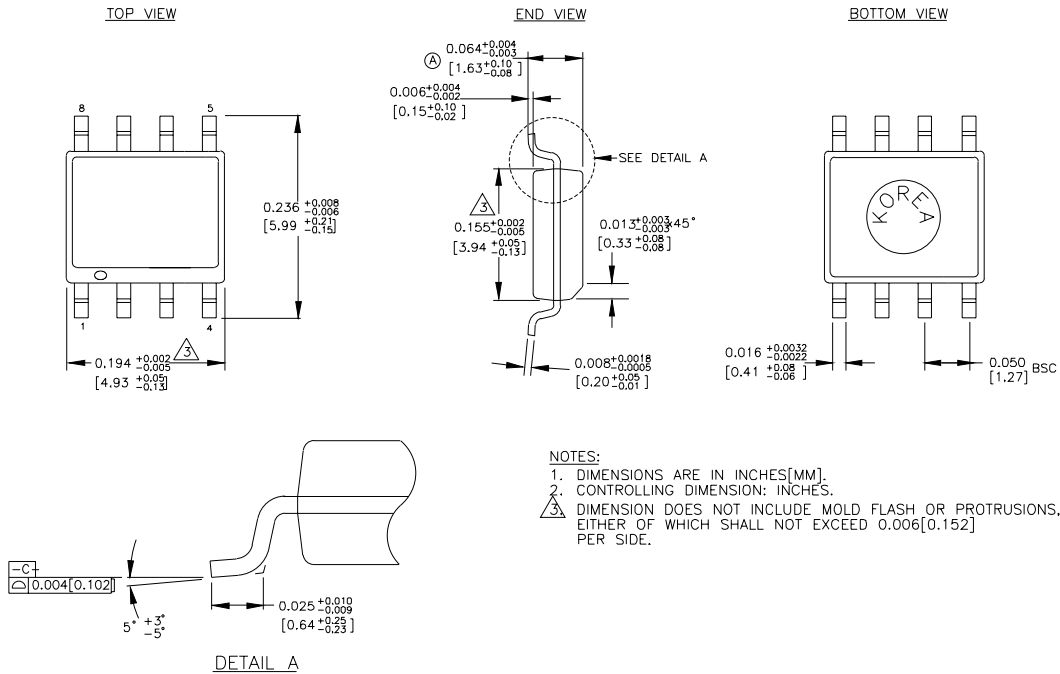
**AC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND

Symbol	Parameter	T <sub>A</sub> = -40°C			T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit	
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
f <sub>MAX</sub>	Maximum Toggle Frequency	1.8	2.8	—	2.2	2.8	—	2.2	2.8	—	2.2	2.8	—	GHz	
t <sub>PD</sub>	Propagation Delay to Output	CLK	325	465	605	375	465	555	385	475	565	440	530	620	ps
		R	305	455	605	355	455	555	355	465	565	410	510	620	
t <sub>S</sub>	Set-up Time	150	0	—	150	0	—	150	0	—	150	0	—	ps	
t <sub>H</sub>	Hold Time	250	100	—	250	100	—	250	100	—	250	100	—	ps	
t <sub>RR</sub>	Reset Recovery	400	200	—	400	200	—	400	200	—	400	200	—	ps	
t <sub>PW</sub>	Minimum Pulse Width CLK, Reset	400	—	—	400	—	—	400	—	—	400	—	—	ps	
V <sub>PP</sub>	Minimum Input Swing <sup>(1)</sup>	150	—	—	150	—	—	150	—	—	150	—	—	mV	
V <sub>CMR</sub>	Common Mode Range <sup>(2)</sup>	(2)	—	-0.4	(2)	—	-0.4	(2)	—	-0.4	(2)	—	-0.4	V	
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Times Q (20% to 80%)	100	225	350	100	225	350	100	225	350	100	225	350	ps	

**NOTES:**

1. Minimum input swing for which AC parameters are guaranteed.
2. 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<sub>PP</sub> min. and 1V. The lower end of the CMR range is dependent on V<sub>EE</sub> and is equal to V<sub>EE</sub> + 3.0V.

**8-PIN SOIC .150" WIDE (Z8-1)**



Rev. 03

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