



## DIFFERENTIAL DATA AND CLOCK D FLIP-FLOP

SY10EL52  
SY100EL52

### FEATURES

- 365ps propagation delay
- 2.0GHz toggle frequency
- Internal 75k $\Omega$  input pull-down resistors
- Available in 8-pin SOIC package

### DESCRIPTION

The SY10/100EL52 are differential data, differential clock D flip-flops. These devices are functionally equivalent to the E452 devices, with higher performance capabilities. With propagation delays and output transition times significantly faster than the E452, the EL52 is ideally suited for those applications which require the ultimate in AC performance.

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 also allow the EL52 to be used as a negative edge triggered device.

The EL52 employs input clamping circuitry so that, under open input conditions (pulled down to VEE), the outputs of the device will remain stable.

### PIN NAMES

Pin	Function
D	Data Input
CLK	Clock Input
Q	Data Output

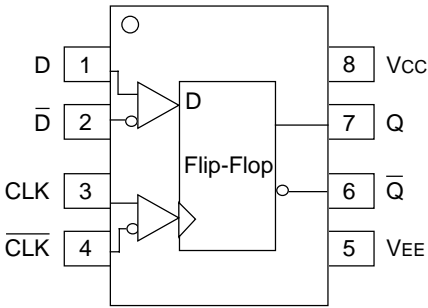
### TRUTH TABLE<sup>(1)</sup>

D	CLK	Q
L	Z	L
H	Z	H

#### NOTE:

1. Z = LOW-to-HIGH transition.

**PACKAGE/ORDERING INFORMATION**



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

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

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EL52ZC	Z8-1	Commercial	HEL52	Sn-Pb
SY10EL52ZCTR <sup>(2)</sup>	Z8-1	Commercial	HEL52	Sn-Pb
SY100EL52ZC	Z8-1	Commercial	XEL52	Sn-Pb
SY100EL52ZCTR <sup>(2)</sup>	Z8-1	Commercial	XEL52	Sn-Pb
SY10EL52ZI	Z8-1	Industrial	HEL52	Sn-Pb
SY10EL52ZITR <sup>(2)</sup>	Z8-1	Industrial	HEL52	Sn-Pb
SY100EL52ZI	Z8-1	Industrial	XEL52	Sn-Pb
SY100EL52ZITR <sup>(2)</sup>	Z8-1	Industrial	XEL52	Sn-Pb
SY10EL52ZG <sup>(3)</sup>	Z8-1	Industrial	HEL52 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY10EL52ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	HEL52 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL52ZG <sup>(3)</sup>	Z8-1	Industrial	XEL52 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL52ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEL52 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**

VEE = VEE (Min.) to VEE (Max.); VCC = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit	
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.		
IEE	Power Supply Current	10EL	—	21	25	17	21	25	17	21	25	17	21	25	mA
		100EL	—	21	25	17	21	25	17	21	25	19	24	29	
VEE	Power Supply Voltage	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	V
		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**

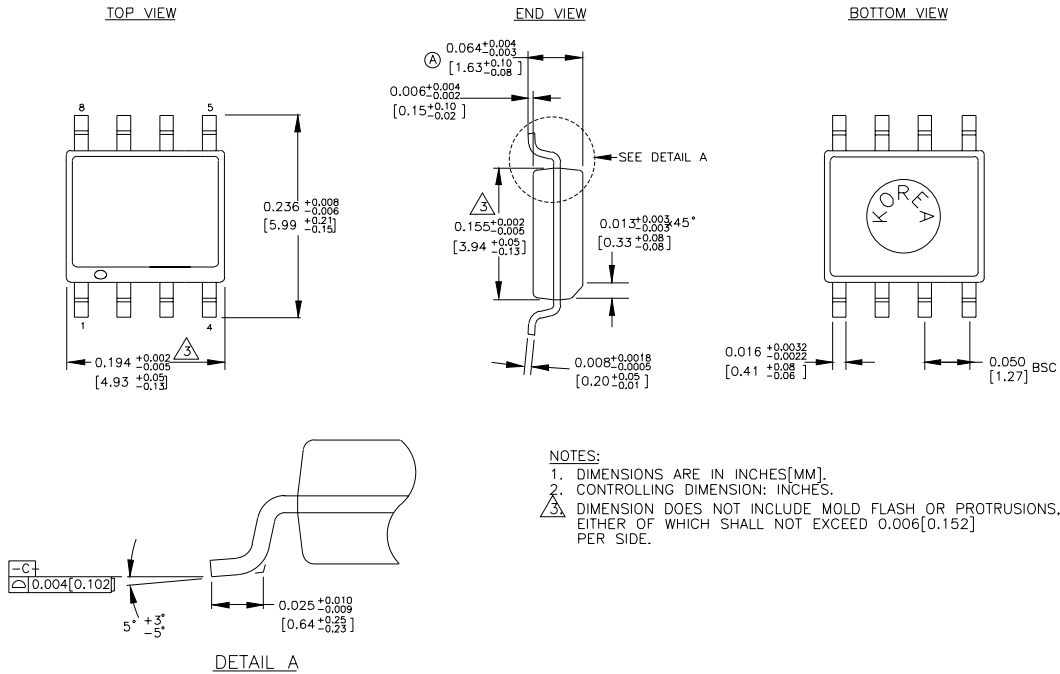
VEE = VEE (Min.) to VEE (Max.); VCC = GND

Symbol	Parameter	TA = -40°C			TA = 0°C			TA = +25°C			TA = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
f <sub>MAX</sub>	Maximum Toggle Frequency	1.8	2.5	—	2.2	2.8	—	2.2	2.8	—	2.2	2.8	—	GHz
t <sub>PD</sub>	Propagation Delay to Output CLK	235	335	515	275	365	465	275	365	465	320	410	510	ps
t <sub>S</sub>	Set-up Time	125	0	—	125	0	—	125	0	—	125	0	—	ps
t <sub>H</sub>	Hold Time	150	50	—	150	50	—	150	50	—	150	50	—	ps
t <sub>PW</sub>	Minimum Pulse Width	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>													V
	D (10EL)	-0.4	—	-1.6	-0.4	—	-1.6	-0.4	—	-1.6	-0.4	—	-1.6	
	D (100EL)	-0.4	—	-1.2	-0.4	—	-1.2	-0.4	—	-1.2	-0.4	—	-1.2	
	CLK (10EL)	-0.6	—	(3)	-0.6	—	(3)	-0.6	—	(3)	-0.6	—	(3)	
	CLK (100EL)	-0.8	—	(3)	-0.8	—	(3)	-0.8	—	(3)	-0.8	—	(3)	
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.
3. 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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