DIFFERENTIAL CLOCK D FLIP-FLOP

FEATURES

- **475ps propagation delay**
- **2.8GHz toggle frequency**
- **Internal 75KΩ input pull-down resistors**
- **Available in 8-pin SOIC package**

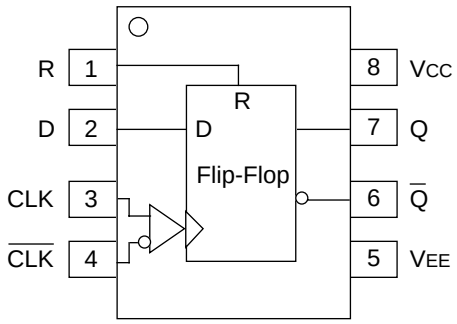
DESCRIPTION

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 V_{EE}) conditions.

PIN CONFIGURATION/BLOCK DIAGRAM



SOIC
TOP VIEW

PIN NAMES

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

TRUTH TABLE(1)

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

NOTE:

1. Z = LOW-to-HIGH transition.

Rev.: F Amendment: /0
Issue Date: February 2003

DC ELECTRICAL CHARACTERISTICS

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													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_{EE}	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_{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	µA

AC ELECTRICAL CHARACTERISTICS

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	1.8	2.8	—	2.2	2.8	—	2.2	2.8	—	2.2	2.8	—	GHz
t_{PLH} t_{PHL}	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_S	Set-up Time	150	0	—	150	0	—	150	0	—	150	0	—	ps
t_H	Hold Time	250	100	—	250	100	—	250	100	—	250	100	—	ps
t_{RR}	Reset Recovery	400	200	—	400	200	—	400	200	—	400	200	—	ps
t_{PW}	Minimum Pulse Width CLK, Reset	400	—	—	400	—	—	400	—	—	400	—	—	ps
V_{PP}	Minimum Input Swing[1]	150	—	—	150	—	—	150	—	—	150	—	—	mV
V_{CMR}	Common Mode Range[2]	(2)	—	–0.4	(2)	—	–0.4	(2)	—	–0.4	(2)	—	–0.4	V
t_r t_f	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_{PP} min. and 1V. The lower end of the CMR range is dependent on V_{EE} and is equal to V_{EE} + 3.0V.

PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range	Marking Code
SY10EL51ZC	Z8-1	Commercial	HEL51
SY10EL51ZCTR*	Z8-1	Commercial	HEL51
SY100EL51ZC	Z8-1	Commercial	XEL51
SY100EL51ZCTR*	Z8-1	Commercial	XEL51

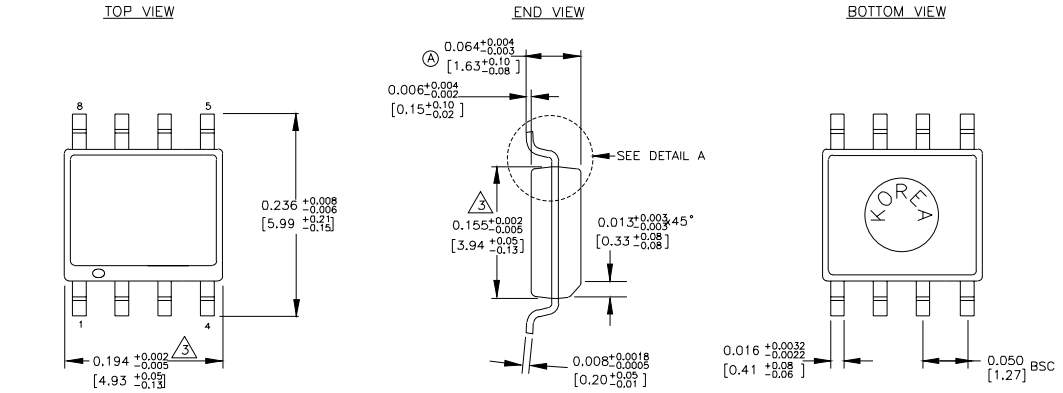
*Tape and Reel

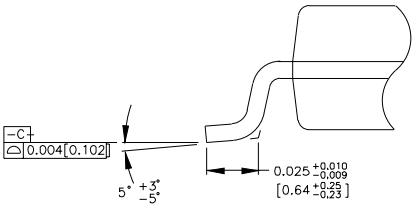
Ordering Code	Package Type	Operating Range	Marking Code
SY10EL51ZI[1]	Z8-1	Industrial	HEL51
SY10EL51ZITR*[1]	Z8-1	Industrial	HEL51
SY100EL51ZI[1]	Z8-1	Industrial	XEL51
SY100EL51ZITR*[1]	Z8-1	Industrial	XEL51

*Tape and Reel

Note 1. Recommended for new designs.

8 LEAD SOIC .150" WIDE (Z8-1)





DETAIL A

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 0.006[0.152] PER SIDE.

Rev. 03

MICREL, INC. 1849 FORTUNE DRIVE SAN JOSE, CA 95131 USA

TEL + 1 (408) 944-0800 FAX + 1 (408) 944-0970 WEB http://www.micrel.com