

**FEATURES**

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

**DESCRIPTION**

The SY10/100EL31 are D flip-flops with set and reset. The devices are functionally equivalent to the E131 devices, with higher performance capabilities. With propagation delays and output transition times significantly faster than the E131, the EL31 is ideally suited for those applications which require the ultimate in AC performance.

Both the set and reset inputs are asynchronous, level triggered signals. 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.

**PIN NAMES**

Pin	Function
D	Data Inputs
Q	Data Outputs
S	Set
R	Reset
CLK	Clock Input

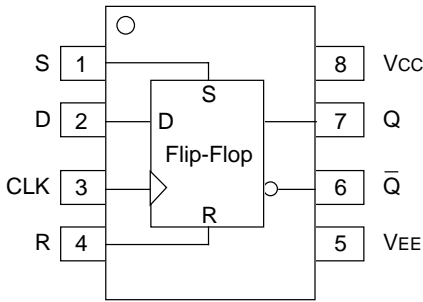
**TRUTH TABLE<sup>(1)</sup>**

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

**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
SY10EL31ZC	Z8-1	Commercial	HEL31	Sn-Pb
SY10EL31ZCTR <sup>(2)</sup>	Z8-1	Commercial	HEL31	Sn-Pb
SY100EL31ZC	Z8-1	Commercial	XEL31	Sn-Pb
SY100EL31ZCTR <sup>(2)</sup>	Z8-1	Commercial	XEL31	Sn-Pb
SY10EL31ZI	Z8-1	Industrial	HEL31	Sn-Pb
SY10EL31ZITR <sup>(2)</sup>	Z8-1	Industrial	HEL31	Sn-Pb
SY100EL31ZI	Z8-1	Industrial	XEL31	Sn-Pb
SY100EL31ZITR <sup>(2)</sup>	Z8-1	Industrial	XEL31	Sn-Pb
SY10EL31ZG <sup>(3)</sup>	Z8-1	Industrial	HEL31 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY10EL31ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	HEL31 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL31ZG <sup>(3)</sup>	Z8-1	Industrial	XEL31 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL31ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEL31 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.

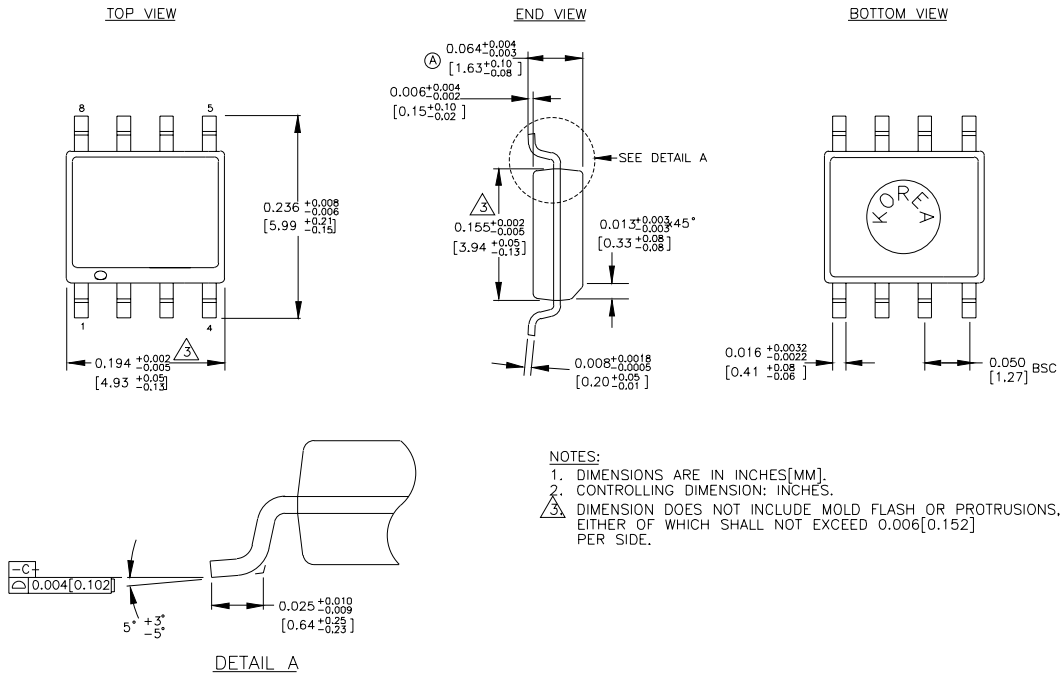
**DC ELECTRICAL CHARACTERISTICS**V<sub>EE</sub> = V<sub>EE</sub> (Min.) to V<sub>EE</sub> (Max.); V<sub>CC</sub> = GND

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	—	27	32	18	27	32	18	27	32	18	27	32	
	100EL	—	27	32	18	27	32	18	27	32	21	31	37	
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	20	2.5	—	2.2	2.8	—	2.2	2.8	—	2.2	2.8	—	GHz
t <sub>PD</sub>	Propagation Delay to Output													ps
	CLK	315	465	630	365	465	580	375	475	590	430	530	645	
	S, R	295	455	630	345	455	580	355	465	590	400	510	645	
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>	Set/Reset Recovery	400	200	—	400	200	—	400	200	—	400	200	—	ps
t <sub>PW</sub>	Minimum Pulse Width CLK, Set, Reset	400	—	—	400	—	—	400	—	—	400	—	—	ps
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

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



Rev. 03

**MICREL, INC. 2180 FORTUNE DRIVE SAN JOSE, CA 95131 USA**

TEL + 1 (408) 944-0800 FAX + 1 (408) 474-1000 WEB <http://www.micrel.com>

The information furnished by Micrel in this datasheet is believed to be accurate and reliable. However, no responsibility is assumed by Micrel for its use. Micrel reserves the right to change circuitry and specifications at any time without notification to the customer.

Micrel Products are not designed or authorized for use as components in life support appliances, devices or systems where malfunction of a product can reasonably be expected to result in personal injury. Life support devices or systems are devices or systems that (a) are intended for surgical implant into the body or (b) support or sustain life, and whose failure to perform can be reasonably expected to result in a significant injury to the user. A Purchaser's use or sale of Micrel Products for use in life support appliances, devices or systems is at Purchaser's own risk and Purchaser agrees to fully indemnify Micrel for any damages resulting from such use or sale.

© 2005 Micrel, Incorporated.