



## 2-INPUT DIFFERENTIAL AND/NAND

**SY10EL05**  
**SY100EL05**

### FEATURES

- 275ps propagation delay
- High bandwidth output transitions
- Internal 75K $\Omega$  input pull-down resistors
- Available in 8-pin SOIC package

### DESCRIPTION

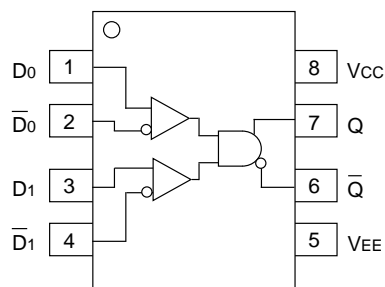
The SY10/100EL05 are 2-input differential AND/NAND gates. These devices are functionally equivalent to the E404 devices, with higher performance capabilities. With propagation delays and output transition times significantly faster than the E404, the EL05 is ideally suited for those applications which require the ultimate in AC performance.

Because a negative 2-input NAND is equivalent to a 2-input OR function with inverted inputs, the differential inputs and outputs of the device allows the EL05 to also be used as a 2-input differential OR/NOR gate.

The differential inputs employ clamp circuitry so that, under open conditions (pulled down to VEE), the input to the AND gate will be HIGH. In this way, if one set of inputs is open, the gate will remain active to the other input.

### PIN NAMES

Pin	Function
D0, D1	Data Inputs
Q	Data Outputs

**PACKAGE/ORDERING INFORMATION****8-Pin SOIC (Z8-1)****Ordering Information<sup>(1)</sup>**

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EL05ZC	Z8-1	Commercial	HEL05	Sn-Pb
SY10EL05ZCTR <sup>(2)</sup>	Z8-1	Commercial	HEL05	Sn-Pb
SY100EL05ZC	Z8-1	Commercial	XEL05	Sn-Pb
SY100EL05ZCTR <sup>(2)</sup>	Z8-1	Commercial	XEL05	Sn-Pb
SY10EL05ZI	Z8-1	Industrial	HEL05	Sn-Pb
SY10EL05ZITR <sup>(2)</sup>	Z8-1	Industrial	HEL05	Sn-Pb
SY100EL05ZI	Z8-1	Industrial	XEL05	Sn-Pb
SY100EL05ZITR <sup>(2)</sup>	Z8-1	Industrial	XEL05	Sn-Pb
SY10EL05ZG <sup>(3)</sup>	Z8-1	Industrial	HEL05 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY10EL05ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	HEL05 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL05ZG <sup>(3)</sup>	Z8-1	Industrial	XEL05 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EL05ZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEL05 with Pb-Free bar-line indicator	Pb-Free NiPdAu

**Notes:**

1. Contact factory for die availability. Dice are guaranteed at  $T_A = 25^\circ\text{C}$ , 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

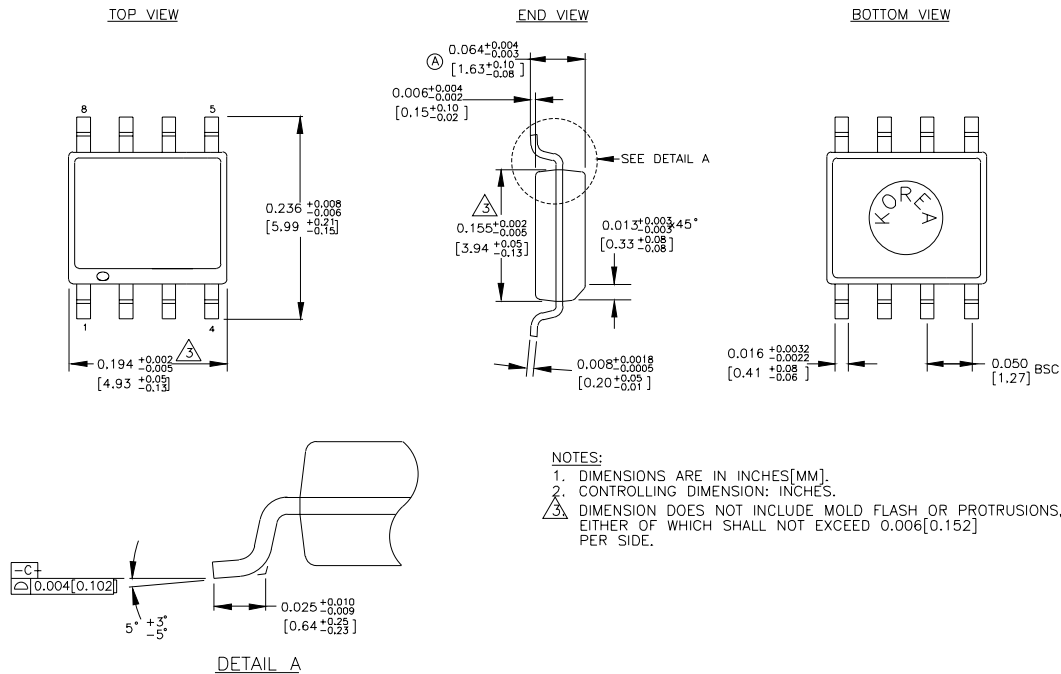
Symbol	Parameter	T <sub>A</sub> = -40°C			T <sub>A</sub> = 0°C			T <sub>A</sub> = +25°C			T <sub>A</sub> = +85°C			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I <sub>EE</sub>	Power Supply Current													mA
	10EL	—	18	22	14	18	22	14	18	22	14	18	22	
	100EL	—	18	22	14	18	22	14	18	22	16	21	25	
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.	
t <sub>PD</sub>	Propagation Delay to Output D	135	260	440	185	275	390	185	275	390	215	305	420	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. The device has a DC gain of ≈40.
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

**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.

© 2006 Micrel, Incorporated.