



# 3.3V DUAL DIFFERENTIAL LVPECL-to-LVTTL TRANSLATOR

ECL Pro™  
SY100EPT23L

## FEATURES

- 3.3V power supply
- 1.9ns typical propagation delay
- Maximum frequency > 275MHz
- Differential LVPECL inputs
- 24mA LVTTL outputs
- Flow-through pinouts
- Internal input resistors: pulldown on D, pulldown and pullup on /D
- Q output will default LOW with inputs open or at Ground
- Available in 8-pin MSOP and SOIC packages



ECL Pro™

## DESCRIPTION

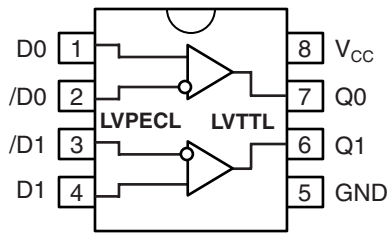
The SY100EPT23L is a dual differential LVPECL-to-LVTTL translator. Because LVPECL (Low Voltage Positive ECL) levels are used, only +3.3V and ground are required. The tiny 8-pin MSOP and dual-gate design of the EPT23L makes it ideal for applications which require the translation of a clock and data signal.

The EPT23L is available in only the ECL 100K standard. Since there are no LVPECL outputs or an external  $V_{BB}$  reference, the EPT23L does not require both ECL standard versions. The inputs can accept 10K voltage levels and any standard differential LVPECL input referenced from a  $V_{CC}$  of +3.3V

## PIN NAMES

Pin	Function
Q0, Q1	LVTTL Outputs
D0, /D0, D1, /D1	Differential LVPECL Inputs
$V_{CC}$	Positive Supply
GND	Ground

**PACKAGE/ORDERING INFORMATION**



**8-pin SOIC (Z8-1)**  
**8-pin MSOP (K8-1)**

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

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100EPT23LZC	Z8-1	Commercial	XEP23L	Sn-Pb
SY100EPT23LZCTR <sup>(2)</sup>	Z8-1	Commercial	XEP23L	Sn-Pb
SY100EPT23LKC	K8-1	Commercial	XP23	Sn-Pb
SY100EPT23LKCTR <sup>(2)</sup>	K8-1	Commercial	XP23	Sn-Pb
SY100EPT23LZI	Z8-1	Industrial	XEP23L	Sn-Pb
SY100EPT23LZITR <sup>(2)</sup>	Z8-1	Industrial	XEP23L	Sn-Pb
SY100EPT23LKI	K8-1	Industrial	XP23	Sn-Pb
SY100EPT23LKITR <sup>(2)</sup>	K8-1	Industrial	XP23	Sn-Pb
SY100EPT23LZG <sup>(3)</sup>	Z8-1	Industrial	XEP23L with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EPT23LZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEP23L with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EPT23LKG <sup>(3)</sup>	K8-1	Industrial	XP23 with Pb-Free bar-line indicator	Pb-Free NiPdAu
SY100EPT23LKGTR <sup>(2, 3)</sup>	K8-1	Industrial	XP23 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.

**ABSOLUTE MAXIMUM RATINGS<sup>(1)</sup>**

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Power Supply Voltage	-0.5 to +3.8	V
V <sub>IN</sub>	PECL Input Voltage	0V to V <sub>CC</sub> +0.5	V
V <sub>OUT</sub>	Voltage Applied to Output at HIGH State	-0.5 to V <sub>CC</sub>	V
I <sub>OUT</sub>	Current Applied to Output at LOW State	Twice the Rated I <sub>OL</sub>	mA
T <sub>Lead</sub>	Lead Temperature (soldering, 20 sec.)	+260	°C
T <sub>store</sub>	Storage Temperature	-65 to +150	°C
T <sub>A</sub>	Operating Temperature	-40 to +85	°C
θ <sub>JA</sub>	(Still-air) SOIC (Still-air) MSOP	160 200	°C/W °C/W
θ <sub>JC</sub>	SOIC MSOP	39 39	°C/W °C/W

**Note:**

1. Permanent device damage may occur if absolute maximum ratings are exceeded. This is a stress rating only and functional operation is not implied at conditions other than those detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

**TRUTH TABLE**

D	/D	Q
L	H	L
H	L	H
Open	Open	L

**LV TTL DC ELECTRICAL CHARACTERISTICS**V<sub>CC</sub> = 3.3V, GND = 0V.

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	Condition
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
V <sub>OH</sub>	Output HIGH Voltage <sup>(2)</sup>	2.3	—	2.3	—	2.3	—	2.3	—	V	I <sub>OH</sub> = -3.0mA
V <sub>OL</sub>	Output LOW Voltage	—	0.5	—	0.5	—	0.5	—	0.5	V	I <sub>OL</sub> = 24mA
I <sub>OS</sub>	Output Short Circuit Current	-80	-240	-80	-240	-80	-240	-80	-240	mA	V <sub>OUT</sub> = 0V

**LVPECL DC ELECTRICAL CHARACTERISTICS**V<sub>CC</sub> = 3.3V, GND = 0V.

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>CC</sub>	Power Supply Current	—	—	30	—	—	30	—	—	30	—	—	30	mA
I <sub>IH</sub>	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I <sub>IL</sub>	Input LOW Current	0.5	—	—	0.5	—	—	0.5	—	—	0.5	—	—	μA
V <sub>CMR</sub>	Common Mode Range	1.5	—	3.3	1.5	—	3.3	1.5	—	3.3	1.5	—	3.3	V
V <sub>PP</sub>	Minimum Peak-to-Peak Input <sup>(1)</sup>	200	—	—	200	—	—	200	—	—	200	—	—	mV
V <sub>IH</sub>	Input HIGH Voltage <sup>(2)</sup>	2070	—	2420	2130	—	2460	2135	—	2490	2130	—	2565	mV
V <sub>IL</sub>	Input LOW Voltage <sup>(2)</sup>	1350	—	1825	1350	—	1825	1350	—	1825	1350	—	1825	mV

**Notes:**

1. 200mV input guarantees full logic at output.
2. These values are for V<sub>CC</sub> = 3.3V. Level Specifications will vary 1:1 with V<sub>CC</sub>.

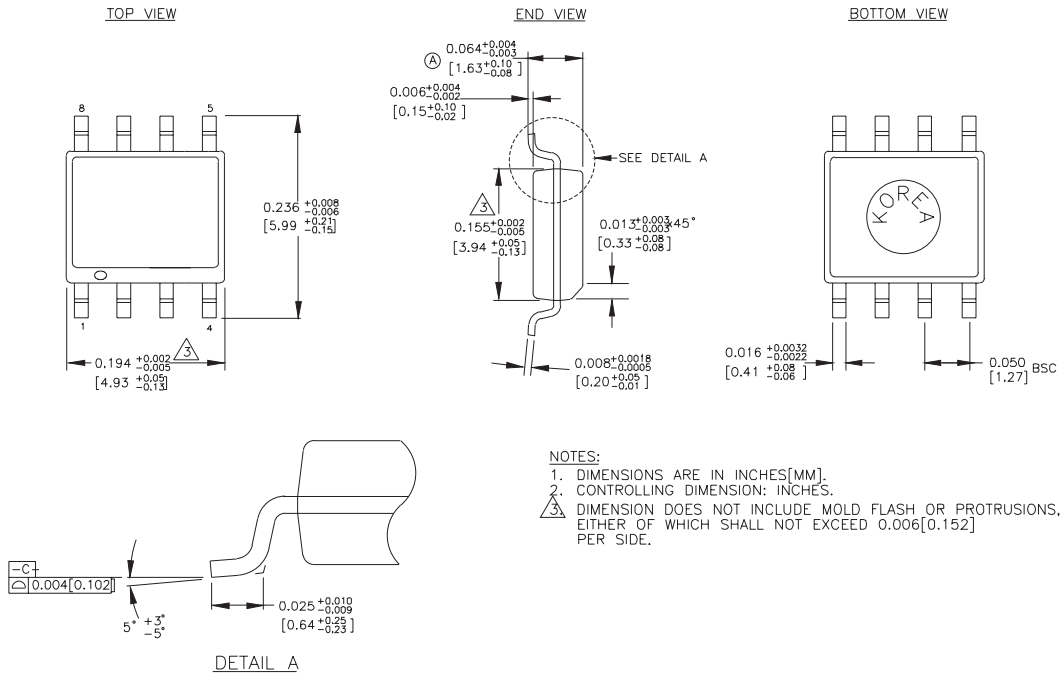
**AC ELECTRICAL CHARACTERISTICS** $V_{CC} = 3.0V$  to  $3.6V$ ,  $GND = 0V$ .

Symbol	Parameter	$T_A = -40^\circ C$		$T_A = 0^\circ C$		$T_A = +25^\circ C$		$T_A = +85^\circ C$		Unit	Condition
		Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
$t_{PD}$	Propagation Delay	1.5	2.5	1.5	2.5	1.5	2.5	1.5	2.5	ns	$C_L = 20pF$
$t_{skpp}$	Part-to-Part Skew <sup>(1,4)</sup>	—	0.5	—	0.5	—	0.5	—	0.5	ns	$C_L = 20pF$
$t_{skew++}$	Within-Device Skew <sup>(2,4)</sup>	—	0.3	—	0.3	—	0.3	—	0.3	ns	$C_L = 20pF$
$t_{skew--}$	Within-Device Skew <sup>(3,4)</sup>	—	0.3	—	0.3	—	0.3	—	0.3	ns	$C_L = 20pF$
$t_r$ $t_f$	Output Rise/Fall Time 1.0V to 2.0V	0.5	1.0	0.5	1.0	0.5	1.0	0.5	1.0	ns	$C_L = 20pF$
$f_{MAX}$	Maximum Input Frequency <sup>(5,6)</sup>	275	—	275	—	275	—	275	—	MHz	$C_L = 20pF$

## Notes:

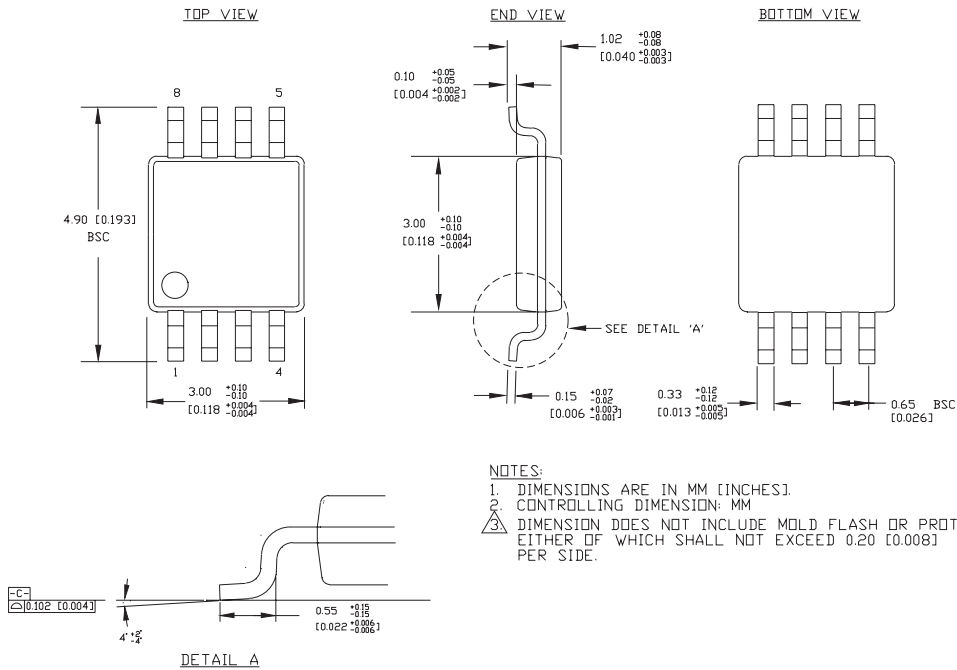
1. Device-to-Device Skew considering HIGH-to-HIGH transitions at common  $V_{CC}$  level.
2. Within-Device Skew considering HIGH-to-HIGH transitions at common  $V_{CC}$  level.
3. Within-Device Skew considering LOW-to-LOW transitions at common  $V_{CC}$  level.
4. All skew parameters are guaranteed but not tested.
5. Frequency at which guaranteed for functionality.  $V_{OH}$  and  $V_{OL}$  levels are guaranteed at DC only.
6. The  $f_{MAX}$  value is specified as the minimum guaranteed maximum frequency. Actual operational maximum frequency may be greater.

**8-PIN PLASTIC SOIC (Z8-1)**



Rev. 03

**8-PIN MSOP (K8-1)**



Rev. 01

**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.