



TRIPLE LVPECL-TO-PECL OR PECL-TO-LVPECL TRANSLATOR

SY100EL92

FEATURES

- 5V and 3.3V power supplies required
- Also, supports LVPECL-to-PECL translation
- 500ps propagation delays
- Fully differential design
- Differential line receiver capability
- Application note
- Available in 20-pin SOIC package

DESCRIPTION

The SY100EL92 is a triple LVPECL-to-PECL or PECL-to-LVPECL translator. The device receives standard PECL signals and translates them to differential LVPECL output signals (or vice versa). SY100EL92 can also be used as a differential line receiver for PECL-to-PECL or LVPECL-to-LVPECL signals. However, please note that for the latter we will need two different power supplies. Please refer to Function Table for more details.

V_{BB} outputs are provided for interfacing single ended input signals. If a single ended input is to be used, the V_{BB} output should be connected to the $\bar{D}$ input and the active signal will drive the D input. When used, the V_{BB} should be bypassed to V_{CC} via a 0.01 μ F capacitor. The V_{BB} is designed to act as a switching reference for the SY100EL92 under single ended input conditions. As a result, the pin can only source/sink 0.5mA of current.

To accomplish the PECL-to-LVPECL level translation, the SY100EL92 requires three power rails. The V_{CC} and V_{CC_VBB} supply is to be connected to the standard PECL supply, the 3.3V supply is to be connected to the V_{CCO} supply, and GND is connected to the system ground plane. Both the V_{CC} and V_{CCO} should be bypassed to ground with a 0.01 μ F capacitor.

To accomplish the LVPECL-to-PECL level translation, the SY100EL92 requires three power rails as well. The 5.0V supply is connected to the V_{CC} and V_{CCO} pins, 3.3V supply is connected to the V_{CC_VBB} pin and GND is connected to the system ground plane. V_{CC_VBB} is used to provide a proper V_{BB} output level if a single ended input is used. For differential LVPECL input V_{CC_VBB} can be either 3.3V or 5V.

Under open input conditions, the $\bar{D}$ input will be biased at a V_{CC}/2 voltage level and the D input will be pulled to GND. This condition will force the "Q" output low, ensuring stability.

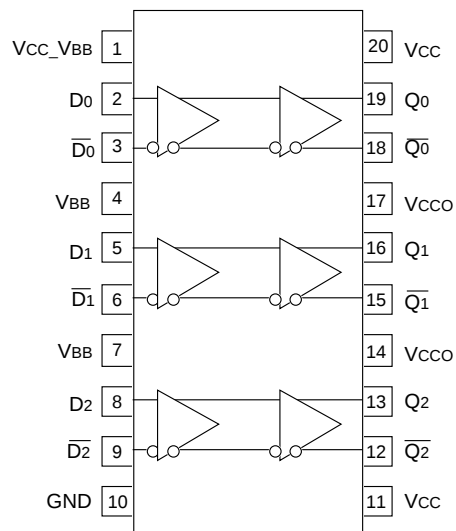
FUNCTION TABLE

Function	V _{CC}	V _{CCO}	V _{CC_VBB}
PECL-to-LVPECL	5.0V	3.3V	5.0V
LVPECL-to-PECL	5.0V	5.0V	3.3V
PECL-to-PECL	5.0V	5.0V	5.0V
LVPECL-to-LVPECL	5.0V	3.3V	3.3V

PIN NAMES

Pin	Function
D _n	PECL / LVPECL Inputs
Q _n	PECL / LVPECL Outputs
V _{BB}	PECL / LVPECL Reference Voltage Output
V _{CCO}	V _{CC} for Output
V _{CC_VBB}	V _{CC} for V _{BB} Output
GND	Common Ground Rail
V _{CC}	V _{CC} for Internal Circuitry

PACKAGE/ORDERING INFORMATION



20-Pin Wide SOIC (Z20-1)

Ordering Information⁽¹⁾

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY100EL92ZC	Z20-1	Commercial	SY100EL92ZC	Sn-Pb
SY100EL92ZCTR ⁽²⁾	Z20-1	Commercial	SY100EL92ZC	Sn-Pb
SY100EL92ZI	Z20-1	Industrial	SY100EL92ZI	Sn-Pb
SY100EL92ZITR ⁽²⁾	Z20-1	Industrial	SY100EL92ZI	Sn-Pb
SY100EL92ZG ⁽³⁾	Z20-1	Industrial	SY100EL92ZG with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100EL92ZGTR ^(2, 3)	Z20-1	Industrial	SY100EL92ZG with Pb-Free bar-line indicator	NiPdAu Pb-Free

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.

PECL INPUT DC ELECTRICAL CHARACTERISTICS

$V_{CC_VBB} = V_{CC} = +4.5V$ to $+5.5V$; $V_{CCO} = +3.0V$ to $+3.8V$

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.	
VCC	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
VIH	Input HIGH Voltage ⁽¹⁾	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	3.835	—	4.120	V
VIL	Input LOW Voltage ⁽¹⁾	3.190	—	3.515	3.190	—	3.525	3.190	—	3.525	3.190	—	3.525	V
VPP	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current $\frac{Dn}{Dn}$	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	μA
VBB	Output Reference ⁽¹⁾	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	3.620	—	3.740	V
I _{CC}	Power Supply Current	—	—	12	—	—	12	—	8.0	12	—	—	12	mA

Note:

1. These levels are for $V_{CC_VBB} = 5.0V$. Level specifications will vary 1:1 with V_{CC_VBB} .

LVPECL OUTPUT DC ELECTRICAL CHARACTERISTICS

$V_{CC_VBB} = V_{CC} = +4.5V$ to $+5.5V$; $V_{CCO} = +3.0V$ to $+3.8V$

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.	
V _{CCO}	Power Supply Voltage	3.0	—	3.8	3.0	—	3.8	3.0	3.3	3.8	3.0	—	3.8	V
V _{OH}	Output HIGH Voltage ⁽¹⁾	2.215	—	2.420	2.275	—	2.420	2.275	2.350	2.420	2.275	—	2.420	V
V _{OL}	Output LOW Voltage ⁽¹⁾	1.470	—	1.745	1.490	—	1.680	1.490	1.600	1.680	1.490	—	1.680	V
I _{CCO}	Power Supply Current	—	—	20	—	—	20	—	15	20	—	—	21	mA

Note:

1. These levels are for $V_{CCO} = 3.3V$. Level specifications will vary 1:1 with V_{CCO} .

LVPECL INPUT DC ELECTRICAL CHARACTERISTICS

$V_{CC_VBB} = +3.0V$ to $+3.8V$ ⁽¹⁾; $V_{CC} = V_{CCO} = +4.5V$ to $+5.5V$

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.	
VCC	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
VIH	Input HIGH Voltage ⁽²⁾	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	2.135	—	2.420	V
VIL	Input LOW Voltage ⁽²⁾	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	1.490	—	1.825	V
VPP	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV
I _{IH}	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	μA
I _{IL}	Input LOW Current $\frac{Dn}{Dn}$	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	μA
VBB	Output Reference ⁽²⁾	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	1.92	—	2.04	V
I _{CC}	Power Supply Current	—	—	12	—	—	12	—	8.0	12	—	—	12	mA

Notes:

- $V_{CC_VBB} = 3.3V$ is only required for single-ended LVPECL input. For differential LVPECL input, V_{CC_VBB} can be either 3.3V or 5V.
- These levels are for $V_{CC_VBB} = 3.3V$. Level specifications will vary 1:1 with V_{CC_VBB} .

PECL OUTPUT DC ELECTRICAL CHARACTERISTICS

$V_{CC_VBB} = +3.0V$ to $+3.8V$; $V_{CC} = V_{CCO} = +4.5V$ to $+5.5V$

Symbol	Parameter	$T_A = -40^{\circ}C$			$T_A = 0^{\circ}C$			$T_A = +25^{\circ}C$			$T_A = +85^{\circ}C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
V_{CCO}	Power Supply Voltage	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	4.5	—	5.5	V
V_{OH}	Output HIGH Voltage ⁽¹⁾	3.915	—	4.120	3.975	—	4.120	3.975	—	4.120	3.975	—	4.120	V
V_{OL}	Output LOW Voltage ⁽¹⁾	3.170	—	3.445	3.190	—	3.380	3.190	—	3.380	3.190	—	3.380	V
I_{CCO}	Power Supply Current	—	—	20	—	—	20	—	15	20	—	—	21	mA

Note:

1. These levels are for $V_{CCO} = 5.0V$. Level specifications will vary 1:1 with V_{CCO} .

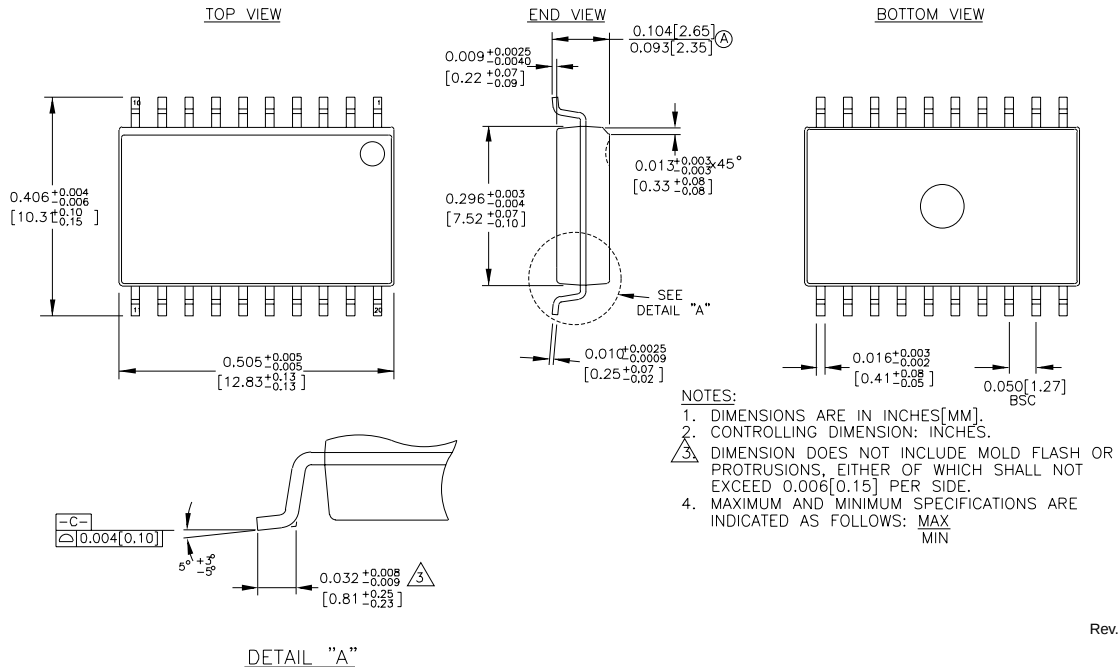
AC ELECTRICAL CHARACTERISTICS⁽¹⁾

Symbol	Parameter	$T_A = -40^{\circ}C$			$T_A = 0^{\circ}C$			$T_A = +25^{\circ}C$			$T_A = +85^{\circ}C$			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
t_{PD}	Propagation Delay D to Q Diff. S.E.	430 410	520 540	630 710	430 410	520 540	630 710	430 410	520 540	630 710	430 410	520 540	630 710	ps
t_{skew}	Within-Device Skew Output-to-Output ⁽²⁾ Part-to-Part (Diff.) ⁽²⁾ Duty Cycle (Diff.) ⁽³⁾	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	— — —	20 20 25	100 200 —	ps
V_{PP}	Minimum Input Swing ⁽⁴⁾	150	—	—	150	—	—	150	—	—	150	—	—	mV
V_{CMR}	Common Mode Range ⁽⁵⁾ $V_{PP} < 500mV$ $V_{PP} \geq 500mV$	1.3 1.5	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	1.2 1.4	— —	$V_{CC}-0.2$ $V_{CC}-0.2$	V
t_r t_f	Output Rise/Fall Times Q (20% to 80%)	320	—	580	320	—	580	320	—	580	320	—	580	ps

Notes:

1. Power supply requirements applies as indicated in the DC electrical characteristics tables.
2. Skew is measured between outputs under identical transitions.
3. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device Common Mode Range.
4. Minimum input swing for which AC parameters are guaranteed. The device has a DC gain of ~ 40 .
5. 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.

20-PIN SOIC .300" WIDE (Z20-1)



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.