

**FEATURES**

- 3.3V and 5V power supply options
- 500ps propagation delay
- Fully differential design
- Supports both standard and low voltage operation
- Available in 20-pin SOIC package

**DESCRIPTION**

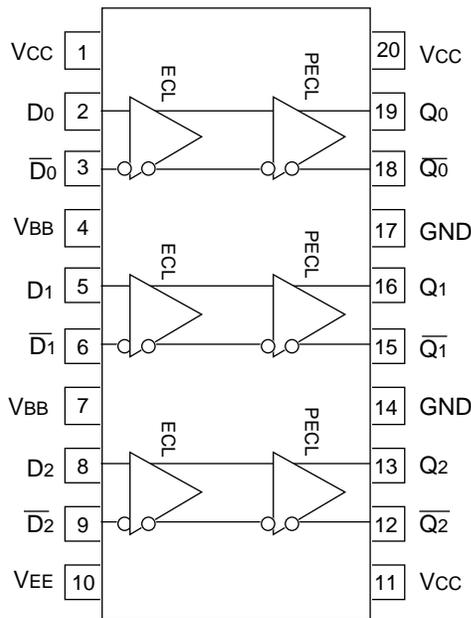
The SY100EL90V is a triple ECL/LVECL-to-PECL/LVPECL translator. The device can translate over all combinations of supply voltages: -5V ECL to 5V PECL, -5V ECL to 3.3V LVPECL, -3.3V LVECL to 5V PECL or -3.3V LVECL to 3.3V LVPECL.

A  $V_{BB}$  output is provided for interfacing with single ended ECL signals at the input. If a single ended input is to be used, the  $V_{BB}$  output should be connected to the  $\bar{D}$  input. The active signal would then drive the D input. When used, the  $V_{BB}$  output should be bypassed to ground via a 0.01 $\mu$ F capacitor. The  $V_{BB}$  output is designed to act as the switching reference for the EL90V under single ended input switching conditions. As a result this pin can only source/sink up to 0.5mA of current.

To accomplish the level translation the EL90V requires three power rails. The  $V_{CC}$  supply should be connected to the positive supply, and the  $V_{EE}$  pin should be connected to the negative power supply. The GND pins as expected are connected to the system ground plane. Both  $V_{EE}$  and  $V_{CC}$  should be bypassed to ground via 0.01 $\mu$ F capacitors.

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

**PIN CONFIGURATION/BLOCK DIAGRAM**



**SOIC  
TOP VIEW**

**PIN NAMES**

Pin	Function
$D_n$	ECL/LVECL Inputs
$Q_n$	PECL/LVPECL Outputs
$V_{BB}$	ECL/LVECL Reference Voltage Output

**FUNCTION TABLE**

Function	$V_{CC}$	$GND$	$V_{EE}$
-5V ECL to 5V PECL	5V	0V	-5V
-5V ECL to 3.3V LVPECL	3.3V	0V	-5V
-3.3V LVECL to 5V PECL	5V	0V	-3.3V
-3.3V LVECL to 3.3V LVPECL	3.3V	0V	-3.3V

**ECL/LVECL INPUT DC ELECTRICAL CHARACTERISTICS**ECL:  $V_{EE} = -4.2V$  to  $-5.5V$ ; LVECL:  $V_{EE} = -3.0V$  to  $-3.8V$ 

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.	
$V_{IH}$	Input HIGH Voltage	-1165	—	-880	-1165	—	-880	-1165	—	-880	-1165	—	-880	mV
$V_{IL}$	Input LOW Voltage	-1810	—	-1475	-1810	—	-1475	-1810	—	-1475	-1810	—	-1475	mV
$I_{EE}$	Power Supply Current	—	—	8	—	—	8	—	—	8	—	—	8	mA
$I_{IH}$	Input HIGH Current	—	—	150	—	—	150	—	—	150	—	—	150	$\mu A$
$I_{IL}$	Input LOW Current $D_n$ $\overline{D_n}$	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	0.5 -600	— —	— —	$\mu A$
$V_{BB}$	Output Reference	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	-1.38	—	-1.26	V
$V_{PP}$	Minimum Peak-to-Peak Input	150	—	—	150	—	—	150	—	—	150	—	—	mV

**LVPECL OUTPUT DC ELECTRICAL CHARACTERISTICS** $V_{CC} = +3.0V$  to  $+3.8V$ 

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.	
$V_{OH}$	Output HIGH Voltage <sup>(1)</sup>	2.215	—	2.420	2.275	—	2.420	2.275	2.350	2.420	2.275	—	2.420	V
$V_{OL}$	Output LOW Voltage <sup>(1)</sup>	1.470	—	1.745	1.490	—	1.680	1.490	1.600	1.680	1.490	—	1.680	V
$I_{CC}$	Power Supply Current	—	—	24	—	—	24	—	20	24	—	—	26	mA

**NOTE:**1. These levels are for  $V_{CC} = 3.3V$ . Level specifications will vary 1:1 with  $V_{CC}$ .**PECL OUTPUT DC ELECTRICAL CHARACTERISTICS** $V_{CC} = +4.2V$  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.	
$V_{OH}$	Output HIGH Voltage <sup>(1)</sup>	3.915	—	4.120	3.975	—	4.120	3.975	4.050	4.120	3.975	—	4.120	V
$V_{OL}$	Output LOW Voltage <sup>(1)</sup>	3.170	—	3.445	3.190	—	3.380	3.190	3.300	3.380	3.190	—	3.380	V
$I_{CC}$	Power Supply Current	—	—	24	—	—	24	—	20	24	—	—	26	mA

**NOTE:**1. These values are for  $V_{CC} = 5V$ . Level specifications will vary 1:1 with  $V_{CC}$ .

## AC ELECTRICAL CHARACTERISTICS

ECL:  $V_{EE} = -4.2V$  to  $-5.5V$ ; LVECL:  $V_{EE} = -3.0V$  to  $-3.8V$ ; PECL:  $V_{CC} = +4.2V$  to  $+5.5V$ ; LVPECL:  $V_{CC} = +3.0V$  to  $+3.8V$

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 <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay D to Q Diff. S.E.	390 340	— —	590 640	410 360	— —	610 660	420 370	— —	620 670	460 410	— —	660 710	ps
t <sub>skew</sub>	Within-Device Skew <sup>(1)</sup> Output-to-Output Part-to-Part (Diff.) Duty Cycle (Diff.)	— — —	20 — 25	100 200 —	— — —	20 — 25	100 200 —	— — —	20 — 25	100 200 —	— — —	20 — 25	100 200 —	ps
V <sub>PP</sub>	Minimum Input Swing <sup>(2)</sup>	150	—	—	150	—	—	150	—	—	150	—	—	mV
V <sub>CMR</sub>	Common Mode Range <sup>(3)</sup>	—	—	-0.4	—	—	-0.4	—	—	-0.4	—	—	-0.4	V
t <sub>r</sub> t <sub>f</sub>	Output Rise/Fall Times Q (20% to 80%)	230	—	500	230	—	500	230	—	500	230	—	500	ps

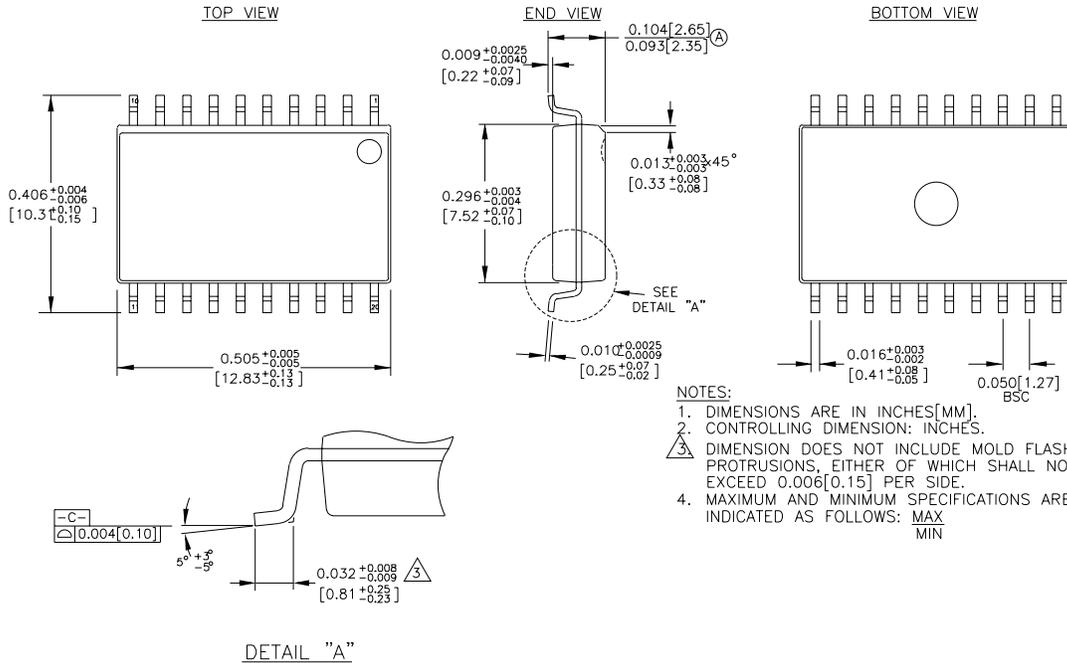
### NOTES:

- Skew is measured between outputs under identical transitions.
- Minimum input swing for which AC parameters are guaranteed. The device will function reliably with differential inputs down to 100mV.
- 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. V<sub>CMR</sub> min. depends on V<sub>EE</sub>, V<sub>PP</sub> and temperature at V<sub>PP</sub> < 500mV and -40°C, V<sub>CMR</sub> is V<sub>EE</sub>+1.3V; and for 0-85°C, V<sub>CMR</sub> is V<sub>EE</sub>+1.2V. At V<sub>PP</sub> ≥ 500mV and -40°C, V<sub>CMR</sub> is V<sub>EE</sub>+1.5V; and for 0-85°C, V<sub>CMR</sub> is V<sub>EE</sub>+1.4V.

## PRODUCT ORDERING CODE

Ordering Code	Package Type	Operating Range
SY100EL90VZC	Z20-1	Commercial
SY100EL90VZCTR	Z20-1	Commercial

**20 LEAD SOIC .300" WIDE (Z20-1)**



Rev. 03

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