



**5V/3.3V**  
**LVTTL/LVCMOS-to-DIFFERENTIAL**  
**LVPECL TRANSLATOR**

**ECL Pro™**  
**SY10EPT20V**  
**SY100EPT20V**

## FEATURES

- 3.3V and 5V power supply options
- 300ps typical propagation delay
- Differential LVPECL output
- I<sub>CC</sub> Max 20mA
- PNP LVTTL input for minimal loading
- Q output will default HIGH with inputs open
- High bandwidth to 800MHz typical
- Available in 8-pin MSOP and SOIC package



ECL Pro™

## DESCRIPTION

The SY10/100EPT20V is a TTL/CMOS to differential PECL translator. Capable of running from a 3.3 or 5V supply, the part can be used in either LVTTL/LVCMOS/LVPECL or TTL/CMOS/PECL systems.

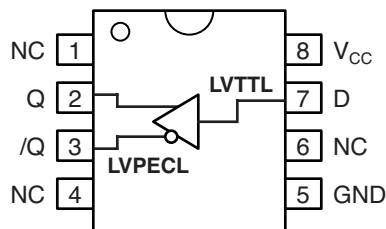
The device only requires a single positive supply of 3.3V or 5V - no negative supply is required.

The tiny 8-pin MSOP package and the low skew, dual gate design of the EPT20V makes it ideal for those applications where space, performance, and low power are at a premium.

## PIN NAMES

Pin	Function
Q, /Q	Differential LVPECL Output
D	LVTTL Input
V <sub>CC</sub>	Positive Supply
GND	Ground

**PACKAGE/ORDERING INFORMATION**



(Available in 8-pin SOIC or 8-pin MSOP)

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

Part Number	Package Type	Operating Range	Package Marking	Lead Finish
SY10EPT20VZC	Z8-1	Commercial	HEP20	Sn-Pb
SY10EPT20VZCTR <sup>(2)</sup>	Z8-1	Commercial	HEP20	Sn-Pb
SY100EPT20VZC	Z8-1	Commercial	XEP20	Sn-Pb
SY100EPT20VZCTR <sup>(2)</sup>	Z8-1	Commercial	XEP20	Sn-Pb
SY10EPT20VKC	K8-1	Commercial	HP20	Sn-Pb
SY10EPT20VKCTR <sup>(2)</sup>	K8-1	Commercial	HP20	Sn-Pb
SY100EPT20VKC	K8-1	Commercial	XP20	Sn-Pb
SY100EPT20VKCTR <sup>(2)</sup>	K8-1	Commercial	XP20	Sn-Pb
SY10EPT20VZI	Z8-1	Industrial	HEP20	Sn-Pb
SY10EPT20VZITR <sup>(2)</sup>	Z8-1	Industrial	HEP20	Sn-Pb
SY100EPT20VZI	Z8-1	Industrial	XEP20	Sn-Pb
SY100EPT20VZITR <sup>(2)</sup>	Z8-1	Industrial	XEP20	Sn-Pb
SY10EPT20VKI	K8-1	Industrial	HP20	Sn-Pb
SY10EPT20VKITR <sup>(2)</sup>	K8-1	Industrial	HP20	Sn-Pb
SY100EPT20VKI	K8-1	Industrial	XP20	Sn-Pb
SY100EPT20VKITR <sup>(2)</sup>	K8-1	Industrial	XP20	Sn-Pb
SY10EPT20VZG <sup>(3)</sup>	Z8-1	Industrial	HEP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY10EPT20VZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	HEP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100EPT20VZG <sup>(3)</sup>	Z8-1	Industrial	XEP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100EPT20VZGTR <sup>(2, 3)</sup>	Z8-1	Industrial	XEP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY10EPT20VKG <sup>(3)</sup>	K8-1	Industrial	HP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY10EPT20VKGTR <sup>(2, 3)</sup>	K8-1	Industrial	HP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100EPT20VKG <sup>(3)</sup>	K8-1	Industrial	XP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free
SY100EPT20VKGTR <sup>(2, 3)</sup>	K8-1	Industrial	XP20 with Pb-Free bar-line indicator	NiPdAu Pb-Free

**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 +7.0	V
V <sub>IN</sub>	TTL Input Voltage	-0.5 to V <sub>CC</sub>	V
I <sub>IN</sub>	TTL Input Current	-30 to +5.0	mA
I <sub>OUT</sub>	PECL Output Current		mA
	-Continuous	50	
	-Surge	100	
T <sub>LEAD</sub>	Lead Temperature (Soldering, 20sec.)	+260	°C
T <sub>store</sub>	Storage Temperature	-65 to +150	°C
T <sub>A</sub>	Operating Temperature	-40 to +85	°C

## TRUTH TABLE

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

**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.

## DC ELECTRICAL CHARACTERISTICS

V<sub>CC</sub> = +3.3V ±10% or +5.0V ±10%

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.	Typ.	Max.	Min.	Max.		
I <sub>CC</sub>	Power Supply Current	—	20	—	20	—	—	20	—	20	mA	—

## TTL DC ELECTRICAL CHARACTERISTICS

V<sub>CC</sub> = +3.3V ±10% or +5.0V ±10%

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.	Typ.	Max.	Min.	Max.		
V <sub>IH</sub>	Input HIGH Voltage	2.0	—	2.0	—	2.0	—	—	2.0	—	V	—
V <sub>IL</sub>	Input LOW Voltage	—	0.8	—	0.8	—	—	0.8	—	0.8	V	—
I <sub>IH</sub>	Input HIGH Current	—	20	—	20	—	—	20	—	20	μA	V <sub>IN</sub> = 2.7V V <sub>IN</sub> = V <sub>CC</sub>
		—	100	—	100	—	—	100	—	100		
I <sub>IL</sub>	Input LOW Current	—	-0.2	—	-0.2	—	—	-0.2	—	-0.2	mA	V <sub>IN</sub> = 0.5V
V <sub>IK</sub>	Input Clamp Voltage	—	-1.2	—	-1.2	—	—	-1.2	—	-1.2	V	I <sub>IN</sub> = -18mA

## PECL DC ELECTRICAL CHARACTERISTICS

V<sub>CC</sub> = +3.3V ±10% or +5.0V ±10%

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.	Typ.	Max.	Min.	Max.		
V <sub>OH</sub>	Output HIGH Voltage <sup>(1)</sup>										mV	
	10EPT	3920	4110	3980	4160	4020	—	4190	4090	4280		
	100EPT	3915	4120	3975	4120	3975	—	4120	3975	4120		
V <sub>OL</sub>	Output LOW Voltage <sup>(1)</sup>										mV	
	10EPT	3050	3350	3050	3370	3050	—	3370	3050	3405		
	100EPT	3170	3445	3190	3380	3190	—	3380	3190	3380		

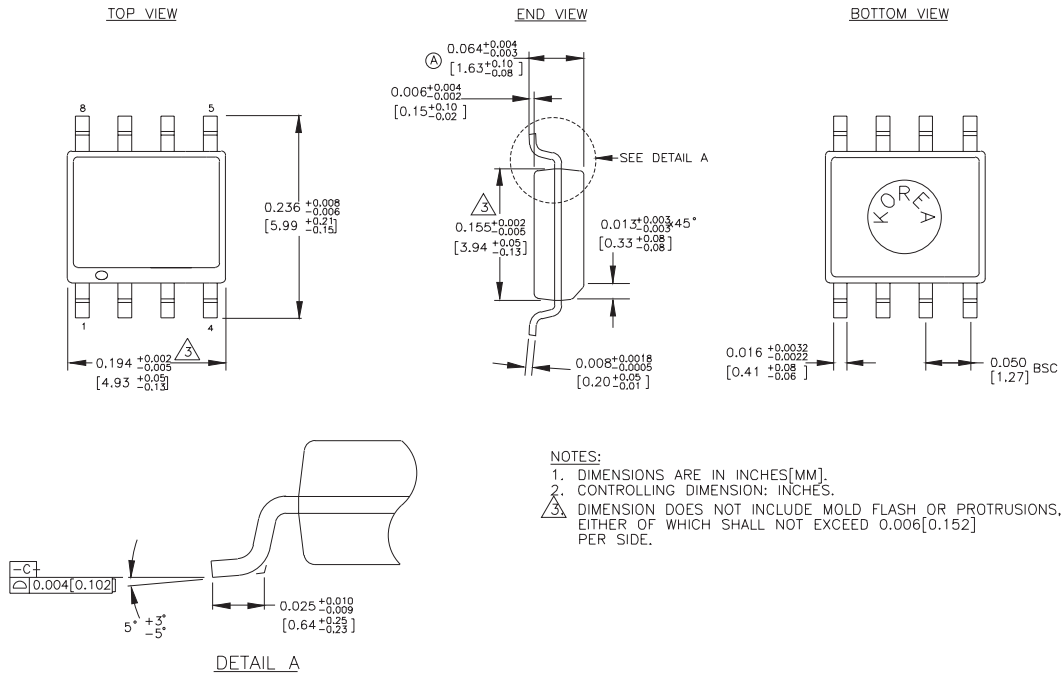
**Note 1.** These values are for V<sub>CC</sub> = 5.0V. Level Specifications will vary 1:1 with V<sub>CC</sub>.

**AC ELECTRICAL CHARACTERISTICS<sup>(1)</sup>** $V_{CC} = +3.3V \pm 10\%$  or  $+5.0V \pm 10\%$ ,  $R_L = 50\Omega$  to  $V_{CC} - 2V$ 

Symbol	Parameter	$T_A = -40^\circ\text{C}$		$T_A = 0^\circ\text{C}$		$T_A = +25^\circ\text{C}$			$T_A = +85^\circ\text{C}$		Unit
		Min.	Max.	Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
$t_{PD}$	Propagation Delay <sup>(1)</sup>	100	600	100	600	100	—	600	100	600	ps
$t_{SKEW}$	Part-to-Part Skew <sup>(2)</sup>	—	500	—	500	—	—	500	—	500	ps
$f_{MAX}$	Maximum Input Frequency	350	—	350	—	350	—	—	350	—	MHz
$f_{MAX}$	Maximum Toggle Frequency	—	800	—	800	—	—	800	—	800	MHz
$t_{JITTER}$	Random Jitter ( $R_J$ ) <sup>(3)</sup>	—	2	—	2	—	0.9	2	—	2	ps <sub>RMS</sub>
$t_r$ $t_f$	Output Rise/Fall Time (20% to 80%)	200	500	200	500	200	—	500	200	500	ps

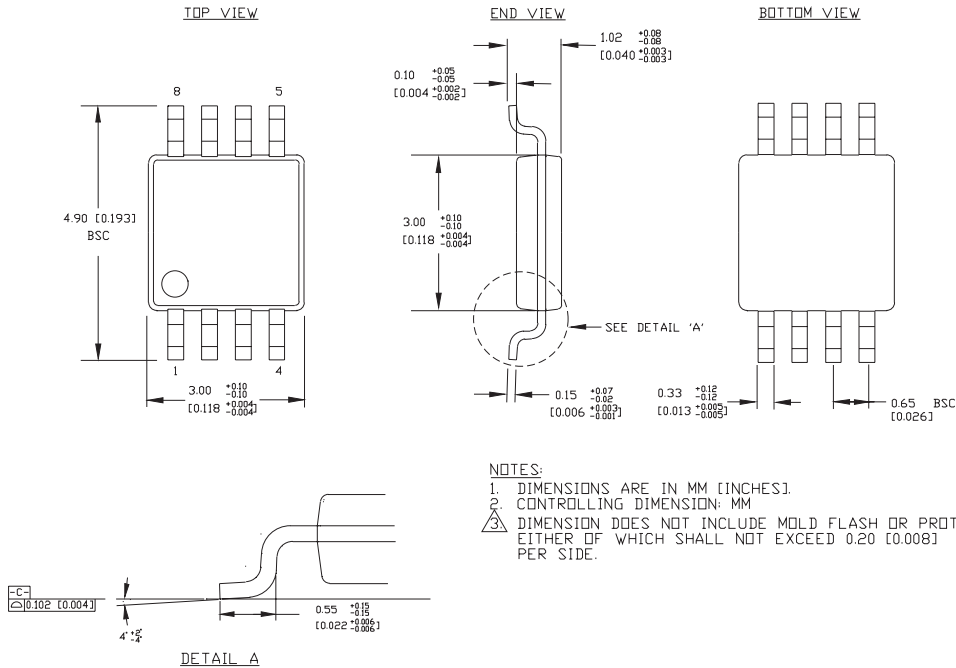
**Note 1.** Input Rise Time < 1.0ns.**Note 2.** Guaranteed by design. Not tested in production.**Note 3.**  $R_J$  is measured with a K28.7 101010 pattern.

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



Rev. 03

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



Rev. 01

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