

3.3V/5V LVTTL/LVCMOS-to-Differential LVPECL Translator

Features

- 3.3V and 5V Power Supply Options
- 300 ps Typical Propagation Delay
- Differential LVPECL Output
- 20 mA Maximum Supply Current
- PNP LVTTL Input for Minimal Loading
- Q Output will Default High with Inputs Open
- High Bandwidth up to 850 MHz Typical
- Available in 8-Lead MSOP and SOIC Packages

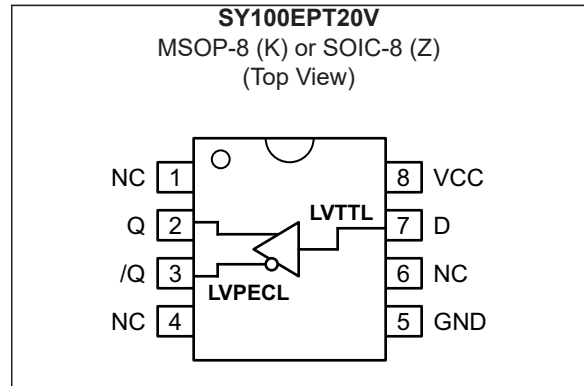
General Description

The SY100EPT20V is a TTL/CMOS to differential PECL translator. Capable of running from a 3.3V 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-lead MSOP package and the low-skew, dual-gate design of the SY100EPT20V make it ideal for those applications where space, performance, and low power are at a premium.

Package Type



SY100EPT20V

1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Power Supply Voltage (V_{CC}).....	-0.5V to +7.0V
TTL Input Voltage (V_{IN}).....	-0.5V to V_{CC}
TTL Input Current (I_{IN}).....	-30 mA to +5.0 mA
PECL Output Current, Continuous (I_{OUT}).....	50 mA
PECL Output Current, Surge (I_{OUT}).....	100 mA

† **Notice:** Permanent device damage can 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

Electrical Characteristics: $V_{CC} = 3.3V \pm 10\%$ or $V_{CC} = 5.0V \pm 10\%$; $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise stated, (Note 1).

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Power Supply Current	I_{EE}	—	—	20	mA	

Note 1: Devices are designed to meet the DC specifications shown in the table above after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.

TTL DC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: $V_{CC} = 3.3V \pm 10\%$ or $V_{CC} = 5.0V \pm 10\%$; $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise stated, (Note 1).

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Input High Voltage	V_{IH}	2.0	—	—	V	—
Input Low Voltage	V_{IL}	—	—	0.8	V	—
Input High Current	I_{IH}	—	—	20	μA	$V_{IN} = 2.7V$
		—	—	100		$V_{IN} = V_{CC}$
Input Low Current	I_{IL}	-0.2	—	—	mA	$V_{IN} = 0.5V$
Input Clamp Voltage	V_{IK}	-1.2	—	—	V	$I_{IN} = -18 mA$

Note 1: Devices are designed to meet the DC specifications shown in the table above after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.

PECL DC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: $V_{CC} = 3.3V \pm 10\%$ or $V_{CC} = 5.0V \pm 10\%$; $T_A = -40^\circ C$ to $+85^\circ C$, unless otherwise stated, (Note 1)

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Output High Voltage (Note 2)	V_{OH}	$V_{CC} - 1.085$	$V_{CC} - 1.005$	$V_{CC} - 0.88$	V	$T_A = -40^\circ C$
		$V_{CC} - 1.025$	$V_{CC} - 0.955$	$V_{CC} - 0.88$		$T_A = 0^\circ C$ to $+85^\circ C$
Output Low Voltage (Note 2)	V_{OL}	$V_{CC} - 1.830$	$V_{CC} - 1.695$	$V_{CC} - 1.555$	V	$T_A = -40^\circ C$
		$V_{CC} - 1.810$	$V_{CC} - 1.705$	$V_{CC} - 1.620$		$T_A = 0^\circ C$ to $+85^\circ C$

Note 1: Devices are designed to meet the DC specifications shown in the table above after thermal equilibration has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500 lfpm is maintained.

2: Outputs are terminated through a 50Ω resistor to $V_{CC} - 2.0V$.

AC ELECTRICAL CHARACTERISTICS

Electrical Characteristics: $V_{CC} = 3.3V \pm 10\%$ or $V_{CC} = 5.0V \pm 10\%$; $T_A = -40^\circ C$ to $+85^\circ C$; $R_L = 50\Omega$ to $V_{CC} - 2.0V$, unless otherwise stated.

Parameter	Symbol	Min.	Typ.	Max.	Units	Conditions
Maximum Input Frequency	f_{MAX}	850	—	—	MHz	—
Propagation Delay (Note 1)	t_{PD}	100	—	600	ps	—
Part-to-Part Skew (Note 2)	t_{SKEW}	—	—	500	ps	—
Random Jitter (R_J) (Note 3)	t_{JITTER}	—	—	2	ps _{RMS}	-40°C, 0°C, +85°C
		—	0.9	2		+25°C
Output Rise/Fall Time (20% to 80%)	t_r/t_f	200	—	500	ps	—

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

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Typ.	Max.	Units	Conditions
Temperature Ranges						
Lead Temperature	T_{LEAD}	—	—	+260	°C	Soldering, 20 sec.
Operating Temperature Range	T_A	-40	—	+85	°C	—
Storage Temperature Range	T_S	-65	—	+150	°C	—
Package Thermal Resistances						
Thermal Resistance, SOIC-8Ld	θ_{JA}	—	160	—	°C/W	Still-Air
		—	109	—	°C/W	500 lfpm
	θ_{JC}	—	39	—	°C/W	—
Thermal Resistance, MSOP-8Ld	θ_{JA}	—	206	—	°C/W	Still-Air
		—	155	—	°C/W	500 lfpm
	θ_{JC}	—	39	—	°C/W	—

TRUTH TABLE

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

SY100EPT20V

2.0 PIN DESCRIPTIONS

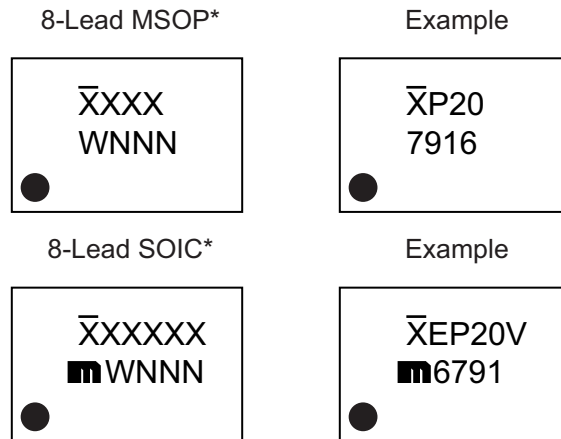
The descriptions of the pins are listed in [Table 2-1](#).

TABLE 2-1: PIN FUNCTION TABLE

Pin Name	Description
Q, /Q	Differential LVPECL Output.
D	LVTTTL Input.
VCC	Positive Supply.
GND	Ground.

3.0 PACKAGING INFORMATION

3.1 Package Marking Information



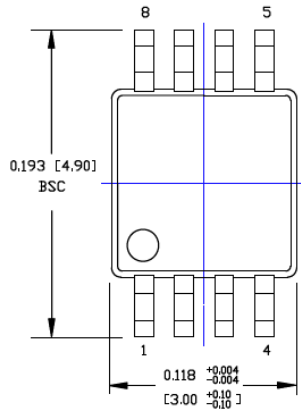
<p>Legend:</p> <p>XX...X Product code or customer-specific information</p> <p>Y Year code (last digit of calendar year)</p> <p>YY Year code (last 2 digits of calendar year)</p> <p>WW Week code (week of January 1 is week '01')</p> <p>NNN Alphanumeric traceability code</p> <p>(e3) Pb-free JEDEC® designator for Matte Tin (Sn)</p> <p>* This package is Pb-free. The Pb-free JEDEC designator (e3) can be found on the outer packaging for this package.</p> <p>•, ▲, ▼ Pin one index is identified by a dot, delta up, or delta down (triangle mark).</p>	<p>Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.</p> <p>Underbar (̄) and/or Overbar (¯) symbol may not be to scale.</p>
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SY100EPT20V

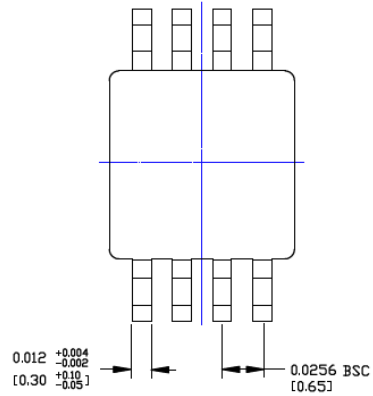
TITLE

8 LEAD MSOP PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

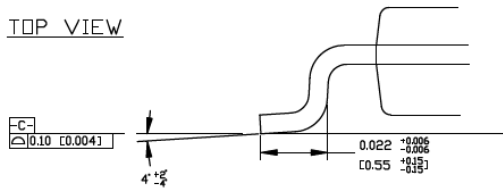
DRAWING #	MSOP-8LD-PL-1	UNIT	INCH [MM]
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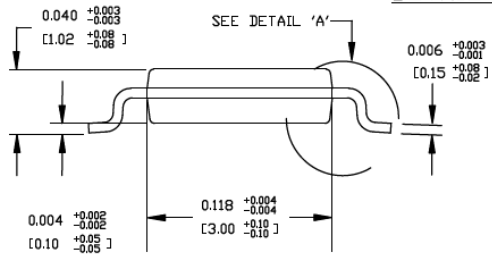
TOP VIEW



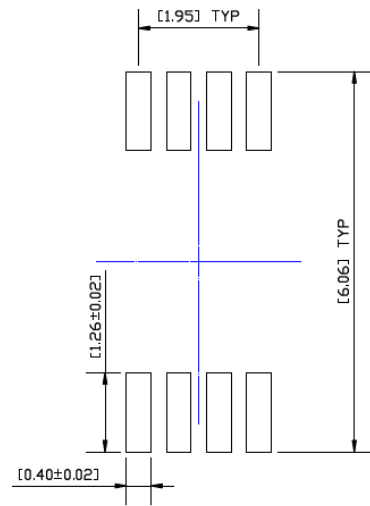
BOTTOM VIEW



DETAIL A



SIDE VIEW



RECOMMENDED LAND PATTERN

NOTES:

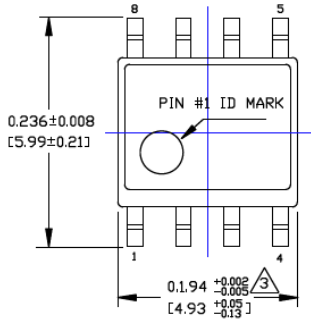
1. DIMENSIONS ARE IN INCHES [MM].
2. CONTROLLING DIMENSION: MM
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.008 [0.20] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>.

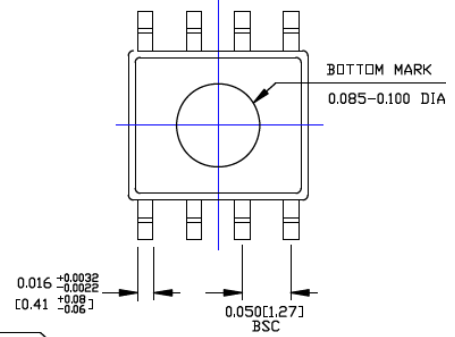
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8 LEAD SOICN PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

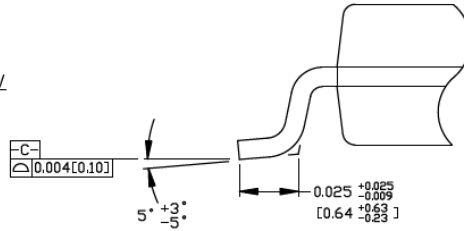
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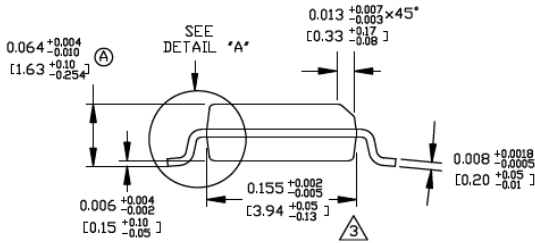
TOP VIEW



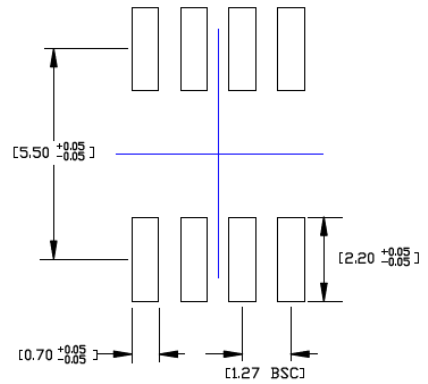
BOTTOM VIEW



DETAIL "A"



END VIEW



RECOMMENDED LAND PATTERN

NOTES:

1. DIMENSIONS ARE IN INCHES[MM].
2. CONTROLLING DIMENSION: INCHES.
3. DIMENSION DOES NOT INCLUDE MOLD FLASH OR PROTRUSIONS, EITHER OF WHICH SHALL NOT EXCEED 0.010[0.25] PER SIDE.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>.

SY100EPT20V

NOTES:

APPENDIX A: REVISION HISTORY

Revision A (January 2020)

- Converted Micrel document SY100EPT20V to Microchip data sheet DS20006245A.
- Minor text changes throughout.
- Removal of all reference to the SY10 version of the device.

SY100EPT20V

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

<u>Part No.</u>	<u>X</u>	<u>X</u>	<u>X</u>	<u>-XX</u>	Examples:
Device	Supply Voltage	Package	Temp. Range	Packing	
Device:	SY100EPT20: LVTTTL/LVCMOS-to-Differential LVPECL Translator				a) SY100EPT20VKG: SY100EPT20, 3.3V/5V, 8-Lead MSOP, -40°C to +85°C Temperature Range, 100/Tube
Supply Voltage:	V	=	3.3V/5V		b) SY100EPT20VKG-TR: SY100EPT20, 3.3V/5V, 8-Lead MSOP, -40°C to +85°C Temperature Range, 1,000/Reel
Package:	K	=	8-Lead MSOP		c) SY100EPT20VZG: SY100EPT20, 3.3V/5V, 8-Lead SOIC, -40°C to +85°C Temperature Range, 95/Tube
	Z	=	8-Lead SOIC		d) SY100EPT20VZG-TR: SY100EPT20, 3.3V/5V, 8-Lead SOIC, -40°C to +85°C Temperature Range, 1,000/Reel
Temperature Range:	G	=	-40°C to +85°C (NiPdAu Pb-Free)		Note 1: Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.
Packing:	<blank>	=	95/Tube (SOIC Package)		
	<blank>	=	100/Tube (MSOP Package)		
	TR	=	1,000/Reel		

SY100EPT20V

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