



# T73LVP21

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

### Applications

- LVPECL-to-LVTTL/LVCMOS clock source

### General Description

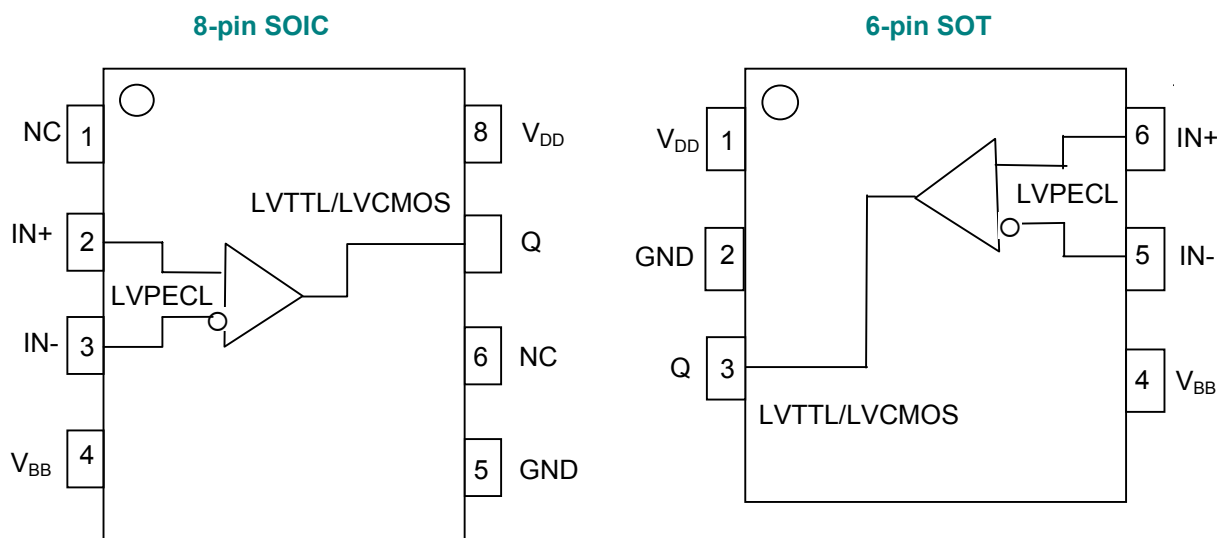
The TLSI T73LVP21 is a general purpose differential LVPECL-to-LVTTL/LVCMOS translator operating from a single +3.3V supply. Both the tiny 6-pin SOT and 8-pin SOIC packages make it ideal for applications which require the translation of a clock or a data signal, and where cost, performance and size are of critical importance. The T73LVP21 is 100K PECL compatible and is **a pin-for-pin replacement for the MC100EPT21D (8-pin SOIC only)**.

The T73LVP21 can be used in either a differential mode or single-ended input mode by using the  $V_{BB}$  pin (see Note 2 under pin descriptions).

### Features

- 1.1 ns Typical Propagation Delay
- Maximum Operating Frequency > 500 MHz
- Operating Temperature -40 °C to +85 °C
- 24 mA LVTTL Outputs
- Operating Range:  $V_{CC} = +3.0V$  to  $+3.6V$
- Open Input Default State
- ESD rating > 2000V (Human Body Model)
- Available as die, in tiny 6 pin SOT or standard 8-pin SOIC packages

Figure 1. Functional Block Diagrams & Pin Assignments (Top View)



See pages 4 & 5 for package outline drawings and ordering information.

Table 1. Pin Descriptions

Name	Description	Type	8-SOIC Pin #	6-SOT Pin #
NC	No Connection	-	1, 6	-
IN <sup>+</sup> ( <sup>1</sup> ), IN <sup>-</sup> ( <sup>1</sup> )	LVPECL differential input pair	I	2, 3	6, 5
V <sub>BB</sub> ( <sup>2</sup> )	Output reference voltage	O	4	4
GND	Connect to ground	P	5	2
Q	LVTTTL/LVCMOS output	O	7	3
V <sub>DD</sub>	Positive supply – connect to +3.3V	P	8	1

**Type Legend:** I = Input  
O = Output  
P = Power supply connection

- Notes:** 1. Q output defaults LOW when IN+ and IN- are left open.  
2. When single-ended cap coupled, the V<sub>BB</sub> output is tied to either the IN+ input or the IN- input. The input signal is then fed to the other input. When cap coupled differentially, the V<sub>BB</sub> output is connected through a resistor to each input pin. If used, the V<sub>BB</sub> pin should be bypassed to V<sub>DD</sub> via a 0.01  $\mu$ F capacitor. For a single-ended direct connection use an external voltage reference source such as a resistor divider. Do not use V<sub>BB</sub> for a single-ended direct connection or port to another device since its sink/source capability is limited.

Table 2. Absolute Maximum Ratings

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V <sub>DD</sub>	Supply voltage	Referenced to GND			+5.0	V
V <sub>IN</sub>	Input voltage	Referenced to GND	-0.5		V <sub>DD</sub>	V
I <sub>OUT</sub>	Output current in LOW state	Continuous			50	mA
I <sub>BB</sub>	V <sub>BB</sub> sink/source current				$\pm$ 0.5	mA
T <sub>STG</sub>	Storage temperature		-65		+150	$^{\circ}$ C

Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These ratings are stress specifications only and correct functional operation of the device at these or any other conditions above those listed in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect product reliability.

Table 3. Operating Conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V <sub>DD</sub>	Power Supply Voltage		+3.0	+3.3	+3.6	V
T <sub>A</sub>	Ambient Temperature		-40		+85	$^{\circ}$ C
V <sub>IH</sub>	Input HIGH Voltage	Single-ended	+2.10		+2.42	V
V <sub>IL</sub>	Input LOW Voltage	Single-ended	+1.35		+1.68	V

**Table 4. DC Characteristics**

$T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{DD} = +3.0\text{V}$  to  $+3.6\text{V}$  unless otherwise stated below.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$I_{IH}$	Input HIGH Current	Single-ended			60	$\mu\text{A}$
$I_{IL}$	Input LOW Current	Single-ended			0.5	$\mu\text{A}$
$V_{BB}$	Output reference voltage		+1.78	+2.00	+2.20	V
$V_{CMR}$	Common mode input range	Differential	2.0		$V_{DD}$	V
$V_{OH}$	Output HIGH Voltage <sup>(1)</sup>	$I_{OH} = -3.0\text{ mA}$	2.4			V
$V_{OL}$	Output LOW Voltage <sup>(1)</sup>	$I_{OL} = 12\text{ mA}$			0.5	V
$I_{DD}$	Power Supply Current	Output set to HIGH, no load		9	12	mA
$I_{OS}$	Output short circuit current		-200		-80	mA

**Notes:** 1. The T73LVP21 is designed to meet these specifications after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board.

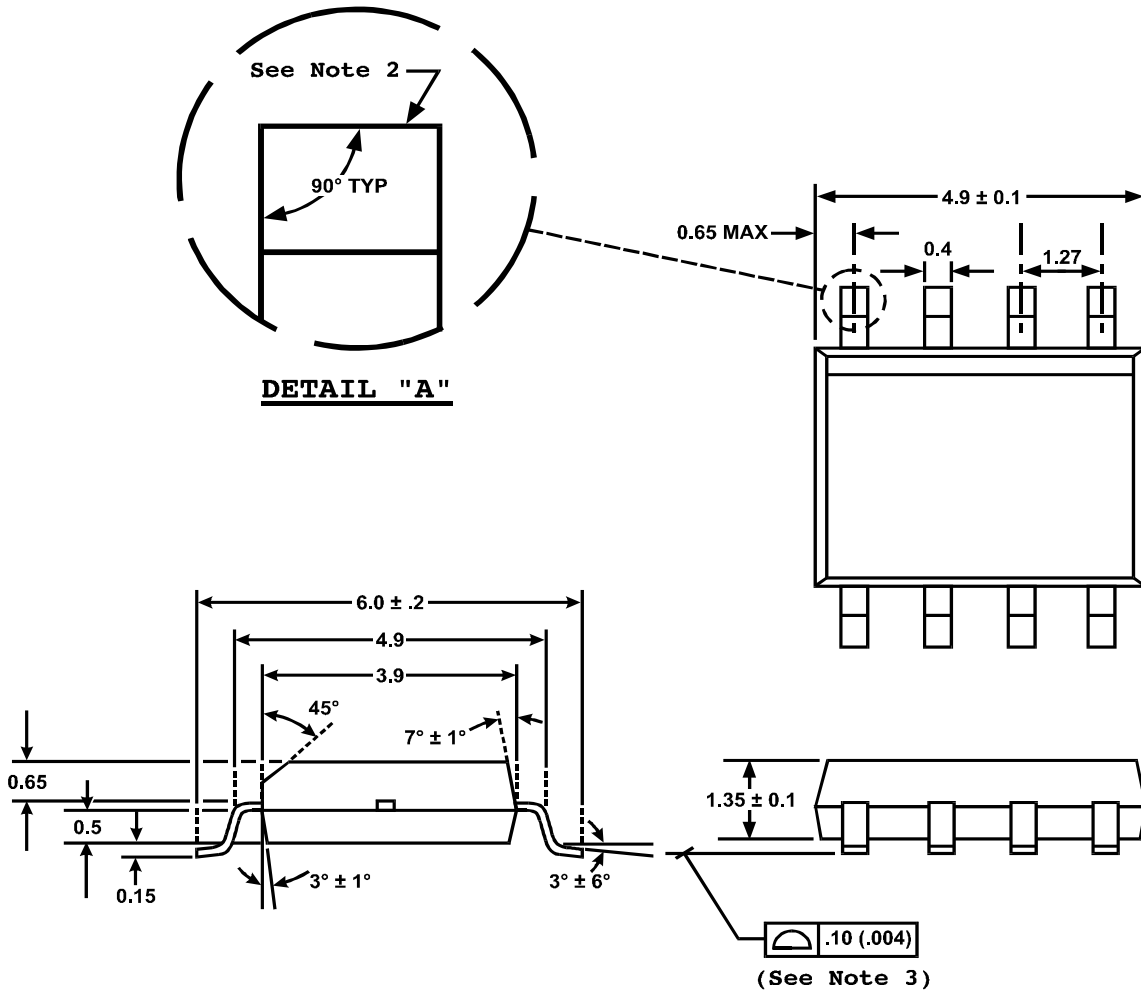
**Table 5. AC Characteristics<sup>(1)</sup>**

$T_A = -40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ ,  $V_{DD} = +3.0\text{V}$  to  $+3.6\text{V}$

Symbol	Parameter	Conditions	Min	Typ	Max	Units
$V_{PP}$	Peak-to-peak input		150			mV
$t_{PLH}$	Propagation Delay	$C_L = 20\text{ pF}$		1.0	1.2	ns
$t_{PHL}$	Propagation Delay	$C_L = 20\text{ pF}$		1.0	1.2	ns
$t_r/t_f$	Output Rise/Fall time	0.8V – 2.0V		500		ps
$f_{MAX}$	Maximum Input Frequency			500		MHz

**Notes:** 1. Measured using a 750mV peak-to-peak, 50% duty cycle clock source.  $R_L = 500\Omega$  to GND and  $C_L = 20\text{ pF}$  to GND.

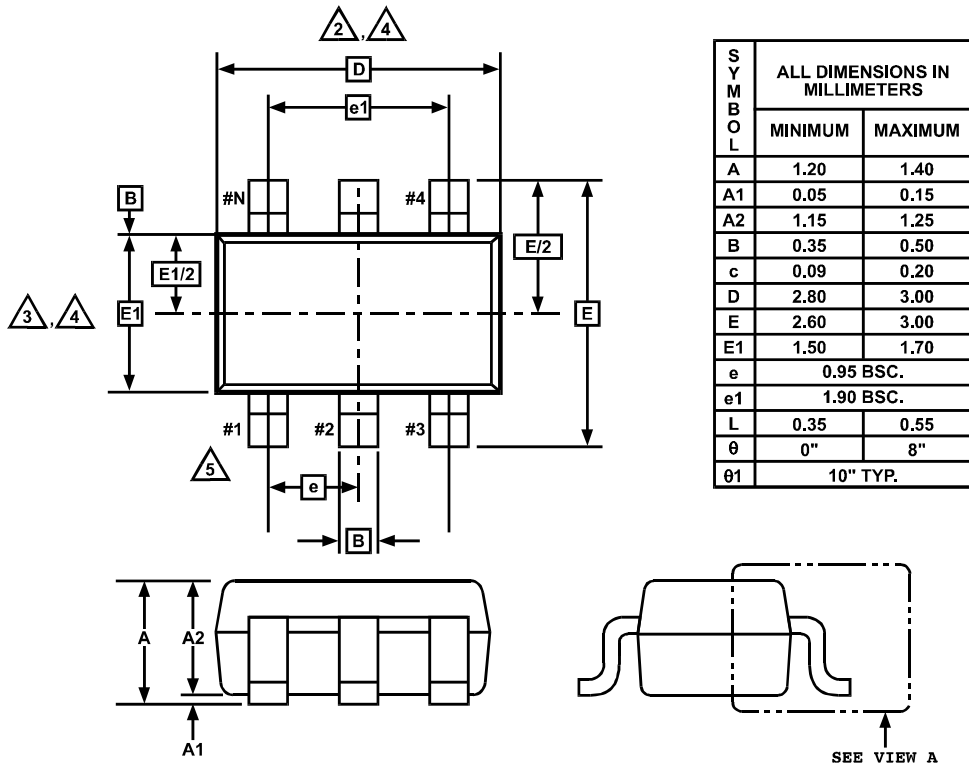
Figure 2. Package Outline (8-pin SOIC)



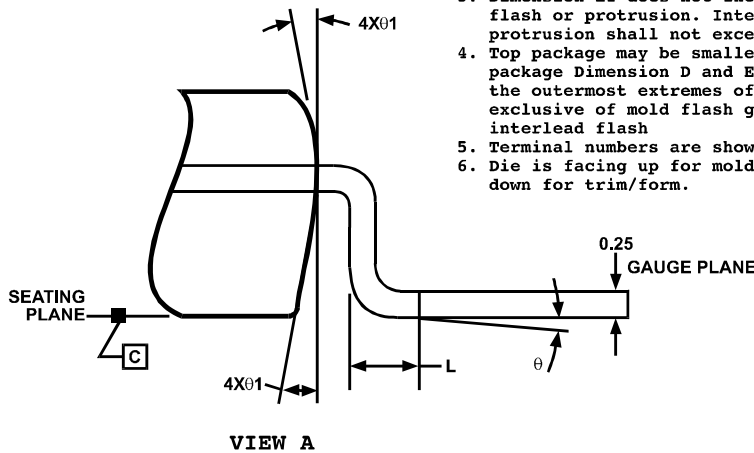
- Note:** 1) All dimensions are in mm.  
 2) All leads must be blunt cut. (See DETAIL "A")  
 3) Lead coplanarity not to exceed 0.004" maximum.

32381

Figure 3. Package Outline (6-pin SOT)



1. Dimensions are in millimeters.
2. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 0.15 mm per side.
3. Dimension E1 does not include interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.15 mm per side.
4. Top package may be smaller than the bottom package. Dimension D and E1 are determined at the outermost extremes of the plastic body exclusive of mold flash, gate burrs and interlead flash.
5. Terminal numbers are shown for reference only.
6. Die is facing up for molding. Die is facing down for trim/form.



32382

Table 6. Ordering Information

Part Number	Marking	Shipping/Packaging	No. of Pins	Package	Temperature
T73LVP21-SO8	T73LVP21	Tubes	8	SOIC	-40°C to +85°C
T73LVP21-SO8-TNR	T73LVP21	Tape & Reel	8	SOIC	-40°C to +85°C
T73LVP21-SOT	LVP21	Tubes	6	SOT	-40°C to +85°C
T73LVP21-SOT-TNR	LVP21	Tape & Reel	6	SOT	-40°C to +85°C
T73LVP21-DIE	N/A	Dice	6	N/A	-40°C to +85°C