

# MC100EPT21

## Differential LVPECL to LVTTTL Translator

The MC100EPT21 is a Differential LVPECL to LVTTTL translator. Because LVPECL (Positive ECL) levels are used only +3.3V and ground are required. The small outline 8-lead SOIC package makes the EPT21 ideal for applications which require the translation of a clock or data signal.

The VBB output allows the EPT21 to also be used in a single-ended input mode. In this mode the VBB output is tied to the D0 input for a non-inverting buffer or the D0 input for an inverting buffer. If used, the VBB pin should be bypassed to ground via a 0.01μF capacitor.

- 1.4ns Typical Propagation Delay
- 275MHz Fmax (Clock bit stream, not pseudo-random)
- Differential LVPECL inputs
- Small Outline SOIC Package
- 24mA TTL outputs
- Flow Through Pinouts
- Internal Input Resistors: Pulldown on D, Pulldown and Pullup on  $\bar{D}$
- Q Output will default LOW with inputs open or at GND
- ESD Protection: >1500V HBM, >100V MM
- VBB Output
- New Differential Input Common Mode Range
- Moisture Sensitivity Level 1, Indefinite Time Out of Drypack.  
For Additional Information, See Application Note AND8003/D
- Flammability Rating: UL-94 code V-0 @ 1/8",  
Oxygen Index 28 to 34
- Transistor Count = 81 devices

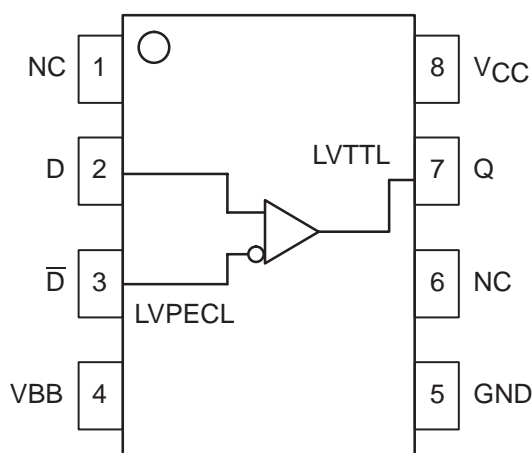


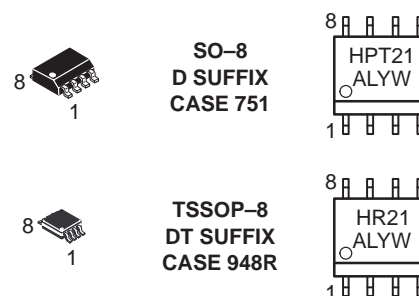
Figure 1. 8-Lead Pinout (Top View) and Logic Diagram



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### MARKING DIAGRAMS\*



A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

\*For additional information, see Application Note AND8002/D

### PIN DESCRIPTION

PIN	FUNCTION
Q	LVTTTL Output
D, $\bar{D}$	Differential LVPECL Input Pair
VCC	Positive Supply
VBB	Output Reference Voltage
GND	Ground

### ORDERING INFORMATION

Device	Package	Shipping
MC100EPT21D	SO-8	98 Units / Rail
MC100EPT21DR2	SO-8	2500 / Reel
MC100EPT21DT	TSSOP-8	?? Units / Rail
MC100EPT21DTR2	TSSOP-8	2500 / Reel

# MC100EPT21

## MAXIMUM RATINGS\*

Symbol	Parameter	Value	Unit
$V_{CC}$	Power Supply (GND = 0V)	0 to 3.8	VDC
$V_I$	Input Voltage (GND = 0V, $V_I$ not more positive than $V_{CC}$ )	0 to 3.8	VDC
$I_{out}$	Output Current Continuous Surge	50 100	mA
$I_{BB}$	$V_{BB}$ Sink/Source Current†	± 0.5	mA
$T_A$	Operating Temperature Range	−40 to +85	°C
$T_{stg}$	Storage Temperature	−65 to +150	°C
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient) Still Air 500lfpm	190 130	°C/W
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)	41 to 44 ± 5%	°C/W
$T_{sol}$	Solder Temperature (<2 to 3 Seconds: 245°C desired)	265	°C

\* Maximum Ratings are those values beyond which damage to the device may occur.

† Use for inputs of same package only.

## DC CHARACTERISTICS ( $V_{CC} = 3.3V \pm 0.3V$ ; GND = 0V; $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$ )

Symbol	Characteristic	Min	Typ	Max	Unit
$I_{CCH}$	Power Supply Current (Outputs set to HIGH)	5.0	12	20	mA
$I_{CCL}$	Power Supply Current (Outputs set to LOW)	8.0	18	26	mA
$V_{IH}$	Input HIGH Voltage ( $V_{CC} = 3.3$ ) (Note 1.)	2135		2420	mV
$V_{IL}$	Input LOW Voltage ( $V_{CC} = 3.3$ ) (Note 1.)	1490		1825	mV
$I_{IH}$	Input HIGH Current			150	μA
$I_{IL}$	Input LOW Current $\frac{D}{\bar{D}}$	−150		0.5	μA
$V_{OH}$	Output HIGH Voltage ( $I_{OH} = -3.0\text{mA}$ ) (Note 2.)	2.4			V
$V_{OL}$	Output LOW Voltage ( $I_{OL} = 24\text{mA}$ ) (Note 2.)			0.5	V
$I_{OS}$	Output Short Circuit Current	−130		−80	mA
$V_{IHCMR}$	Input HIGH Voltage Common Mode Range (Note 3.)	2.0		3.3	V
$V_{BB}$	Output Voltage Reference		2.0		V

NOTE: 100EP circuits are designed to meet the DC specifications shown in the above table after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse airflow greater than 500lfpm is maintained.

1. All values vary 1:1 with  $V_{CC}$ .
2. All loading with 500 ohms to GND,  $CL = 20\text{pF}$ .
3.  $V_{IHCMR}$  min varies 1:1 with GND, max varies 1:1 with  $V_{CC}$ .

## AC CHARACTERISTICS ( $V_{CC} = 3.3V \pm 0.3V$ ; GND = 0V)

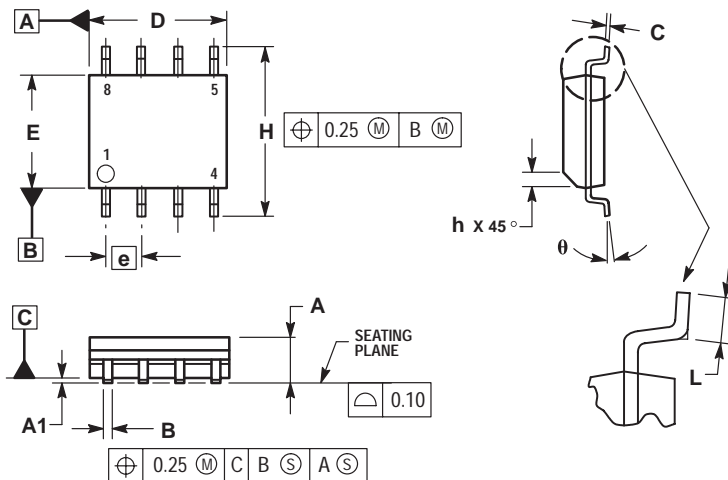
Symbol	Characteristic	−40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{max}$	Maximum Toggle Frequency (Note 4.)	275	350		275	350		275	350		MHz
$t_{PLH}$ , $t_{PHL}$	Propagation Delay to Output Differential (Note 5.)	1200	1450	1800	1200	1450	1800	1300	1450	1900	ps
$t_{SK++}$ , $t_{SK--}$ , $t_{SKPP}$	Output-to-Output Skew++ Output-to-Output Skew-- Part-to-Part Skew (Note 6.)		60 25 500			60 25 500			60 25 500		ps
$t_{JITTER}$	Cycle-to-Cycle Jitter		TBD			TBD			TBD		ps
$V_{PP}$	Input Voltage Swing (Diff.)	150	800	1200	150	800	1200	150	800	1200	mV
$t_r$ , $t_f$	Output Rise/Fall Times (0.8V – 2.0V) $Q, \bar{Q}$	330	500	900	330	500	900	330	500	900	ps

4.  $F_{max}$  guaranteed for functionality only.  $V_{OL}$  and  $V_{OH}$  levels are guaranteed at DC only.
5. Reference ( $V_{CC} = 3.3V \pm 5\%$ , GND = 0V)
6. Skews are measured between outputs under identical transitions.

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## PACKAGE DIMENSIONS

**SO-8**  
**D SUFFIX**  
 PLASTIC SOIC PACKAGE  
 CASE 751-06  
 ISSUE T



### NOTES:

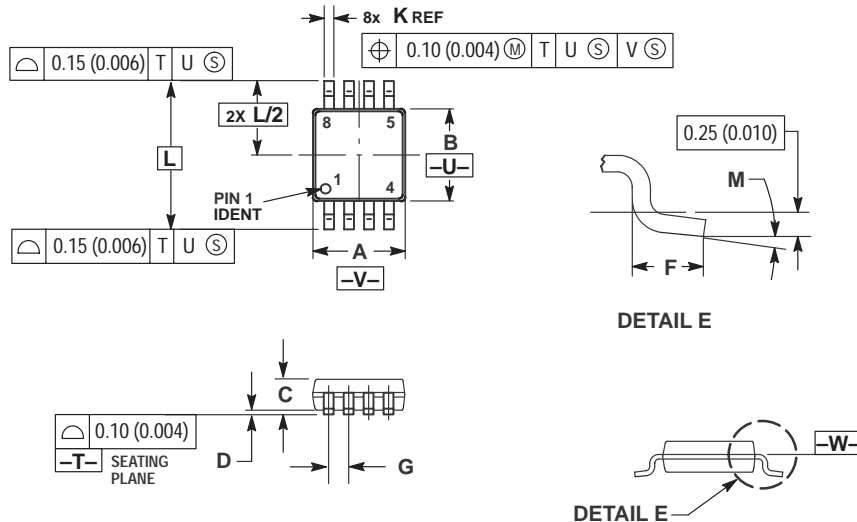
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

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## PACKAGE DIMENSIONS


**TSSOP-8**  
**DT SUFFIX**  
 PLASTIC TSSOP PACKAGE  
 CASE 948R-02  
 ISSUE A



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH. PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6°	0°	6°

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