

# MC100EPT622

## 3.3V LVTTTL/LVCMOS to LVPECL Translator

The MC100EPT622 is a 10-Bit LVTTTL/LVCMOS to LVPECL translator. Because LVPECL (Positive ECL) levels are used only +3.3 V and ground are required. The device has an OR-ed enable input which can accept either LVPECL (ENPECL) or TTL/LVCMOS inputs (ENTTL). If the inputs are left open, they will default to the enable state. The device design has been optimized for low channel-to-channel skew

- 450 ps Typical Propagation Delay
- Maximum Frequency > 1.5 GHz Typical
- PECL Mode
- Operating Range:  $V_{CC} = 3.0\text{ V to }3.8\text{ V}$  with  $V_{EE} = 0\text{ V}$
- PNP LVTTTL Inputs for Minimal Loading
- Q Output Will Default HIGH with Inputs Open
- The 100 Series Contains Temperature Compensation.

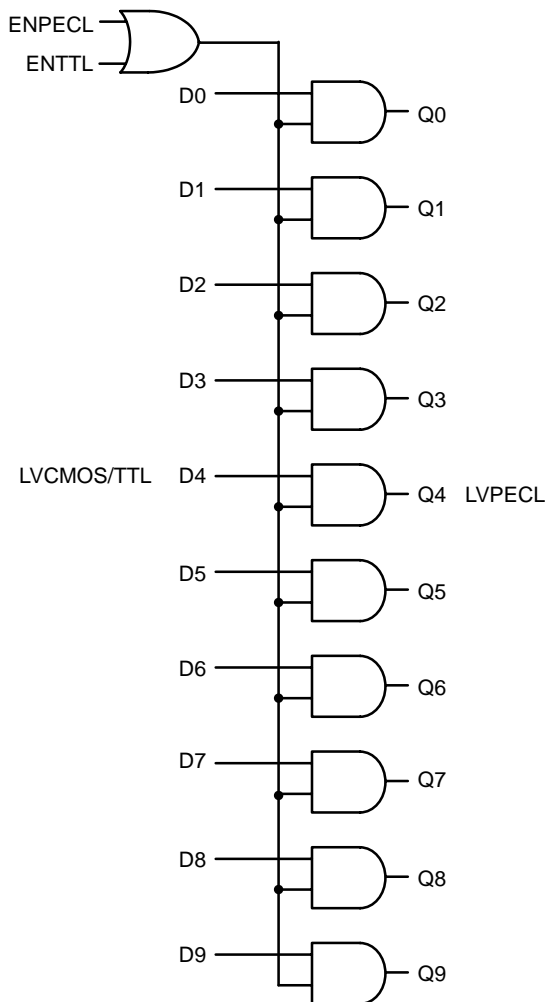


Figure 1. Logic Symbol



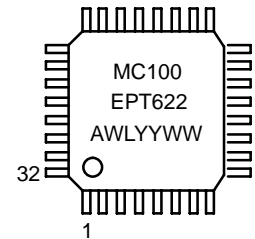
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### MARKING DIAGRAM\*



LQFP-32  
FA SUFFIX  
CASE 873A



A = Assembly Location  
WL = Wafer Lot  
YY = Year  
WW = Work Week

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

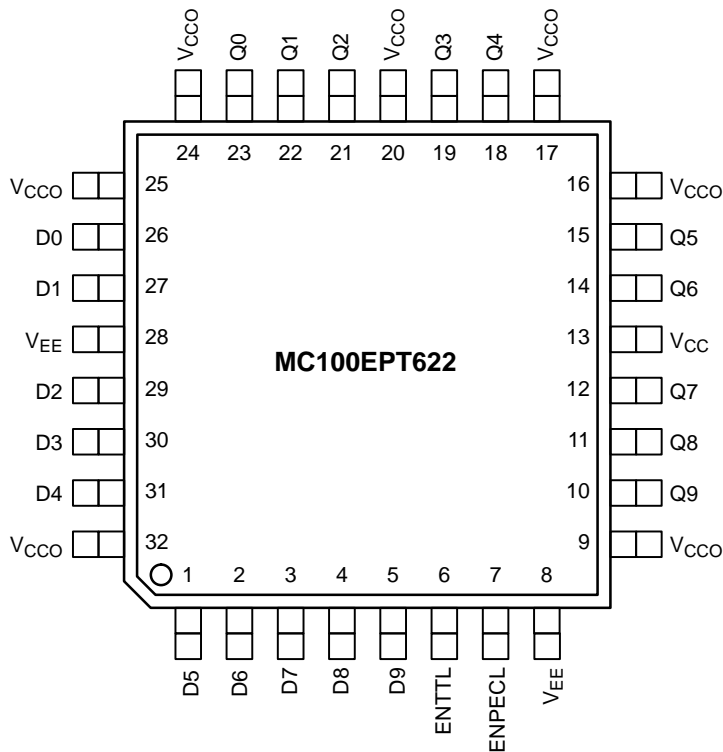
### ORDERING INFORMATION

Device	Package	Shipping
MC100EPT622FA	LQFP32	250 Unit Trays
MC100EPT622FAR2	LQFP32	2000 Tape & Reel

### TRUTH TABLE

ENPECL	ENTTL	D	Q
H	X	H	H
H	X	L	L
X	H	H	H
X	H	L	L
L	L	X	L

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## PIN DESCRIPTION

PIN	FUNCTION
D0:9	Data Input (TTL)
Q0:9	Data Output (PECL)
ENTTL	Enable Control (TTL)
ENPECL	Enable Control (PECL)
V <sub>CC</sub>	Positive Supply
V <sub>EE</sub>	Ground

Warning: All V<sub>CC</sub> and V<sub>EE</sub> pins must be externally connected to Power Supply to guarantee proper operation.

Figure 1. 32-Lead LQFP Pinout (Top View)

## ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	N/A
Internal Input Pullup Resistor	N/A
ESD Protection	Human Body Model Machine Model Charged Device Model
	> 2 kV > 150 V > 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack	Level 2
Flammability Rating	Oxygen Index: 28 to 34 UL 94 V-0 @ 0.125 in
Transistor Count	596 Devices
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

## MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V <sub>CC</sub>	Power Supply	V <sub>EE</sub> = 0 V		5	V
V <sub>I</sub>	Input Voltage	V <sub>EE</sub> = 0 V	V <sub>I</sub> ≤ V <sub>CC</sub>	5 to 0	V
I <sub>out</sub>	Output Current	Continuous Surge		50 100	mA mA
T <sub>A</sub>	Operating Temperature Range			-40 to +85	°C
T <sub>stg</sub>	Storage Temperature Range			-65 to +150	°C
θ <sub>JA</sub>	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	32 LQFP 32 LQFP	80 55	°C/W °C/W
θ <sub>JC</sub>	Thermal Resistance (Junction-to-Case)	std bd	32 LQFP	12 to 17	°C/W
T <sub>sol</sub>	Wave Solder	<2 to 3 sec @ 248°C		265	°C

1. Maximum Ratings are those values beyond which device damage may occur.

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## TTL INPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$ , $GND = 0.0\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
$I_{IH}$	Input HIGH Current	$V_{IN} = 2.7\text{ V}$			25	$\mu\text{A}$
$I_{IHH}$	Input HIGH Current MAX	$V_{IN} = V_{CC}$			100	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{IN} = 0.5\text{ V}$			-0.6	$\text{mA}$
$V_{IK}$	Input Clamp Voltage	$I_{IN} = -18\text{ mA}$	-1.2	-0.9		$\text{V}$
$V_{IH}$	Input HIGH Voltage		2.0			$\text{V}$
$V_{IL}$	Input LOW Voltage				0.8	$\text{V}$

## PECL INPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$ , $GND = 0.0\text{ V}$ , $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
$I_{IH}$	Input HIGH Current	$V_{IN} = 2420\text{ mV}$			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	$V_{IN} = 1490\text{ mV}$			200	$\mu\text{A}$
$V_{IH}$	Input HIGH Voltage		2075		2420	$\text{mV}$
$V_{IL}$	Input LOW Voltage		1490		1675	$\text{mV}$

## PECL OUTPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$ , $GND = 0.0\text{ V}$ (Note 2)

Symbol	Characteristic	$-40^\circ\text{C}$			$25^\circ\text{C}$			$85^\circ\text{C}$			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current	85	115	145	90	120	155	95	130	155	$\text{mA}$
$V_{OH}$	Input High Voltage (Note 3)	2155	2280	2405	2155	2280	2405	2155	2280	2405	$\text{mV}$
$V_{OL}$	Input Low Current (Note 3)	1355	1520	1700	1355	1520	1700	1355	1520	1700	$\text{mV}$

NOTE: Devices 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 air flow greater than 500 lpm is maintained.

- Input and output parameters vary 1:1 with  $V_{CC}$ .
- All loading with  $50\ \Omega$  to  $V_{CC} - 2.0\text{ V}$ .

## AC CHARACTERISTICS $V_{CC} = 3.0\text{ V}$ to $3.8\text{ V}$ (Note 4)

Symbol	Characteristic	$-40^\circ\text{C}$			$25^\circ\text{C}$			$85^\circ\text{C}$			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\text{max}}$	Maximum Frequency (See Figure 2)	1.0	1.5		1.0	1.5		1.0	1.5		$\text{GHz}$
$t_{\text{PLH}}$ , $t_{\text{PHL}}$	Propagation Delay to Output (Figure 3, Note 5) D to Q ENPECL to Q ENTTL to Q	100 150 300	450 500 450	800 875 800	100 150 300	500 500 500	875 875 800	100 200 300	500 550 500	800 925 800	$\text{ps}$
$t_{\text{JITTER}}$	Random Clock Jitter (RMS) (See Figure 2)		0.7	3.0		0.7	3.0		0.7	3.0	$\text{ps}$
$t_r / t_f$	Output Rise/Fall Times (20% - 80%)	100	200	450	100	200	250	100	200	300	$\text{ps}$
$T_{\text{SKEW}}$	Duty Cycle Skew (Note 6) D to Q Channel 0-7 Channel 8-9 ENPECL to Q ENTTL to Q		120 200 120 100	375 775 400 275		120 200 120 100	375 775 400 275		120 200 120 100	375 775 400 275	$\text{ps}$

- Measured using a 2.4 V source, 50% duty cycle clock source. All loading with  $50\ \Omega$  to  $V_{CC} - 2.0\text{ V}$ .
- 1.5 V to 50% point of the output.
- Duty cycle skew  $|t_{\text{PLH}} - t_{\text{PHL}}|$  on the specific path.

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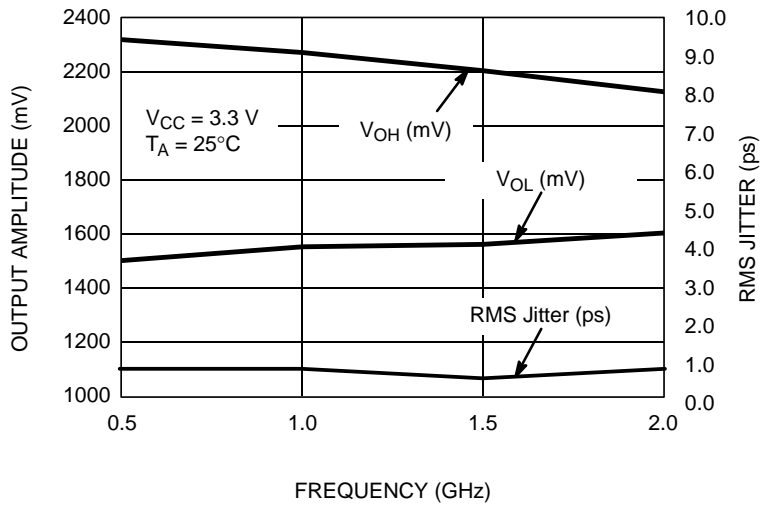


Figure 2. Average Output Amplitude/Jitter (3.3 V, 25°C)

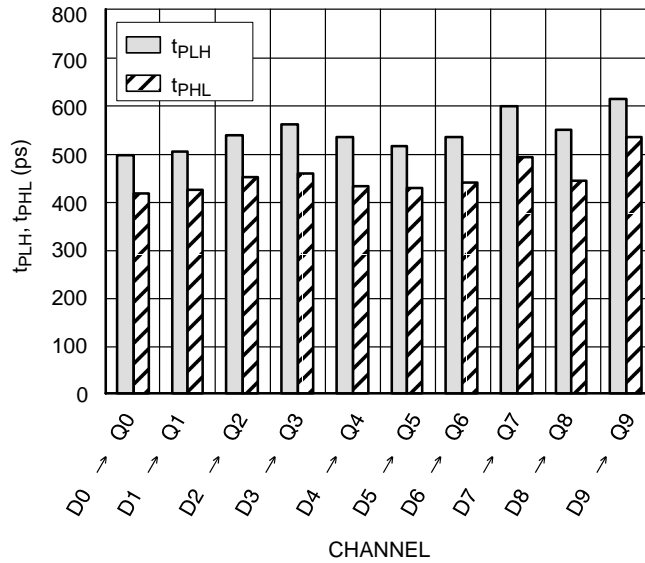


Figure 3. Average Propagation Delay (3.3 V, 25°C)

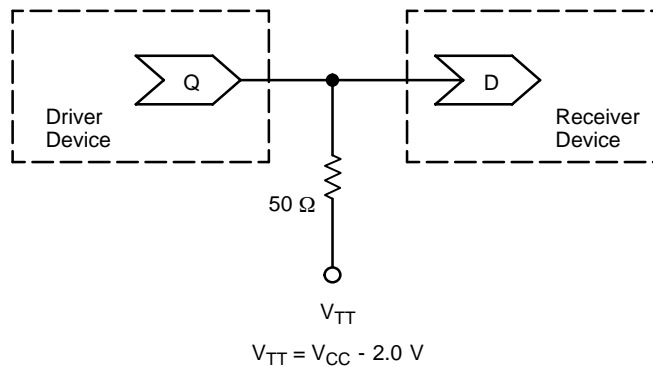


Figure 4. Typical Termination for Output Driver and Device Evaluation (See Application Note AND8020 - Termination of ECL Logic Devices.)

## Resource Reference of Application Notes

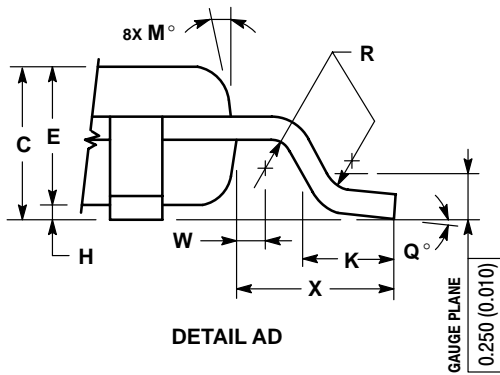
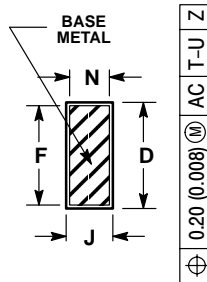
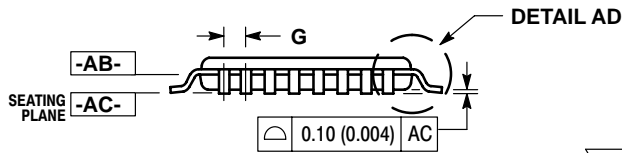
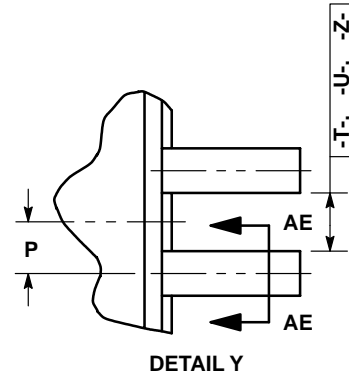
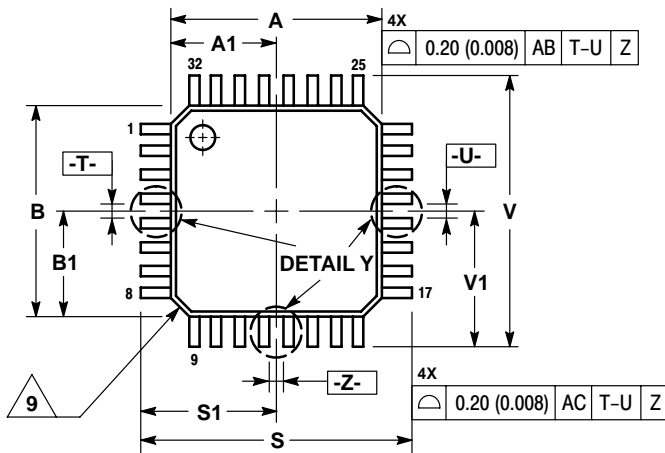
- AN1404** - ECLinPS Circuit Performance at Non-Standard  $V_{IH}$  Levels
- AN1405** - ECL Clock Distribution Techniques
- AN1406** - Designing with PECL (ECL at +5.0 V)
- AN1504** - Metastability and the ECLinPS Family
- AN1568** - Interfacing Between LVDS and ECL
- AN1650** - Using Wire-OR Ties in ECLinPS Designs
- AN1672** - The ECL Translator Guide
- AND8001** - Odd Number Counters Design
- AND8002** - Marking and Date Codes
- AND8009** - ECLinPS Plus™ Spice I/O Model Kit
- AND8020** - Termination of ECL Logic Devices

For an updated list of Application Notes, please see our website at <http://onsemi.com>.

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## PACKAGE DIMENSIONS

LQFP  
FA SUFFIX  
32-LEAD PLASTIC PACKAGE  
CASE 873A-02  
ISSUE A



SECTION AE-AE

- NOTES:
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  - CONTROLLING DIMENSION: MILLIMETER.
  - DATUM PLANE -AB- IS LOCATED AT BOTTOM OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE BOTTOM OF THE PARTING LINE.
  - DATUMS -T-, -U-, AND -Z- TO BE DETERMINED AT DATUM PLANE -AB-.
  - DIMENSIONS S AND V TO BE DETERMINED AT SEATING PLANE -AC-.
  - DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS 0.250 (0.010) PER SIDE. DIMENSIONS A AND B DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -AB-.
  - DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. DAMBAR PROTRUSION SHALL NOT CAUSE THE D DIMENSION TO EXCEED 0.520 (0.020).
  - MINIMUM SOLDER PLATE THICKNESS SHALL BE 0.0076 (0.0003).
  - EXACT SHAPE OF EACH CORNER MAY VARY FROM DEPICTION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	7.000 BSC		0.276 BSC	
A1	3.500 BSC		0.138 BSC	
B	7.000 BSC		0.276 BSC	
B1	3.500 BSC		0.138 BSC	
C	1.400	1.600	0.055	0.063
D	0.300	0.450	0.012	0.018
E	1.350	1.450	0.053	0.057
F	0.300	0.400	0.012	0.016
G	0.800 BSC		0.031 BSC	
H	0.050	0.150	0.002	0.006
J	0.090	0.200	0.004	0.008
K	0.500	0.700	0.020	0.028
M	12° REF		12° REF	
N	0.090	0.160	0.004	0.006
P	0.400 BSC		0.016 BSC	
Q	1°	5°	1°	5°
R	0.150	0.250	0.006	0.010
S	9.000 BSC		0.354 BSC	
S1	4.500 BSC		0.177 BSC	
V	9.000 BSC		0.354 BSC	
V1	4.500 BSC		0.177 BSC	
W	0.200 REF		0.008 REF	
X	1.000 REF		0.039 REF	

**Notes**

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