

# MC100EPT25

## -3.3V/-5V Differential ECL to +3.3V LVTTTL Translator

The MC100EPT25 is a Differential ECL to LVTTTL translator. This device requires +3.3 V, -3.3 V to -5.2 V, and ground. The small outline 8-lead package and the single gate of the EPT25 make it ideal for applications which require the translation of a clock or data signal.

The  $V_{BB}$  output allows the EPT25 to also be used in a single-ended input mode. In this mode the  $V_{BB}$  output is tied to the D input for a inverting buffer or the  $\bar{D}$  input for a non-inverting buffer. If used, the  $V_{BB}$  pin should be bypassed to ground with at least a 0.01  $\mu\text{F}$  capacitor.

- 1.1 ns Typical Propagation Delay
- Maximum Frequency > 275 MHz Typical
- Operating Range:  $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$ ;  
 $V_{EE} = -5.5 \text{ V to } -3.0 \text{ V}$ ;  $GND = 0 \text{ V}$
- 24 mA TTL Outputs
- Q Output Will Default LOW with Inputs Open or at  $V_{EE}$
- $V_{BB}$  Output
- Open Input Default State
- Safety Clamp on Inputs



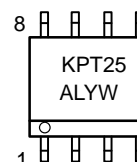
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### MARKING DIAGRAMS\*



**SO-8  
D SUFFIX  
CASE 751**



**TSSOP-8  
DT SUFFIX  
CASE 948R**



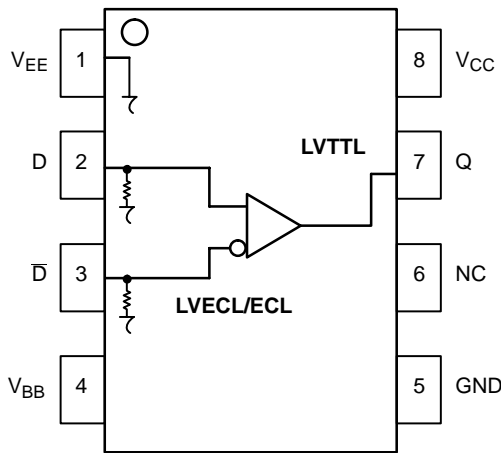
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

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

### ORDERING INFORMATION

Device	Package	Shipping
MC100EPT25D	SO-8	98 Units / Rail
MC100EPT25DR2	SO-8	2500 Tape & Reel
MC100EPT25DT	TSSOP-8	100 Units / Rail
MC100EPT25DTR2	TSSOP-8	2500 Tape & Reel

# MC100EPT25



## PIN DESCRIPTION

PIN	FUNCTION
Q	LVTTTL Output
D*, $\bar{D}^*$	Differential ECL Input Pair
V <sub>CC</sub>	Positive Supply
V <sub>BB</sub>	Output Reference Voltage
GND	Ground
V <sub>EE</sub>	Negative Supply
NC	No Connect

\* Pins will default LOW when left open.

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

## ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 k $\Omega$
Internal Input Pullup Resistor	N/A
ESD Protection	Human Body Model Machine Model Charged Device Model
	> 4 kV > 200 V > 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Level 1
Flammability Rating	Oxygen Index: 28 to 34
	UL-94 V-0 @ 0.125 in
Transistor Count	111 Devices
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

1. For additional information, see Application Note AND8003/D.

## MAXIMUM RATINGS (Note 2)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
V <sub>CC</sub>	Positive Power Supply	GND = 0 V	V <sub>EE</sub> = -5.0 V	3.8	V
V <sub>EE</sub>	Negative Power Supply	GND = 0 V	V <sub>CC</sub> = +3.3 V	-6	V
V <sub>IN</sub>	Input Voltage	GND = 0 V		0 to V <sub>EE</sub>	V
I <sub>BB</sub>	V <sub>BB</sub> Sink/Source			$\pm 0.5$	mA
T <sub>A</sub>	Operating Temperature Range			-40 to +85	$^{\circ}$ C
T <sub>stg</sub>	Storage Temperature Range			-65 to +150	$^{\circ}$ C
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	8 SOIC 8 SOIC	190 130	$^{\circ}$ C/W $^{\circ}$ C/W
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)	std bd	8 SOIC	41 to 44	$^{\circ}$ C/W
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	8 TSSOP 8 TSSOP	185 140	$^{\circ}$ C/W $^{\circ}$ C/W
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)	std bd	8 TSSOP	41 to 44	$^{\circ}$ C/W
T <sub>sol</sub>	Wave Solder	< 2 to 3 sec @ 248 $^{\circ}$ C		265	$^{\circ}$ C

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

# MC100EPT25

## NECL DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$ ; $V_{EE} = -5.5\text{ V}$ to $-3.0\text{ V}$ ; $GND = 0.0\text{ V}$ (Note 3)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current	8.0	16	25	8.0	16	25	8.0	16	25	mA
$V_{IH}$	Input HIGH Voltage Single-Ended	-1225		-880	-1225		-880	-1225		-880	mV
$V_{IL}$	Input LOW Voltage Single-Ended	-1945		-1625	-1945		-1625	-1945		-1625	mV
$V_{BB}$	Output Voltage Reference	-1525	-1425	-1325	-1525	-1425	-1325	-1525	-1425	-1325	mV
$V_{IHCMR}$	Input HIGH Voltage Common Mode Range (Note 4)	$V_{EE} + 2.0$		0.0	$V_{EE} + 2.0$		0.0	$V_{EE} + 2.0$		0.0	V
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	D D	0.5 -150		0.5 -150			0.5 -150			$\mu\text{A}$

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 500 lfpm is maintained.

3. Input parameters vary 1:1 with GND.

4.  $V_{IHCMR}$  min varies 1:1 with  $V_{EE}$ ,  $V_{IHCMR}$  max varies 1:1 with  $V_{CC}$ . The  $V_{IHCMR}$  range is referenced to the most positive side of the differential input signal.

## TTL OUTPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$ ; $V_{EE} = -5.5\text{ V}$ to $-3.0\text{ V}$ ; $GND = 0.0\text{ V}$ ; $T_A = -40^\circ\text{C}$ to $85^\circ\text{C}$

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
$V_{OH}$	Output HIGH Voltage (Note 5)	$I_{OH} = -3.0\text{ mA}$	2.2			V
$V_{OL}$	Output LOW Voltage (Note 5)	$I_{OL} = 24\text{ mA}$			0.5	V
$I_{CCH}$	Power Supply Current		6	10	14	mA
$I_{CCL}$	Power Supply Current		7	12	17	mA

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 500 lfpm is maintained.

5. All loading with  $500\ \Omega$  to GND;  $CL = 20\text{ pF}$ .

## AC CHARACTERISTICS $V_{CC} = 3.0\text{ V}$ to $3.6\text{ V}$ ; $V_{EE} = -5.5\text{ V}$ to $-3.0\text{ V}$ ; $GND = 0.0\text{ V}$ (Note 6)

Symbol	Characteristic	-40°C			25°C			85°C			Unit	
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
$f_{max}$	Maximum Frequency (See Figure 2 $F_{max}/JITTER$ )	275			275			275			MHz	
$t_{PLH}$ , $t_{PHL}$	Propagation Delay to Output Differential	800	1200	1800	800	1100	1600	800	1100	1600	ns	
$t_{SKPP}$	Device-to-Device Skew (Note 7)			500			500			500	ps	
$t_{JITTER}$	Cycle-to-Cycle Jitter (See Figure 2 $F_{max}/JITTER$ )		0.2	< 1		0.2	< 1		0.2	< 1	ps	
$V_{PP}$	Input Voltage Swing (Differential)	150	800	1200	150	800	1200	150	800	1200	mV	
$t_r$ $t_f$	Output Rise/Fall Times (0.8 V – 2.0 V)	Q, $\bar{Q}$	450 900	600 1160	750 1400	450 900	600 1100	750 1400	450 900	600 1100	750 1400	ps

6. Measured using a 750 mV source, 50% duty cycle clock source. All loading with  $500\ \Omega$  to GND.

7. Skews are measured between outputs under identical conditions.

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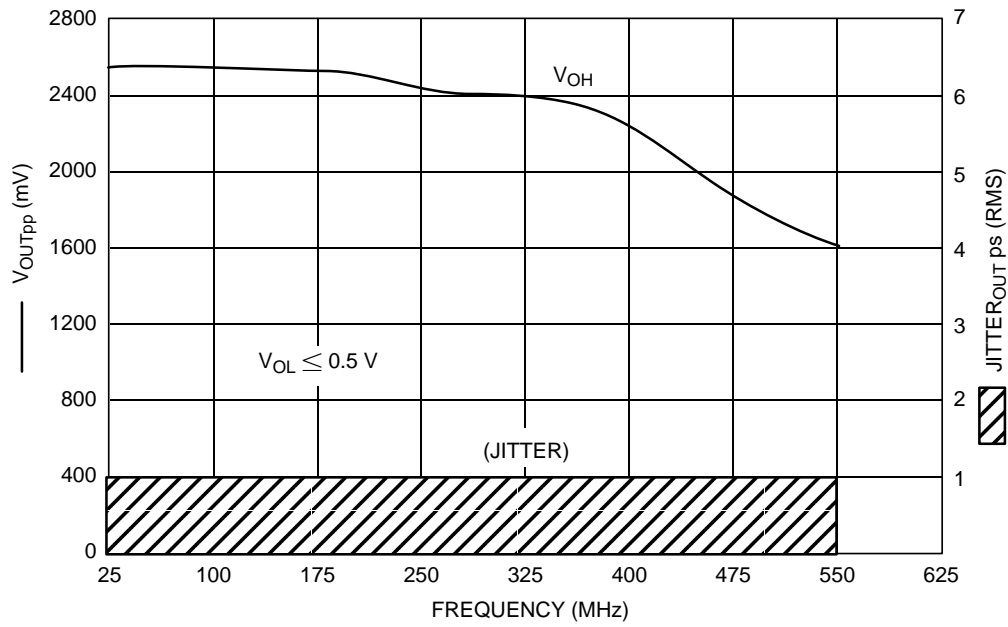


Figure 2.  $F_{max}/Jitter$

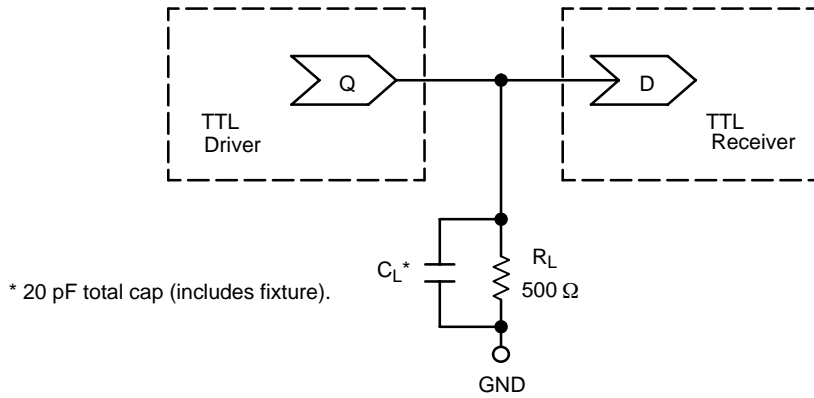


Figure 3. TTL Output Loading Used for Device Evaluation

## MC100EPT25

### Resource Reference of Application Notes

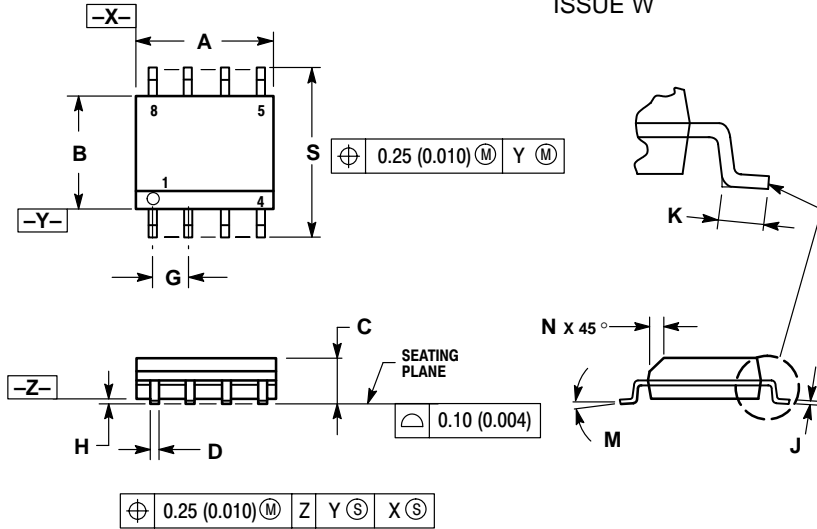
- AN1404** – ECLinPS Circuit Performance at Non-Standard  $V_{IH}$  Levels
- AN1405** – ECL Clock Distribution Techniques
- AN1406** – Designing with PECL (ECL at +5.0 V)
- AN1503** – ECLinPS I/O SPICE Modeling Kit
- AN1504** – Metastability and the ECLinPS Family
- AN1560** – Low Voltage ECLinPS SPICE Modeling Kit
- AN1568** – Interfacing Between LVDS and ECL
- AN1596** – ECLinPS Lite Translator ELT Family SPICE I/O Model Kit
- AN1650** – Using Wire-OR Ties in ECLinPS Designs
- AN1672** – The ECL Translator Guide
- AND8001** – Odd Number Counters Design
- AND8002** – Marking and Date Codes
- AND8020** – Termination of ECL Logic Devices

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

# MC100EPT25

## PACKAGE DIMENSIONS

### SO-8 D SUFFIX PLASTIC SOIC PACKAGE CASE 751-07 ISSUE W

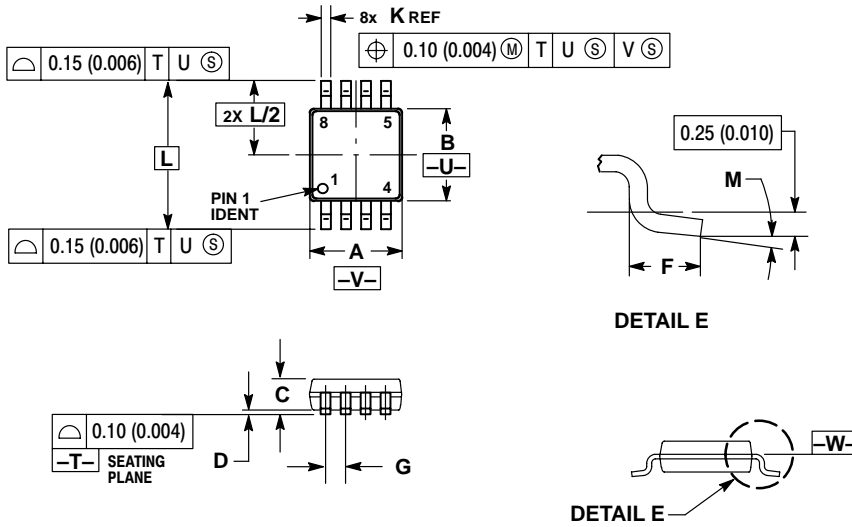


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

### 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°

**Notes**

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