MC100EPT25

−3.3V / −5V Differential ECL to +3.3V LVTTL Translator

The MC100EPT25 is a Differential ECL to LVTTL 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 $\overline{D}$ input for a non−inverting buffer. If used, the V_{BB} pin should be bypassed to ground with at least a 0.01 μF capacitor.

- 1.1 ns Typical Propagation Delay
- Maximum Frequency > 275 MHz Typical
- Operating Range: V_{CC} = 3.0 V to 3.6 V; V_{EE} = −5.5 V to −3.0 V; GND = 0 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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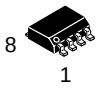
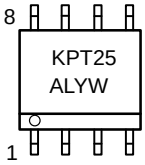
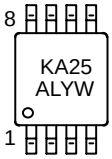
MARKING DIAGRAMS*



SO−8
D SUFFIX
CASE 751



TSSOP−8
DT SUFFIX
CASE 948R



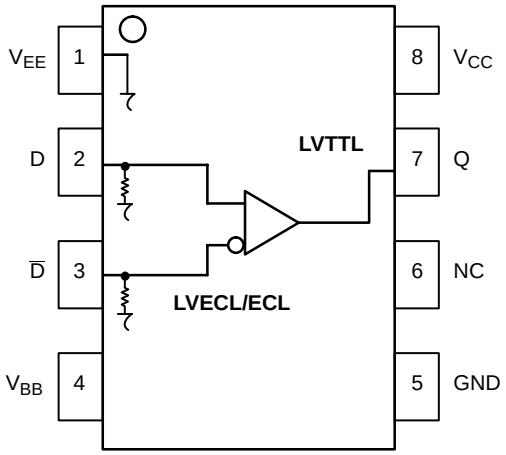
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

*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

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.



PIN DESCRIPTION

PIN	FUNCTION
Q	LVTTL Output
D*, $\overline{D}$*	Differential ECL Input Pair
V_{CC}	Positive Supply
V_{BB}	Output Reference Voltage
GND	Ground
V_{EE}	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 kΩ
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_{CC}	Positive Power Supply	GND = 0 V	V_{EE} = −5.0 V	3.8	V
V_{EE}	Negative Power Supply	GND = 0 V	V_{CC} = +3.3 V	−6	V
V_{IN}	Input Voltage	GND = 0 V		0 to V_{EE}	V
I_{BB}	V_{BB} Sink/Source			± 0.5	mA
T_A	Operating Temperature Range			−40 to +85	°C
T_{stg}	Storage Temperature Range			−65 to +150	°C
θ_{JA}	Thermal Resistance (Junction−to−Ambient)	0 LFPM 500 LFPM	8 SOIC 8 SOIC	190 130	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction−to−Case)	std bd	8 SOIC	41 to 44	°C/W
θ_{JA}	Thermal Resistance (Junction−to−Ambient)	0 LFPM 500 LFPM	8 TSSOP 8 TSSOP	185 140	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction−to−Case)	std bd	8 TSSOP	41 to 44	°C/W
T_{sol}	Wave Solder	< 2 to 3 sec @ 248°C		265	°C

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

NECL DC CHARACTERISTICS V_{CC} = 3.3 V; V_{EE} = −5.5 V to −3.0 V; GND = 0.0 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	μA
I_{IL}	Input LOW Current	0.5			0.5			0.5			μA

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 V; V_{EE} = −5.5 V to −3.0 V; GND = 0.0 V; T_A = −40°C to 85°C

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
V_{OH}	Output HIGH Voltage	I_{OH} = −3.0 mA	2.2			V
V_{OL}	Output LOW Voltage	I_{OL} = 24 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.

AC CHARACTERISTICS V_{CC} = 3.0 V to 3.6 V; V_{EE} = −5.5 V to −3.0 V; GND = 0.0 V (Note 5)

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 (Cross−Point to 1.5 V)	800	1200	1800	800	1100	1600	800	1100	1600	ps
t_{SKPP}	Device−to−Device Skew (Note 6)			500			500			500	ps
t_{JITTER}	Random Clock Jitter (RMS) (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 Q, $\overline{Q}$ (0.8 V − 2.0 V)	450 900	600 1160	750 1400	450 900	600 1100	750 1400	450 900	600 1100	750 1400	ps

5. Measured with a 750 mV 50% duty−cycle clock source. R_L = 500 Ω to GND and C_L = 20 pF to GND. Refer to Figure 3.
6. Skews are measured between outputs under identical conditions.

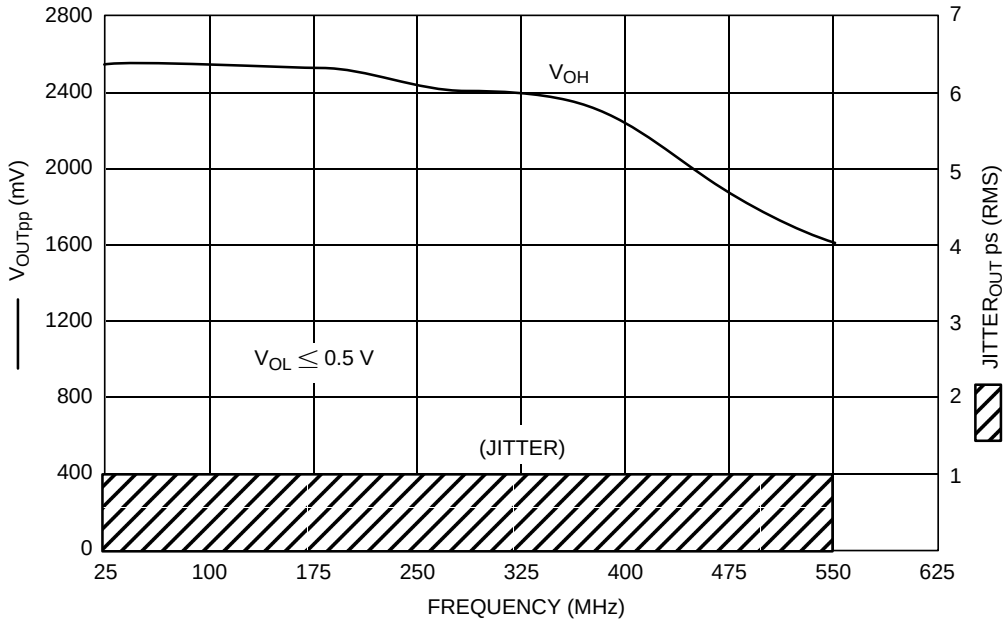


Figure 2. F_{max}/Jitter

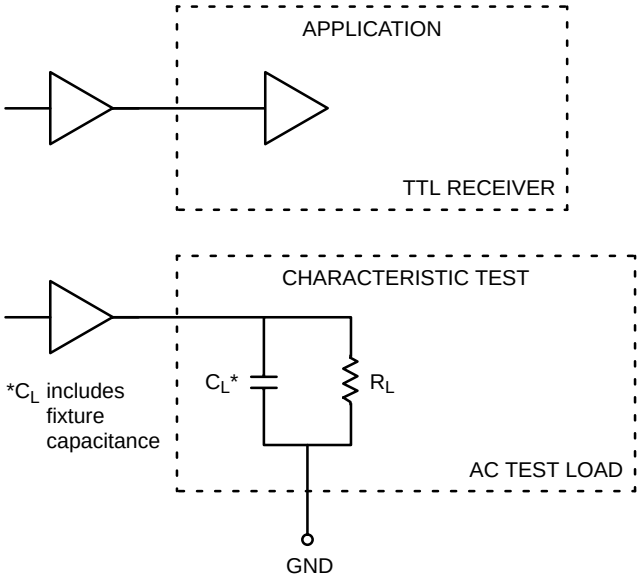


Figure 3. TTL Output Loading Used for Device Evaluation

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

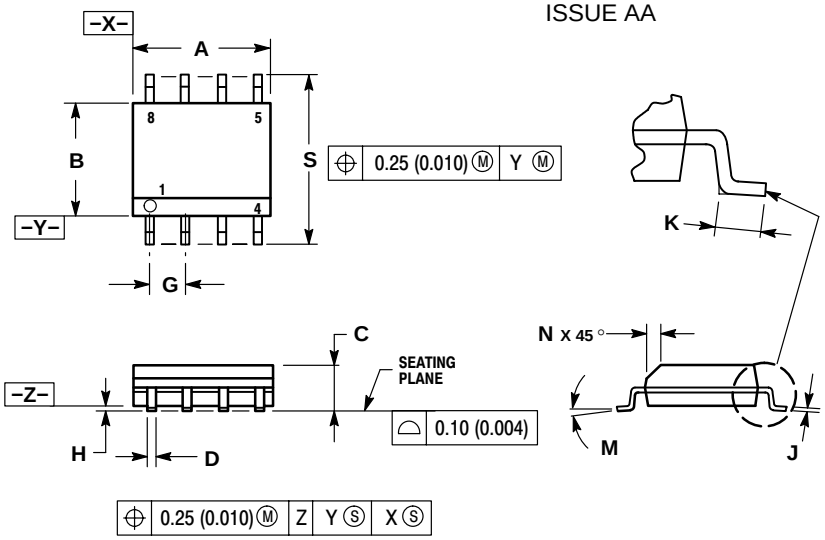
AND8009 − ECLinPS Plus Spice I/O Model Kit

AND8020 − Termination of ECL Logic Devices

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

PACKAGE DIMENSIONS

SO−8
D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751−07
ISSUE AA

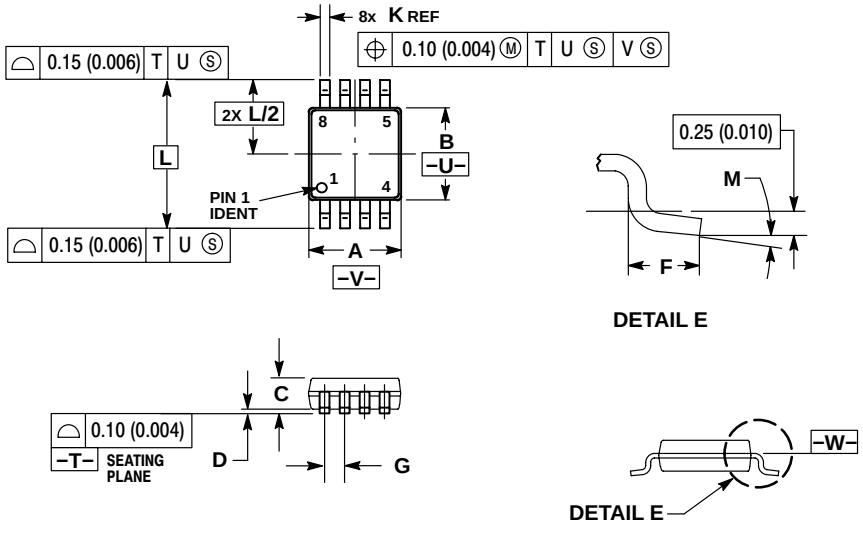


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. 751−01 THRU 751−06 ARE OBSOLETE. NEW STANDAARD IS 751−07

	MILLIMETERS		INCHES	
DIM	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

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−.

	MILLIMETERS		INCHES	
DIM	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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