

MC100EPT22

3.3V Dual LVTTTL/LVCMOS to Differential LVPECL Translator

The MC100EPT22 is a dual LVTTTL/LVCMOS to differential LVPECL translator. Because LVPECL (Positive ECL) levels are used only +3.3 V and ground are required. The small outline 8-lead package and the single gate of the EPT22 makes it ideal for those applications where space, performance, and low power are at a premium. Because the mature MOSAIC 5 process is used, low cost and high speed can be added to the list of features.

- 420 ps Typical Propagation Delay
- Maximum Frequency > 1.1 GHz Typical
- Operating Range: $V_{CC} = 3.0\text{ V}$ to 3.6 V with $GND = 0\text{ V}$
- PNP LVTTTL Inputs for Minimal Loading
- Q Output Will Default HIGH with Inputs Open
- The 100 Series Contains Temperature Compensation.



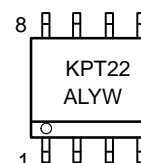
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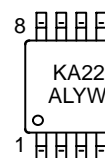
MARKING DIAGRAMS*



SO-8
D SUFFIX
CASE 751



TSSOP-8
DT SUFFIX
CASE 948R



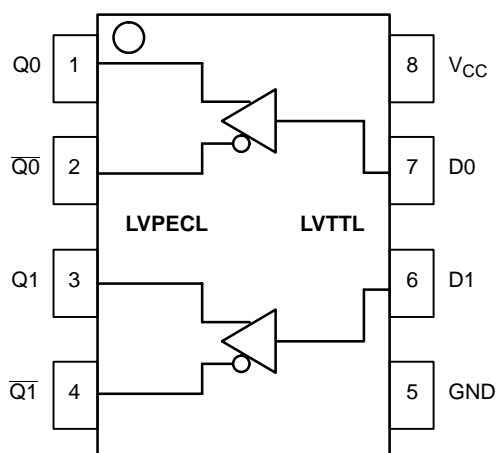
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

*For additional information, see Application Note
AND8002/D

ORDERING INFORMATION

Device	Package	Shipping
MC100EPT22D	SO-8	98 Units/Rail
MC100EPT22DR2	SO-8	2500 Tape & Reel
MC100EPT22DT	TSSOP-8	100 Units/Rail
MC100EPT22DTR2	TSSOP-8	2500 Tape & Reel

MC100EPT22



PIN DESCRIPTION

PIN	FUNCTION
Q0, Q1, $\overline{Q0}$, $\overline{Q1}$	LVPECL Differential Outputs
D0, D1	LVTTTL Inputs
V _{CC}	Positive Supply
GND	Ground

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

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
	> 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	164 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}	Power Supply	GND = 0 V		6	V
V _I	Input Voltage	GND = 0 V	V _I ≤ V _{CC}	6 to 0	V
I _{out}	Output Current	Continuous Surge		50 100	mA 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.

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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°C

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
I_{IH}	Input HIGH Current	$V_{IN} = 2.7\text{ V}$			20	μA
I_{IHH}	Input HIGH Current MAX	$V_{IN} = V_{CC}$			100	μA
I_{IL}	Input LOW Current	$V_{IN} = 0.5\text{ V}$			-0.6	mA
V_{IK}	Input Clamp Voltage	$I_{IN} = -18\text{ mA}$			-1.0	V
V_{IH}	Input HIGH Voltage		2.0			V
V_{IL}	Input LOW Voltage				0.8	V

PECL OUTPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$, $GND = 0.0\text{ V}$ (Note 3)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{CC}	Power Supply Current	32	43	55	35	45	60	37	46	62	mA
V_{OH}	Output HIGH Voltage (Note 4)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V_{OL}	Output LOW Voltage (Note 4)	1355	1480	1605	1355	1480	1605	1355	1480	1605	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.

3. Output parameters vary 1:1 with V_{CC} .

4. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

AC CHARACTERISTICS $V_{CC} = 3.0\text{ V}$ to 3.6 V , $GND = 0.0\text{ V}$ (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)	0.8	1.1		0.8	1.1		0.8	1.1		GHz
t_{PLH} , t_{PHL}	Propagation Delay to Output Differential	250	400	650	250	420	675	300	500	700	ps
t_{skew}	Within-Device Skew (Note 6) Device-to-Device Skew (Note 7)		50 200	100 400		50 200	100 425		50 200	100 400	ps
t_{JITTER}	Random Clock Jitter (See Figure 2. F_{\max}/JITTER)		0.2	< 1		0.2	< 1		0.2	< 1	ps
t_r , t_f	Output Rise/Fall Times (20% - 80%) Q, \bar{Q}	50	110	200	60	120	220	70	140	250	ps

5. Measured using a 2.4 V source, 50% duty cycle clock source. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

6. Skew is measured between outputs under identical transitions and conditions on any one device.

7. Device-to-Device Skew for identical transitions at identical V_{CC} levels.

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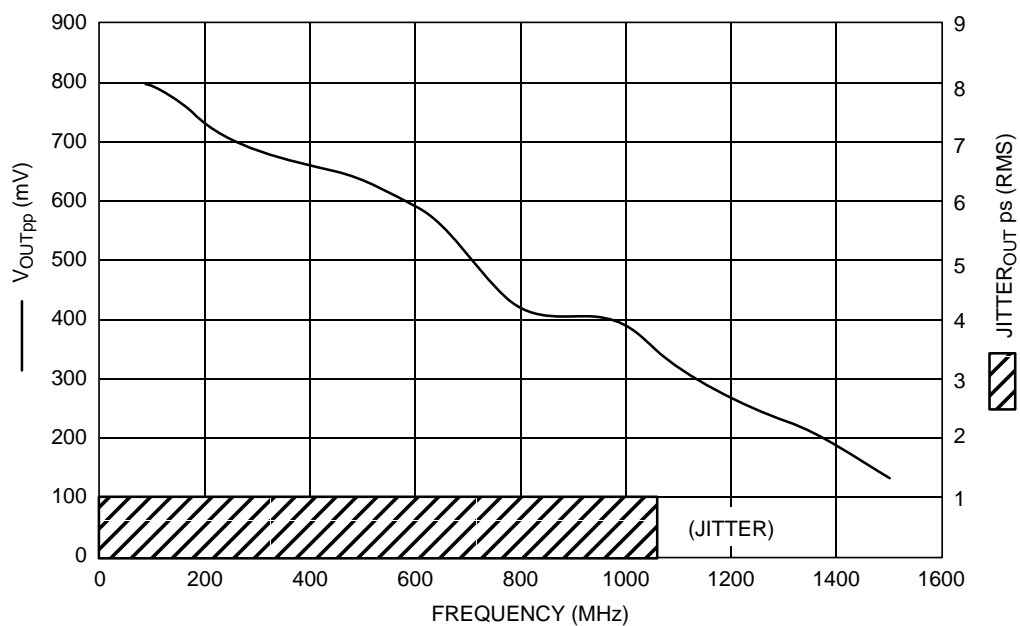


Figure 2. $F_{max}/Jitter$

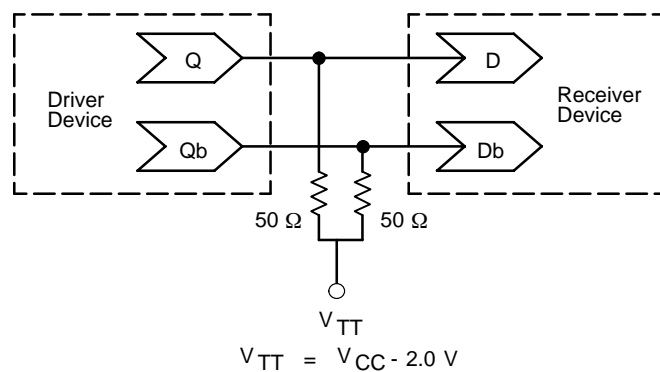


Figure 3. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 - Termination of ECL Logic Devices.)

Resource Reference of Application Notes

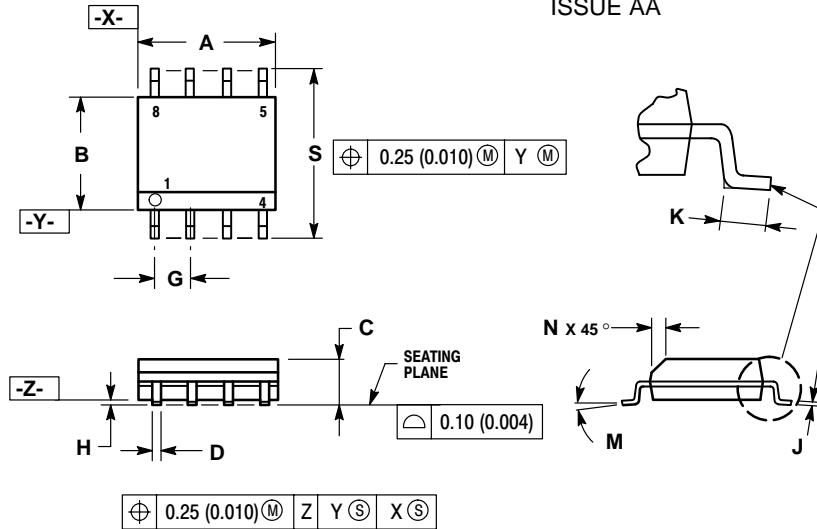
- AN1404** - ECLinPS Circuit Performance at Non-Standard V_{IH} Levels
- AN1405** - ECL Clock Distribution Techniques
- AN1406** - Designing with PECL (ECL at +5.0 V)
- AN1504** - Metastability and the ECLinPS Family
- AN1568** - Interfacing Between LVDS and ECL
- AN1650** - Using Wire-OR Ties in ECLinPS 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

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

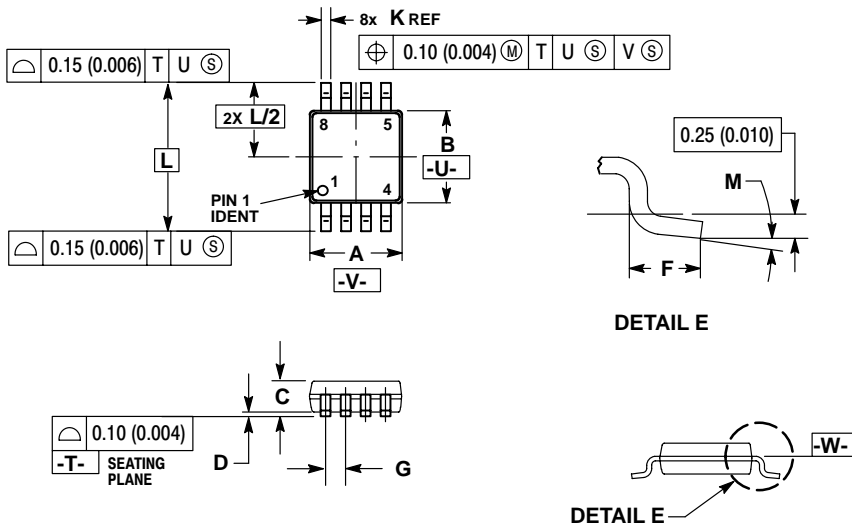


NOTES:

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 STANDARD IS 751-07

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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