MC10ELT24, MC100ELT24

5V TTL to Differential ECL Translator

The MC10ELT/100ELT24 is a TTL to differential ECL translator. Because ECL levels are used a +5 V, -5.2 V (or -4.5 V) and ground are required. The small outline 8-lead package and the single gate of the ELT24 makes it ideal for those applications where space, performance and low power are at a premium.

The 100 Series contains temperature compensation.

- 0.8 ns t_{PHL}, 0.95 ns t_{PLH} Typical Propagation Delay
- PNP TTL Inputs for Minimal Loading
- Flow Through Pinouts
- Operating Range: V_{CC} = 4.5 V to 5.5 V; V_{EE} = -4.2 V to -5.5 V with GND = 0 V

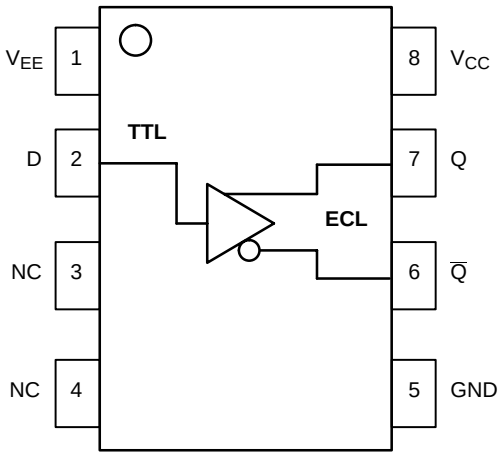

Figure 1. Logic Diagram and Pinout Assignment

PIN DESCRIPTION

PIN	FUNCTION
Q, $\overline{Q}$	ECL Differential Outputs*
D	TTL Input
V_{CC}	Positive Supply
V_{EE}	Negative Supply
GND	Ground
NC	No Connect

* Output state undetermined when inputs are open.

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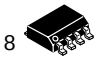
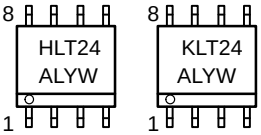
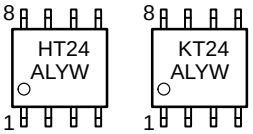
MARKING DIAGRAMS*



SO-8
D SUFFIX
CASE 751



TSSOP-8
DT SUFFIX
CASE 948R



H = MC10
K = MC100
A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

Device	Package	Shipping†
MC10ELT24D	SO-8	98 Units/Rail
MC10ELT24DR2	SO-8	2500 Tape & Reel
MC100ELT24D	SO-8	98 Units/Rail
MC100ELT24DR2	SO-8	2500 Tape & Reel
MC10ELT24DT	SO-8	98 Units/Rail
MC10ELT24DRT2	SO-8	2500 Tape & Reel
MC10ELT24DT	SO-8	98 Units/Rail
MC10ELT24DRT2	SO-8	2500 Tape & Reel

†For additional tape and reel information, refer to Brochure BRD8011/D.

ATTRIBUTES

Characteristics		Value
Internal Input Pulldown Resistor		N/A
Internal Input Pullup Resistor		N/A
ESD Protection	Human Body Model Machine Model	> 4 kV > 200 V
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		51
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	7	V
V_{EE}	Negative Power Supply	GND = 0 V	V_{CC} = +5.0 V	-8	V
V_{IN}	Input Voltage	GND = 0 V	$V_I \le V_{CC}$	0 to V_{CC}	V
I_{out}	Output Current	Continuous Surge		50 100	mA mA
TA	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	SO-8 SO-8	190 130	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SO-8	41 to 44	°C/W
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	TSSOP-8 TSSOP-8	185 140	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-8	41 to 44 ± 5%	°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.

10ELT SERIES NECL OUTPUT DC CHARACTERISTICS V_{CC} = 5.0 V; V_{EE} = -5.0 V; GND = 0 V (Note 3)

Symbol	Characteristic	-40 °C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{CC}	V_{CC} Power Supply Current			7.0		4.5	7.0			7.0	mA
I_{EE}	Power Supply Current			18		12.5	18			18	mA
V_{OH}	Output HIGH Voltage (Note 4)	- 1080	- 990	- 890	- 980	- 895	- 810	- 910	- 815	- 720	mV
V_{OL}	Output LOW Voltage (Note 4)	- 1950	- 1800	- 1650	- 1950	- 1790	- 1630	- 1950	- 1773	- 1595	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 lfpm is maintained.

3. Output parameters vary 1:1 with GND. V_{EE} can vary +0.06 V / -0.5 V.
4. Outputs are terminated through a 50 Ω resistor to GND - 2 volts.

100ELT SERIES NECL OUTPUT DC CHARACTERISTICS V_{CC} = 5.0 V; V_{EE} = -5.0 V; GND = 0 V (Note 5)

Symbol	Characteristic	-40 °C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{CC}	V_{CC} Power Supply Current			7.0		4.5	7.0			7.0	mA
I_{EE}	Power Supply Current			18		12.5	18			18	mA
V_{OH}	Output HIGH Voltage (Note 6)	- 1085	- 1005	- 880	- 1025	- 955	- 880	- 1025	- 955	- 880	mV
V_{OL}	Output LOW Voltage (Note 6)	- 1830	- 1695	- 1555	- 1810	- 1705	- 1620	- 1810	- 1705	- 1620	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 lfpm is maintained.

5. Output parameters vary 1:1 with GND. V_{EE} can vary +0.8 V / -0.5 V.
6. Outputs are terminated through a 50 Ω resistor to GND - 2 volts.

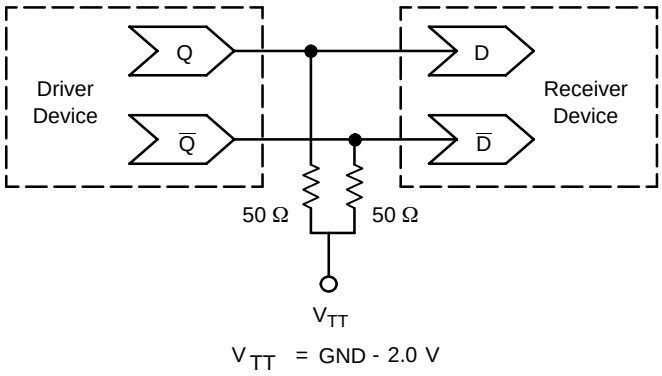
TTL INPUT DC CHARACTERISTICS V_{CC} = 4.75 V to 5.25 V; T_A = -40°C to +85°C

Symbol	Characteristic	Condition	Min	Typ	Max	Unit
I_{IH}	Input HIGH Current	V_{IN} = 2.7 V			20	μA
I_{IHH}	Input HIGH Current	V_{IN} = 7.0 V			100	μA
I_{IL}	Input LOW Current	V_{IN} = 0.5 V			-0.6	mA
V_{IK}	Input Clamp Diode Voltage	I_{IN} = -18 mA			-1.2	V
V_{IH}	Input HIGH Voltage		2.0			V
V_{IL}	Input LOW Voltage				0.8	V

AC CHARACTERISTICS V_{CC} = 4.75 V to 5.25 V; V_{EE} = -5.0 V; GND = 0.0 V (Note 7)

Symbol	Characteristic	-40 °C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{max}	Maximum Toggle Frequency					400					MHz
t_{PLH}	Propagation Delay (Note 8) 1.5 V to 50%	0.7		1.3	0.65	0.95	1.25	0.65		1.25	ns
t_{PHL}	Propagation Delay (Note 8) 1.5 V to 50%	0.4		1.0	0.50	0.80	1.10	0.70		1.30	ns
t_{JITTER}	Random Clock Jitter (RMS)					2.5					ps
t_r/t_f	Output Rise/Fall Time (20-80%)	0.25		1.25	0.25		1.25	0.25		1.25	ns

7. V_{EE} can vary +0.06 V / -0.5 V for 10ELT; V_{EE} can vary +0.8 V / -0.5 V for 100ELT.
8. Specifications for standard TTL input signal.



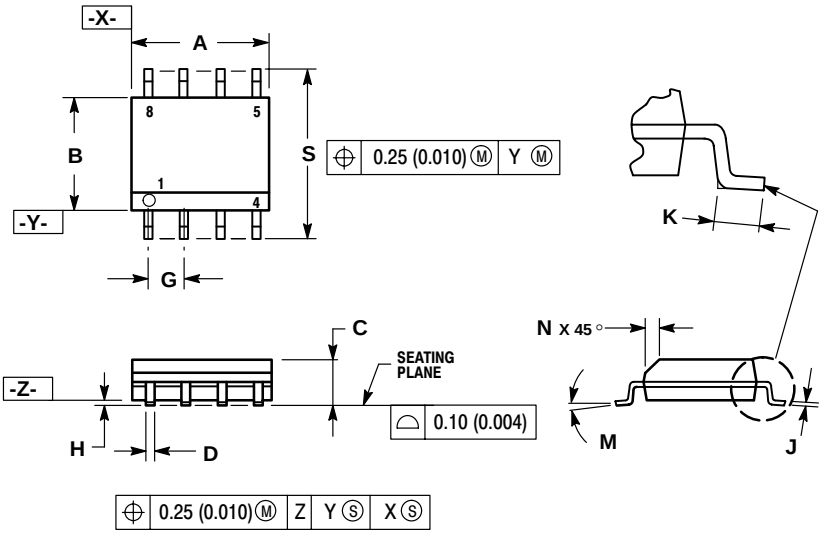
Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020 - Termination of ECL Logic Devices.)

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)
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
AND8090	-	AC Characteristics of ECL Devices

PACKAGE DIMENSIONS

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

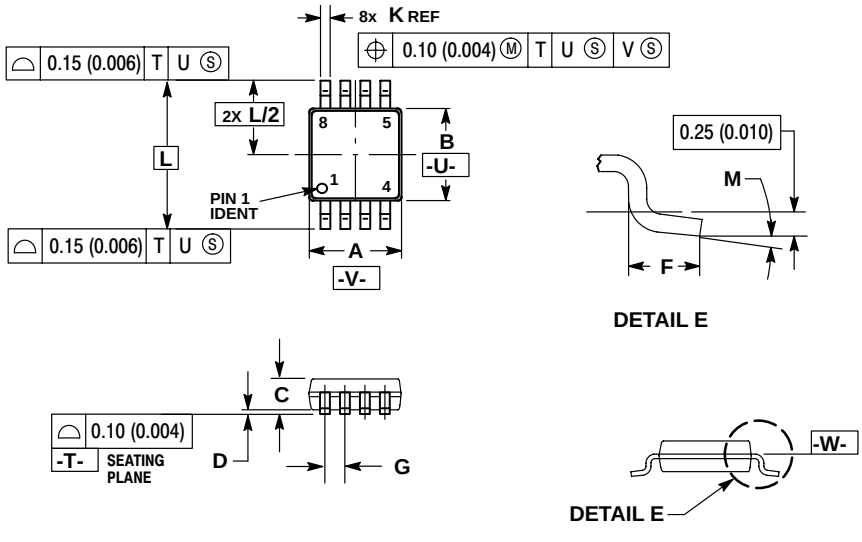


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005)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

	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. DIMENSIONS AND TOLERANCING PER ASME Y14.5M, 1994.
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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