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 TPHL, 0.95 ns TPLH Typical Propagation Delay
- PNP TTL Inputs for Minimal Loading
- Flow Through Pinouts
- ESD Protection: > 4 KV HBM, > 200 V MM
- Operating Range: V_{CC} = 4.5 V to 5.5 V; V_{EE} = –4.2 V to –5.5 V with GND = 0 V
- Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test
- Moisture Sensitivity Level 1
  For Additional Information, see Application Note AND8003/D
- Flammability Rating: UL–94 code V–0 @ 1/8″,
  Oxygen Index 28 to 34
- Transistor Count = 51 devices

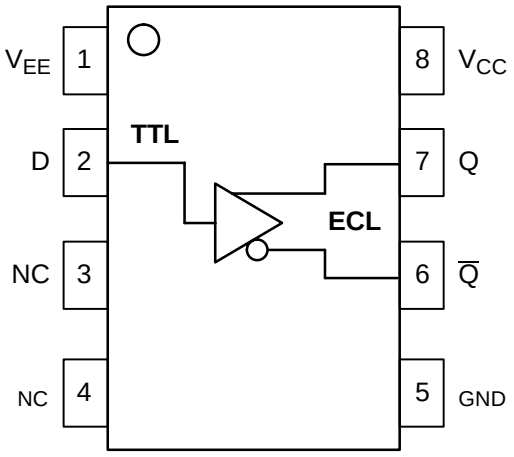

Figure 1. Logic Diagram and Pinout Assignment

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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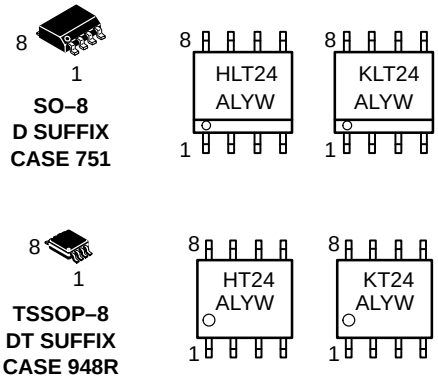
MARKING DIAGRAMS*



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

*For additional information, see Application Note AND8002/D

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

MAXIMUM RATINGS (Note 1)

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	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 ± 5%	°C/W
T_{sol}	Wave Solder	< 2 to 3 sec @ 248°C		265	°C

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

10ELT SERIES NECL DC CHARACTERISTICS V_{CC} = 5.0 V; V_{EE} = –5.0 V; GND = 0 V (Note 2)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
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 3)	–1080	–990	–890	–980	–895	–810	–910	–815	–720	mV
V_{OL}	Output LOW Voltage (Note 3)	–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.

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

100ELT SERIES NECL DC CHARACTERISTICS V_{CC} = 5.0 V; V_{EE} = –5.0 V; GND = 0 V (Note 4)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
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 5)	–1085	–1005	–880	–1025	–955	–880	–1025	–955	–880	mV
V_{OL}	Output LOW Voltage (Note 5)	–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.

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

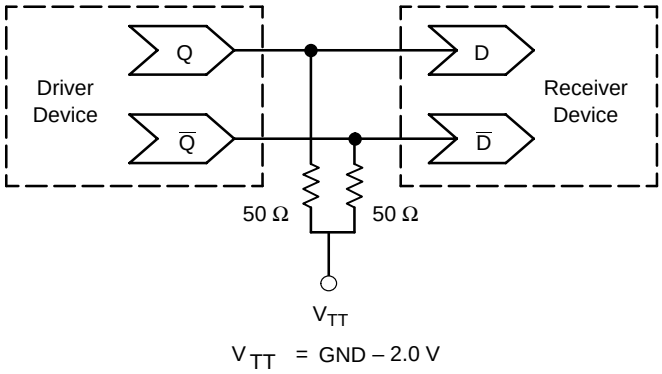
TTL INPUT DC CHARACTERISTICS V_{CC} = 4.75 V to 5.25 V; T_A = –40°C to +85°C

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 6)

		–40°C			25°C			85°C			
Symbol	Characteristic	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Unit
f_{max}	Maximum Toggle Frequency		TBD			TBD			TBD		GHz
t_{PLH}	Propagation Delay (Note 7) 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 7) 1.5 V to 50%	0.4		1.0	0.50	0.80	1.10	0.70		1.30	ns
t_{JITTER}	Cycle–to–Cycle Jitter		TBD			TBD			TBD		ps
t_r/t_f	Output Rise/Fall Time (20–80%)	0.25		1.25	0.25		1.25	0.25		1.25	ns

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



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

ORDERING INFORMATION

Device	Package Type	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	TSSOP–8	98 Units/Rail
MC10ELT24DTR2	TSSOP–8	2500 Tape & Reel
MC100ELT24DT	TSSOP–8	98 Units/Rail
MC100ELT24DTR2	TSSOP–8	2500 Tape & Reel

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

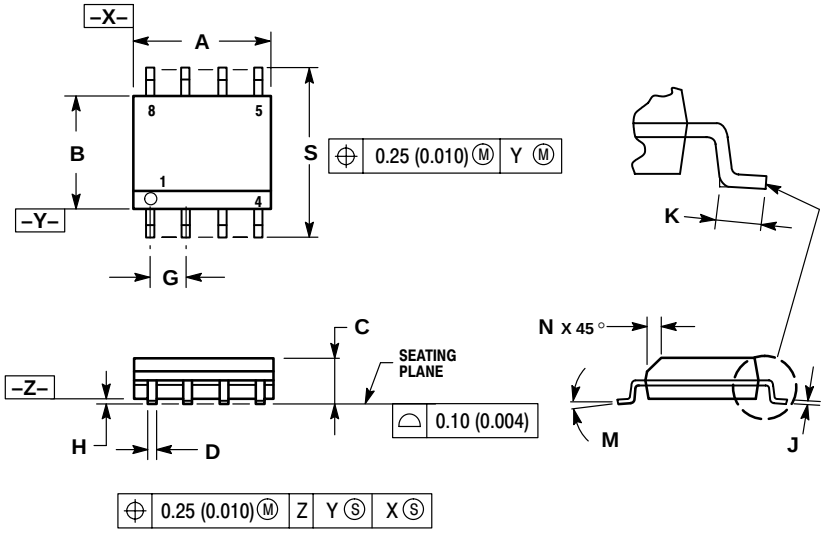
AND8001 – Odd Number Counters Design

AND8002 – Marking and Date Codes

AND8020 – Termination of ECL Logic Devices

PACKAGE DIMENSIONS

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

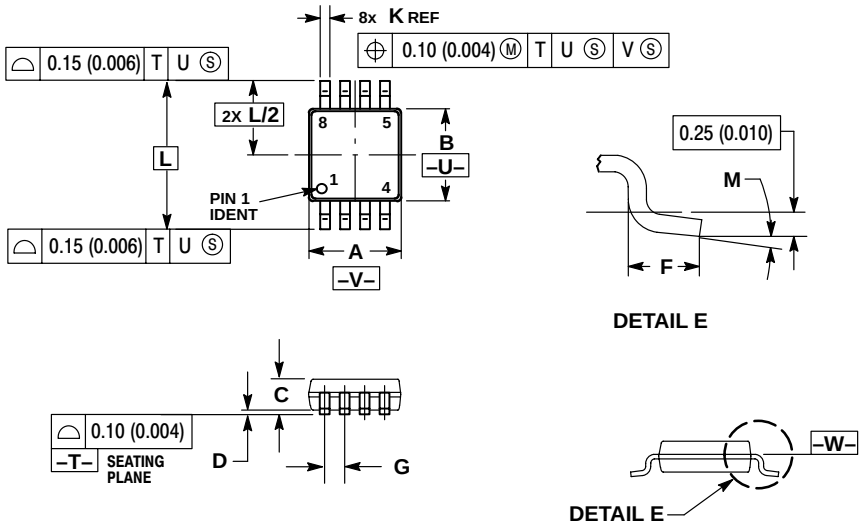


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005)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

	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°

Notes

PUBLICATION ORDERING INFORMATION

Literature Fulfillment:
Literature Distribution Center for ON Semiconductor
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