

# 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:  $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ;  $V_{EE} = -4.2\text{ V to }-5.5\text{ V}$  with  $GND = 0\text{ V}$

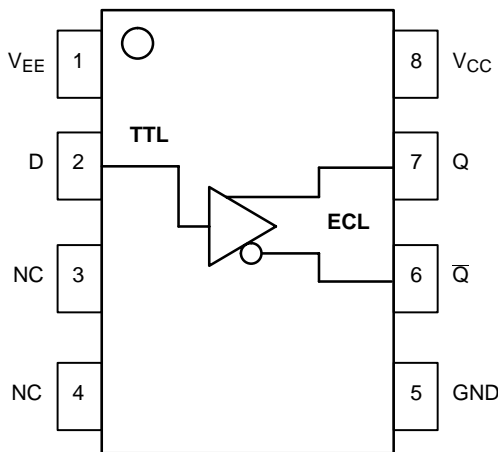


Figure 1. Logic Diagram and Pinout Assignment

### PIN DESCRIPTION

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

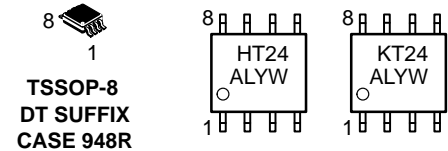
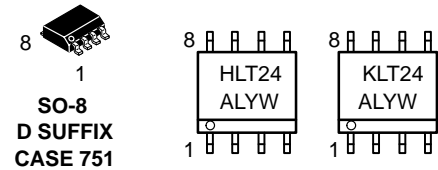
\* Output state undetermined when inputs are open.



ON Semiconductor®

<http://onsemi.com>

### MARKING DIAGRAMS\*



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.

# MC10ELT24, MC100ELT24

## 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	$V_I \leq V_{CC}$	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
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	SO-8 SO-8	190 130	°C/W °C/W
$\theta_{JC}$	Thermal Resistance (Junction-to-Case)	Standard Board	SO-8	41 to 44	°C/W
$\theta_{JA}$	Thermal Resistance (Junction-to-Ambient)	0 LFPM 500 LFPM	TSSOP-8 TSSOP-8	185 140	°C/W °C/W
$\theta_{JC}$	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.

# MC10ELT24, MC100ELT24

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

Symbol	Characteristic	-40 °C			25 °C			85 °C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{CC}$	$V_{CC}$ 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 lpm 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  $\Omega$  resistor to GND - 2 volts.

## 100ELT SERIES NECL OUTPUT DC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$ ; $V_{EE} = -5.0\text{ V}$ ; $GND = 0\text{ V}$ (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 lpm 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  $\Omega$  resistor to GND - 2 volts.

## TTL INPUT DC CHARACTERISTICS $V_{CC} = 4.75\text{ V}$ to $5.25\text{ V}$ ; $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$

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

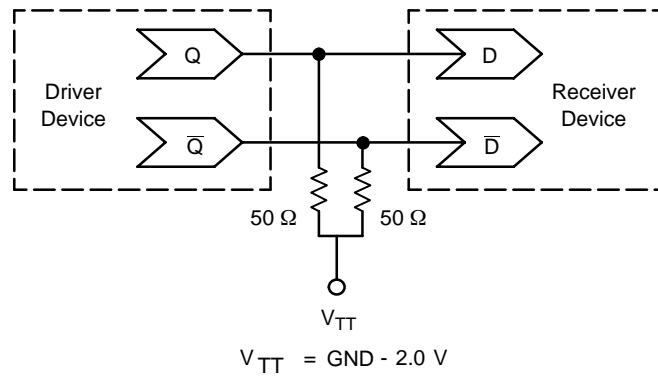
## AC CHARACTERISTICS $V_{CC} = 4.75\text{ V}$ to $5.25\text{ V}$ ; $V_{EE} = -5.0\text{ V}$ ; $GND = 0.0\text{ V}$ (Note 7)

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.

## MC10ELT24, MC100ELT24



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

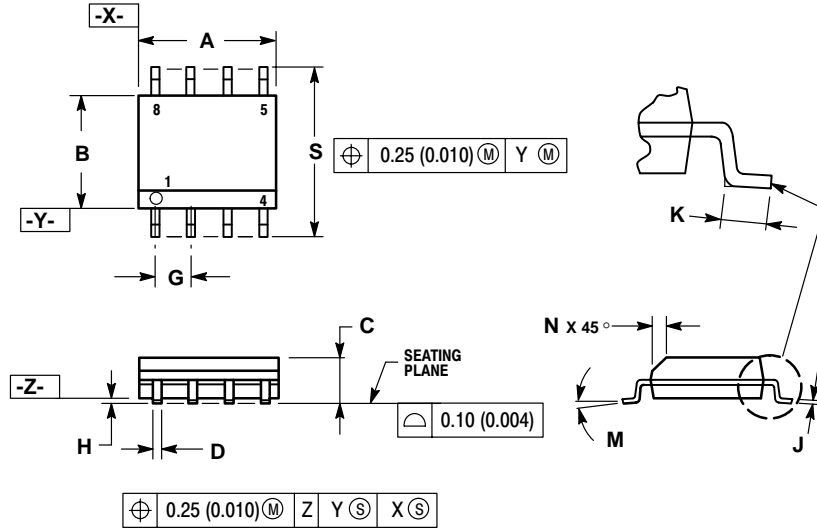
### Resource Reference of Application Notes

- 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

# MC10ELT24, MC100ELT24

## PACKAGE DIMENSIONS

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



**NOTES:**

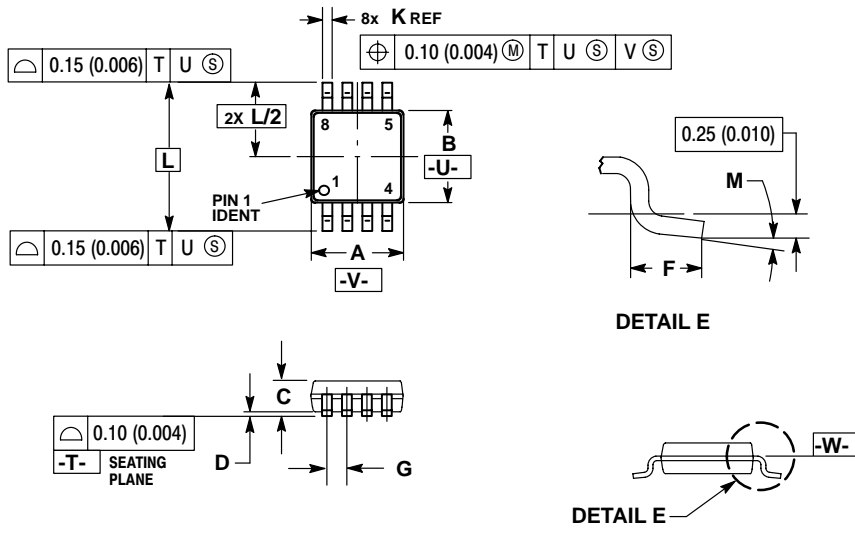
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

# MC10ELT24, MC100ELT24

## 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 -V-.

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°

ON Semiconductor and  are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer.

### PUBLICATION ORDERING INFORMATION

#### Literature Fulfillment:

Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: ONlit@hibbertco.com

N. American Technical Support: 800-282-9855 Toll Free USA/Canada

JAPAN: ON Semiconductor, Japan Customer Focus Center  
2-9-1 Kamimeguro, Meguro-ku, Tokyo, Japan 153-0051  
Phone: 81-3-5773-3850

ON Semiconductor Website: <http://onsemi.com>

For additional information, please contact your local Sales Representative.