



# MC10ELT22, MC100ELT22

## 5.0 V Dual TTL to Differential PECL Translator

The MC10ELT/100ELT22 is a dual TTL to differential PECL translator. Because PECL (Positive ECL) levels are used only +5 V and ground are required. The small outline 8-lead package and the low skew, dual gate design of the ELT22 makes it ideal for applications which require the translation of a clock and a data signal.

### Features

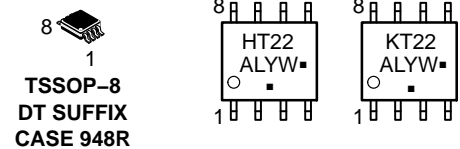
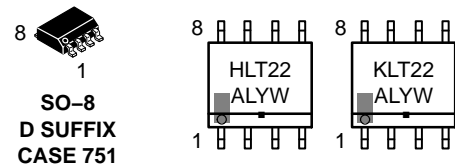
- 1.2 ns Typical Propagation Delay
- < 300 ps Typical Output to Output Skew
- PNP TTL Inputs for Minimal Loading
- Flow Through Pinouts
- Operating Range:  $V_{CC} = 4.75 \text{ V}$  to  $5.25 \text{ V}$  with  $GND = 0 \text{ V}$
- No Internal Input Pulldown Resistors
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant



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### MARKING DIAGRAMS\*



H = MC10  
K = MC100  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

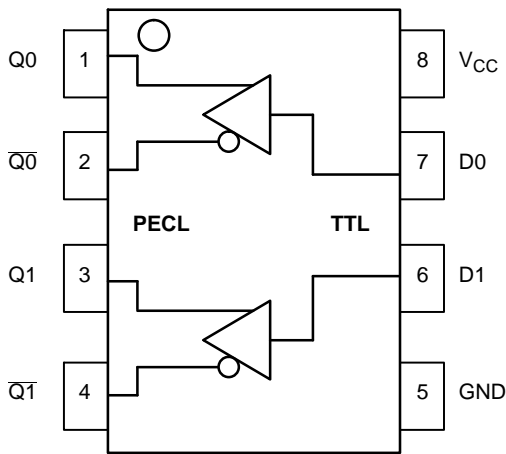
(Note: Microdot may be in either location)

\*For additional information, see Application Note AND8002/D.

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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**Table 1. PIN DESCRIPTION**

| Pin                 | Function                   |
|---------------------|----------------------------|
| Qn, $\overline{Qn}$ | PECL Differential Outputs* |
| Dn                  | TTL Inputs                 |
| VCC                 | Positive Supply            |
| GND                 | Ground                     |

\*Output state undetermined when inputs are open.

**Figure 1. Logic Diagram and Pinout Assignment**

**Table 2. ATTRIBUTES**

| Characteristics   | Value  |
|---|--|
| Internal Input Pulldown Resistor                              | N/A  |
| Internal Input Pullup Resistor                                | N/A  |
| ESD Protection  | Human Body Model<br>Machine Model<br>> 2 kV<br>> 200 V |
| Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1) | Level 1  |
| Flammability Rating   | Oxygen Index: 28 to 34<br>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.

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**Table 3. MAXIMUM RATINGS**

| Symbol           | Parameter                                | Condition 1         | Condition 2        | Rating                                     | Units        |
|------------------|--|---------------------|--------------------|--|--------------|
| V <sub>CC</sub>  | Positive Power Supply                    | GND = 0 V           |                    | 7  | V            |
| V <sub>IN</sub>  | Input Voltage                            | GND = 0 V           |                    | $GND + 0.025 \leq V_I \leq V_{CC} - 0.025$ | V            |
| I <sub>out</sub> | Output Current                           | Continuous<br>Surge |                    | 50<br>100                                  | mA<br>mA     |
| T <sub>A</sub>   | Operating Temperature Range              |                     |                    | -40 to +85                                 | °C           |
| T <sub>stg</sub> | Storage Temperature Range                |                     |                    | -65 to +150                                | °C           |
| θ <sub>JA</sub>  | Thermal Resistance (Junction-to-Ambient) | 0 lfp<br>500 lfp    | 8 SOIC<br>8 SOIC   | 190<br>130                                 | °C/W<br>°C/W |
| θ <sub>JC</sub>  | Thermal Resistance (Junction-to-Case)    | Standard Board      | 8 SOIC             | 41 to 44                                   | °C/W         |
| θ <sub>JA</sub>  | Thermal Resistance (Junction-to-Ambient) | 0 lfp<br>500 lfp    | 8 TSSOP<br>8 TSSOP | 185<br>140                                 | °C/W<br>°C/W |
| θ <sub>JC</sub>  | Thermal Resistance (Junction-to-Case)    | Standard Board      | 8 TSSOP            | 41 to 44 ± 5%                              | °C/W         |
| T <sub>sol</sub> | Wave Solder                              | <2 to 3 sec @ 248°C |                    | 265  | °C           |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**Table 4. 10ELT SERIES PECL DC CHARACTERISTICS** V<sub>CC</sub> = 5.0 V; GND = 0.0 V (Note 2)

| Symbol          | Characteristic               | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|-----------------|------------------------------|-------|------|------|------|------|------|------|------|------|------|
|                 |                              | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| I <sub>CC</sub> | Power Supply Current         |       |      | 22   |      |      | 22   |      |      | 22   | mA   |
| V <sub>OH</sub> | Output HIGH Voltage (Note 3) | 3920  | 4010 | 4110 | 4020 | 4105 | 4190 | 4090 | 4185 | 4280 | mV   |
| V <sub>OL</sub> | Output LOW Voltage (Note 3)  | 3050  | 3200 | 3350 | 3050 | 3210 | 3370 | 3050 | 3227 | 3405 | mV   |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfp.

2. Output parameters vary 1:1 with V<sub>CC</sub>. V<sub>CC</sub> can vary ± 0.25 V.
3. Outputs are terminated through a 50 Ω resistor to V<sub>CC</sub> - 2.0 V.

**Table 5. 100ELT SERIES PECL DC CHARACTERISTICS** V<sub>CC</sub> = 5.0 V; GND = 0.0 V (Note 4)

| Symbol          | Characteristic               | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|-----------------|------------------------------|-------|------|------|------|------|------|------|------|------|------|
|                 |                              | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| I <sub>CC</sub> | Power Supply Current         |       |      | 22   |      |      | 22   |      |      | 22   | mA   |
| V <sub>OH</sub> | Output HIGH Voltage (Note 5) | 3915  | 3995 | 4120 | 3975 | 4045 | 4120 | 3975 | 4050 | 4120 | mV   |
| V <sub>OL</sub> | Output LOW Voltage (Note 5)  | 3170  | 3305 | 3445 | 3190 | 3295 | 3380 | 3190 | 3295 | 3380 | mV   |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfp.

4. Output parameters vary 1:1 with V<sub>CC</sub>. V<sub>CC</sub> can vary ± 0.25 V.
5. Outputs are terminated through a 50 Ω resistor to V<sub>CC</sub> - 2.0 V.

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**Table 6. 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        | $V_{IN} = 2.7 \text{ V}$ ;<br>$V_{IN} = (V_{CC} - 0.025) \text{ V}$     |                                |     | 20                         | $\mu\text{A}$ |
| $I_{IHH}$ | Input HIGH Current        | $V_{IN} = 7.0 \text{ V}$  |                                |     | 100                        | $\mu\text{A}$ |
| $I_{IL}$  | Input LOW Current         | $V_{IN} = 0.5 \text{ V}$ ;<br>$V_{IN} = (\text{GND} + 0.025) \text{ V}$ |                                |     | -0.6                       | $\text{mA}$   |
| $V_{IK}$  | Input Clamp Diode Voltage | $I_{IN} = -18 \text{ mA}$   |                                |     | -1.2                       | $\text{V}$    |
| $V_{IH}$  | Input HIGH Voltage        |   | 2.0                            |     | $V_{CC} - 0.025 \text{ V}$ | $\text{V}$    |
| $V_{IL}$  | Input LOW Voltage         |   | $\text{GND} + 0.025 \text{ V}$ |     | 0.8                        | $\text{V}$    |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lpm.

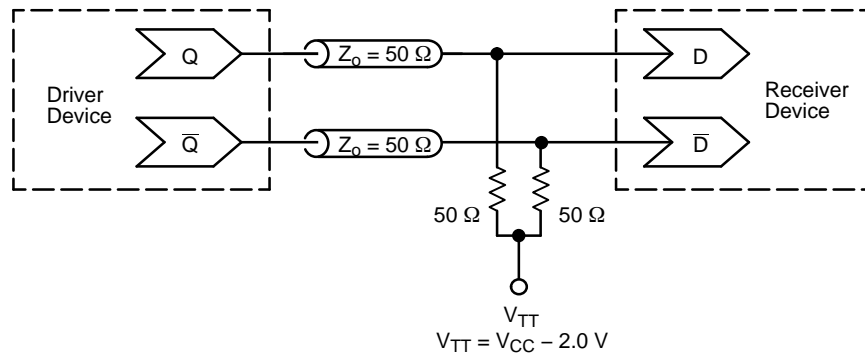
**Table 7. AC CHARACTERISTICS**  $V_{CC} = 4.75 \text{ V to } 5.25 \text{ V}$ ;  $\text{GND} = 0.0 \text{ V}$

| Symbol       | Characteristic  | $-40^\circ\text{C}$ |           |            | $25^\circ\text{C}$ |           |            | $85^\circ\text{C}$ |           |            | Unit         |
|--------------|---|---------------------|-----------|------------|--------------------|-----------|------------|--------------------|-----------|------------|--------------|
|              |   | Min                 | Typ       | Max        | Min                | Typ       | Max        | Min                | Typ       | Max        |              |
| $f_{MAX}$    | Maximum Input Frequency                                       |                     |           |            |                    | 500       |            |                    |           |            | $\text{MHz}$ |
| $t_{PLH}$    | Propagation Delay (Note 6)<br>1.5 V to 50%                    | 0.6                 |           | 1.2        | 0.9                | 1.2       | 1.5        | 0.6                |           | 1.35       | $\text{ns}$  |
| $t_{PHL}$    | Propagation Delay (Note 6)<br>1.5 V to 50%                    | 0.4                 |           | 1.0        | 0.5                | 0.8       | 1.1        | 0.7                |           | 1.30       | $\text{ns}$  |
| $t_{skew}$   | Within-Device Skew (Note 7)<br>Device-to-Device Skew (Note 8) |                     | 50<br>300 | 100<br>600 |                    | 50<br>300 | 100<br>600 |                    | 50<br>350 | 100<br>750 | $\text{ps}$  |
| $t_{JITTER}$ | CLOCK Random Jitter (RMS)                                     |                     |           |            |                    | 0.5       |            |                    |           |            | $\text{ps}$  |
| $t_r/t_f$    | Output Rise/Fall Time<br>(20–80%)                             | 0.4                 |           | 1.6        | 0.4                |           | 1.6        | 0.4                |           | 1.6        | $\text{ns}$  |

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lpm.

6. Specifications for standard TTL input signal.
7. Skew is measured between outputs under identical transitions and conditions on any one device.
8. Device-to-Device Skew for identical transitions at identical  $V_{CC}$  levels.

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**Figure 2. Typical Termination for Output Driver and Device Evaluation  
(See Application Note AND8020/D – Termination of ECL Logic Devices.)**

### ORDERING INFORMATION

| Device          | Package              | Shipping†        |
|-----------------|----------------------|------------------|
| MC10ELT22DG     | SO-8<br>(Pb-Free)    | 98 Units / Rail  |
| MC10ELT22DR2G   | SO-8<br>(Pb-Free)    | 2500 Tape & Reel |
| MC10ELT22DTG    | TSSOP-8<br>(Pb-Free) | 100 Units / Rail |
| MC10ELT22DTR2G  | TSSOP-8<br>(Pb-Free) | 2500 Tape & Reel |
| MC100ELT22DG    | SO-8<br>(Pb-Free)    | 98 Units / Rail  |
| MC100ELT22DR2G  | SO-8<br>(Pb-Free)    | 2500 Tape & Reel |
| MC100ELT22DTG   | TSSOP-8<br>(Pb-Free) | 100 Units / Rail |
| MC100ELT22DTR2G | TSSOP-8<br>(Pb-Free) | 2500 Tape & Reel |

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

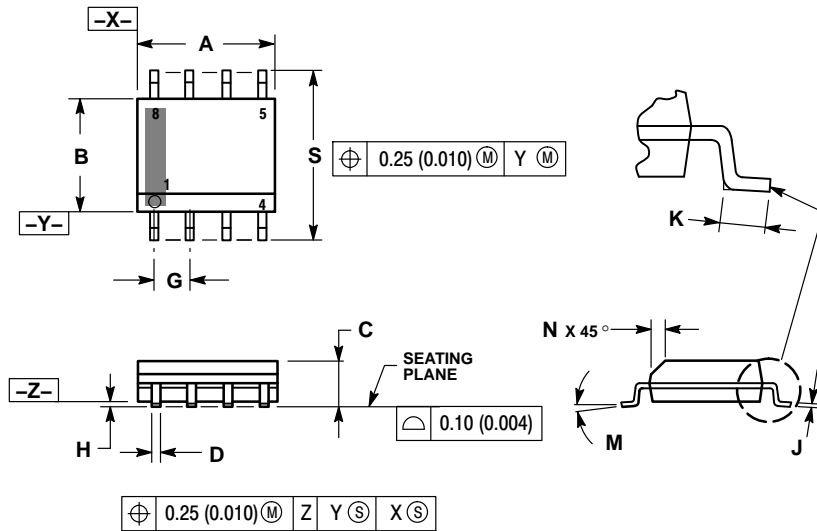
### Resource Reference of Application Notes

- AN1405/D** – ECL Clock Distribution Techniques
- AN1406/D** – Designing with PECL (ECL at +5.0 V)
- AN1503/D** – ECLinPS™ I/O SPICE Modeling Kit
- AN1504/D** – Metastability and the ECLinPS Family
- AN1568/D** – Interfacing Between LVDS and ECL
- AN1672/D** – The ECL Translator Guide
- AND8001/D** – Odd Number Counters Design
- AND8002/D** – Marking and Date Codes
- AND8020/D** – Termination of ECL Logic Devices
- AND8066/D** – Interfacing with ECLinPS
- AND8090/D** – AC Characteristics of ECL Devices

# MC10ELT22, MC100ELT22

## PACKAGE DIMENSIONS

SOIC-8 NB  
CASE 751-07  
ISSUE AK

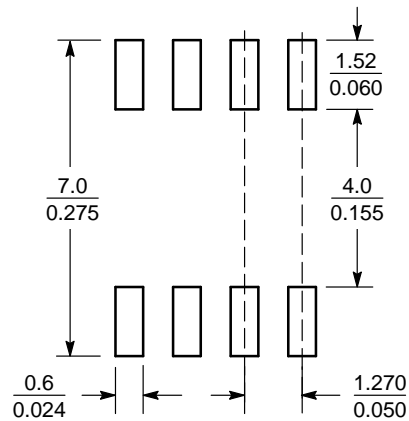


NOTES:

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 |

### SOLDERING FOOTPRINT\*



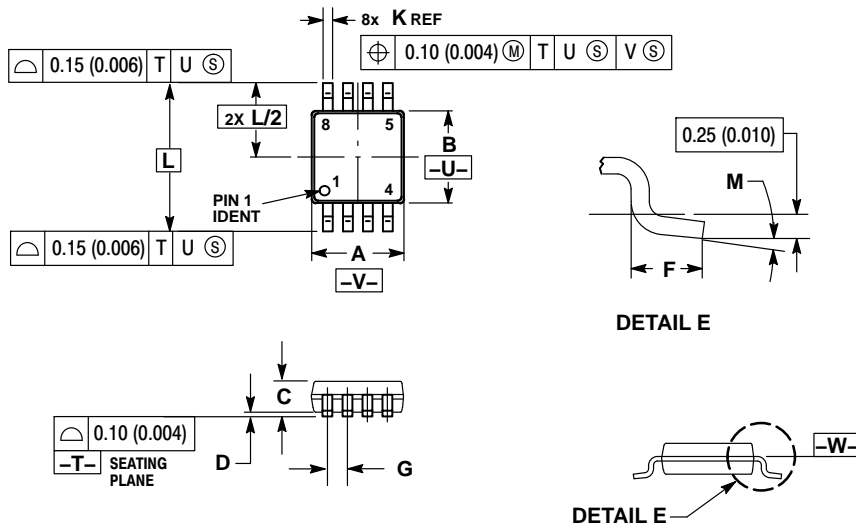
SCALE 6:1  $\left(\frac{\text{mm}}{\text{inches}}\right)$

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

# MC10ELT22, MC100ELT22

## PACKAGE DIMENSIONS

TSSOP-8  
DT SUFFIX  
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 -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°    |

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