

MC10ELT20, MC100ELT20

5V TTL to Differential PECL Translator

Description

The MC10ELT/100ELT20 is a 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 single gate of the ELT20 makes it ideal for those applications where space, performance, and low power are at a premium.

The 100 Series contains temperature compensation.

Features

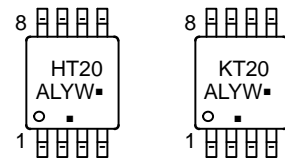
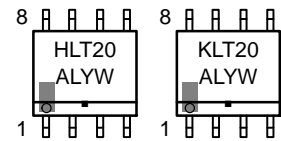
- 1.2 ns Typical Propagation Delay
- PNP TTL Inputs for Minimal Loading
- Flow Through Pinouts
- Operating Range: $V_{CC} = 4.75\text{ V}$ to 5.25 V with $GND = 0\text{ V}$
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant



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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 marking information, refer to 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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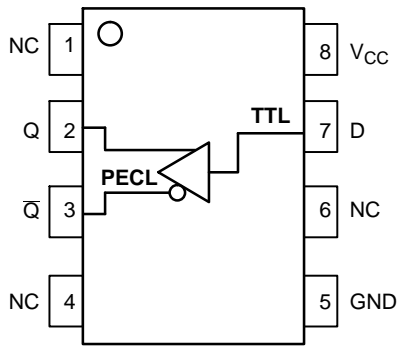


Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

| Pin | Function |
|-----------------|----------------------------|
| Q, \bar{Q} | PECL Differential Outputs* |
| D | TTL Input |
| V _{CC} | Positive Supply |
| GND | Ground |
| NC | No Connect |

*Output state undetermined when inputs are open.

Table 2. 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) | Pb-Free Pkg |
| | SO-8 TSSOP-8 Level 1 Level 3 |
| Flammability Rating | Oxygen Index: 28 to 34 UL 94 V-0 @ 0.125 in |
| Transistor Count | 51 Devices |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test | |

1. For additional information, see Application Note AND8003/D.

Table 3. MAXIMUM RATINGS

| Symbol | Parameter | Condition 1 | Condition 2 | Rating | Unit |
|------------------|------------------------------------------|--------------------------|----------------------------------|-------------|--------------|
| V _{CC} | Positive Power Supply | GND = 0 V | | 7 | V |
| V _{IN} | Input Voltage | GND = 0 V | V _I ≤ V _{CC} | 7 | 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 | 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 | °C/W |
| T _{sol} | Wave Solder | Pb-Free < 3 s @ 260°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.

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Table 4. 10ELT SERIES PECL DC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $GND = 0.0\text{ V}$ (Note 2)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|----------|------------------------------|-------|------|------|------|------|------|------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{CC} | Power Supply Current | | | 16 | | | 16 | | | 16 | mA |
| V_{OH} | Output HIGH Voltage (Note 3) | 3920 | 4010 | 4110 | 4020 | 4105 | 4190 | 4090 | 4185 | 4280 | mV |
| V_{OL} | 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 lfm.

- Output parameters vary 1:1 with V_{CC} . V_{CC} can vary $\pm 0.25\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2\text{ V}$.

Table 5. 100ELT SERIES PECL DC CHARACTERISTICS $V_{CC} = 5.0\text{ V}$; $GND = 0.0\text{ V}$ (Note 4)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|----------|------------------------------|-------|------|------|------|------|------|------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{CC} | Power Supply Current | | | 16 | | | 16 | | | 16 | mA |
| V_{OH} | Output HIGH Voltage (Note 5) | 3915 | 3995 | 4120 | 3975 | 4045 | 4120 | 3975 | 4050 | 4120 | mV |
| V_{OL} | Output LOW Voltage (Note 5) | 3170 | 3305 | 3445 | 3190 | 3295 | 3380 | 3190 | 3295 | 3380 | mV |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current | 0.5 | | | 0.5 | | | 0.5 | | | μA |

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 lfm.

- Output parameters vary 1:1 with V_{CC} . V_{CC} can vary $\pm 0.25\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2\text{ V}$.

Table 6. TTL INPUT DC CHARACTERISTICS $V_{CC} = 4.7\text{ V}$ to 5.27 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 | $V_{IN} = 7.0\text{ V}$ | | | 100 | μA |
| 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 |

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 lfm.

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

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|--------------|-----------------------------------|-------|------|-----|------|------|------|------|------|------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{max} | Maximum Toggle Frequency | 100 | | | 100 | | | 100 | | | MHz |
| t_{PLH} | Propagation Delay 1.5 V to 50% | 0.6 | 0.82 | 1.2 | 0.6 | 0.82 | 1.25 | 0.6 | 0.83 | 1.35 | ns |
| t_{PHL} | Propagation Delay 1.5 V to 50% | 0.4 | | 1.0 | 0.5 | 0.8 | 1.1 | 0.7 | | 1.30 | ns |
| t_{JITTER} | Cycle-to-Cycle Jitter | | TBD | | | TBD | | | TBD | | ps |
| t_r/t_f | Output Rise/Fall Time (20–80%) | 0.15 | | 1.5 | 0.15 | | 1.5 | 0.15 | | 1.5 | 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 lfpm.

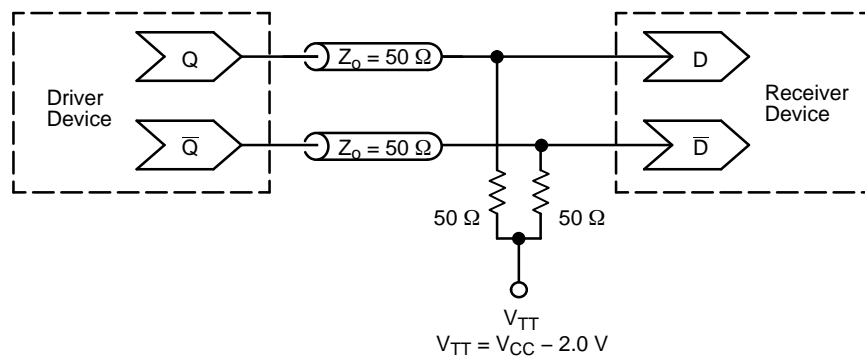


Figure 2. Typical Termination for Output Driver and Device Evaluation
(See Application Note AND8020/D – Termination of ECL Logic Devices.)

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ORDERING INFORMATION

| Device | Package | Shipping† |
|-----------------|----------------------|--------------------|
| MC10ELT20DG | SO-8 (Pb-Free) | 98 Units / Rail |
| MC10ELT20DR2G | SO-8 (Pb-Free) | 2500 / Tape & Reel |
| MC10ELT20DTG | TSSOP-8 (Pb-Free) | 100 Units / Rail |
| MC10ELT20DTR2G | TSSOP-8 (Pb-Free) | 2500 / Tape & Reel |
| MC100ELT20DG | SO-8 (Pb-Free) | 98 Units / Rail |
| MC100ELT20DR2G | SO-8 (Pb-Free) | 2500 / Tape & Reel |
| MC100ELT20DTG | TSSOP-8 (Pb-Free) | 100 Units / Rail |
| MC100ELT20DTR2G | TSSOP-8 (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 Specifications Brochure, BRD8011/D.

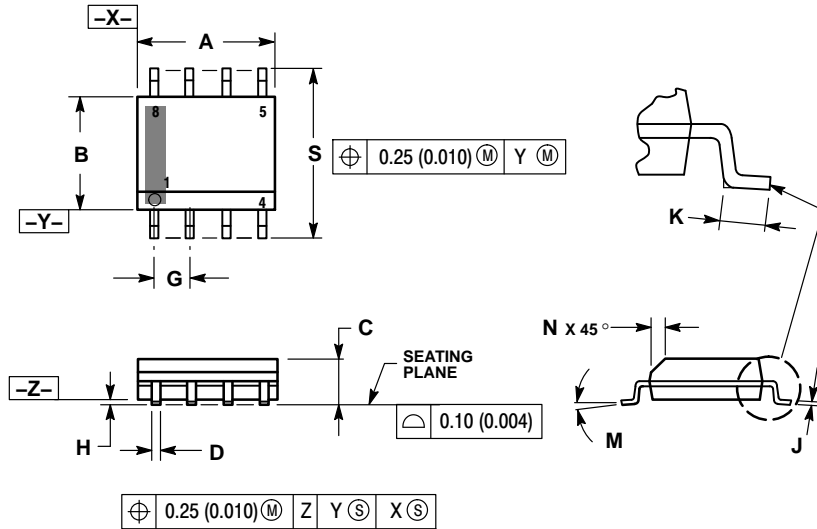
Resource Reference of Application Notes

- 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

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PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AK

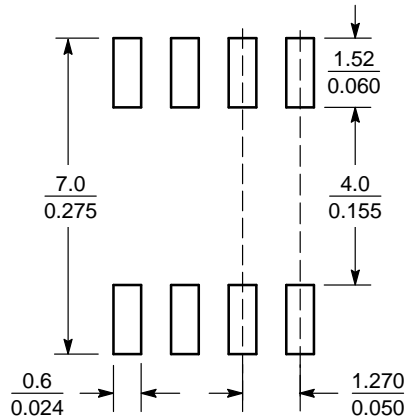


NOTES:

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*



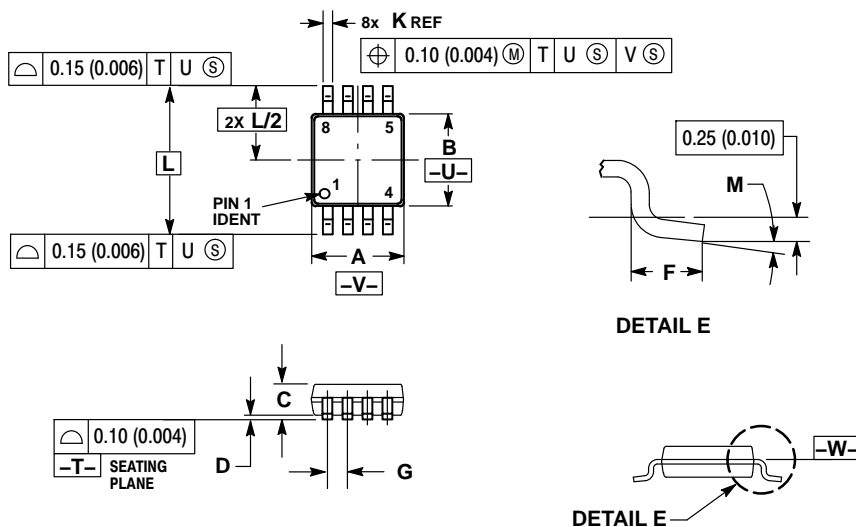
SCALE 6:1 $\left(\frac{\text{mm}}{\text{inches}}\right)$

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

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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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