

MC100LVELT20

Product Preview

3.3V LVTTTL/LVCMOS to Differential LVPECL Translator

Description

The MC100LVELT20 is a 3.3 V TTL/CMOS to differential PECL translator. Because PECL (Positive ECL) levels are used, only + 3.3 V and ground are required. The small outline SOIC-8 package and the single gate of the MC100LVELT20 makes it ideal for those applications where space, performance, and low power are at a premium.

The 100 Series contains temperature compensation.

Features

- 390 ps Typical Propagation Delay
- Maximum Input Clock Frequency > 0.8 GHz Typical
- Operating Range $V_{CC} = 3.0\text{ V}$ to 3.6 V with $GND = 0\text{ V}$
- PNP TTL Input for Minimal Loading
- Q Output will Default HIGH with Input Open
- Pb-Free Packages are Available



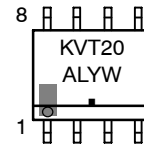
ON Semiconductor®

<http://onsemi.com>

MARKING DIAGRAM



SO-8
D SUFFIX
CASE 751



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

*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 4 of this data sheet.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

MC100LVELT20

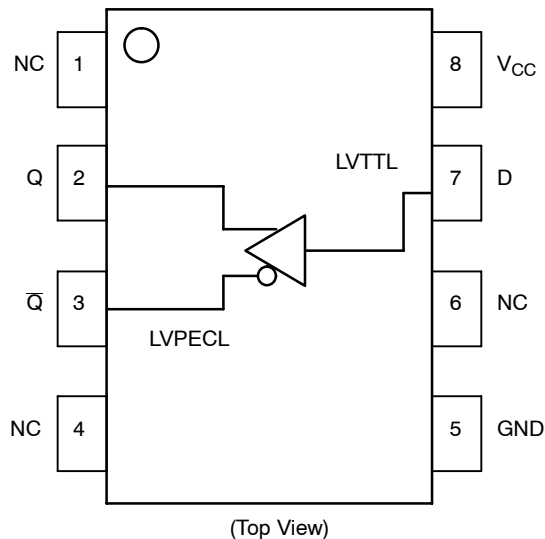


Table 1. PIN DESCRIPTION

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

Figure 1. 8-Lead Pinout and Logic Diagram

Table 2. ATTRIBUTES

| Characteristics | | Value | |
|---|--|------------------------|----------------------|
| Internal Input Pulldown Resistor | | N/A | |
| Internal Input Pullup Resistor | | N/A | |
| ESD Protection | | Human Body Model | > 1.5 kV |
| | | Machine Model | > 200 V |
| | | Charged Device Model | > 2 kV |
| Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1) | | Pb Pkg | Pb-Free Pkg |
| | | SOIC-8 | Level 1 |
| Flammability Rating | | Oxygen Index: 28 to 34 | UL 94 V-0 @ 0.125 in |
| Transistor Count | | 150 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} | Power Supply | GND = 0 V | | 6 | V |
| V _I | Input Voltage | GND = 0 V | V _I ≤ V _{CC} | 6 | 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 | SOIC-8 SOIC-8 | 190 130 | °C/W °C/W |
| θ _{JC} | Thermal Resistance (Junction-to-Case) | Standard Board | SOIC-8 | 41 to 44 | °C/W |
| T _{sol} | Wave Solder | Pb Pb-Free | | 265 265 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

MC100LVELT20

Table 4. LVTTTL INPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$, $GND = 0\text{ V}$, $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$

| Symbol | Characteristic | Min | Typ | Max | Unit |
|-----------|--|-----|-----|------|---------------|
| I_{IH} | Input HIGH Current ($V_{in} = 2.7\text{ V}$) | | | 20 | μA |
| I_{IHH} | Input HIGH Current MAX ($V_{in} = 6.0\text{ V}$) | | | 100 | μA |
| I_{IL} | Input LOW Current ($V_{in} = 0.5\text{ V}$) | | | -0.6 | mA |
| V_{IK} | Input Clamp 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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

Table 5. 100LVELT PECL OUTPUT DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$, $GND = 0\text{ V}$ (Note 2)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|----------|-------------------------------|---------------------|------|------|--------------------|------|------|--------------------|------|------|-------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{CC} | Negative Power Supply Current | 20 | 25 | 30 | 22 | 27 | 32 | 23 | 28 | 33 | mA |
| V_{OH} | Output HIGH Voltage (Note 3) | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | mV |
| V_{OL} | Output LOW Voltage (Note 3) | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | 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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Output parameters vary 1:1 with V_{CC} .
- All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

Table 6. AC CHARACTERISTICS $V_{CC} = 3.0\text{ V}$ to 3.6 V , $GND = 0\text{ V}$ (Note 4)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|--------------------------|---|---------------------|-----|-----|--------------------|-----|-----|--------------------|-----|-----|--------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{max} | Maximum Input Clock Frequency (Figure 2) | 600 | 800 | | 600 | 800 | | 600 | 800 | | MHz |
| t_{PLH} , t_{PHL} | Propagation Delay to Output Differential | 280 | 350 | 430 | 300 | 370 | 450 | 320 | 400 | 490 | ps |
| t_{SKEW} | Device-to-Device Skew (Note 5) | | | 250 | | | 250 | | | 250 | ps |
| t_{JITTER} | Random Clock Jitter (RMS) (Figure 2) | | < 1 | < 2 | | < 1 | < 2 | | < 1 | < 2 | ps |
| t_r , t_f | Output Rise/Fall Times (20% - 80%) Q, \bar{Q} | 70 | 100 | 225 | 80 | 120 | 225 | 90 | 140 | 225 | ps |

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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Measured using a LVTTTL source, 50% duty cycle clock source. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.
- Skew is measured between outputs under identical transitions.

MC100LVELT20

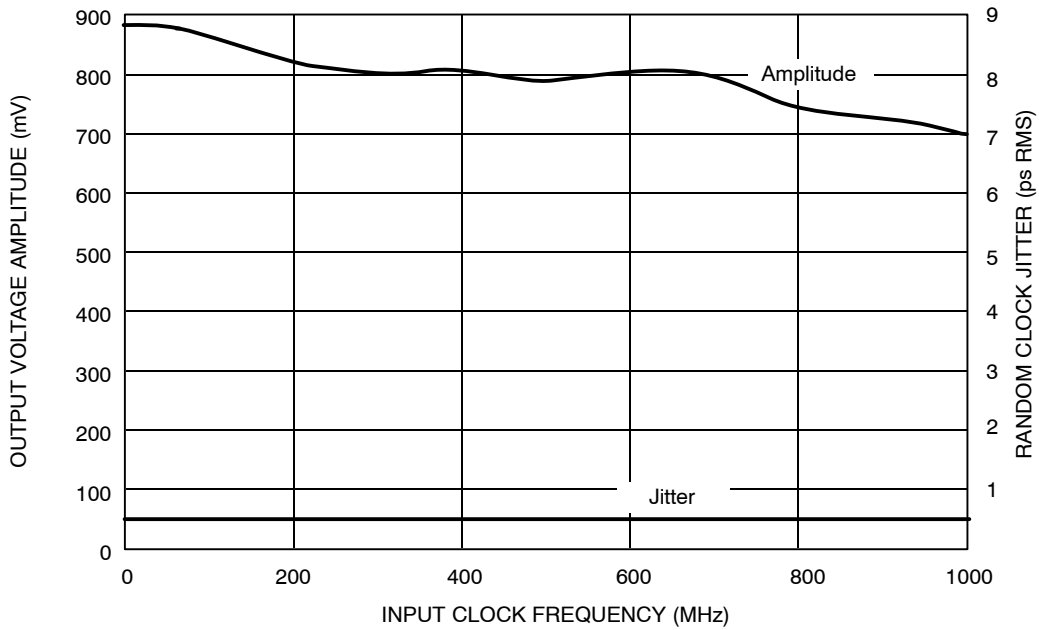


Figure 2. Output Voltage Amplitude (V_{OUTpp})/RMS Jitter vs. Input Clock Frequency at Ambient Temperature

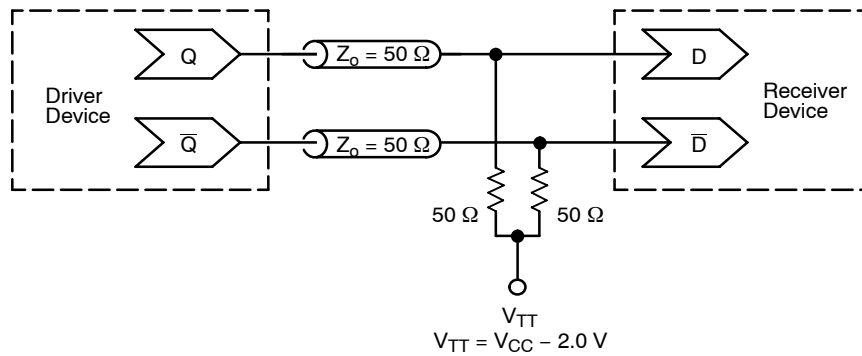


Figure 3. Typical Termination for Output Driver and Device Evaluation (See Application Note AND8020/D – Termination of ECL Logic Devices.)

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|------------------|---------------------|-----------------------|
| MC100LVELT20D | SOIC-8 | 98 Units / Rail |
| MC100LVELT20DG | SOIC-8 (Pb-Free) | 98 Units / Rail |
| MC100LVELT20DR2 | SOIC-8 | 2500 / Tape & Reel |
| MC100LVELT20DR2G | SOIC-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.

MC100LVELT20

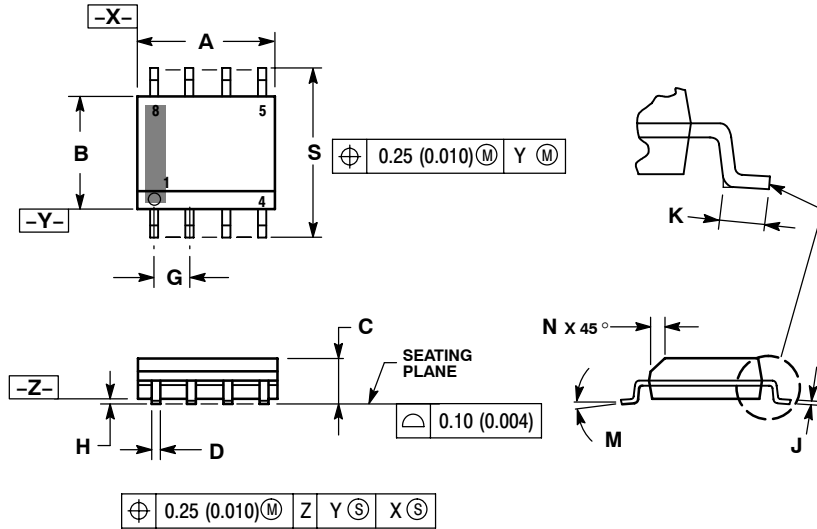
Resource Reference of Application Notes

- 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

MC100LVELT20

PACKAGE DIMENSIONS

SOIC-8 NB
CASE 751-07
ISSUE AH

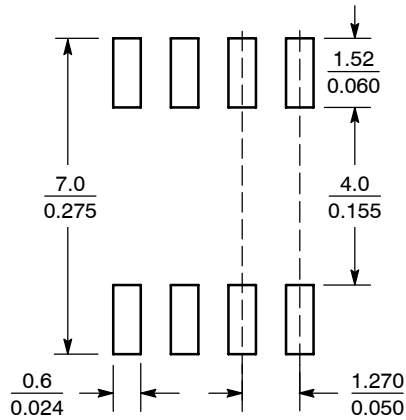


NOTES:

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 ($\frac{\text{mm}}{\text{inches}}$)

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

MC100LVELT20

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