

# MC100LVELT22

## 3.3V Dual LVTTTL/LVCMOS to Differential LVPECL Translator

The MC100LVELT22 is a dual LVTTTL/LVCMOS to differential LVPECL translator. Because LVPECL (Low Voltage Positive ECL) levels are used, only +3.3 V and ground are required. The small outline 8-lead package and the low skew, dual gate design of the LVELT22 makes it ideal for applications which require the translation of a clock and a data signal.

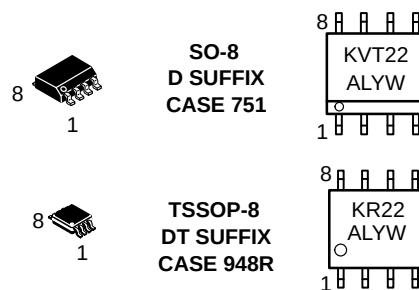
- 350 ps Typical Propagation Delay
- <100 ps Output-to-Output Skew
- Flow Through Pinouts
- The 100 Series Contains Temperature Compensation
- LVPECL Operating Range:  $V_{CC} = 3.0\text{ V}$  to  $3.8\text{ V}$  with  $GND = 0\text{ V}$
- When Unused TTL Input is left Open, Q Output will Default High



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### MARKING DIAGRAMS\*



A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week

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

### ORDERING INFORMATION

| Device           | Package | Shipping**      |
|------------------|---------|-----------------|
| MC100LVELT22D    | SO-8    | 98 Units/Rail   |
| MC100LVELT22DR2  | SO-8    | 2500 Units/Reel |
| MC100LVELT22DT   | TSSOP-8 | 98 Units/Rail   |
| MC100LVELT22DTR2 | TSSOP-8 | 2500 Units/Reel |

\*\*For additional tape and reel information, see Brochure BRD8011/D.

MC100LVELT22

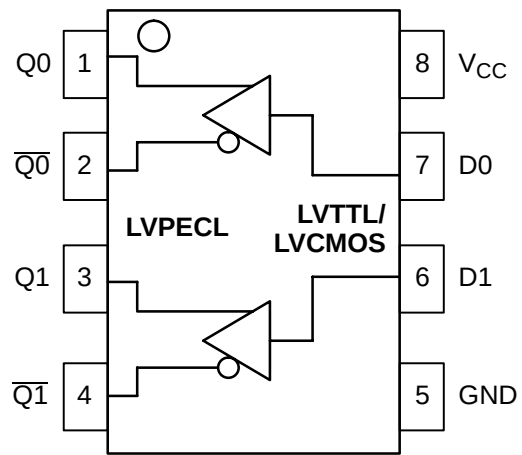


Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

PIN DESCRIPTION

| PIN                 | FUNCTION                    |
|---------------------|-----------------------------|
| Qn, $\overline{Qn}$ | LVPECL Differential Outputs |
| D0, D1              | LVTTTL/LVCMOS Inputs        |
| V <sub>CC</sub>     | Positive Supply             |
| GND                 | Ground                      |

ATTRIBUTES

| Characteristics                                               | Value                             |
|---------------------------------------------------------------|-----------------------------------|
| Internal Input Pulldown Resistor                              | N/A                               |
| Internal Input Pullup Resistor                                | N/A                               |
| ESD Protection                                                | Human Body Model<br>Machine Model |
|                                                               | > 4 kV<br>> 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                                              | 164                               |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test        |                                   |

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

# MC100LVELT22

## MAXIMUM RATINGS (Note 2)

| Symbol           | Parameter                                | Condition 1         | Condition 2                      | Rating        | Units        |
|------------------|------------------------------------------|---------------------|----------------------------------|---------------|--------------|
| V <sub>CC</sub>  | Positive Power Supply                    | GND = 0 V           |                                  | 7             | V            |
| V <sub>I</sub>   | Input Voltage                            | GND = 0 V           | V <sub>I</sub> ≤ V <sub>CC</sub> | 7             | 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 LFPM<br>500 LFPM  | SO-8<br>SO-8                     | 190<br>130    | °C/W<br>°C/W |
| θ <sub>JC</sub>  | Thermal Resistance (Junction-to-Case)    | std bd              | SO-8                             | 41 to 44 ± 5% | °C/W         |
| θ <sub>JA</sub>  | Thermal Resistance (Junction-to-Ambient) | 0 LFPM<br>500 LFPM  | TSSOP-8<br>TSSOP-8               | 185<br>140    | °C/W<br>°C/W |
| θ <sub>JC</sub>  | Thermal Resistance (Junction-to-Case)    | std bd              | TSSOP-8                          | 41 to 44 ± 5% | °C/W         |
| T <sub>sol</sub> | Wave Solder                              | <2 to 3 sec @ 248°C |                                  | 265           | °C           |

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

## LVPECL DC CHARACTERISTICS V<sub>CC</sub> = 3.3 V; GND = 0.0 V (Note 3)

| 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         |        |     | 28   |       |     | 28   |       |     | 29   | mA   |
| V <sub>OH</sub> | Output HIGH Voltage (Note 4) | 2275   |     | 2420 | 2275  |     | 2420 | 2275  |     | 2420 | mV   |
| V <sub>OL</sub> | Output LOW Voltage (Note 4)  | 1490   |     | 1680 | 1490  |     | 1680 | 1490  |     | 1680 | 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 lfm is maintained.

3. Output parameters vary 1:1 with V<sub>CC</sub>. V<sub>CC</sub> can vary ±0.15 V.

4. Outputs are terminated through a 50 ohm resistor to V<sub>CC</sub>-2 volts.

## LVTTTL/LVC MOS INPUT DC CHARACTERISTICS V<sub>CC</sub> = 3.3 V; T<sub>A</sub> = -40 °C to 85 °C (Note 5)

| Symbol           | Characteristic     | Min | Typ | Max  | Unit | Condition                         |
|------------------|--------------------|-----|-----|------|------|-----------------------------------|
| I <sub>IH</sub>  | Input HIGH Current |     |     | 20   | μA   | V <sub>IN</sub> = 2.7 V           |
| I <sub>IHH</sub> | Input HIGH Current |     |     | 100  | μA   | V <sub>IN</sub> = V <sub>CC</sub> |
| I <sub>IL</sub>  | Input LOW Current  |     |     | -0.2 | mA   | V <sub>IN</sub> = 0.5 V           |
| V <sub>IK</sub>  |                    |     |     | -1.2 | V    | I <sub>IN</sub> = -18 mA          |
| V <sub>IH</sub>  | Input HIGH Voltage | 2.0 |     |      | V    |                                   |
| V <sub>IL</sub>  | Input LOW Voltage  |     |     | 0.8  | V    |                                   |

5. V<sub>CC</sub> can vary ±0.15 V.

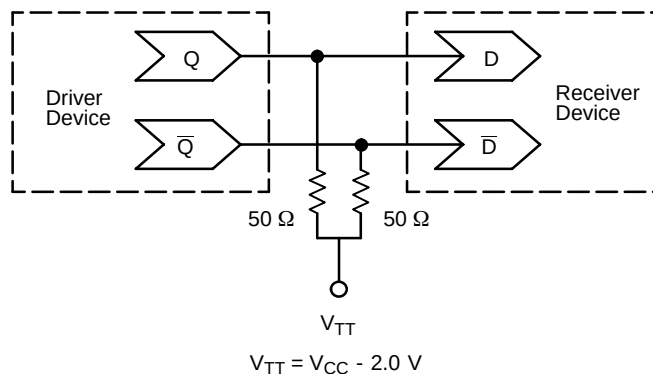
## AC CHARACTERISTICS V<sub>CC</sub> = 3.3 V; GND = 0.0 V (Note 6)

| Symbol                         | Characteristic                           | -40 °C |     |            | 25 °C |     |            | 85 °C |     |            | Unit |
|--------------------------------|------------------------------------------|--------|-----|------------|-------|-----|------------|-------|-----|------------|------|
|                                |                                          | Min    | Typ | Max        | Min   | Typ | Max        | Min   | Typ | Max        |      |
| f <sub>max</sub>               | Maximum Toggle Frequency                 |        |     |            |       | 350 |            |       |     |            | MHz  |
| t <sub>PLH</sub>               | Propagation Delay (Note 7)               | 200    | 350 | 600        | 200   | 350 | 600        | 200   | 350 | 600        | ps   |
| t <sub>skew</sub>              | Skew<br>Output-to-Output<br>Part-to-Part |        | 30  | 100<br>400 |       | 30  | 100<br>400 |       | 30  | 100<br>400 | ps   |
| t <sub>JITTER</sub>            | Random Clock Jitter (RMS)                |        |     |            |       | 1.6 |            |       |     |            | ps   |
| t <sub>r</sub> /t <sub>f</sub> | Output Rise/Fall Time (20-80%)           | 200    |     | 550        | 200   |     | 500        | 200   |     | 500        | ps   |

6. V<sub>CC</sub> can vary ±0.15 V.

7. Specifications for standard TTL input signal.

## MC100LVELT22



**Figure 1. Typical Termination for Output Driver and Device Evaluation**  
(See Application Note AND8020 - Termination of ECL Logic Devices.)

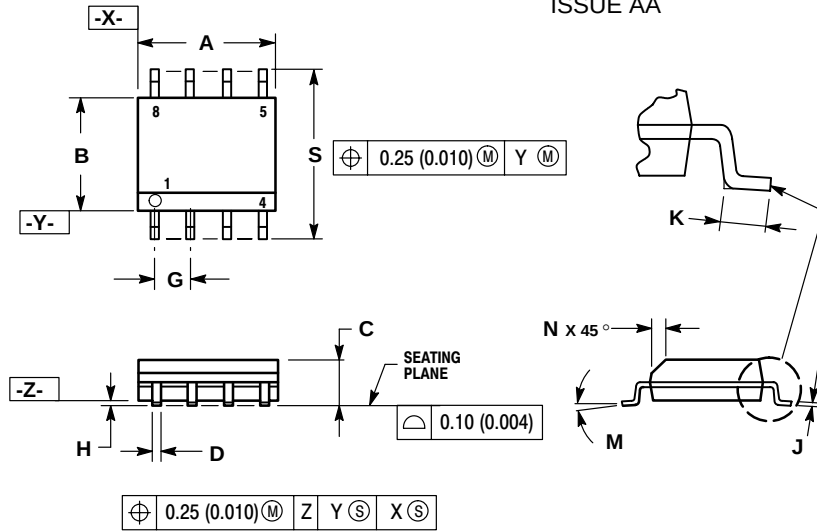
### Resource Reference of Application Notes

|                |                                                               |
|----------------|---------------------------------------------------------------|
| <b>AN1404</b>  | - ECLinPS Circuit Performance at Non-Standard $V_{IH}$ Levels |
| <b>AN1405</b>  | - ECL Clock Distribution Techniques                           |
| <b>AN1406</b>  | - Designing with PECL (ECL at +5.0 V)                         |
| <b>AN1503</b>  | - ECLinPS I/O SPICE Modeling Kit                              |
| <b>AN1504</b>  | - Metastability and the ECLinPS Family                        |
| <b>AN1560</b>  | - Low Voltage ECLinPS SPICE Modeling Kit                      |
| <b>AN1568</b>  | - Interfacing Between LVDS and ECL                            |
| <b>AN1596</b>  | - ECLinPS Lite Translator ELT Family SPICE I/O Model Kit      |
| <b>AN1650</b>  | - Using Wire-OR Ties in ECLinPS Designs                       |
| <b>AN1672</b>  | - The ECL Translator Guide                                    |
| <b>AND8001</b> | - Odd Number Counters Design                                  |
| <b>AND8002</b> | - Marking and Date Codes                                      |
| <b>AND8020</b> | - Termination of ECL Logic Devices                            |
| <b>AND8090</b> | - AC Characteristics of ECL Devices                           |

# MC100LVELT22

## PACKAGE DIMENSIONS

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



### NOTES:

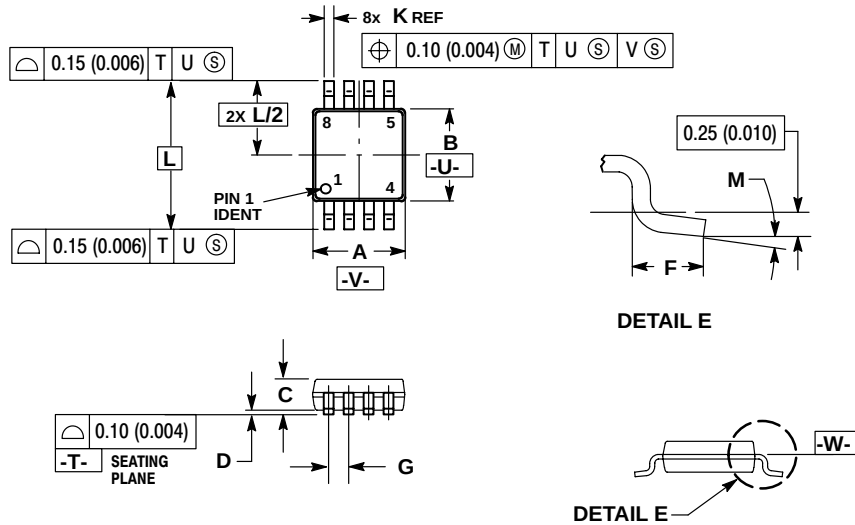
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL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

# MC100LVELT22

## 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-.

| 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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