

Triple PECL to ECL Translator

The MC100LVEL/EL91 is a triple PECL to ECL translator. The MC100LVEL91 receives low voltage PECL signals and translates them to differential ECL output signals. The MC100EL91 receives standard voltage PECL signals and translates them to differential ECL output signals.

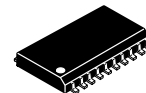
- MC100LVEL91 Supports Low Voltage Operation
- MC100LVEL91 Has 620ps Typical Propagation Delays
- MC100EL91 Supports Standard Voltage Operation
- MC100EL91 Has 670ps Typical Propagation Delays
- Fully Differential Design
- 20-lead SOIC Packaging

A V_{BB} output is provided for interfacing with single ended PECL signals at the input. If a single ended input is to be used the V_{BB} output should be connected to the D input. The active signal would then drive the D input. When used the V_{BB} output should be bypassed to ground via a $0.01\mu F$ capacitor. The V_{BB} output is designed to act as the switching reference for the EL/LVEL91 under single ended input switching conditions, as a result this pin can only source/sink up to 0.5mA of current.

To accomplish the level translation the EL/LVEL91 requires three power rails. The V_{CC} supply should be connected to the positive supply, and the V_{EE} pin should be connected to the negative power supply. The GND pins are connected to the system ground plain. Both V_{EE} and V_{CC} should be bypassed to ground via $0.01\mu F$ capacitors.

Under open input conditions, the \bar{D} input will be biased at $V_{CC}/2$ and the D input will be pulled to GND. This condition will force the Q output to a low, ensuring stability.

MC100LVEL91 MC100EL91



DW SUFFIX
20-LEAD PLASTIC SOIC WIDE PACKAGE
CASE 751D-04

PIN NAMES

| Pins | Function |
|----------------|-------------------------------|
| Dn | PECL/LVPECL Inputs |
| Qn | ECL/LVECL Outputs |
| PECL_ V_{BB} | PECL Reference Voltage Output |

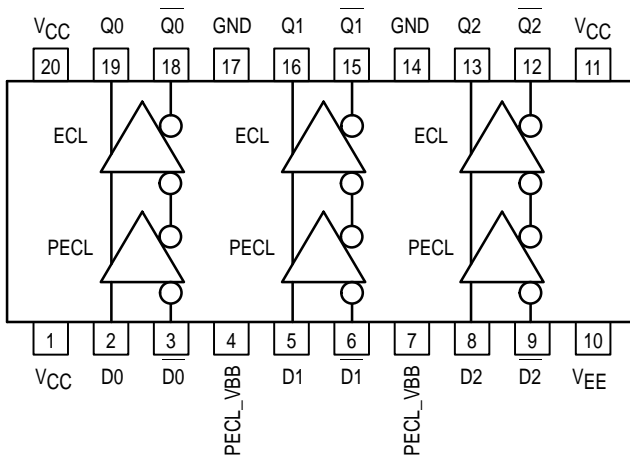


Figure 1. 20-Lead Pinout (Top View) and Logic Diagram



LVPECL INPUT DC CHARACTERISTICS

| Symbol | Characteristic | -40°C | | 0°C | | 25°C | | | 85°C | | Unit | Condition |
|------------------|------------------------------|-------|-------|-------|-------|-------|-----|-------|-------|-------|------|------------------------|
| | | Min | Max | Min | Max | Min | Typ | Max | Min | Max | | |
| V _{CC} | Power Supply Voltage | 3.0 | 3.6 | 3.0 | 3.6 | 3.0 | 3.3 | 3.6 | 3.0 | 3.6 | V | |
| I _{IH} | Input HIGH Current | | 150 | | 150 | | | 150 | | 150 | µA | |
| I _{IL} | Input LOW Current | 0.5 | | 0.5 | | 0.5 | | | 0.5 | | µA | |
| V _{IH} | Input HIGH Voltage (Note 1.) | 2.135 | 2.420 | 2.135 | 2.420 | 2.135 | | 2.420 | 2.135 | 2.420 | V | V _{CC} = 3.3V |
| V _{IL} | Input LOW Voltage (Note 1.) | 1.49 | 1.825 | 1.49 | 1.825 | 1.49 | | 1.825 | 1.49 | 1.825 | V | V _{CC} = 3.3V |
| V _{BB} | Reference Output (Note 1.) | 1.92 | 2.04 | 1.92 | 2.04 | 1.92 | | 2.04 | 1.92 | 2.04 | V | V _{CC} = 3.3V |
| I _{GND} | Power Supply Current | | 10 | | 10 | | 6.0 | 10 | | 10 | mA | |

1. DC levels vary 1:1 with V_{CC}.

PECL INPUT DC CHARACTERISTICS

| Symbol | Characteristic | -40°C | | 0°C | | 25°C | | | 85°C | | Unit | Condition |
|------------------|------------------------------|-------|-------|-------|-------|-------|-----|-------|-------|-------|------|------------------------|
| | | Min | Max | Min | Max | Min | Typ | Max | Min | Max | | |
| V _{CC} | Power Supply Voltage | 4.75 | 5.25 | 4.75 | 5.25 | 4.75 | 5.0 | 5.25 | 4.75 | 5.25 | V | |
| I _{IH} | Input HIGH Current | | 150 | | 150 | | | 150 | | 150 | µA | |
| I _{IL} | Input LOW Current | 0.5 | | 0.5 | | 0.5 | | | 0.5 | | µA | |
| V _{IH} | Input HIGH Voltage (Note 2.) | 3.835 | 4.120 | 3.835 | 4.12 | 3.835 | | 4.12 | 3.835 | 4.120 | V | V _{CC} = 5.0V |
| V _{IL} | Input LOW Voltage (Note 2.) | 3.19 | 3.525 | 3.19 | 3.525 | 3.19 | | 3.525 | 3.19 | 3.525 | V | V _{CC} = 5.0V |
| V _{BB} | Reference Output (Note 2.) | 3.62 | 3.74 | 3.62 | 3.74 | 3.62 | | 3.74 | 3.62 | 3.75 | V | V _{CC} = 5.0V |
| I _{GND} | Power Supply Current | | 11 | | 11 | | 6.0 | 11 | | 11 | mA | |

2. DC levels vary 1:1 with V_{CC}.

ECL/LVECL OUTPUT DC CHARACTERISTICS

| Symbol | Characteristic | -40°C | | 0°C | | 25°C | | | 85°C | | Unit | Condition |
|-----------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|------|-----------|
| | | Min | Max | Min | Max | Min | Typ | Max | Min | Max | | |
| V _{EE} | Power Supply Voltage EL91 LVEL91 | -4.2 -3.0 | -5.5 -3.8 | -4.2 -3.0 | -5.5 -3.8 | -4.2 -3.0 | -4.5 -3.3 | -5.5 -3.8 | -4.2 -3.0 | -5.5 -3.8 | V | |
| V _{OH} | Output HIGH Voltage | -1085 | -880 | -1025 | -880 | -1025 | -955 | -880 | -1025 | -880 | mV | |
| V _{OL} | Output LOW Voltage | -1830 | -1555 | -1810 | -1620 | -1810 | -1705 | -1620 | -1810 | -1620 | mV | |
| I _{EE} | Power Supply Current EL91 LVEL91 | | 28 27 | | 28 27 | | 22 21 | 28 27 | | 30 29 | mA | |

MC100LVEL91**AC CHARACTERISTICS** ($V_{EE} = -3.0V$ to $-3.8V$; $V_{CC} = 3.0V$ to $3.6V$)

| Symbol | Characteristic | -40°C | | | 0°C | | | 25°C | | | 85°C | | | Unit |
|--------------------------------------|--|------------|------------|--|------------|------------|--|------------|------------|--|------------|------------|--|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| t _{PLH} t _{PHL} | Propagation Delay D to Q Diff S.E. | 490 440 | 590 590 | 690 740 | 510 460 | 610 610 | 710 760 | 520 470 | 620 620 | 720 770 | 560 510 | 660 660 | 760 810 | ps |
| t _{SKEW} | Skew Output-to-Output (Note 3.) Part-to-Part (Diff) (Note 3.) Duty Cycle (Diff) (Note 4.) | | 40 25 | 100 200 | | 40 25 | 100 200 | | 40 25 | 100 200 | | 40 25 | 100 200 | ps |
| V _{PP} | Minimum Input Swing (Note 5.) | 200 | | | 200 | | | 200 | | | 200 | | | mV |
| V _{CMR} | Common Mode Range (Note 6.) V _{PP} < 500mV V _{PP} ≥ 500mV | 1.3 1.5 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | V |
| t _r t _f | Output Rise/Fall Times Q (20% – 80%) | 320 | 400 | 580 | 320 | 400 | 580 | 320 | 400 | 580 | 320 | 400 | 580 | ps |

- Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
- Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
- Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
- The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1V.

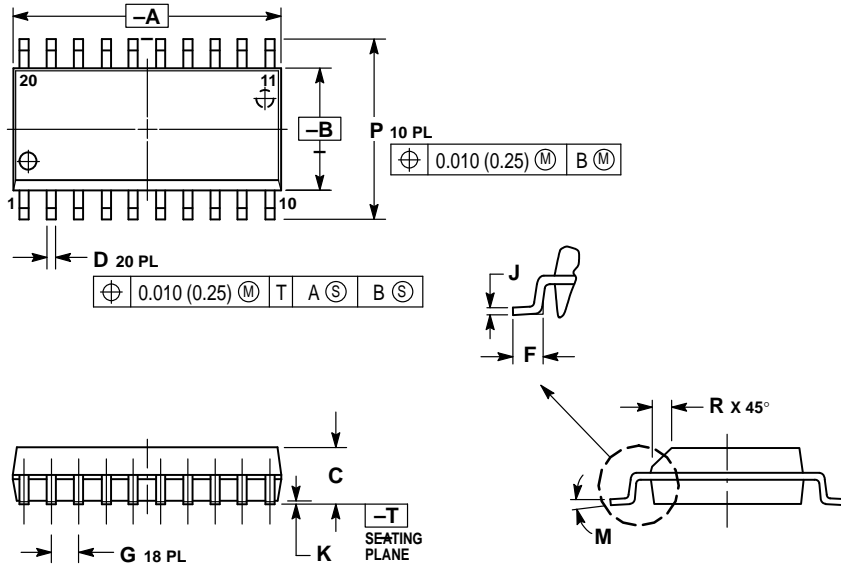
MC100EL91**AC CHARACTERISTICS** ($V_{EE} = -4.20V$ to $-5.5V$; $V_{CC} = 4.75V$ to $5.25V$)

| Symbol | Characteristic | -40°C | | | 0°C | | | 25°C | | | 85°C | | | Unit |
|--------------------------------------|--|------------|------------|--|------------|------------|--|------------|------------|--|------------|------------|--|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| t _{PLH} t _{PHL} | Propagation Delay D to Q (Note 11.) Diff S.E. | 540 490 | 640 640 | 740 790 | 560 510 | 660 660 | 760 810 | 570 520 | 670 670 | 770 820 | 610 560 | 710 710 | 810 860 | ps |
| t _{SKEW} | Skew Output-to-Output (Note 7.) Part-to-Part (Diff) (Note 7.) Duty Cycle (Diff) (Note 8.) | | 40 25 | 100 200 | | 40 25 | 100 200 | | 40 25 | 100 200 | | 40 25 | 100 200 | ps |
| V _{PP} | Minimum Input Swing (Note 9.) | 200 | | | 200 | | | 200 | | | 200 | | | mV |
| V _{CMR} | Common Mode Range (Note 10.) V _{PP} < 500mV V _{PP} ≥ 500mV | 1.3 1.5 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | 1.2 1.4 | | V _{CC-0.2} V _{CC-0.2} | V |
| t _r t _f | Output Rise/Fall Times Q (20% – 80%) | 320 | 400 | 580 | 320 | 400 | 580 | 320 | 400 | 580 | 320 | 400 | 580 | ps |

- Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
- Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
- Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
- The CMR range is referenced to the most positive side of the differential input signal. Normal operation is obtained if the HIGH level falls within the specified range and the peak-to-peak voltage lies between V_{ppmin} and 1V.
- The MC100EL91 design has different propagation delays compared to the MC100LVEL91 due to differences in the translation structure.

OUTLINE DIMENSIONS

DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D-04
ISSUE E



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.150 (0.006) PER SIDE.
 5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.13 (0.005) TOTAL IN EXCESS OF D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 12.65 | 12.95 | 0.499 | 0.510 |
| B | 7.40 | 7.60 | 0.292 | 0.299 |
| C | 2.35 | 2.65 | 0.093 | 0.104 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.50 | 0.90 | 0.020 | 0.035 |
| G | 1.27 BSC | | 0.050 BSC | |
| J | 0.25 | 0.32 | 0.010 | 0.012 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° | 7° | 0° | 7° |
| P | 10.05 | 10.55 | 0.395 | 0.415 |
| R | 0.25 | 0.75 | 0.010 | 0.029 |

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