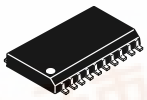
Triple PECL to ECL Translator

MC100LVEL91
MC100EL91

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



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

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 0.01µF 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 0.01µF capacitors.

Under open input conditions, the $\overline{D}$ 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.

PIN NAMES

Pins	Function
Dn	PECL/LVPECL Inputs
Qn	ECL/LVECL Outputs
PECL_V_{BB}	PECL Reference Voltage Output

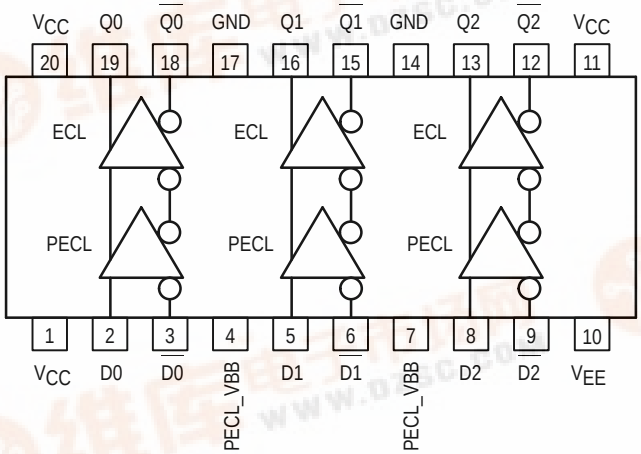


Figure 1. 20–Lead Pinout (Top View) **and Logic Diagram**

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 Curremt		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 Curremt		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 Volrage	–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)

		–40°C			0°C			25°C			85°C			
Symbol	**Characteristic**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
t_{PLH} t_{PHL}	Propagation Delay Diff D to Q 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

3. Skews are valid across specified voltage range, part–to–part skew is for a given temperature.
4. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
5. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
6. 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_{PP}min and 1V.

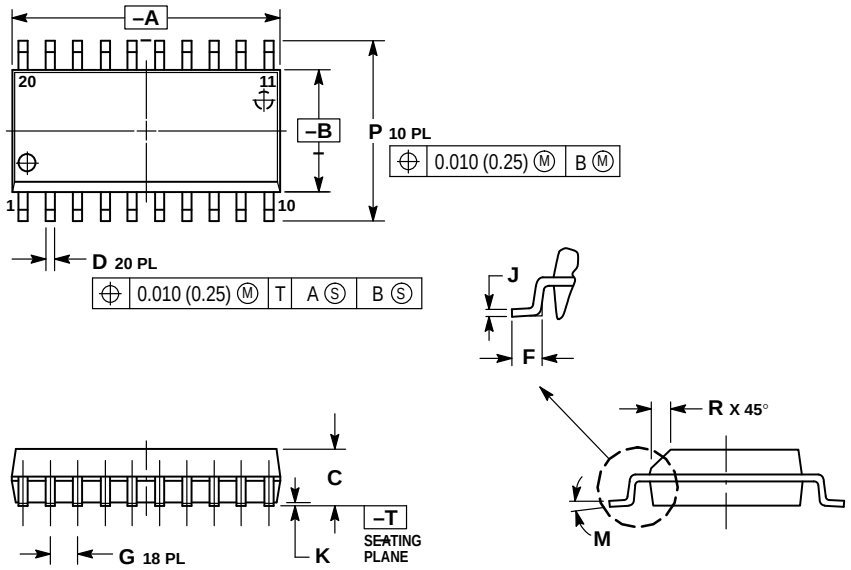
MC100EL91
AC CHARACTERISTICS (V_{EE} = –4.20V to –5.5V; V_{CC} = 4.75V to 5.25V)

		–40°C			0°C			25°C			85°C			
Symbol	**Characteristic**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Min**	**Typ**	**Max**	**Unit**
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

7. Skews are valid across specified voltage range, part–to–part skew is for a given temperature.
8. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
9. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
10. 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_{PP}min and 1V.
11. 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.

	MILLIMETERS		INCHES	
DIM	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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