Triple PECL to LVPECL Translator

MC100LVEL92

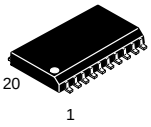
The MC100LVEL92 is a triple PECL to LVPECL translator. The device receives standard PECL signals and translates them to differential LVPECL output signals.

- 500ps Propagation Delays
- Fully Differential Design
- 20–Lead SOIC Package
- 5V and 3.3V Supplies Required
- >1500V ESD

A PECL V_{BB} output is provided for interfacing single ended PECL signals at the inputs. If a single ended PECL input is to be used the PECL V_{BB} output should be connected to the $\overline{D}$ input and the active signal will drive the D input. When used the PECL V_{BB} should be bypassed to ground via a 0.01µf capacitor. The PECL V_{BB} is designed to act as a switching reference for the MC100LVEL92 under single ended input conditions, as a result the pin can only source/sink 0.5mA of current.

To accomplish the PECL to LVPECL level translation, the MC100LVEL92 requires three power rails. The V_{CC} supply is to be connected to the standard PECL supply, the LVCC supply is to be connected to the LVPECL supply, and Ground is connected to the system ground plane. Both the V_{CC} and LVCC should be bypassed to ground with a 0.01µf capacitor.

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

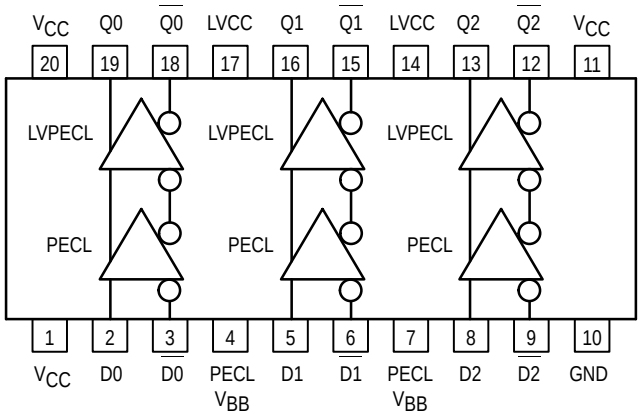


DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D-04

PIN NAMES

Pins	Function
Dn	PECL Inputs
Qn	LVPECL Outputs
V_{BB}	PECL Reference Voltage Output
LVCC	V_{CC} for LVPECL Output
V_{CC}	V_{CC} for PECL Inputs
GND	Common Ground Rail

Logic Diagram and Pinout: 20-Lead SOIC (Top View)



MOTOROLA

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	4.5	5.5	4.5	5.5	4.5		5.5	4.5	5.5	V	
I_{IH}	Input HIGH Current		150		150			150		150	µA	
I_{IL}	Input LOW Current Dn Dn	0.5 –600		0.5 –600		0.5 –600			0.5 –600		µA	
V_{PP}	Minimum Peak-to-Peak Input[1]	150		150		150			150		mV	
V_{IH}	Input HIGH Voltage[2]	3835	4120	3835	4120	3835		4120	3835	4120	mV	V_{CC} = 5.0V
V_{IL}	Input LOW Voltage[2]	3190	3515	3190	3525	3190		3525	3190	3525	mV	V_{CC} = 5.0V
V_{BB}	Reference Output[2]	3620	3740	3620	3740	3620		3740	3620	3740	mV	V_{CC} = 5.0V
I_{VCC}	Power Supply Current		12		12		8.0	12		12	mA	

1. 150mV input guarantees full logic swing at the output.
2. DC levels vary 1:1 with V_{CC}.

LVPECL 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_{CC}	Power Supply Voltage	3.0	3.8	3.0	3.8	3.0	3.3	3.8	3.0	3.8	V	
V_{OH}	Output HIGH Voltage[3]	2.215	2.42	2.275	2.42	2.275	2.35	2.42	2.275	2.42	V	V_{CC} = 3.3V
V_{OL}	Output LOW Voltage[3]	1.47	1.745	1.49	1.68	1.49	1.60	1.68	1.49	1.68	V	V_{CC} = 3.3V
I_{GND}	Power Supply Current		20		20		15	20		21	mA	

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

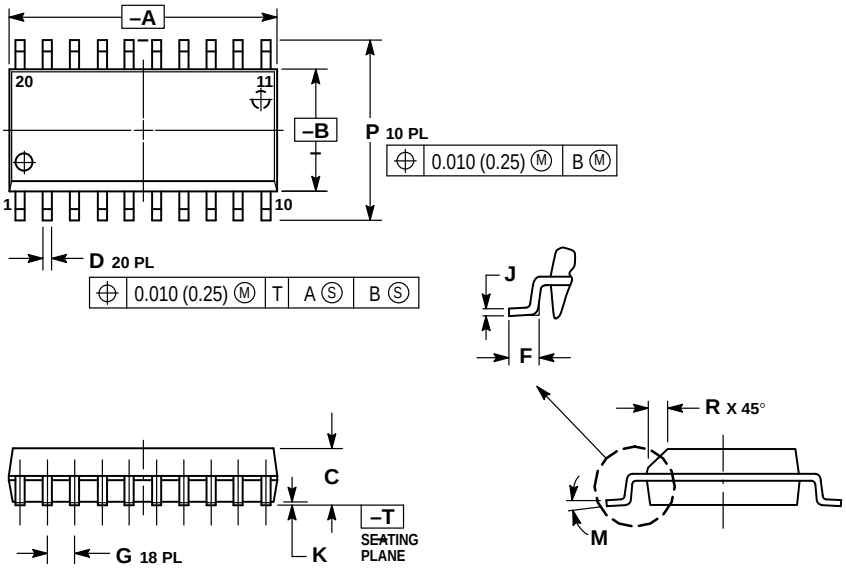
MC100LVEL92
AC CHARACTERISTICS (LV_{CC} = 3.0V to 3.8V; V_{CC} = 4.5V to 5.5V)

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 Diff D to Q S.E.	490 440	590 590	690 740	510 460	610 610	710 760	510 460	610 610	710 760	530 480	630 630	730 780	ps
t_{SKEW}	Skew Output–to–Output[4] Part–to–Part (Diff)[4] Duty Cycle (Diff)[5]		20 20 25	100 200		20 20 25	100 200		20 20 25	100 200		20 20 25	100 200	ps
V_{PP}	Minimum Input Swing[6]	150			150			150			150			mV
V_{CMR}	Common Mode Range[7] V_{PP} < 500mV	1.3		V_{CC} –0.2	1.2		V_{CC} –0.2	1.2		V_{CC} –0.2	1.2		V_{CC} –0.2	V
	$V_{PP} \geq$ 500mV	1.5		V_{CC} –0.2	1.4		V_{CC} –0.2	1.4		V_{CC} –0.2	1.4		V_{CC} –0.2	
t_r t_f	Output Rise/Fall Times Q (20% – 80%)	320		580	320		580	320		580	320		580	ps

4. Skews are valid across specified voltage range, part–to–part skew is for a given temperature.
5. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.Common Mode Range
6. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
7. 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.

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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