Triple ECL to PECL Translator

The MC100LVEL/EL90 is a triple ECL to PECL translator. The device receives either standard or low voltage differential ECL signals and translates them to either standard or low voltage differential PECL output signals. The LVEL device can handle the low voltage signals while the EL device is designed for the standard signals. It is possible to have low voltage signals on one side and standard signals on the other if the LVEL90 is used.

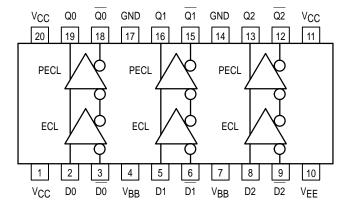
- 500ps Propagation Delays
- · Fully Differential Design
- Supports both Standard and Low Voltage Operation
- 20-Lead SOIC Packaging

A VBB output is provided for interfacing with single ended ECL signals at the input. If a single ended input is to be used the VBB output should be connected to the D input. The active signal would then drive the D input. When used the VBB output should be bypassed to ground via a $0.01\mu F$ capacitor. The VBB output is designed to act as the switching reference for the EL90 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/LVEL90 requires three power rails. The VCC supply should be connected to the positive supply, and the VEE pin should be connected to the negative power supply. The GND pins as expected are connected to the system ground plain. Both VEE and VCC should be bypassed to ground via $0.01\mu F$ capacitors.

Under open input conditions, the D input will be biased at VEE/2 and the D input will be pulled to VEE. This condition will force the Q output to a LOW, ensuring stability.

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



MC100LVEL90 MC100EL90



DW SUFFIXPLASTIC SOIC PACKAGE
CASE 751D-04

PIN NAMES

Pins	Function
Dn Qn V _{BB}	ECL Inputs PECL Outputs ECL Reference Voltage Output



ECL INPUT DC CHARACTERISTICS

		-40)°C	0°C		25°C			85	°C		
Symbol	Characteristic	Min	Max	Min	Max	Min	Тур	Max	Min	Max	Unit	Condition
VEE	Power Supply EL90 Voltage LVEL90	-4.2 -3.0	-5.5 -3.8	-4.2 -3.0	-5.5 -3.8	-4.2 -3.0		-5.5 -3.8	-4.2 -3.0	-5.5 -3.8	V	
lН	Input HIGH Current		150		150			150		150	μΑ	
I _{IL}	Input LOW Current	0.5		0.5		0.5			0.5		μΑ	
V _{PP}	Minimum Peak-to-Peak Input ¹	150		150		150			150		mV	
VIH	Input HIGH Voltage	-1165	-880	-1165	-880	-1165		-880	-1165	-880	V	
V _{IL}	Input LOW Voltage	-1810	-1475	-1810	-1475	-1810		-1475	-1810	-1475	V	
V _{BB}	Reference Output	-1.38	-1.26	-1.38	-1.26	-1.38		-1.26	-1.38	-1.26	V	·
I _{EE}	Power Supply Current		8.0		8.0		6.0	8.0		8.0	mA	

^{1. 150}mV input guarantees full logic swing at the output.

LVPECL OUTPUT DC CHARACTERISTICS

		–40°C		0°C		25°C			85	°C		
Symbol	Characteristic	Min	Max	Min	Max	Min	Тур	Max	Min	Max	Unit	Condition
Vcc	Power Supply Voltage	3.0	3.8	3.0	3.8	3.0	3.3	3.8	3.0	3.8	V	
Vон	Output HIGH Voltage ¹	2.215	2.42	2.275	2.42	2.275	2.35	2.42	2.275	2.42	V	VCC = 3.3V
VOL	Output LOW Voltage1	1.47	1.745	1.49	1.68	1.49	1.60	1.68	1.49	1.68	V	VCC = 3.3V
IGND	Power Supply Current		24		24		20	24		26	mA	

^{1.} Levels will vary 1:1 with V_{CC}.

PECL OUTPUT DC CHARACTERISTICS

		–40°C		0°C		25°C			85	°C		
Symbol	Characteristic	Min	Max	Min	Max	Min	Тур	Max	Min	Max	Unit	Condition
VCC	Power Supply Voltage	4.75	5.25	4.75	5.25	4.75		5.25	4.75	5.25	V	
VOH	Output HIGH Voltage ¹	3.915	4.12	3.975	4.12	3.975	4.05	4.12	3.975	4.12	V	V _{CC} = 5.0V
VOL	Output LOW Voltage ¹	3.17	3.445	3.19	3.38	3.19	3.30	3.38	3.19	3.38	V	V _{CC} = 5.0V
I _{GND}	Power Supply Current		24		24		20	24		26	mA	

^{1.} Levels will vary 1:1 with V_{CC}.

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MC100LVEL90 AC CHARACTERISTICS ($V_{EE} = -3.0V$ to -3.8V; $V_{CC} = 3.0V$ to 3.8V)

		-40°C				0°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Unit										
^t PLH ^t PHL	Propagation Delay Diff D to Q S.E.	390 340		590 640	410 360		610 660	420 370		620 670	460 410		660 710	ps	
^t SKEW	Skew Output-to-Output ¹ Part-to-Part (Diff) ¹ Duty Cycle (Diff) ²		20 25	100 200	ps										
VPP	Minimum Input Swing ³	150			150			150			150			mV	
VCMR	Common Mode Range ⁴	See4		-0.4	V										
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	230		500	230		500	230		500	230		500	ps	

- 1. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
- 2. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
- 3. Minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈40.
- 4. 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 Vppmin and 1V. V_{CMR}min depends on V_{EE}, V_{PP} and temperature. At V_{PP} < 500mV and −40°C, V_{CMR} is V_{EE} +1.3V; and for 0−85°C, V_{CMR} is V_{EE} +1.2V. At V_{PP} ≥500mV and −40°C, V_{CMR} is V_{EE} +1.5V; and for 0−85°C, V_{CMR} is V_{EE} +1.4V.

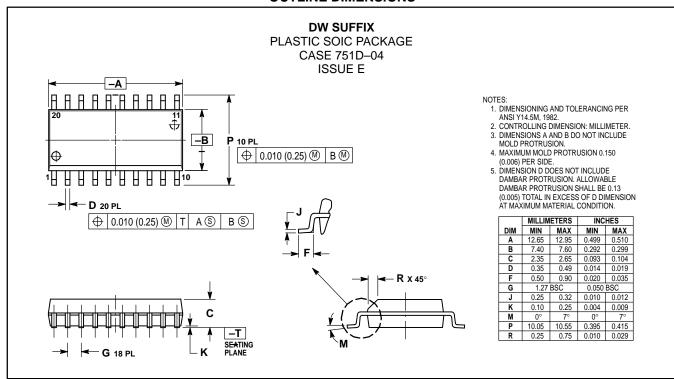
MC100EL90 AC CHARACTERISTICS ($V_{EE} = -4.20V$ to -5.5V; $V_{CC} = 4.5V$ to 5.5V)

		–40°C				0°C			25°C			85°C			
Symbol	Characteristic	Min	Тур	Max	Unit										
^t PLH ^t PHL	Propagation Delay Diff D to Q S.E.	390 340		590 640	410 360		610 660	420 370		620 670	460 410		660 710	ps	
tSKEW	Skew Output-to-Output ¹ Part-to-Part (Diff) ¹ Duty Cycle (Diff) ²		20 25	100 200	ps										
V_{PP}	Minimum Input Swing ³	150			150			150			150			mV	
VCMR	Common Mode Range4	See4		-0.4	V										
t _r t _f	Output Rise/Fall Times Q (20% – 80%)	230		500	230		500	230		500	230		500	ps	

- 1. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
- 2. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
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OUTLINE DIMENSIONS



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MC100LVEL90/D