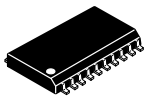
-3.3 V / -5 V Triple ECL Input to LVPECL Output Translator

MC100LVEL90



SOIC-20 WB
DW SUFFIX
CASE 751D

Description

The MC100LVEL90 is a triple ECL to LVPECL translator. The device receives either –3.3 V or –5 V differential ECL signals, determined by the V_{EE} supply level, and translates them to +3.3 V differential LVPECL output signals.

To accomplish the level translation, the LVEL90 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, as expected, are connected to the system ground plane. Both V_{EE} and V_{CC} should be bypassed to ground via 0.01 μF capacitors.

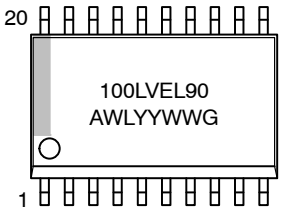
Under open input conditions, the $\overline{D}$ input will be biased at $V_{EE}/2$ and the D input will be pulled to V_{EE}. This condition will force the Q output to a LOW, ensuring stability.

The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

Features

- 500 ps Propagation Delays
- ESD Protection: > 2 kV HBM, > 200 V MM
- The 100 Series Contains Temperature Compensation
- Operating Range: V_{CC} = 3.0 V to 3.8 V; V_{EE} = –3.0 V to –5.5 V; GND = 0 V
- Internal Input Pulldown Resistors
- Q Output will Default LOW with Inputs Open or at V_{EE}
- Meets or Exceeds JEDEC Spec EIA/JESD78 IC Latchup Test
- Moisture Sensitivity: Level 3 (Pb-Free)
  For Additional Information, see Application Note AND8003/D
- Flammability Rating: UL 94 V-0 @ 0.125 in,
  Oxygen Index: 28 to 34
- Transistor Count = 261 devices
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant

MARKING DIAGRAM*



A	= Assembly Location
WL	= Wafer Lot
YY	= Year
WW	= Work Week
G	= Pb-Free Package

*For additional marking information, refer to Application Note AND8002/D.

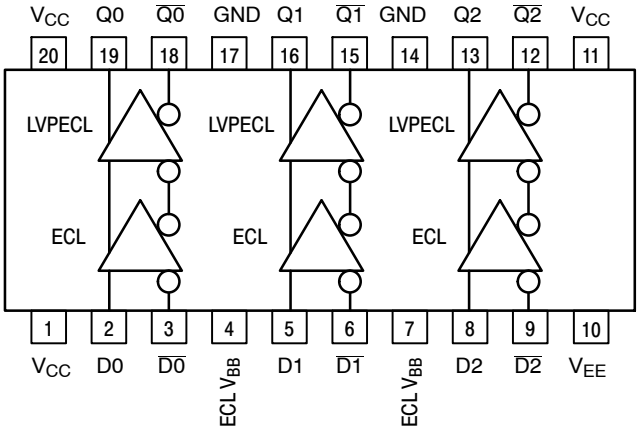
ORDERING INFORMATION

Device	Package	Shipping†
MC100LVEL90DWG	SOIC-20 WB (Pb-Free)	38 Units/Tube
MC100LVEL90DWR2G	SOIC-20 WB (Pb-Free)	1000/Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

© Semiconductor Components Industries, LLC, 2016

Downloaded from Arrow.com.



* All V_{CC} pins are tied together on the die.

Warning: All V_{CC}, V_{EE}, and GND pins must be externally connected to Power Supply to guarantee proper operation.

Table 1. PIN DESCRIPTION

PIN	FUNCTION
Dn, $\overline{Dn}$	ECL Inputs
Qn, $\overline{Qn}$	LVPECL Outputs
ECL V_{BB}	ECL Reference Voltage Output
V_{CC}	Positive Supply
V_{EE}	Negative Supply
GND	Ground

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

Table 2. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V_{CC}	PECL Power Supply	GND = 0 V		8 to 0	V
V_{EE}	NECL Power Supply	GND = 0 V		−8 to 0	V
V_I	NECL Mode Input Voltage	GND = 0 V	$V_I \geq V_{EE}$	−6 to 0	V
I_{out}	Output Current	Continuous Surge		50 100	mA
I_{BB}	ECL V_{BB} Sink/Source			± 0.5	mA
T_A	Operating Temperature Range			−40 to +85	°C
T_{stg}	Storage Temperature Range			−65 to +150	°C
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	SOIC-20 WB	90 60	°C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	SOIC-20 WB	30 to 35	°C/W
T_{sol}	Wave Solder			265	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

Table 3. NECL INPUT DC CHARACTERISTICS (V_{CC}= 3.3 V; V_{EE}= −3.3 V; GND= 0 V (Note 1))

Symbol	Characteristic	−40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	V_{EE} Power Supply Current			8.0		6.0	8.0			8.0	mA
V_{IH}	Input HIGH Voltage (Single-Ended)	−1165		−880	−1165		−880	−1165		−880	mV
V_{IL}	Input LOW Voltage (Single-Ended)	−1810		−1475	−1810		−1475	−1810		−1475	mV
ECL V_{BB}	Output Voltage Reference	−1.38		−1.26	−1.38		−1.26	−1.38		−1.26	V
V_{IHCMR}	Input HIGH Voltage Common Mode Range (Differential) (Note 2) Vpp < 500 mV Vpp ≥ 500 mV	 V_{EE}+1.3 VEE+1.5		 −0.4 −0.4	 V_{EE}+1.2 VEE+1.4		 −0.4 −0.4	 V_{EE}+1.2 VEE+1.4		 −0.4	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current D $\overline{D}$	 0.5 −600			 0.5 −600			 0.5 −600			μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

1. Input parameters vary 1:1 with GND. V_{EE} can vary −3.0 V to −5.5 V.
2. V_{IHCMR} min varies 1:1 with V_{EE}. V_{IHCMR} max varies 1:1 with GND.

Table 4. LVPECL OUTPUT DC CHARACTERISTICS (V_{CC}= 3.3 V; V_{EE}= −3.3 V; GND= 0 V (Note 3))

Symbol	Characteristic	−40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{CC}	V_{CC} Power Supply Current			24		20	24			26	mA
V_{OH}	Output HIGH Voltage (Note 4)	2215	2295	2420	2275	2345	2420	2275	2345	2420	mV
V_{OL}	Output LOW Voltage (Note 4)	1470	1605	1745	1490	1600	1680	1490	1595	1680	mV

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

3. Output parameters vary 1:1 with V_{CC}. V_{CC} can vary +0.5 V / −0.3 V. V_{EE} can vary −3.0 V to −5.5 V.
4. Outputs are terminated through a 50 Ω resistor to V_{CC}−2 V.

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

Table 5. AC CHARACTERISTICS (V_{CC} = 3.0 V to 3.8 V; V_{EE}= −3.0 V to −5.5 V; GND = 0 V)

Symbol	Characteristic	−40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
fmax	Maximum Toggle Frequency		560			650			700		MHz
t_{PLH} t_{PHL}	Propagation Delay Diff D to Q S.E.	 390 340		 590 640	 420 370		 620 670	 460 410		 660 710	ps
t_{SKEW}	Skew Output-to-Output (Note 5) Part-to-Part (Diff) (Note 5) Duty Cycle (Diff) (Note 6)		 20 25	 100 200		 20 25	 100 200		 20 25	 100 200	ps
tJITTER	Random Clock Jitter		TBD			TBD			TBD		ps
V_{PP}	Input Voltage Swing (Differential Configuration) (Note 7)	150		1000	150		1000	150		1000	mV
t_r t_f	Output Rise/Fall Times Q (20% − 80%)	230		500	230		500	230		500	ps

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm.

5. Skews are valid across specified voltage range, part-to-part skew is for a given temperature.
6. Duty cycle skew is the difference between a TPLH and TPHL propagation delay through a device.
7. V_{PP} (min) is swing measured single-ended on each input in differential configuration. The device has a DC gain of ≈40.

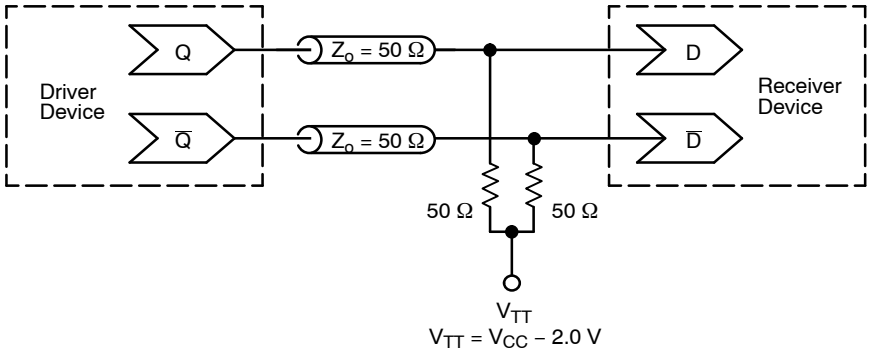


Figure 2. Typical Termination for Output Driver and Device Evaluation (See Application Note AND8020/D − Termination of ECL Logic Devices.)

Share Feedback
Your Opinion Matters

Downloaded from Arrow.com.

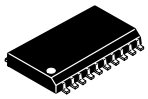
Resource Reference of Application Notes

AN1405/D	–	ECL Clock Distribution Techniques
AN1406/D	–	Designing with PECL (ECL at +5.0 V)
AN1503/D	–	ECLinPS™ I/O SPiCE Modeling Kit
AN1504/D	–	Metastability and the ECLinPS Family
AN1568/D	–	Interfacing Between LVDS and ECL
AN1672/D	–	The ECL Translator Guide
AND8001/D	–	Odd Number Counters Design
AND8002/D	–	Marking and Date Codes
AND8020/D	–	Termination of ECL Logic Devices
AND8066/D	–	Interfacing with ECLinPS
AND8090/D	–	AC Characteristics of ECL Devices

ECLinPS is a trademark of Semiconductor Components Industries, LLC dba “**onsemi**” or its affiliates and/or subsidiaries in the United States and/or other countries.

Share Feedback
Your Opinion Matters

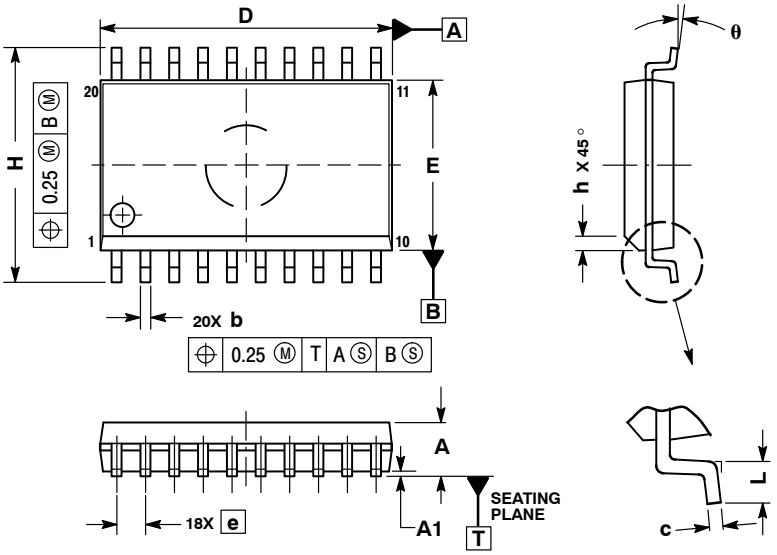
Downloaded from Arrow.com.



SOIC−20 WB
CASE 751D−05
ISSUE H

DATE 22 APR 2015

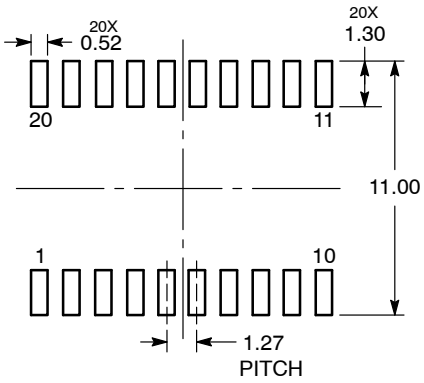
SCALE 1:1



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
b	0.35	0.49
c	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

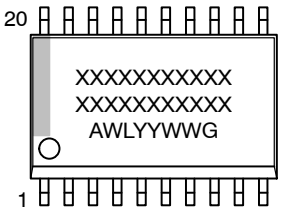
RECOMMENDED SOLDERING FOOTPRINT*



DIMENSIONS: MILLIMETERS

*For additional information on our Pb−Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week
G = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

DOCUMENT NUMBER:	**98ASB42343B**	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red.
DESCRIPTION:	**SOIC−20 WB**	**PAGE 1 OF 1**

onsemi and onsemi are trademarks of Semiconductor Components Industries, LLC dba **onsemi** or its subsidiaries in the United States and/or other countries. **onsemi** reserves the right to make changes without further notice to any products herein. **onsemi** makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. **onsemi** does not convey any license under its patent rights nor the rights of others.

Downloaded from Arrow.com.

onsemi, ONSEMI , and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** reserves the right to make changes at any time to any products or information herein, without notice. The information herein is provided "as−is" and **onsemi** makes no warranty, representation or guarantee regarding the accuracy of the information, product features, availability, functionality, or suitability of its products for any particular purpose, nor does **onsemi** assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. Buyer is responsible for its products and applications using **onsemi** products, including compliance with all laws, regulations and safety requirements or standards, regardless of any support or applications information provided by **onsemi**. "Typical" parameters which may be provided in **onsemi** data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. **onsemi** does not convey any license under any of its intellectual property rights nor the rights of others. **onsemi** products are not designed, intended, or authorized for use as a critical component in life support systems or any FDA Class 3 medical devices or medical devices with a same or similar classification in a foreign jurisdiction or any devices intended for implantation in the human body. Should Buyer purchase or use **onsemi** products for any such unintended or unauthorized application, Buyer shall indemnify and hold **onsemi** and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of the part. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

ADDITIONAL INFORMATION

TECHNICAL PUBLICATIONS:
Technical Library: www.onsemi.com/design/resources/technical−documentation
onsemi Website: www.onsemi.com

ONLINE SUPPORT: www.onsemi.com/support
For additional information, please contact your local Sales Representative at www.onsemi.com/support/sales

◊

Downloaded from Arrow.com.