MC100LVEL90

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

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.

- 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 1
  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

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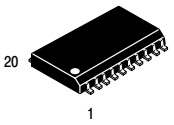
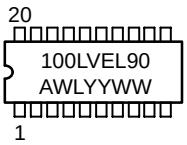
MARKING DIAGRAM*



SO−20
DW SUFFIX
CASE 751D



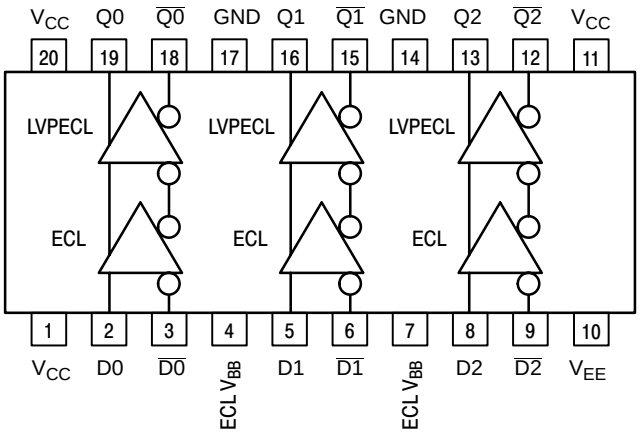
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

*For additional information, see Application Note AND8002/D

ORDERING INFORMATION

Device	Package	Shipping†
MC100LVEL90DW	SO−20	38 Units/Rail
MC100LVEL90DWR2	SO−20	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.



* 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.

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)

MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
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 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	20 SOIC 20 SOIC	90 60	°C/W °C/W
θ_{JC}	Thermal Resistance (Junction−to−Case)	std bd	20 SOIC	30 to 35	°C/W
T_{sol}	Wave Solder			265	°C

1. Maximum Ratings are those values beyond which device damage may occur.

NECL INPUT DC CHARACTERISTICS V_{CC}= 3.3 V; V_{EE}= −3.3 V; GND= 0 V (Note 2)

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 3)										
	Vpp < 500 mV	V_{EE}+1.3		−0.4	V_{EE}+1.2		−0.4	V_{EE}+1.2		−0.4	V
	Vpp ≧ 500 mV	VEE+1.5		−0.4	VEE+1.4		−0.4	VEE+1.4		−0.4	V
I_{IH}	Input HIGH Current			150			150			150	μA
I_{IL}	Input LOW Current D	0.5			0.5			0.5			μA
	Input LOW Current $\overline{D}$	−600			−600			−600			

NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfpm is maintained.

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

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

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 5)	2215	2295	2420	2275	2345	2420	2275	2345	2420	mV
V_{OL}	Output LOW Voltage (Note 5)	1470	1605	1745	1490	1600	1680	1490	1595	1680	mV

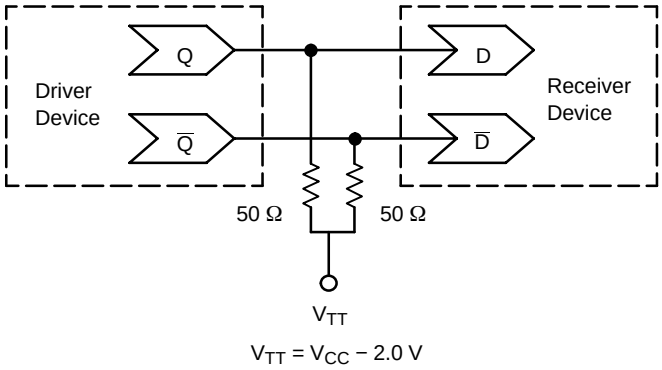
NOTE: Devices are designed to meet the DC specifications shown in the above table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 lfpm is maintained.

4. 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.
5. Outputs are terminated through a 50 Ω resistor to V_{CC}−2 volts.

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}	Propagation Delay Diff	390		590	420		620	460		660	ps
t_{PHL}	D to Q S.E.	340		640	370		670	410		710	
t_{SKEW}	Skew Output−to−Output (Note 6)		20	100		20	100		20	100	ps
	Part−to−Part (Diff) (Note 6)			200			200			200	
	Duty Cycle (Diff) (Note 7)		25			25			25		
tJITTER	Random Clock Jitter		TBD			TBD			TBD		ps
V_{PP}	Input Voltage Swing (Differential Configuration) (Note 8)	150		1000	150		1000	150		1000	mV
t_r	Output Rise/Fall Times Q	230		500	230		500	230		500	ps
t_f	(20% − 80%)										

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



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

Resource Reference of Application Notes

AN1404 − ECLinPS Circuit Performance at Non−Standard V_{IH} Levels

AN1405 − ECL Clock Distribution Techniques

AN1406 − Designing with PECL (ECL at +5.0 V)

AN1503 − ECLinPS I/O SPICE Modeling Kit

AN1504 − Metastability and the ECLinPS Family

AN1560 − Low Voltage ECLinPS SPICE Modeling Kit

AN1568 − Interfacing Between LVDS and ECL

AN1596 − ECLinPS Lite Translator ELT Family SPICE I/O Model Kit

AN1650 − Using Wire−OR Ties in ECLinPS Designs

AN1672 − The ECL Translator Guide

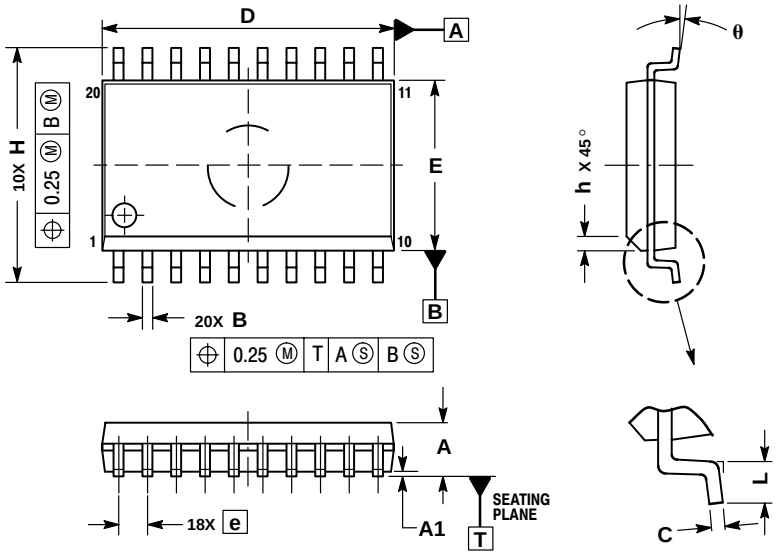
AND8001 − Odd Number Counters Design

AND8002 − Marking and Date Codes

AND8020 − Termination of ECL Logic Devices

PACKAGE DIMENSIONS

SO−20
DW SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D−05
ISSUE F



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 °

PUBLICATION ORDERING INFORMATION

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