

MC100LVEL12

3.3V ECL Low Impedance Driver

Description

The MC100LVEL12 is a low impedance drive buffer. With two pairs of OR/NOR outputs the device is ideally suited for high drive applications such as memory addressing. The device is functionally equivalent to the EL12 device and operates from a 3.3 V power supply. With propagation delays equivalent to the EL12, the LVEL12 is ideally suited for those applications which require the ultimate in AC performance in a low voltage environment.

Features

- 445 ps Propagation Delay
- Dual Outputs for 25 Ω Drive Applications
- ESD Protection: >4 kV Human Body Model, > 200 V Machine Model
- The 100 Series Contains Temperature Compensation
- PECL Mode Operating Range: $V_{CC} = 3.0$ V to 3.8 V with $V_{EE} = 0$ V
- NECL Mode Operating Range: $V_{CC} = 0$ V with $V_{EE} = -3.0$ V to -3.8 V
- Internal Input Pulldown Resistors
- Q Output will Default LOW with All 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 = 83 devices
- Pb-Free Packages are Available



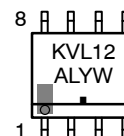
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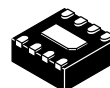
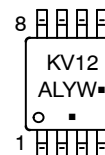
MARKING DIAGRAMS*



SOIC-8
D SUFFIX
CASE 751



TSSOP-8
DT SUFFIX
CASE 948R



DFN8
MN SUFFIX
CASE 506AA



A = Assembly Location
L = Wafer Lot
Y = Year
W = Work Week
 \bar{M} = Date Code
▪ = Pb-Free Package

(Note: Microdot may be in either location)

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

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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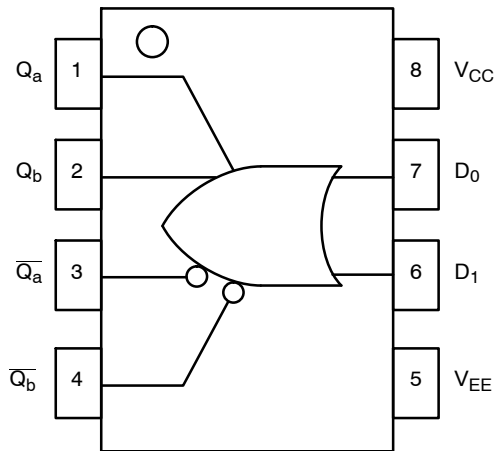


Figure 1. Logic Diagram and Pinout Assignment

Table 1. PIN DESCRIPTION

PIN	FUNCTION
D0, D1	ECL Data Inputs
Qa, Qa-bar; Qb, Qb-bar	ECL Data Outputs
VCC	Positive Supply
VEE	Negative Supply
EP	(DFN8 only) Thermal exposed pad must be connected to a sufficient thermal conduit. Electrically connect to the most negative supply (GND) or leave unconnected, floating open.

Table 2. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Units
VCC	PECL Mode Power Supply	VEE = 0 V		8 to 0	V
VEE	NECL Mode Power Supply	VCC = 0 V		-8 to 0	V
VI	PECL Mode Input Voltage NECL Mode Input Voltage	VEE = 0 V VCC = 0 V	VI ≤ VCC VI ≥ VEE	6 to 0 -6 to 0	V V
Iout	Output Current	Continuous Surge		50 100	mA mA
TA	Operating Temperature Range			-40 to +85	°C
Tstg	Storage Temperature Range			-65 to +150	°C
θJA	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	8 SOIC 8 SOIC	190 130	°C/W °C/W
θJC	Thermal Resistance (Junction-to-Case)	Standard Board	8 SOIC	41 to 44 ± 5%	°C/W
θJA	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	8 TSSOP 8 TSSOP	185 140	°C/W °C/W
θJC	Thermal Resistance (Junction-to-Case)	Standard Board	8 TSSOP	41 to 44 ± 5%	°C/W
θJA	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	DFN8 DFN8	129 84	°C/W °C/W
Tsol	Wave Solder Pb Pb-Free	<2 to 3 sec @ 248°C <2 to 3 sec @ 260°C		265 265	°C
θJC	Thermal Resistance (Junction-to-Case)	(Note 1)	DFN8	35 to 40	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. JEDEC standard multilayer board – 2S2P (2 signal, 2 power)

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Table 3. LVPECL DC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$; $V_{EE} = 0.0\text{ V}$ (Note 2)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		17	24		17	24		18	25	mA
V_{OH}	Output HIGH Voltage (Note 3)	2215	2295	2420	2275	2345	2420	2275	2345	2420	mV
V_{OL}	Output LOW Voltage (Note 3)	1470	1605	1745	1490	1595	1680	1490	1595	1680	mV
V_{IH}	Input HIGH Voltage	2135		2420	2135		2420	2135		2420	mV
V_{IL}	Input LOW Voltage	1490		1825	1490		1825	1490		1825	mV
I_{IH}	Input HIGH Current			150			150			150	mA
I_{IL}	Input LOW Current	0.5			0.5			0.5			mA

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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $\pm 0.3\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.

Table 4. LVNECL DC CHARACTERISTICS $V_{CC} = 0.0\text{ V}$; $V_{EE} = -3.3\text{ V}$ (Note 4)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I_{EE}	Power Supply Current		17	24		17	24		18	25	mA
V_{OH}	Output HIGH Voltage (Note 5)	-1085	-1005	-880	-1025	-955	-880	-1025	-955	-880	mV
V_{OL}	Output LOW Voltage (Note 5)	-1830	-1695	-1555	-1810	-1705	-1620	-1810	-1705	-1620	mV
V_{IH}	Input HIGH Voltage	-1165		-880	-1165		-880	-1165		-880	mV
V_{IL}	Input LOW Voltage	-1810		-1475	-1810		-1475	-1810		-1475	mV
I_{IH}	Input HIGH Current			150			150			150	mA
I_{IL}	Input LOW Current	0.5			0.5			0.5			mA

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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $\pm 0.3\text{ V}$.
- Outputs are terminated through a $50\ \Omega$ resistor to $V_{CC} - 2.0\text{ V}$.

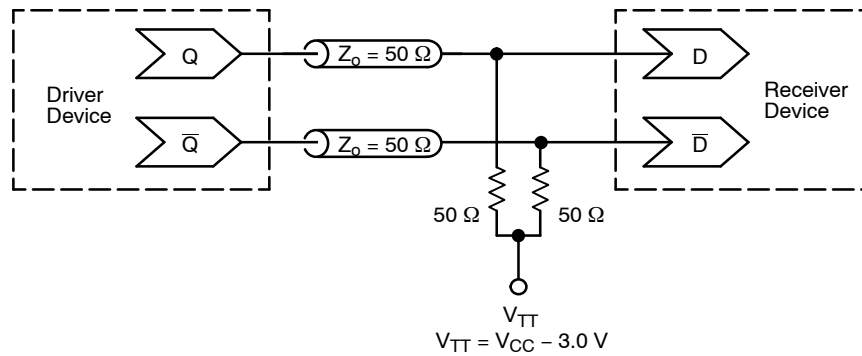
Table 5. AC CHARACTERISTICS $V_{CC} = 3.3\text{ V}$; $V_{EE} = 0.0\text{ V}$ or $V_{CC} = 0.0\text{ V}$; $V_{EE} = -3.3\text{ V}$ (Note 6)

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
f_{max}	Maximum Toggle Frequency		TBD			TBD			TBD		GHz
t_{PLH} t_{PHL}	Propagation Delay to Output	310		580	310	445	580	320		590	ps
t_{JITTER}	Cycle-to-Cycle Jitter		TBD			TBD			TBD		ps
t_r t_f	Output Rise/Fall Times Q (20% - 80%)	230	400	550	230	400	550	230	400	550	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. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

- V_{EE} can vary $\pm 0.3\text{ V}$.

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

ORDERING INFORMATION

Device	Package	Shipping [†]
MC100LVEL12D	SOIC-8	98 Units / Rail
MC100LVEL12DG	SOIC-8 (Pb-Free)	98 Units / Rail
MC100LVEL12DR2	SOIC-8	2500 / Tape & Reel
MC100LVEL12DR2G	SOIC-8 (Pb-Free)	2500 / Tape & Reel
MC100LVEL12DT	TSSOP-8	100 Units / Rail
MC100LVEL12DTG	TSSOP-8 (Pb-Free)	100 Units / Rail
MC100LVEL12DTR2	TSSOP-8	2500 / Tape & Reel
MC100LVEL12DTR2G	TSSOP-8 (Pb-Free)	2500 / Tape & Reel
MC100LVEL12MNR4	DFN8	1000 / Tape & Reel
MC100LVEL12MNR4G	DFN8 (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.

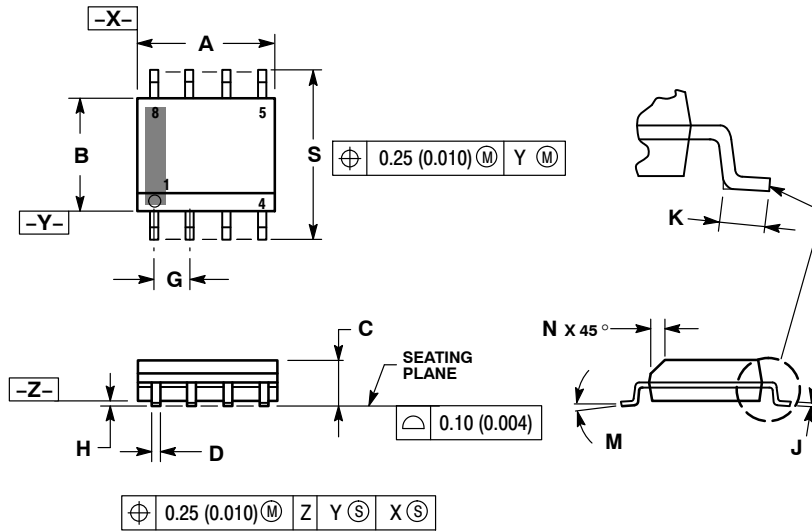
Resource Reference of Application Notes

- 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

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PACKAGE DIMENSIONS

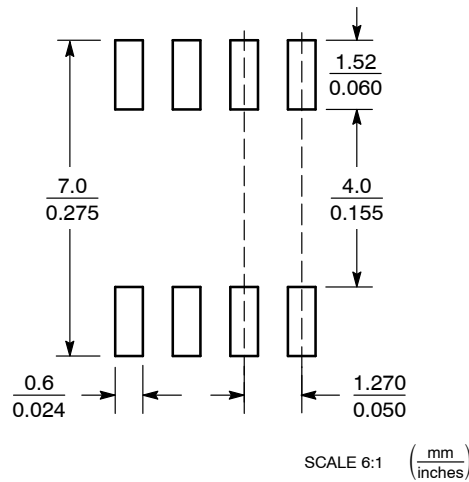
SOIC-8 NB
CASE 751-07
ISSUE AH



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
 4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
 5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.
 6. 751-01 THRU 751-06 ARE OBSOLETE. NEW STANDARD IS 751-07.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.80	5.00	0.189	0.197
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.053	0.069
D	0.33	0.51	0.013	0.020
G	1.27 BSC		0.050 BSC	
H	0.10	0.25	0.004	0.010
J	0.19	0.25	0.007	0.010
K	0.40	1.27	0.016	0.050
M	0°	8°	0°	8°
N	0.25	0.50	0.010	0.020
S	5.80	6.20	0.228	0.244

SOLDERING FOOTPRINT*

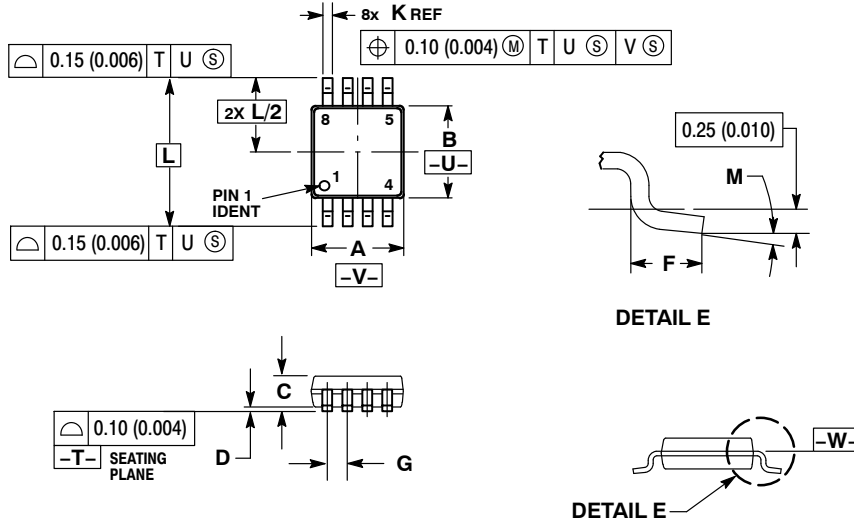


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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PACKAGE DIMENSIONS

TSSOP-8
DT SUFFIX
PLASTIC TSSOP PACKAGE
CASE 948R-02
ISSUE A



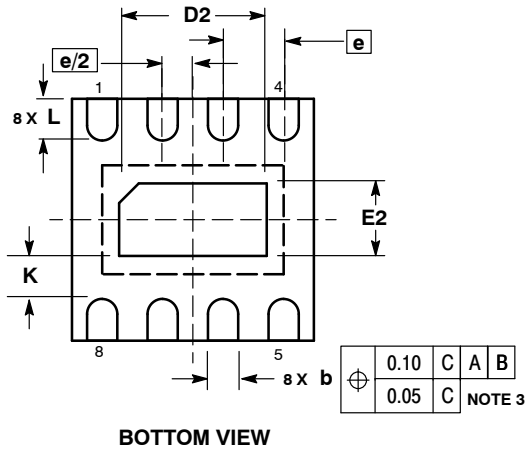
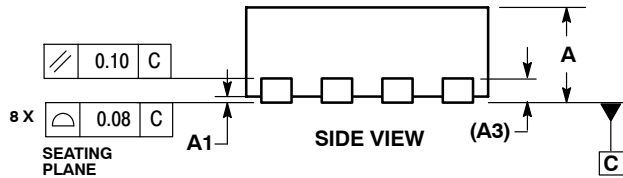
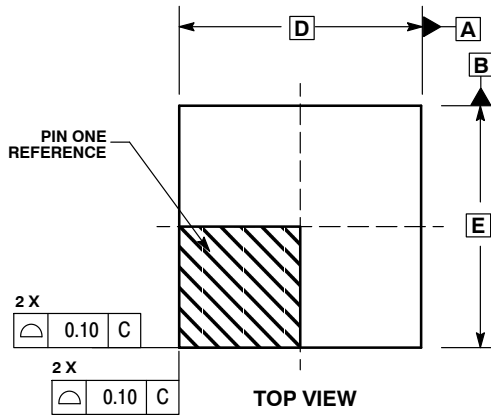
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A DOES NOT INCLUDE MOLD FLASH. PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
 4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
 5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
 6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6°	0°	6°

MC100LEVEL12

PACKAGE DIMENSIONS


DFN8
CASE 506AA-01
ISSUE D



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994 .
2. CONTROLLING DIMENSION: MILLIMETERS.
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.
4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

DIM	MILLIMETERS	
	MIN	MAX
A	0.80	1.00
A1	0.00	0.05
A3	0.20 REF	
b	0.20	0.30
D	2.00 BSC	
D2	1.10	1.30
E	2.00 BSC	
E2	0.70	0.90
e	0.50 BSC	
K	0.20	---
L	0.25	0.35

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