FAIRCHILD

SEMICONDUCTOR ™

August 1986
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DM74LS00
Quad 2-Input NAND Gate

General Description

This device contains four independent gates each of which performs the logic NAND function.

Ordering Code:

Order Number	Package Number	Package Description
DM74LS00M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
DM74LS00SJ	M14D	14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
DM74LS00N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram
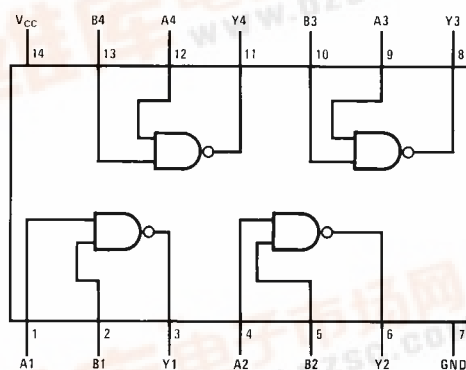
Function Table

$$Y = \overline{AB}$$

Inputs		Output
A	**B**	**Y**
L	L	H
L	H	H
H	L	H
H	H	L

H = HIGH Logic Level
L = LOW Logic Level

DM74LS00

Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Recommended Operating Conditions

Symbol	Parameter	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.75	5	5.25	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			−0.4	mA
I_{OL}	LOW Level Output Current			8	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics
over recommended operating free air temperature range (unless otherwise noted)

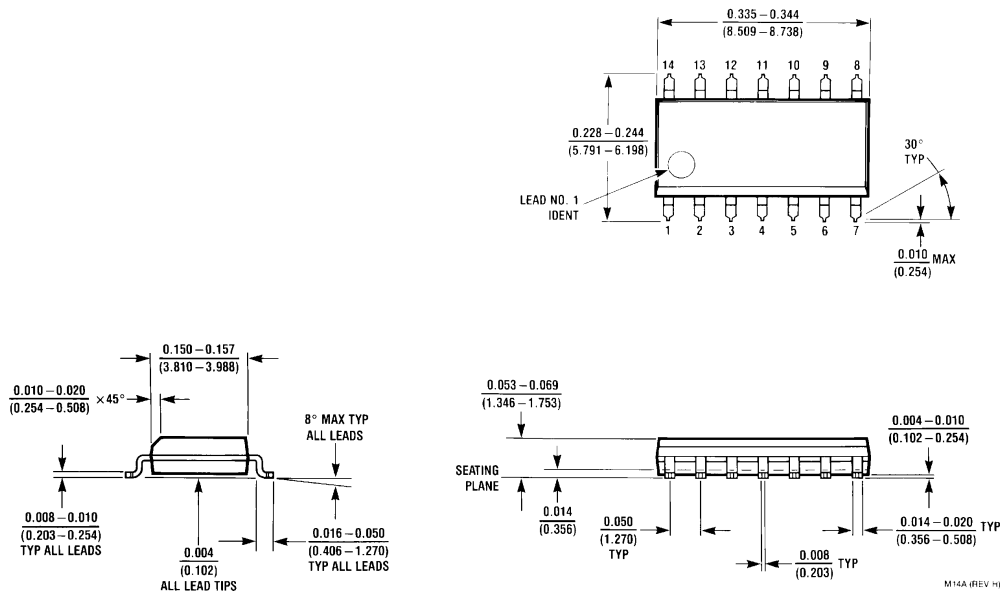| Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA			−1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = Min, I_{OH} = Max, V_{IL} = Max	2.7	3.4		V
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min		0.35	0.5	V
		I_{OL} = 4 mA, V_{CC} = Min		0.25	0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V			0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V			20	μA
I_{IL}	LOW Level Input Current	V_{CC} = Max, V_I = 0.4V			−0.36	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 3)	−20		−100	mA
I_{CCH}	Supply Current with Outputs HIGH	V_{CC} = Max		0.8	1.6	mA
I_{CCL}	Supply Current with Outputs LOW	V_{CC} = Max		2.4	4.4	mA

Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.
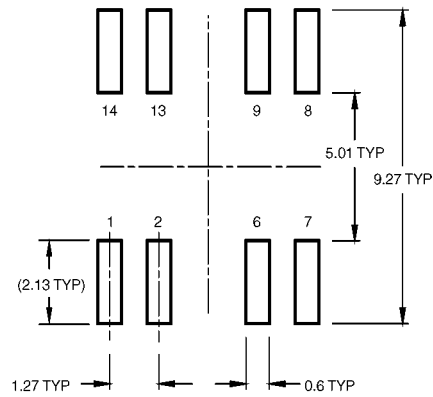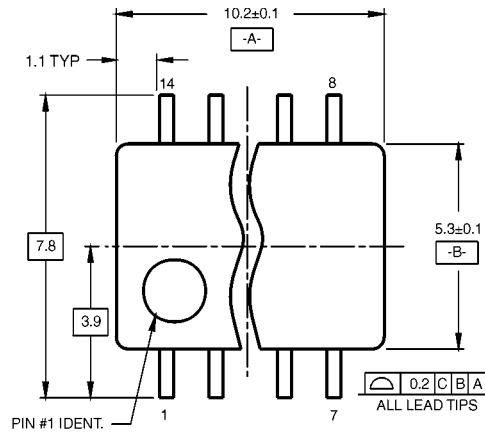
Switching Characteristics
at V_{CC} = 5V and T_A = 25°C

Symbol	Parameter	R_L = 2 kΩ				Units
		C_L = 15 pF		C_L = 50 pF		
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	3	10	4	15	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output	3	10	4	15	ns

Physical Dimensions inches (millimeters) unless otherwise noted

0.335 − 0.344
(8.509 − 8.738)

14 13 12 11 10 9 8

0.228 − 0.244
(5.791 − 6.198)

LEAD NO. 1
IDENT

1 2 3 4 5 6 7

30°
TYP

0.010 MAX
(0.254)

0.150 − 0.157
(3.810 − 3.988)

0.010 − 0.020
(0.254 − 0.508) × 45°

8° MAX TYP
ALL LEADS

0.008 − 0.010
(0.203 − 0.254)
TYP ALL LEADS

0.004
(0.102)
ALL LEAD TIPS

0.016 − 0.050
(0.406 − 1.270)
TYP ALL LEADS

0.053 − 0.069
(1.346 − 1.753)

0.004 − 0.010
(0.102 − 0.254)

SEATING
PLANE

0.014
(0.356)

0.050
(1.270)
TYP

0.008
(0.203) TYP

0.014 − 0.020
(0.356 − 0.508) TYP

M14A (REV H)

14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
Package Number M14A

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Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

10.2±0.1
-A-

1.1 TYP

14   8

7.8

3.9

5.3±0.1
-B-

0.2 C B A
ALL LEAD TIPS

PIN #1 IDENT.   1   7

14   13   9   8

5.01 TYP

9.27 TYP

(2.13 TYP)   1   2   6   7

1.27 TYP   0.6 TYP

LAND PATTERN RECOMMENDATION

ALL LEAD TIPS

2.1 MAX.   0.1 C

-C-

1.27 TYP

0.35-0.51

0.12 Ⓜ C A

DIMENSIONS ARE IN MILLIMETERS

1.8±0.1

0.15±0.05

SEE DETAIL A

0.15-0.25
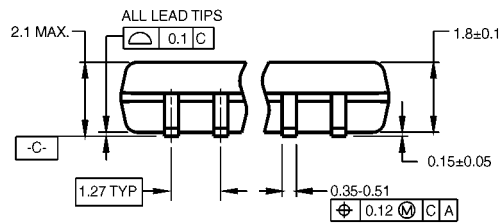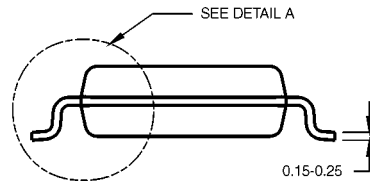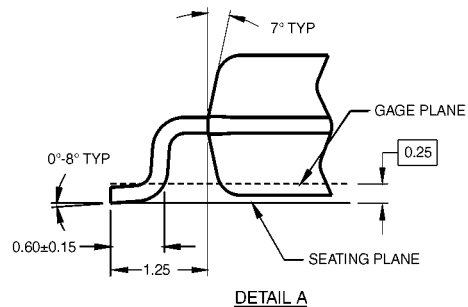
NOTES:
A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

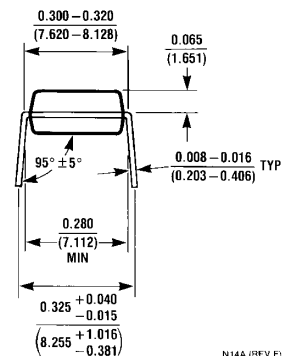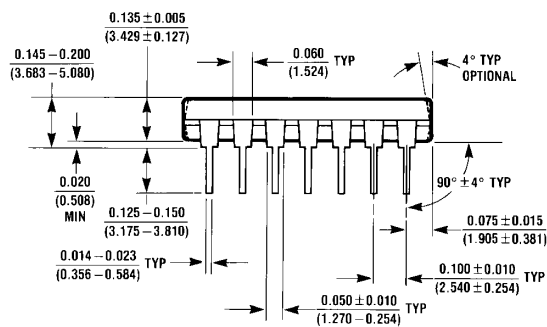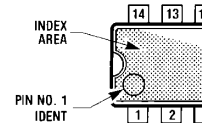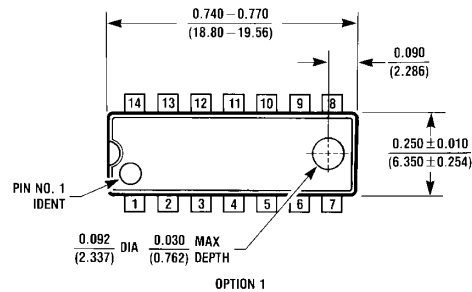M14DRevB1

7° TYP

GAGE PLANE

0°-8° TYP

0.25

0.60±0.15

1.25

SEATING PLANE

DETAIL A

14-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M14D

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

0.740 − 0.770
(18.80 − 19.56)

0.090
(2.286)

0.250 ± 0.010
(6.350 ± 0.254)

PIN NO. 1
IDENT

0.092
(2.337) DIA   0.030 MAX
(0.762) DEPTH

OPTION 1

INDEX
AREA

PIN NO. 1
IDENT

OPTION 02

0.135 ± 0.005
(3.429 ± 0.127)

0.145 − 0.200
(3.683 − 5.080)

0.060
(1.524) TYP

4° TYP
OPTIONAL

0.020
(0.508)
MIN

0.125 − 0.150
(3.175 − 3.810)

90° ± 4° TYP

0.014 − 0.023
(0.356 − 0.584) TYP

0.075 ± 0.015
(1.905 ± 0.381)

0.100 ± 0.010
(2.540 ± 0.254) TYP

0.050 ± 0.010
(1.270 − 0.254) TYP

0.300 − 0.320
(7.620 − 8.128)

0.065
(1.651)

95° ± 5°

0.008 − 0.016
(0.203 − 0.406) TYP

0.280
(7.112)
MIN

$0.325 \begin{smallmatrix} +0.040 \\ -0.015 \end{smallmatrix}$

$\left(8.255 \begin{smallmatrix} +1.016 \\ -0.381 \end{smallmatrix} \right)$

N14A (REV F)

14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N14A

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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