

54LS00/DM54LS00/DM74LS00

Quad 2-Input NAND Gates

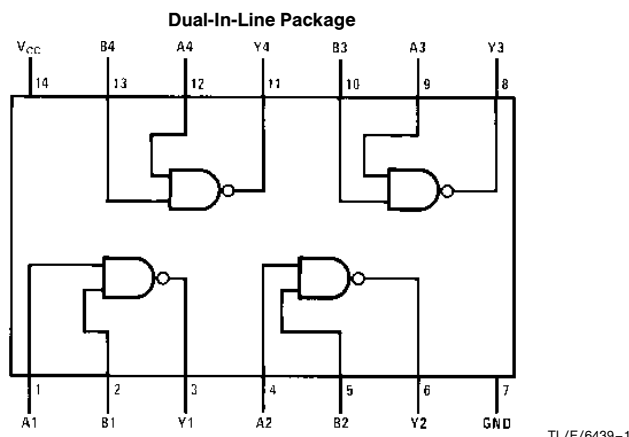
General Description

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

Features

- Alternate Military/Aerospace device (54LS00) is available. Contact a National Semiconductor Sales Office/Distributor for specifications.

Connection Diagram



Order Number 54LS00DMQB, 54LS00FMB, 54LS00LMB, DM54LS00J, DM54LS00W, DM74LS00M or DM74LS00N
See NS Package Number E20A, J14A, M14A, N14A or W14B

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

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM54LS and 54LS	−55°C to +125°C
DM74LS	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note: 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” table 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	DM54LS00			DM74LS00			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.7			0.8	V
I _{OH}	High Level Output Current			−0.4			−0.4	mA
I _{OL}	Low Level Output Current			4			8	mA
T _A	Free Air Operating Temperature	−55		125	0		70	°C

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

Symbol	Parameter	Conditions	Min	Typ (Note 1)	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	DM54 2.5	3.4		V
			DM74 2.7	3.4		
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max, V _{IH} = Min	DM54	0.25	0.4	V
			DM74	0.35	0.5	
		I _{OL} = 4 mA, V _{CC} = Min	DM74	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 2)	DM54 −20		−100	mA
			DM74 −20		−100	
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

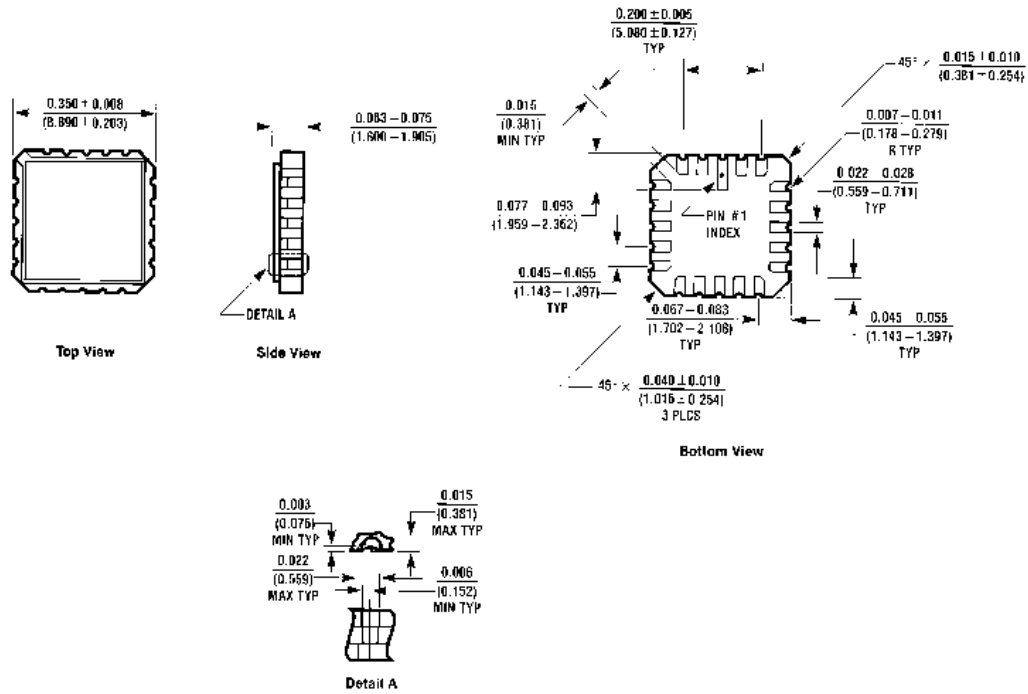
Switching Characteristics at V_{CC} = 5V and T_A = 25°C (See Section 1 for Test Waveforms and Output Load)

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

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

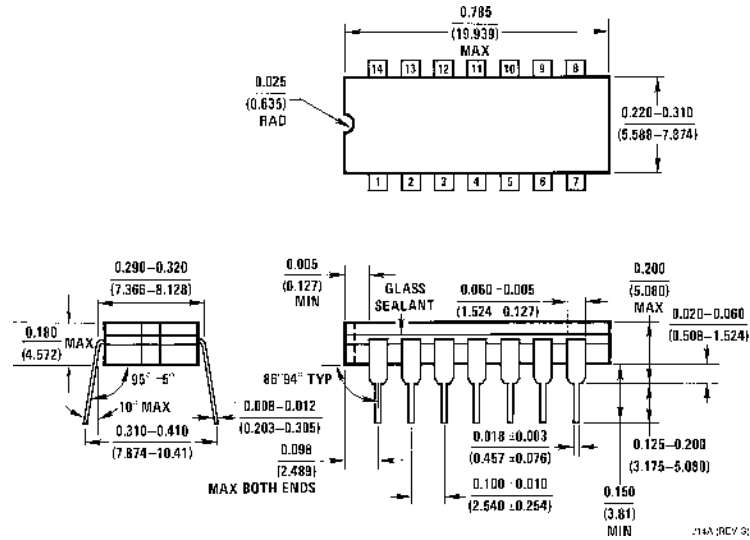
Physical Dimensions inches (millimeters)



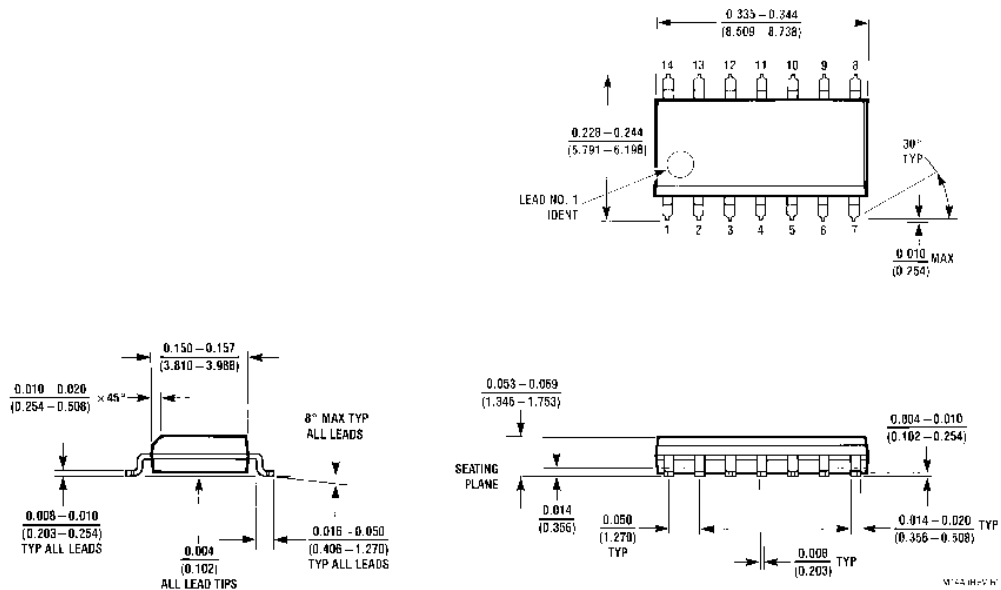
Ceramic Leadless Chip Carrier Package (E)
Order Number 54LS00LMQB
NS Package Number E20A

54LS00LMQB

Physical Dimensions inches (millimeters)



14-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS00DMQB or DM54LS00J
NS Package Number J14A



14-Lead Small Outline Molded Package (M)
Order Number DM74LS00M
NS Package Number M14A

Physical Dimensions inches (millimeters) (Continued)

The diagram illustrates the physical dimensions of a 14-Lead Molded Dual-In-Line Package (N). It includes two views: a top view and a side view. The top view shows the package with 14 pins, labeled 1 through 14. The side view shows the package profile with dimensions for height, width, and pin spacing. Dimensions are provided in both inches and millimeters.

Top View Dimensions:

- Pin 1 to Pin 14 spacing: 0.155 ± 0.005 (3.429 $\pm$ 0.127)
- Pin 1 to Pin 14 spacing: $0.145 - 0.200$ (3.683 - 5.080)
- Pin 1 to Pin 14 spacing: 0.020 (0.508) MIN
- Pin 1 to Pin 14 spacing: $0.125 - 0.150$ (3.175 - 3.810)
- Pin 1 to Pin 14 spacing: 0.014 (0.355 - 0.354) TYP
- Pin 1 to Pin 14 spacing: 0.075 ± 0.015 (1.935 $\pm$ 0.381)
- Pin 1 to Pin 14 spacing: 0.100 ± 0.010 (2.540 $\pm$ 0.254) TYP
- Pin 1 to Pin 14 spacing: $0.050 - 0.040$ (1.270 - 0.254) TYP
- Pin 1 to Pin 14 spacing: 0.060 TYP (1.524)
- Pin 1 to Pin 14 spacing: 0.090 (2.286)
- Pin 1 to Pin 14 spacing: 0.290 ± 0.010 (6.350 $\pm$ 0.254)
- Pin 1 to Pin 14 spacing: 0.089 (2.267) MAX
- Pin 1 to Pin 14 spacing: 0.030 (0.762) DEPTH

Side View Dimensions:

- Package height: $0.300 - 0.320$ (7.620 - 8.128)
- Package width: 0.060 (1.651)
- Pin height: $0.003 - 0.015$ TYP (0.203 - 0.406)
- Pin spacing: 0.280 (7.112) MIN
- Pin spacing: 0.325 ± 0.040 (8.255 $\pm$ 0.010)
- Pin spacing: 0.381 (9.688)

Option 1:

- Pin 1 to Pin 14 spacing: 0.089 (2.267) MAX
- Pin 1 to Pin 14 spacing: 0.030 (0.762) DEPTH

Option 2:

- Pin 1 to Pin 14 spacing: 0.089 (2.267) MAX
- Pin 1 to Pin 14 spacing: 0.030 (0.762) DEPTH

14-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS00N
NS Package Number N14A

