

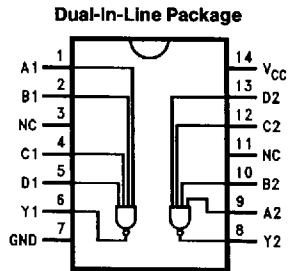
# DM74LS40

## Dual 4-Input NAND Buffer

### General Description

This device contains two independent gates each of which perform the logic NAND function.

### Connection Diagrams



TL/F/10171-1

Order Number DM74LS40M or DM74LS40N  
See NS Package Number M14A or N14A

### Function Table

(Each Gate)

Inputs				Outputs
A	B	C	D	Y
H	H	H	H	L
L	X	X	X	H
X	L	X	X	H
X	X	L	X	H
X	X	X	L	H

Logic Diagram (Each Gate)



TL/F/10171-2

Positive Logic

$$Y = A \cdot B \cdot C \cdot D \quad \text{or} \quad Y = \bar{A} + \bar{B} + \bar{C} + \bar{D}$$

### Absolute Maximum Ratings (Note)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range 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	DM74LS40			Units
		Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8	V
I <sub>OH</sub>	High Level Output Current			-1.2	mA
I <sub>OL</sub>	Low Level Output Current			24	mA
T <sub>A</sub>	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 1)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max	2.7			V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max, V <sub>IH</sub> = Min			0.5	V
		I <sub>OL</sub> = 12 mA, V <sub>CC</sub> = Min			0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			-0.4	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	-30		-130	mA
I <sub>CCH</sub>	Supply Current with Outputs High	V <sub>CC</sub> = Max, V <sub>IN</sub> = GND			1.0	mA
I <sub>CCL</sub>	Supply Current with Outputs Low	V <sub>CC</sub> = Max, V <sub>IN</sub> = OPEN			6.0	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

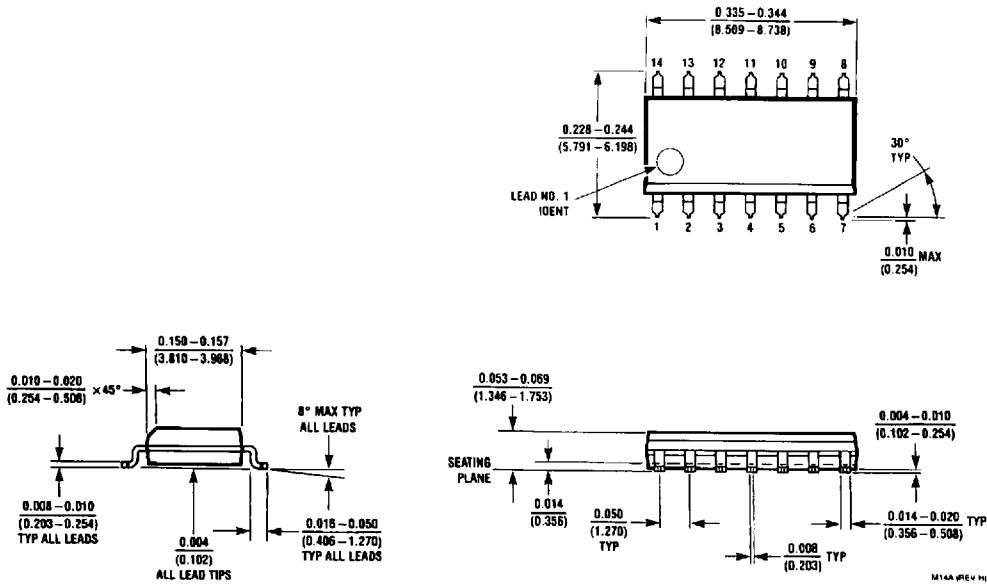
Note 2: Note more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

$V_{CC} = +5.0V, T_A = +25^{\circ}C$

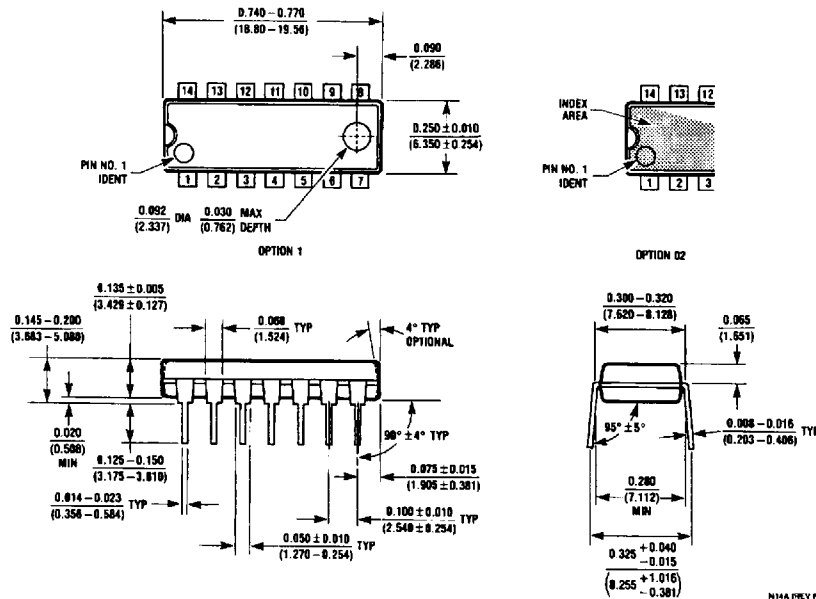
Symbol	Parameter	$R_L = 2\text{ k}\Omega$ $C_L = 15\text{ pF}$		Units
		Min	Max	
$t_{PLH}$	Propagation Delay Time Low to High Level Output		24	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output		24	ns

## Physical Dimensions inches (millimeters)



14-Lead Small Outline Molded Package (M)  
Order Number DM74LS40M  
NS Package Number M14A

**Physical Dimensions** inches (millimeters) (Continued)



**14-Lead Molded Dual-In-Line Package (N)  
Order Number DM74LS40N  
NS Package Number N14A**

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