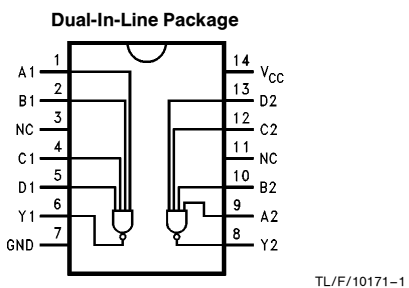


## DM74LS40 Dual 4-Input NAND Buffer

### General Description

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

### Connection Diagrams



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

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

## 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.

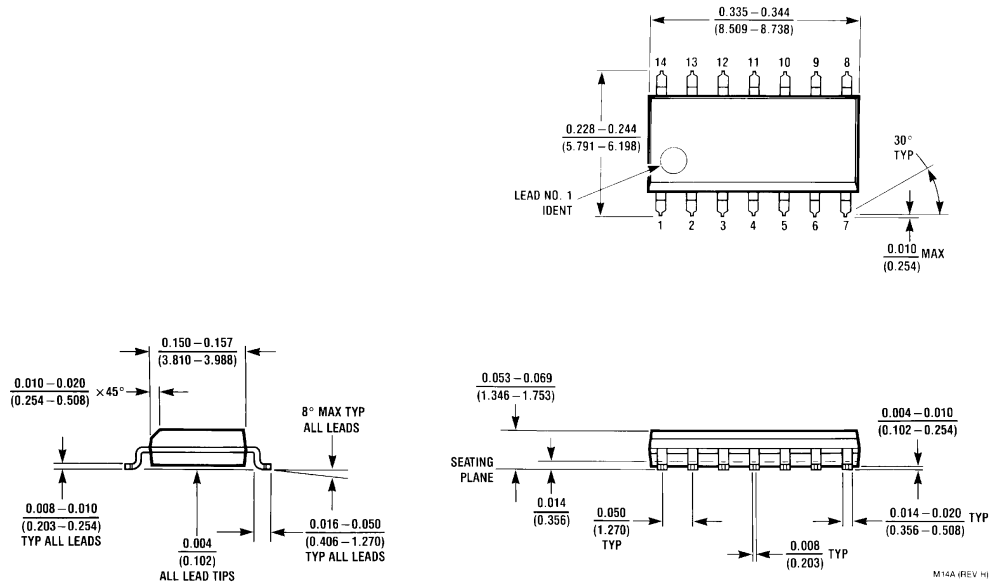
**Note 2:** Note more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

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

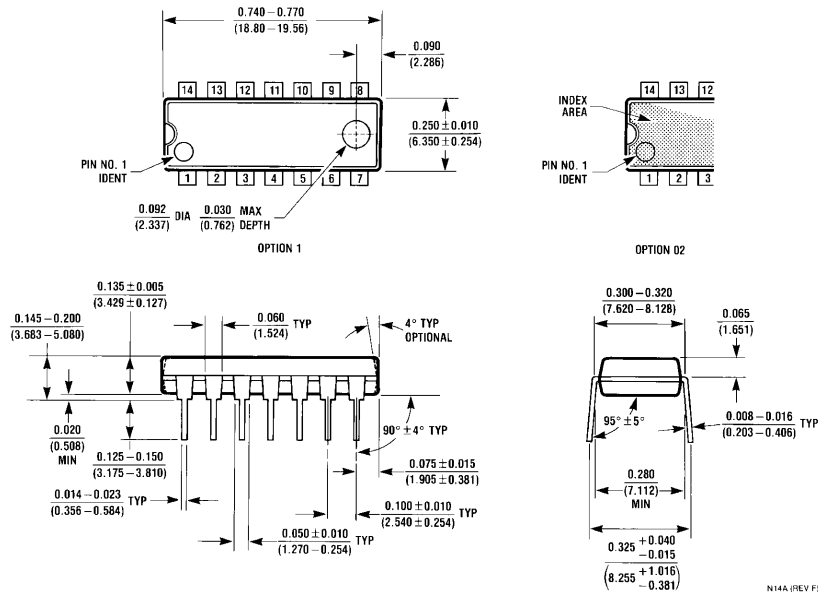
Symbol	Parameter	$R_L = 2\text{ k}\Omega$ $C_L = 15\text{ pF}$		Units
		Min	Max	
$t_{PLH}$	Propagation Delay Time Low to High Level Output		24	ns
$t_{PHL}$	Propagation Delay Time High to Low Level Output		24	ns

## 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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**National Semiconductor Corporation**  
 1111 West Bardin Road  
 Arlington, TX 76017  
 Tel: (800) 272-9959  
 Fax: (800) 737-7018

**National Semiconductor Europe**  
 Fax: (+49) 0-180-530 85 86  
 Email: cnjwge@tevm2.nsc.com  
 Deutsch Tel: (+49) 0-180-530 85 85  
 English Tel: (+49) 0-180-532 78 32  
 Français Tel: (+49) 0-180-532 93 58  
 Italiano Tel: (+49) 0-180-534 16 80

**National Semiconductor Hong Kong Ltd.**  
 19th Floor, Straight Block,  
 Ocean Centre, 5 Canton Rd.  
 Tsimshatsui, Kowloon  
 Hong Kong  
 Tel: (852) 2737-1600  
 Fax: (852) 2736-9960

**National Semiconductor Japan Ltd.**  
 Tel: 81-043-299-2309  
 Fax: 81-043-299-2408

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