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## DM74S20

### Dual 4-Input NAND Gate

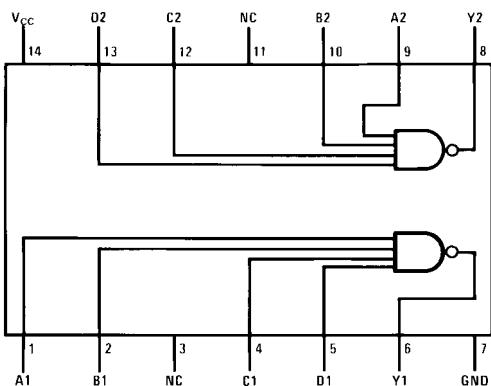
#### General Description

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

#### Ordering Code:

Order Number	Package Number	Package Description
DM74S20N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

#### Connection Diagram



#### Function Table

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

$Y = \overline{ABCD}$

H = HIGH Logic Level  
L = LOW Logic Level  
X = Either LOW or HIGH Logic Level

**Absolute Maximum Ratings**(Note 1)

Supply Voltage	7V
Input Voltage	5.5V
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			-1	mA
$I_{OL}$	LOW Level Output Current			20	mA
$T_A$	Free Air Operating Temperature	0		70	°C

**Electrical Characteristics**

over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
$V_I$	Input Clamp Voltage	$V_{CC} = \text{Min}$ , $I_I = -18 \text{ mA}$			-1.2	V
$V_{OH}$	HIGH Level Output Voltage	$V_{CC} = \text{Min}$ , $I_{OH} = \text{Max}$ $V_{IL} = \text{Max}$	2.7	3.4		V
$V_{OL}$	LOW Level Output Voltage	$V_{CC} = \text{Min}$ , $I_{OL} = \text{Max}$ $V_{IH} = \text{Min}$			0.5	V
$I_I$	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}$ , $V_I = 5.5V$			1	mA
$I_{IH}$	HIGH Level Input Current	$V_{CC} = \text{Max}$ , $V_I = 2.7V$			50	μA
$I_{IL}$	LOW Level Input Current	$V_{CC} = \text{Max}$ , $V_I = 0.5V$			-2	mA
$I_{OS}$	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	-40		-100	mA
$I_{CCH}$	Supply Current with Outputs HIGH	$V_{CC} = \text{Max}$		5	8	mA
$I_{CCL}$	Supply Current with Outputs LOW	$V_{CC} = \text{Max}$		10	18	mA

**Note 2:** All typicals are at  $V_{CC} = 5V$ ,  $T_A = 25^\circ\text{C}$ .

**Note 3:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

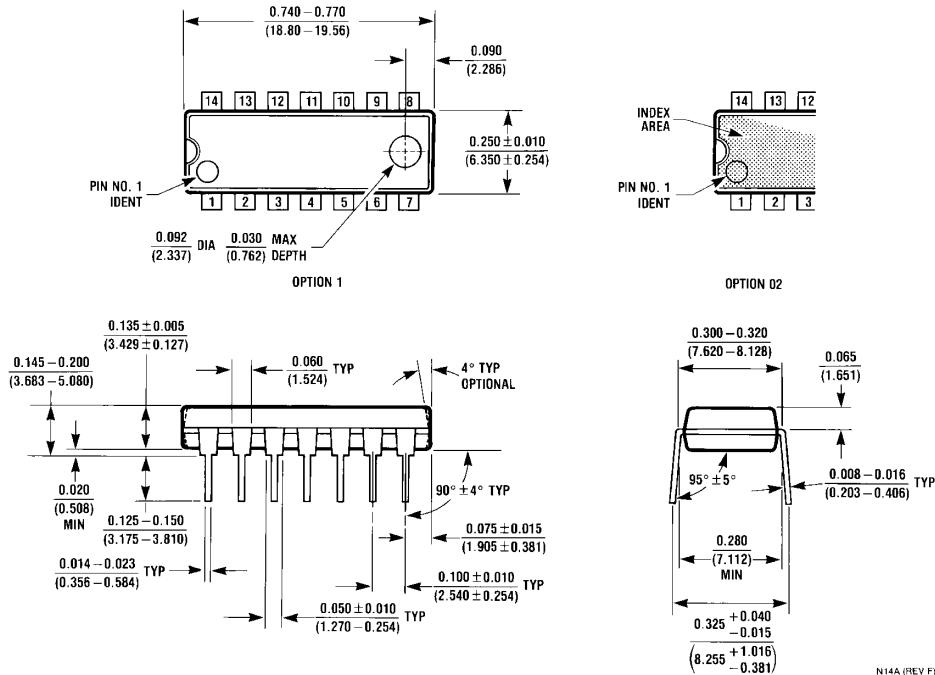
**Switching Characteristics**

at  $V_{CC} = 5V$  and  $T_A = 25^\circ\text{C}$

Symbol	Parameter	$R_L = 280\Omega$				Units	
		$C_L = 15 \text{ pF}$		$C_L = 50 \text{ pF}$			
		Min	Max	Min	Max		
$t_{PLH}$	Propagation Delay Time LOW-to-HIGH Level Output	2	4.5	2	7	ns	
$t_{PHL}$	Propagation Delay Time HIGH-to-LOW Level Output	2	5	2	8	ns	

### Physical Dimensions

inches (millimeters) unless otherwise noted



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

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