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Jameco Part Number 47095FSC

DM74LS20

Dual 4-Input NAND Gate

General Description

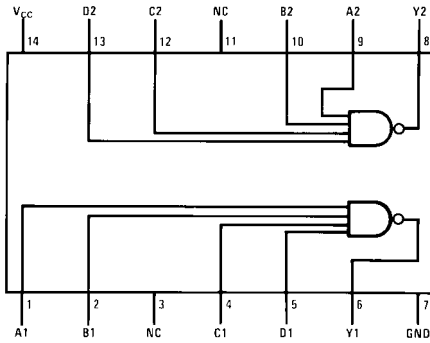
This device contains two independent gates each of which performs the logic NAND function.

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM74LS20M | M14A | 14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow |
| DM74LS20N | 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

$$Y = \overline{ABCD}$$

| 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 |

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 | 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 | | 0.4 | 0.8 | mA |
| I _{CCL} | Supply Current with Outputs LOW | V _{CC} = Max | | 1.2 | 2.2 | mA |

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

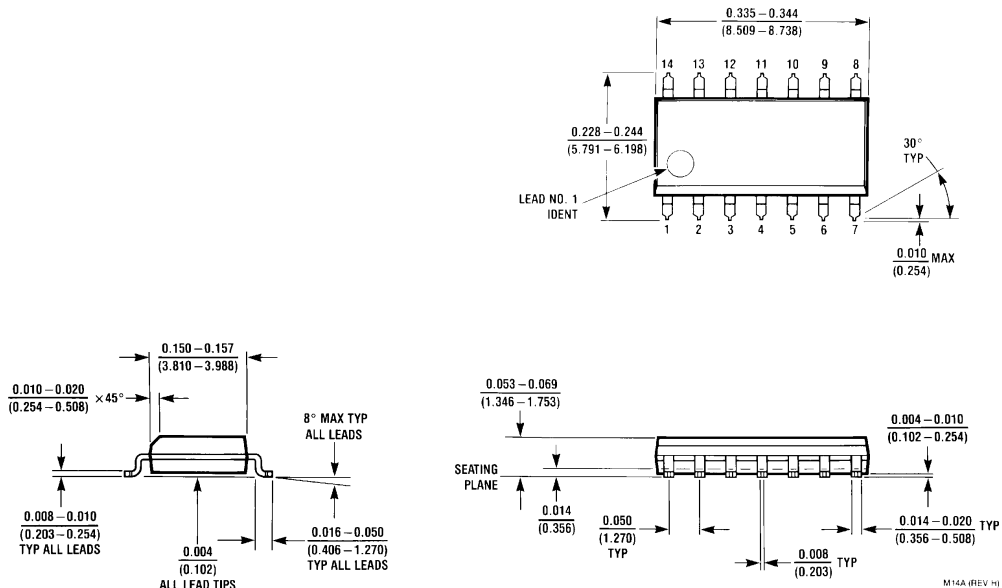
Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

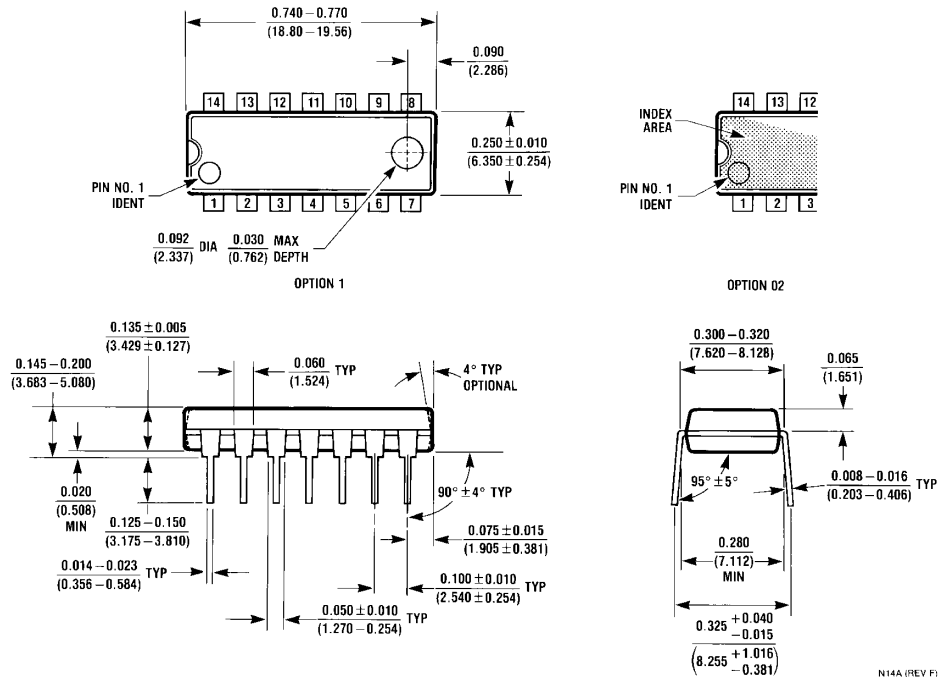
| Symbol | Parameter | R _L = 2 kΩ | | | | Units |
|------------------|--|------------------------|-----|------------------------|-----|-------|
| | | C _L = 15 pF | | C _L = 50 pF | | |
| | | Min | Max | Min | Max | |
| t _{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | 3 | 10 | 4 | 15 | ns |
| t _{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | 3 | 10 | 4 | 15 | ns |

Physical Dimensions inches (millimeters) unless otherwise noted



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

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



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

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