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FAIRCHILD SEMICONDUCTOR™

August 1986
Revised March 2000

DM74LS26
Quad 2-Input NAND Gate with High Voltage Open-Collector Outputs

General Description

This device contains four independent gates each of which performs the logic NAND function. The open-collector outputs require external pull-up resistors for proper logical operation.

These gates feature high-voltage output ratings (up to 15V) for interfacing with 12V systems. Although the outputs are rated for 15V, the device supply is still rated for 5V.

Pull-Up Resistor Equations

$$R_{MAX} = \frac{V_O\ (Min) - V_{OH}}{N_1\ (I_{OH}) + N_2\ (I_{IH})}$$

$$R_{MIN} = \frac{V_O\ (Max) - V_{OL}}{I_{OL} - N_3\ (I_{IL})}$$

Where: N_1 (I_{OH}) = total maximum output high current for all outputs tied to pull-up resistor

N_2 (I_{IH}) = total maximum input high current for all inputs tied to pull-up resistor

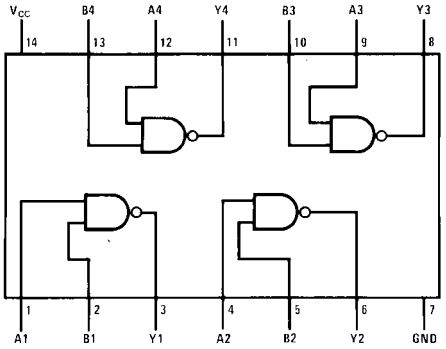
N_3 (I_{IL}) = total maximum input low current for all inputs tied to pull-up resistor

Ordering Code:

Order Number	Package Number	Package Description
DM74LS26M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow
DM74LS26N	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

$$Y = \overline{AB}$$

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 1)

Supply Voltage	7V
Input Voltage	7V
Output Voltage	15V
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
V_{OH}	HIGH Level Output Voltage			15	V
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
I_{CEX}	HIGH Level Output Current	V_{CC} = Min, V_{IL} = Max	V_O = 15V			1000	μA
			V_O = 12V			50	
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, V_I = 5.5V				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_{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

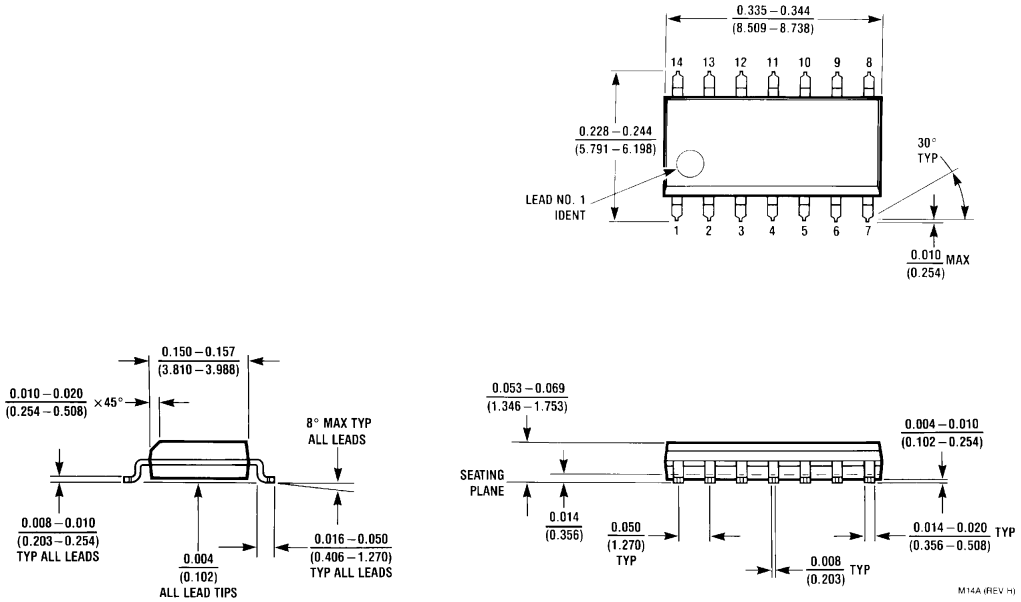
Note 2: All typicals are at V_{CC} = 5V, T_A = 25°C.

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

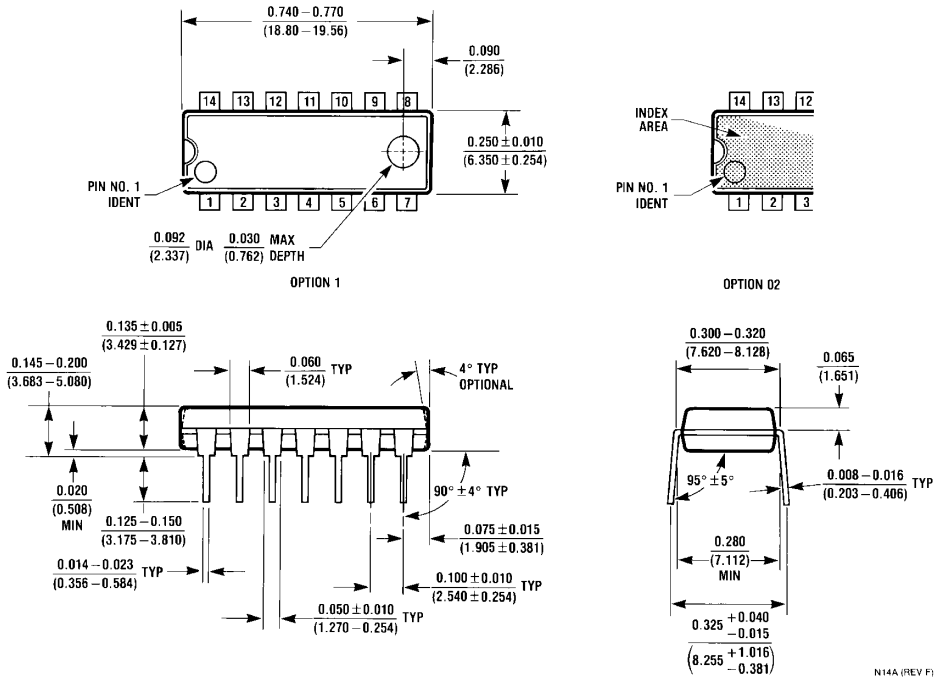
Symbol	Parameter	R_L = 2 kΩ				Units
		C_L = 15 pF		C_L = 50 pF		
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		20		45	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		15		20	ns

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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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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