National Semiconductor

February 1992

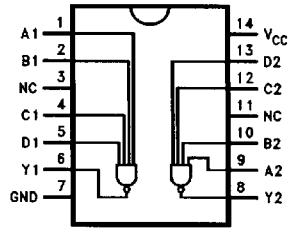
DM74LS22
Dual 4-Input NAND Gate with Open-Collector Output

General Description

The 'LS22 contains two independent NAND gates, each with four data inputs.

Connection Diagram

Dual-In-Line Package



TL/F/10168–1

Order Number DM74LS22M or DM74LS22N
See NS Package Number M14A or N14A

Truth Table

$Y = \overline{ABCD}$

Inputs				Outputs
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

DM74LS22 Dual 4-Input NAND Gate with Open-Collector Output

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	DM74LS22			Units
		Min	Nom	Max	
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			5.5	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 1)	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_O = 5.5V, V_{IL} = Max				100	μA
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min	DM74			0.5	V
		I_{OL} = 4 mA, V_{CC} = Min	DM74			0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, 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				−0.4	mA
I_{CCH}	Supply Current Outputs High	V_{CC} = Max, V_{IN} = GND				0.8	mA
I_{CCL}	Supply Current Outputs Low	V_{CC} = Max, V_{IN} = Open				2.2	mA

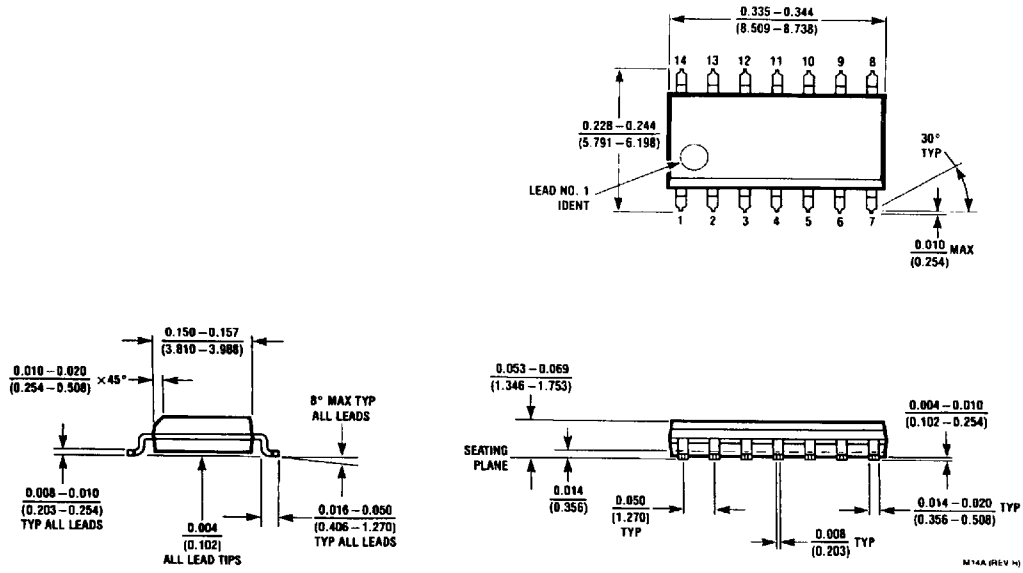
Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Switching Characteristics

at V_{CC} = +5.0V, T_A = +25°C

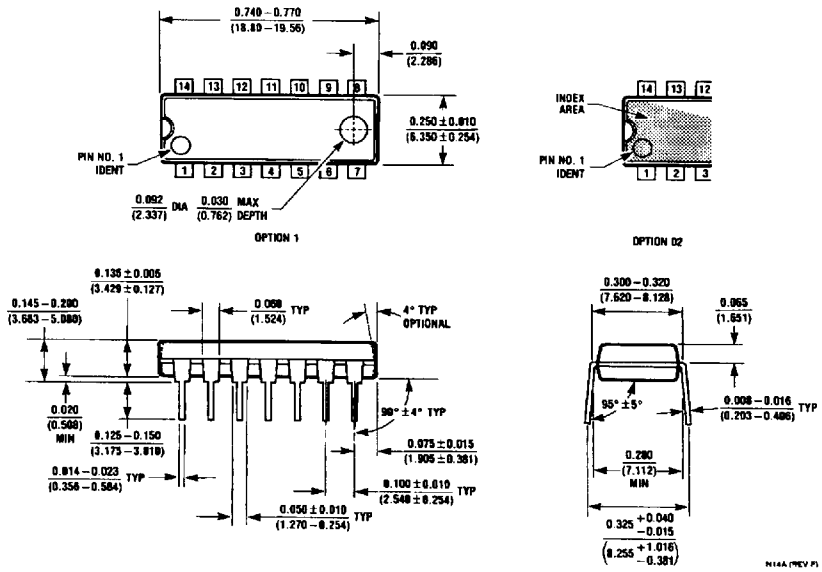
Symbol	Parameter	R_L = 2 kΩ, C_L = 15 pF		Units
		Min	Max	
t_{PLH}	Propagation Delay Time Low to High Level Output		22	ns
t_{PHL}	Propagation Delay Time High to Low Level Output		24	ns

Physical Dimensions inches (millimeters)



14-Lead Small Outline Molded Package (M)
Order Number DM74LS22M
NS Package Number M14A

Physical Dimensions inches (millimeters) (Continued)



14-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS22N
NS Package Number N14A

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2. A critical component is 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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