

DM74LS20 Dual 4-Input NAND Gates

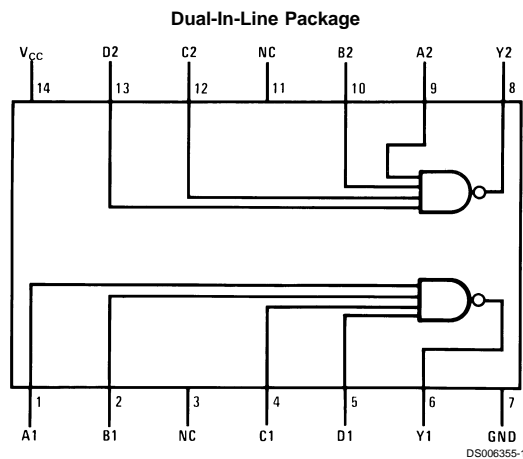
General Description

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

Features

- Alternate Military/Aerospace device (54LS20) is available. Contact a Fairchild Semiconductor Sales Office/Distributor for specifications

Connection Diagram



Order Number 54LS20DMQB, 54LS20FMQB, 54LS20LMQB,
DM54LS20J, DM54LS20W, DM74LS20M or DM74LS20N
See Package Number E20A, J14A, M14A, N14A or W14B

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	DM54LS and 54LS	-55°C to +125°C
Input Voltage	7V	DM74LS	0°C to +70°C
Operating Free Air Temperature Range		Storage Temperature Range	-65°C to +150°C

Recommended Operating Conditions

Symbol	Parameter	DM54LS20			DM74LS20			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.7			0.8	V
I _{OH}	High Level Output Current			-0.4			-0.4	mA
I _{OL}	Low Level Output Current			4			8	mA
T _A	Free Air Operating Temperature	-55		125	0		70	°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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

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	DM54 2.5	3.4		V
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max, V _{IH} = Min	DM54 0.25	0.25	0.4	V
		I _{OL} = 4 mA, V _{CC} = Min	DM74 0.35	0.35	0.5	
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	DM54 -20		-100	mA
		(Note 3)	DM74 -20		-100	
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

Switching Characteristics

at V_{CC} = 5V and T_A = 25°C

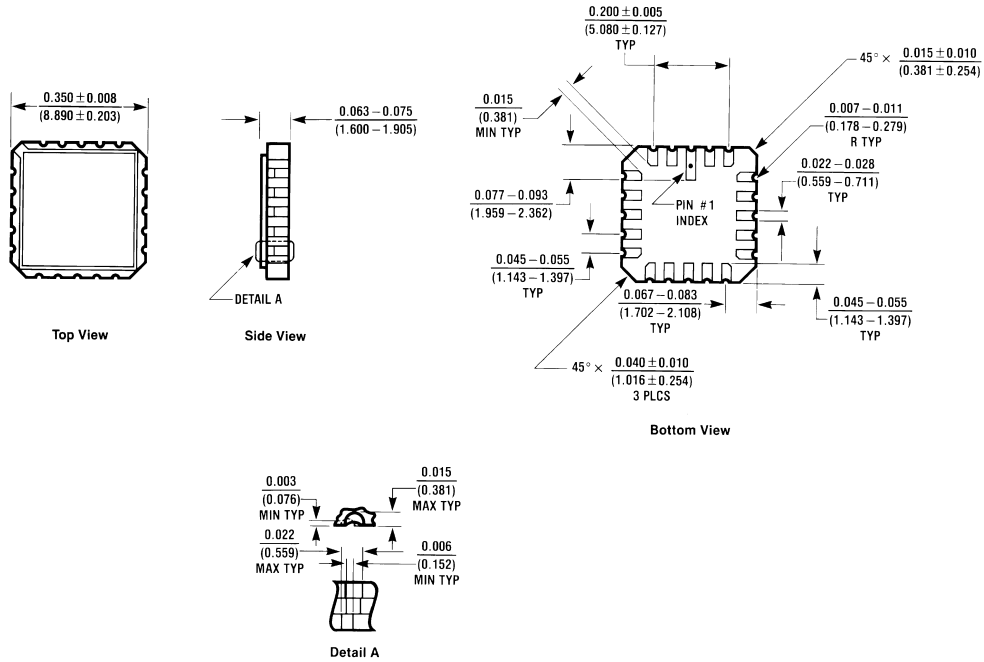
Symbol	Parameter	R _L = 2 kΩ				Units
		C _L = 15 pF		C _L = 50 pF		
		Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	3	10	4	15	ns
t _{PHL}	Propagation Delay Time High to Low Level Output	3	10	4	15	ns

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.

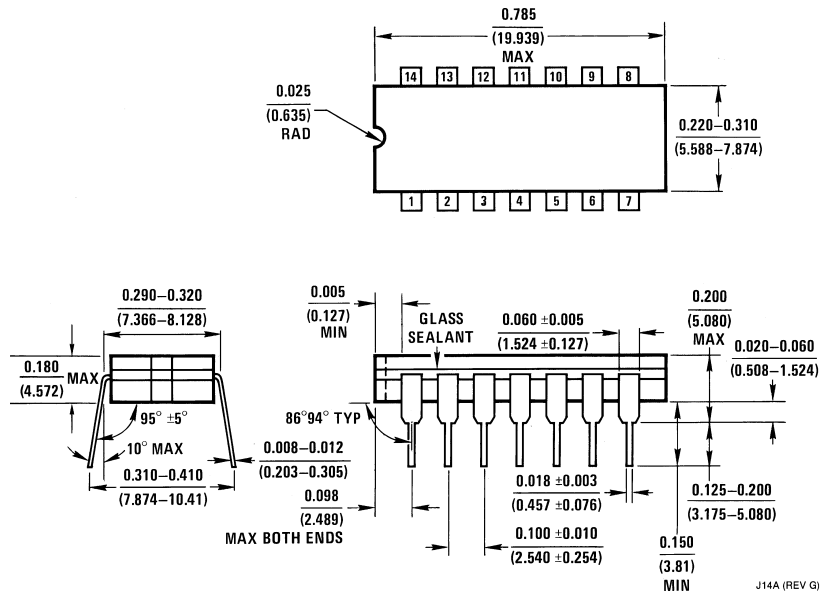


Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

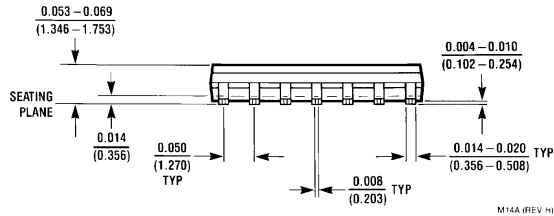
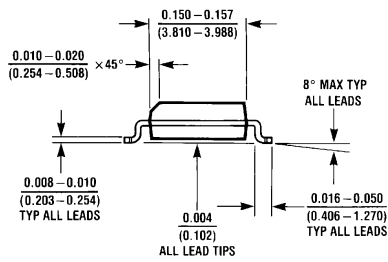
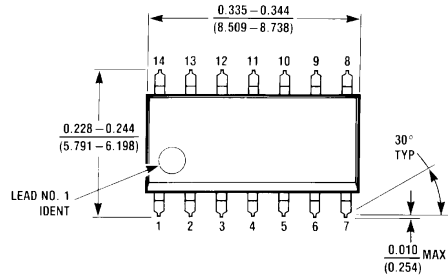
Ceramic Leadless Chip Carrier Package (E)
Order Number 54LS20LMQB
Package Number E20A



J14A (REV G)

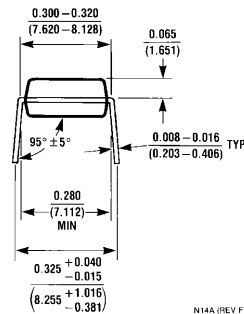
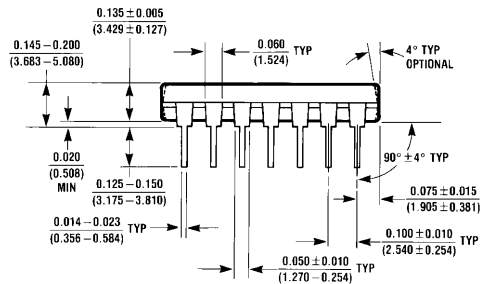
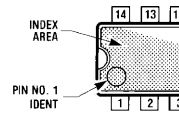
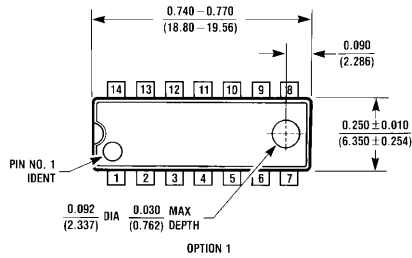
14-Lead Ceramic Dual-In-Line Package (J)
Order Number 54LS20DMQB or DM54LS20J
Package Number J14A

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



M14A (REV. H)

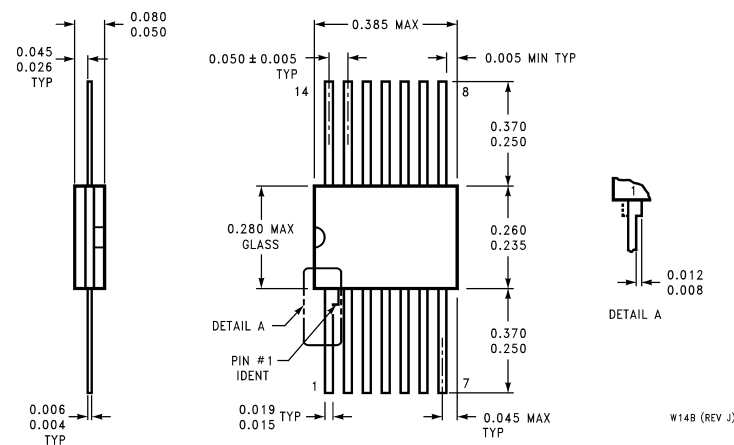
14-Lead Small Outline Molded Package (M)
Order Number DM74LS20M
Package Number M14A



N14A (REV. F)

14-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS20N
Package Number N14A

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



14-Lead Ceramic Flat Package (W)
Order Number 54LS20FMQB or DM54LS20W
Package Number W14B

W14B (REV J)

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