National Semiconductor Corporation

DM54L20/DM74L20 Dual 4-Input NAND Gates

General Description

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

Absolute Maximum Ratings (Note)

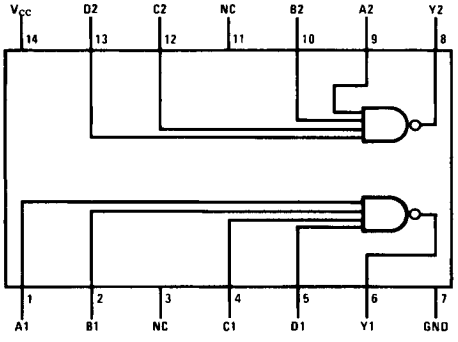
Specifications for Military/Aerospace products are not contained in this datasheet. Refer to the associated reliability electrical test specifications document.

Supply Voltage	8V
Input Voltage	5.5V
Operating Free Air Temperature Range	
DM54L	−55°C to +125°C
DM74L	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.*

Connection Diagram

Dual-In-Line Package



TL/F/6621–1

Order Number DM54L20J or DM74L20N
See NS Package Number J14A or N14A

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

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Recommended Operating Conditions

Symbol	Parameter	DM54L20			DM74L20			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			0.7	V
I_{OH}	High Level Output Current			−0.2			−0.2	mA
I_{OL}	Low Level Output Current			2			3.6	mA
T_A	Free Air Operating Temperature	−55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_{OH}	High Level Ouput Voltage	V_{CC} = Min, I_{OH} = Max V_{IL} = Max		2.4	3.3		V
V_{OL}	Low Voltage Output Voltage	V_{CC} = Min I_{OL} = Max V_{IH} = Min	DM54		0.15	0.3	V
			DM74		0.2	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 = 2.4V				10	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.3V				−0.18	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)	DM54	−3		−15	mA
			DM74	−3		−15	
I_{CCH}	Supply Current with Outputs High	V_{CC} = Max			0.22	0.4	mA
I_{CCL}	Supply Current with Outputs Low	V_{CC} = Max			0.58	1.02	mA

Switching Characteristics at V_{CC} = 5V and T_A = 25°C (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	R_L = 4 kΩ, C_L = 50 pF		60	ns
t_{PHL}	Propagation Delay Time High to Low Level Output			60	ns

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

Note 2: Not more than one output should be shorted at a time.