

August 1986 Revised March 2000

DM74LS51 Dual 2-Wide 2-Input, 2-Wide 3-Input **AND-OR-INVERT** Gate

General Description

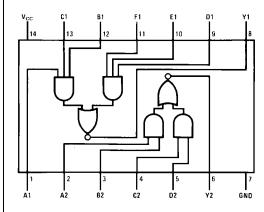
This device contains two independent combinations of gates each of which performs the logic AND-OR-INVERT function. Each package contains one 2-wide 2-input and one 2-wide 3-input AND-OR-INVERT gates.

Ordering Code:

Order Number	Package Number	Package Description			
DM74LS51M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150 Narrow			
DM74LS51N	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

Inputs					Output	
A1	B1	C1	D1	E1	F1	Y1
Н	Н	Н	Х	Х	Х	L
X	Χ	Χ	Н	Н	Н	L
Other Combinations					Н	

Y2 = ((A2) (B2) + (C2) (D2))

Inputs				Output
A2	B2	C2	D2	Y2
Н	Н	Х	Х	L
X	X	Н	Н	L
Other combinations				Н

H = HIGH Logic Level

L = LOW Logic Level X = Either LOW or HIGH Logic Level

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Absolute Maximum Ratings(Note 1)

Supply Voltage 7V Input Voltage 7V Operating Free Air Temperature Range $0^{\circ}\text{C to } +70^{\circ}\text{C}$ Storage Temperature Range $-65^{\circ}\text{C to } +150^{\circ}\text{C}$

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
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -18 \text{ mA}$			-1.5	V
V _{OH}	HIGH Level Output Voltage	$V_{CC} = Min, I_{OH} = Max,$ $V_{IL} = Max$	2.7	3.4		٧
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	
lı	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	μΑ
I _{IL}	LOW Level Input Current	V _{CC} = Max, V _I = 0.4V			-0.36	mA
los	Short Circuit Output Current	V _{CC} = Max (Note 3)	-20		-100	mA
Іссн	Supply Current with Outputs HIGH	V _{CC} = Max		0.8	1.6	mA
I _{CCL}	Supply Current with Outputs LOW	V _{CC} = Max		1.4	2.8	mA

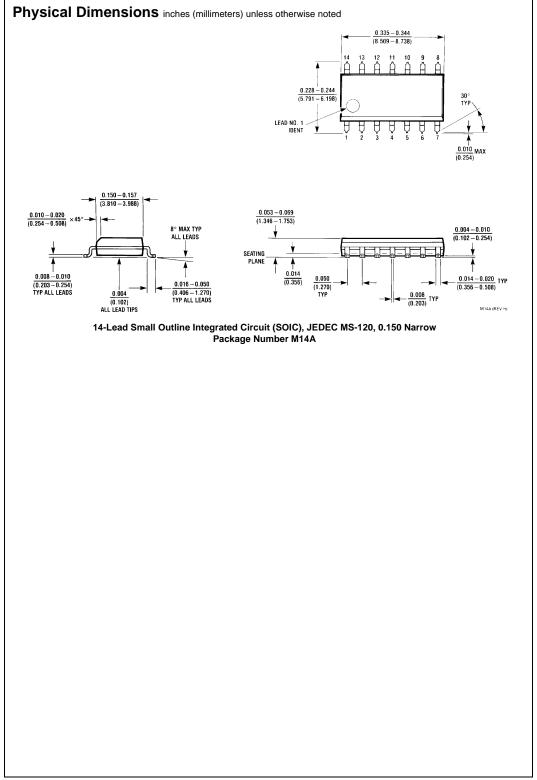
Note 2: All typicals are at $V_{CC} = 5V$, $T_A = 25$ °C.

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 $T_A = 25^{\circ}C$

Symbol	Parameter	$C_L = 50 \text{ pF, } R_L = 2 \text{ k}\Omega$		Units
		Min	Max	Oillis
t _{PLH}	Propagation Delay Time	4	18	ns
	LOW-to-HIGH Level Output	4	10	115
t _{PHL}	Propagation Delay Time	3	15	
	HIGH-to-LOW Level Output	3	15	ns



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Physical Dimensions inches (millimeters) unless otherwise noted (Continued) 0.740 - 0.770 (18.80 - 19.56)0.090 (2.286) 14 13 12 14 13 12 11 10 9 8 INDEX AREA 0.250 ± 0.010 (6.350 ± 0.254) PIN NO. 1 PIN NO. 1 IDENT 1 2 3 4 5 6 7 1 2 3 $\frac{0.092}{(2.337)}$ DIA 0.030 MAX (0.762) DEPTH OPTION 1 OPTION 02 $\frac{0.135 \pm 0.005}{(3.429 \pm 0.127)}$ 0.300 - 0.320 $\frac{0.630 - 8.128}{(7.620 - 8.128)}$ 0.060 0.145 - 0.2004° TYP Optional (1.651) (3.683 - 5.080) $\frac{0.008 - 0.016}{(0.203 - 0.406)}$ TYP 0.020 (0.508)0.125 - 0.150 0.075 ± 0.015 $\overline{(3.175 - 3.810)}$ (1.905 ± 0.381) (7.112) MIN 0.014 - 0.0230.100 ± 0.010 (2.540 ± 0.254) (0.356 - 0.584)0.05<u>0±0.010</u> TYP 0.325 ^{+0.040} -0.015 (1.270 - 0.254)8.255 + 1.016

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

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N144 (REV.F)

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