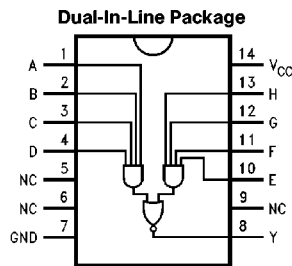


## DM54LS55/DM74LS55 2-Wide, 4-Input AND-OR-INVERT Gate

### General Description

This device contains a combination of AND-OR-INVERT functions. The internal gates are configured as two, four-input AND gates with their outputs connected to a two-input NOR gate.

### Connection Diagram



TL/F/10174-1

Order Number DM54LS55J, DM54LS55W, DM74LS55M or DM74LS55N  
See NS Package Number J14A, M14A, N14A or W14B

### Function Table

$$Y = \overline{ABCD} + EFGH$$

Inputs								Output
A	B	C	D	E	F	G	H	Y
H	H	H	H	X	X	X	X	L
X	X	X	X	H	H	H	H	L
All Other Combinations								H

H = High Logic Level  
L = Low Logic Level  
X = Either Low or High Logic Level

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
DM54LS	-55°C to +125°C
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	DM54LS55			DM74LS55			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.7			0.8	V
I <sub>OH</sub>	High Level Output Current			-0.4			-0.4	mA
I <sub>OL</sub>	Low Level Output Current			4			8	mA
T <sub>A</sub>	Free Air Operating Temperature	-55		125	0		70	°C

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

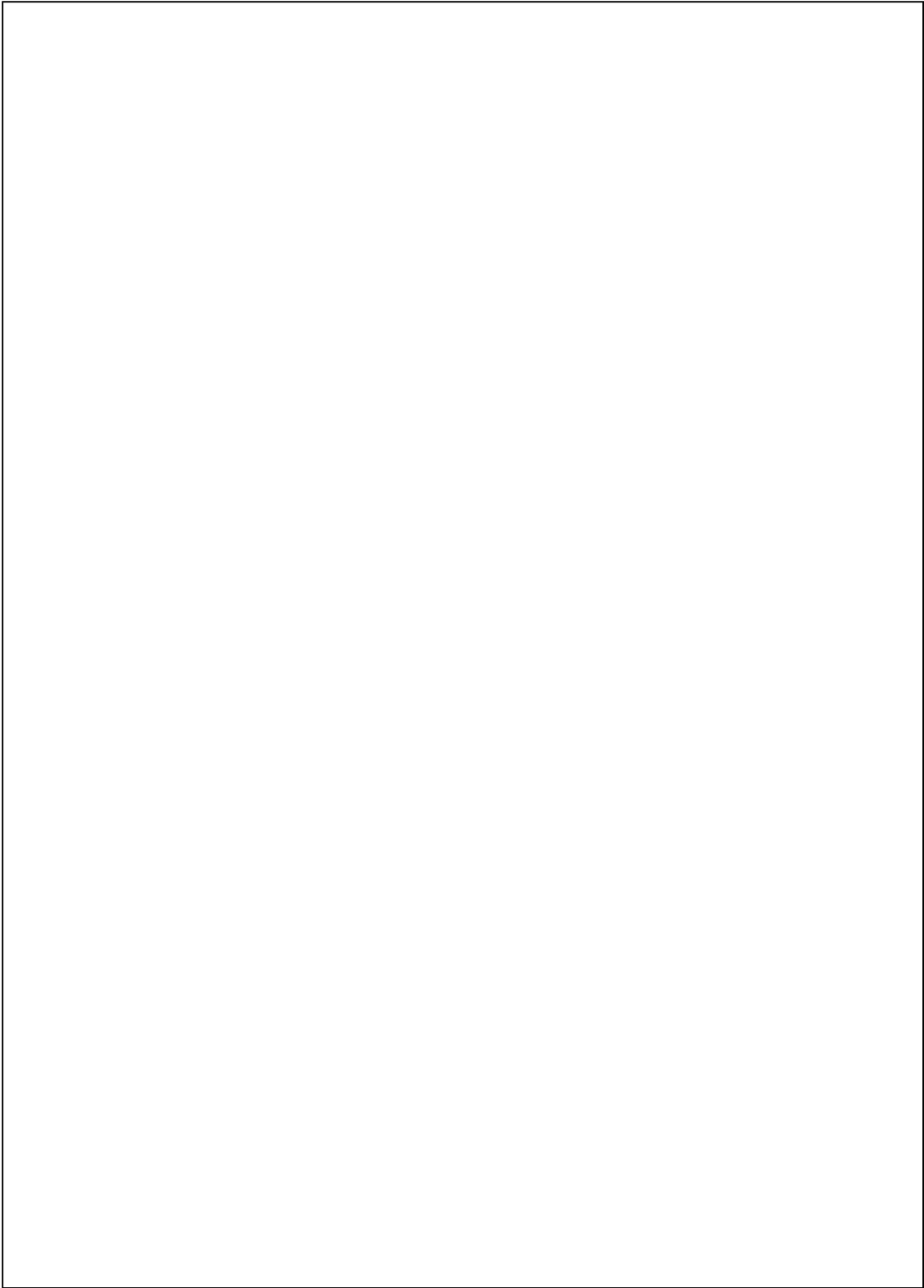
Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max	DM54 2.5			V
			DM74 2.7			
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max, V <sub>IH</sub> = Min	DM54		0.4	V
			DM74		0.5	
		I <sub>OL</sub> = 4 mA, V <sub>CC</sub> = Min	DM74		0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V V <sub>I</sub> = 10V (DM54)			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			-0.4	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	DM54 -20		-100	mA
			DM74 -20		-100	
I <sub>CCH</sub>	Supply Current with Outputs High	V <sub>CC</sub> = Max, V <sub>IN</sub> = GND			0.8	mA
I <sub>CCL</sub>	Supply Current with Outputs Low	V <sub>CC</sub> = Max, V <sub>IN</sub> = Open			1.3	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

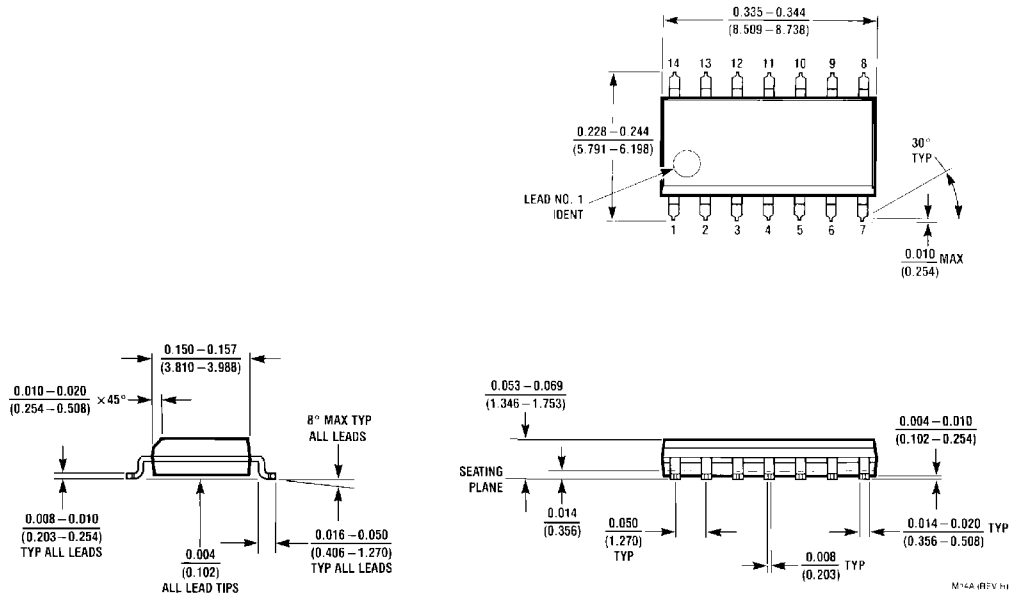
## Switching Characteristics V<sub>CC</sub> = +5.0V, T<sub>A</sub> = +25°C

Symbol	Parameter	C <sub>L</sub> = 15 pF, R <sub>L</sub> = 2 kΩ		Units
		Min	Max	
t <sub>PLH</sub>	Propagation Delay Time		15	ns
t <sub>PHL</sub>			15	

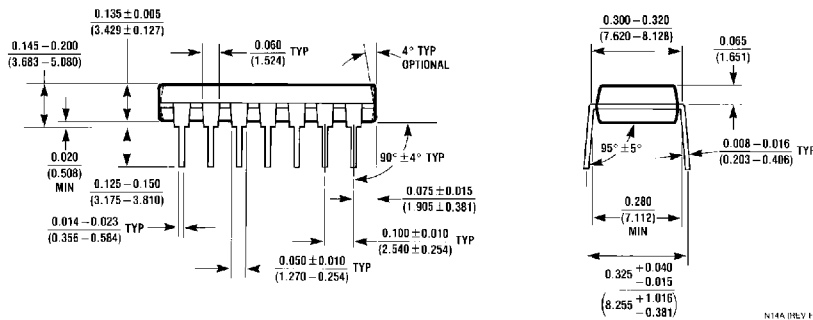
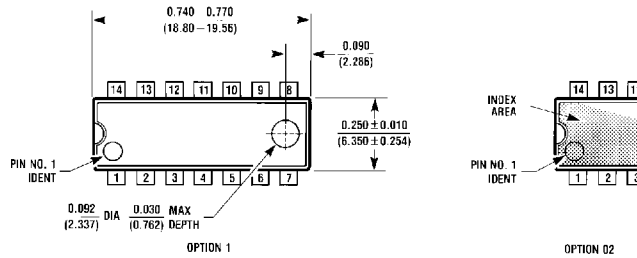




**Physical Dimensions** inches (millimeters) (Continued)

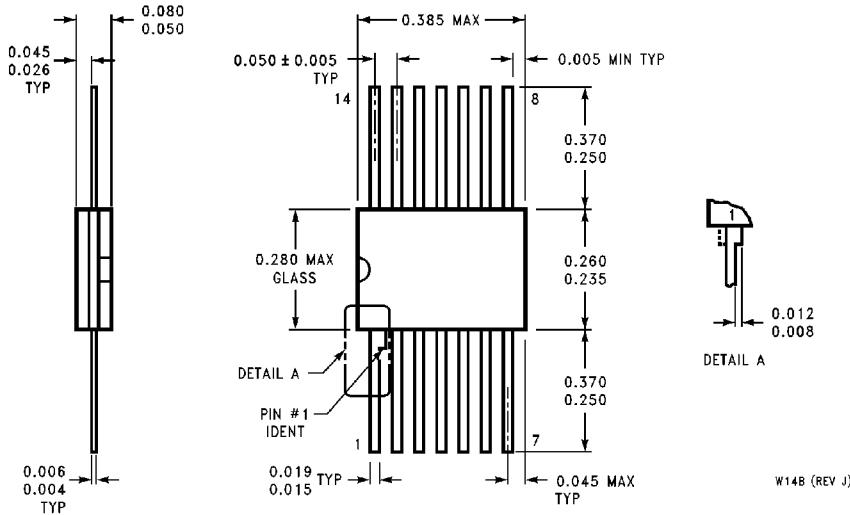


**14-Lead Small Outline Molded Package (M)**  
**Order Number DM74LS55M**  
**NS Package Number M14A**



**14-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM74LS55N**  
**NS Package Number N14A**

**Physical Dimensions** inches (millimeters) (Continued)



**14-Lead Ceramic Flat Package (W)**  
**Order Number DM54LS55W**  
**NS Package Number W14B**

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**National Semiconductor Corporation**  
 1111 West Bardin Road  
 Arlington, TX 76017  
 Tel: 1(800) 272-9959  
 Fax: 1(800) 737-7018

**National Semiconductor Europe**  
 Fax: (+49) 0-180-530 85 86  
 Email: onjwge@tevm2.nsc.com  
 Deutsch Tel: (+49) 0-180-530 85 85  
 English Tel: (+49) 0-180-532 78 32  
 Français Tel: (+49) 0-180-532 93 58  
 Italiano Tel: (+49) 0-180-534 16 80

**National Semiconductor Hong Kong Ltd.**  
 13th Floor, Straight Block,  
 Ocean Centre, 5 Canton Rd.  
 Tsimshatsui, Kowloon  
 Hong Kong  
 Tel: (852) 2737-1600  
 Fax: (852) 2736-9960

**National Semiconductor Japan Ltd.**  
 Tel: 81-043-299-2309  
 Fax: 81-043-299-2408

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