

## DM74ALS27 Triple 3-Input NOR Gate

### General Description

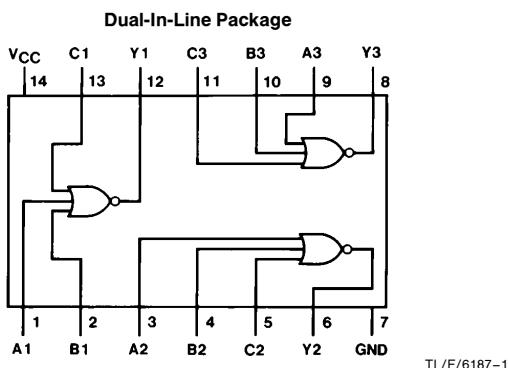
This device contains three independent gates, each of which performs the logic NOR function.

- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts

### Features

- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range

### Connection Diagram



**Order Number DM74ALS27M or DM74ALS27N**  
See NS Package Number M14A or N14A

### Function Table

$$Y = \overline{A + B + C}$$

Inputs			Output
A	B	C	Y
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

H = High Logic Level

L = Low Logic Level

X = Either Low or High Logic Level

## Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range DM74ALS	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical $\theta_{JA}$	
N Package	86.5°C/W
M Package	116.0°C/W

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	DM74ALS27			Units
		Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8	V
I <sub>OH</sub>	High Level Output Current			-0.4	mA
I <sub>OL</sub>	Low Level Output Current			8	mA
T <sub>A</sub>	Free Air Operating Temperature	0		70	°C

## Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.5V, I <sub>I</sub> = -18 mA				-1.5	V
V <sub>OH</sub>	High Level Output Voltage	I <sub>OH</sub> = -0.4 mA V <sub>CC</sub> = 4.5V to 5.5V	V <sub>CC</sub> - 2				V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = 4.5V	74ALS I <sub>OL</sub> = 8 mA		0.35	0.5	V
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 7V				0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 2.7V				20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IL</sub> = 0.4V				-0.1	mA
I <sub>O</sub>	Output Drive Current	V <sub>CC</sub> = 5.5V	V <sub>O</sub> = 2.25V	-30		-112	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 5.5V	Outputs High		0.97	1.8	mA
			Outputs Low		2	4	mA

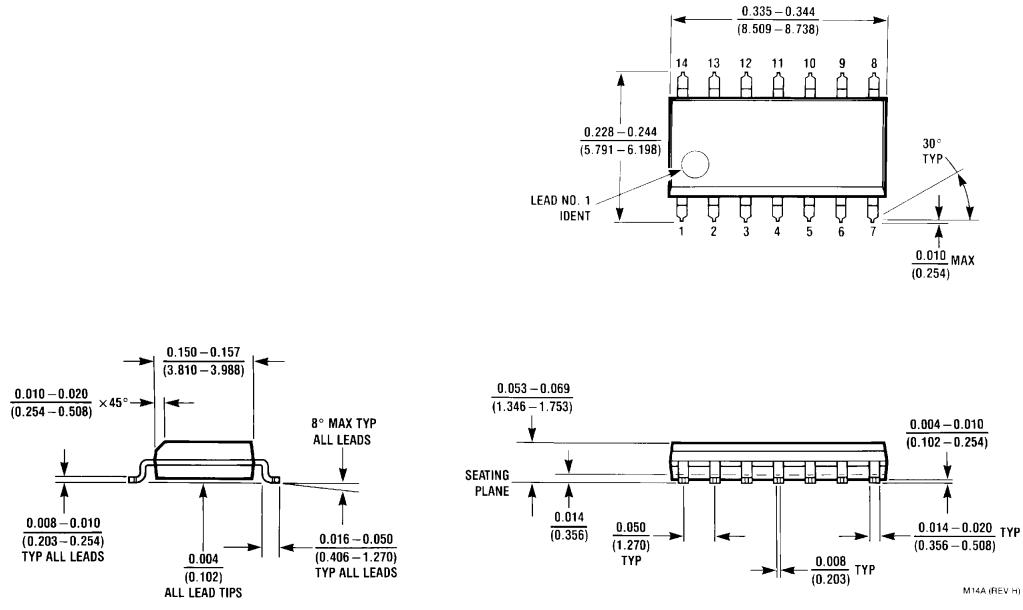
## Switching Characteristics

over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	DM74ALS27		Units
			Min	Max	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	V <sub>CC</sub> = 4.5V to 5.5V R <sub>L</sub> = 500Ω C <sub>L</sub> = 50 pF	4	15	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		3	9	ns

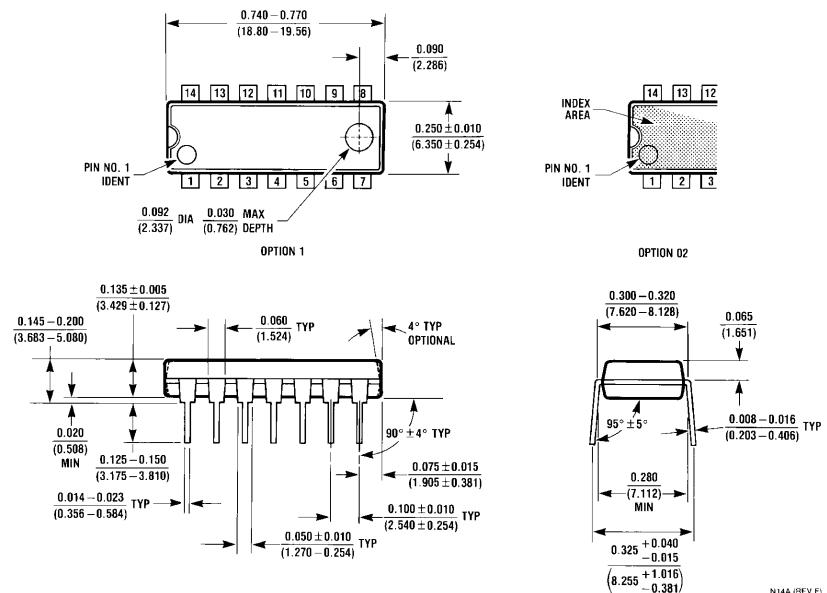
Note 1: See Section 5 for test waveforms and output load.

**Physical Dimensions** inches (millimeters)



S.O. Package (M)  
Order Number DM74ALS27M  
NS Package Number M14A

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



**Molded Dual-In-Line Package (N)**  
Order Number DM74ALS27N  
NS Package Number N14A

N14A (REV F)

**LIFE SUPPORT POLICY**

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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.



**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: cnjwge@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

National does not assume any responsibility for use of any circuitry described, no circuit patent licenses are implied and National reserves the right at any time without notice to change said circuitry and specifications.