

# SN54F27, SN74F27 TRIPLE 3-INPUT POSITIVE-NOR GATES

SDFS042A – MARCH 1987 – REVISED OCTOBER 1993

- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

## description

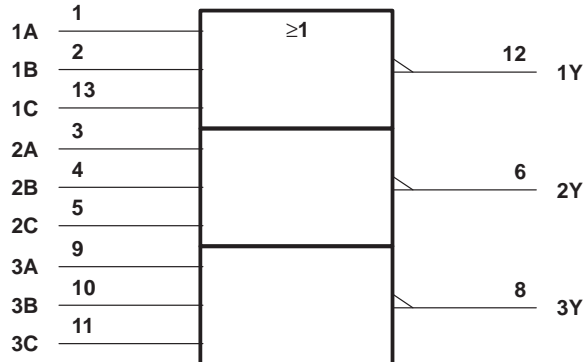
These devices contain three independent 3-input NOR gates. They perform the Boolean functions  $Y = \overline{A} \cdot \overline{B} \cdot \overline{C}$  or  $Y = A + B + C$  in positive logic.

The SN54F27 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F27 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE  
(each gate)

INPUTS			OUTPUT Y
A	B	C	
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

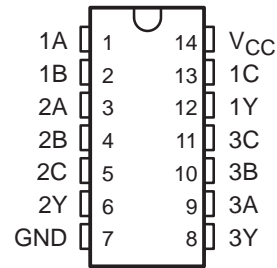
## logic symbol†



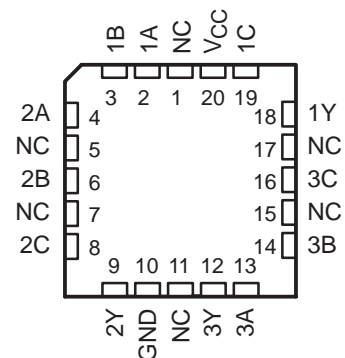
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, and N packages.

SN54F27 ... J PACKAGE  
SN74F27 ... D OR N PACKAGE  
(TOP VIEW)



SN54F27 ... FK PACKAGE  
(TOP VIEW)



NC – No internal connection

## logic diagram, each gate (positive logic)



# SN54F27, SN74F27

## TRIPLE 3-INPUT POSITIVE-NOR GATES

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### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, $V_{CC}$	–0.5 V to 7 V
Input voltage range, $V_I$ (see Note 1)	–1.2 V to 7 V
Input current range	–30 mA to 5 mA
Voltage range applied to any output in the high state	–0.5 V to $V_{CC}$
Current into any output in the low state	40 mA
Operating free-air temperature range: SN54F27	–55°C to 125°C
SN74F27	0°C to 70°C
Storage temperature range	–65°C to 150°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

### recommended operating conditions

		SN54F27			SN74F27			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage			0.8			0.8	V
$I_{IK}$	Input clamp current			–18			–18	mA
$I_{OH}$	High-level output current			–1			–1	mA
$I_{OL}$	Low-level output current			20			20	mA
$T_A$	Operating free-air temperature	–55		125	0		70	°C

### electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	SN54F27			SN74F27			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IK}$	$V_{CC} = 4.5$ V, $I_I = -18$ mA			–1.2			–1.2	V
$V_{OH}$	$V_{CC} = 4.5$ V, $I_{OH} = -1$ mA	2.5	3.4		2.5	3.4		V
	$V_{CC} = 4.75$ V, $I_{OH} = -1$ mA				2.7			
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 20$ mA		0.3	0.5		0.3	0.5	V
$I_I$	$V_{CC} = 5.5$ V, $V_I = 7$ V			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20			20	μA
$I_{IL}$	$V_{CC} = 5.5$ V, $V_I = 0.5$ V			–0.6			–0.6	mA
$I_{OS}§$	$V_{CC} = 5.5$ V, $V_O = 0$	–60		–150	–60		–150	mA
$I_{CCH}$	$V_{CC} = 5.5$ V, $V_I = 0$		3.8	5.5		3.8	5.5	mA
$I_{CCL}$	$V_{CC} = 5.5$ V, See Note 2		8.4	12		8.4	12	mA

‡ All typical values are at  $V_{CC} = 5$  V,  $T_A = 25^\circ\text{C}$ .

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

NOTE 2:  $I_{CCL}$  is measured with one input at 4.5 V and all others grounded.



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## switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			'F27			SN54F27		SN74F27		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A, B, or C	Y	1.2	3.1	5	1	6	1	5.5	ns
t <sub>PHL</sub>			1	2.1	4.5	1	5.5	1	4.5	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.  
NOTE 3: Load circuits and waveforms are shown in Section 1.





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