

SN5427, SN54LS27, SN7427, SN74LS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

DECEMBER 1983—REVISED MARCH 1988

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs

- Dependable Texas Instruments Quality and Reliability

description

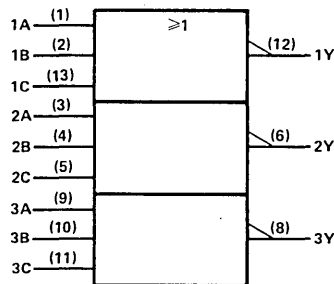
These devices contain three independent 3-input NOR gates.

The SN5427 and SN54LS27 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN7427 and SN74LS27 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

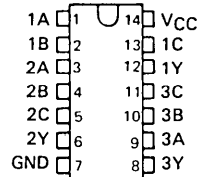
logic symbol†



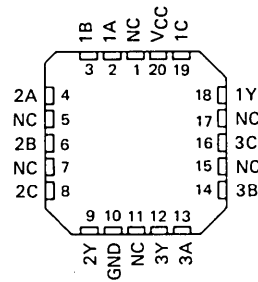
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN5427, SN54LS27 . . . J OR W PACKAGE
SN7427 . . . N PACKAGE
SN74LS27 . . . D OR N PACKAGE
(TOP VIEW)

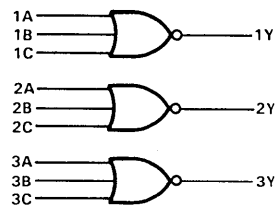


SN54LS27 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

logic diagram



positive logic

$$Y = \overline{A + B + C} \text{ or } Y = \overline{A} \cdot \overline{B} \cdot \overline{C}$$

2

TTL Devices

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS
INSTRUMENTS

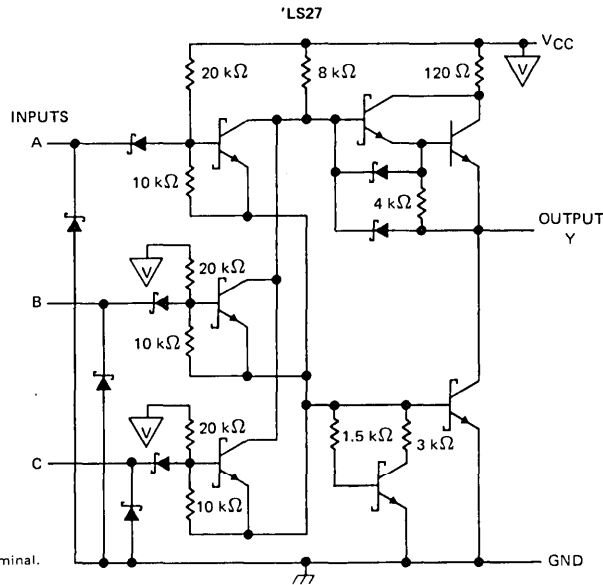
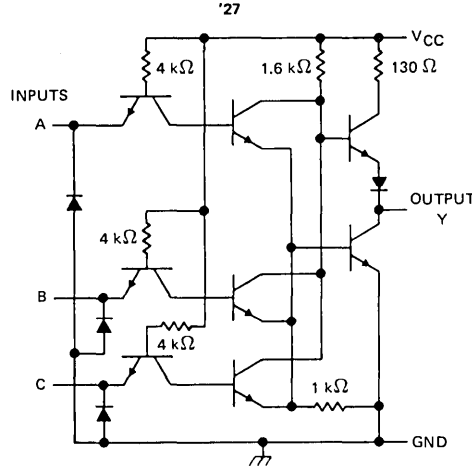
POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

2-119

SN5427, SN54LS27, SN7427, SN74LS27
TRIPLE 3-INPUT POSITIVE-NOR GATES

schematics (each gate)

2
TTL Devices



Resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '27	5.5 V
'LS27	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

SN5427, SN7427
TRIPLE 3-INPUT POSITIVE-NOR GATES

recommended operating conditions

	SN5427			SN7427			UNIT
	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	0.8			0.8			V
I _{OH} High-level output current	-0.8			-0.8			mA
I _{OL} Low-level output current	16			16			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 †	SN5427		SN7427		UNIT
		MIN	TYP ‡	MAX	MIN	
V _{IK}	V _{CC} = MIN, I _I = -12 mA	-1.5		-1.5		V
V _{OH}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OH} = -0.8 mA	2.4	3.4	2.4	3.4	V
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 16 mA	0.2	0.4	0.2	0.4	V
I _I	V _{CC} = MAX, V _I = 5.5 V	1		1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.4 V	40		40		µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-1.6		-1.6		mA
I _{OS} §	V _{CC} = MAX	-20	-55	-18	-55	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	10	16	10	16	mA
I _{CCL}	V _{CC} = MAX, See Note 2	16	26	16	26	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

§ Not more than one output should be shorted at a time.

NOTE 2: One input at 4.5 V, all others at GND.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A, B or C	Y	R _L = 400 Ω, C _L = 15 pF	10	15		ns
t _{PHL}				7	11		ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

2
TTL Devices

SN54LS27, SN74LS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

recommended operating conditions

	SN54LS27			SN74LS27			UNIT
	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			0.8			V
I _{OH} High-level output current	-0.4			-0.4			mA
I _{OL} Low-level output current	4			8			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 †	SN54LS27			SN74LS27			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = -18 mA	-1.5			-1.5			V
V _{OH}	V _{CC} = MIN, V _{IL} = MAX, I _{OH} = -0.4 mA	2.5	3.4		2.7	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 4 mA	0.25	0.4		0.25	0.4	V	
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA				0.35	0.5		
I _I	V _{CC} = MAX, V _I = 7 V	0.1			0.1			mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	20			20			μA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V	-0.4			-0.4			mA
I _{OS} §	V _{CC} = MAX	-20		-100	-20		-100	mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	2	4		2	4	mA	
I _{CCL}	V _{CC} = MAX, See Note 2	3.4	6.8		3.4	6.8	mA	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡ All typical values are at V_{CC} = 5 V, T_A = 25°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: One input at 4.5 V, all others at GND.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	A, B or C	Y	R _L = 2 kΩ, C _L = 15 pF	10	15		ns
t _{PHL}				10	15		ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

2

TTL Devices