

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

SDLS089

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

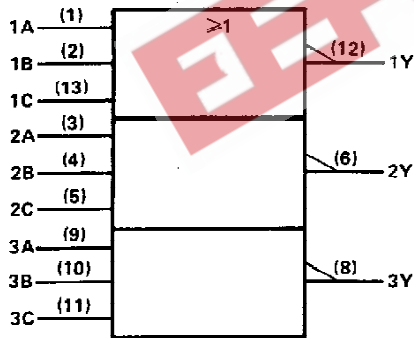
These devices contain three independent 3-input NOR gates.

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)

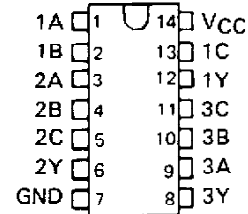
INPUTS			OUTPUT
A	B	C	Y
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

logic symbol†

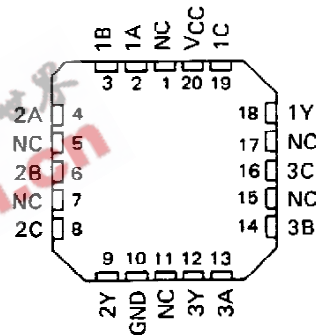


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, N, and W packages.

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

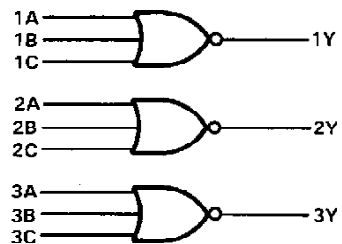


SN54LS27 . . . FK PACKAGE
(TOP VIEW)



NC - No internal connection

logic diagram



positive logic

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

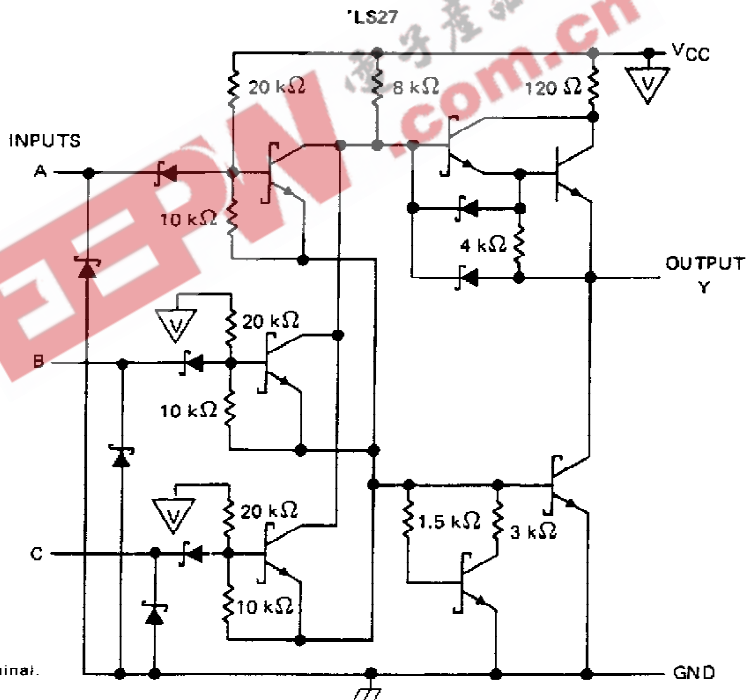
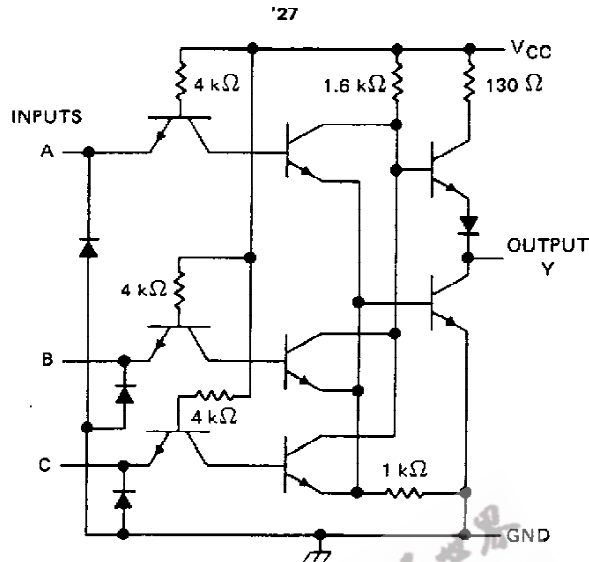
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SN5427, SN54LS27, SN7427, SN74LS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

schematics (each gate)



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.

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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	TYP ‡	MAX	
V_{fK}	$V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$			-1.5			-1.5	V
V_{OH}	$V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}, I_{OH} = -0.8 \text{ mA}$	2.4	3.4		2.4	3.4		V
V_{OL}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 16 \text{ mA}$		0.2	0.4		0.2	0.4	V
I_I	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$			40			40	µA
I_{IL}	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-1.6			-1.6	mA
$I_{OS} §$	$V_{CC} = \text{MAX}$	-20		-55	-18		-55	mA
I_{CCH}	$V_{CC} = \text{MAX}, V_I = 0 \text{ V}$		10	16		10	16	mA
I_{CCL}	$V_{CC} = \text{MAX}, \text{ See Note 2}$		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 $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ 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, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	A, B or C	Y	$R_L = 400 \Omega,$	$C_L = 15 \text{ pF}$		10	15	ns
t_{PHL}						7	11	ns

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

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			°C

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

PARAMETER	TEST CONDITIONS †	SN54LS27		SN74LS27		UNIT
		MIN	TYP ‡	MAX	MIN	
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-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		V
	V _{CC} = MIN, V _{IH} = 2 V, I _{OL} = 8 mA			0.35		
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		mA
I _{CCH}	V _{CC} = MAX, V _I = 0 V	2		4		mA
I _{CCL}	V _{CC} = MAX, See Note 2	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.

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PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
JM38510/00404BCA	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
JM38510/30302B2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30302B2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30302BCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30302BCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30302BDA	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC
JM38510/30302BDA	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC
SN5427J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
SN5427J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
SN54LS27J	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SN54LS27J	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SN7427N	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN7427N	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74LS27D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS27N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS27N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74LS27N3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74LS27NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS27NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS27NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS27NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SNJ5427J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
SNJ5427J	OBSOLETE	CDIP	J	14		TBD	Call TI	Call TI
SNJ5427W	OBSOLETE	CFP	W	14		TBD	Call TI	Call TI
SNJ5427W	OBSOLETE	CFP	W	14		TBD	Call TI	Call TI
SNJ54LS27FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS27FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS27J	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS27J	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS27W	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC
SNJ54LS27W	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

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⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265