

TYPES SN54ALS27, SN54AS27, SN74ALS27, SN74AS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

D2661, APRIL 1982—REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

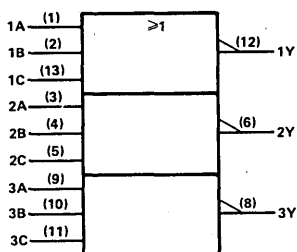
These devices contain three independent 3-input NOR gates. They perform the Boolean functions $Y = A + B + C$ or $Y = \overline{A \cdot B \cdot C}$ in positive logic.

The SN54ALS27 and SN54AS27 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS27 and SN74AS27 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

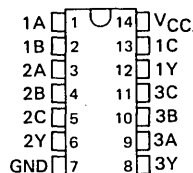
INPUTS			OUTPUT
A	B	C	Y
H	X	X	L
X	H	X	L
X	X	H	L
L	L	L	H

logic symbol

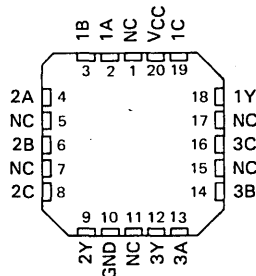


Pin numbers shown are for J and N packages.

SN54ALS27, SN54AS27 . . . J PACKAGE
SN74ALS27, SN74AS27 . . . N PACKAGE
(TOP VIEW)



SN54ALS27, SN54AS27 . . . FH PACKAGE
SN74ALS27, SN74AS27 . . . FN PACKAGE
(TOP VIEW)



NC—No internal connection

TYPES SN54ALS27, SN74ALS27

TRIPLE 3-INPUT POSITIVE-NOR GATES

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Operating free-air temperature range: SN54ALS27	-55 °C to 125 °C
SN74ALS27	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS27			SN74ALS27			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_{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	SN54ALS27			SN74ALS27			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$		-1.5			-1.5		V
V_{OH}	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $I_{OH} = -0.4 \text{ mA}$	$V_{CC}-2$			$V_{CC}-2$			V
V_{OL}	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 4 \text{ mA}$	0.25	0.4		0.25	0.4		V
	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 8 \text{ mA}$				0.35	0.5		
I_I	$V_{CC} = 5.5 \text{ V}$, $V_I = 7 \text{ V}$		0.1			0.1		mA
I_{IH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 2.7 \text{ V}$		20			20		µA
I_{IL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.4 \text{ V}$		-0.1			-0.1		mA
$I_{O\ddagger}$	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.25 \text{ V}$	-30	-112		-30	-112		mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$		0.97	1.8		0.97	1.8	mA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 4.5 \text{ V}$		2	4		2	4	mA

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

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX				UNIT
			SN54ALS27		SN74ALS27		
			MIN	MAX	MIN	MAX	
t _{PLH}	Any	Y	4	22	4	15	ns
t _{PHL}	Any	Y	3	10	3	9	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

TYPES SN54AS27, SN74AS27 TRIPLE 3-INPUT POSITIVE-NOR GATES

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Operating free-air temperature range: SN54AS27	-55 °C to 125 °C
SN74AS27	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54AS27			SN74AS27			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_{OH}	High-level output current			-2			-2	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	SN54AS27			SN74AS27			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $I_{OH} = -2 \text{ mA}$	$V_{CC}-2$			$V_{CC}-2$			V
V_{OL}	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 20 \text{ mA}$	0.35	0.5		0.35	0.5		V
I_I	$V_{CC} = 5.5 \text{ V}$, $V_I = 7 \text{ V}$		0.1			0.1		mA
I_{IH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 2.7 \text{ V}$		20			20		μA
I_{IL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.4 \text{ V}$		-0.5			-0.5		mA
$I_{O\ddagger}$	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.25 \text{ V}$	-30		-112	-30		-112	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$	4	6.4		4	6.4		mA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 4.5 \text{ V}$	10.6	17.1		10.6	17.1		mA

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

‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 4.5 V to 5.5 V, CL = 50 pF, RL = 500 Ω, TA = MIN to MAX				UNIT
			SN54AS27		SN74AS27		
			MIN	MAX	MIN	MAX	
tPLH	Any	Y	1	6.5	1	5.5	ns
tPHL	Any	Y	1	5	1	4.5	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.