

# TYPES SN54ALS08, SN54AS08, SN74ALS08, SN74AS08 QUADRUPLE 2-INPUT POSITIVE-AND 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

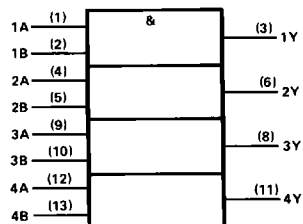
These devices contain four independent 2-input AND gates. They perform the Boolean functions  $Y = A \cdot B$  or  $Y = \overline{A + B}$  in positive logic.

The SN54ALS08 and SN54AS08 are characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS08 and SN74AS08 are characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE  
(each gate)

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

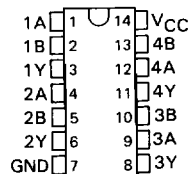
## logic symbol



Pin numbers shown are for J and N packages.

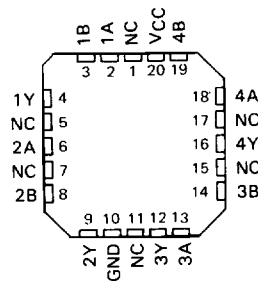
## SN54ALS08, SN54AS08 . . . J PACKAGE SN74ALS08, SN74AS08 . . . N PACKAGE

(TOP VIEW)



## SN54ALS08, SN54AS08 . . . FH PACKAGE SN74ALS08, SN74AS08 . . . FN PACKAGE

(TOP VIEW)



NC—No internal connection

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ALS AND AS CIRCUITS

**TYPES SN54ALS08, SN74ALS08  
QUADRUPLE 2-INPUT POSITIVE-AND 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: SN54ALS08 .....	-55°C to 125°C
SN74ALS08 .....	0°C to 70°C
Storage temperature range .....	-65°C to 150°C

**recommended operating conditions**

		SN54ALS08			SN74ALS08			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	SN54ALS08			SN74ALS08			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.5			-1.5	V
$V_{OH}$	$V_{CC} = 4.5 V$ to 5.5 V, $I_{OH} = -0.4 mA$	$V_{CC}-2$						V
$V_{OL}$	$V_{CC} = 4.5 V, I_{OL} = 4 mA$	0.25	0.4		0.25	0.4		V
	$V_{CC} = 4.5 V, I_{OL} = 8 mA$				0.35	0.5		
$I_I$	$V_{CC} = 5.5 V, V_I = 7 V$		0.1			0.1		mA
$I_{IH}$	$V_{CC} = 5.5 V, V_I = 2.7 V$		20			20		μA
$I_{IL}$	$V_{CC} = 5.5 V, V_I = 0.4 V$		-0.1			-0.1		mA
$I_{O±}$	$V_{CC} = 5.5 V, V_O = 2.25 V$	-30		-112	-30		-112	mA
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 4.5 V$		1.3	2.4		1.3	2.4	mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 0 V$		2.2	4		2.2	4	mA

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

‡ 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, $C_L = 50 pF,$ $R_L = 500 \Omega,$ $T_A = MIN$ to MAX				UNIT
			SN54ALS08		SN74ALS08		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	4	16	4	14	ns
$t_{PHL}$	A or B	Y	3	12	3	10	ns

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

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**TYPES SN54AS08, SN74AS08**  
**QUADRUPLE 2-INPUT POSITIVE-AND 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: SN54AS08 .....	-55 °C to 125 °C
SN74AS08 .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

recommended operating conditions

		SN54AS08			SN74AS08			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	SN54AS08			SN74AS08			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 to 5.5 V, $I_{OH} = -2$ mA	$V_{CC}-2$			$V_{CC}-2$			V
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 20$ mA		0.35	0.5		0.35	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, $V_I = 0.4$ V			-0.5			-0.5	mA
$I_{O\ddagger}$	$V_{CC} = 5.5$ V, $V_O = 2.25$ V	-30		-112	-30		-112	mA
$I_{CCH}$	$V_{CC} = 5.5$ V, $V_I = 4.5$ V		5.8	9.3		5.8	9.3	mA
$I_{CCL}$	$V_{CC} = 5.5$ V, $V_I = 0$ V		14.9	24		14.9	24	mA

†All typical values are at  $V_{CC} = 5$  V,  $T_A = 25$  °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, $T_A = \text{MIN to MAX}$				UNIT
			SN54AS08		SN74AS08		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	1	6.5	1	5.5	ns
$t_{PHL}$	A or B	Y	1	6.5	1	5.5	ns

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

**2**  
**ALS AND AS CIRCUITS**