

TYPES SN54ALS1008A, SN54AS1008, SN74ALS1008A, SN74AS1008 QUADRUPLE 2-INPUT POSITIVE-AND BUFFERS/DRIVERS

D2661, DECEMBER 1982—REVISED DECEMBER 1983

- 'ALS1008A is a Buffer Version of 'ALS08
- 'AS1008 is a Driver Version of 'AS08
- 'AS1008 Offers High Capacitive Drive Capability
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

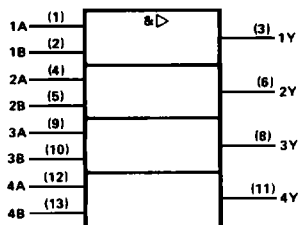
These devices contain four independent 2-input AND buffers/drivers. They perform the Boolean functions $Y = A \cdot B$ or $Y = \overline{A} + \overline{B}$ in positive logic.

The SN54ALS1008A and SN54AS1008 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS1008A and SN74AS1008 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE
(each gate)

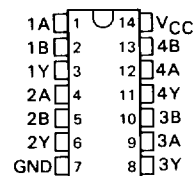
INPUTS		OUTPUT
A	B	Y
H	H	H
L	X	L
X	L	L

logic symbol

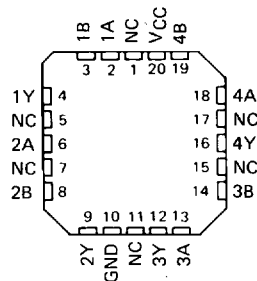


Pin numbers shown are for J and N packages.

SN54ALS1008A, SN54AS1008 . . . J PACKAGE
SN74ALS1008A, SN74AS1008 . . . N PACKAGE
(TOP VIEW)



SN54ALS1008A, SN54AS1008 . . . FH PACKAGE
SN74ALS1008A, SN74AS1008 . . . FN PACKAGE
(TOP VIEW)



NC—No internal connection

2

ALS AND AS CIRCUITS

TYPES SN54ALS1008A, SN74ALS1008A QUADRUPLE 2-INPUT POSITIVE-AND BUFFERS

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: SN54ALS1008A	-55 °C to 125 °C
SN74ALS1008A	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54ALS1008A			SN74ALS1008A			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			-1			-2.6	mA
I_{OL}	Low-level output current			12			24	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	SN54ALS1008A			SN74ALS1008A			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
	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -1 \text{ mA}$	2.4	3.3					
	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -2.6 \text{ mA}$				2.4	3.2		
V_{OL}	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 12 \text{ mA}$		0.25	0.4			V	
	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 24 \text{ mA}$				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
$I_{O†}$	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.25 \text{ V}$	-30		-112	-30		-112	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 4.5 \text{ V}$		1.8	3		1.8	3	mA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$		5.7	9.3		5.7	9.3	mA

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

‡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)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $C_L = 50 \text{ pF}$, $R_L = 500 \text{ } \Omega$, $T_A = \text{MIN to MAX}$				UNIT
			SN54ALS1008A		SN74ALS1008A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	2	11	2	9	ns
t_{PHL}			3	11	3	9	

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

2

ALS AND AS CIRCUITS

TYPES SN54AS1008, SN74AS1008 QUADRUPLE 2-INPUT POSITIVE-AND DRIVERS

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

Supply voltage, V_{CC}7 V
Input voltage7 V
Operating free-air temperature range: SN54AS1008	-55 °C to 125 °C
SN74AS1008	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

recommended operating conditions

		SN54AS1008			SN74AS1008			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			-40			-48	mA
I_{OL}	Low-level output current			40			48	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	SN54AS1008			SN74AS1008			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
	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -3 \text{ mA}$	2.4	3.2		2.4	3.2		
	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -40 \text{ mA}$	2						
	$V_{CC} = 4.5 \text{ V}$, $I_{OH} = -48 \text{ mA}$				2			
V_{OL}	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 40 \text{ mA}$	0.25 0.5						V
	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 48 \text{ mA}$				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}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.4 \text{ V}$			-0.5			-0.5	mA
$I_{O†}$	$V_{CC} = 5.5 \text{ V}$, $V_O = 2.25 \text{ V}$			-135			-135	mA
I_{CCH}	$V_{CC} = 5.5 \text{ V}$, $V_I = 4.5 \text{ V}$			5.6 9.5			5.6 9.5	mA
I_{CCL}	$V_{CC} = 5.5 \text{ V}$, $V_I = 0 \text{ V}$			13.5 22			13.5 22	mA

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

‡ 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)	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$, $C_L = 50 \text{ pF}$, $R_L = 500 \text{ } \Omega$, $T_A = \text{MIN to MAX}$				UNIT
			SN54AS1008		SN74AS1008		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1	6	1	5	ns
t_{PHL}			1	6	1	5	

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

2

ALS AND AS CIRCUITS