

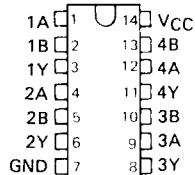
TYPES SN5408, SN54LS08, SN54S08, SN7408, SN74LS08, SN74S08 QUADRUPL 2-INPUT POSITIVE-AND GATES

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

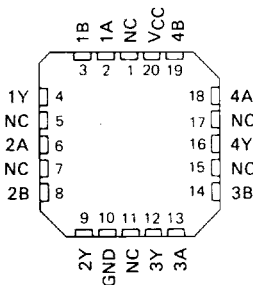
SN5408, SN54LS08, SN54S08 ... J OR W PACKAGE
SN7408 ... J OR N PACKAGE
SN74LS08, SN74S08 ... D, J OR N PACKAGE

(TOP VIEW)



SN54LS08, SN54S08 ... FK PACKAGE
SN74LS08, SN74S08 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

description

These devices contain four independent 2-input AND gates.

The SN5408, SN54LS08, and SN54S08 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN7408, SN74LS08 and SN74S08 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 diagram (each gate)



positive logic

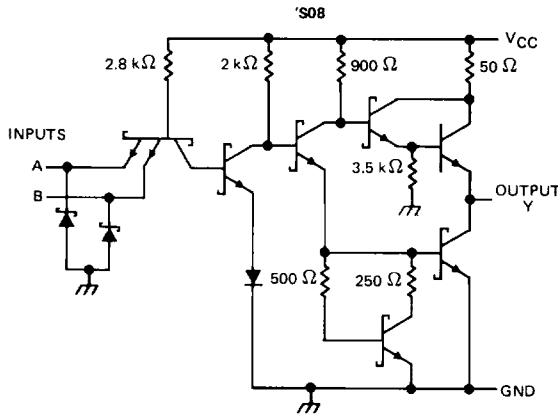
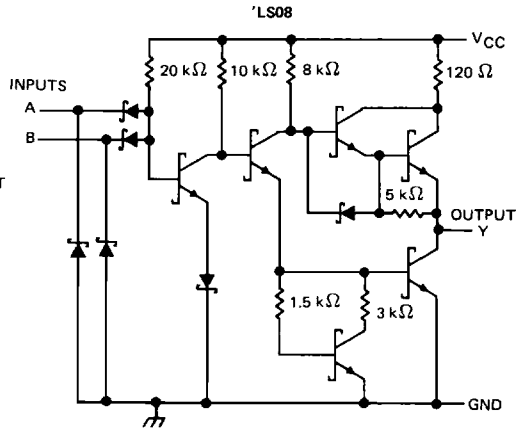
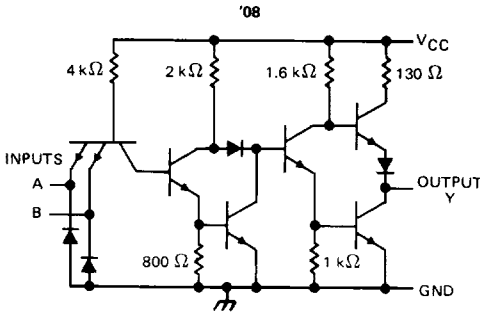
$$Y = A \cdot B \text{ or } Y = \overline{\overline{A} + \overline{B}}$$

3

TTL DEVICES

**TYPES SN5408, SN54LS08, SN54S08,
SN7408, SN74LS08, SN74S08
QUADRUPLE 2-INPUT POSITIVE-AND GATES**

schematics (each gate)



Resistor values 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: '08, 'S08	5.5 V
'LS08	7 V
Operating free-air temperature range: 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.

TTL DEVICES

TYPES SN5408, SN7408 QUADRUPLE 2-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN5408			SN7408			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			0			70 °C

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

PARAMETER	TEST CONDITIONS †	SN5408		SN7408		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 _{IH} = 2 V, I _{OH} = -0.8 mA	2.4	3.4	2.4	3.4	V
V _{OL}	V _{CC} = MIN, V _{IL} = 0.8 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 = 4.5 V	11	21	11	21	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V	20	33	20	33	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.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 400 Ω,	C _L = 15 pF	17.5		27	ns
t _{PHL}					12		19	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

3

TTL DEVICES

TYPES SN54LS08, SN74LS08 QUADRUPLE 2-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54LS08			SN74LS08			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 †	SN54LS08		SN74LS08		UNIT	
		MIN	TYP‡	MAX	MIN		TYP‡
V _{IK}	V _{CC} = MIN, I _I = -18 mA			-1.5		-1.5	V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = -0.4 mA	2.5	3.4	2.7	3.4	V	
V _{OL}	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 4 mA		0.25	0.4	0.25	0.4	V
	V _{CC} = MIN, V _{IL} = MAX, 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 = 4.5 V		2.4	4.8	2.4	4.8	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V		4.4	8.8	4.4	8.8	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.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 2 kΩ,	C _L = 15 pF		8	15	ns
t _{PHL}						10	20	

NOTE 2: See General Information Section for load circuits and voltage waveforms.

TYPES SN54S08, SN74S08 QUADRUPLE 2-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54S08			SN74S08			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	-1			-1			mA	
I _{OL} Low-level output current	20			20			mA	
T _A Operating free-air temperature	-55			0			70	°C

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

PARAMETER	TEST CONDITIONS †	SN54S08			SN74S08			UNIT	
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX		
V _{IK}	V _{CC} = MIN, I _I = -18 mA	-1.2			-1.2			V	
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = -1 mA	2.5	3.4		2.7	3.4	V		
V _{OL}	V _{CC} = MIN, V _{IL} = 0.8 V, I _{OL} = 20 mA	0.5			0.5			V	
I _I	V _{CC} = MAX, V _I = 5.5 V	1			1			mA	
I _{IH}	V _{CC} = MAX, V _I = 2.7 V	50			50			µA	
I _{IL}	V _{CC} = MAX, V _I = 0.5 V	-2			-2			mA	
I _{OS} §	V _{CC} = MAX	-40		-100	-40		-100	mA	
I _{CCH}	V _{CC} = MAX, V _I = 4.5 V	18			18			32	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V	32			32			57	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.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t _{PLH}	A or B	Y	R _L = 280 Ω,	C _L = 15 pF	4.5		7	ns
t _{PHL}					5		7.5	ns
t _{PLH}			R _L = 280 Ω,	C _L = 50 pF	6		ns	
t _{PHL}					7.5		ns	

NOTE 2: See General Information Section for load circuits and voltage waveforms.

3

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