

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

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

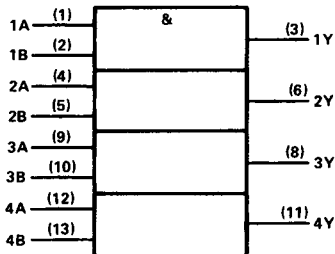
These devices contain four independent 2-input AND gates.

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° to 70°C .

FUNCTION TABLE (each gate)

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

logic symbol†

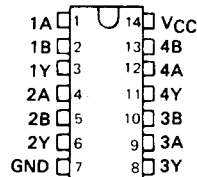


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, N, and W packages.

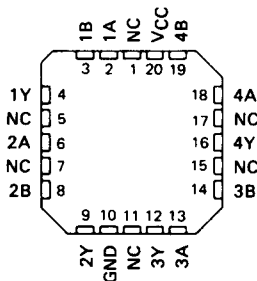
SN5408, SN54LS08, SN54S08 . . . J OR W PACKAGE
SN7408 . . . J OR N PACKAGE
SN74LS08, SN74S08 . . . D, J OR N PACKAGE

(TOP VIEW)



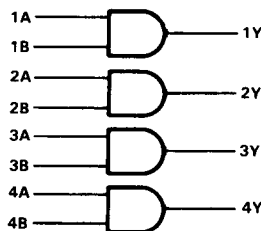
SN54LS08, SN54S08 . . . FK PACKAGE

(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



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

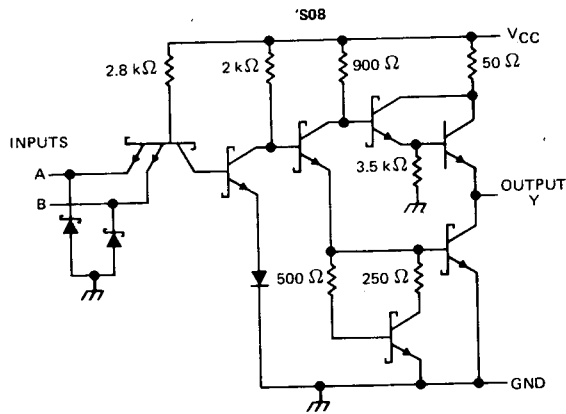
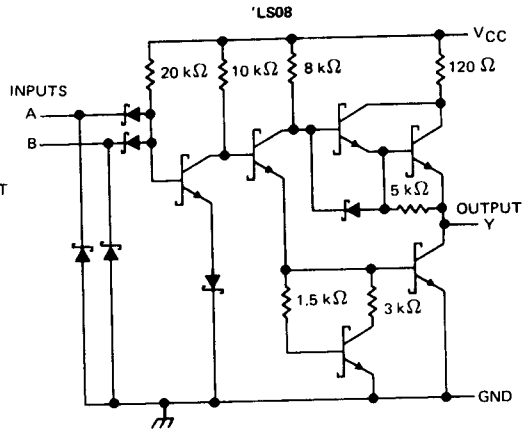
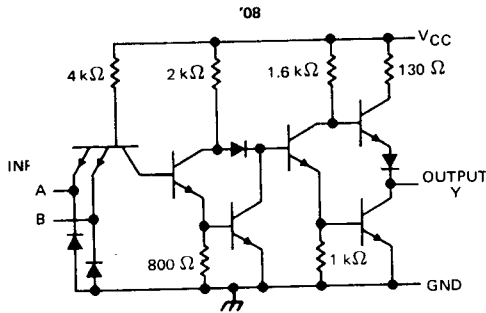
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PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**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.

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TTL Devices

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		125	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	TYP‡	MAX	
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: Load circuits and voltage waveforms are shown in Section 1.

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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	
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	ns	

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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			V
I _{OH} High-level output current				-1			mA
I _{OL} Low-level output current				20			mA
T _A Operating free-air temperature	-55			0			°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	32		18	32	mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V		32	57		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: Load circuits and voltage waveforms are shown in Section 1.

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