

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

These devices contain a single 8-input OR/NOR gate and perform the following Boolean functions in positive logic:

$$W = \overline{A} + B + C + D + E + F + G + H$$

or

$$W = \overline{A} \cdot \overline{B} \cdot \overline{C} \cdot \overline{D} \cdot \overline{E} \cdot \overline{F} \cdot \overline{G} \cdot \overline{H}$$

and

$$Y = A + B + C + D + E + F + G + H$$

or

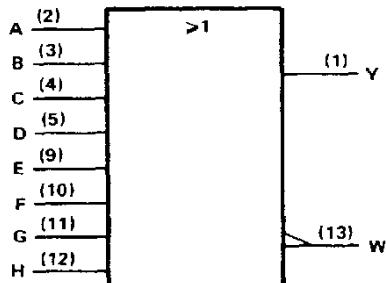
$$Y = \overline{\overline{A} \cdot \overline{B} \cdot \overline{C} \cdot \overline{D} \cdot \overline{E} \cdot \overline{F} \cdot \overline{G} \cdot \overline{H}}$$

The SN54HC4078A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC4078A is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

INPUTS A THRU H	OUTPUTS
	W Y
One or more inputs H	L H
All inputs L	H L

logic symbol†

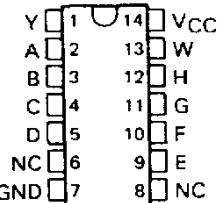


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

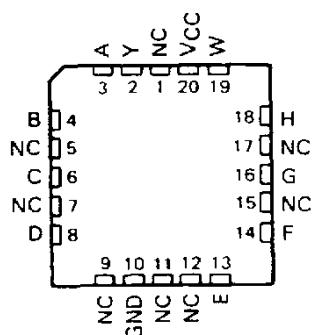
SN54HC4078A . . . J PACKAGE
SN74HC4078A . . . D OR N PACKAGE

(TOP VIEW)



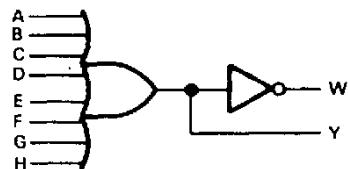
SN54HC4078A . . . FK PACKAGE

(TOP VIEW)



NC—No internal connection

logic diagram (positive logic)



SN54HC4078A, SN74HC4078A
8-INPUT OR/NOR GATE

absolute maximum ratings over operating free-air temperature range[†]

Supply voltage, V _{CC}	-0.5 V to 7 V
Input clamp current, I _{IK} (V _I < 0 or V _I > V _{CC})	±20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CC})	±20 mA
Continuous output current, I _O (V _O = 0 to V _{CC})	±25 mA
Continuous current through V _{CC} or GND pins	±50 mA
Lead temperature 1.6 mm (1/16 in) from case for 60 s: FK or J package	300°C
Lead temperature 1.6 mm (1/16 in) from case for 10 s: D or N package	260°C
Storage temperature range	-65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

recommended operating conditions

		SN54HC4078A			SN74HC4078A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage		2	5	6	2	5	6	V
V _{IH} High-level input voltage	V _{CC} = 2 V	1.5			1.5			
	V _{CC} = 4.5 V	3.15			3.15			
	V _{CC} = 6 V	4.2			4.2			
V _{IL} Low-level input voltage	V _{CC} = 2 V	0	0.3	0	0	0.3	0.3	V
	V _{CC} = 4.5 V	0	0.9	0	0	0.9	0.9	
	V _{CC} = 6 V	0	1.2	0	0	1.2	1.2	
V _I Input voltage		0	V _{CC}	0	0	V _{CC}	0	V
V _O Output voltage		0	V _{CC}	0	0	V _{CC}	0	V
t _t Input transition (rise and fall) times	V _{CC} = 2 V	0	1000	0	0	1000		
	V _{CC} = 4.5 V	0	500	0	0	500	500	ns
	V _{CC} = 6 V	0	400	0	0	400	400	
T _A Operating free-air temperature		-55		125	-40		85	°C

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN54HC4078A		SN74HC4078A		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V _{OH}	V _I = V _{IH} or V _{IL} , I _{OH} = -20 μA	2 V	1.9	1.998		1.9		1.9		V
		4.5 V	4.4	4.499		4.4		4.4		
		6 V	5.9	5.999		5.9		5.9		
V _{OL}	V _I = V _{IH} or V _{IL} , I _{OL} = -4 mA	4.5 V	3.98	4.30		3.7		3.84		V
	V _I = V _{IH} or V _{IL} , I _{OL} = -5.2 mA	6 V	5.48	5.80		5.2		5.34		
	V _I = V _{IH} or V _{IL} , I _{OL} = 20 μA	2 V	0.002	0.1		0.1		0.1		
		4.5 V	0.001	0.1		0.1		0.1		V
		6 V	0.001	0.1		0.1		0.1		
	V _I = V _{IH} or V _{IL} , I _{OL} = 4 mA	4.5 V	0.17	0.26		0.4		0.33		
I _I	V _I = V _{CC} or 0	6 V	±0.1	±100		±1000		±1000	nA	
	V _I = V _{CC} or 0, I _O = 0	6 V			8		160	80	μA	
	C _i	2 to 6 V		3	10		10	10	pF	

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

**SN54HC4078A, SN74HC4078A
8-INPUT OR/NOR GATE**

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), $C_L = 50 \text{ pF}$ (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC4078A		SN74HC4078A		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	A thru H	Y/W	2 V		40	130		195		165	ns
			4.5 V		12	26		39		33	
			6 V		10	22		33		28	
t _t		Y/W	2 V		38	75		110		95	ns
			4.5 V		8	15		22		19	
			6 V		6	13		19		16	

C _{pd}	Power dissipation capacitance per gate	No load, T _A = 25°C	25 pF typ
-----------------	--	--------------------------------	-----------

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

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.