

- Compare Two 8-Bit Words
- Package Options Include Plastic Small-Outline (DW) and Ceramic Flat (W) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

These magnitude comparators perform comparisons of two 8-bit binary or BCD words. These devices provide $\overline{P} = Q$ and $\overline{P} > Q$ outputs.

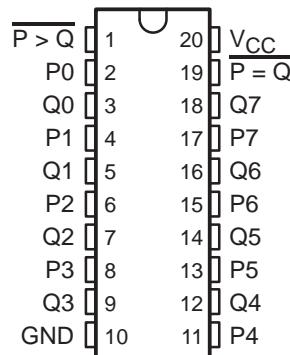
The SN54HC684 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC684 is characterized for operation from -40°C to 85°C .

FUNCTION TABLE

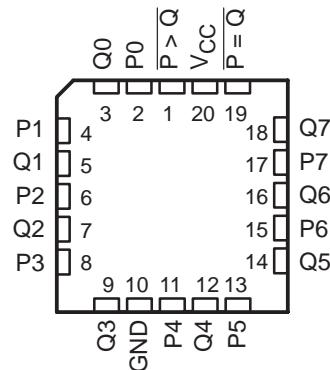
DATA INPUTS P, Q	OUTPUTS	
	$\overline{P} = Q$	$\overline{P} > Q$
$P = Q$	L	H
$P > Q$	H	L
$P < Q$	H	H

The $P < Q$ function can be generated by applying $P = Q$ and $P > Q$ to a 2-input NAND gate.

SN54HC684 . . . J OR W PACKAGE
SN74HC684 . . . DW OR N PACKAGE
(TOP VIEW)



SN54HC684 . . . FK PACKAGE
(TOP VIEW)



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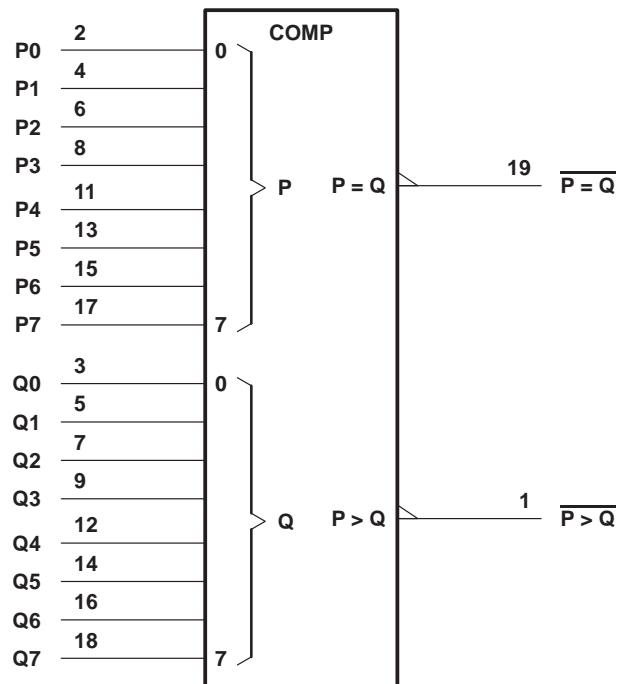
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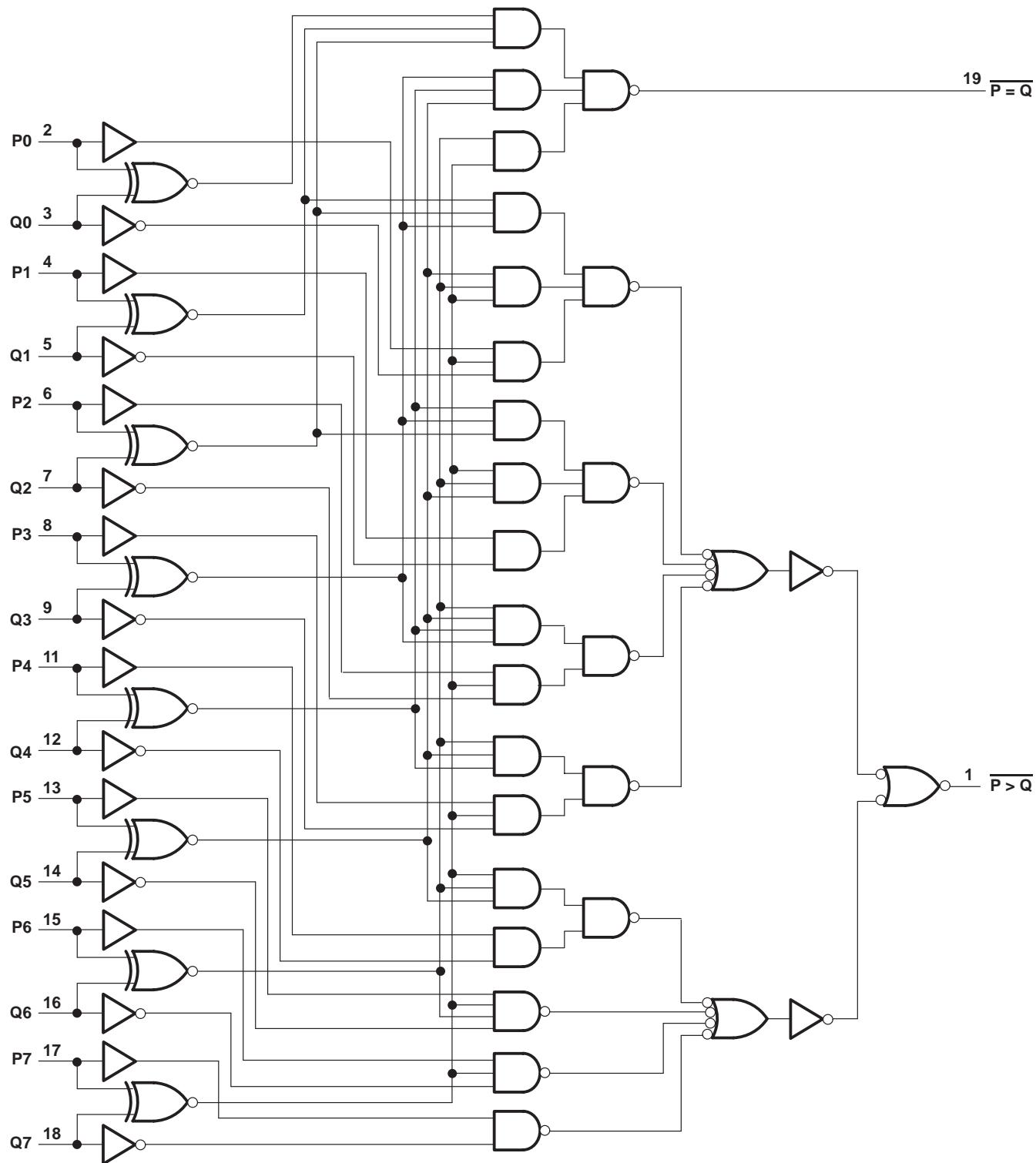
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logic symbol†



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

logic diagram (positive logic)



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absolute maximum ratings over operating free-air temperature range†

† 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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
 2. The package thermal impedance is calculated in accordance with JEDEC 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions

		SN54HC684			SN74HC684			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
		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	0.5	0	0	0.5	V
		V _{CC} = 4.5 V	0	1.35	0	0	1.35	
		V _{CC} = 6 V	0	1.8	0	0	1.8	
V _I	Input voltage	0	V _{CC}		0	V _{CC}		V
V _O	Output voltage	0	V _{CC}		0	V _{CC}		V
t _f	Input transition (rise and fall) times	V _{CC} = 2 V	0	1000	0	1000		ns
		V _{CC} = 4.5 V	0	500	0	500		
		V _{CC} = 6 V	0	400	0	400		
T _A	Operating free-air temperature	-55		125	-40		85	°C

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

PARAMETER	TEST CONDITIONS	V _{CC}	T _A = 25°C			SN54HC684		SN74HC684		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	V	V	
			4.5 V	4.4	4.499	4.4	4.4				
			6 V	5.9	5.999	5.9	5.9				
		I _{OH} = -4 mA	4.5 V	3.98	4.30	3.7	3.84	V	V	V	
			6 V	5.48	5.80	5.2	5.34				
		I _{OL} = 20 μA	2 V	0.002	0.1	0.1	0.1	V	V	V	
V _{OL}	V _I = V _{IH} or V _{IL}		4.5 V	0.001	0.1	0.1	0.1				
			6 V	0.001	0.1	0.1	0.1				
	I _{OL} = 4 mA	4.5 V	0.17	0.26	0.4	0.33	V	V	V		
		6 V	0.15	0.26	0.4	0.33					
I _{IH}	V _I = V _{CC}	6 V	0.1	100	1000	1000	1000	nA	nA	nA	
I _{IL}	V _I = 0	6 V	-0.1	-100	-1000	-1000	-1000	nA	nA	nA	
I _{CC}	V _I = V _{CC} or 0, I _O = 0	6 V		8	160	160	80	μA	μA	μA	
C _i		2 V to 6 V	3	10	10	10	10	pF	pF	pF	

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC684		SN74HC684		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	P or Q	Any	2 V	130	275	413		344			ns
			4.5 V	26	55	88		69			
			6 V	22	47	70		58			
t _t		Any	2 V	38	75	110		95			ns
			4.5 V	8	15	22		19			
			6 V	6	13	19		16			

operating characteristics, T_A = 25°C

PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd} Power dissipation capacitance	No load	40	pF

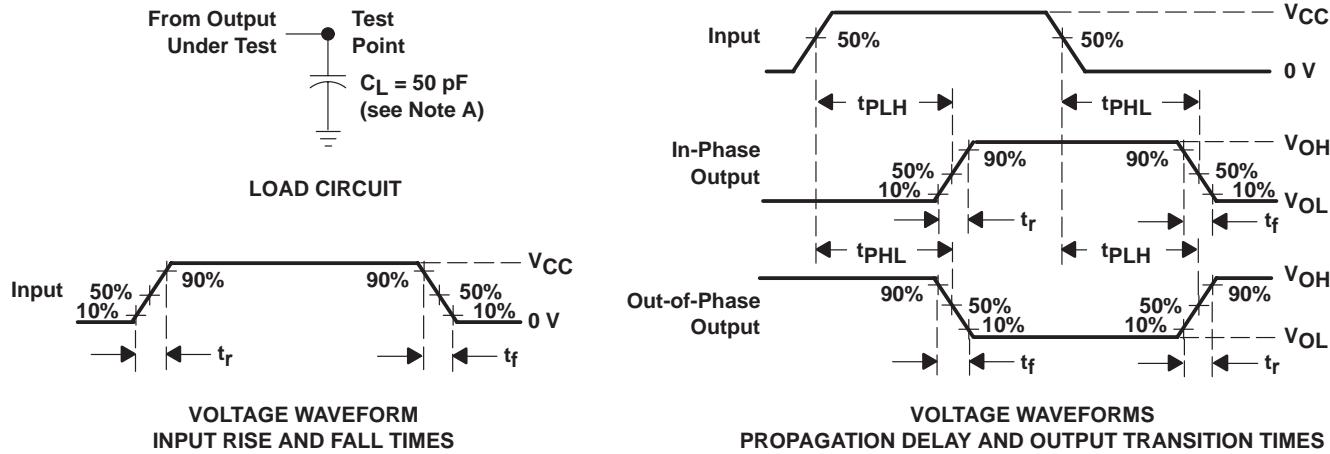
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PARAMETER MEASUREMENT INFORMATION



NOTES:

- A. C_L includes probe and test-fixture capacitance.
- B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, $Z_O = 50 \Omega$, $t_r = 6$ ns, $t_f = 6$ ns.
- C. The outputs are measured one at a time with one input transition per measurement.
- D. t_{PLH} and t_{PHL} are the same as t_{pd} .

Figure 1. Load Circuit and Voltage Waveforms

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