

SN54HC688, SN74HC688 8-BIT IDENTITY COMPARATORS

SCLS010A – DECEMBER 1982 – REVISED JANUARY 1996

- 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

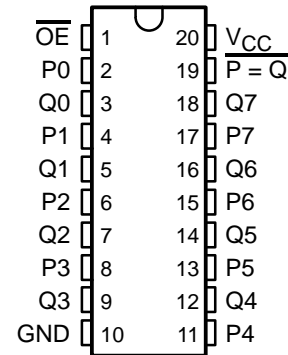
These identity comparators perform comparisons of two 8-bit binary or BCD words. An output-enable (\overline{OE}) input may be used to force the output to the high level.

The SN54HC688 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC688 is characterized for operation from -40°C to 85°C .

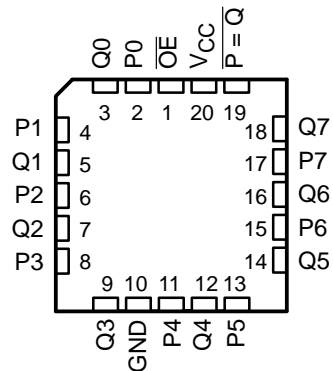
FUNCTION TABLE

INPUTS		OUTPUT $\overline{P=Q}$
DATA P, Q	\overline{OE}	
$P = Q$	L	L
$P > Q$	X	H
$P < Q$	X	H
X	H	H

SN54HC688 . . . J OR W PACKAGE
SN74HC688 . . . DW OR N PACKAGE
(TOP VIEW)



SN54HC688 . . . FK PACKAGE
(TOP VIEW)



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PRODUCTION DATA information is 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.

**TEXAS
INSTRUMENTS**

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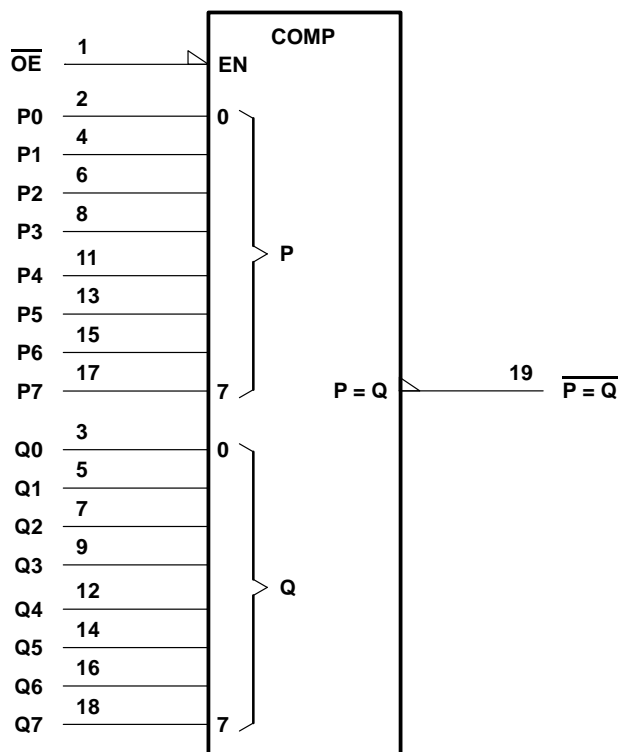
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SN54HC688, SN74HC688

8-BIT IDENTITY COMPARATORS

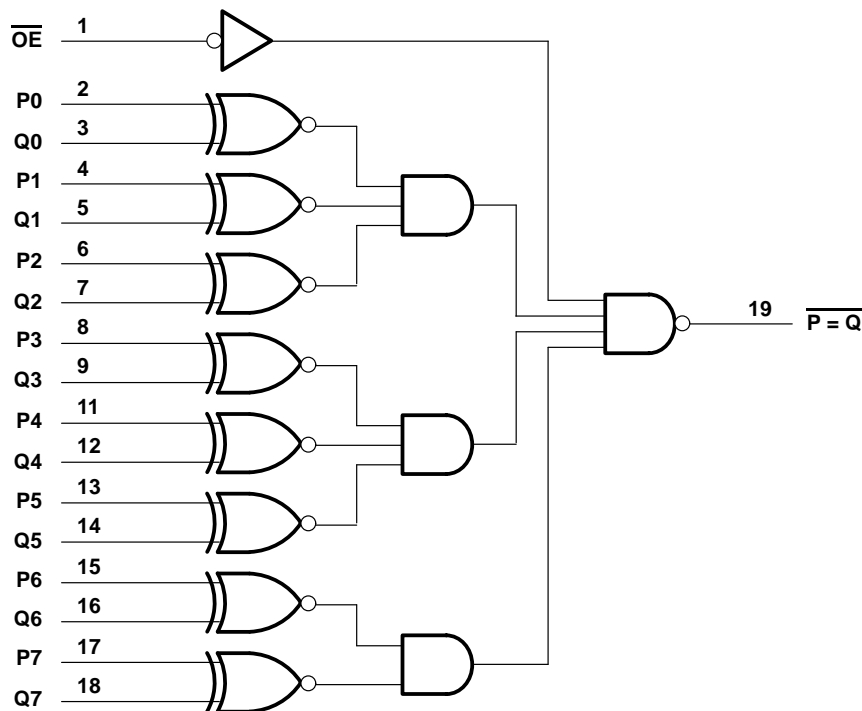
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logic symbol†



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

logic diagram (positive logic)



SN54HC688, SN74HC688 8-BIT IDENTITY COMPARATORS

SCLS010A – DECEMBER 1982 – REVISED JANUARY 1996

absolute maximum ratings over operating free-air temperature†

Supply voltage range, V_{CC}	–0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) (see Note 1)	± 20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 25 mA
Continuous current through V_{CC} or GND	± 50 mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2):	
DW package	1.6 W
N package	1.3 W
Storage temperature range, T_{stg}	–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.

- NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

recommended operating conditions

		SN54HC688			SN74HC688			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		0.5	V
		$V_{CC} = 4.5$ V		0	0		1.35	
		$V_{CC} = 6$ V		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_t	Input transition (rise and fall) time	$V_{CC} = 2$ V		0	0		1000	ns
		$V_{CC} = 4.5$ V		0	0		500	
		$V_{CC} = 6$ V		0	0		400	
T_A	Operating free-air temperature	–55		125	–40		85	°C



SN54HC688, SN74HC688

8-BIT IDENTITY COMPARATORS

SCLS010A – DECEMBER 1982 – REVISED JANUARY 1996

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

PARAMETER	TEST CONDITIONS		V _{CC}	T _A = 25°C			SN54HC688		SN74HC688		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		
		I _{OH} = -4 mA	4.5 V	3.98	4.3		3.7		3.84		
		I _{OH} = -5.2 mA	6 V	5.48	5.8		5.2		5.34		
V _{OL}	V _I = V _{IH} or V _{IL}	I _{OL} = 20 µA	2 V		0.002	0.1		0.1		0.1	V
			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	
		I _{OL} = 5.2 mA	6 V		0.15	0.26		0.4		0.33	
I _I	V _I = V _{CC} or 0		6 V		±0.1	±100		±1000		±1000	nA
I _{CC}	V _I = V _{CC} or 0, I _O = 0		6 V			8		160		80	µA
C _i			2 V to 6 V		3	10		10		10	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			SN54HC688		SN74HC688		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	P or Q	$\overline{P} = \overline{Q}$	2 V		113	210		313		265	ns
			4.5 V		30	42		63		53	
			6 V		24	36		53		45	
	\overline{OE}	$\overline{P} = \overline{Q}$	2 V		66	120		179		151	
			4.5 V		16	24		36		30	
			6 V		14	20		30		26	
t _t		Any	2 V		38	75		110		95	ns
			4.5 V		8	15		22		19	
			6 V		6	13		19		16	

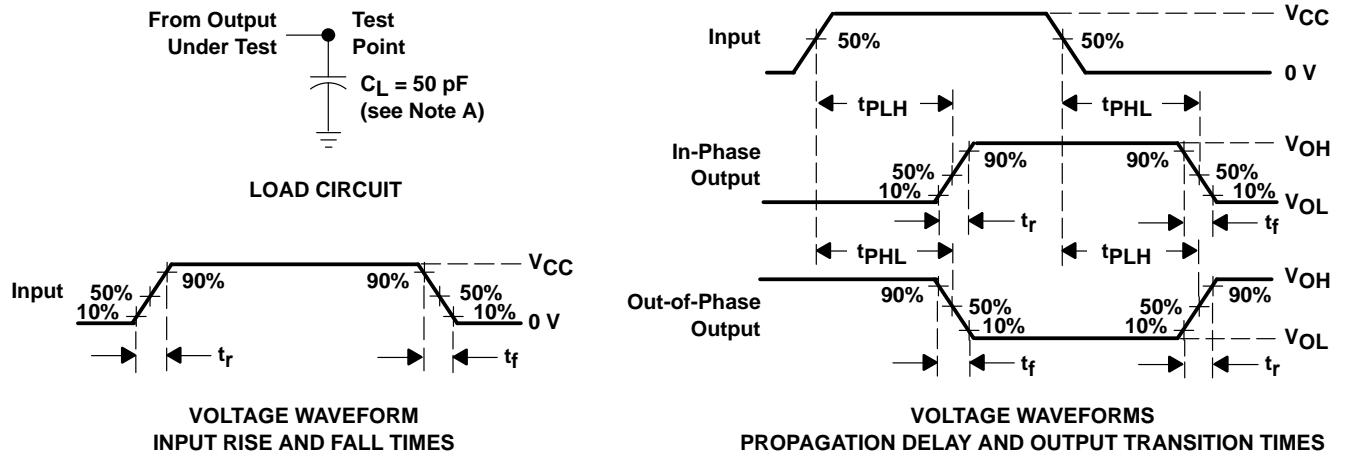
operating characteristics, T_A = 25°C

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: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r = 6 \text{ ns}$, $t_f = 6 \text{ ns}$.
 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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