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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HC682/HD74HC684

8-bit Magnitude Comparator



ADE-205-528 (Z)
1st. Edition
Sep. 2000

Description

These magnitude comparators perform comparisons of two eight-bit binary or BCD words. All types provide $\overline{P=Q}$ outputs and provide $\overline{P>Q}$ outputs. The HD74HC682 features 20 k Ω pullup termination resistors on the Q inputs for analog or switch data.

Type	$\overline{P=Q}$	$\overline{P>Q}$	Output Enable	20 k Ω Pullup
HD74HC682	Yes	Yes	No	Yes
HD74HC684	Yes	Yes	No	No

Features

- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: $V_{CC} = 2$ to 6 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max ($T_a = 25^\circ\text{C}$)

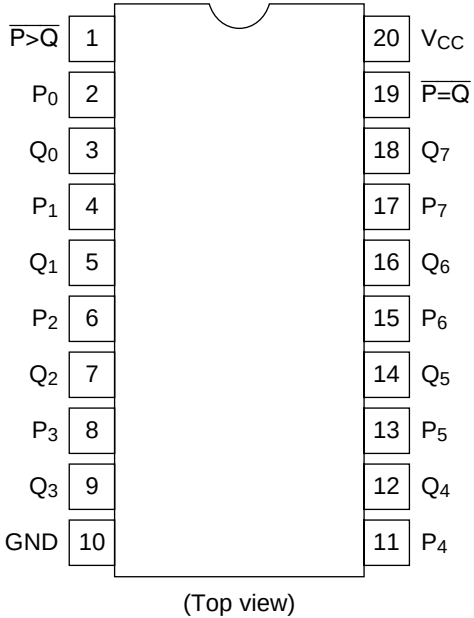
Function Table

Input	Outputs	
Data	$\overline{P=Q}$	$\overline{P>Q}$
P, Q	$\overline{P=Q}$	$\overline{P>Q}$
$P=Q$	L	H
$P>Q$	H	L
$P<Q$	H	H

Note: 1. The $\overline{P<Q}$ function can be generated by applying the $\overline{P=Q}$ and $\overline{P>Q}$ Outputs to a 2-input NAND gate.

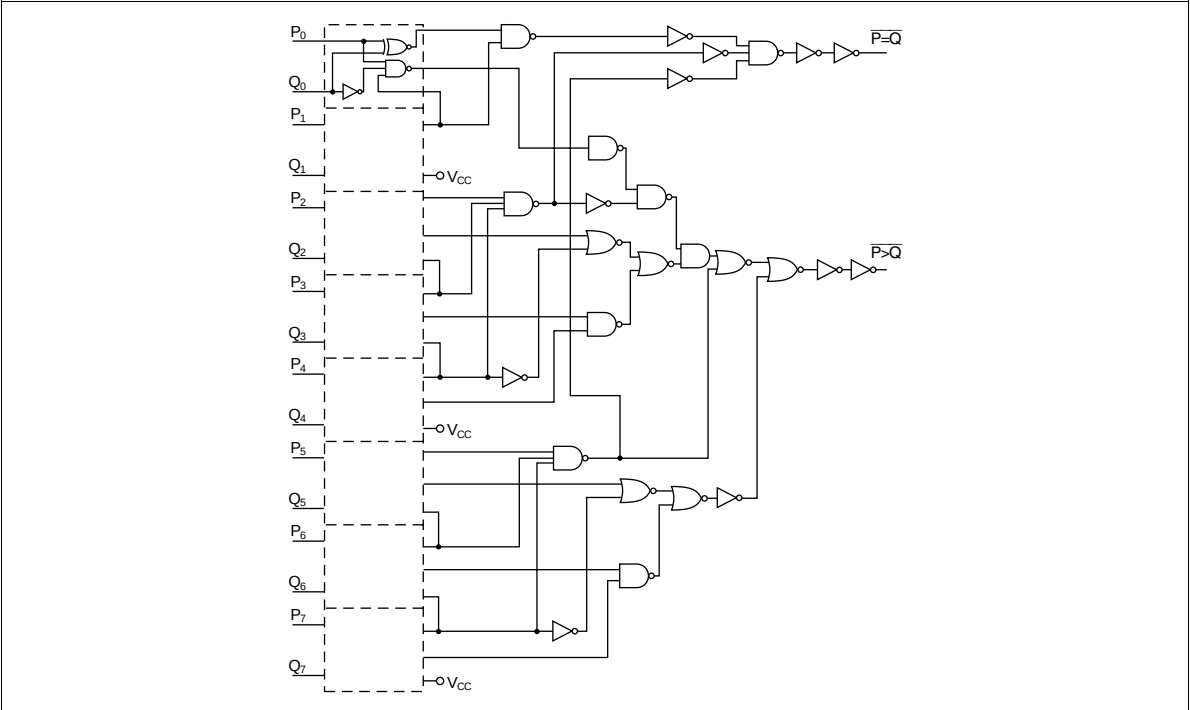
Pin Arrangement

HD74HC682/HD74HC684



Logic Diagram

HD74HC682/HD74HC684



DC Characteristics

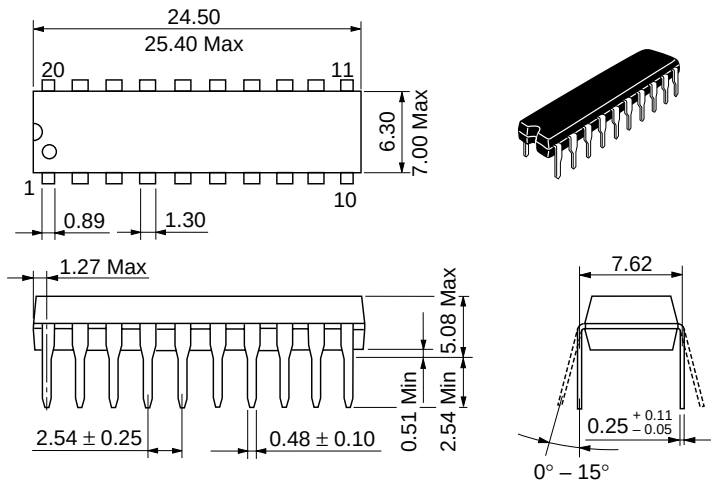
Item	Symbol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Input voltage	V _{IH}	2.0	1.5	—	—	1.5	—	V	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V _{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V _{OH}	2.0	1.9	2.0	—	1.9	—	V	I _{OH} = -4 mA
		4.5	4.4	4.5	—	4.4	—		
		6.0	5.9	6.0	—	5.9	—		
		4.5	4.18	—	—	4.13	—		
		6.0	5.68	—	—	5.63	—		
	V _{OL}	2.0	—	0.0	0.1	—	0.1	V	I _{OL} = 20 μA
		4.5	—	0.0	0.1	—	0.1		
		6.0	—	0.0	0.1	—	0.1		
		4.5	—	—	0.26	—	0.33		
		6.0	—	—	0.26	—	0.33		
Input current (HC684)	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC} or GND
Quiescent supply current (HC684)	I _{CC}	6.0	—	—	4.0	—	40	μA	Vin = V _{CC} or GND, I _{out} = 0 μA
Input current (HD682)	I _{in}	6.0	—	—	±0.1	—	±1.0	μA	Vin = V _{CC}
					—0.6	—	—0.7	mA	I _{in} = GND
Quescent supply current (HC682)	I _{CC}	6.0	—	—	4.8	—	5.6	mA	Qn = GND, other inputs = V _{CC} or GND I _{out} = 0 μA
			—	—	4.0	—	40	μA	Qn = V _{CC} , other inputs = V _{CC} or GND I _{out} = 0 μA

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	V _{CC} (V)	Ta = −40 to +85°C						Unit	Test Conditions
			Ta = 25°C							
			Min	Typ	Max	Min	Max			
Propagation delay time	t _{PLH}	2.0	—	—	175	—	220	ns	P or Q to $\overline{P=Q}$	
	t _{PHL}	4.5	—	—	35	—	44			
		6.0	—	—	30	—	37			
	t _{PLH}	2.0	—	—	200	—	250	ns	P or Q to $\overline{P>Q}$	
	t _{PHL}	4.5	—	—	40	—	50			
		6.0	—	—	34	—	43			
Output rise/fall time	t _{TLH}	2.0	—	—	60	—	75	ns		
	t _{THL}	4.5	—	—	12	—	15			
		6.0	—	—	10	—	13			
Input capacitance	C _{in}	—	—	5	10	—	10	pF		

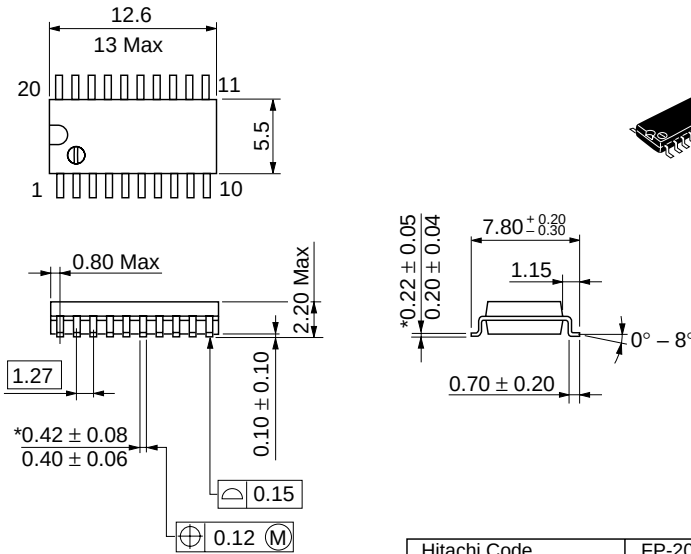
Package Dimensions

Unit: mm



Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Mass (reference value)	1.26 g

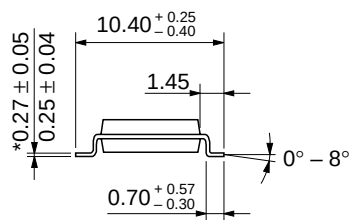
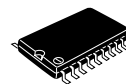
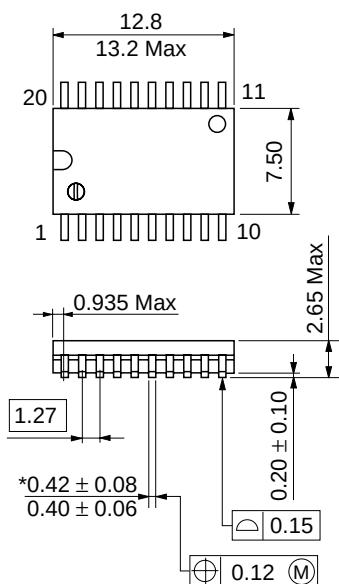
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.31 g

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.52 g

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