

74HC688 8-Bit Magnitude Comparators

1. General Description

1.1 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.

1.2 Features

- Wide operating voltage range of 2V to 6V
- High-current outputs drive up to 10 LSTTL loads

- Low power consumption, 10uA max I_{CC}
- ± 4 mA output drive at 5V
- Low input current of 1uA max
- Compare two 8-bit words

1.3 Device Information

PART NUMBER	PACKAGE
74HC688	DIP
	SOP
	TSSOP

2. Connection Diagrams and Pin Description

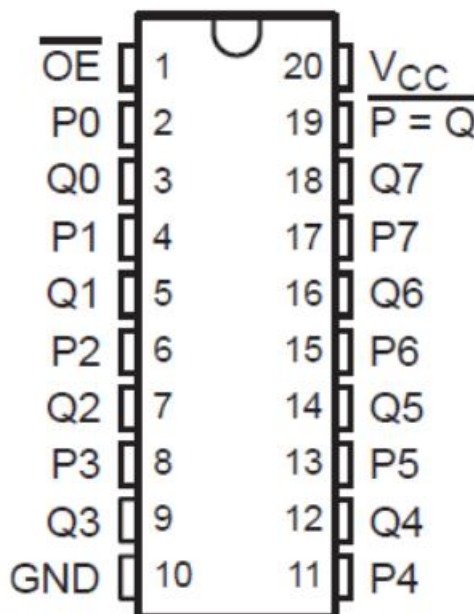


Figure 2.1 Top View



PIN No.	NAME	I/O	FUNCTION
1	$\overline{OE}$	I	Output Enable Input
2	P0	I	Data Input
3	Q0	I	Data Input
4	P1	I	Data Input
5	Q1	I	Data Input
6	P2	I	Data Input
7	Q2	I	Data Input
8	P3	I	Data Input
9	Q3	I	Data Input
10	GND		Ground
11	P4	I	Data Input
12	Q4	I	Data Input
13	P5	I	Data Input
14	Q5	I	Data Input
15	P6	I	Data Input
16	Q6	I	Data Input
17	P7	I	Data Input
18	Q7	I	Data Input
19	$\overline{P=Q}$	O	Data Output
20	VCC		Supply Voltage

3. System Diagram

3.1 Logic Diagram

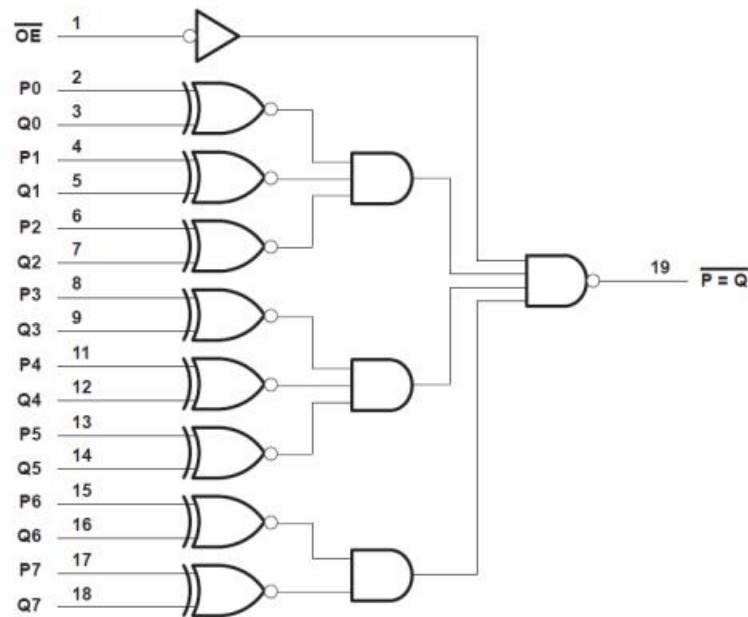


Figure 3.1: 74HC688 Logic Diagram

3.2 Function Table

Input		Output
Data(P,Q)	$\overline{OE}$	$\overline{P=Q}$
P=Q	0	0
P>Q	X	1
P<Q	X	1
X	1	1

X = don't care, 1≡High State, 0≡Low State

4. Specifications

4.1 Absolute Maximum Ratings

Symbol	Parameter	MIN	MAX	Unit
V_{CC}	Supply Voltage	-0.5	7	V
P_D	Power Dissipation		500	mW
T_J	Junction Temperature		125	°C
T_{OP}	Operating Temperature	-40	85	°C

Absolute maximum ratings are those values beyond which the device could be permanently damaged, These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under normal operating conditions.



4.2 Recommended Operating Conditions

Symbol	Parameter	Test Condition	MIN	NOM	MAX	Unit
V_{CC}	Supply Voltage		2	5	6	V
V_{IH}	High Level Input Voltage	$V_{CC}=2V$	1.5			V
		$V_{CC}=4.5V$	3.15			V
		$V_{CC}=6V$	4.2			V
V_{IL}	Low Level Input Voltage	$V_{CC}=2V$			0.5	V
		$V_{CC}=4.5V$			1.35	V
		$V_{CC}=6V$			1.8	V
V_I	Input voltage		0		V_{CC}	V

4.3 Electrical Characteristics

($T_a=25^{\circ}C$, voltages are referenced to GND (ground=0V), unless otherwise specified)

Symbol	Parameter	Test Condition	MIN	TYP	MAX	Unit
V_{OH}	High Level Output Voltage	$V_{CC}=2V, I_O=-20\mu A$	1.9	--	--	V
		$V_{CC}=4.5V, I_O=-20\mu A$	4.4	--	--	V
		$V_{CC}=6V, I_O=-20\mu A$	5.9	--	--	V
		$V_{CC}=4.5V, I_O=-4mA$	4	--	--	V
		$V_{CC}=6V, I_O=-5.2mA$	5.5	--	--	V
V_{OL}	Low Level Output Voltage	$V_{CC}=2V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=4.5V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=6V, I_O=20\mu A$	--	--	0.1	V
		$V_{CC}=4.5V, I_O=4mA$	--	--	0.26	V
		$V_{CC}=6V, I_O=5.2mA$	--	--	0.26	V
I_I	Input Leakage Current	$V_{CC}=6V, V_I=V_{CC}$ or GND	--	0	± 1	μA
I_{CC}	Quiescent Supply Current	$V_{CC}=6V, V_I=V_{CC}/GND$	--	0	10	μA



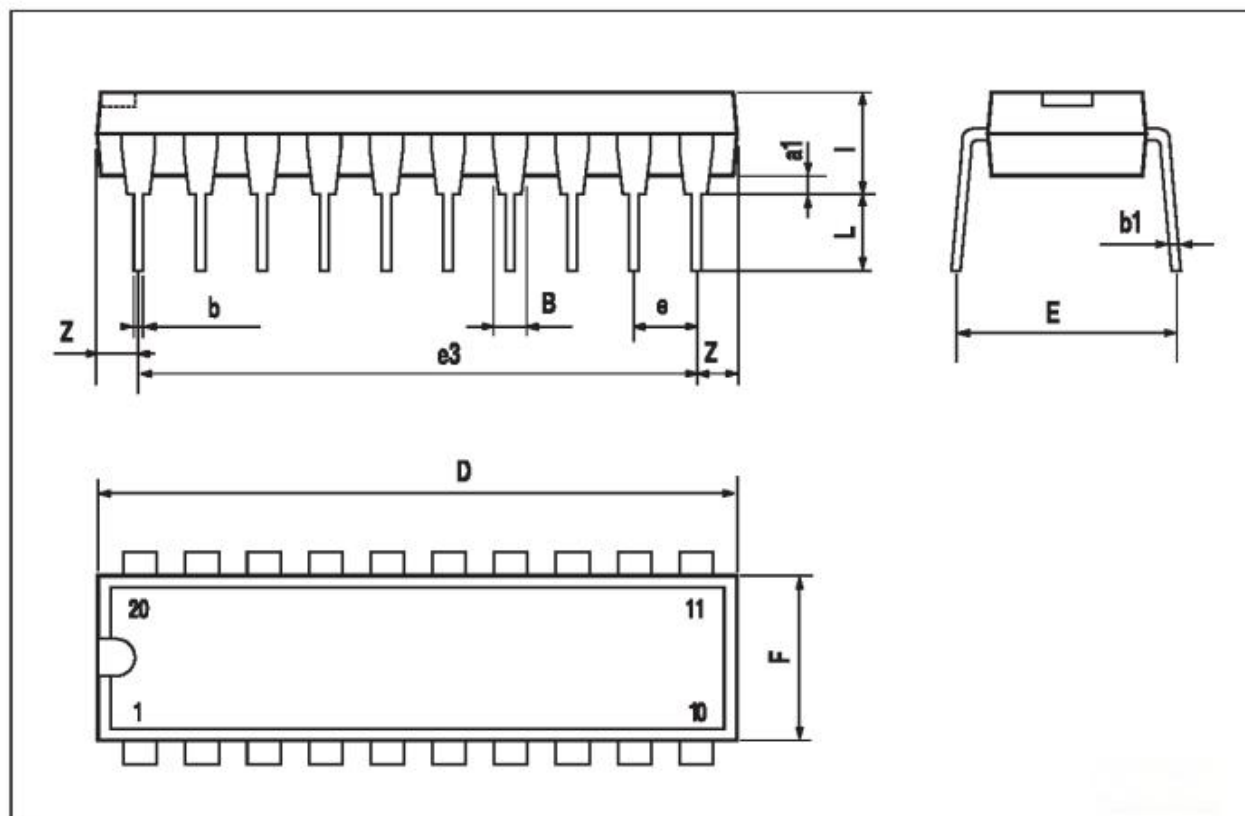
5. Ordering Information

Orderable Device	Package Type	Pins	Packing	Package Qty
74HC688ND20ATAH	DIP	20	Tube	18
74HC688NS20ARBQ	SOP	20	Tape & Reel	2000
74HC688TS20ARCQ	TSSOP	20	Tape & Reel	3000

6. Package Information

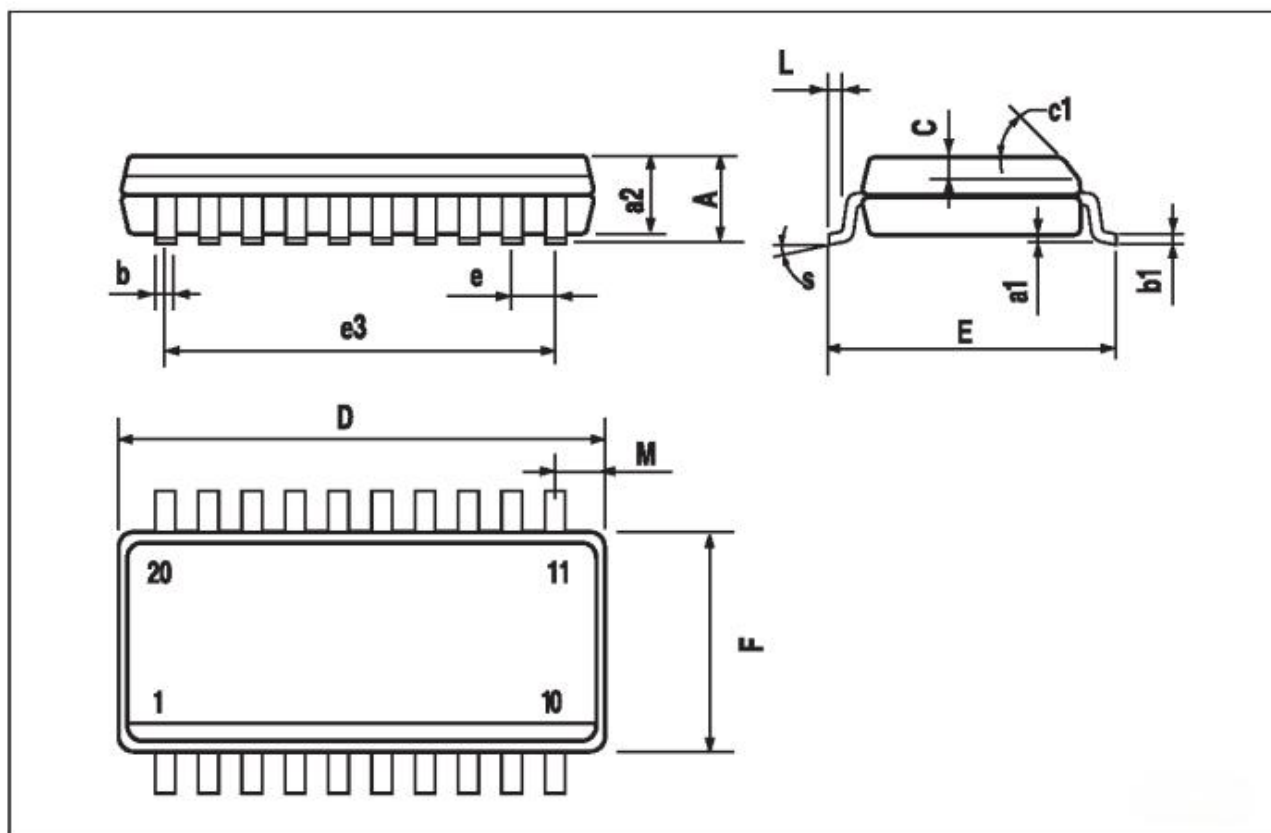
6.1 DIP20

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.254			0.010		
B	1.39		1.65	0.055		0.065
b		0.45			0.018	
b1		0.25			0.010	
D			25.4			1.000
E		8.5			0.335	
e		2.54			0.100	
e3		22.86			0.900	
F			7.1			0.280
I			3.93			0.155
L		3.3			0.130	
Z			1.34			0.053



6.2 SOP20

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45° (typ.)					
D	12.60		13.00	0.496		0.512
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
e3		11.43			0.450	
F	7.40		7.60	0.291		0.300
L	0.50		1.27	0.020		0.050
M			0.75			0.029
S	8° (max.)					



6.3 TSSOP20

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	6.4	6.5	6.6	0.252	0.256	0.260
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030

