

NEW PRODUCT

MITSUBISHI LS TTLs

M74LS682P

8-BIT MAGNITUDE COMPARATOR

DESCRIPTION

The M74LS682P is a semiconductor integrated circuit containing two 8-bit words comparator functions.

FEATURES

- Hysteresis at inputs (width = 400mV typical)
- Internal $24k\Omega$ pull-up resistors on the Q inputs
- Active pull-up outputs
- Wide operating temperature range ($T_a = -20 \sim +75^\circ\text{C}$)

APPLICATION

General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

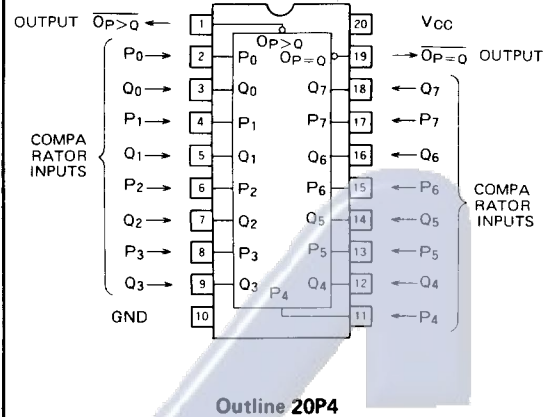
Two eight-bit binary or BCD words are applied at inputs $P_0 \sim P_7$ and $Q_0 \sim Q_7$. The results as shown in Function Table are expressed at outputs $\overline{O}_{P>Q}$ and $\overline{O}_{P=Q}$.

$Q_0 \sim Q_7$ have internal pull-up resistors ($=24k\Omega$), so that misoperation due to noise is reduced on condition that $Q_0 \sim Q_7$ are open.

Beside the IC, there are eight-bit digital comparators varying input/output formats. They are shown in the table. The detailed information are shown in individual catalogue.

An example of the extension bits is shown in the application.

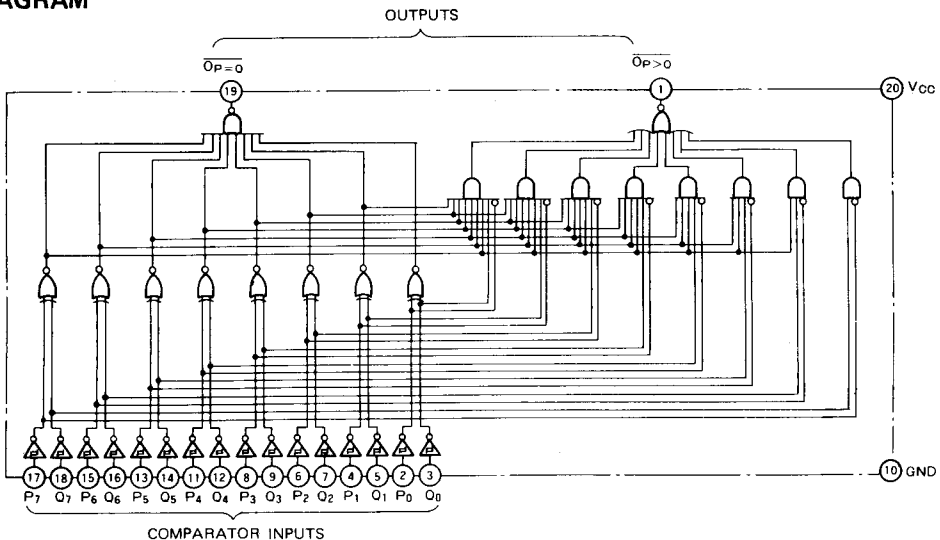
PIN CONFIGURATION (TOP VIEW)



8-BIT MAGNITUDE COMPARATORS TABLE

Type designation	Inputs		Outputs		
	Q $24k\Omega$ pull-up	$\overline{E}$	$\overline{O}_{P=Q}$	$\overline{O}_{P>Q}$	Format
M74LS682P	Yes	No	Yes	Yes	Active pull-up
M74LS683P	Yes	No	Yes	Yes	Open collector
M74LS684P	No	No	Yes	Yes	Active pull-up
M74LS685P	No	No	Yes	Yes	Open collector
M74LS688P	No	Yes	Yes	No	Active pull-up
M74LS689P	No	Yes	Yes	No	Open collector

BLOCK DIAGRAM



8-BIT MAGNITUDE COMPARATOR

FUNCTION TABLE

P, Q	$\overline{OP}=Q$	$\overline{OP}>Q$
P=Q	L	H
P>Q	H	L
P<Q	H	H

ABSOLUTE MAXIMUM RATINGS (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
VCC	Supply voltage		-0.5 ~ +7	V
Vi	Input voltage	Inputs P	-0.5 ~ +15	V
		Inputs Q	-0.5 ~ VCC + 0.5	V
Vo	Output voltage	High-level state	-0.5 ~ VCC	V
Topr	Operating free-air ambient temperature range		-20 ~ +75	°C
Tstg	Storage temperature range		-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter		Limits			Unit
			Min	Typ	Max	
V _{CC}	Supply voltage		4.75	5	5.25	V
I _{OH}	High-level output current	V _{OH} ≥ 2.7 V	0		− 400	μA
I _{OL}	Low-level output current	V _{OL} ≤ 0.4 V	0		12	mA
		V _{OL} ≤ 0.5 V	0		24	mA

ELECTRICAL CHARACTERISTICS (Ta = -20 ~ +75°C, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ *	Max	
VIH	High-level input voltage		2			V
VIL	Low-level input voltage				0.8	V
VT+ - VT-	Hysteresis width	VCC = 4.75V		0.4		V
VIC	Input clamp voltage	VCC = 4.75V, IIC = -18mA			-1.5	V
VOH	High-level output voltage	VCC = 4.75V, Vi = 2V, Vi = 0.8V, IOH = -400μA	2.7			V
VOL	Low-level output voltage	VCC = 4.75V, Vi = 2V, IOH = 12mA		0.25	0.4	V
		Vi = 0.8V, IOH = 24mA		0.35	0.5	V
IIH	High-level input current	P, Q VCC = 5.25V, Vi = 2.7V			20	μA
		P VCC = 5.25V, Vi = 10V			0.1	mA
		Q VCC = 5.25V, Vi = 5.5V				
IIL	Low-level input current	P VCC = 5.25V, Vi = 0.4V			-0.2	mA
		Q			-0.4	mA
IOS	Short-circuit output current (Note 1)	VCC = 5.25V, Vo = 0V	-20		-100	mA
ICC	Supply current	VCC = 5.25V (Note 2)		42	70	mA

* : All typical values are at VCC = 5V, Ta = 25°C.

Note 1: All measurements should be done quickly, and not more than one output should be shorted at a time.

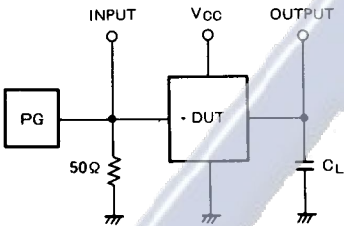
2: ICC is measured with all inputs at value of 4.5V.

8-BIT MAGNITUDE COMPARATOR

SWITCHING CHARACTERISTICS (V_{CC} = 5V, Ta = 25°C, unless otherwise noted)

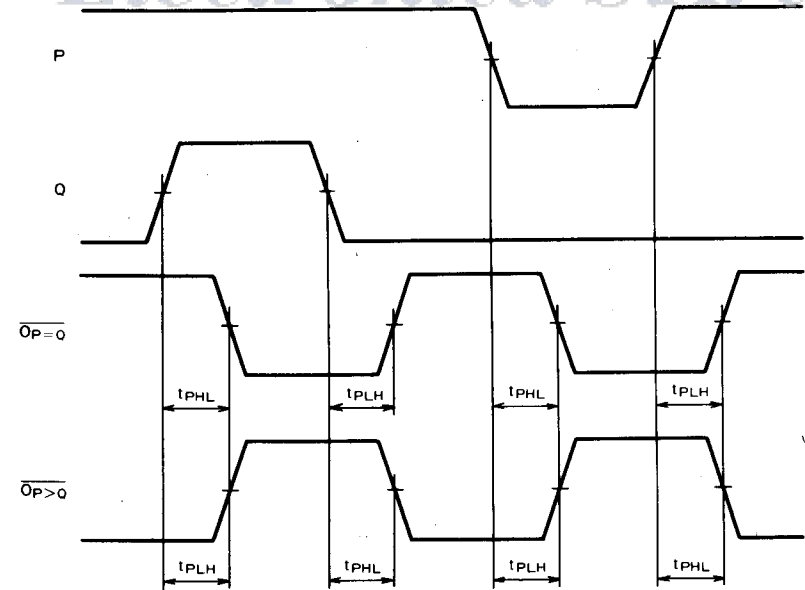
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t _{PLH}	Low-to-high level, high-to-low level output	C _L = 45pF (Note 3) All other input pins in low-state		13	30	ns
t _{PHL}	propagation time from inputs P to output $\overline{O_P=Q}$			16	30	
t _{PLH}	Low-to-high level, high-to-low level output			12	30	ns
t _{PHL}	propagation time from inputs Q to output $\overline{O_P=Q}$			17	30	
t _{PLH}	Low-to-high level, high-to-low level output			24	30	ns
t _{PHL}	propagation time from inputs P to output $\overline{O_P>Q}$			21	30	
t _{PLH}	Low-to-high level, high-to-low level output			26	30	ns
t _{PHL}	propagation time from inputs Q to output $\overline{O_P>Q}$			27	30	

Note 3: Measurement circuit



- (1) The pulse generator (PG) has the following characteristics:
PRR = 1MHz, t_r = 6ns, t_f = 6ns, t_w = 500ns, V_p = 3V_{p.p.},
Z_o = 50Ω
- (2) C_L includes probe and jig capacitance.

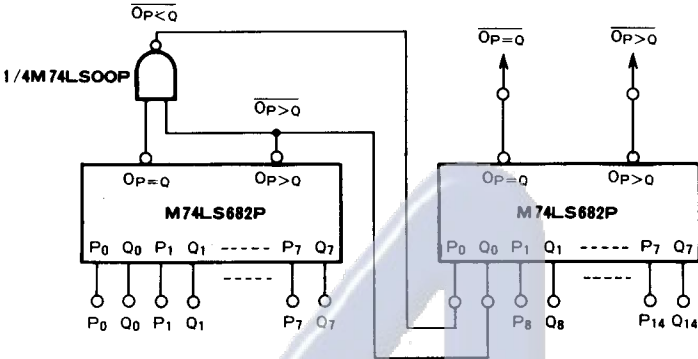
TIMING DIAGRAM (Reference level = 1.3V)



8-BIT MAGNITUDE COMPARATOR

APPLICATION EXAMPLE

Example of 15-bit comparator



Electrónica S.A. de C.V.

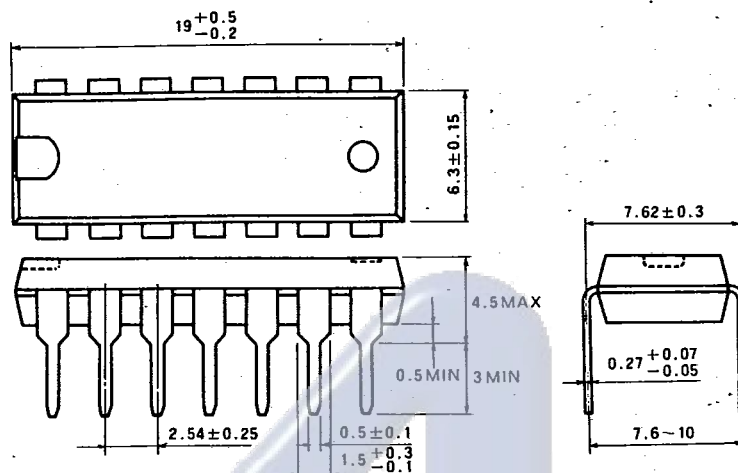
PACKAGE OUTLINES

MITSUBISHI {DGTL LOGIC} 07E D ■ 6249827 0013561 3 ■

T-90-20

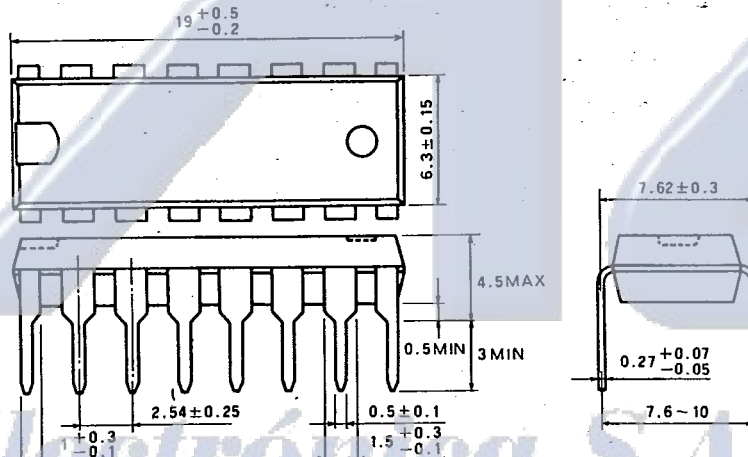
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm

