M74LS158P

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER (INVERTED)

DESCRIPTION

The M74LS158P is a semiconductor integrated circuit containing four 2-line to 1-line data selector/multiplexer circuits.

FEATURES

- Converted outputs provided
- Strobe inputs provided independently for each circuits
- Selection inputs common to four circuits
- Low output impedance
- Wide operating temperature range (T_a=−20~+75°C)

APPLICATION

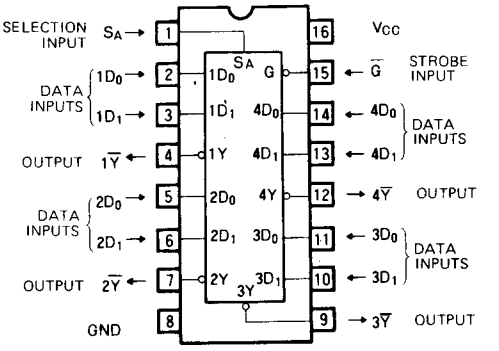
General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

This IC has four data selector circuits which provide 2-line to 1-line selection for 4 pairs of signals using four multiplexer circuits which convert the 2-bit parallel data into serial data with time-sharing. When 2-line signals are applied to the data inputs D_0 and D_1 and 1 data is specified from among the data from selection input S_A, the input signal is inverted and can be output at $\overline{Y}$. By applying 2-bit parallel data to D_0 and D_1, and connecting a binary counter output to S_A, the D_0 and D_1 data are inverted and appear in the order to D_0 and D_1 synchronized with the clock pulse. S_A and strobe input $\overline{G}$ are common to all four circuits. When $\overline{G}$ is set high, $1\overline{Y}$, $2\overline{Y}$, $3\overline{Y}$ and $4\overline{Y}$ are set high irrespective of the status of the inputs.

M74LS158P has the same functions and pin connections as M74LS258P but the latter is provided with 3-state outputs.

PIN CONFIGURATION (TOP VIEW)



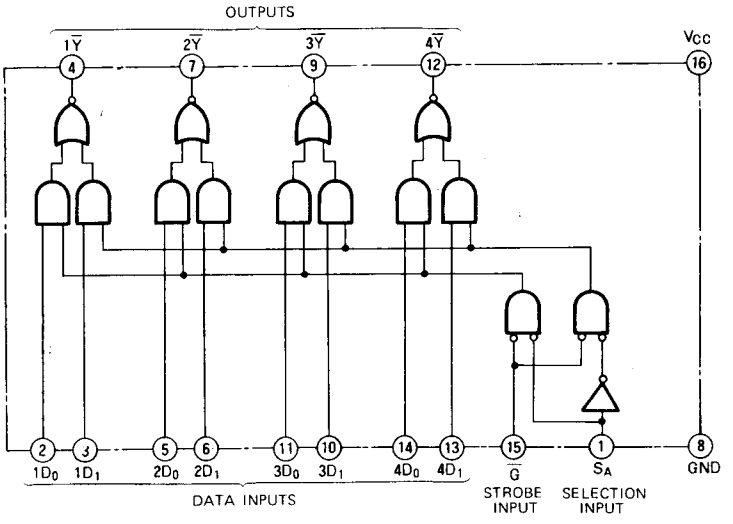
Outline 16P4

FUNCTION TABLE (Note 1)

$\overline{G}$	S_A	D_0	D_1	$\overline{Y}$
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

Note 1 X : Irrelevant

BLOCK DIAGRAM



MITSUBISHI ELECTRIC

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER (INVERTED)

ABSOLUTE MAXIMUM RATINGS (Ta = −20 ~ +75℃, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		−0.5 ~ +7	V
V_I	Input voltage		−0.5 ~ +15	V
V_O	Output voltage	High-level state	−0.5 ~ +7	V
Topr	Operating free-air ambient temperature range		−20 ~ +75	℃
Tstg	Storage temperature range		−65 ~ +150	℃

RECOMMENDED OPERATING CONDITIONS (Ta = −20 ~ +75℃, 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	$V_{OH} \geqq 2.7V$	0		−400	μA
I_{OL}	Low-level output current	$V_{OL} \leqq 0.4V$	0		4	mA
		$V_{OL} \leqq 0.5V$	0		8	mA

ELECTRICAL CHARACTERISTICS (Ta = −20 ~ +75℃, unless otherwise noted)

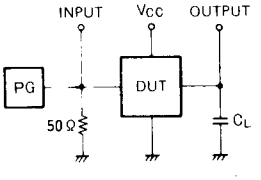
Symbol	Parameter		Test conditions		Limits			Unit
					Min	Typ *	Max	
V_{IH}	High-level input voltage				2			V
V_{IL}	Low-level input voltage						0.8	V
V_{IC}	Input clamp voltage		V_{CC}=4.75V, I_{IC}=−18mA				−1.5	V
V_{OH}	High-level output voltage		V_{CC}=4.75V, V_I=0.8V V_I=2V, I_{OH}=−400μA		2.7	3.4		V
V_{OL}	Low-level output voltage		V_{CC}=4.75V	I_{OL}=4mA		0.25	0.4	V
			V_I=0.8V, V_I=2V	I_{OL}=8mA		0.35	0.5	V
I_{IH}	High-level input current	D_0, D_1	V_{CC}=5.25V				20	μA
		S_A, $\overline{G}$	V_I=2.7V				40	
		D_0, D_1	V_{CC}=5.25V				0.1	mA
		S_A, $\overline{G}$	V_I=10V				0.2	
I_{IL}	Low-level input current	D_0, D_1	V_{CC}=5.25V				−0.4	mA
		S_A, $\overline{G}$	V_I=0.4V				−0.8	
I_{OS}	Short-circuit output current (Note 2)		V_{CC}=5.25V, V_O=0V		−20		−100	mA
I_{CCH}	High level Supply current		V_{CC}=5.25V (Note 3)			4.8	8	mA
I_{CCL}	Low-level supply current		V_{CC}=5.25V (Note 4)			6.5	11	mA

* : All typical values are at V_{CC}=5V, T_a=25°C.
Note 2: All measurements should be done quickly, and not more than one output should be shorted at a time. Note 3: I_{CC} is measured with all inputs at 4.5V.
Note 4: The supply current should be measured with $1D_0$~$4D_0$ at 4.5V and the other inputs at 0V.

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

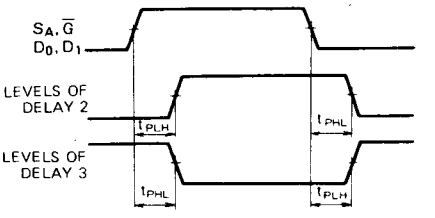
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t_{PLH}	Low-to-high-level, high-to-low-level output propagation time, from inputs D_0, D_1 to output $\overline{Y}$	C_L=15pF (Note 5)		5	12	ns
t_{PHL}				5	12	ns
t_{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input S_A to output $\overline{Y}$			9	20	ns
t_{PHL}				10	24	ns
t_{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input $\overline{G}$ to output $\overline{Y}$			8	17	ns
t_{PHL}				8	18	ns

Note 5: Measurement circuit



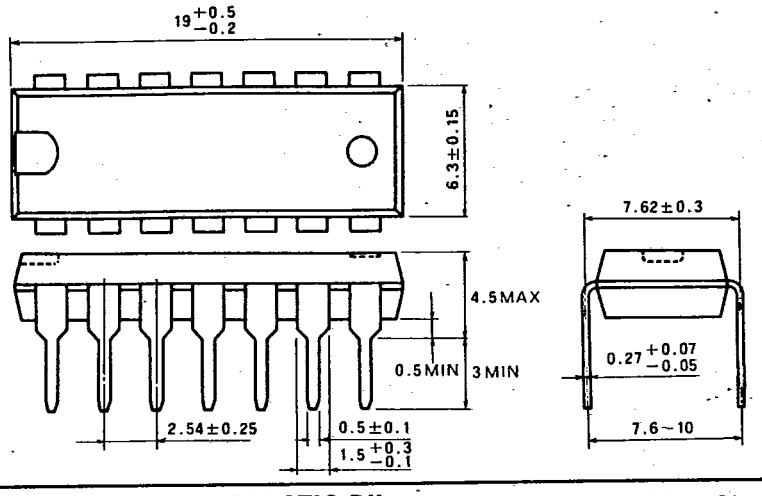
(1) The pulse generator (GP) has the following characteristics: PRR = 1MHz, t_r = 6ns, t_f = 6ns, t_w = 500ns, V_P = 3Vp-p, Z_O = 50Ω.
(2) C_L includes probe and jig capacitance.

TIMING DIAGRAM (Reference level = 1.3V)



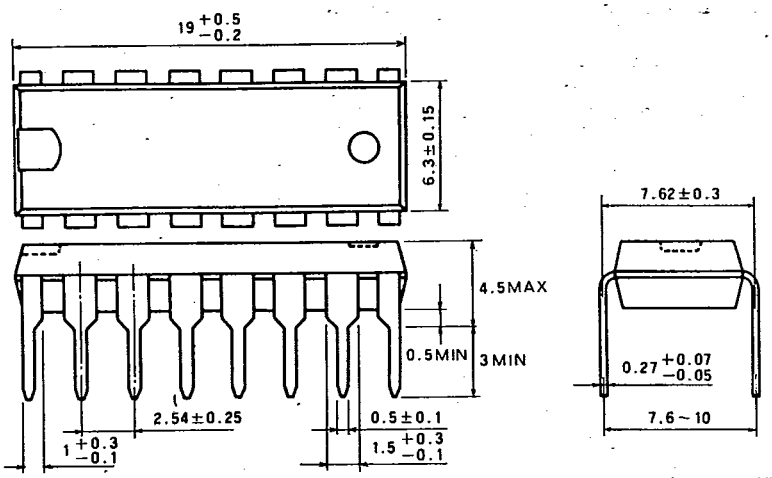
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm