

8-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH STROBE

DESCRIPTION

The M74LS151P is a semiconductor integrated circuit containing an 8-line to 1-line data selector/multiplexer function.

FEATURES

- Strobe input provided
- Complementary output provided
- Low output impedance
- Wide operating temperature range ($T_a = -20 \sim +75^\circ\text{C}$)

APPLICATION

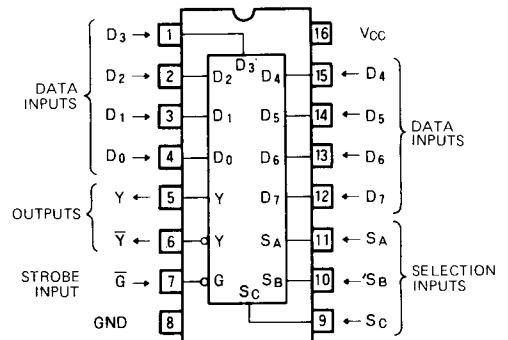
General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

This IC has a data selector function which provides 1-line selection of 8 input signals and a multiplexer function which converts the 8-bit parallel data into serial data. When 8-line signals are applied to the data inputs and 1 data is specified from among the 8 data from selection inputs S_A , S_B and S_C , the input signal is output at Y and the inverted signal from output $\bar{Y}$. By applying 8-bit parallel data to $D_0 \sim D_7$ and connecting a synchronous octal counter output to S_A , S_B and S_C , the data appear in Y in $D_0 \sim D_7$ order and in $\bar{Y}$ in $\bar{D}_0 \sim \bar{D}_7$ order as synchronized with the clock pulse. When strobe input $\bar{G}$ is set high, Y is set low and $\bar{Y}$ high.

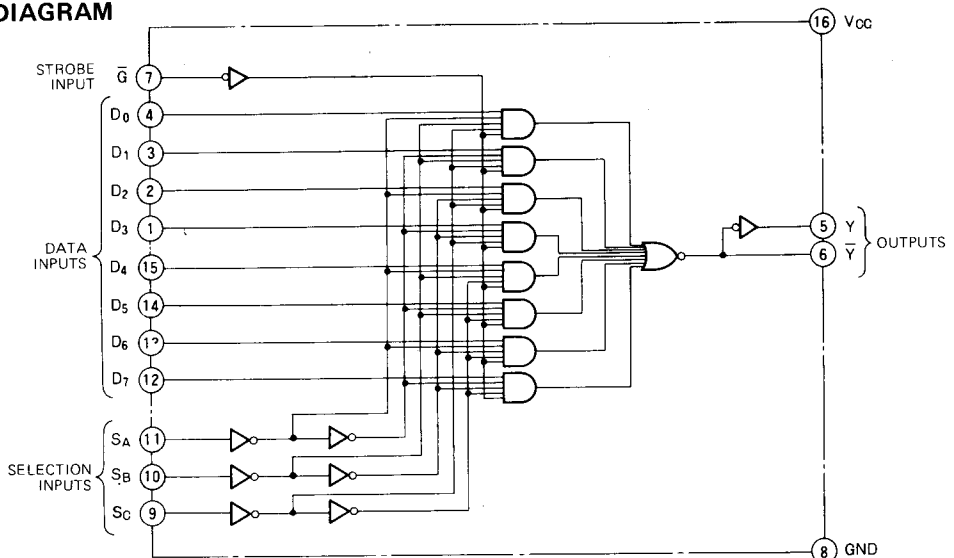
M74LS151P has the same functions and pin connections as M74LS251P but the latter is provided with 3-state outputs.

PIN CONFIGURATION (TOP VIEW)



Outline 16P4

BLOCK DIAGRAM



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FUNCTION TABLE (Note 1)

S _C	S _B	S _A	$\overline{G}$	D ₀	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	Y	$\overline{Y}$
X	X	X	H	X	X	X	X	X	X	X	X	L	H
L	L	L	L	L	X	X	X	X	X	X	X	L	H
L	L	L	L	H	X	X	X	X	X	X	X	H	L
L	L	H	L	X	L	X	X	X	X	X	X	L	H
L	L	H	L	X	H	X	X	X	X	X	X	H	L
L	H	L	L	X	X	L	X	X	X	X	X	L	H
L	H	L	L	X	X	H	X	X	X	X	X	H	L
L	H	H	L	X	X	X	L	X	X	X	X	L	H
L	H	H	L	X	X	X	H	X	X	X	X	H	L
H	L	L	L	X	X	X	X	L	X	X	X	L	H
H	L	L	L	X	X	X	X	H	X	X	X	H	L
H	L	H	L	X	X	X	X	X	L	X	X	L	H
H	L	H	L	X	X	X	X	X	H	X	X	H	L
H	H	L	L	X	X	X	X	X	X	L	X	L	H
H	H	L	L	X	X	X	X	X	X	H	X	H	L
H	H	H	L	X	X	X	X	X	X	X	L	L	H
H	H	H	L	X	X	X	X	X	X	X	H	H	L

Note 1 X : Irrelevant

ABSOLUTE MAXIMUM RATINGS (T_a = -20 ~ +75°C, 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 ~ V _{CC}	V
T _{opr}	Operating free-air ambient temperature range		-20 ~ +75	°C
T _{stg}	Storage temperature range		-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS (T_a = -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} ≥ 2.7V	0		-400	μA
I _{OL}	Low-level output current	V _{OL} ≤ 0.4V	0		4	mA
		V _{OL} ≤ 0.5V	0		8	mA

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

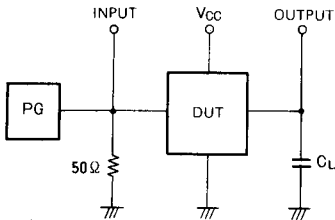
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ *	Max	
V _{IH}	High-level input voltage		2			V
V _{IL}	Low-level input voltage				0.8	V
V _{IC}	Input clamp voltage	V _{CC} = 4.75V, I _{IC} = -18mA			-1.5	V
V _{OH}	High-level output voltage	V _{CC} = 4.75V, V _I = 0.8V V _I = 2V, I _{OH} = -400μA	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	V _{CC} = 5.25V, V _I = 2.7V			20	μA
		V _{CC} = 5.25V, V _I = 10V			0.1	mA
I _{IL}	Low-level input current	V _{CC} = 5.25V, V _I = 0.4V			-0.4	mA
I _{OS}	Short-circuit output current (Note 2)	V _{CC} = 5.25V, V _O = 0V	-20		-100	mA
I _{CC}	Supply current	V _{CC} = 5.25V (Note 3)		6	10	mA

* : All typical values are at V_{CC} = 5V, T_a = 25°C.
Note 2: All measurements should be done quickly.
Note 3: I_{CC} is measured with all inputs at 4.5V

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

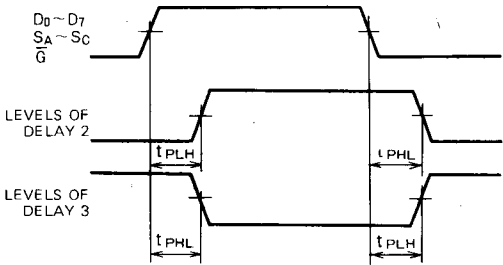
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from inputs S _A , S _B , S _C to output $\bar{Y}$	C _L = 15pF (Note 4)		10	23	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from inputs S _A , S _B , S _C to output Y			15	32	ns
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input $\bar{G}$ to output $\bar{Y}$			22	43	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from input $\bar{G}$ to output Y			16	30	ns
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input $\bar{G}$ to output $\bar{Y}$			10	24	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from input $\bar{G}$ to output Y			14	30	ns
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output $\bar{Y}$			21	42	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output Y			16	32	ns
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output $\bar{Y}$			7	21	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output Y			8	20	ns
t _{PLH}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output $\bar{Y}$			17	32	ns
t _{PHL}	Low-to-high-level, high-to-low-level output propagation time, from inputs D ₀ ~ D ₇ to output Y			12	26	ns

Note 4: Measurement circuit



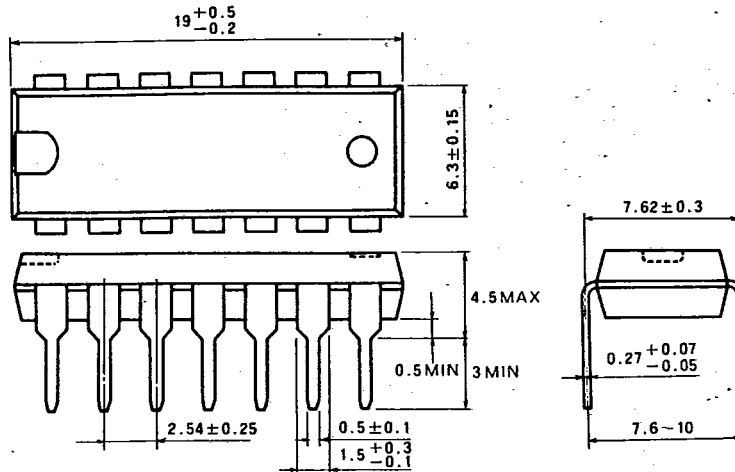
- (1) The pulse generator (PG) has the following characteristics:
PRR = 1MHz, t_r = 6ns, t_f = 6ns, t_w = 500ns,
V_p = 3V_{p-p}, Z_o = 50Ω.
(2) C_L includes probe and jig capacitance.

TIMING DIAGRAM (Reference=1.3V)



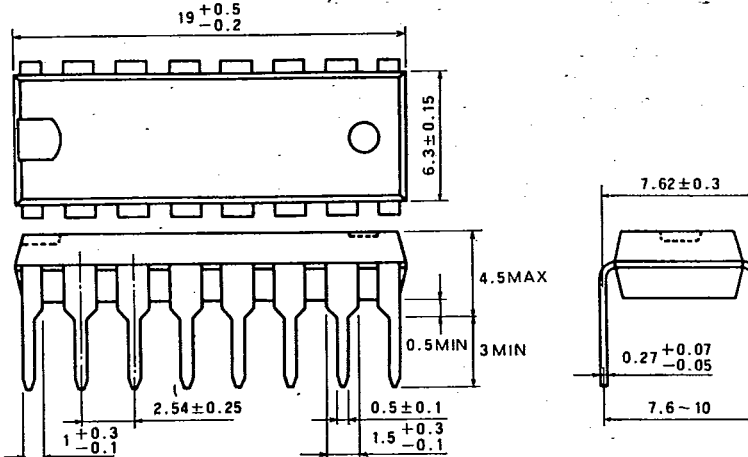
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm

