

MITSUBISHI LSTTL[®]

M74LS258AP

QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUT (INVERTED)

DESCRIPTION

The M74LS258AP is a semiconductor integrated circuit containing four 2-line to 1-line data selector/multiplexer circuits with 3-state outputs.

FEATURES

- Inverted outputs
- Output control input common to all four circuits
- Select input common to all four circuits
- 3-state outputs
- Wide operating temperature range ($T_a = -20 \sim +75^\circ\text{C}$)

APPLICATION

General purpose, for use in industrial and consumer equipment.

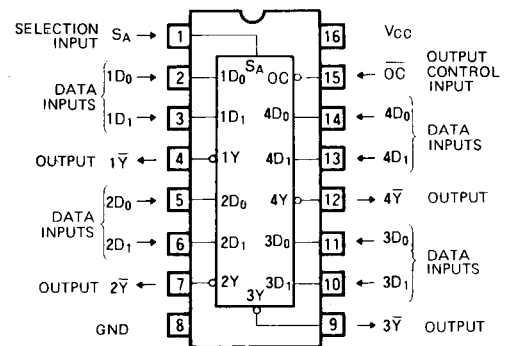
FUNCTIONAL DESCRIPTION

This IC contains four sets of circuits which are used 1-line selection 2 input signals and as both data selectors, selecting 1-line out of 2 input signals, and multiplexers which convert the 2-bit parallel data into serial data by time-sharing. When one out of 2-line signals, which are applied to the data inputs D_0 and D_1 , is specified by select from input S_A , inverted signal of that appears at output \bar{Y} .

S_A and output control \overline{OC} are common to all four circuits. When \overline{OC} is set high, $1\bar{Y}$, $2\bar{Y}$, $3\bar{Y}$ and $4\bar{Y}$ are put in the high-impedance state irrespective of the status of the other inputs.

M74LS258AP has the same functions and pin connections as M74LS158P but the latter is provided with active pull-up resistor outputs.

PIN CONFIGURATION (TOP VIEW)



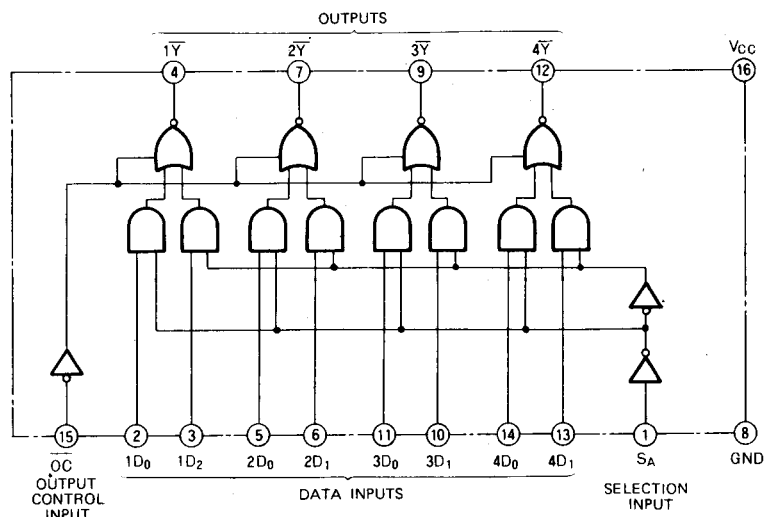
FUNCTION TABLE (Note 1)

\overline{OC}	S_A	D_0	D_1	\bar{Y}
H	X	X	X	Z
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

Note 1 X : Irrelevant

Z : High-impedance state

BLOCK DIAGRAM



MITSUBISHI LSTTLs
M74LS258AP
**QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER
WITH 3-STATE OUTPUT (INVERTED)**
ABSOLUTE MAXIMUM RATINGS ($T_a = -20 \sim +75^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		$-0.5 \sim +7$	V
V_I	Input voltage		$-0.5 \sim +15$	V
V_O	Output voltage	Off-state	$-0.5 \sim +5.5$	V
T_{opr}	Operating free-air ambient temperature range		$-20 \sim +75$	$^\circ\text{C}$
T_{stg}	Storage temperature range		$-65 \sim +150$	$^\circ\text{C}$

RECOMMENDED OPERATING CONDITIONS ($T_a = -20 \sim +75^\circ\text{C}$, 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	$V_{OH} \geq 2.4\text{V}$	0	-2.6	mA
I_{OL}	Low-level output current	$V_{OL} \leq 0.4\text{V}$	0	12	mA
		$V_{OL} \leq 0.5\text{V}$	0	24	mA

ELECTRICAL CHARACTERISTICS ($T_a = -20 \sim +75^\circ\text{C}$, 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	$V_{CC} = 4.75\text{V}$, $I_{IC} = -18\text{mA}$			-1.5	V	
V_{OH}	High-level output voltage	$V_{CC} = 4.75\text{V}$, $V_I = 0.8\text{V}$ $V_I = 2\text{V}$, $I_{OH} = -2.6\text{mA}$	2.4	3.1		V	
V_{OL}	Low-level output voltage	$V_{CC} = 4.75\text{V}$			0.25	0.4	V
		$V_I = 0.8\text{V}$, $V_I = 2\text{V}$			0.35	0.5	V
I_{OZH}	Off-state high-level output current	$V_{CC} = 5.25\text{V}$, $V_I = 2\text{V}$, $V_O = 2.7\text{V}$			20	μA	
I_{OZL}	Off-state low-level output current	$V_{CC} = 5.25\text{V}$, $V_I = 2\text{V}$, $V_O = 0.4\text{V}$			-20	μA	
I_{IH}	High-level input current	D_0, D_1, \overline{OC}	$V_{CC} = 5.25\text{V}$			20	μA
		S_A	$V_I = 2.7\text{V}$			40	μA
		D_0, D_1, \overline{OC}	$V_{CC} = 5.25\text{V}$			0.1	mA
		S_A	$V_I = 10\text{V}$			0.2	mA
I_{IL}	Low-level input current	D_0, D_1, \overline{OC}	$V_{CC} = 5.25\text{V}$			-0.4	mA
		S_A	$V_I = 0.4\text{V}$			-0.8	mA
I_{OS}	Short-circuit output current (Note 2)	$V_{CC} = 5.25\text{V}$, $V_O = 0\text{V}$	-30		130	mA	
I_{CCH}	Supply current, all outputs high	$V_{CC} = 5.25\text{V}$ (Note 3)		4.5	7	mA	
I_{CCL}	Supply current, all outputs low	$V_{CC} = 5.25\text{V}$ (Note 4)		8.8	14	mA	
I_{CCZ}	Supply current, all outputs off	$V_{CC} = 5.25\text{V}$ (Note 5)		12	19	mA	

* : All typical values are at $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$.

Note 2: All measurements should be done quickly and not more than one output should be shorted at a time.

Note 3: I_{CCH} is measured with all inputs at 0V.

Note 4: I_{CCL} is measured with \overline{OC} , S_A and D_1 at 0V and D_0 at 4.5V.

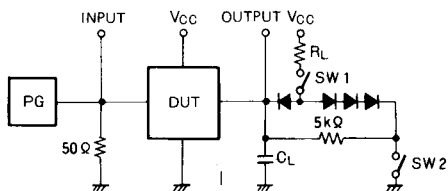
Note 5: I_{CCZ} is measured with \overline{OC} at 4.5V and all other inputs at 0V.

SWITCHING CHARACTERISTICS ($V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$, 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 D_0, D_1 to output \overline{Y}	$C_L = 45\text{pF}$ (Note 6)		5	18	ns	
t_{PHL}				8	18	ns	
t_{PLH}	Low-to-high-level, high-to-low-level output propagation time, from input S_A to output \overline{Y}			9	28	ns	
t_{PHL}				16	35	ns	
t_{PZH}	Output enable time to high-level		$R_L = 667\Omega$, $C_L = 45\text{pF}$ (Note 6)		7	22	ns
t_{PZL}	Output enable time to low-level		$R_L = 667\Omega$, $C_L = 45\text{pF}$ (Note 6)		12	35	ns
t_{PLZ}	Output disable time from low-level	$R_L = 667\Omega$, $C_L = 5\text{pF}$ (Note 6)		11	26	ns	
t_{PHZ}	Output disable time from high-level	$R_L = 667\Omega$, $C_L = 5\text{pF}$ (Note 6)		8	35	ns	

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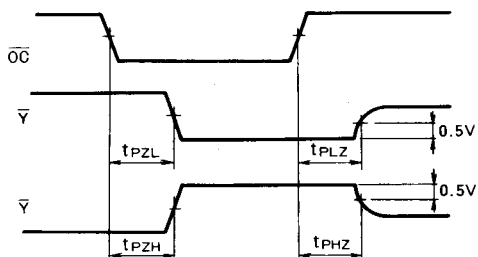
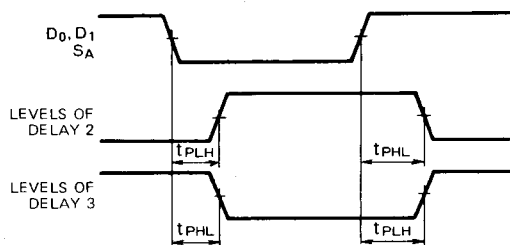
Note 6: Measurement circuit



Symbol	SW 1	SW 2
t_{PZH}	Open	Closed
t_{PZL}	Closed	Open
t_{PLZ}	Closed	Closed
t_{PHZ}	Closed	Closed

- (1) The pulse generator (PG) has the following characteristics:
 PRR = 1MHz, $t_r = 6ns$, $t_f = 6ns$, $t_w = 500ns$, $V_p = 3V_{p-p}$, $Z_0 = 50\Omega$.
- (2) All diodes are switching diodes.
- (3) C_L includes probe and jig capacitance

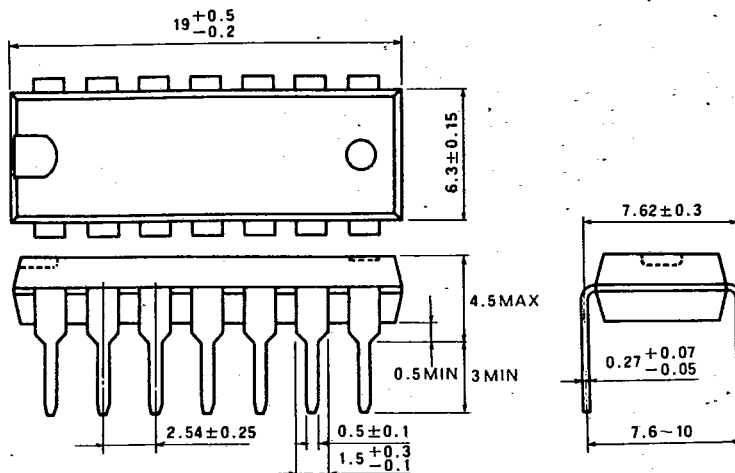
TIMING DIAGRAM (Reference level = 1.3V)



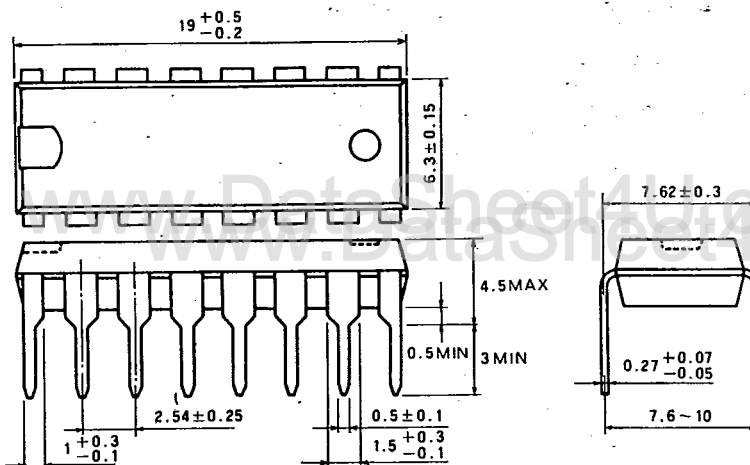
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TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm

**TYPE 16P4 16-PIN MOLDED PLASTIC DIL**

Dimension in mm

**TYPE 20P4 20-PIN MOLDED PLASTIC DIL**

Dimension in mm

