M74LS641P

OCTAL BUS TRANSCEIVER WITH OPEN COLLECTOR OUTPUT(NONINVERTED)

DESCRIPTION

The M74LS641P is a semiconductor integrated circuit containing 8 bus transmitter/receiver circuits with non-inverted open collector outputs.

FEATURES

- Bi-directional transmission or separation of two 8 bit data is possible.
- Open collector outputs
- Hysteresis provided (width = 400mV typical) for input/output A and output/input B
- High fan-out (I_{OL} = 24mA)
- Wide operating temperature range. (T_a = –20 ~ +75°C)

APPLICATION

General purpose, for use in industrial and consumer equipment.

FUNCTIONAL DESCRIPTION

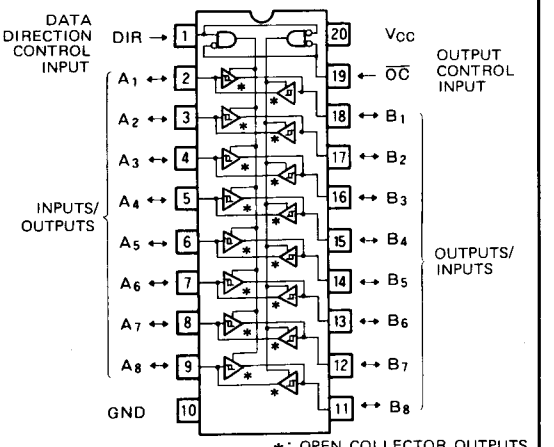
The inputs and outputs of the two buffer circuits with 3-state non-inverted outputs are connected together to form bi-directional buffers. The input sections of input/output A and output/input B have been designed with hysteresis characteristics giving increased noise margin. The input/output direction is controlled by DIR.

When DIR is high, A is the input pin and B is the output pin. When DIR is low then B is input terminal and A is the output terminal. When output control input OC is high, A and B become high so the buffers are isolated.

Open collector outputs are provided, so the high-level output impedance can be freely selected with external load resistors.

The functions and pin connections of this IC are identical to those of M74LS645P.

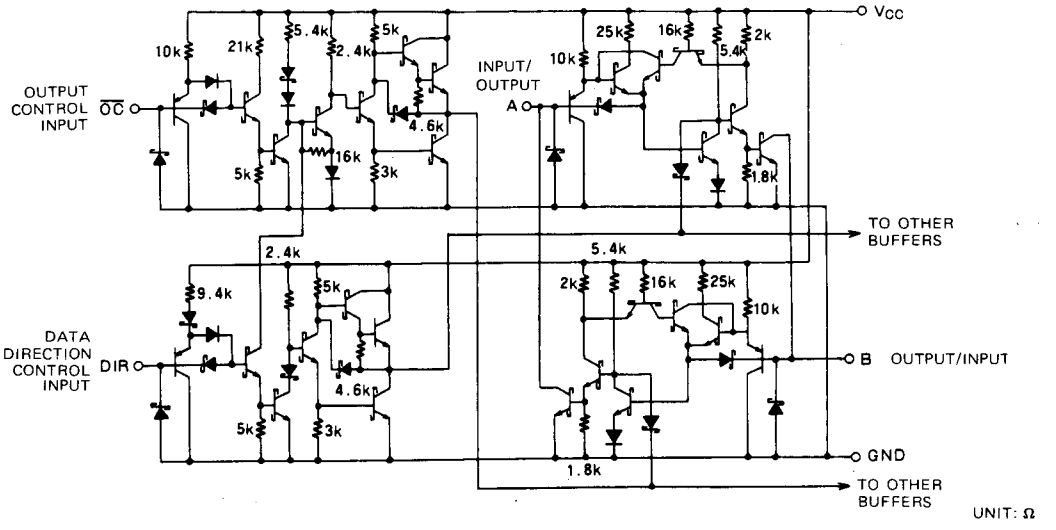
PIN CONFIGURATION (TOP VIEW)



Outline 20P4

A device, M74LS641-1P, having the same pin connections and functions except the value of I_{OL} (= 48mA) has been provided.

CIRCUIT DIAGRAM (Each buffer)



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FUNCTION TABLE (Note 1)

$\overline{OC}$	DIR	A	B
L	L	O	I
L	H	I	O
H	X	H	H

Note 1: I: Input pin
O: Output (non-inverted output) pin
X: Irrelevant

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	A, B		−0.5 ~ +7	V
		DIR, $\overline{OC}$		−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_O=5.5V	0		100	μA
I_{OL}	Low-level output current	V_{OL}≦0.4V	0		12	mA
		V_{OL}≦0.5V	0		24	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						0.6	V
$V_{T+}-V_{T-}$	Hysteresis width		V_{CC}=4.75V		0.2	0.4		V
V_{IC}	Input clamp voltage		V_{CC}=4.75V, I_{IC}=−18mA				−1.5	V
I_{OH}	High-level output current		V_{CC}=4.75V, V_I=0.6V, V_I=2V, V_O=5.5V				100	μA
V_{OL}	Low-level output voltage		V_{CC}=4.75V	I_{OL}=12mA		0.25	0.4	V
			V_I=0.6V, V_I=2V	I_{OL}=24mA		0.35	0.5	V
I_{IH}	High-level input current	A, B	V_{CC}=5.25V, V_I=2.7V				20	μA
		DIR, $\overline{OC}$					20	μA
		A, B	V_{CC}=5.25V, V_I=5.5V				0.1	mA
		DIR, $\overline{OC}$	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_{CCH}	Supply current, all outputs high		V_{CC}=5.25V, V_I=0V, V_I=4.5V			48	70	mA
I_{CCL}	Supply current, all outputs low		V_{CC}=5.25V, V_I=0V, V_I=4.5V			62	90	mA
I_{CCZ}	Supply current, all outputs off		V_{CC}=5.25V, V_I=0V, V_I=4.5V			64	95	mA

* : All typical values are at V_{CC} = 5V, T_a = 25°C.

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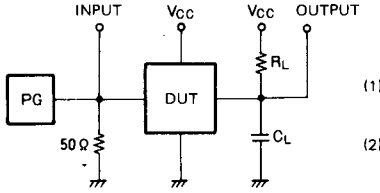
SWITCHING CHARACTERISTICS (V_{CC}=5V, Ta=25℃, unless otherwise noted)

Symbol	Parameter		Test conditions	Limits			Unit
				Min	Typ	Max	
t_{PLH}	Low-to-high level output propagation time	From input A to output B	C_L=45pF, R_L=667Ω (Note 2)		20	25	ns
		From input B to output A			20	25	
t_{PHL}	High-to-low level output propagation time	From input A to output B			15	25	ns
		From input B to output A			15	25	
t_{PLH}	Low-to-high level output propagation time	From input $\overline{OC}$ to output A			25	40	ns
		From input $\overline{OC}$ to output B			25	40	
t_{PHL}	High-to-low level output propagation time	From input $\overline{OC}$ to output A			30	50	ns
		From input $\overline{OC}$ to output B			30	50	

Note 2: Measurement circuit



(1) The pulse generator (PG) 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)