

**OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUT (NONINVERTED)**

**DESCRIPTION**

The M74LS241P is a semiconductor integrated circuit containing 2 buffer blocks with 3-state non-inverted outputs and is provided with output control inputs which are common to 4 circuits and which are independent.

**FEATURES**

- Small input load factor (pnp input)
- Hysteresis provided ( $\approx 400\text{mV}$  typical)
- High breakdown input voltage ( $V_i \geq 15\text{V}$ )
- Complementary output control inputs ( $1\overline{\text{OC}}, 2\text{OC}$ )
- High fan-out 3-state outputs ( $I_{OL} = 24\text{mA}$ ,  $I_{OH} = -15\text{mA}$ )
- Wide operating temperature range ( $T_a = -20 \sim +75^\circ\text{C}$ )

**APPLICATION**

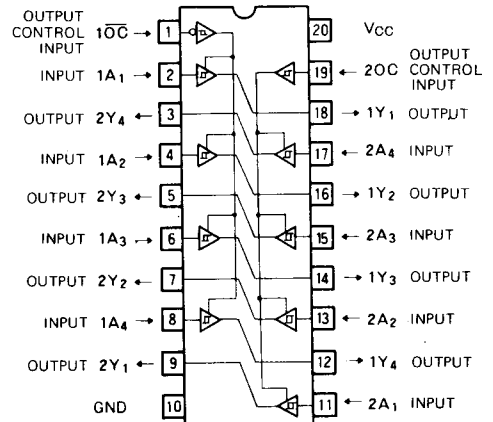
General purpose, for use in industrial and consumer equipment.

**FUNCTIONAL DESCRIPTION**

Since pnp transistors are used for the input circuits, the input load factor is small and a high breakdown input voltage is provided. The 3-state non-inverted output buffers have a high noise margin due to hysteresis.

When  $1\overline{\text{OC}}$  is low, low appears in output Y if input 1A is low, and high appears in Y if 1A is high. When 2OC is high, low appears in output 2Y if input 2A is low and high

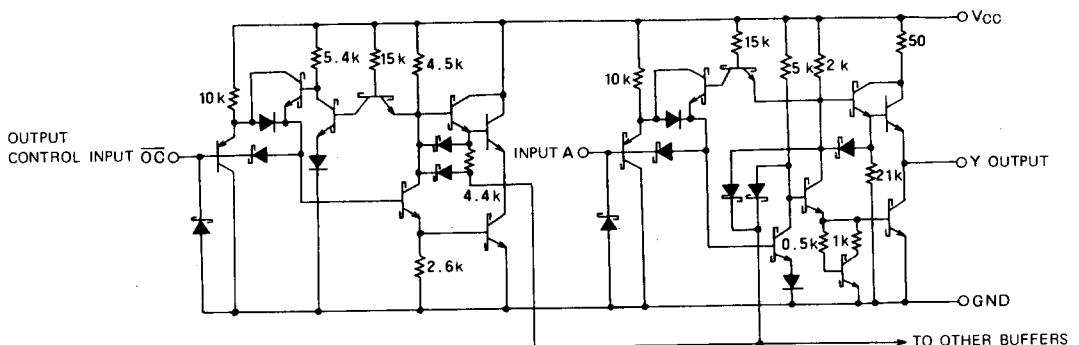
**PIN CONFIGURATION (TOP VIEW)**



appears in 2Y if 2A is high. All the outputs are put in a high-impedance state when  $1\overline{\text{OC}}$  and 2OC are high and low, respectively.

The device can be used as a 4-bit two-way bus driver by connecting  $1\overline{\text{OC}}$  and 2OC, 1A and 2Y and also 2A and 1Y. The outputs can be terminated with load resistors of not less than 133 ohms.

**CIRCUIT DIAGRAM (EACH BUFFER)**



UNIT:  $\Omega$

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**FUNCTION TABLE** (Note 1)

| 1A | 1 $\overline{O}$ C | 1Y | 2A | 2 $\overline{O}$ C | 2Y |
|----|--------------------|----|----|--------------------|----|
| L  | L                  | L  | L  | H                  | L  |
| H  | L                  | H  | H  | H                  | H  |
| X  | H                  | Z  | X  | L                  | Z  |

Note 1 Z : High-impedance

X : irrelevant

**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      |     | -3   | mA   |
|          |                           | $V_{OH} \geq 2\text{V}$   | 0      |     | -15  | 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             |
| $V_{T+} - V_{T-}$ | Hysteresis width                      | $V_{CC} = 4.75\text{V}$                                                | 0.2    | 0.4   |      | 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             | $V_{CC} = 4.75\text{V}$ , $V_i = 0.8\text{V}$ , $I_{OH} = -3\text{mA}$ | 2.4    | 3.1   |      | V             |
|                   |                                       | $V_i = 2\text{V}$ , $V_i = 0.5\text{V}$ , $I_{OH} = -15\text{mA}$      | 2      |       |      | V             |
| $V_{OL}$          | Low-level output voltage              | $V_{CC} = 4.75\text{V}$ , $I_{OL} = 12\text{mA}$                       |        | 0.25  | 0.4  | V             |
|                   |                                       | $V_i = 0.8\text{V}$ , $V_i = 2\text{V}$ , $I_{OL} = 24\text{mA}$       |        | 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   | $\mu\text{A}$ |
| $I_{OZL}$         | Off-state low-level output current    | $V_{CC} = 5.25\text{V}$ , $V_i = 2\text{V}$ , $V_o = 0.4\text{V}$      |        |       | -20  | $\mu\text{A}$ |
| $I_{IH}$          | High-level input current              | $V_{CC} = 5.25\text{V}$ , $V_i = 2.7\text{V}$                          |        |       | 20   | $\mu\text{A}$ |
|                   |                                       | $V_{CC} = 5.25\text{V}$ , $V_i = 10\text{V}$                           |        |       | 0.1  | mA            |
| $I_{iL}$          | Low-level input current               | $V_{CC} = 5.25\text{V}$ , $V_i = 0.4\text{V}$                          |        |       | -0.2 | mA            |
| $I_{OS}$          | Short-circuit output current (Note 2) | $V_{CC} = 5.25\text{V}$ , $V_o = 0\text{V}$                            | -40    |       | -225 | mA            |
| $I_{CCH}$         | Supply current, all outputs high      | $V_{CC} = 5.25\text{V}$ , $V_i = 0\text{V}$ , $V_i = 4.5\text{V}$      |        | 17    | 27   | mA            |
| $I_{CCL}$         | Supply current, all outputs low       | $V_{CC} = 5.25\text{V}$ , $V_i = 0\text{V}$ , $V_i = 4.5\text{V}$      |        | 27    | 46   | mA            |
| $I_{CCZ}$         | Supply current, all outputs disabled  | $V_{CC} = 5.25\text{V}$ , $V_i = 0\text{V}$ , $V_i = 4.5\text{V}$      |        | 32    | 54   | mA            |

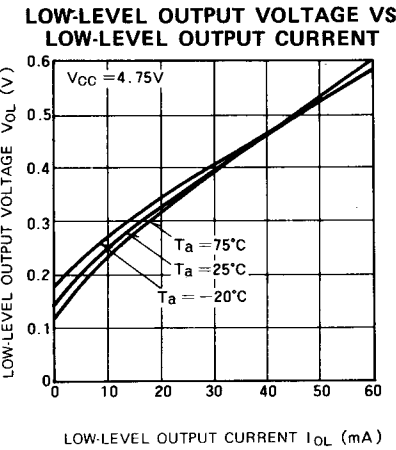
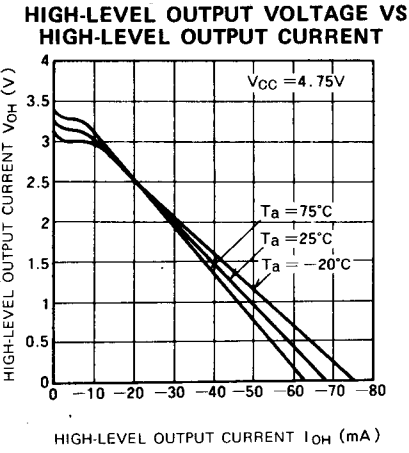
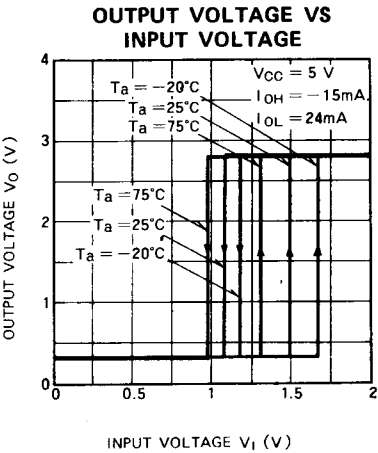
\* : All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_a = 25^\circ\text{C}$ .

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



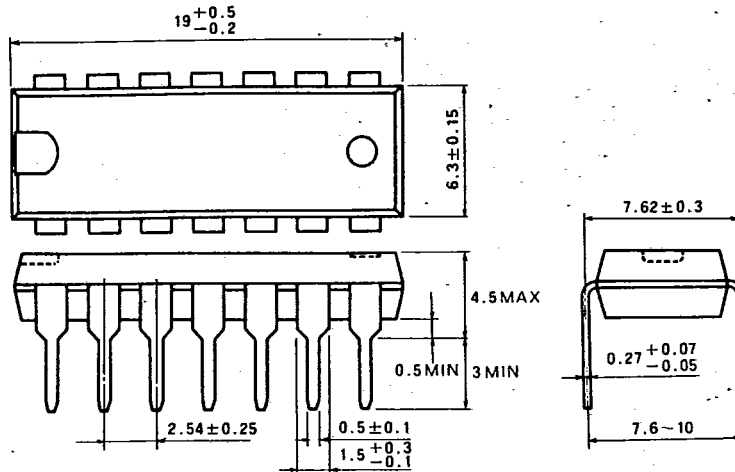
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TYPICAL CHARACTERISTICS



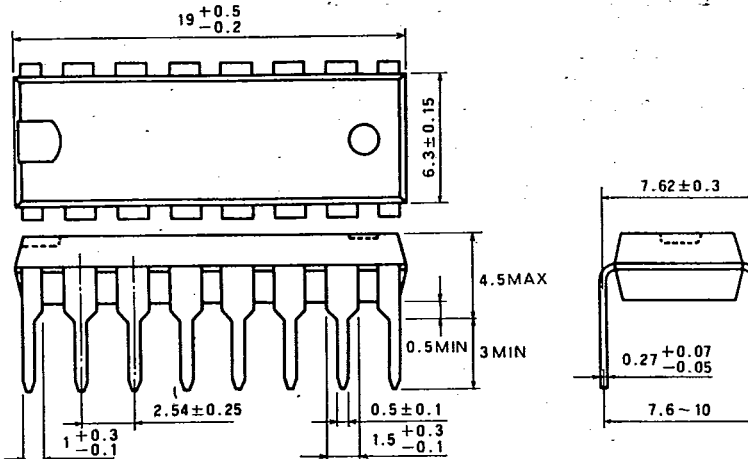
TYPE 14P4 14-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 16P4 16-PIN MOLDED PLASTIC DIL

Dimension in mm



TYPE 20P4 20-PIN MOLDED PLASTIC DIL

Dimension in mm

