

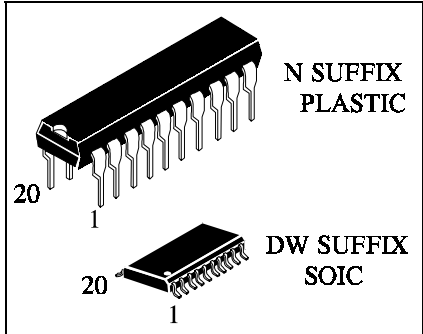
**IN74ALS245**

**Octal 3-State Noninverting Bus Transceiver**

This device contains eight pairs of 3-state logic elements designed for asynchronous two-way communication between data buses.

These circuits are suited for use in memory, microprocessor systems and asynchronous bi-directional data buses. The Enable input ( $\overline{E}$ ) can be used to isolate the buses.

- Non-inverting logic output
- Switching response specified into 500Ω/50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Low level drive current:  
54ALS = 12 mA, 74ALS = 24 mA

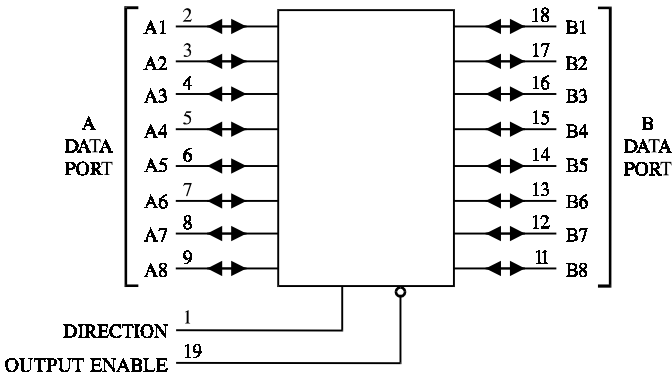


**N SUFFIX PLASTIC**

**DW SUFFIX SOIC**

**ORDERING INFORMATION**  
 IN74ALS245N Plastic  
 IN74ALS245DW SOIC  
 $T_A = -10^\circ$  to  $70^\circ$  C  
 for all packages

**LOGIC DIAGRAM**



PIN 20 =  $V_{CC}$   
 PIN 10 = GND

**PIN ASSIGNMENT**

|                  |     |    |                      |
|------------------|-----|----|----------------------|
| <b>DIRECTION</b> | 1 ● | 20 | $V_{CC}$             |
| A1               | 2   | 19 | <b>OUTPUT ENABLE</b> |
| A2               | 3   | 18 | B1                   |
| A3               | 4   | 17 | B2                   |
| A4               | 5   | 16 | B3                   |
| A5               | 6   | 15 | B4                   |
| A6               | 7   | 14 | B5                   |
| A7               | 8   | 13 | B6                   |
| A8               | 9   | 12 | B7                   |
| GND              | 10  | 11 | B8                   |

**FUNCTION TABLE**

| Control Inputs |           | Operation                             |
|----------------|-----------|---------------------------------------|
| Output Enable  | Direction |                                       |
| L              | L         | Data Transmitted from Bus B to Bus A  |
| L              | H         | Data Transmitted from Bus A to Bus B  |
| H              | X         | Buses Isolated (High Impedance State) |

X = don't care

## MAXIMUM RATINGS\*

| Symbol           | Parameter                 | Value       | Unit |
|------------------|---------------------------|-------------|------|
| V <sub>CC</sub>  | Supply Voltage            | 7.0         | V    |
| V <sub>IN</sub>  | Input Voltage             | 7.0         | V    |
| V <sub>OUT</sub> | Output Voltage            | 5.5         | V    |
| T <sub>stg</sub> | Storage Temperature Range | -65 to +150 | °C   |

\*Maximum Ratings are those values beyond which damage to the device may occur. Functional operation should be restricted to the Recommended Operating Conditions.

## RECOMMENDED OPERATING CONDITIONS

| Symbol          | Parameter                 | Min | Max | Unit |
|-----------------|---------------------------|-----|-----|------|
| V <sub>CC</sub> | Supply Voltage            | 4.5 | 5.5 | V    |
| V <sub>IH</sub> | High Level Input Voltage  | 2.0 |     | V    |
| V <sub>IL</sub> | Low Level Input Voltage   |     | 0.8 | V    |
| I <sub>OH</sub> | High Level Output Current |     | -15 | mA   |
| I <sub>OL</sub> | Low Level Output Current  |     | 24  | mA   |
| T <sub>A</sub>  | Ambient Temperature Range | -10 | +70 | °C   |

## DC ELECTRICAL CHARACTERISTICS over full operating conditions

| Symbol           | Parameter                    | Test Conditions  | Guaranteed Limit |      | Unit |
|------------------|------------------------------|--|------------------|------|------|
|                  |                              |  | Min              | Max  |      |
| V <sub>IK</sub>  | Input Clamp Voltage          | V <sub>CC</sub> = min, I <sub>IN</sub> = -18 mA                    |                  | -1.5 | V    |
| V <sub>OH</sub>  | High Level Output Voltage    | V <sub>CC</sub> = min, I <sub>OH</sub> = -0.4 mA                   | 2.5              |      | V    |
|                  |                              | V <sub>CC</sub> = min, I <sub>OH</sub> = -3.0 mA                   | 2.4              |      |      |
|                  |                              | V <sub>CC</sub> = min, I <sub>OH</sub> = -15 mA                    | 2.0              |      |      |
| V <sub>OL</sub>  | Low Level Output Voltage     | V <sub>CC</sub> = min, I <sub>OL</sub> = 12 mA                     |                  | 0.4  | V    |
|                  |                              | V <sub>CC</sub> = min, I <sub>OL</sub> = 24 mA                     |                  | 0.5  |      |
| I <sub>OZH</sub> | Output Off Current HIGH      | V <sub>CC</sub> = max, V <sub>OUT</sub> = 2.7 V                    |                  | 20   | μA   |
| I <sub>OZL</sub> | Output Off Current LOW       | V <sub>CC</sub> = max, V <sub>OUT</sub> = 0.4 V                    |                  | -20  | μA   |
| I <sub>IH</sub>  | High Level Input Current     | V <sub>CC</sub> = max, V <sub>IN</sub> = 2.7 V                     |                  | 20   | μA   |
|                  |                              | V <sub>CC</sub> = max, V <sub>IN</sub> = 5.5 V                     |                  | 0.1  | mA   |
|                  |                              | V <sub>CC</sub> = max, V <sub>IN</sub> = 7.0 V<br>for Pin1, Pin 19 |                  | 0.1  |      |
| I <sub>IL</sub>  | Low Level Input Current      | V <sub>CC</sub> = max, V <sub>IN</sub> = 0.4 V                     |                  | -0.1 | mA   |
| I <sub>O</sub>   | Output Short Circuit Current | V <sub>CC</sub> = max, V <sub>O</sub> = 2.25 V                     | -30              | -112 | mA   |
| I <sub>CC</sub>  | Supply Current               | V <sub>CC</sub> = max  | Outputs High     | 45   | mA   |
|                  |                              |  | Outputs Low      | 55   |      |
|                  |                              |  | 3-State (High Z) | 58   |      |

**AC ELECTRICAL CHARACTERISTICS** over full operating conditions ( $V_{CC} = 5.0 \text{ V} \pm 10\%$ ,  $C_L = 50 \text{ pF}$ ,  $R_{L1} = R_{L2} = 500\Omega$ , Input  $t_r = t_f = 2.0 \text{ ns}$ )

| Symbol    | Parameter  | Min | Max | Unit |
|-----------|--|-----|-----|------|
| $t_{PLH}$ | Propagation Delay Time, Low-to-High Level Output (from A or B to Output) |     | 10  | ns   |
| $t_{PHL}$ | Propagation Delay Time, High-to-Low Level Output (from A or B to Output) |     | 10  | ns   |
| $t_{PZH}$ | Output Enable Time to High Level (from OE to Output)                     |     | 20  | ns   |
| $t_{PZL}$ | Output Enable Time to Low Level (from OE to Output)                      |     | 20  | ns   |
| $t_{PHZ}$ | Output Disable Time from High Level (from OE to Output)                  |     | 40  | ns   |
| $t_{PLZ}$ | Output Disable Time from Low Level (from OE to Output)                   |     | 35  | ns   |

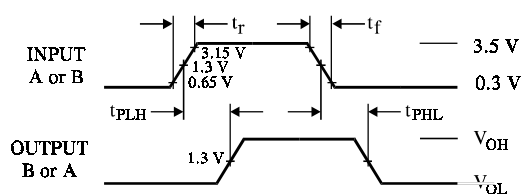
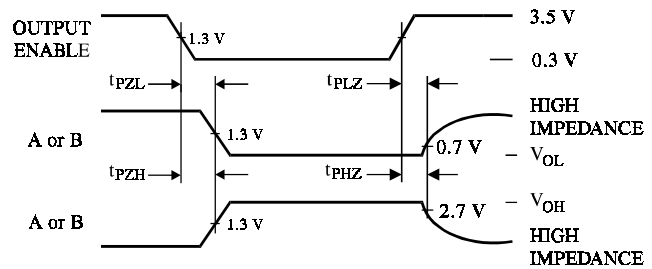
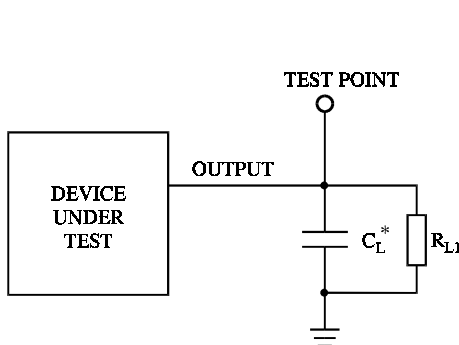


Figure 1. Switching Waveforms



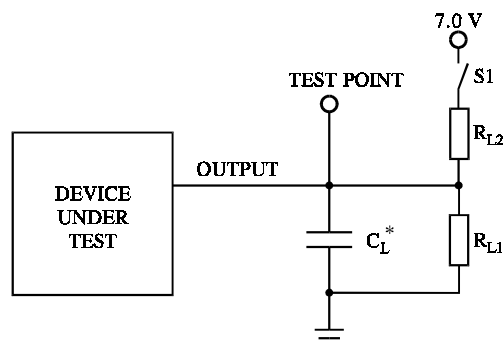
$t_{PZL}, t_{PLZ}$  - S1 closed  
 $t_{PZH}, t_{PHZ}$  - S1 opened

Figure 2. Switching Waveforms



\* Includes all probe and jig capacitance.

Figure 3. Test Circuit



\* Includes all probe and jig capacitance.

Figure 4. Test Circuit

EXPANDED LOGIC DIAGRAM

