

## DM74LS243 Quadruple Bus Transceiver

### General Description

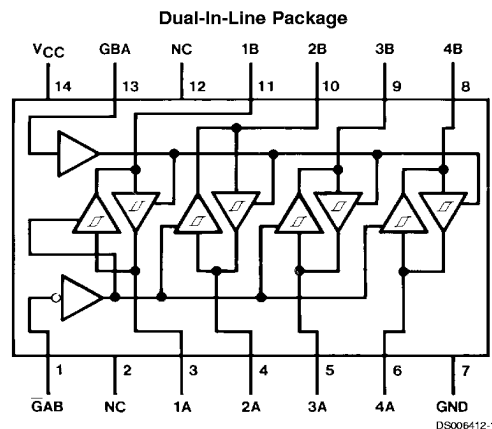
This four data line transceiver is designed for asynchronous two-way communications between data buses. It can be used to drive terminated lines down to 133Ω.

- PNP inputs reduce DC loading on bus line
- Hysteresis at data inputs improves noise margin

### Features

- Two-way asynchronous communication between data buses

### Connection Diagram



Order Number DM74LS243WM or DM74LS243N  
See Package Number M14B or N14A

### Function Table

| Control Inputs |     | Data Port Status |          |
|----------------|-----|------------------|----------|
| $\bar{G}AB$    | GBA | A                | B        |
| H              | H   | O                | I        |
| L              | H   | (Note 1)         | (Note 1) |
| H              | L   | ISOLATED         |          |
| L              | L   | I                | O        |

I = Input, O = Output.

H = High Logic Level, L = Low Logic Level.

**Note 1:** Possibly destructive oscillation may occur if the transceivers are enabled in both directions at once.

## Absolute Maximum Ratings (Note 2)

|                |    |                                      |                 |
|----------------|----|--------------------------------------|-----------------|
| Supply Voltage | 7V | A or B                               | 5.5V            |
| Input Voltage  | 7V | Operating Free Air Temperature Range | 0°C to +70°C    |
| Any G          | 7V | DM74LS                               | –65°C to +150°C |
|                |    | Storage Temperature Range            |                 |

## Recommended Operating Conditions

| Symbol          | Parameter                      | DM74LS243 |     |      | Units |
|-----------------|--------------------------------|-----------|-----|------|-------|
|                 |                                | Min       | Nom | Max  |       |
| V <sub>CC</sub> | Supply Voltage                 | 4.75      | 5   | 5.25 | V     |
| V <sub>IH</sub> | High Level Input Voltage       | 2         |     |      | 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>  | Free Air Operating Temperature | 0         |     | 70   | °C    |

**Note 2:** The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

## Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

| Symbol           | Parameter                                                             | Conditions                                                                                     | Min                   | Typ<br>(Note 3) | Max  | Units |
|------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|-----------------|------|-------|
| V <sub>I</sub>   | Input Clamp Voltage                                                   | V <sub>CC</sub> = Min, I <sub>I</sub> = –18 mA                                                 |                       |                 | –1.5 | V     |
| HYS              | Hysteresis (V <sub>T+</sub> – V <sub>T–</sub> )<br>(Data Inputs Only) | V <sub>CC</sub> = Min                                                                          | 0.2                   | 0.4             |      | V     |
| V <sub>OH</sub>  | High Level Output Voltage                                             | V <sub>CC</sub> = Min, V <sub>IH</sub> = Min<br>V <sub>IL</sub> = Max, I <sub>OH</sub> = –1 mA | 2.7                   |                 |      | V     |
|                  |                                                                       | V <sub>CC</sub> = Min, V <sub>IH</sub> = Min<br>V <sub>IL</sub> = Max, I <sub>OH</sub> = –3 mA | 2.4                   | 3.4             |      |       |
|                  |                                                                       | V <sub>CC</sub> = Min, V <sub>IH</sub> = Min<br>V <sub>IL</sub> = 0.5V, I <sub>OH</sub> = Max  | 2                     |                 |      |       |
|                  |                                                                       |                                                                                                |                       |                 |      |       |
| V <sub>OL</sub>  | Low Level Output Voltage                                              | V <sub>CC</sub> = Min<br>I <sub>OL</sub> = 12 mA                                               |                       |                 | 0.4  | V     |
|                  |                                                                       | V <sub>IL</sub> = Max<br>I <sub>OL</sub> = Max                                                 |                       |                 |      |       |
|                  |                                                                       | V <sub>IH</sub> = Min                                                                          |                       |                 | 0.5  |       |
| I <sub>OZH</sub> | Off-State Output Current,<br>High Level Voltage Applied               | V <sub>CC</sub> = Max<br>V <sub>IL</sub> = Max                                                 | V <sub>O</sub> = 2.7V |                 | 40   | μA    |
| I <sub>OZL</sub> | Off-State Output Current,<br>Low Level Voltage Applied                | V <sub>IH</sub> = Min                                                                          | V <sub>O</sub> = 0.4V |                 | –200 | μA    |
| I <sub>I</sub>   | Input Current at Maximum<br>Input Voltage                             | V <sub>CC</sub> = Max                                                                          | V <sub>I</sub> = 5.5V | A or B          | 0.1  | mA    |
|                  |                                                                       |                                                                                                | V <sub>I</sub> = 7V   | Any G           | 0.1  | mA    |
| I <sub>IH</sub>  | High Level Input Current                                              | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V                                                   |                       |                 | 20   | μA    |
| I <sub>IL</sub>  | Low Level Input Current                                               | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V                                                   |                       |                 | –0.2 | mA    |
| I <sub>OS</sub>  | Short Circuit Output Current                                          | V <sub>CC</sub> = Max (Note 4)                                                                 | –40                   |                 | –225 | mA    |
| I <sub>CC</sub>  | Supply Current                                                        | V <sub>CC</sub> = Max                                                                          | Outputs High          | 22              | 38   | mA    |
|                  |                                                                       | Outputs                                                                                        | Outputs Low           | 29              | 50   |       |
|                  |                                                                       | Open                                                                                           | Outputs Disabled      | 32              | 54   |       |

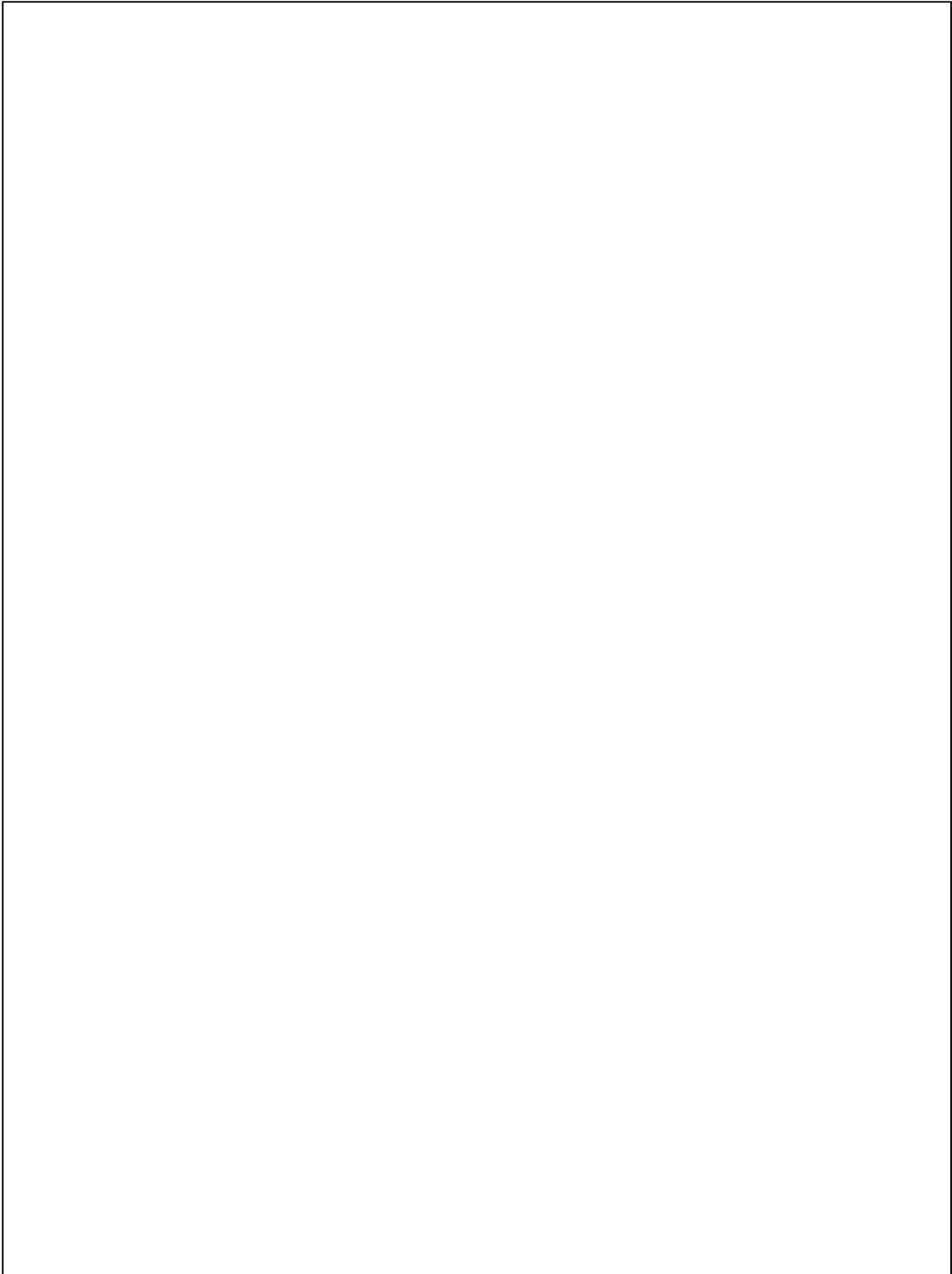
**Note 3:** All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

**Note 4:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

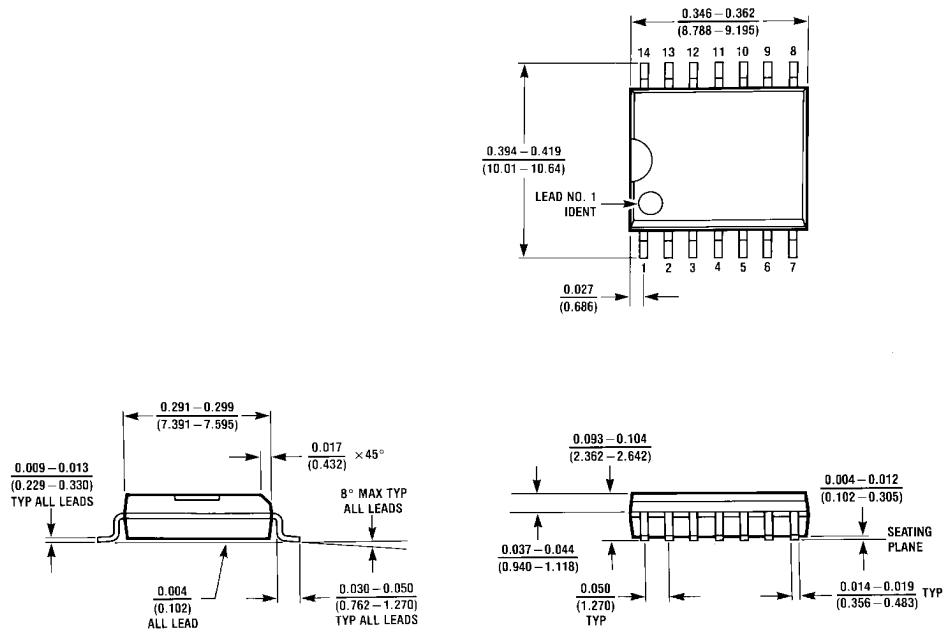
## Switching Characteristics

at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$  (for Test Waveforms and Output Load)

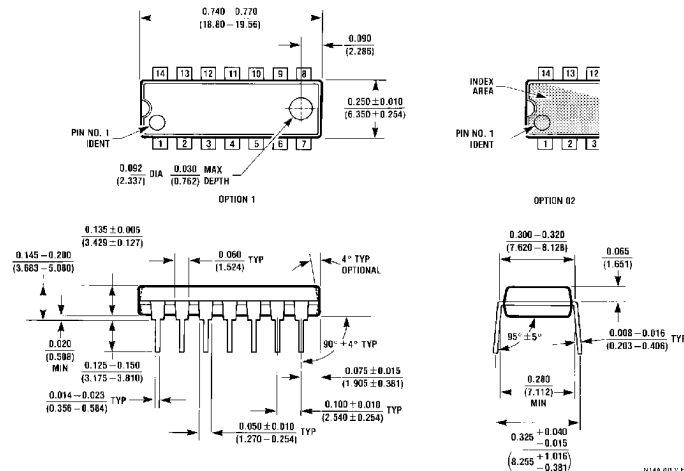
| Symbol    | Parameter                                          | Conditions                                  | Min | Max | Units |
|-----------|----------------------------------------------------|---------------------------------------------|-----|-----|-------|
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | $C_L = 45 \text{ pF}$<br>$R_L = 667\Omega$  |     | 18  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | $C_L = 45 \text{ pF}$<br>$R_L = 667\Omega$  |     | 18  | ns    |
| $t_{PZL}$ | Output Enable Time to<br>Low Level                 | $C_L = 45 \text{ pF}$<br>$R_L = 667\Omega$  |     | 30  | ns    |
| $t_{PZH}$ | Output Enable Time to<br>High Level                | $C_L = 45 \text{ pF}$<br>$R_L = 667\Omega$  |     | 23  | ns    |
| $t_{PLZ}$ | Output Disable Time<br>from Low Level              | $C_L = 5 \text{ pF}$<br>$R_L = 667\Omega$   |     | 25  | ns    |
| $t_{PHZ}$ | Output Disable Time<br>from High Level             | $C_L = 5 \text{ pF}$<br>$R_L = 667\Omega$   |     | 18  | ns    |
| $t_{PLH}$ | Propagation Delay Time<br>Low to High Level Output | $C_L = 150 \text{ pF}$<br>$R_L = 667\Omega$ |     | 21  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>High to Low Level Output | $C_L = 150 \text{ pF}$<br>$R_L = 667\Omega$ |     | 22  | ns    |
| $t_{PZL}$ | Output Enable Time to<br>Low Level                 | $C_L = 150 \text{ pF}$<br>$R_L = 667\Omega$ |     | 33  | ns    |
| $t_{PZH}$ | Output Enable Time to<br>High Level                | $C_L = 150 \text{ pF}$<br>$R_L = 667\Omega$ |     | 26  | ns    |



# Physical Dimensions inches (millimeters) unless otherwise noted



**14-Lead Wide Small Outline Package (M)**  
**Order Number DM74LS243WM**  
**Package Number M14B**



**14-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM74LS243N**  
**Package Number N14A**