



TRI-STATE® Hex Buffers

General Description

These devices provide six, two-input buffers in each package. Both the standard (7400 compatible) TTL technology, and the "true tenth-power" (74L compatible) low power versions are available for each of the four types. One of the two inputs to each buffer is used as a control line to gate the output into the high-impedance state, while the other input passes the data through the buffer. The 95 and 97 present the true data at the outputs, while the 96 and 98 are inverting. On the 95 and 96 versions, all six control lines for TRI-STATE enable are common in a single line. On the 97 and 98 versions, four buffers are enabled from a common line, and the other two buffers from a separate common line. In all cases, the outputs are placed in the TRI-STATE condition by applying a high logic level to the control pins. With either the standard TTL or the low power versions of

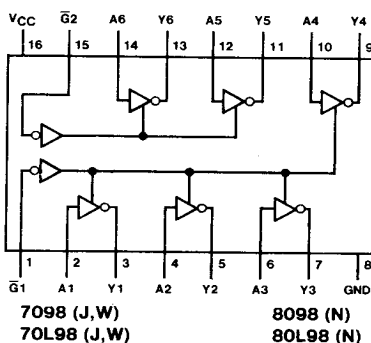
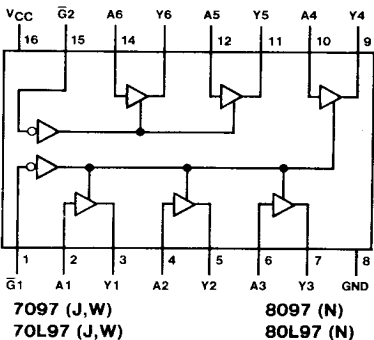
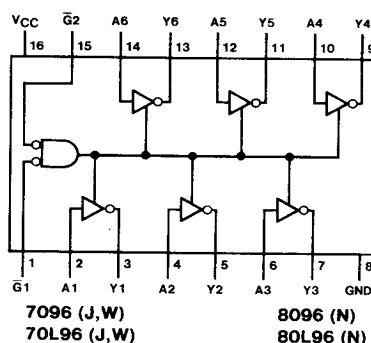
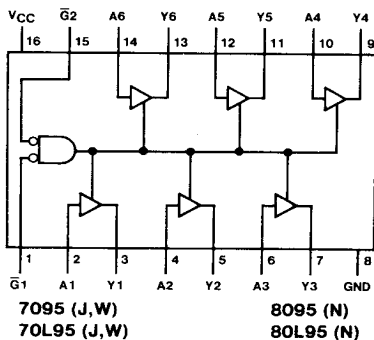
these circuits, it is possible to connect over 100 like devices to a common bus line and still have adequate drive capability.

Features

| Type | Typical Power Dissipation | Typical Propagation Delay |
|----------|---------------------------|---------------------------|
| 95, 97 | 325 mW | 12 ns |
| L95, L97 | 20 mW | 34 ns |
| 96, 98 | 295 mW | 11 ns |
| L96, L98 | 15 mW | 31 ns |

■ Pin equivalent to DM54365 (95), DM54366 (96), DM54367 (97), DM54368 (98)

Connection Diagrams



Truth Table (Each Driver)

95, L95

96, L96

97, L97

98, L98

| Inputs | | Outputs | |
|--------|----|---------|------|
| G1 | G2 | A | Y |
| H | X | X | Hi-Z |
| X | H | X | Hi-Z |
| L | L | H | H |
| L | L | L | L |

| Inputs | | Outputs | |
|--------|----|---------|------|
| G1 | G2 | A | Y |
| H | X | X | Hi-Z |
| X | H | X | Hi-Z |
| L | L | H | L |
| L | L | L | H |

| Inputs | | Outputs |
|--------|---|---------|
| G | A | Y |
| H | X | Hi-Z |
| L | H | H |
| L | L | L |

| Inputs | | Outputs |
|--------|---|---------|
| G | A | Y |
| H | X | Hi-Z |
| L | H | L |
| L | L | H |

**Electrical Characteristics** over recommended operating free-air temperature range (unless otherwise noted)

| Parameter | | Conditions | | DM70/80 | | | DM70/80 | | | Units | | |
|------------------------|---|--|------------------------|--------------------------------|------------------------|------|--------------------|---------|------|-------|-------|----|
| | | | | 95, 96, 97, 98 | | | L95, L96, L97, L98 | | | | | |
| | | | | Min | Typ (1) | Max | Min | Typ (1) | Max | | | |
| V _{IH} | High Level Input Voltage | | | | | | 2 | | | V | | |
| V _{IL} | Low Level Input Voltage | | | | | 0.8 | | | 0.7 | V | | |
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = -12 mA | | | | | -1.5 | | N/A | V | | |
| I _{OH} | High Level Output Current | | DM70 | | | | -2.0 | | -1.0 | mA | | |
| | | | DM80 | | | | -5.2 | | -1.0 | | | |
| V _{OH} | High Level Output Voltage | V _{CC} = Min, V _{IH} = 2 V V _{IL} = Max, I _{OH} = Max | | 2.4 | 3.1 | | 2.4 | | | V | | |
| I _{OL} | Low Level Output Current | | DM70 | | | | 32 | | 2.0 | mA | | |
| | | | DM80 | | | | 32 | | 3.6 | | | |
| V _{OL} | Low Level Output Voltage | V _{CC} = Min, V _{IH} = 2 V V _{IL} = Max, I _{OL} = Max | | | | | 0.4 | | 0.3 | V | | |
| | | | DM80 | | | | 0.4 | | 0.4 | | | |
| I _{O(OFF)} | Off-State (High-Impedance State) Output Current | V _{CC} = Max V _{IH} = 2 V V _{IL} = Max | V _O = 0.3 V | | | | | | | -10 | μA | |
| | | | V _O = 0.4 V | | | | | -40 | | | | |
| | | | V _O = 2.4 V | | | | | 40 | | 10 | | |
| I _I | Input Current at Maximum Input Voltage | V _{CC} = Max, V _I = 5.5 V | | | | | 1 | | 1 | mA | | |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _I = 2.4 V | | | | | 40 | | 10 | μA | | |
| I _{IL} | Level Input Current | A Input | V _{CC} = Max | Both \bar{G} Inputs at 2 V | V _I = 0.3 V | | | | | -10 | μA | |
| | | | | | V _I = 0.5 V | | | | -40 | | | |
| | | | | | V _I = 0.3 V | | | | | -0.18 | | |
| | | \bar{G} Input | | Both \bar{G} Inputs at 0.4 V | V _I = 0.3 V | | | | | | -0.18 | mA |
| | | | | | V _I = 0.4 V | | | | -1.6 | | | |
| | | | | | V _I = 0.3 V | | | | | -0.18 | | |
| V _I = 0.4 V | | | | -1.6 | | | | | | | | |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max (2) | | -40 | | -115 | -3 | | -15 | mA | | |
| I _{CC} | Supply Current | V _{CC} = Max | | 95, 97 | | 65 | 85 | | 4.0 | 5.8 | mA | |
| | | | | 96, 98 | | 59 | 77 | | 3.0 | 4.5 | | |

Note 1: All typical values are at V_{CC} = 5 V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time, and for the DM70/DM8095, 96, 97, 98 duration of short circuit should not exceed one second.

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Switching Characteristics V_{CC} = 5 V, T_A = 25°C

| Parameter | | Conditions | | | DM70/80 | | | | DM70/80 | | | | Units | |
|------------------|--|------------------------|------|------------------------|-----------------------|-----|--------|-----|----------|-----|----------|-----|-------|----|
| | | | | | 95, 97 | | 96, 98 | | L95, L97 | | L96, L98 | | | |
| | | Both | Std. | Low Power | Typ | Max | Typ | Max | Typ | Max | Typ | Max | | |
| t _{PLH} | Propagation Delay Time, Low-to-High Level Output | C _L = 50 pF | | R _L = 400 Ω | R _L = 4 kΩ | 10 | 16 | 11 | 17 | 30 | 60 | 26 | 48 | ns |
| t _{PHL} | Propagation Delay Time, High-to-Low Level Output | | | | | 14 | 22 | 10 | 16 | 37 | 75 | 35 | 53 | ns |
| t _{ZH} | Output Enable Time to High Level | | | | | 21 | 35 | 21 | 35 | 47 | 96 | 42 | 90 | ns |
| t _{ZL} | Output Enable Time to Low Level | | | | | 24 | 37 | 24 | 37 | 21 | 45 | 42 | 75 | ns |
| t _{HZ} | Output Disable Time from High Level | C _L = 5 pF | | | | 6 | 11 | 6 | 11 | 47 | 90 | 25 | 43 | ns |
| t _{LZ} | Output Disable Time from Low Level | | | | | 16 | 27 | 16 | 27 | 30 | 63 | 34 | 63 | ns |

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