

DS7834/DS8834 Quad TRI-STATE® Bus Transceivers

General Description

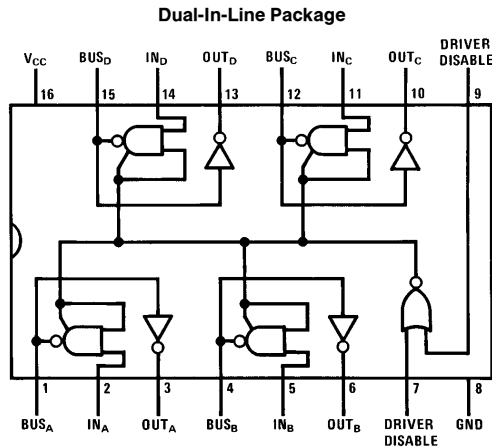
This family of TRI-STATE bus transceivers offers extreme versatility in bus organized data transmission systems. The data bus may be unterminated, or terminated DC or AC, at one or both ends. Drivers in the third (high impedance) state load the data bus with a negligible leakage current. The receiver input current is low, allowing at least 100 driver/receiver pairs to utilize a single bus. The bus loading is unchanged when $V_{CC} = 0V$. The receiver incorporates hysteresis to provide greater noise immunity. Both devices utilize a high current TRI-STATE output driver. The DS7834/DS8834 employs TTL outputs on the receiver.

The DS7834/DS8834 are inverting quad transceivers with two common inverter driver disable controls.

Features

- Receiver hysteresis 400 mV typ
- Receiver noise immunity 1.4V typ
- Bus terminal current for normal V_{CC} or $V_{CC} = 0V$ 80 μA max
- Receivers
 - Sink 16 mA at 0.4V max
 - Source 2.0 mA (Mil) at 2.4V min
 - 5.2 mA (Com) at 2.4V min
- Drivers
 - Sink 50 mA at 0.5V max
 - Source 32 mA at 0.4V max
 - 10.4 mA (Com) at 2.4V min
 - 5.2 mA (Mil) at 2.4V min
- Drivers have TRI-STATE outputs
- Receivers have TRI-STATE outputs
- Capable of driving 100 Ω DC-terminated Buses
- Compatible with Series 54/74

Connection Diagram



TL/F/5809-1

Top View

Order Number DS7834J, or DS8834N
See NS Package Number J16A or N16A

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Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

| | |
|------------------------------------|---------|
| Supply Voltage | 7.0V |
| Input Voltage | 5.5V |
| Output Voltage | 5.5V |
| Maximum Power Dissipation* at 25°C | |
| Cavity Package | 1509 mW |
| Molded Package | 1476 mW |

*Derate cavity package 10.1 mW/°C above 25°C; derate molded package 11.8 mW/°C above 25°C.

| | |
|---|-----------------|
| Storage Temperature | -65°C to +150°C |
| Lead Temperature (Soldering, 4 seconds) | 260°C |

Operating Conditions

| | Min | Max | Units |
|-----------------------------------|------|------|-------|
| Supply Voltage (V _{CC}) | | | |
| DS7834 | 4.5 | 5.5 | V |
| DS8834 | 4.75 | 5.25 | V |
| Temperature (T _A) | | | |
| DS7834 | -55 | +125 | °C |
| DS8834 | 0 | +70 | °C |

Electrical Characteristics (Notes 2 and 3)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units | |
|----------------------------------|--------------------------------------|---|---|--------|------|-------|----|
| DISABLE/DRIVER INPUT | | | | | | | |
| V _{IH} | High Level Input Voltage | V _{CC} = Min | 2.0 | | | V | |
| V _{IL} | Low Level Input Voltage | V _{CC} = Min | | | 0.8 | V | |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _{IN} = 2.4V | | | 40 | μA | |
| | | | V _{IN} = 5.5V | | | 1.0 | mA |
| I _{IL} | Low Level Input Current | V _{CC} = Max, V _{IN} = 0.4V | | -1.0 | -1.6 | mA | |
| I _{IND} | Driver Disabled Input Low Current | Driver Disable Input = 2.0V, V _{IN} = 0.4V | | | -40 | μA | |
| V _{CL} | Input Clamp Diode | V _{CC} = 5.0V, I _{IN} = -12 mA, T _A = 25°C | | -0.8 | -1.5 | V | |
| RECEIVER INPUT/BUS OUTPUT | | | | | | | |
| V _{TH} | High Level Threshold Voltage | V _{CC} = Max | DS7834 | 1.4 | 1.75 | 2.1 | V |
| | | | DS8834 | 1.5 | 1.75 | 2.0 | V |
| V _{TL} | Low Level Threshold Voltage | V _{CC} = Min | DS7834 | 0.8 | 1.35 | 1.6 | V |
| | | | DS8834 | 0.8 | 1.35 | 1.5 | V |
| I _{BH} | Bus Current, Output Disabled or High | V _{BUS} = 4.0V | V _{CC} = Max, Disable Input = 2.0V | | 25 | 80 | μA |
| | | | V _{CC} = 0V | | 5.0 | 80 | μA |
| | | V _{CC} = Max, V _{SUS} = 0.4V, Disable Input = 2.0V | | | | -40 | μA |
| V _{OH} | Logic "1" Output Voltage | V _{CC} = Min | I _{OUT} = -5.2 mA | DS7834 | 2.4 | 2.75 | V |
| | | | I _{OUT} = -10.4 mA | DS7834 | 2.4 | 2.75 | V |
| V _{OL} | Logic "0" Output Voltage | V _{CC} = Min | I _{OUT} = 50 mA | | 0.28 | 0.5 | V |
| | | | I _{OUT} = 32 mA | | | 0.4 | V |
| I _{OS} | Output Short Circuit Current | V _{CC} = Max, (Note 4) | -40 | -62 | -120 | mA | |
| RECEIVER OUTPUT | | | | | | | |
| V _{OH} | Logic "1" Output Voltage | V _{CC} = Min | I _{OUT} = -2.0 mA | DS7834 | 2.4 | 3.0 | V |
| | | | I _{OUT} = -5.2 mA | DS8834 | 2.4 | 2.9 | V |
| V _{OL} | Logic "0" Output Voltage | V _{CC} = Min, I _{OUT} = 16 mA | | 0.22 | 0.4 | V | |
| I _{OS} | Output Short Circuit Current | V _{CC} = Max, (Note 4) | DS7834 | -28 | -40 | -70 | mA |
| | | | DS8834 | -30 | | -70 | mA |
| I _{CC} | Supply Current | V _{CC} = Max | | 75 | 95 | mA | |

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Unless otherwise specified, min/max limits apply across the -55°C to +125°C temperature range for the DS7834 and across the 0°C to +70°C range for the DS8834. All typicals are given for V_{CC} = 5.0V and T_A = 25°C.

Note 3: All currents into device pins shown as positive, out of device pins as negative, all voltages referenced to ground unless otherwise noted. All values shown as max or min on absolute value basis.

Note 4: Only one output at a time should be shorted.

Switching Characteristics $V_{CC} = 5.0V, T_A = 25^\circ C$

| Symbol | Parameter | Conditions | | Min | Typ | Max | Units |
|-----------|---|---|---------------|-----|-----|-----|-------|
| t_{pd0} | Propagation Delay to a Logic "0" from Input to Bus | (Figure 1) | DS7834/DS8834 | | 10 | 20 | ns |
| t_{pd1} | Propagation Delay to a Logic "1" from Input to Bus | (Figure 1) | DS7834/DS8834 | | 11 | 30 | ns |
| t_{pd0} | Propagation Delay to a Logic "0" from Bus to Output | (Figure 2) | DS7834/DS8834 | | 16 | 35 | ns |
| t_{pd1} | Propagation Delay to a Logic "1" from Bus to Output | (Figure 2) | DS7834/DS8834 | | 18 | 30 | ns |
| t_{PHZ} | Delay from Disable Input to High Impedance State (from Logic "1" Level) | $C_L = 5.0$ pF, (Figures 1 and 2) Driver Only | | | 8 | 20 | ns |
| t_{PLZ} | Delay from Disable Input to High Impedance State (from Logic "0" Level) | $C_L = 5.0$ pF, (Figures 1 and 2) Driver Only | | | 20 | 35 | ns |
| t_{PZH} | Delay from Disable Input to Logic "1" Level (from High Impedance State) | $C_L = 50$ pF, (Figures 1 and 2) Driver Only | | | 24 | 40 | ns |
| t_{PZL} | Delay from Disable Input to Logic "0" Level (from High Impedance State) | $C_L = 50$ pF, (Figures 1 and 2) Driver Only | | | 19 | 35 | ns |

AC Test Circuit

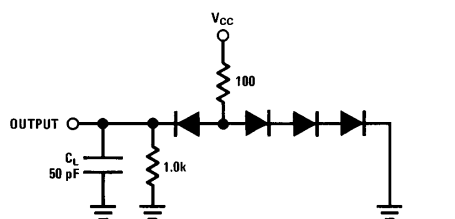


FIGURE 1. Driver Output Load

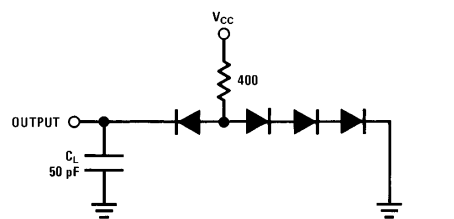
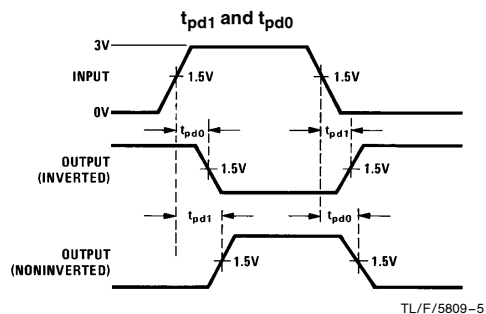
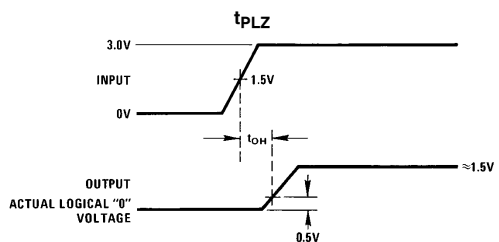


FIGURE 2. Receiver Output Load

Switching Time Waveforms

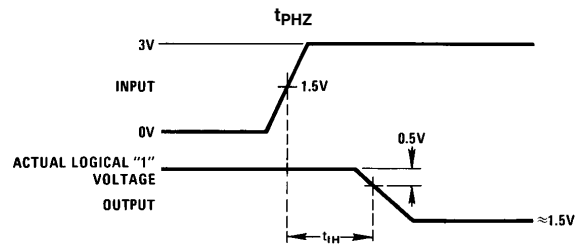


$f = 1$ MHz
 $t_r = t_f \leq 10$ ns (10% to 90%)
 Duty Cycle = 50%

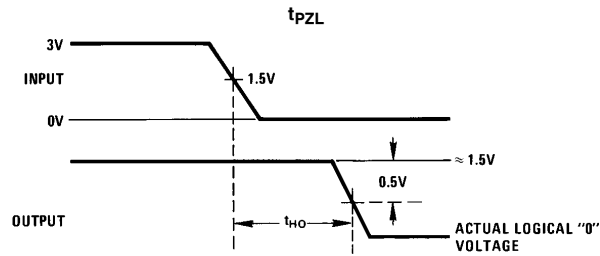


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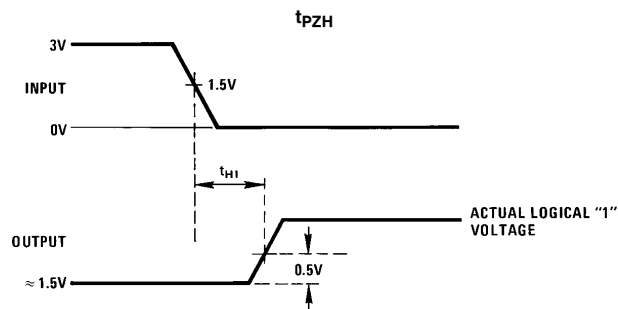
Switching Time Waveforms (Continued)



TL/F/5809-7



TL/F/5809-8



TL/F/5809-9

Truth Table

| Disable Input | Driver Input (IN_x) | Receiver Input/ Bus Output (BUS_x) | Receiver Output (OUT_x) | Mode of Operation |
|----------------------|-------------------------|--|-----------------------------|--------------------|
| DS7834/DS8834 | | | | |
| 1 | X | | \overline{BUS} | Receive Bus Signal |
| 0 | 1 | 0 | 1 | Drive Bus |
| 0 | 0 | 1 | 0 | Drive Bus |

X = Don't care

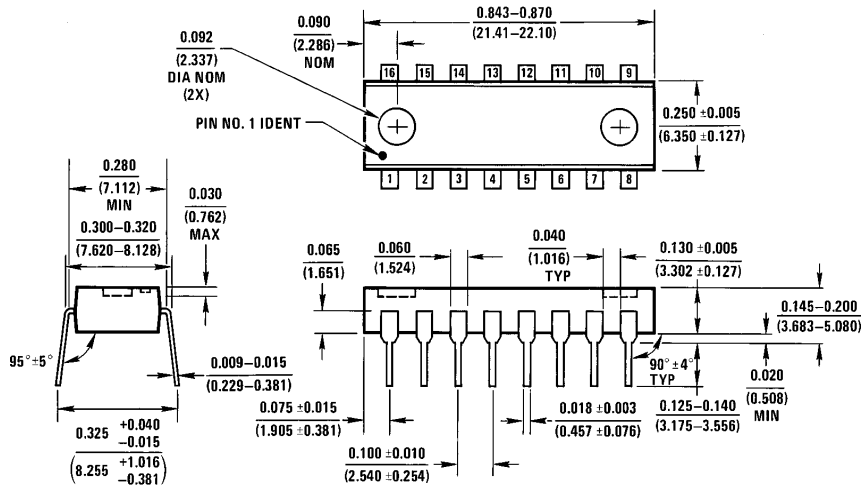
Physical Dimensions inches (millimeters)



Ceramic Dual-In-Line Package (J)
Order Number DS7834J
NS Package Number J16A

J16A (REV L)

Physical Dimensions inches (millimeters) (Continued)



Molded Dual-In-Line Package (N)
Order Number DS8834N
NS Package Number N16A

N16A (REV E)

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