

93L22 Quad 2-Input Multiplexer

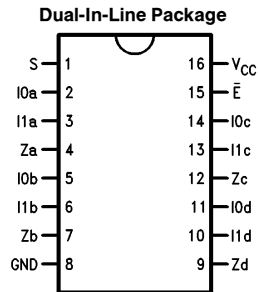
General Description

The 93L22 quad 2-input digital multiplexers consist of four multiplexing circuits with common select and enable logic; each circuit contains two inputs and one output.

Features

- Multifunction capability
- On-chip select logic decoding
- Fully buffered outputs

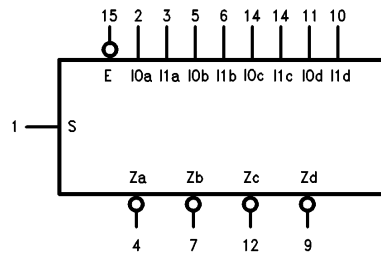
Connection Diagram



TL/F/10198-1

Order Number 93L22DMQB or 93L22FMQB
See NS Package Number J16A or W16A

Logic Symbol



TL/F/10198-2

V_{CC} = Pin 16
GND = Pin 8

Truth Table

| Pin Names | Description |
|------------------------|---------------------------|
| S | Common Select Input |
| \bar{E} | Enable Input (Active LOW) |
| I0a–I0d } I1a–I1d } | Multiplexer Inputs |
| Za–Zd | Multiplexer Outputs |

| Inputs | | | | Output |
|-----------|---|-----|-----|--------|
| \bar{E} | S | I0n | I1n | Zn |
| H | X | X | X | L |
| L | H | X | L | L |
| L | H | X | H | H |
| L | L | L | X | L |
| L | L | H | X | H |

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial

Absolute Maximum Ratings (Note)

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

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| Operating Free Air Temperature Range | |
| MIL | –55°C to +125°C |
| Storage Temperature Range | –65°C to +150°C |

Note: 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.

Recommended Operating Conditions

| Symbol | Parameter | 93L22 (MIL) | | | Units |
|-----------------|--------------------------------|-------------|-----|------|-------|
| | | Min | Nom | Max | |
| V _{CC} | Supply Voltage | 4.5 | 5 | 5.5 | V |
| V _{IH} | High Level Input Voltage | 2 | | | V |
| V _{IL} | Low Level Input Voltage | | | 0.7 | V |
| I _{OH} | High Level Output Current | | | –400 | μA |
| I _{OL} | Low Level Output Current | | | 4.8 | mA |
| T _A | Free Air Operating Temperature | –55 | | 125 | °C |

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

| Symbol | Parameter | Conditions | Min | Typ (Note 1) | Max | Units |
|-----------------|-----------------------------------|--|------|--------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = –10 mA | | | –1.5 | V |
| V _{OH} | High Level Output Voltage | V _{CC} = Min, I _{OH} = Max, V _{IL} = Max, V _{IH} = Min | 2.4 | | | V |
| V _{OL} | Low Level Output Voltage | V _{CC} = Min, I _{OL} = Max, V _{IH} = Min, V _{IL} = Max | | | 0.3 | V |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 5.5V | | | 1 | mA |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _I = 2.4V | | | 20 | μA |
| I _{IL} | Low Level Input Current | V _{CC} = Max, V _I = 0.3V | | | –400 | μA |
| I _{OS} | Short Circuit Output Current | V _{CC} = Max, (Note 2) | –2.5 | | –25 | mA |
| I _{CC} | Supply Current | V _{CC} = Max | | | 13.2 | mA |

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

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics

$V_{CC} = +5.0V$, $T_A = +25^\circ C$ (See Section 1 for test waveforms and output load)

| Symbol | Parameter | $C_L = 15 \text{ pF}$ | | Units |
|--------------|--------------------------------------|-----------------------|----------|-------|
| | | Min | Max | |
| tPLH tPHL | Propagation Delay S to Zn | | 36 49 | ns |
| tPLH tPHL | Propagation Delay I0 or I1 to Zn | | 30 22 | ns |
| tPLH tPHL | Propagation Delay \bar{E} to Zn | | 27 27 | ns |

Functional Description

The 93L22 quad 2-input multiplexer provides the ability to select four bits of either data or control from two sources, in one package. The Enable input (\bar{E}) is active LOW. When not activated all outputs (Z_n) are LOW regardless of all other inputs.

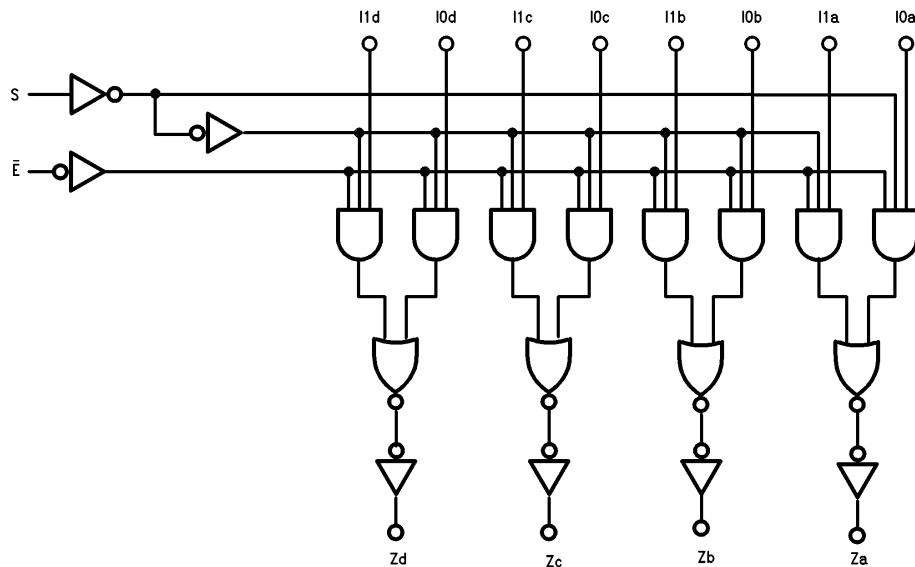
The 93L22 quad 2-input multiplexer is the logical implementation of a four-pole, two position switch, with the position of the switch being set by the logic levels supplied to the one select input. The logic equations for the outputs are shown below:

$$Z_a = E \cdot (I_{1a} \cdot S + I_{0a} \cdot \bar{S}) \quad Z_b = E \cdot (I_{1b} \cdot S + I_{0b} \cdot \bar{S})$$

$$Z_c = E \cdot (I_{1c} \cdot S + I_{0c} \cdot \bar{S}) \quad Z_d = E \cdot (I_{1d} \cdot S + I_{0d} \cdot \bar{S})$$

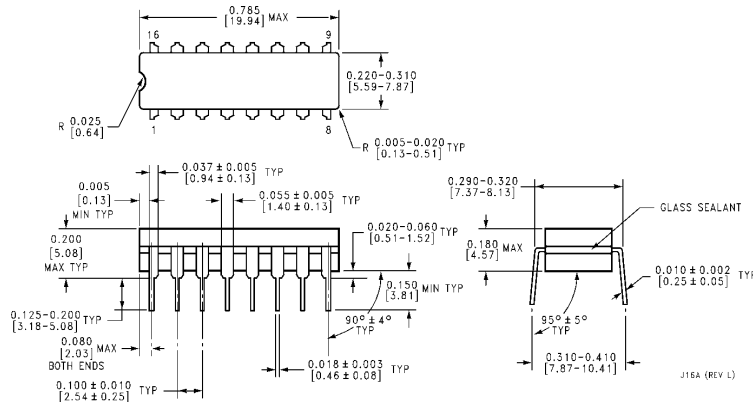
A common use of the 93L22 is the moving of data from a group of registers to four common output busses. The particular register from which the data comes is determined by the state of the select input. A less obvious use is as a function generator. The 93L22 can generate four functions of two variables with one variable common. This is useful for implementing random gating functions.

Logic Diagram

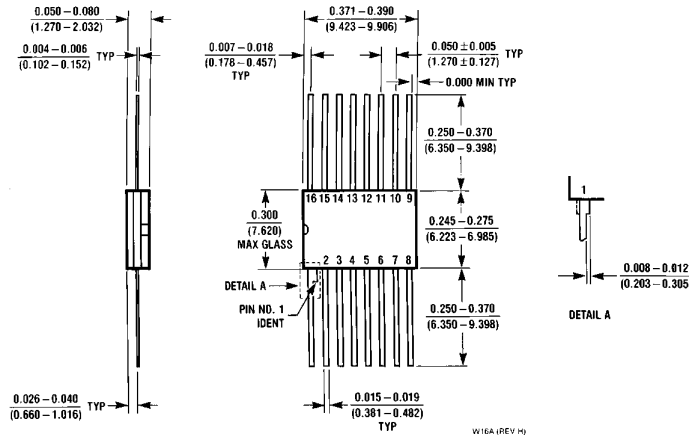


TL/F/10198-3

Physical Dimensions inches (millimeters)



16-Lead Ceramic Dual-In-Line Package (J)
Order Number 93L22DMQB
NS Package Number J16A



16-Lead Ceramic Flat Package (W)
Order Number 93L22FMQB
NS Package Number W16A

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This file is the datasheet for the following electronic components:

93L22 - <http://www.ti.com/product/93L22?HQS=TI-null-null-dscatalog-df-pf-null-ww>



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