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**PART NUMBER****93L22DMB-ROCV**

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**Rochester Electronics  
Manufactured Components**

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

**Quality Overview**

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
  - Class Q Military
  - Class V Space Level

**Qualified Suppliers List of Distributors (QSLD)**

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

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*The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.*

## 93L22 Quad 2-Input Multiplexer

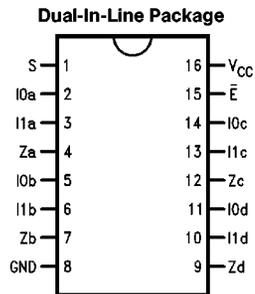
### General Description

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

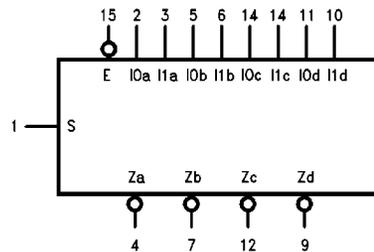
### Connection Diagram



TL/F/10198-1

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

### Logic Symbol



V<sub>CC</sub> = Pin 16  
GND = Pin 8

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### 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

$\bar{E}$	Inputs			Output
	S	I0n	I1n	
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 <sub>CC</sub>	Supply Voltage	4.5	5	5.5	V
V <sub>IH</sub>	High Level Input Voltage	2			V
V <sub>IL</sub>	Low Level Input Voltage			0.7	V
I <sub>OH</sub>	High Level Output Current			−400	μA
I <sub>OL</sub>	Low Level Output Current			4.8	mA
T <sub>A</sub>	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 <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = −10 mA			−1.5	V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max, V <sub>IH</sub> = Min	2.4			V
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max, V <sub>IH</sub> = Min, V <sub>IL</sub> = Max			0.3	V
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V			1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.3V			−400	μA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max, (Note 2)	−2.5		−25	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max			13.2	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 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.

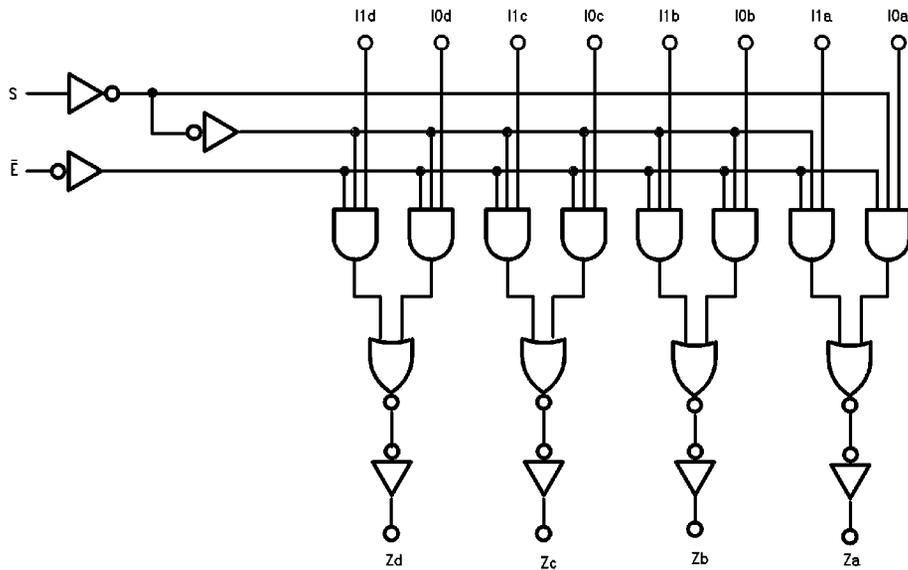
The 93L22 quad 2-input multiplexer is the logical implementation of a four-pole, two position switch, with the position of the switch being set by the logic levels supplied to the one select input. The logic equations for the outputs are shown below:

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

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

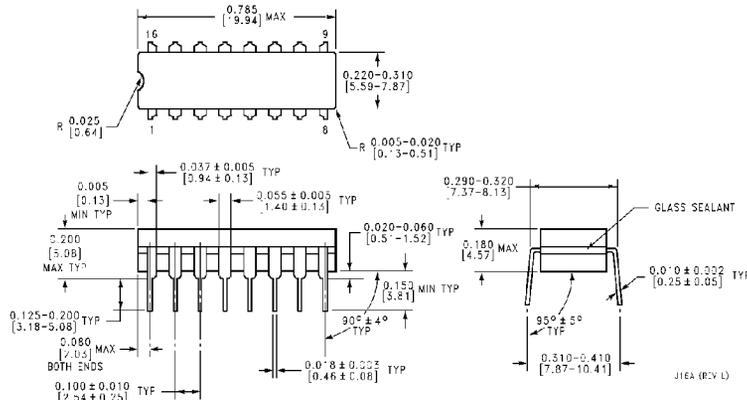
A common use of the 93L22 is the moving of data from a group of registers to four common output busses. The particular register from which the data comes is determined by the state of the select input. A less obvious use is as a function generator. The 93L22 can generate four functions of two variables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

## Logic Diagram

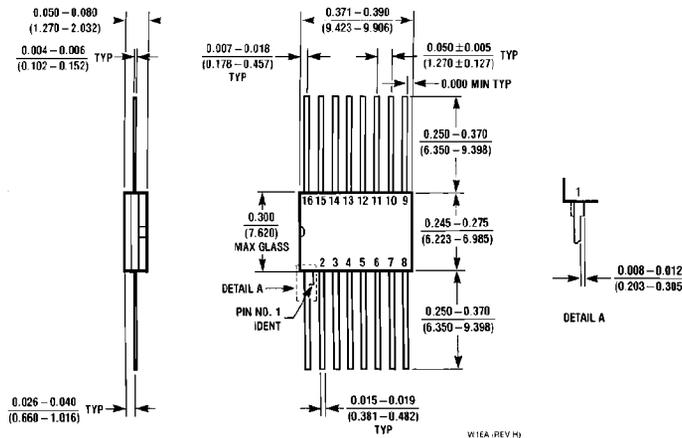


TL/F/10198-3

**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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