Rochester Electronics

Datasheet

PART NUMBER

93L12FM-ROCV

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.

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.

National Semiconductor

93L12
8-Input Multiplexer

General Description

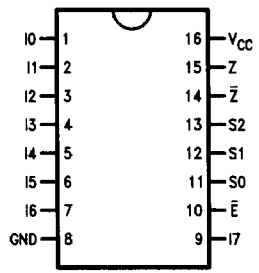
The 93L12 is a monolithic, high speed, 8-input digital multiplexer circuit. It provides, in one package, the ability to select one bit of data from up to eight sources. The 93L12 can be used as a universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

Features

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

Connection Diagram

Dual-In-Line Package



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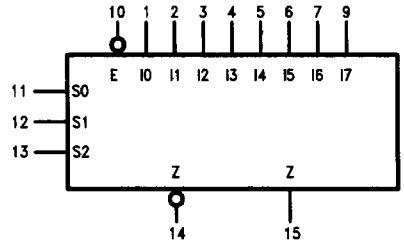
Order Number 93L12DMQB or 93L12FMQB
See NS Package Number J16A or W16A

Logic Symbol



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V_{CC} = Pin 16
GND = Pin 8

Pin Names	Description
S0–S2	Select Inputs
$\overline{E}$	Enable Input (Active LOW)
I0–I7	Multiplexer Inputs
Z	Multiplexer Output
$\overline{Z}$	Complementary Multiplexer Output

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	93L12 (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	3.4		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 (Note 3)			13.3	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.

Note 3: I_{CC} is measured with all outputs open and all inputs grounded.

Switching Characteristics

V_{CC} = +5.0V, T_A = +25°C (See Section 1 for waveforms and load configurations)

Symbol	Parameter	C_L = 15 pF		Units
		Min	Max	
t_{PLH} t_{PHL}	Propagation Delay S0 to Z		60 75	ns
t_{PLH} t_{PHL}	Propagation Delay S0 to $\overline{Z}$		70 50	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to Z		60 75	ns
t_{PLH} t_{PHL}	Propagation Delay $\overline{E}$ to $\overline{Z}$		70 45	ns
t_{PLH} t_{PHL}	Propagation Delay In to Z		70 65	ns
t_{PLH} t_{PHL}	Propagation Delay In to $\overline{Z}$		55 55	ns

Functional Description

The 93L12 is a logical implementation of a single pole, eight position switch with the switch position controlled by the state of three Select inputs, S0, S1, S2. Both assertion and negation outputs are provided. The Enable input (E) is active LOW. When it is not activated the negation output is HIGH and the assertion output is LOW, regardless of all other inputs. The logic function provided at the output is:

$$Z = E \bullet (I0 \bullet \overline{S0} \bullet \overline{S1} \bullet \overline{S2} + I1 \bullet S0 \bullet \overline{S1} \bullet \overline{S2} + I2 \bullet \overline{S0} \bullet S1 \bullet \overline{S2} + I3 \bullet S0 \bullet S1 \bullet \overline{S2} + I4 \bullet \overline{S0} \bullet \overline{S1} \bullet S2 + I5 \bullet S0 \bullet \overline{S1} \bullet S2 + I6 \bullet \overline{S0} \bullet S1 \bullet S2 + I7 \bullet S0 \bullet S1 \bullet S2).$$

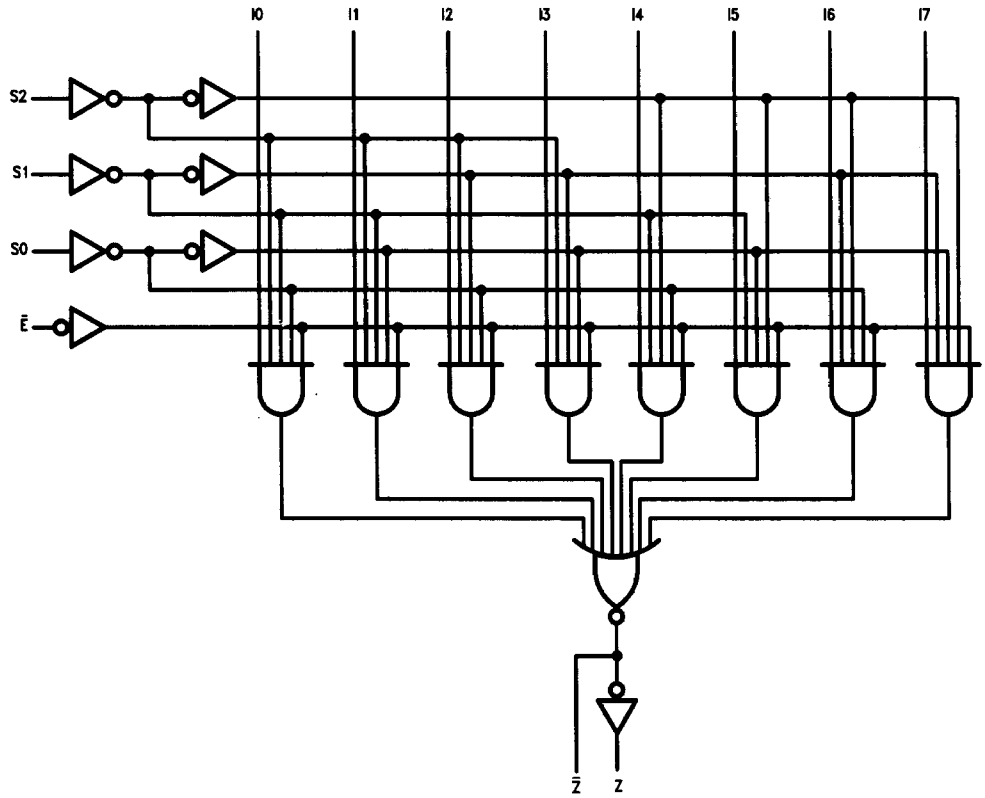
The 93L12 provides the ability, in one package, to select from eight sources of data or control information. By proper manipulation of the inputs, the 93L12 can provide any logic function of four variables and its negation. Thus any number of random logic elements used to generate unusual truth tables can be replaced by one 93L12.

Truth Table

Inputs												Outputs	
$\overline{E}$	S2	S1	S0	I0	I1	I2	I3	I4	I5	I6	I7	$\overline{Z}$	Z
H	X	X	X	X	X	X	X	X	X	X	X	H	L
L	L	L	L	L	X	X	X	X	X	X	X	H	L
L	L	L	L	H	X	X	X	X	X	X	X	L	H
L	L	L	H	X	L	X	X	X	X	X	X	H	L
L	L	L	H	X	H	X	X	X	X	X	X	L	H
L	L	H	L	X	X	L	X	X	X	X	X	H	L
L	L	H	L	X	X	H	X	X	X	X	X	L	H
L	L	H	H	X	X	X	L	X	X	X	X	H	L
L	L	H	H	X	X	X	H	X	X	X	X	L	H
L	H	L	L	X	X	X	X	L	X	X	X	H	L
L	H	L	L	X	X	X	X	H	X	X	X	L	H
L	H	L	H	X	X	X	X	X	L	X	X	H	L
L	H	L	H	X	X	X	X	X	H	X	X	L	H
L	H	H	L	X	X	X	X	X	X	L	X	H	L
L	H	H	L	X	X	X	X	X	X	H	X	L	H
L	H	H	H	X	X	X	X	X	X	X	L	H	L
L	H	H	H	X	X	X	X	X	X	X	H	L	H

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

Logic Diagram



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