Rochester Electronics

Datasheet

PART NUMBER

54F157BFA-ROC

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.

MOTOROLA

MC54F157
MC74F157

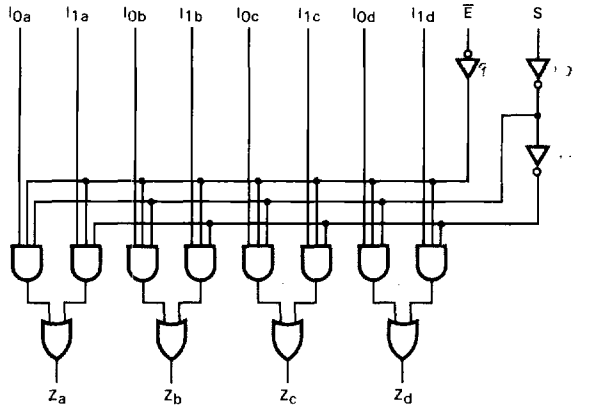
QUAD 2-INPUT MULTIPLEXER

DESCRIPTION — The MC54F/74F157 is a high-speed quad 2-input multiplexer. Four bits of data from two sources can be selected using the common Select and Enable inputs. The four buffered outputs present the selected data in the true (non-inverted) form. The 'F157 can also be used to generate any four of the 16 different functions to two variables.

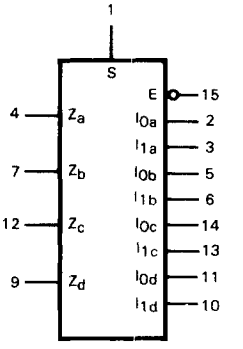
QUAD 2-INPUT MULTIPLEXER

FAST™ SCHOTTKY TTL

LOGIC DIAGRAM



LOGIC SYMBOL



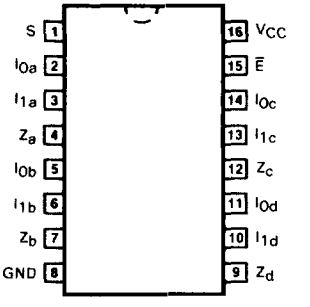
VCC = Pin 16
GND = Pin 8

TRUTH TABLE

INPUTS				OUTPUT
$\overline{E}$	S	I_0	I_1	Z
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

CONNECTION DIAGRAM



J Suffix — Case 620-08
(Ceramic)
N Suffix — Case 648-05
(Plastic)

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GUARANTEED OPERATING RANGES

SYMBOL	PARAMETER		MIN	TYP	MAX	UNIT
V_{CC}	Supply Voltage	54, 74	4.50	5.0	5.50	V
T_A	Operating Ambient Temperature Range	54	-55	25	125	°C
		74	0	25	70	
I_{OH}	Output Current — High	54, 74			-1.0	mA
I_{OL}	Output Current — Low	54, 74			20	mA

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNITS	TEST CONDITIONS	
V_{IH}	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage	
V_{IL}	Input LOW Voltage				0.8	V	Guaranteed Input LOW Voltage	
V_{IK}	Input Clamp Diode Voltage				-1.2	V	I_{IN} = -18 mA	V_{CC} = MIN,
V_{OH}	Output HIGH Voltage	54, 74	2.5	3.4		V	I_{OH} = -1.0 mA	V_{CC} = 4.50 V
		74	2.7	3.4		V	I_{OH} = -1.0 mA	V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage			0.35	0.5	V	I_{OL} = 20 mA	V_{CC} = MIN
I_{IH}	Input HIGH Current				20	μA	V_{IN} = 2.7 V	V_{CC} = MAX
					100	μA	V_{IN} = 7.0 V	
I_{IL}	Input LOW Current				-0.6	mA	V_{IN} = 0.5 V	V_{CC} = MAX
I_{OS}	Output Short Circuit Current (Note 2)		-60		-150	mA	V_{OUT} = 0 V	V_{CC} = MAX
I_{CC}	Power Supply Current			15	23	mA	All Inputs = 4.5 V	V_{CC} = MAX

NOTES:
1. For conditions such as MIN or MAX, use the appropriate value specified under guaranteed operating ranges
2. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS

SYMBOL	PARAMETER	54/74F T_A = +25°C, V_{CC} = +5.0 V, C_L = 50 pF MIN	TYP	MAX	54F T_A = -55 to +125°C, V_{CC} = 5.0 V ±10%, C_L = 50 pF MIN	MAX	74F T_A = 0 to +70°C, V_{CC} = 5.0 V ± 10%, C_L = 50 pF MIN	MAX	UNITS
t_{PLH}	Propagation Delay	4.5	10.1	13	3.5	17	4.5	15	ns
t_{PHL}	S to Z_n	3.5	6.3	9.0	3.5	12.5	3.5	10.0	
t_{PLH}	Propagation Delay	5.0	7.6	10	5.0	15	5.0	11.5	ns
t_{PHL}	$\overline{E}$ to Z_n	3.8	5.3	7.0	3.8	8.5	3.8	8.0	
t_{PLH}	Propagation Delay	3.0	5.5	7.0	3.0	10	3.0	8.0	ns
t_{PHL}	I_n to Z_n	2.5	4.6	5.5	1.5	7.5	2.0	7.0	

FUNCTIONAL DESCRIPTION — The F157 is a quad 2-input multiplexer. It selects four bits of data from two sources under the control of a common Select input (S). The Enable input ($\overline{E}$) is active LOW. When $\overline{E}$ is HIGH, all of the outputs (Z) are forced LOW regardless of all other inputs. The F157 is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the Select input. The logic equations for the outputs are shown below:

$$Z_a = \overline{E} \cdot (I_{1a} \cdot S + I_{0a} \cdot \overline{S}) \quad Z_b = \overline{E} \cdot (I_{1b} \cdot S + I_{0b} \cdot \overline{S})$$
$$Z_c = \overline{E} \cdot (I_{1c} \cdot S + I_{0c} \cdot \overline{S}) \quad Z_d = \overline{E} \cdot (I_{1d} \cdot S + I_{0d} \cdot \overline{S})$$

A common use of the F157 is the moving of data from two groups 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 F157 can generate any four of the 16 different functions of two variables with one variable common. This is useful for implementing highly irregular logic.