PART NUMBER

74ACT158SC-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.

FAIRCHILD
SEMICONDUCTOR™

74ACT158
Quad 2-Input Multiplexer

General Description

The ACT158 is a high-speed quad 2-input multiplexer. It selects four bits of data from two sources using the common Select and Enable inputs. The four buffered outputs present the selected data in the inverted form. The ACT158 can also be used as a function generator.

Features

■ I_{CC} reduced by 50%
■ Outputs source/sink 24 mA
■ TTL-compatible inputs

Ordering Code:

Order Number	Package Number	Package Description
74ACT158SC	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Body
74ACT158PC	M16D	16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74ACT158MTC	MTC16	16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
74ACT158SJ	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Device also available in Tape and Reel. Specify by appending suffix letter "X" to the ordering code.

Logic Symbols

IEE/IEC
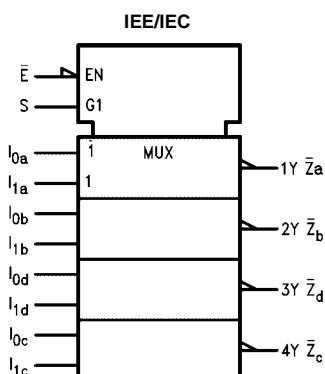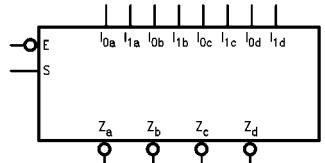
Connection Diagram
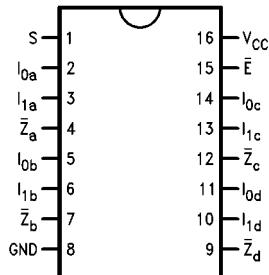
Pin Descriptions

Pin Names	Description
I_{0a}–I_{0d}	Source 0 Data Inputs
I_{1a}–I_{1d}	Source 1 Data Inputs
$\overline{E}$	Enable Input
S	Select Input
$\overline{Z}_a$–$\overline{Z}_d$	Inverted Outputs

FACT™ is a trademark of Fairchild Semiconductor Corporation.

Functional Description

The ACT158 quad 2-input multiplexer selects four bits of data from two sources under the control of a common Select input (S) and presents the data in inverted form at the four outputs. The Enable input ($\overline{E}$) is active-LOW. When $\overline{E}$ is HIGH, all of the outputs ($\overline{Z}$) are forced HIGH regardless of all other inputs. The ACT158 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.

A common use of the ACT158 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 ACT158 can generate four functions of two variables with one variable common. This is useful for implementing gating functions.

Truth Table

Inputs				Outputs
$\overline{E}$	S	I_0	I_1	$\overline{Z}$
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

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

Logic Diagram
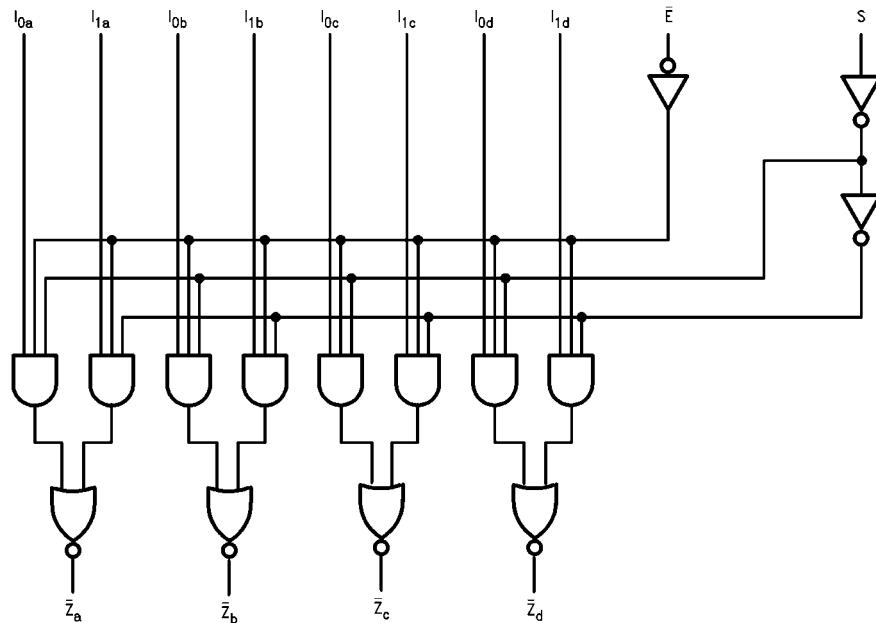
Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

Absolute Maximum Ratings(Note 1)

Supply Voltage (V_{CC})	−0.5V to +7.0V
DC Input Diode Current (I_{IK})	
$V_I = -0.5V$	−20 mA
$V_I = V_{CC} + 0.5V$	+20 mA
DC Input Voltage (V_I)	−0.5V to V_{CC} + 0.5V
DC Output Diode Current (I_{OK})	
$V_O = -0.5V$	−20 mA
$V_O = V_{CC} + 0.5V$	+20 mA
DC Output Voltage (V_O)	−0.5V to V_{CC} + 0.5V
DC Output Source	
or Sink Current (I_O)	±50 mA
DC V_{CC} or Ground Current	
per Output Pin (I_{CC} or I_{GND})	±50 mA
Storage Temperature (T_{STG})	−65°C to +150°C
Junction Temperature (T_J)	140°C

Recommended Operating Conditions

Supply Voltage (V_{CC})	4.5V to 5.5V
Input Voltage (V_I)	0V to V_{CC}
Output Voltage (V_O)	0V to V_{CC}
Operating Temperature (T_A)	−40°C to +85°C
Minimum Input Edge Rate ($\Delta V/\Delta t$)	
V_{IN} from 0.8V to 2.0V	
V_{CC} @ 4.5V, 5.5V	125 mV/ns

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variable. Fairchild does not recommend operation of FACT™ circuits outside databook specifications.

DC Electrical Characteristics

Symbol	Parameter	V_{CC} (V)	$T_A = +25°C$ Typ	$T_A = +25°C$ Guaranteed Limits	$T_A = -40°C$ to +85°C	Units	Conditions
V_{IH}	Minimum HIGH Level	4.5	1.5	2.0	2.0	V	$V_{OUT} = 0.1V$
	Input Voltage	5.5	1.5	2.0	2.0		or V_{CC} − 0.1V
V_{IL}	Maximum LOW Level	4.5	1.5	0.8	0.8	V	$V_{OUT} = 0.1V$
	Input Voltage	5.5	1.5	0.8	0.8		or V_{CC} − 0.1V
V_{OH}	Minimum HIGH Level	4.5	4.49	4.4	4.4	V	$I_{OUT} = -50\ \mu A$
	Output Voltage	5.5	5.49	5.4	5.4		
		4.5		3.86	3.76	V	$V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -24$ mA
		5.5		4.86	4.76		$I_{OH} = -24$ mA (Note 2)
V_{OL}	Maximum LOW Level	4.5	0.001	0.1	0.1	V	$I_{OUT} = 50\ \mu A$
	Output Voltage	5.5	0.001	0.1	0.1		
		4.5		0.36	0.44	V	$V_{IN} = V_{IL}$ or V_{IH} $I_{OL} = 24$ mA
		5.5		0.36	0.44		$I_{OL} = 24$ mA (Note 2)
I_{IN}	Maximum Input Leakage Current	5.5		±0.1	±1.0	μA	$V_I = V_{CC}$, GND
I_{CCT}	Maximum I_{CC}/Input	5.5	0.6		1.5	mA	$V_I = V_{CC}$ − 2.1V
I_{OLD}	Minimum Dynamic	5.5			75	mA	$V_{OLD} = 1.65V$ Max
I_{OHD}	Output Current (Note 3)	5.5			−75	mA	$V_{OHD} = 3.85V$ Min
I_{CC}	Maximum Quiescent Supply Current	5.5		4.0	40.0	μA	$V_{IN} = V_{CC}$ or GND

Note 2: All outputs loaded; thresholds on input associated with output under test.

**Note 3:** Maximum test duration 2.0 ms, one output loaded at a time.

74ACT158

AC Electrical Characteristics

Symbol	Parameter	V_{CC} (V) (Note 4)	$T_A = +25°C$ $C_L = 50$ pF			$T_A = -40°C$ to $+85°C$ $C_L = 50$ pF		Units
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay S to $\overline{Z}_n$	5.0	2.5	6.0	9.5	2.0	11.0	ns
t_{PHL}	Propagation Delay S to $\overline{Z}_n$	5.0	1.5	5.5	9.0	1.5	10.0	ns
t_{PLH}	Propagation Delay $\overline{E}$ to $\overline{Z}_n$	5.0	1.5	5.5	9.5	1.5	10.5	ns
t_{PHL}	Propagation Delay $\overline{E}$ to $\overline{Z}_n$	5.0	1.5	5.5	9.5	1.5	10.5	ns
t_{PLH}	Propagation Delay I_n to $\overline{Z}_n$	5.0	1.5	4.5	8.0	1.0	8.5	ns
t_{PHL}	Propagation Delay I_n to $\overline{Z}_n$	5.0	1.5	4.0	6.5	1.0	7.5	ns

Note 4: Voltage Range 5.0 is 5.0V ± 0.5V

Capacitance

Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = OPEN
C_{PD}	Power Dissipation Capacitance	45.0	pF	V_{CC} = 5.0V

Physical Dimensions inches (millimeters) unless otherwise noted

0.386 − 0.394
(9.804 − 10.00)

16 15 14 13 12 11 10 9

0.228 − 0.244
(5.791 − 6.198)

30°
TYP

LEAD NO.1
IDENT

1 2 3 4 5 6 7 8

0.010 MAX
(0.254)

0.150 − 0.157
(3.810 − 3.988)

0.010 − 0.020
(0.254 − 0.508) ×45°

8° MAX TYP
ALL LEADS

0.008 − 0.010
(0.203 − 0.254)
TYP ALL LEADS

0.004
(0.102)
ALL LEAD TIPS

0.016 − 0.050
(0.406 − 1.270)
TYP ALL LEADS

0.053 − 0.069
(1.346 − 1.753)

0.004 − 0.010
(0.102 − 0.254)

SEATING
PLANE

0.014
(0.356)

0.050
(1.270)
TYP

0.008
(0.203) TYP

0.014 − 0.020
(0.356 − 0.508) TYP

M16A (REV H)
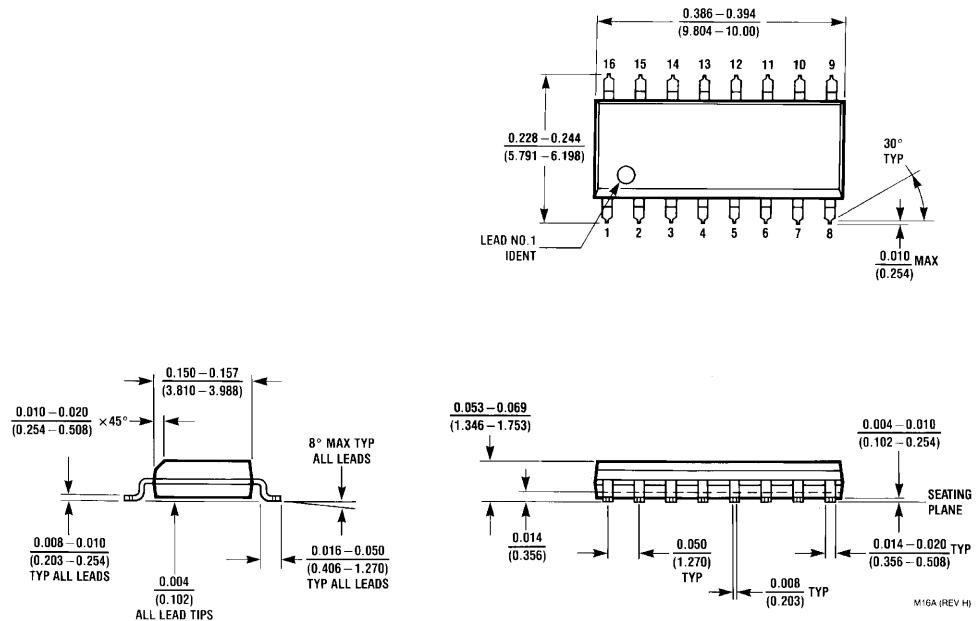
16- Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow Body
**Package Number M16A**

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)
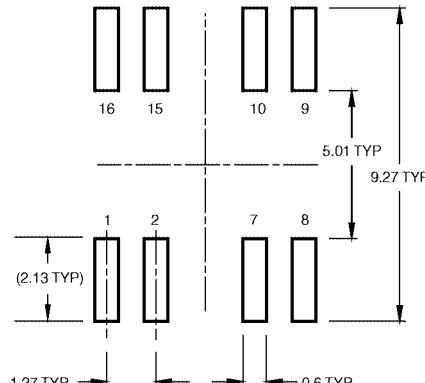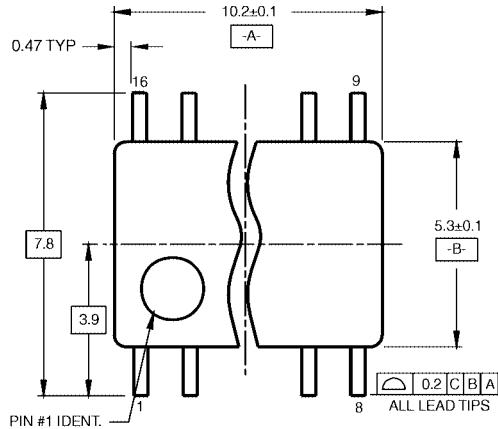

LAND PATTERN RECOMMENDATION

DIMENSIONS ARE IN MILLIMETERS

DETAIL A
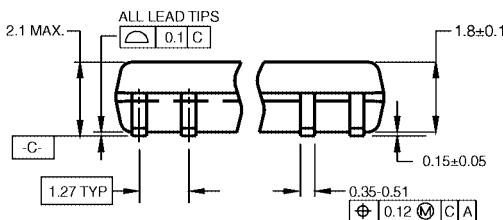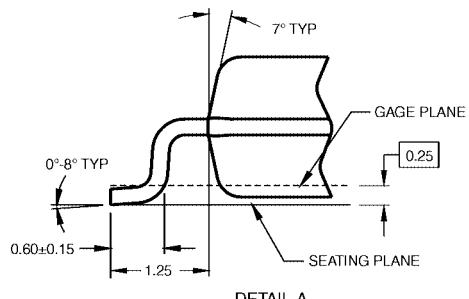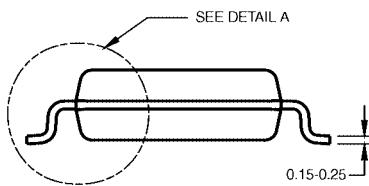
NOTES:
A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
B. DIMENSIONS ARE IN MILLIMETERS.
C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M16DRevB1

16-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M16D

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

DIMENSIONS METRIC ONLY

7.72 TYP.

4.16 TYP.

(1.78 TYP)

0.42 TYP

0.65 TYP

LAND PATTERN RECOMMENDATION

5.0 ± 0.1

-A-

16   9

6.4

4.4 ± 0.1

-B-

3.2

1   8

PIN #1 IDENT.

◯ 0.2 C B A
ALL LEAD TIPS

GAGE PLANE

0.25

0°-8°

SEATING PLANE

0.6 ± 0.1

DETAIL A
TYPICAL, SCALE: 40X

SEE DETAIL A

◯ 0.1 C
ALL LEAD TIPS

-C-

(0.90)

1.1 MAX TYP

0.65 TYP

0.10 ± 0.05 TYP

0.19 - 0.30 TYP

0.09-0.20 TYP

⊕ 0.13 Ⓜ A B Ⓢ C Ⓢ

MTC16 (REV C)
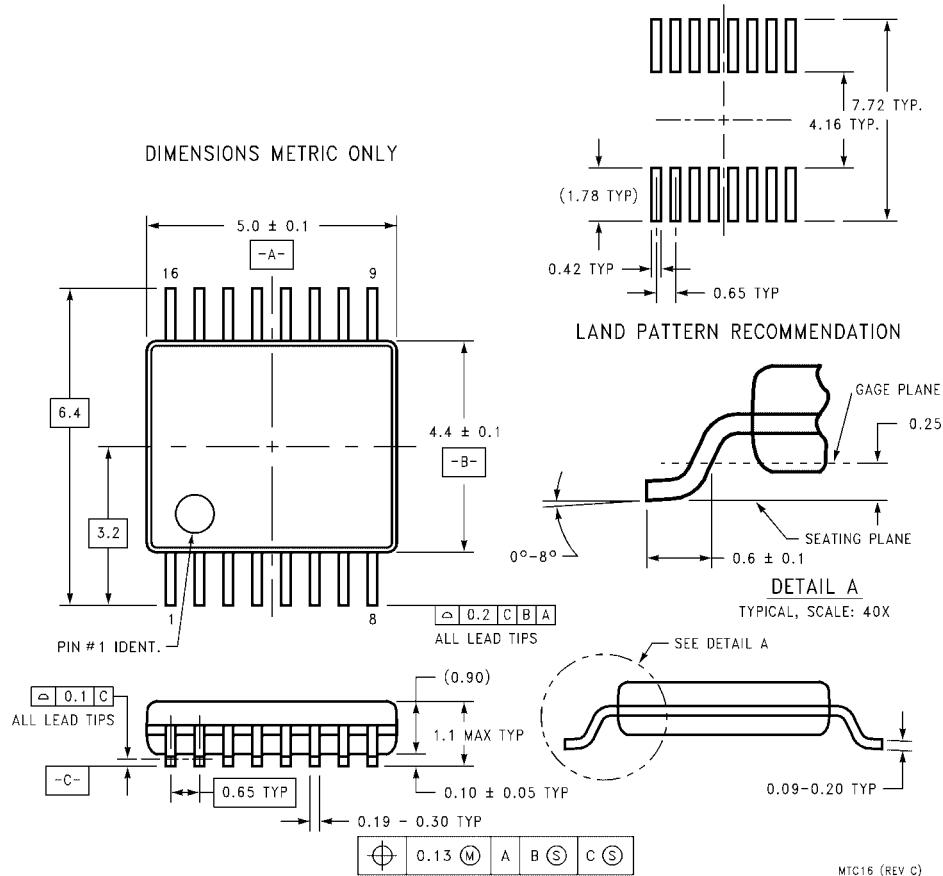
16-Lead Thin Shrink Small Outline Package (TSSOP), JEDEC MO-153, 4.4mm Wide
Package Number MTC16

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)
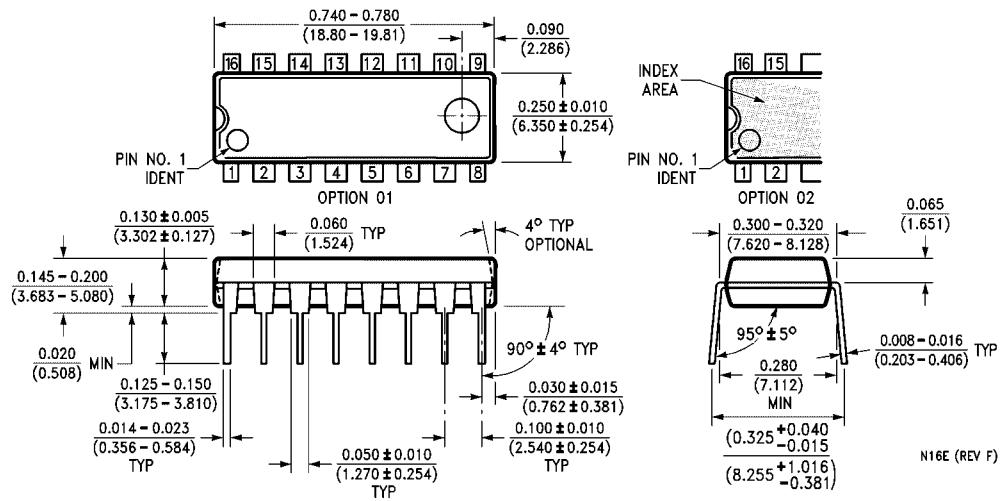
16- Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N16E

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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