

MM74C157 Quad 2-Input Multiplexers

General Description

The MM74C157 multiplexers are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement transistors. They consist of four 2-input multiplexers with common select and enable inputs. When the enable input is at logical "0" the four outputs assume the values as selected from the inputs. When the enable input is at logical "1", the outputs assume logical "0". Select decoding is done internally resulting in a single select input only.

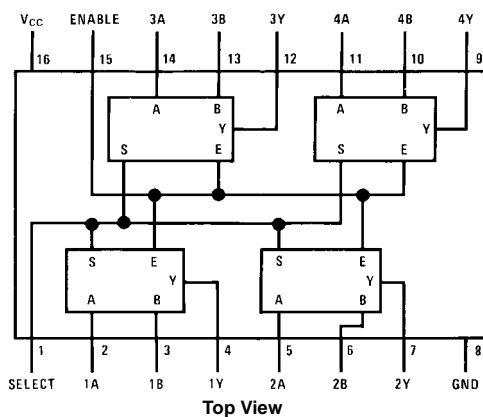
Features

- Supply voltage range: 3V to 15V
- High noise immunity: $0.45 V_{CC}$ (typ.)
- Low power: 50 nW (typ.)
- Tenth power TTL compatible: Drive 2 LPTTL loads

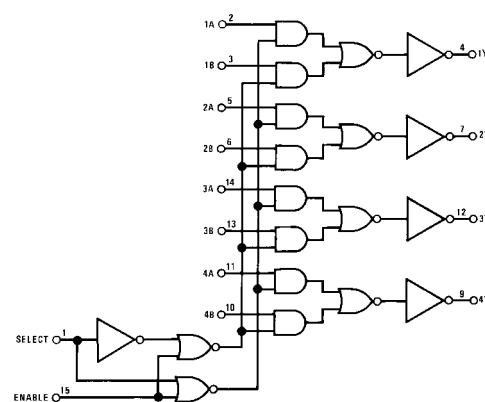
Ordering Code:

Order Number	Package Number	Package Description
MM74C157N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Connection Diagram



Logic Diagram



Truth Table

Enable	Select	A	B	Output Y
1	X	X	X	0
0	0	0	X	0
0	0	1	X	1
0	1	X	0	0
0	1	X	1	1

Absolute Maximum Ratings(Note 1)

Voltage at Any Pin	−0.3V to $V_{CC} + 0.3V$
Operating Temperature Range	−55°C to +125°C
Storage Temperature Range	−65°C to +150°C
Maximum V_{CC} Voltage	18V
Power Dissipation (P_D)	
Dual-In-Line	700 mW
Small Outline	500 mW
Operating V_{CC} Range	3V to 15V
Lead Temperature (Soldering, 10 seconds)	260°C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

DC Electrical Characteristics

Min/Max limits apply across temperature range unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
CMOS TO CMOS						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$	3.5 8.0			V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$			1.5 2.0	V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$	4.5 9.0			V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 5V$ $V_{CC} = 10V$			0.5 1.0	V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC} = 15V$		0.005	1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC} = 15V$	−1.0	−0.005		μA
I_{CC}	Supply Current	$V_{CC} = 15V$		0.05	60	μA
CMOS TO TENTH POWER INTERFACE						
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC} = 4.75V$	$V_{CC} - 1.5$			V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC} = 4.75V$			0.8	V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC} = 4.75V, I_O = -360 \mu A$	2.4			V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC} = 4.75V, I_O = 360 \mu A$			0.4	V
OUTPUT DRIVE (See Family Characteristics Data Sheet) (Short Circuit Current)						
I_{SOURCE}	Output Source Current	$V_{CC} = 5V, V_{IN(0)} = 0V$ $T_A = 25^\circ C, V_{OUT} = 0V$	−1.75			mA
I_{SOURCE}	Output Source Current	$V_{CC} = 10V, V_{IN(0)} = 0V$ $T_A = 25^\circ C, V_{OUT} = 0V$	−8.0			mA
I_{SINK}	Output Sink Current	$V_{CC} = 5V, V_{IN(1)} = 5V$ $T_A = 25^\circ C, V_{OUT} = V_{CC}$	1.75			mA
I_{SINK}	Output Sink Current	$V_{CC} = 10V, V_{IN(1)} = 10V$ $T_A = 25^\circ C, V_{OUT} = V_{CC}$	8.0			mA

AC Electrical Characteristics (Note 2)

$T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, unless otherwise specified

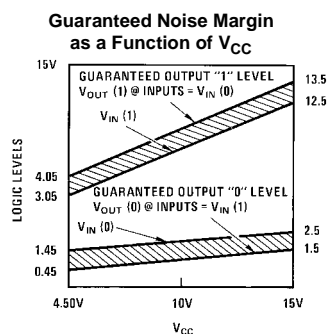
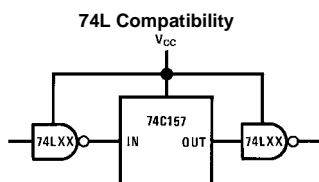
Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{pd0}, t_{pd1}	Propagation Delay from Data to Output	$V_{CC} = 5.0\text{V}$ $V_{CC} = 10\text{V}$		150 70	250 110	ns
t_{pd0}, t_{pd1}	Propagation Delay from Select to Output	$V_{CC} = 5\text{V}$ $V_{CC} = 10\text{V}$		180 80	300 130	ns
t_{pd0}, t_{pd1}	Propagation Delay from Enable to Output	$V_{CC} = 5\text{V}$ $V_{CC} = 10\text{V}$		180 80	300 130	ns
C_{IN}	Input Capacitance	(Note 3)		5		pF
C_{PD}	Power Dissipation Capacitance	(Note 4)		20		pF

Note 2: AC Parameters are guaranteed by DC correlated testing.

Note 3: Capacitance is guaranteed by periodic testing.

Note 4: C_{PD} determines the no load AC power consumption of any CMOS device. For complete explanation, see Family Characteristics, Application Note AN-90.

Typical Applications



The drawing illustrates the mechanical specifications for the 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide, Package Number N16E. It includes three views: a top view, a side view, and an end view.

Top View: Shows the package with 16 pins. The pin numbers are 16, 15, 14, 13, 12, 11, 10, 9 on the top and 1, 2, 3, 4, 5, 6, 7, 8 on the bottom. The overall width is 0.740 - 0.780 (18.80 - 19.81). The pin pitch is 0.090 (2.286). The distance from the center of the package to the center of the pins is 0.250 ± 0.010 (6.350 ± 0.254). The distance from the center of the package to the center of the pins is 0.130 ± 0.005 (3.302 ± 0.127). The distance from the center of the package to the center of the pins is 0.060 (1.524) TYP. The distance from the center of the package to the center of the pins is 0.020 (0.508) MIN. The distance from the center of the package to the center of the pins is 0.125 - 0.150 (3.175 - 3.810) TYP. The distance from the center of the package to the center of the pins is 0.014 - 0.023 (0.356 - 0.584) TYP. The distance from the center of the package to the center of the pins is 0.050 ± 0.010 (1.270 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 0.030 ± 0.015 (0.762 ± 0.381) TYP. The distance from the center of the package to the center of the pins is 0.100 ± 0.010 (2.540 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 90° ± 4° TYP. The distance from the center of the package to the center of the pins is 4° TYP OPTIONAL.

Side View: Shows the package with a height of 0.145 - 0.200 (3.683 - 5.080). The distance from the center of the package to the center of the pins is 0.130 ± 0.005 (3.302 ± 0.127). The distance from the center of the package to the center of the pins is 0.060 (1.524) TYP. The distance from the center of the package to the center of the pins is 0.020 (0.508) MIN. The distance from the center of the package to the center of the pins is 0.125 - 0.150 (3.175 - 3.810) TYP. The distance from the center of the package to the center of the pins is 0.014 - 0.023 (0.356 - 0.584) TYP. The distance from the center of the package to the center of the pins is 0.050 ± 0.010 (1.270 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 0.030 ± 0.015 (0.762 ± 0.381) TYP. The distance from the center of the package to the center of the pins is 0.100 ± 0.010 (2.540 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 90° ± 4° TYP. The distance from the center of the package to the center of the pins is 4° TYP OPTIONAL.

End View: Shows the package with a width of 0.300 - 0.320 (7.620 - 8.128). The distance from the center of the package to the center of the pins is 0.130 ± 0.005 (3.302 ± 0.127). The distance from the center of the package to the center of the pins is 0.060 (1.524) TYP. The distance from the center of the package to the center of the pins is 0.020 (0.508) MIN. The distance from the center of the package to the center of the pins is 0.125 - 0.150 (3.175 - 3.810) TYP. The distance from the center of the package to the center of the pins is 0.014 - 0.023 (0.356 - 0.584) TYP. The distance from the center of the package to the center of the pins is 0.050 ± 0.010 (1.270 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 0.030 ± 0.015 (0.762 ± 0.381) TYP. The distance from the center of the package to the center of the pins is 0.100 ± 0.010 (2.540 ± 0.254) TYP. The distance from the center of the package to the center of the pins is 90° ± 4° TYP. The distance from the center of the package to the center of the pins is 4° TYP OPTIONAL.

Dimensions:

- Overall width: 0.740 - 0.780 (18.80 - 19.81)
- Pin pitch: 0.090 (2.286)
- Distance from center to pins: 0.250 ± 0.010 (6.350 ± 0.254)
- Distance from center to pins: 0.130 ± 0.005 (3.302 ± 0.127)
- Distance from center to pins: 0.060 (1.524) TYP
- Distance from center to pins: 0.020 (0.508) MIN
- Distance from center to pins: 0.125 - 0.150 (3.175 - 3.810) TYP
- Distance from center to pins: 0.014 - 0.023 (0.356 - 0.584) TYP
- Distance from center to pins: 0.050 ± 0.010 (1.270 ± 0.254) TYP
- Distance from center to pins: 0.030 ± 0.015 (0.762 ± 0.381) TYP
- Distance from center to pins: 0.100 ± 0.010 (2.540 ± 0.254) TYP
- Distance from center to pins: 90° ± 4° TYP
- Distance from center to pins: 4° TYP OPTIONAL
- Overall height: 0.145 - 0.200 (3.683 - 5.080)
- Distance from center to pins: 0.130 ± 0.005 (3.302 ± 0.127)
- Distance from center to pins: 0.060 (1.524) TYP
- Distance from center to pins: 0.020 (0.508) MIN
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- Overall width: 0.300 - 0.320 (7.620 - 8.128)
- Distance from center to pins: 0.130 ± 0.005 (3.302 ± 0.127)
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Notes:

- PIN NO. 1 IDENT
- INDEX AREA
- OPTION 01
- OPTION 02
- 95° ± 5°
- 0.008 - 0.016 (0.203 - 0.406) TYP
- 0.325 ± 0.040 (8.255 ± 1.016)
- 0.280 (7.112) MIN
- 0.065 (1.651)

Package Number N16E

N16E (REV F)

LIFE SUPPORT POLICY

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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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