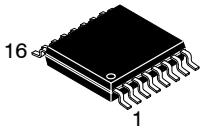
Low Voltage Quad 2-Input Multiplexer

74LVX157



TSSOP 16
CASE 948AH

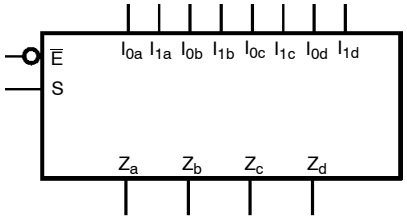
General Description

The LVX157 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 outputs present the selected data in the true (noninverted) form. The LVX157 can also be used as a function generator.

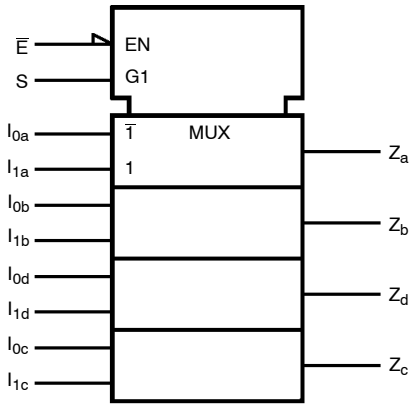
Features

- Input Voltage Level Translation from 5 V to 3 V
- Ideal for Low Power/Low Noise 3.3 V Applications
- Guaranteed Simultaneous Switching Noise Level and Dynamic Threshold Performance
- This Device is Halide Free and Pb-Free

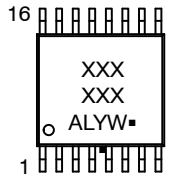
Logic Symbols



IEEE/IEC



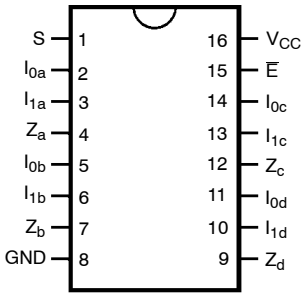
MARKING DIAGRAM



XXXXXX	= Specific Device Code
A	= Assembly Location
L	= Wafer Lot
Y	= Year
W	= Work Week
G or ▪	= Pb-Free Package

(Note: Microdot may be in either location)

CONNECTION DIAGRAM



PIN DESCRIPTION

Pins	Function
I_{0a}–I_{0d}	Source 0 Data Inputs
I_{1a}–I_{1d}	Source 1 Data Inputs
$\overline{E}$	Enable Input
S	Select Input
Z_a–Z_d	Outputs

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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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

Functional Description

The LVX157 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 (E) is active−LOW. When E is HIGH, all of the outputs (Z) are forced LOW regardless of all other inputs. The LVX157 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:

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

A common use of the LVX157 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 LVX157 can generate any four of the sixteen different functions of two variables with one variable common. This is useful for implementing gating functions.

Logic Diagram

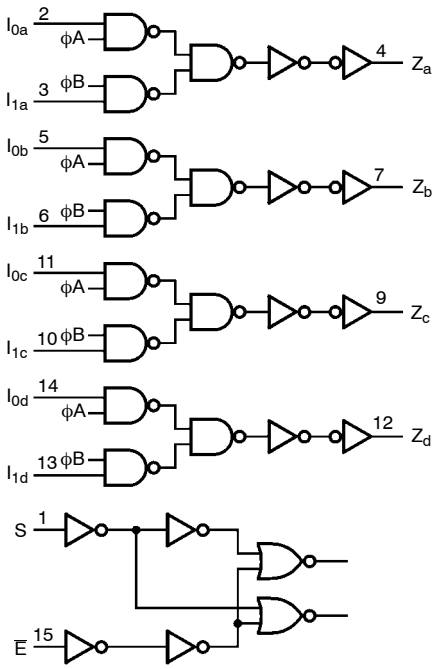


Figure 1. Logic Diagram

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MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{CC}	DC Supply Voltage		−0.5 to +6.5	V
V_{IN}	DC Input Voltage		−0.5 to +6.5	V
V_{OUT}	DC Output Voltage		−0.5 to V_{CC} + 0.5	V
I_{IN}	DC Input Current, per Pin		±20	mA
I_{OUT}	DC Output Current, per Pin		±25	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins		±75	mA
I_{IK}	Input Clamp Current		−20	mA
I_{OK}	Output Clamp Current		±20	mA
T_{STG}	Storage Temperature Range		−65 to +150	°C
T_L	Lead Temperature, 1 mm from Case for 10 Seconds		260	°C
T_J	Junction Temperature Under Bias		+150	°C
θ_{JA}	Thermal Resistance (Note 1)		159	°C/W
P_D	Power Dissipation in Still Air at 25 °C		787	mW
MSL	Moisture Sensitivity		Level 1	
F_R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in	
V_{ESD}	ESD Withstand Voltage (Note 2)	Human Body Model Charged Device Model	2000 N/A	V

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Measured with minimum pad spacing on an FR4 board, using 76mm-by-114mm, 2-ounce copper trace no air flow per JESD51-7.
2. HBM tested to EIA / JESD22-A114-A. CDM tested to JESD22-C101-A. JEDEC recommends that ESD qualification to EIA/JESD22-A115A (Machine Model) be discontinued.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage	2.0	3.6	V
V_{in}	DC Input Voltage (Note 3)	0	5.5	V
V_{out}	DC Output Voltage (Note 3)	0	V_{CC}	V
T_A	Operating Temperature	−40	+85	°C
t_r, t_f	Input Rise and Fall Time	0	100	ns/V

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

3. Unused inputs must always be tied to an appropriate logic voltage level (e.g., either GND or V_{CC}). Unused outputs must be left open.

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DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	V_{CC}	T_A = 25 °C			T_A = −40 to 85 °C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High-Level Input Voltage		2.0 3.0 3.6	1.5 2.0 2.4	– – –	– – –	1.5 2.0 2.4	– – –	V
V_{IL}	Low-Level Input Voltage		2.0 3.0 3.6	– – –	– – –	0.5 0.8 0.8	– – –	0.5 0.8 0.8	V
V_{OH}	High-Level Output Voltage (V_{IN} = V_{IL} or V_{IH})	I_{OH} = −50 μA I_{OH} = −50 μA I_{OH} = −4 mA	2.0 3.0 3.0	1.9 2.9 2.58	2.0 3.0	– – –	1.9 2.9 2.48	– – –	V
V_{OL}	Low-Level Output Voltage (V_{IN} = V_{IL} or V_{IH})	I_{OL} = 50 μA I_{OL} = 50 μA I_{OL} = 4 mA	2.0 3.0 3.0	– – –	0.0 0.0 –	0.1 0.1 0.36	– – –	0.1 0.1 0.44	V
I_{IN}	Input Leakage Current	V_{in} = 5.5 V or GND	3.6	–	–	±0.1	–	±1.0	μA
I_{CC}	Quiescent Supply Current	V_{in} = V_{CC} or GND	3.6	–	–	4.0	–	40.0	μA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

NOISE CHARACTERISTICS (Note 4)

Symbol	Characteristic	C_L (pF)	V_{CC} (V)	T_A = 25 °C		Unit
				Typ	Max	
V_{OLP}	Quiet Output Maximum Dynamic V_{OL}	50	3.3	0.3	0.5	V
V_{OLV}	Quiet Output Minimum Dynamic V_{OL}	50	3.3	−0.3	−0.5	V
V_{IHD}	Minimum HIGH Level Dynamic Input Voltage	50	3.3	–	2.0	V
V_{ILD}	Maximum LOW Level Dynamic Input Voltage	50	3.3	–	0.8	V

4. Input t_r = t_f = 3 ns

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	C_L (pF)	V_{CC} (V)	T_A = 25 °C			T_A = −40 to 85 °C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH}, t_{PHL}	Propagation Delay Time, I_n to Z_n	15 50	2.7	– –	6.6 9.1	12.5 16.0	1.0 1.0	15.5 19.0	ns
		15 50	3.3 ± 0.3	– –	5.1 7.6	7.9 11.4	1.0 1.0	9.5 13.0	
t_{PLH}, t_{PHL}	Propagation Delay Time, S to Z_n	15 50	2.7	– –	8.9 11.4	16.9 20.4	1.0 1.0	20.5 24.0	ns
		15 50	3.3 ± 0.3	– –	7.0 9.5	11.0 14.5	1.0 1.0	13.0 16.5	
t_{PLH}, t_{PHL}	Propagation Delay Time, $\overline{E}$ to Z_n	15 50	2.7	– –	9.1 11.6	17.6 21.1	1.0 1.0	20.5 24.0	ns
		15 50	3.3 ± 0.3	– –	7.2 9.7	11.5 15.0	1.0 1.0	13.5 17.0	
t_{OSHL} t_{OSLH}	Output to Output Skew (Note 5)	50	2.7 3.3	– –	– –	1.5 1.5	– –	1.5 1.5	ns

5. Parameter guaranteed by design.
t_{OSLH} = $|t_{PLHm} - t_{PLHn}|$.
t_{OSHL} = $|t_{PHLm} - t_{PHLn}|$.

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CAPACITIVE CHARACTERISTICS

Symbol	Parameter	T_A = 25 °C			T_A = −40 to 85 °C		Unit
		Min	Typ	Max	Min	Max	
Cin	Input Capacitance	–	4	10	–	10	pF
C_{PD}	Power Dissipation Capacitance (Note 6)	–	20	–	–	–	pF

6. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation: $I_{CC(opr.)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

ORDERING INFORMATION

Device	Marking	Package	Shipping†
74LVX157MTCX	LVX 157	TSSOP-16 (Pb-Free)	2500 Units / Tape & Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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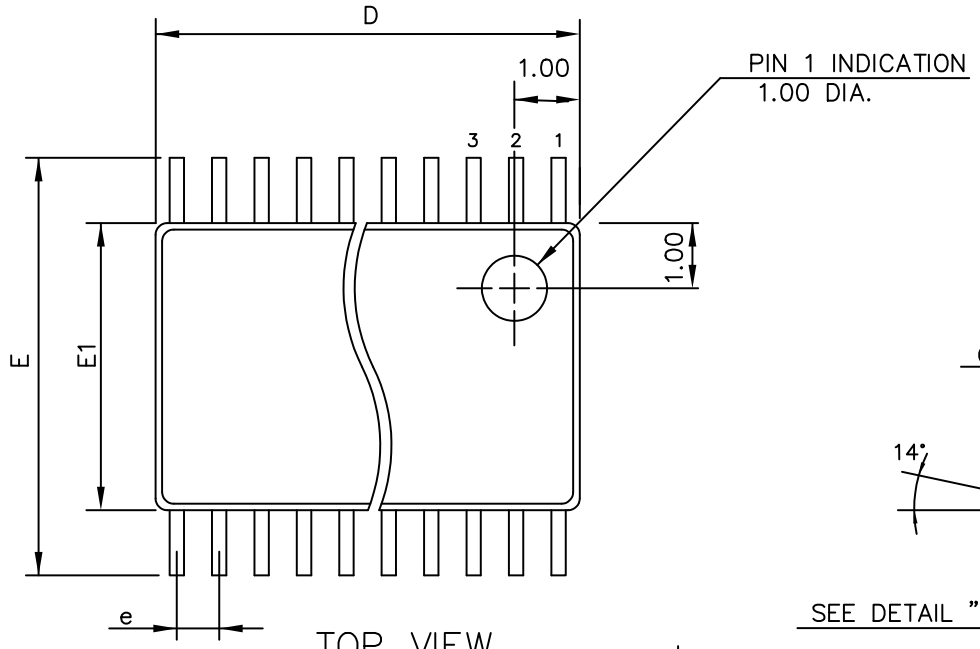
REVISION HISTORY

Revision	Description of Changes	Date
2	Converted the Data Sheet to **onsem**i format with the updates in Ordering Information Table, Recommended Operating Table, Maximum Rating Table.	05/06/2025

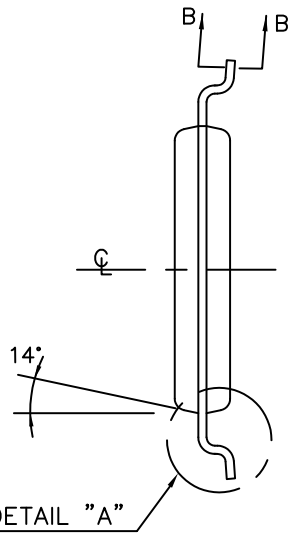
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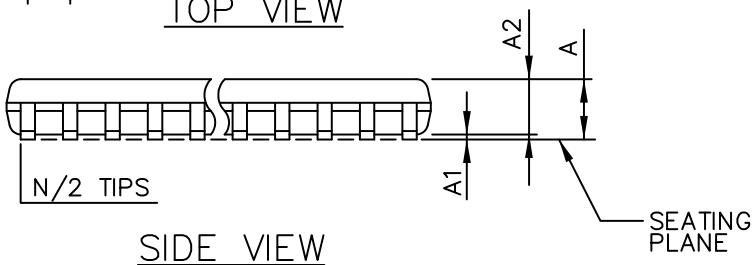
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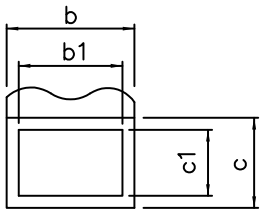
TOP VIEW



END VIEW



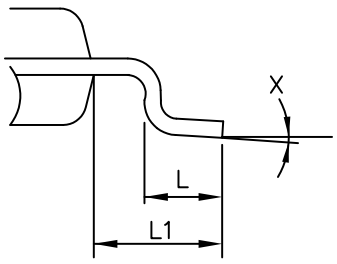
SIDE VIEW



SECTION "B–B"

THIS TABLE FOR 0.65mm PITCH

SYMBOL	COMMON DIMENSIONS			NOTE VARIATIONS	D	N
	MIN.	NOM.	MAX.			
A	——	——	1.10	AA/AAT	3.00 BSC	8
A_1	0.05	——	0.15	AB–1/ABT	5.00 BSC	14
A_2	0.85	0.90	0.95	AB/ABT	5.00 BSC	16
b	0.19	–	0.30	AD/ADT	7.80 BSC	24
b1	0.19	0.22	0.25			
c	0.09	–	0.20			
c1	0.09	0.127	0.16			
D	SEE VARIATIONS					
E1	4.30	4.40	4.50			
e	0.65 BSC					
E	6.40 BSC					
L	0.50	0.60	0.70			
L1	1.00 REF					
N	SEE VARIATIONS					
X	0°	——	8°			



DETAIL 'A'

ALL DIMENSIONS IN MILLIMETERS

MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15mm ON D PER SIDE

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