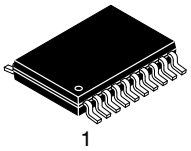
Low Voltage Octal Buffer/Line Driver with 5 V Tolerant Inputs and Outputs

74LVX245



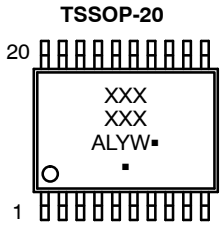
TSSOP-20
CASE 948AQ

The LVX245 contains eight non-inverting bidirectional buffers and is intended for bus-oriented applications. The Transmit/Receive ($T/\overline{R}$) input determines the direction of data flow through the bidirectional transceiver. Transmit (active-HIGH) enables data from A ports to B ports; Receive (active-LOW) enables data from B ports to A ports. The Output Enable input, when HIGH, disables both A and B ports by placing them in a high impedance condition.

Features

- Ideal for Low Power/low Noise 3.3 V Applications
- Guaranteed Simultaneous Switching Noise Level and Dynamic Threshold Performance
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

MARKING DIAGRAM



XXXXXX = Specific Device Code
A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week
▪ = Pb-Free Package

(Note: Microdot may be in either location)

PIN DESCRIPTION

Pin Names	Description
$\overline{OE}$	Output Enable Input
$T/\overline{R}$	Transmit/Receive Input
A_0–A_7	Side A Inputs or 3-STATE Outputs
B_0–B_7	Side B Inputs or 3-STATE Outputs

TRUTH TABLE

Inputs		Outputs
$\overline{OE}$	$T/\overline{R}$	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	HIGH-Z State

H = High Voltage Level
L = Low Voltage Level
X = Immaterial

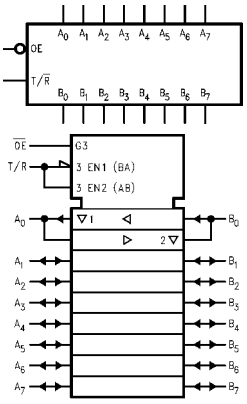


Figure 1. Logic Symbols

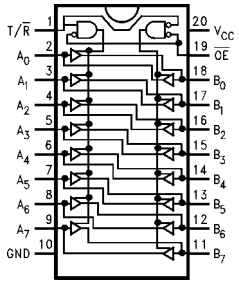


Figure 2. Connection Diagram

ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

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 2)	TSSOP-20	150	°C/W
P_D	Power Dissipation in Still Air at 25 °C	TSSOP-20	833	mW
MSL	Moisture Sensitivity	All Other Packages	Level 1	–
F_R	Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0 @ 0.573 in	–
V_{ESD}	ESD Withstand Voltage (Note 3)	Human Body Model	2000	V
		Charged Device Model	N/A	

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. Applicable to devices with outputs that may be tri-stated.
2. Measured with minimum pad spacing on an FR4 board, using 76 mm-by-114 mm, 2-ounce copper trace no air flow per JESD51-7.
3. 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 4)	0	5.5	V
V_{OUT}	DC Output Voltage (Note 4)	0	V_{CC}	V
T_A	Operating Temperature	−40	+85	°C
t_r, t_f	Input Rise or Fall Rate	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.

4. 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.

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = +25 °C			T_A = −40 °C to +85 °C		Unit
				Min	Typ	Max	Min	Max	
V_{IH}	High-Level Input Voltage		2.0	1.5			1.5		V
			3.0	2.0			2.0		
			3.6	2.4			2.4		
V_{IL}	Low-Level Input Voltage		2.0		0.5			0.5	V
			3.0		0.8			0.8	
			3.6		0.8			0.8	
V_{OH}	High-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}							V
		I_{OH} = −50 μA	2.0	1.9	2.0		1.9		
		I_{OH} = −50 μA	3.0	2.9	3.0		2.9		
		I_{OH} = −4 mA	3.6	2.58			2.48		
V_{OL}	Low-Level Output Voltage	V_{IN} = V_{IH} or V_{IL}							V
		I_{OH} = −50 μA	2.0		0	0.1		0.1	
		I_{OH} = −50 μA	3.0		0	0.1		0.1	
		I_{OL} = −4 mA	3.6			0.36		0.44	
I_{OZ}	3-State Output Leakage Current	V_{IN} = V_{IH} or V_{IL}, V_{OUT} = VCC or GND	3.6			±0.25		±2.5	μA
I_{IN}	Input Leakage Current	V_{IN} = 5.5 V or GND	3.6			±0.1		±1.0	
I_{CC}	Quiescent Supply Current	V_{IN} = 5.5 V 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.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	T_A = +25 °C			T_A = −40 °C to +85 °C		Unit
				Min	Typ	Max	Min	Max	
t_{PLH}, t_{PHL}	Propagation Delay CP to Q_n	C_L = 15 pF	2.7		6.1	10.7	1.0	13.5	ns
		C_L = 50 pF			8.6	14.2	1.0	17.0	
		C_L = 15 pF	3.3 ± 0.3		4.7	6.8	1.0	8.0	
		C_L = 50 pF			7.2	10.1	1.0	11.5	
t_{PLH}, t_{PHL}	3-State Output Enable Current	C_L = 15 pF, R_L = 1 kΩ	2.7		9.0	16.9	1.0	20.5	ns
		C_L = 50 pF R_L = 1 kΩ			11.5	20.4	1.0	24.0	
		C_L = 15 pF R_L = 1 kΩ	3.3 ± 0.3		7.1	11.0	1.0	13.0	
		C_L = 50 pF R_L = 1 kΩ			9.6	14.5	1.0	16.5	
t_{PZL}, t_{PZH}	3-State Output Disable Current	C_L = 50 pF R_L = 1 kΩ	2.7	8.0	11.5	18.0	1.0	21.0	ns
		C_L = 50 pF R_L = 1 kΩ	3.3 ± 0.3	5.5	9.6	12.8	1.0	14.5	
t_{OSLH}, t_{OSHL}	Output to Output Skew (Note 5)	C_L = 50 pF	2.7	8.0		1.5		1.5	ns
			3.3 ± 0.3	5.5		1.5		1.5	

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

NOISE CHARACTERISTICS (Note 6)

Symbol	Characteristic	C_L (pF)	V_{CC} (V)	T_A = +25 °C		Unit
				Typ	Limit	
V_{OLP}	Quiet Output Dynamic Peak V_{OL}	50	3.3	0.5	0.8	V
V_{OLV}	Quiet Output Dynamic Valley V_{OL}	50	3.3	0.5	0.8	V
V_{IHD}	Minimum HIGH Level Dynamic Input Voltage	50	3.3		2.0	V
V_{ILD}	Maximum HOW Level Dynamic Input Voltage	50	3.3		0.8	V

6. Input $t_r = t_f$ = 3 ns.

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	T_A = +25 °C			T_A = −40 °C to +85 °C		Unit
		Min	Typ	Max	Min	Max	
C_{IN}	Input Capacitance T/$\overline{R}$, $\overline{OE}$		4	10		10	pF
C_{OUT}	Output Capacitance A_n, B_n		6				pF
C_{PD}	Power Dissipation Capacitance (Note 7)		21				pF

7. 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 following equation:

$$ICC(opr.) = \frac{C_{PD} \times V_{CC} \times f_{IN} + I_{CC}}{8\ (\text{per bit})} \qquad \text{(eq. 1)}$$

ORDERING INFORMATION

Device	Marking	Package	Shipping†
74LVX245MTCX	LCX 275	TSSOP-20 (Pb-Free)	2500 / 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.

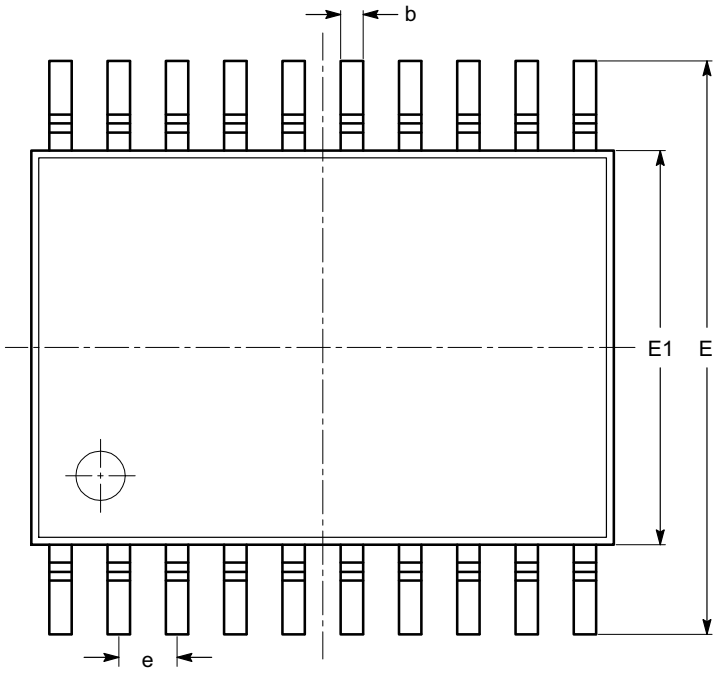
REVISION HISTORY

Revision	Description of Changes	Date
2	Modified voltage ratings from 7.0 V to 6.5 V. Removed discontinued devices from ordering table. Converted the Data Sheet to **onsemi** format.	07/10/2025

This document has undergone updates prior to the inclusion of this revision history table. The changes tracked here only reflect updates made on the noted approval dates.

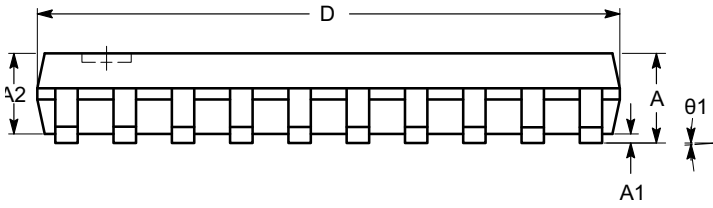
TSSOP20, 4.4x6.5
CASE 948AQ
ISSUE A

DATE 19 MAR 2009

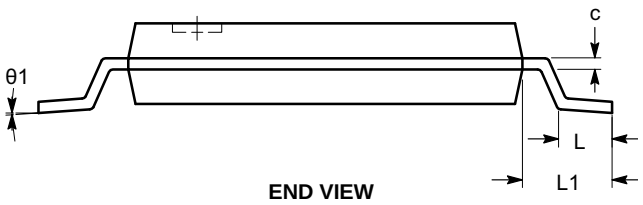


TOP VIEW

SYMBOL	MIN	NOM	MAX
A			1.20
A1	0.05		0.15
A2	0.80		1.05
b	0.19		0.30
c	0.09		0.20
D	6.40	6.50	6.60
E	6.30	6.40	6.50
E1	4.30	4.40	4.50
e		0.65 BSC	
L	0.45	0.60	0.75
L1		1.00 REF	
θ	0°		8°



SIDE VIEW



END VIEW

Notes:
(1) All dimensions are in millimeters. Angles in degrees.
(2) Complies with JEDEC MO-153.

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