

MC74LVX245

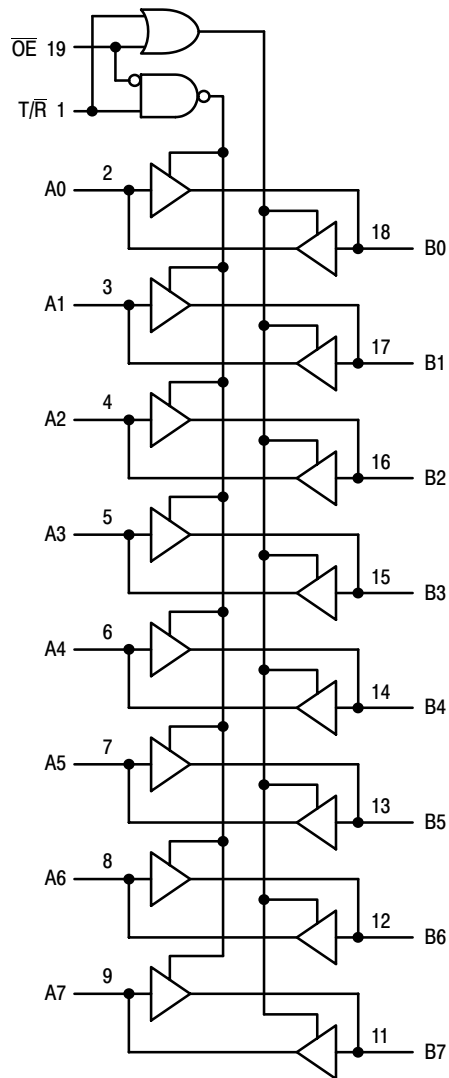


Figure 2. Logic Diagram

Table 1. PIN NAMES

Pins	Function
\overline{OE}	Output Enable Input
T/R	Transmit/Receive Input
A0–A7	Side A 3–State Inputs or 3–State Outputs
B0–B7	Side B 3–State Inputs or 3–State Outputs

INPUTS		OPERATING MODE Non-Inverting
OE	T/R	
L	L	B Data to A Bus
L	H	A Data to B Bus
H	X	Z

H = High Voltage Level; L = Low Voltage Level; Z = High Impedance State; X = High or Low Voltage Level and Transitions are Acceptable; For I_{CC} reasons, Do Not Float Inputs

ORDERING INFORMATION

Device	Package	Shipping [†]
MC74LVX245DWR2	SOIC–20	1000 / Tape & Reel
MC74LVX245DWR2G	SOIC–20 (Pb–Free)	1000 / Tape & Reel
MC74LVX245DTR2	TSSOP–20*	2500 / Tape & Reel
MC74LVX245M	SOEIAJ–20 (Pb–Free)	50 Units / Rail
MC74LVX245MEL	SOEIAJ–20 (Pb–Free)	2000 / 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.

*This package is inherently Pb–Free.

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MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	DC Supply Voltage	-0.5 to +7.0	V
V_{in}	DC Input Voltage (T/R, OE)	-0.5 to +7.0	V
$V_{I/O}$	DC Output Voltage	-0.5 to V_{CC} +0.5	V
I_{IK}	Input Diode Current	-20	mA
I_{OK}	Output Diode Current	±20	mA
I_{out}	DC Output Current, per Pin	±25	mA
I_{CC}	DC Supply Current, V_{CC} and GND Pins	±75	mA
P_D	Power Dissipation	180	mW
T_{stg}	Storage Temperature	-65 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage	2.0	3.6	V
V_{in}	DC Input Voltage (T/R, OE)	0	5.5	V
$V_{I/O}$	DC Output Voltage	0	V_{CC}	V
T_A	Operating Temperature, All Package Types	-40	+85	°C
$\Delta t/\Delta V$	Input Rise and Fall Time	0	100	ns/V

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	V_{CC} V	$T_A = 25^\circ\text{C}$			$T_A = -40 \text{ to } 85^\circ\text{C}$		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 ($V_{in} = V_{IH}$ or V_{IL})	$I_{OH} = -50 \mu\text{A}$ $I_{OH} = -50 \mu\text{A}$ $I_{OH} = -4 \text{ mA}$	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 ($V_{in} = V_{IH}$ or V_{IL})	$I_{OL} = 50 \mu\text{A}$ $I_{OL} = 50 \mu\text{A}$ $I_{OL} = 4 \text{ mA}$	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	$V_{in} = 5.5 \text{ V}$ or GND (T/R, OE)	3.6			±0.1		±1.0	μA
I_{OZ}	Maximum 3-State Leakage Current	$V_{in} = V_{IL}$ or V_{IH} $V_{out} = V_{CC}$ or GND	3.6			±0.2 5		±2.5	μA
I_{CC}	Quiescent Supply Current	$V_{in} = V_{CC}$ or GND	3.6			4.0		40.0	μA

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AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0$ ns)

Symbol	Parameter	Test Conditions	T _A = 25°C			T _A = – 40 to 85°C		Unit
			Min	Typ	Max	Min	Max	
t _{PLH} , t _{PHL}	Propagation Delay Input to Output	V _{CC} = 2.7 V C _L = 15 pF C _L = 50 pF		6.1 8.6	10.7 14.2	1.0 1.0	13.5 17.0	ns
		V _{CC} = 3.3 ± 0.3 V C _L = 15 pF C _L = 50 pF		4.7 7.2	6.6 10.1	1.0 1.0	8.0 11.5	
t _{PZL} , t _{PZH}	Output Enable Time to High and Low Level	V _{CC} = 2.7 V C _L = 15 pF R _L = 1 kΩ C _L = 50 pF		9.0 11.5	16.9 20.4	1.0 1.0	20.5 24.0	ns
		V _{CC} = 3.3 ± 0.3 V C _L = 15 pF R _L = 1 kΩ C _L = 50 pF		7.1 9.6	11.0 14.5	1.0 1.0	13.0 16.5	
t _{PLZ} , t _{PHZ}	Output Disable Time From High and Low Level	V _{CC} = 2.7 V C _L = 50 pF R _L = 1 kΩ		11.5	18.0	1.0	21.0	ns
		V _{CC} = 3.3 ± 0.3 V C _L = 50 pF R _L = 1 kΩ		9.6	12.8	1.0	14.5	
t _{OSHL} , t _{OSLH}	Output-to-Output Skew (Note 1)	V _{CC} = 2.7 V C _L = 50 pF V _{CC} = 3.3 ± 0.3 V C _L = 50 pF			1.5 1.5		1.5 1.5	ns

1. Skew is defined as the absolute value of the difference between the actual propagation delay for any two separate outputs of the same device. The specification applies to any outputs switching in the same direction, either HIGH-to-LOW (t_{OSHL}) or LOW-to-HIGH (t_{OSLH}); parameter guaranteed by design.

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	T _A = 25°C			T _A = – 40 to 85°C		Unit
		Min	Typ	Max	Min	Max	
C _{in}	Input Capacitance (T/R, OE)		4	10		10	pF
C _{I/O}	Maximum 3-State I/O Capacitance		8				pF
C _{PD}	Power Dissipation Capacitance (Note 2)		21				pF

2. 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} • V_{CC} • f_{in} + I_{CC}/8 (per bit). C_{PD} is used to determine the no-load dynamic power consumption; P_D = C_{PD} • V_{CC}² • f_{in} + I_{CC} • V_{CC}.

NOISE CHARACTERISTICS (Input t_r = t_f = 3.0ns, C_L = 50pF, V_{CC} = 3.3V, Measured in SOIC Package)

Symbol	Characteristic	T _A = 25°C		Unit
		Typ	Max	
V _{OLP}	Quiet Output Maximum Dynamic V _{OL}	0.5	0.8	V
V _{OLV}	Quiet Output Minimum Dynamic V _{OL}	–0.5	–0.8	V
V _{IHD}	Minimum High Level Dynamic Input Voltage		2.0	V
V _{ILD}	Maximum Low Level Dynamic Input Voltage		0.8	V

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SWITCHING WAVEFORMS

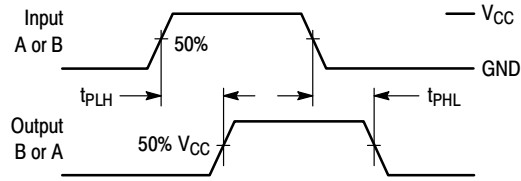


Figure 3.

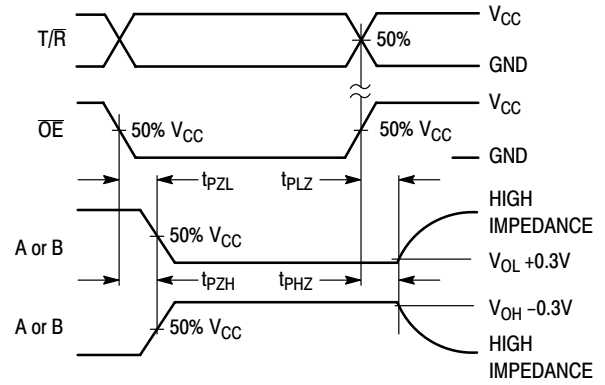
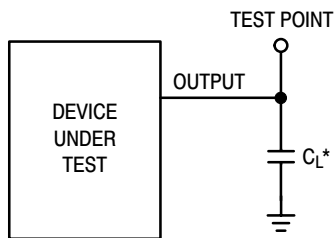


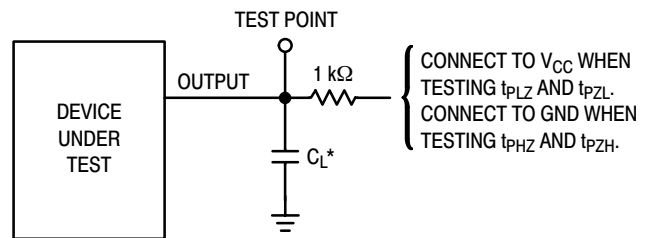
Figure 4.

TEST CIRCUITS



*Includes all probe and jig capacitance

Figure 5. Propagation Delay Test Circuit



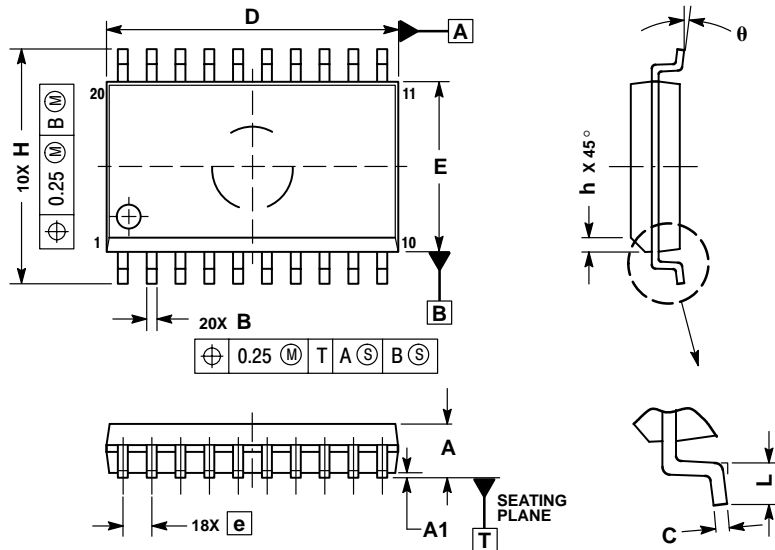
*Includes all probe and jig capacitance

Figure 6. 3-State Test Circuit

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PACKAGE DIMENSIONS

SOIC-20
DW SUFFIX
CASE 751D-05
ISSUE G

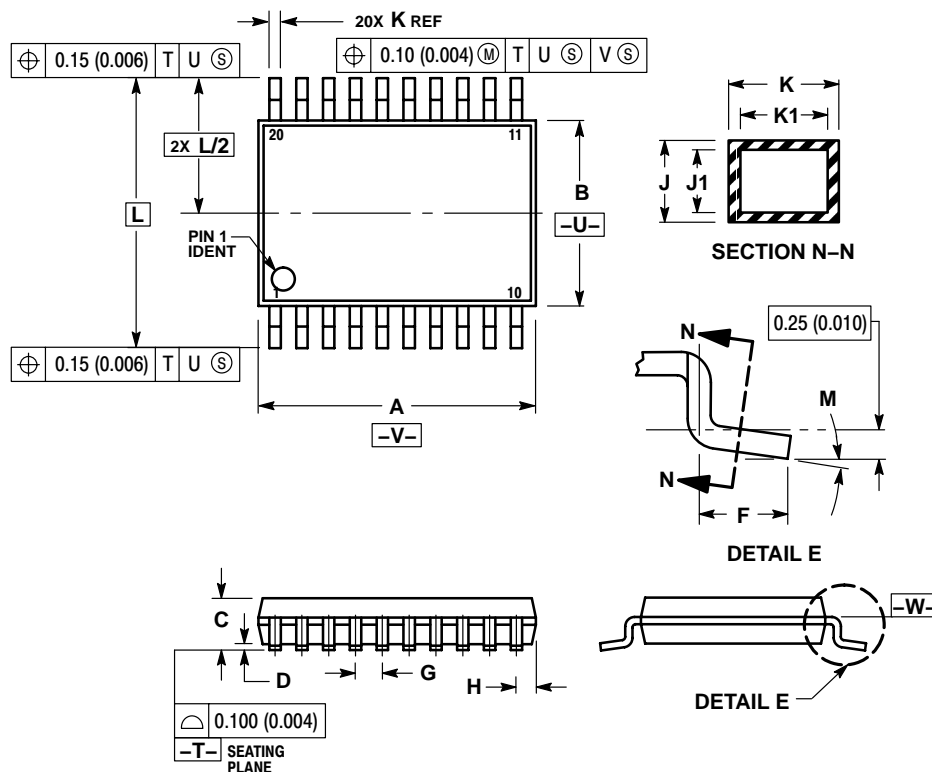


NOTES:

1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

DIM	MILLIMETERS	
	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
theta	0°	7°

TSSOP-20
DT SUFFIX
CASE 948E-02
ISSUE B



NOTES:

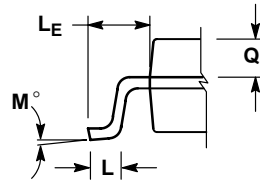
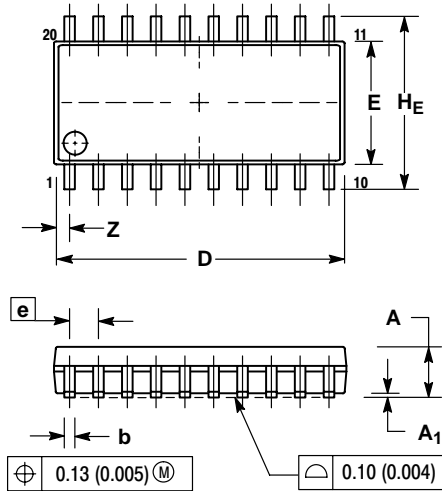
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	6.40	6.60	0.252	0.260
B	4.30	4.50	0.169	0.177
C	---	1.20	---	0.047
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.65 BSC		0.026 BSC	
H	0.27	0.37	0.011	0.015
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.19	0.30	0.007	0.012
K1	0.19	0.25	0.007	0.010
L	6.40 BSC		0.252 BSC	
M	0°	8°	0°	8°

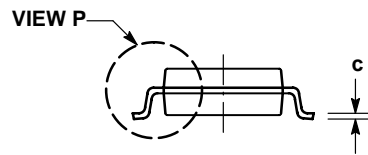
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PACKAGE DIMENSIONS

SOEIAJ-20
M SUFFIX
CASE 967-01
ISSUE O



DETAIL P




NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A ₁	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.18	0.27	0.007	0.011
D	12.35	12.80	0.486	0.504
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
HE	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
LE	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q ₁	0.70	0.90	0.028	0.035
Z	---	0.81	---	0.032

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