

MC74LCX16245

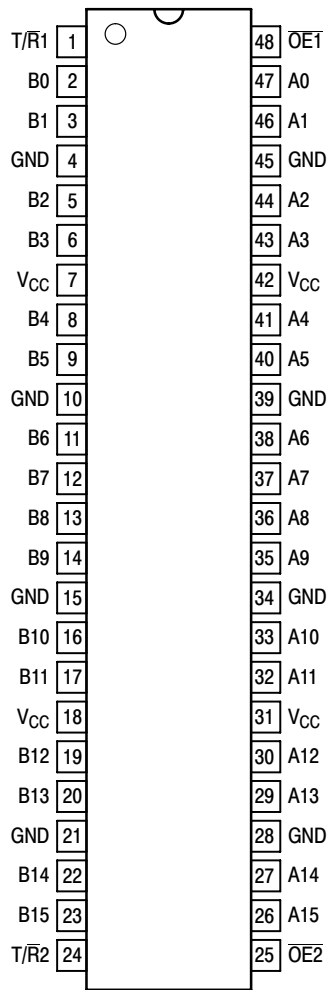


Figure 1. Pinout: 48-Lead (Top View)

Table 1. PIN NAMES

Pins	Function
$\overline{OE}n$	Output Enable Inputs
T/Rn	Transmit/Receive Inputs
A0 – A15	Side A Inputs or 3-State Outputs
B0 – B15	Side B Inputs or 3-State Outputs

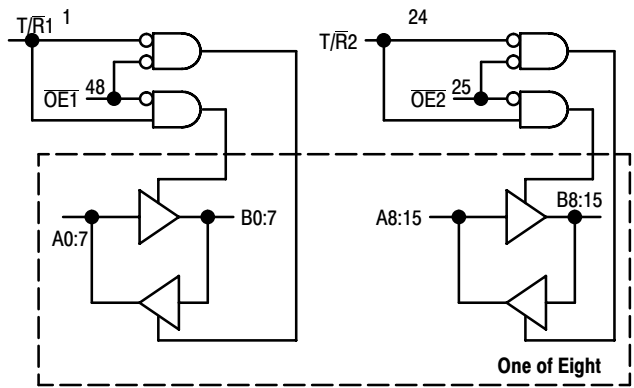


Figure 2. Logic Diagram

TRUTH TABLE

Inputs		Outputs	Inputs		Outputs
OE1	T/R1		OE2	T/R2	
L	L	Bus B0:7 Data to Bus A0:7	L	L	Bus B8:15 Data to Bus A8:15
L	H	Bus A0:7 Data to Bus B0:7	L	H	Bus A8:15 Data to Bus B8:15
H	X	High Z State on A0:7, B0:7	H	X	High Z State on A8:15, B8:15

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

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ORDERING INFORMATION

Device	Package	Shipping [†]
MC74LCX16245DT	TSSOP-48*	39 Units / Rail
MC74LCX16245DTG	TSSOP-48*	39 Units / Rail
MC74LCX16245DTR2	TSSOP-48*	2500 / Tape & Reel
M74LCX16245DTR2G	TSSOP-48*	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.

*This package is inherently Pb-Free.

MAXIMUM RATINGS

Symbol	Parameter	Value	Condition	Unit
V _{CC}	DC Supply Voltage	-0.5 to +7.0		V
V _I	DC Input Voltage	-0.5 ≤ V _I ≤ +7.0		V
V _O	DC Output Voltage	-0.5 ≤ V _O ≤ +7.0	Output in 3-State	V
		-0.5 ≤ V _O ≤ V _{CC} + 0.5	Output in HIGH or LOW State. (Note 1)	V
I _{IK}	DC Input Diode Current	-50	V _I < GND	mA
I _{OK}	DC Output Diode Current	-50	V _O < GND	mA
		+50	V _O > V _{CC}	mA
I _O	DC Output Source/Sink Current	±50		mA
I _{CC}	DC Supply Current Per Supply Pin	±100		mA
I _{GND}	DC Ground Current Per Ground Pin	±100		mA
T _{STG}	Storage Temperature Range	-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.

1. I_O absolute maximum rating must be observed.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage Operating Data Retention Only	2.0 1.5	2.5, 3.3 2.5, 3.3	3.6 3.6	V
V _I	Input Voltage	0		5.5	V
V _O	Output Voltage (HIGH or LOW State) (3-State)	0 0		V _{CC} 5.5	V
I _{OH}	HIGH Level Output Current V _{CC} = 3.0 V - 3.6 V V _{CC} = 2.7 V - 3.0 V V _{CC} = 2.3 V - 2.7 V			- 24 - 12 - 8	mA
I _{OL}	LOW Level Output Current V _{CC} = 3.0 V - 3.6 V V _{CC} = 2.7 V - 3.0 V V _{CC} = 2.3 V - 2.7 V			+ 24 + 12 + 8	mA
T _A	Operating Free-Air Temperature	-40		+85	°C
Δt/ΔV	Input Transition Rise or Fall Rate, V _{IN} from 0.8 V to 2.0 V, V _{CC} = 3.0 V	0		10	ns/V

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DC ELECTRICAL CHARACTERISTICS

Symbol	Characteristic	Condition	T _A = -40°C to +85°C		Unit
			Min	Max	
V _{IH}	HIGH Level Input Voltage (Note 2)	2.3 V ≤ V _{CC} ≤ 2.7 V	1.7		V
		2.7 V ≤ V _{CC} ≤ 3.6 V	2.0		
V _{IL}	LOW Level Input Voltage (Note 2)	2.3 V ≤ V _{CC} ≤ 2.7 V		0.7	V
		2.7 V ≤ V _{CC} ≤ 3.6 V		0.8	
V _{OH}	HIGH Level Output Voltage	2.3 V ≤ V _{CC} ≤ 3.6 V; I _{OL} = 100 μA	V _{CC} - 0.2		V
		V _{CC} = 2.3 V; I _{OH} = -8 mA	1.8		
		V _{CC} = 2.7 V; I _{OH} = -12 mA	2.2		
		V _{CC} = 3.0 V; I _{OH} = -18 mA	2.4		
		V _{CC} = 3.0 V; I _{OH} = -24 mA	2.2		
V _{OL}	LOW Level Output Voltage	2.3 V ≤ V _{CC} ≤ 3.6 V; I _{OL} = 100 μA		0.2	V
		V _{CC} = 2.3 V; I _{OL} = 8 mA		0.6	
		V _{CC} = 2.7 V; I _{OL} = 12 mA		0.4	
		V _{CC} = 3.0 V; I _{OL} = 16 mA		0.4	
		V _{CC} = 3.0 V; I _{OL} = 24 mA		0.55	
I _I	Input Leakage Current	2.3 V ≤ V _{CC} ≤ 3.6 V; 0 V ≤ V _I ≤ 5.5 V		±5.0	μA
I _{OZ}	3-State Output Current	2.3 ≤ V _{CC} ≤ 3.6 V; 0V ≤ V _O ≤ 5.5 V; V _I = V _{IH} or V _{IL}		±5.0	μA
I _{OFF}	Power-Off Leakage Current	V _{CC} = 0 V; V _I or V _O = 5.5 V		10	μA
I _{CC}	Quiescent Supply Current	2.3 ≤ V _{CC} ≤ 3.6 V; V _I = GND or V _{CC}		20	μA
		2.3 ≤ V _{CC} ≤ 3.6 V; 3.6 ≤ V _I or V _O ≤ 5.5 V		±20	μA
ΔI _{CC}	Increase in I _{CC} per Input	2.3 ≤ V _{CC} ≤ 3.6 V; V _{IH} = V _{CC} - 0.6 V		500	μA

2. These values of V_I are used to test DC electrical characteristics only.

AC CHARACTERISTICS t_R = t_F = 2.5 ns; R_L = 500 Ω

Symbol	Parameter	Waveform	T _A = -40°C to +85°C						Unit
			V _{CC} = 3.3 V ± 0.3 V C _L = 50 pF		V _{CC} = 2.7 V C _L = 50 pF		V _{CC} = 2.5 V ± 0.2 V C _L = 30 pF		
			Min	Max	Min	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation Delay Input to Output	1	1.5 1.5	4.5 4.5	1.5 1.5	5.2 5.2	1.5 1.5	5.4 5.4	ns
t _{PZH} t _{PZL}	Output Enable Time to High and Low Level	2	1.5 1.5	6.5 6.5	1.5 1.5	7.2 7.2	1.5 1.5	8.5 8.5	ns
t _{PHZ} t _{PLZ}	Output Disable Time From High and Low Level	2	1.5 1.5	6.4 6.4	1.5 1.5	6.9 6.9	1.5 1.5	7.7 7.7	ns
t _{OSHL} t _{OSLH}	Output-to-Output Skew (Note 3)			1.0 1.0					ns

3. 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.

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DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Characteristic	Condition	T _A = +25°C			Unit
			Min	Typ	Max	
V _{OLP}	Dynamic LOW Peak Voltage (Note 4)	V _{CC} = 3.3 V, C _L = 50 pF, V _{IH} = 3.3 V, V _{IL} = 0 V V _{CC} = 2.5 V, C _L = 30 pF, V _{IH} = 2.5 V, V _{IL} = 0 V		0.8 0.6		V V
V _{OLV}	Dynamic LOW Valley Voltage (Note 4)	V _{CC} = 3.3 V, C _L = 50 pF, V _{IH} = 3.3 V, V _{IL} = 0 V V _{CC} = 2.5 V, C _L = 30 pF, V _{IH} = 2.5 V, V _{IL} = 0 V		-0.8 -0.6		V V

4. Number of outputs defined as "n". Measured with "n-1" outputs switching from HIGH-to-LOW or LOW-to-HIGH. The remaining output is measured in the LOW state.

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Condition	Typical	Unit
C _{IN}	Input Capacitance	V _{CC} = 3.3 V, V _I = 0 V or V _{CC}	7	pF
C _{I/O}	Input/Output Capacitance	V _{CC} = 3.3 V, V _I = 0 V or V _{CC}	8	pF
C _{PD}	Power Dissipation Capacitance	10 MHz, V _{CC} = 3.3 V, V _I = 0 V or V _{CC}	20	pF

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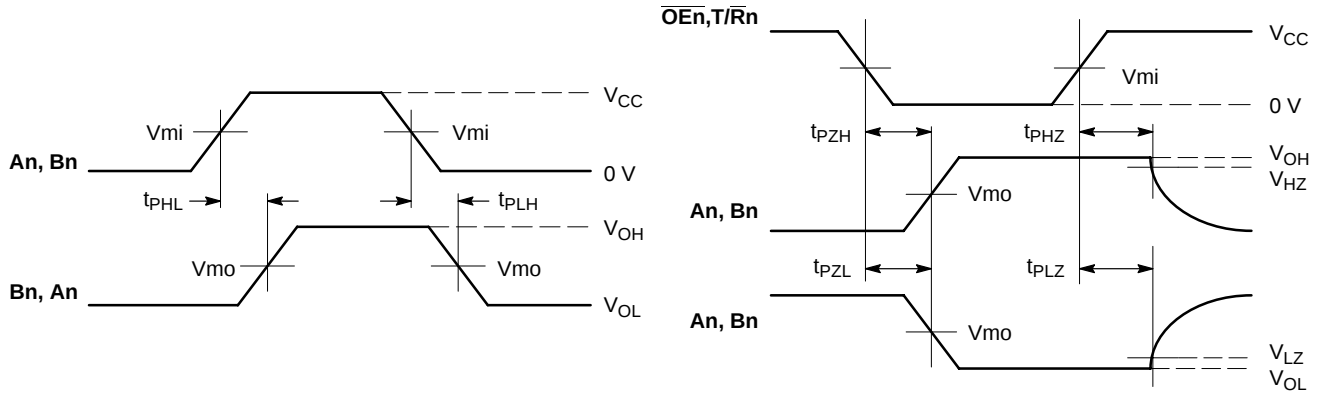


Figure 3. AC Waveforms

Table 2. AC WAVEFORMS

Symbol	V_{CC}		
	$3.3 \text{ V} \pm 0.3 \text{ V}$	2.7 V	$2.5 \text{ V} \pm 0.2 \text{ V}$
V_{mi}	1.5 V	1.5 V	$V_{CC} / 2$
V_{mo}	1.5 V	1.5 V	$V_{CC} / 2$
V_{HZ}	$V_{OL} + 0.3 \text{ V}$	$V_{OL} + 0.3 \text{ V}$	$V_{OL} + 0.15 \text{ V}$
V_{LZ}	$V_{OH} - 0.3 \text{ V}$	$V_{OH} - 0.3 \text{ V}$	$V_{OH} - 0.15 \text{ V}$

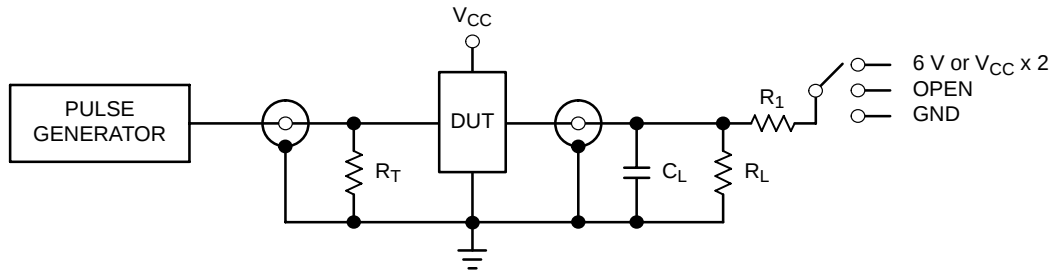


Figure 4. Test Circuit

Table 3. TEST CIRCUIT

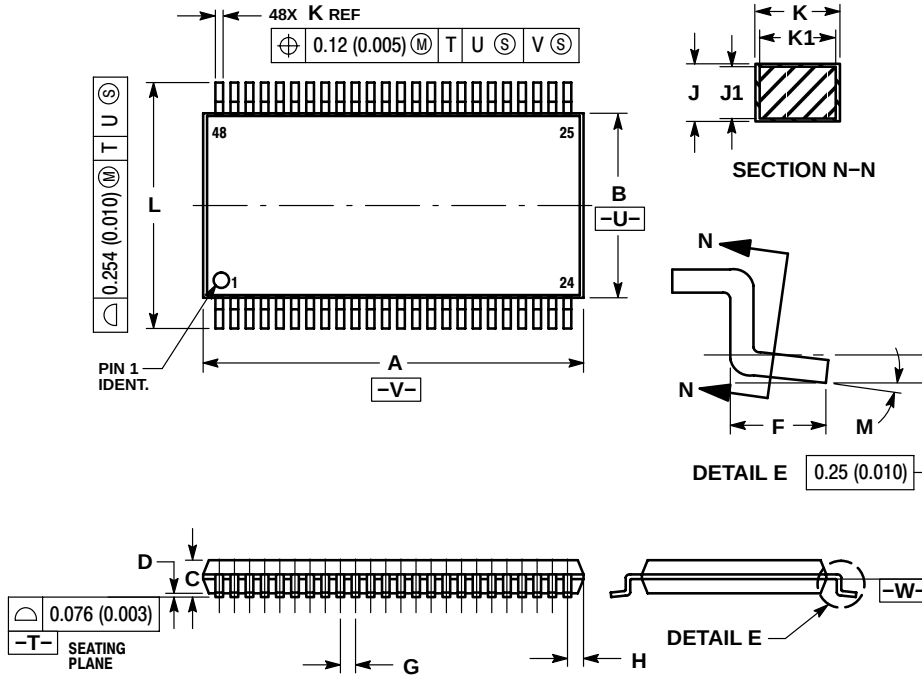
TEST	SWITCH
t_{PLH} , t_{PHL}	Open
t_{PZL} , t_{PLZ}	6 V at $V_{CC} = 3.3 \pm 0.3 \text{ V}$ 6 V at $V_{CC} = 2.5 \pm 0.2 \text{ V}$
Open Collector/Drain t_{PLH} and t_{PHL}	6 V
t_{PZH} , t_{PHZ}	GND

$C_L = 50 \text{ pF}$ at $V_{CC} = 3.3 \pm 0.3 \text{ V}$ or equivalent (includes jig and probe capacitance)
 $C_L = 30 \text{ pF}$ at $V_{CC} = 2.5 \pm 0.2 \text{ V}$ or equivalent (includes jig and probe capacitance)
 $R_L = R_1 = 500 \Omega$ or equivalent
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

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PACKAGE DIMENSIONS

TSSOP-48
DT SUFFIX
CASE 1201-01
ISSUE A



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. 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.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSIONS A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	12.40	12.60	0.488	0.496
B	6.00	6.20	0.236	0.244
C	---	1.10	---	0.043
D	0.05	0.15	0.002	0.006
F	0.50	0.75	0.020	0.030
G	0.50	BSC	0.0197	BSC
H	0.37	---	0.015	---
J	0.09	0.20	0.004	0.008
J1	0.09	0.16	0.004	0.006
K	0.17	0.27	0.007	0.011
K1	0.17	0.23	0.007	0.009
L	7.95	8.25	0.313	0.325
M	0 °	8 °	0 °	8 °

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