Low-Voltage CMOS Hex Buffer with Open Drain Outputs

With 5 V-Tolerant Inputs

The MC74LCX07 is a high performance hex buffer operating from a 2.3 to 3.6 V supply. High impedance TTL compatible inputs significantly reduce current loading to input drivers. These LCX devices have open drain outputs which provide the ability to set output levels, or do active–HIGH AND or active–LOW OR functions. A $V_{\rm I}$ specification of 5.5 V allows MC74LCX07 inputs to be safely driven from 5.0 V devices.

Features

- Designed for 2.3 to 3.6 V V_{CC} Operation
- 5.0 V Tolerant Inputs/Outputs
- LVTTL Compatible
- LVCMOS Compatible
- 24 mA Output Sink Capability
- $\bullet\,$ Near Zero Static Supply Current (10 $\mu A)$ Substantially Reduces System Power Requirements
- Latchup Performance Exceeds 500 mA
- Wired-OR, Wired-AND
- Output Level Can Be Set Externally Without Affecting Speed of Device
- ESD Performance: Human Body Model >1500 V; Machine Model >200 V
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

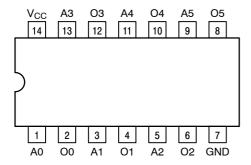


Figure 1. Pinout: 14-Lead (Top View)



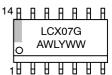
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MARKING DIAGRAMS



SOIC-14 D SUFFIX CASE 751A





TSSOP-14 DT SUFFIX CASE 948G



A = Assembly Location

L, WL = Wafer Lot
Y, YY = Year
W, WW = Work Week
G = Pb-Free Package
■ Pb-Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 2 of this data sheet.

1

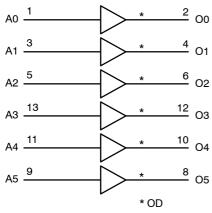


Figure 2. Logic Diagram

PIN NAMES

Pins	Function
An	Data Inputs
On	Outputs

TRUTH TABLE

An	On
L	L
H	Z

MAXIMUM RATINGS

Symbol	Parameter	Value	Condition	Unit
V _{CC}	DC Supply Voltage	-0.5 to +7.0		V
VI	DC Input Voltage	$-0.5 \le V_{ } \le +7.0$		V
Vo	DC Output Voltage	$-0.5 \le V_{O} \le +7.0$	Output in HIGH or LOW State (Note 1)	V
I _{IK}	DC Input Diode Current	-50	V _I < GND	mA
lok	DC Output Diode Current	-50	V _O < GND	mA
		+50	V _O > V _{CC}	mA
Io	DC Output/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
MSL	Moisture Sensitivity		Level 1	

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. Io absolute maximum rating must be observed.

ORDERING INFORMATION

Device	Package	Shipping [†]
MC74LCX07DG	SOIC-14 (Pb-Free)	55 Units / Rail
MC74LCX07DR2G	SOIC-14 (Pb-Free)	2500 Tape & Reel
MC74LCX07DTG	TSSOP-14 (Pb-Free)	96 Units / Rail
MC74LCX07DTR2G	TSSOP-14 (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.

RECOMMENDED OPERATING CONDITIONS

Symbol	Para	ameter	Min	Тур	Max	Unit
V _{CC}	Supply Voltage	Operating Data Retention Only	2.0 1.5	2.3 to 3.3	5.5 5.5	V
VI	Input Voltage		0		5.5	V
Vo	Output Voltage	(HIGH or LOW State)	0		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
l _{OL}	LOW Level Output Current	$V_{CC} = 3.0 \text{ V} - 3.6 \text{ V}$ $V_{CC} = 2.7 \text{ V} - 3.0 \text{ V}$ $V_{CC} = 2.3 \text{ V} - 2.7 \text{ V}$			+24 +12 +8	mA
T _A	Operating Free-Air Temperature		-40		+85	°C
$\Delta t/\Delta V$	Input Transition Rise or Fall Rate, V	N from 0.8 V to 2.0 V, V _{CC} = 3.0 V	0		10	ns/V

DC ELECTRICAL CHARACTERISTICS

			T _A = -40°0	C to +85°C	
Symbol	Characteristic	Condition	Min	Max	Unit
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		
		4.5 V ≤ V _{CC} ≤ 5.25 V	3.125		
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	1
		4.5 V ≤ V _{CC} ≤ 5.25 V		0.8	1
V _{OL}	LOW Level Output Voltage	$2.3 \text{ V} \le \text{V}_{CC} \le 3.6 \text{ V}; \text{I}_{OL} = 100 \mu\text{A}$		0.2	V
		V _{CC} = 2.3 V; I _{OL} = 8 mA		0.3	1
		V _{CC} = 2.7 V; I _{OL} = 12 mA		0.4	1
		V _{CC} = 3.0 V; I _{OL} = 16 mA		0.4	1
		V _{CC} = 3.0 V; I _{OL} = 24 mA		0.55	1
l _{OZ}	3-State Output Current	$V_{CC} = 3.6 \text{ V}, V_{IN} = V_{IH} \text{ or } V_{IL}, V_{OUT} = 0 \text{ to } 5.5 \text{ V}$		±5	μΑ
I _{OFF}	Power Off Leakage Current	V _{CC} = 0, V _{IN} = 5.5 V or V _{OUT} = 5.5 V		10	μΑ
I _{IN}	Input Leakage Current	V _{CC} = 3.6 V, V _{IN} = 5.5 V or GND		±5	μΑ
I _{CC}	Quiescent Supply Current	V _{CC} = 3.6 V, V _{IN} = 5.5 V or GND		10	μΑ
Δl _{CC}	Increase in I _{CC} per Input	$2.3~V \le V_{CC} \le 3.6~V$ $4.5~V \le V_{CC} \le 5.5~V$ $V_{CC} = 5.25~V, one input at 3.125~V, other inputs at V_{CC} or GND$		500 1.0 10	μA mA mA

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

AC ELECTRICAL CHARACTERISTICS

			Limits					
			T _A = -40°C to +85°C					
		$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$ $V_{CC} = 2.7 \text{ V}$ $V_{CC} = 2.5 \text{ V} \pm 0.2 \text{ V}$						
		C _L = 5	C _L = 50 pF C _L = 50 pF C _L = 3			30 pF		
Symbol	Parameter	Min	Max	Min	Max	Min	Max	Unit
t _{PLZ}	Propagation Delay	0.5	3.0	8.0	3.7	8.0	3.8	ns
t_{PZL}	Input to Output	0.5	3.0	0.8	3.7	8.0	3.8	ns

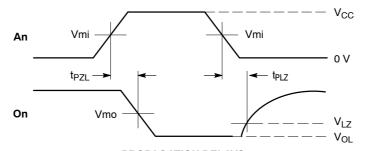
DYNAMIC SWITCHING CHARACTERISTICS

			T,	_A = +25°	С	
Symbol	Characteristic	Condition	Min	Тур	Max	Unit
V _{OLP}	Dynamic LOW Peak Voltage (Note 3)	$V_{CC} = 3.3 \text{ V}, C_L = 50 \text{ pF}, V_{IH} = 3.3 \text{ V}, V_{IL} = 0 \text{ V}$		0.9		V
		$V_{CC} = 2.5 \text{ V}, C_L = 30 \text{ pF}, V_{IH} = 2.5 \text{ V}, V_{IL} = 0 \text{ V}$		0.7		
V _{OLV}	Dynamic LOW Valley Voltage (Note 3)	$V_{CC} = 3.3 \text{ V}, C_L = 50 \text{ pF}, V_{IH} = 3.3 \text{ V}, V_{IL} = 0 \text{ V}$		-0.8		V
		$V_{CC} = 2.5 \text{ V}, C_L = 30 \text{ pF}, V_{IH} = 2.5 \text{ V}, V_{IL} = 0 \text{ V}$		-0.6		

^{3.} 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 _{OUT}	Output Capacitance	$V_{CC} = 3.3 \text{ V}, V_I = 0 \text{ V or } V_{CC}$	8	pF
C _{PD}	Power Dissipation Capacitance	10 MHz, V_{CC} = 3.3 V, V_{I} = 0 V or V_{CC}	25	pF

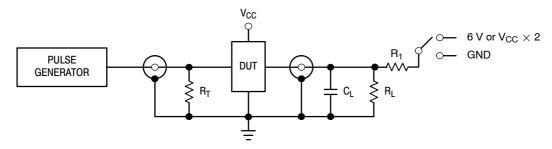


PROPAGATION DELAYS

 t_R = t_F = 2.5 ns, 10% to 90%; f = 1MHz; t_W = 500 ns

	V _{CC}				
Symbol	3.3 V ± 0.3 V	2.7 V	2.5 V ± 0.2 V		
Vmi	1.5 V	1.5 V	V _{CC} /2		
Vmo	1.5 V	1.5 V	V _{CC} /2		
V _{LZ}	V _{OL} + 0.3 V	V _{OL} + 0.3 V	V _{OL} + 015 V		

Figure 3. AC Waveforms



TEST	SWITCH
t _{PZL} , t _{PLZ}	6 V
Open Collector/Drain t _{PLH} and t _{PHL}	6 V
t _{PZH} , t _{PHZ}	GND

 C_L = 50 pF at V_{CC} = 3.3 \pm 0.3 V or equivalent (includes jig and probe capacitance)

 C_L = 30 pF at V_{CC} = 2.5 \pm 0.2 V or equivalent (includes jig and probe capacitance)

 $R_L = R_1 = 500 \Omega$ or equivalent

 $R_T = Z_{OUT}$ of pulse generator (typically 50 Ω)

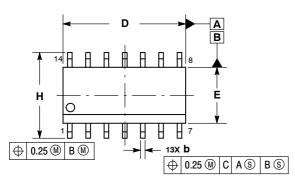
Figure 4. Test Circuit

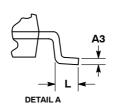


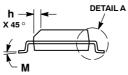
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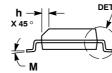
SOIC-14 NB CASE 751A-03 **ISSUE L**

DATE 03 FEB 2016









- NOTES:

 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

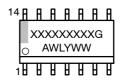
 2. CONTROLLING DIMENSION: MILLIMETERS.

 3. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF AT MANUAL MEDICAL PROTRUSION. MAXIMUM MATERIAL CONDITION.
 DIMENSIONS D AND E DO NOT INCLUDE
 - MOLD PROTRUSIONS.

 5. MAXIMUM MOLD PROTRUSION 0.15 PER
 - SIDE.

	MILLIMETERS		MILLIMETERS INCI		HES
DIM	MIN	MAX	MIN	MAX	
Α	1.35	1.75	0.054	0.068	
A1	0.10	0.25	0.004	0.010	
А3	0.19	0.25	0.008	0.010	
b	0.35	0.49	0.014	0.019	
D	8.55	8.75	0.337	0.344	
Е	3.80	4.00	0.150	0.157	
е	1.27 BSC		0.050	BSC	
Н	5.80	6.20	0.228	0.244	
h	0.25	0.50	0.010	0.019	
L	0.40	1.25	0.016	0.049	
М	0 °	7°	0 °	7 °	

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code = Assembly Location Α

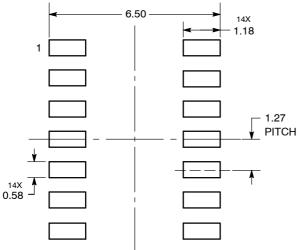
WL = Wafer Lot Υ = Year ww = Work Week G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " •", may or may not be present.

SOLDERING FOOTPRINT*

C SEATING PLANE

е



DIMENSIONS: MILLIMETERS *For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

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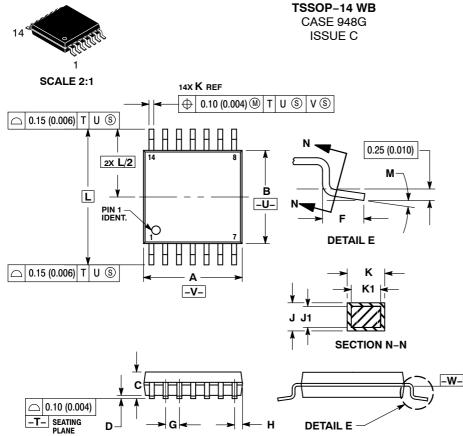
SOIC-14 CASE 751A-03 ISSUE L

DATE 03 FEB 2016

STYLE 1: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 2: CANCELLED	STYLE 3: PIN 1. NO CONNECTION 2. ANODE 3. ANODE 4. NO CONNECTION 5. ANODE 6. NO CONNECTION 7. ANODE 8. ANODE 9. ANODE 10. NO CONNECTION 11. ANODE 12. ANODE 13. NO CONNECTION 14. COMMON CATHODE	STYLE 4: PIN 1. NO CONNECTION 2. CATHODE 3. CATHODE 4. NO CONNECTION 5. CATHODE 6. NO CONNECTION 7. CATHODE 8. CATHODE 9. CATHODE 10. NO CONNECTION 11. CATHODE 12. CATHODE 13. NO CONNECTION 14. COMMON ANODE
STYLE 5: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. NO CONNECTION 7. COMMON ANODE 8. COMMON CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 6: PIN 1. CATHODE 2. CATHODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE 7. CATHODE 8. ANODE 9. ANODE 10. ANODE 11. ANODE 12. ANODE 13. ANODE 14. ANODE	STYLE 7: PIN 1. ANODE/CATHODE 2. COMMON ANODE 3. COMMON CATHODE 4. ANODE/CATHODE 5. ANODE/CATHODE 6. ANODE/CATHODE 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. COMMON CATHODE 12. COMMON ANODE 13. ANODE/CATHODE 14. ANODE/CATHODE	STYLE 8: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. ANODE/CATHODE 7. COMMON ANODE 8. COMMON ANODE 9. ANODE/CATHODE 10. ANODE/CATHODE 11. NO CONNECTION 12. ANODE/CATHODE 13. ANODE/CATHODE 14. COMMON CATHODE

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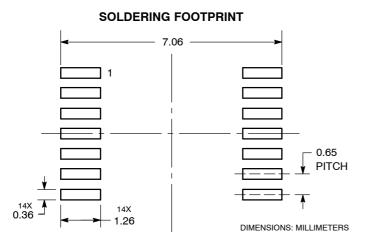
DATE 17 FEB 2016

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.
 DIMENSION B DOES NOT INCLUDE
- INTERLEAD FLASH OR PROTRUSION.
 INTERLEAD FLASH OR PROTRUSION SHALL
- INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE. 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.
 TERMINAL NUMBERS ARE SHOWN FOR DEEEDENGE ONLY.
- REFERENCE ONLY.
 DIMENSION A AND B ARE TO BE
- DETERMINED AT DATUM PLANE -W-.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
Α	4.90	5.10	0.193	0.200
В	4.30	4.50	0.169	0.177
С	-	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	
Н	0.50	0.60	0.020	0.024
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	
М	0°	8 °	0°	8 °

GENERIC MARKING DIAGRAM*





= Assembly Location

= Wafer Lot

= Year

W = Work Week

= Pb-Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot " ■", may or may not be present.

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74AUP1G34FW5-7 74AUP1G07FW5-7 74LVC2G126RA3-7 NLX2G17CMUTCG 74LVCE1G125FZ4-7 Le87501NQC 74AUP1G126FW5-7 TC74HC4050AP(F) 74LVCE1G07FZ4-7 NLX3G16DMUTCG NLX2G06AMUTCG NLVVHC1G50DFT2G NLU2G17AMUTCG
LE87100NQC LE87290YQC LE87290YQCT LE87511NQC LE87511NQCT LE87557NQC LE87557NQCT LE87614MQC
LE87614MQCT 74AUP1G125FW5-7 NLU2G16CMUTCG MC74LCX244MN2TWG NLV74VHC125DTR2G NL17SG126DFT2G