

MC74LVX04DR2 Datasheet

DiGi

Manuf



Electronics Part Number	MC74LVX04DR2-DG
Manufacturer	onsemi
facturer Product Number	MC74LVX04DR2
Description	IC INVERTER 6CH 1-INP 14SOIC
Detailed Description	Inverter IC 6 Channel 14-SOIC

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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
MC74LVX04DR2	onsemi
Series:	Product Status:
74LVX	Obsolete
Logic Type:	Number of Circuits:
Inverter	6
Number of Inputs:	Features:
1	
Voltage - Supply:	Current - Quiescent (Max):
2V ~ 3.6V	2 μΑ
Current - Output High, Low:	Input Logic Level - Low:
4mA, 4mA	0.5V ~ 0.8V
Input Logic Level - High:	Max Propagation Delay @ V, Max CL:
1.5V ~ 2.4V	9.7ns @ 3.3V, 50pF
Operating Temperature:	Mounting Type:
-40°C ~ 85°C	Surface Mount
Supplier Device Package:	Package / Case:
14-SOIC	14-SOIC (0.154", 3.90mm Width)
Base Product Number:	
74LVX04	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
RoHS non-compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	

8542.39.0001

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Hex Inverter With 5 V-Tolerant Inputs

MC74LVX04

The MC74LVX04 is an advanced high speed CMOS hex inverter. The inputs tolerate voltages up to 6.5 V, allowing the interface of 5.0 V systems to 3.0 V systems.

Features

- High Speed: t_{PD} = 4.1 ns (Typ) at V_{CC} = 3.3 V
- Low Power Dissipation: $I_{CC} = 2 \mu A$ (Max) at $T_A = 25^{\circ}C$
- Power Down Protection Provided on Inputs
- Balanced Propagation Delays
- Low Noise: $V_{OLP} = 0.5 V (Max)$
- Pin and Function Compatible with Other Standard Logic Families
- Latchup Performance Exceeds 300 mA
- ESD Performance:

Human Body Model > 2000 V

• These Devices are Pb-Free and are RoHS Compliant

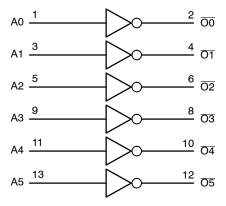


Figure 1. Logic Diagram

PIN NAMES

Pins	Function
An	Data Inputs
On	Outputs

FUNCTION TABLE

An	On
L H	HL

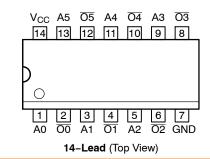
LVX LOW-VOLTAGE CMOS



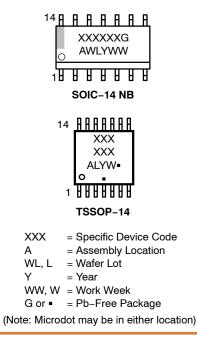
SOIC-14 NB D SUFFIX CASE 751A



PIN ASSIGNMENT



MARKING DIAGRAMS



ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

MC74LVX04

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 _{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	±50	mA
PD	Power Dissipation SOIC TSSOP	1077 833	mW
T _{stg}	Storage Temperature	-65 to +150	°C

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.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V _{CC}	DC Supply Voltage	2.0	3.6	V
V _{in}	DC Input Voltage	0	5.5	V
Vout	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

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.

DC ELECTRICAL CHARACTERISTICS

			V _{CC}		T _A = 25°C		$T_A = -40$) to 85°C	
Symbol	Parameter	Test Conditions	(V)	Min	Тур	Max	Min	Max	Unit
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})	$I_{OH} = -50 \ \mu A$ $I_{OH} = -50 \ \mu A$ $I_{OH} = -4 \ m A$	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})	$I_{OL} = 50 \ \mu A$ $I_{OL} = 50 \ \mu A$ $I_{OL} = 4 \ m A$	2.0 3.0 3.0		0.0 0.0	0.1 0.1 0.36		0.1 0.1 0.44	V
l _{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			2.0		20.0	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.

MC74LVX04

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3.0 \text{ ns}$)

				T _A = 25°C		$T_A = -40$ to $85^{\circ}C$		
Symbol	Parameter	Test Conditions	Min	Тур	Max	Min	Max	Unit
t _{PLH} , t _{PHL}	Propagation Delay, Input to Output	$V_{CC} = 2.7 \text{ V}, C_L = 15 \text{ pF}$ $C_L = 50 \text{ pF}$		5.4 7.9	10.1 13.6	1.0 1.0	12.5 16.0	ns
		$V_{CC} = 3.3 \pm 0.3 \text{ V}, C_L = 15 \text{ pF} \\ C_L = 50 \text{ pF}$		4.1 6.6	6.2 9.7	1.0 1.0	7.5 11.0	
t _{OSHL} t _{OSLH}	Output-to-Output Skew (Note 1)				1.5 1.5		1.5 1.5	ns

 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

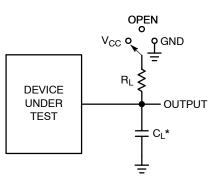
		T _A = 25°C		T _A = −40 to 85°C			
Symbol	Parameter	Min	Тур	Max	Min	Max	Unit
Cin	Input Capacitance		4	10		10	pF
C _{PD}	Power Dissipation Capacitance (Note 2)		18				pF

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: $I_{CC(OPR)} = C_{PD} \bullet V_{CC} \bullet f_{in} + I_{CC}/6$ (per buffer). C_{PD} is used to determine the no–load dynamic power consumption; $P_D = C_{PD} \bullet V_{CC}^2 \bullet f_{in} + I_{CC} \bullet V_{CC}$.

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

		T _A = 25°C		
Symbol	Characteristic	Тур	Max	Unit
V _{OLP}	Quiet Output Maximum Dynamic V _{OL}	0.3	0.5	V
V _{OLV}	Quiet Output Minimum Dynamic V _{OL}	-0.3	-0.5	V
V _{IHD}	Minimum High Level Dynamic Input Voltage		2.0	V
V _{ILD}	Maximum Low Level Dynamic Input Voltage		0.8	V

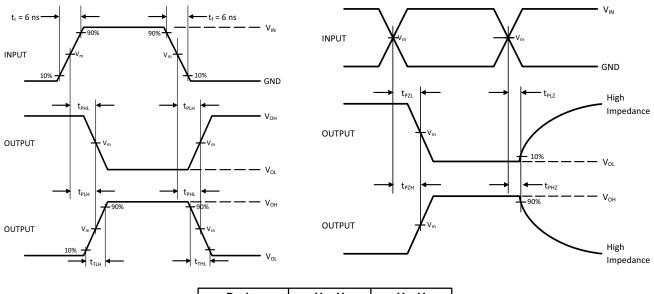
MC74LVX04



Test	Switch Position	CL	RL
t _{PLH} / t _{PHL}	Open	See AC	1 kΩ
t _{PLZ} / t _{PZL}	V _{CC}	Charac- terisitcs	
t _{PHZ} / t _{PZH}	GND	Table	

*CL Includes probe and jig capacitance

Figure 2. Test Circuit



Device	V _{IN} , V	V _m , V
MC74LVX04	V _{CC}	50% x V _{CC}

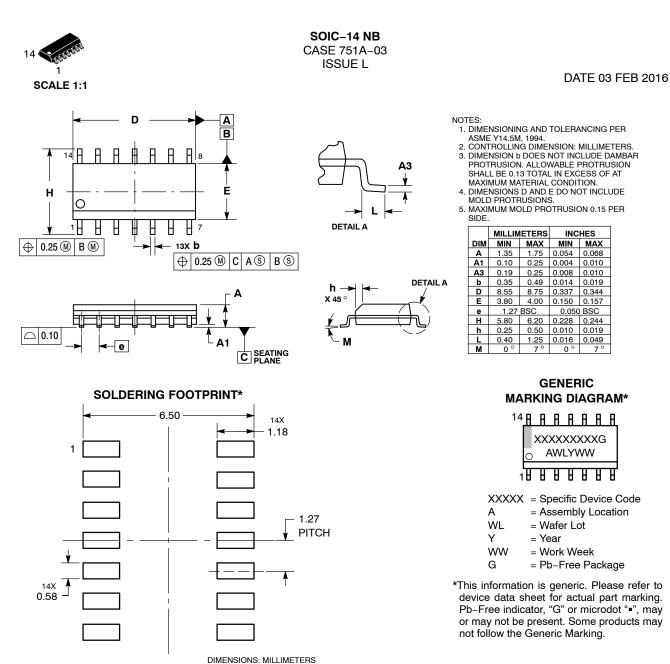
Figure 3. Switching Waveforms

ORDERING INFORMATION

Device	Marking	Package	Shipping [†]
MC74LVX04DR2G	LVX04	SOIC-14	2500 Tape & Reel
MC74LVX04DTR2G	LVX 04	TSSOP-14	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.





DIMENSIONS: MILLIMETER

*For additional information on our Pb–Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

STYLES ON PAGE 2

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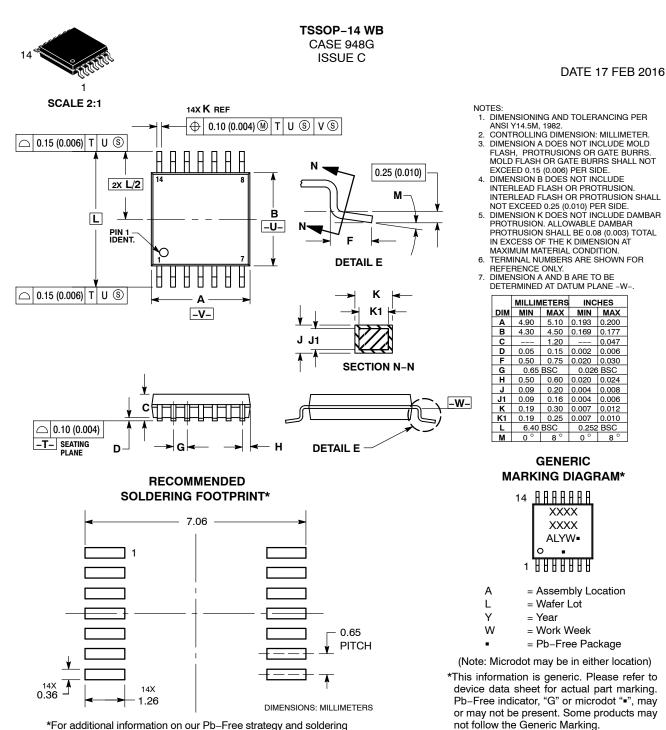
STYLE 1: PIN 1. COMMON CATHODE 2. ANODE/CATHODE 3. ANODE/CATHODE 4. NO CONNECTION 5. ANODE/CATHODE 6. NO CONNECTION 7. ANODE/CATHODE 8. ANODE/CATHODE 9. ANODE/CATHODE 10. NO CONNECTION 11. ANODE/CATHODE 12. ANODE/CATHODE 13. NO CONNECTION 14. COMMON ANODE	STYLE 2: CANCELLED	STYLE 3: PIN 1. NO CONNECTION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



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

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