

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

CD4049UBC • CD4050BC

Hex Inverting Buffer • Hex Non-Inverting Buffer

General Description

The CD4049UBC and CD4050BC hex buffers are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement mode transistors. These devices feature logic level conversion using only one supply voltage (V_{DD}). The input signal high level (V_{IH}) can exceed the V_{DD} supply voltage when these devices are used for logic level conversions. These devices are intended for use as hex buffers, CMOS to DTL/TTL converters, or as CMOS current drivers, and at $V_{DD} = 5.0V$, they can drive directly two DTL/TTL loads over the full operating temperature range.

Features

- Wide supply voltage range: 3.0V to 15V
- Direct drive to 2 TTL loads at 5.0V over full temperature range
- High source and sink current capability
- Special input protection permits input voltages greater than V_{DD}

Applications

- CMOS hex inverter/buffer
- CMOS to DTL/TTL hex converter
- CMOS current "sink" or "source" driver
- CMOS HIGH-to-LOW logic level converter

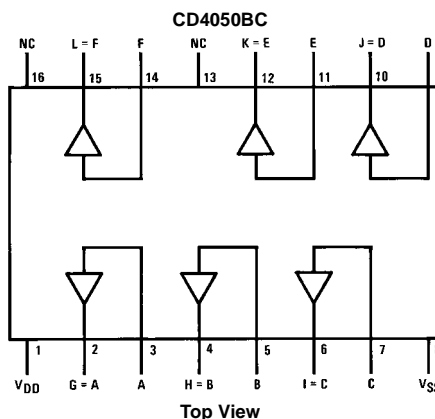
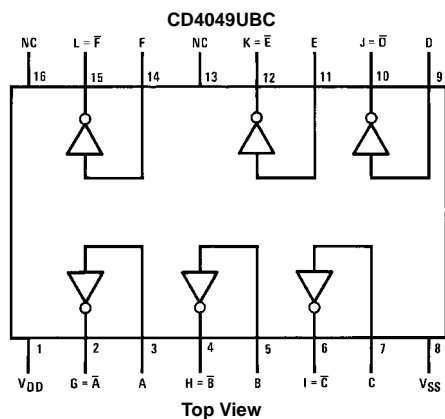
Ordering Code:

Order Number	Package Number	Package Description
CD4049UBCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4049UBCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
CD4050BCM	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
CD4050BCN	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

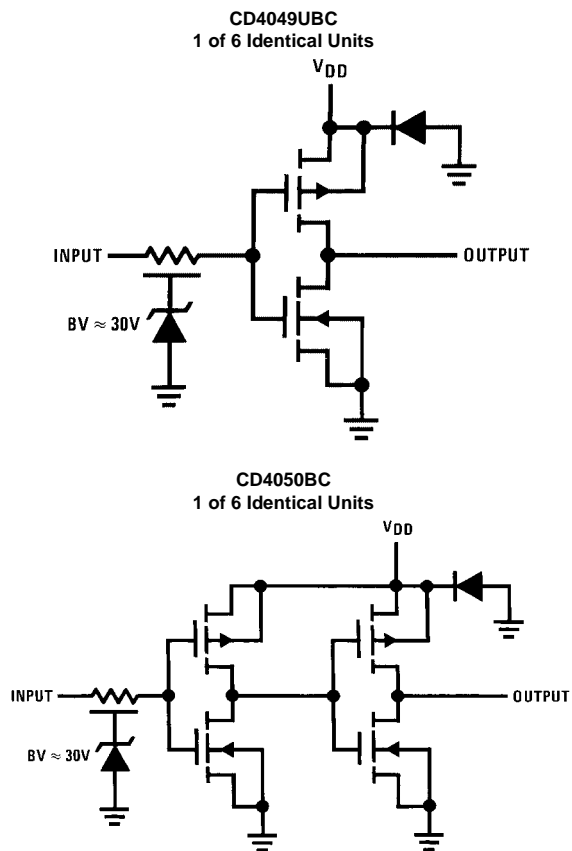
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagrams

Pin Assignments for DIP



Schematic Diagrams



Absolute Maximum Ratings(Note 1)

(Note 2)

Supply Voltage (V_{DD})	–0.5V to +18V
Input Voltage (V_{IN})	–0.5V to +18V
Voltage at Any Output Pin (V_{OUT})	–0.5V to $V_{DD} + 0.5V$
Storage Temperature Range (T_S)	–65°C to +150°C
Power Dissipation (P_D)	
Dual-In-Line	700 mW
Small Outline	500 mW
Lead Temperature (T_L)	
(Soldering, 10 seconds)	260°C

Recommended Operating Conditions (Note 2)

Supply Voltage (V_{DD})	3V to 15V
Input Voltage (V_{IN})	0V to 15V
Voltage at Any Output Pin (V_{OUT})	0 to V_{DD}
Operating Temperature Range (T_A)	
CD4049UBC, CD4050BC	–55°C to +125°C

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed; they are not meant to imply that the devices should be operated at these limits. The table of "Recommended Operating Conditions" and "Electrical Characteristics" provides conditions for actual device operation.

Note 2: $V_{SS} = 0V$ unless otherwise specified.

DC Electrical Characteristics (Note 3)

Symbol	Parameter	Conditions	–55°C		+25°C			+125°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	$V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		1.0 2.0 4.0		0.01 0.01 0.03	1.0 2.0 4.0		30 60 120	μA
V_{OL}	LOW Level Output Voltage	$V_{IH} = V_{DD}$, $V_{IL} = 0V$, $ I_O < 1 \mu A$ $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$		0.05 0.05 0.05		0 0 0	0.05 0.05 0.05		0.05 0.05 0.05	V
V_{OH}	HIGH Level Output Voltage	$V_{IH} = V_{DD}$, $V_{IL} = 0V$, $ I_O < 1 \mu A$ $V_{DD} = 5V$ $V_{DD} = 10V$ $V_{DD} = 15V$	4.95 9.95 14.95		4.95 9.95 14.95	5 10 15		4.95 9.95 14.95		V
V_{IL}	LOW Level Input Voltage (CD4050BC Only)	$ I_O < 1 \mu A$ $V_{DD} = 5V$, $V_O = 0.5V$ $V_{DD} = 10V$, $V_O = 1V$ $V_{DD} = 15V$, $V_O = 1.5V$		1.5 3.0 4.0		2.25 4.5 6.75	1.5 3.0 4.0		1.5 3.0 4.0	V
V_{IL}	LOW Level Input Voltage (CD4049UBC Only)	$ I_O < 1 \mu A$ $V_{DD} = 5V$, $V_O = 4.5V$ $V_{DD} = 10V$, $V_O = 9V$ $V_{DD} = 15V$, $V_O = 13.5V$		1.0 2.0 3.0		1.5 2.5 3.5	1.0 2.0 3.0		1.0 2.0 3.0	V
V_{IH}	HIGH Level Input Voltage (CD4050BC Only)	$ I_O < 1 \mu A$ $V_{DD} = 5V$, $V_O = 4.5V$ $V_{DD} = 10V$, $V_O = 9V$ $V_{DD} = 15V$, $V_O = 13.5V$	3.5 7.0 11.0		3.5 7.0 11.0	2.75 5.5 8.25		3.5 7.0 11.0		V
V_{IH}	HIGH Level Input Voltage (CD4049UBC Only)	$ I_O < 1 \mu A$ $V_{DD} = 5V$, $V_O = 0.5V$ $V_{DD} = 10V$, $V_O = 1V$ $V_{DD} = 15V$, $V_O = 1.5V$	4.0 8.0 12.0		4.0 8.0 12.0	3.5 7.5 11.5		4.0 8.0 12.0		V
I_{OL}	LOW Level Output Current (Note 4)	$V_{IH} = V_{DD}$, $V_{IL} = 0V$ $V_{DD} = 5V$, $V_O = 0.4V$ $V_{DD} = 10V$, $V_O = 0.5V$ $V_{DD} = 15V$, $V_O = 1.5V$	5.6 12 35		4.6 9.8 29	5 12 40		3.2 6.8 20		mA
I_{OH}	HIGH Level Output Current (Note 4)	$V_{IH} = V_{DD}$, $V_{IL} = 0V$ $V_{DD} = 5V$, $V_O = 4.6V$ $V_{DD} = 10V$, $V_O = 9.5V$ $V_{DD} = 15V$, $V_O = 13.5V$	–1.3 –2.6 –8.0		–1.1 –2.2 –7.2	–1.6 –3.6 –12		–0.72 –1.5 –5		mA
I_{IN}	Input Current	$V_{DD} = 15V$, $V_{IN} = 0V$ $V_{DD} = 15V$, $V_{IN} = 15V$		–0.1 0.1		-10^{-5} 10^{-5}	–0.1 0.1		–1.0 1.0	μA

Note 3: $V_{SS} = 0V$ unless otherwise specified.

DC Electrical Characteristics (Continued)

Note 4: These are peak output current capabilities. Continuous output current is rated at 12 mA maximum. The output current should not be allowed to exceed this value for extended periods of time. I_{OL} and I_{OH} are tested one output at a time.

AC Electrical Characteristics (Note 5)

CD4049UBC

 $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ k}\Omega$, $t_r = t_f = 20\text{ ns}$, unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level	$V_{DD} = 5\text{V}$		30	65	ns
		$V_{DD} = 10\text{V}$		20	40	
		$V_{DD} = 15\text{V}$		15	30	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level	$V_{DD} = 5\text{V}$		45	85	ns
		$V_{DD} = 10\text{V}$		25	45	
		$V_{DD} = 15\text{V}$		20	35	
t_{THL}	Transition Time HIGH-to-LOW Level	$V_{DD} = 5\text{V}$		30	60	ns
		$V_{DD} = 10\text{V}$		20	40	
		$V_{DD} = 15\text{V}$		15	30	
t_{TLH}	Transition Time LOW-to-HIGH Level	$V_{DD} = 5\text{V}$		60	120	ns
		$V_{DD} = 10\text{V}$		30	55	
		$V_{DD} = 15\text{V}$		25	45	
C_{IN}	Input Capacitance	Any Input		15	22.5	pF

Note 5: AC Parameters are guaranteed by DC correlated testing.

AC Electrical Characteristics (Note 6)

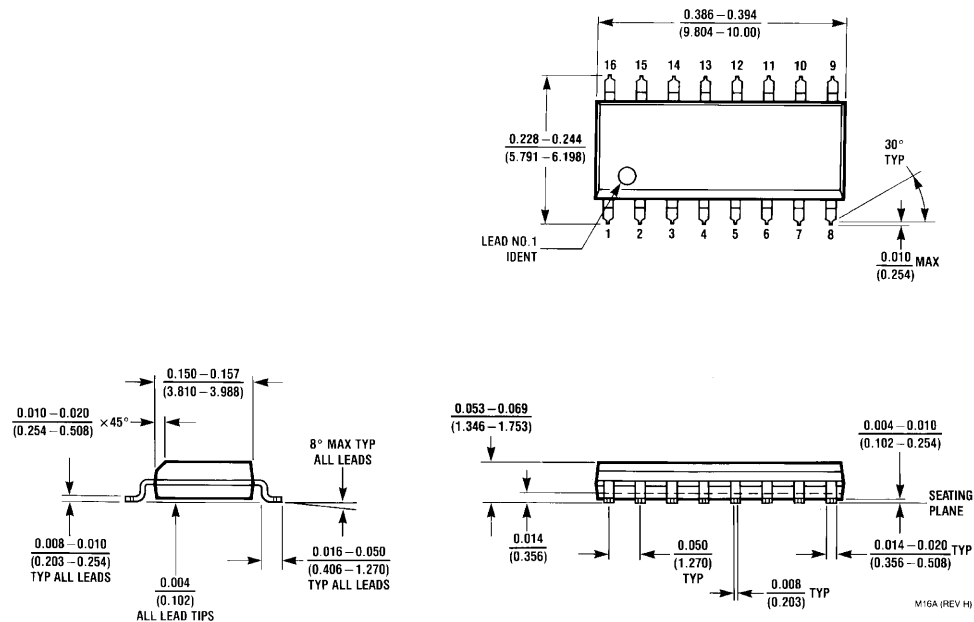
CD4050BC

 $T_A = 25^\circ\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ k}\Omega$, $t_r = t_f = 20\text{ ns}$, unless otherwise specified

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level	$V_{DD} = 5\text{V}$		60	110	ns
		$V_{DD} = 10\text{V}$		25	55	
		$V_{DD} = 15\text{V}$		20	30	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level	$V_{DD} = 5\text{V}$		60	120	ns
		$V_{DD} = 10\text{V}$		30	55	
		$V_{DD} = 15\text{V}$		25	45	
t_{THL}	Transition Time HIGH-to-LOW Level	$V_{DD} = 5\text{V}$		30	60	ns
		$V_{DD} = 10\text{V}$		20	40	
		$V_{DD} = 15\text{V}$		15	30	
t_{TLH}	Transition Time LOW-to-HIGH Level	$V_{DD} = 5\text{V}$		60	120	ns
		$V_{DD} = 10\text{V}$		30	55	
		$V_{DD} = 15\text{V}$		25	45	
C_{IN}	Input Capacitance	Any Input		5	7.5	pF

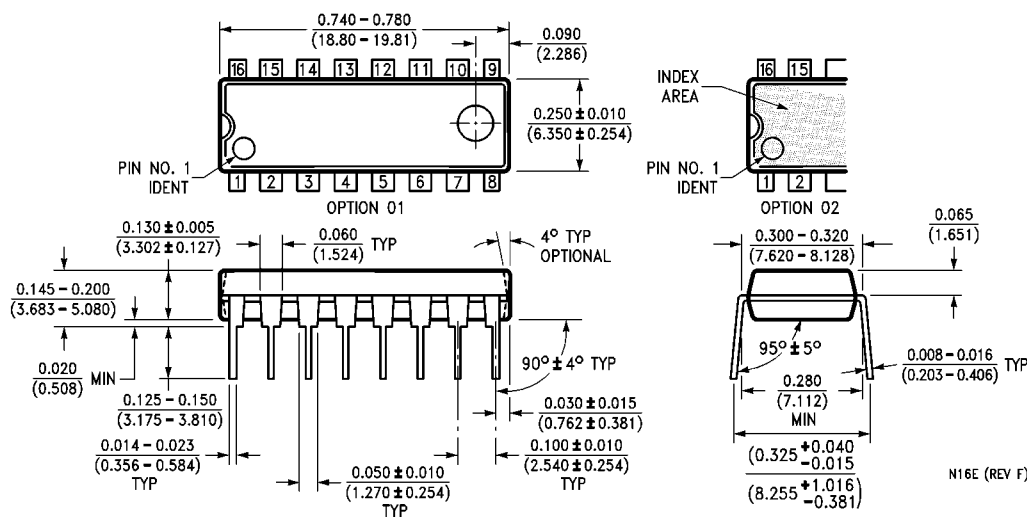
Note 6: AC Parameters are guaranteed by DC correlated testing.

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150" Narrow
Package Number M16A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N16E

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CD4050BC

Hex Non-Inverting Buffer

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General description

The CD4049UBC and CD4050BC hex buffers are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement mode transistors. These devices feature logic level conversion using only one supply voltage (V_{DD}). The input signal high level (V_{IH}) can exceed the V_{DD} supply voltage when these devices are used for logic level conversions. These devices are intended for use as hex buffers, CMOS to DTL/TTL converters, or as CMOS current drivers, and at $V_{DD} = 5.0V$, they can drive directly two DTL/TTL loads over the full operating temperature range.

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Features

- Wide supply voltage range: 3.0V to 15V
- Direct drive to 2 TTL loads at 5.0V over full temperature range
- High source and sink current capability
- Special input protection permits input voltages greater than V_{DD}

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Product status/pricing/packageing

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Product	Product status	Pb-free Status	Pricing*	Package type	Leads	Packing method	Package Marking Convention**

CD4050BCM	Full Production		\$0.189	SOIC	16	RAIL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 2 (2-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BCM
CD4050BCMX	Full Production		\$0.172	SOIC	16	TAPE REEL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 2 (2-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BCM
CD4050BCN	Full Production		\$0.299	DIP	16	RAIL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 4 (4-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BCN
CD4050BCN_NL	Full Production		N/A	DIP	16	RAIL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 4 (4-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BCN
CD4050BCSJ	Full Production		\$0.214	SOP	16	RAIL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 2 (2-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BC
CD4050BCSJX	Full Production		\$0.214	SOP	16	TAPE REEL	Line 1: \$Y (Fairchild logo) & Z (Asm. Plant Code) & 2 (2-Digit Date Code) & T (Die Trace Code) Line 2: CD4050BC

* Fairchild 1,000 piece Budgetary Pricing

** A sample button will appear if the part is available through Fairchild's on-line samples program. If there is no sample button, please contact a [Fairchild distributor](#) to obtain samples



Indicates product with Pb-free second-level interconnect. For more information [click here](#).

Package marking information for product CD4050BC is available. [Click here for more information](#).

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Qualification Support

Click on a product for detailed qualification data

Product

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CD4050BCMx
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