FAIRCHILD SEMICONDUCTOR™

October 1987
Revised January 1999

CD4071BC • CD4081BC
Quad 2-Input OR Buffered B Series Gate • Quad 2-Input AND Buffered B Series Gate

General Description

The CD4071BC and CD4081BC quad gates are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement mode transistors. They have equal source and sink current capabilities and conform to standard B series output drive. The devices also have buffered outputs which improve transfer characteristics by providing very high gain.

All inputs protected against static discharge with diodes to V_{DD} and V_{SS}.

Features

- Low power TTL compatibility:
  Fan out of 2 driving 74L or 1 driving 74LS
- 5V–10V–15V parametric ratings
- Symmetrical output characteristics
- Maximum input leakage 1 µA at 15V over full temperature range

Ordering Code:

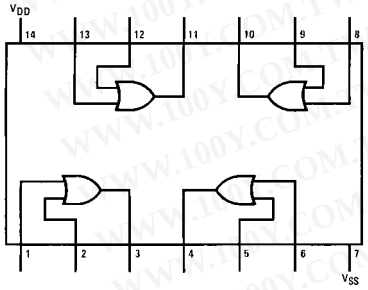
Order Number	Package Number	Package Description
CD4071BCM	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150” Narrow
CD4071BCN	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300” Wide
CD4081BCM	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150” Narrow
CD4081BCN	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300” Wide

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

Connection Diagrams

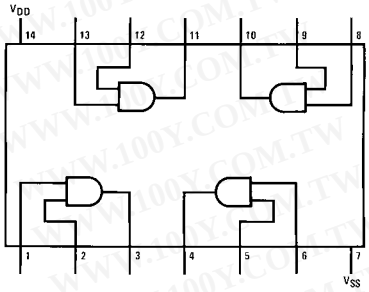
Pin Assignments for DIP and SOIC

CD4071B



Top View

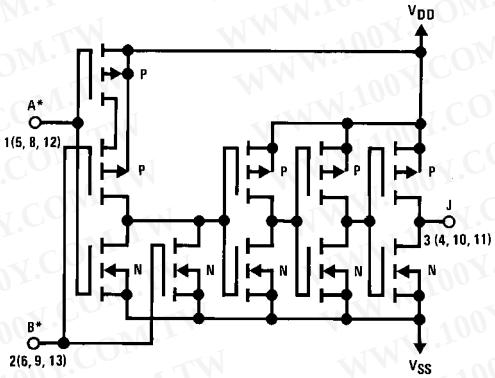
CD4081B

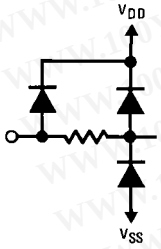


Top View

Schematic Diagrams

CD4071B





$^1/_4$ **of device shown**

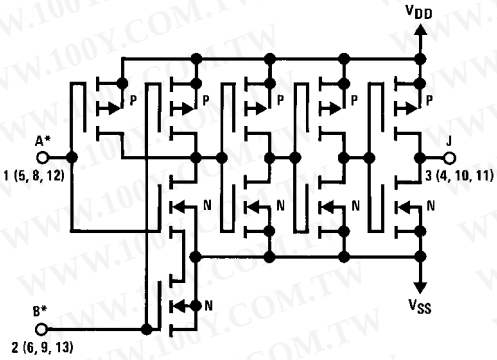
J = A + B

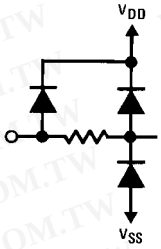
Logical "1" = HIGH

Logical "0" = LOW

*All inputs protected by standard CMOS protection circuit.

CD4081B





$^1/_4$ **of device shown**

J = A • B

Logical "1" = HIGH

Logical "0" = LOW

All inputs protected by standard CMOS protection circuit.

Absolute Maximum Ratings (Note 1)

(Note 2)

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

Recommended Operating Conditions

Operating Range (V_{DD})	3 V_{DC} to 15 V_{DC}
Operating Temperature Range (T_A)	
CD4071BC, CD4081BC	−40°C to +85°C

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

Note 2: All voltages measured with respect to V_{SS} unless otherwise specified.

DC Electrical Characteristics (Note 2)

CD4071BC/CD4081BC

Symbol	Parameter	Conditions	−40°C		+25°C			+85°C		Units
			Min	Max	Min	Typ	Max	Min	Max	
I_{DD}	Quiescent Device Current	V_{DD} = 5V		1		0.004	1		7.5	µA
		V_{DD} = 10V		2		0.005	2		15	µA
		V_{DD} = 15V		4		0.006	4		30	µA
V_{OL}	LOW Level Output Voltage	V_{DD} = 5V		0.05		0	0.05		0.05	V
		V_{DD} = 10V $\lvert I_O \rvert$ < 1 µA		0.05		0	0.05		0.05	V
		V_{DD} = 15V		0.05		0	0.05		0.05	V
V_{OH}	HIGH Level Output Voltage	V_{DD} = 5V	4.95		4.95	5		4.95		V
		V_{DD} = 10V $\lvert I_O \rvert$ < 1 µA	9.95		9.95	10		9.95		V
		V_{DD} = 15V	14.95		14.95	15		14.95		V
V_{IL}	LOW Level Input Voltage	V_{DD} = 5V, V_O = 0.5V		1.5		2	1.5		1.5	V
		V_{DD} = 10V, V_O = 1.0V		3.0		4	3.0		3.0	V
		V_{DD} = 15V, V_O = 1.5V		4.0		6	4.0		4.0	V
V_{IH}	HIGH Level Input Voltage	V_{DD} = 5V, V_O = 4.5V	3.5		3.5	3		3.5		V
		V_{DD} = 10V, V_O = 9.0V	7.0		7.0	6		7.0		V
		V_{DD} = 15V, V_O = 13.5V	11.0		11.0	9		11.0		V
I_{OL}	LOW Level Output Current (Note 3)	V_{DD} = 5V, V_O = 0.4V	0.52		0.44	0.88		0.36		mA
		V_{DD} = 10V, V_O = 0.5V	1.3		1.1	2.25		0.9		mA
		V_{DD} = 15V, V_O = 1.5V	3.6		3.0	8.8		2.4		mA
I_{OH}	HIGH Level Output Current (Note 3)	V_{DD} = 5V, V_O = 4.6V	−0.52		−0.44	−0.88		−0.36		mA
		V_{DD} = 10V, V_O = 9.5V	−1.3		−1.1	−2.25		−0.9		mA
		V_{DD} = 15V, V_O = 13.5V	−3.6		−3.0	−8.8		−2.4		mA
I_{IN}	Input Current	V_{DD} = 15V, V_{IN} = 0V		−0.30		-10^{-5}	−0.30		−1.0	µA
		V_{DD} = 15V, V_{IN} = 15V		0.30		10^{-5}	0.30		1.0	µA

Note 3: I_{OH} and I_{OL} are tested one output at a time.

AC Electrical Characteristics (Note 4)

CD4071BC T_A = 25°C, Input t_r; t_f = 20 ns, C_L = 50 pF, R_L = 200 kΩ, Typical temperature coefficient is 0.3%/°C

Symbol	Parameter	Conditions	Typ	Max	Units
t_{PHL}	Propagation Delay Time, HIGH-to-LOW Level	V_{DD} = 5V	100	250	ns
		V_{DD} = 10V	40	100	ns
		V_{DD} = 15V	30	70	ns
t_{PLH}	Propagation Delay Time, LOW-to-HIGH Level	V_{DD} = 5V	90	250	ns
		V_{DD} = 10V	40	100	ns
		V_{DD} = 15V	30	70	ns
t_{THL}, t_{TLH}	Transition Time	V_{DD} = 5V	90	200	ns
		V_{DD} = 10V	50	100	ns
		V_{DD} = 15V	40	80	ns
C_{IN}	Average Input Capacitance	Any Input	5	7.5	pF
C_{PD}	Power Dissipation Capacity	Any Gate	18		pF

Note 4: AC Parameters are guaranteed by DC correlated testing.

AC Electrical Characteristics (Note 5)

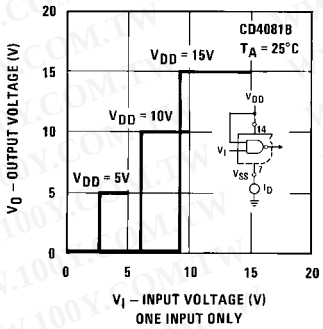
CD4081BC $T_A = 25°C$, Input t_r; $t_f = 20$ ns, $C_L = 50$ pF, $R_L = 200$ kΩ, Typical temperature coefficient is 0.3%/°C

Symbol	Parameter	Conditions	Typ	Max	Units
t_{PHL}	Propagation Delay Time,	$V_{DD} = 5V$	100	250	ns
	HIGH-to-LOW Level	$V_{DD} = 10V$	40	100	ns
		$V_{DD} = 15V$	30	70	ns
t_{PLH}	Propagation Delay Time,	$V_{DD} = 5V$	120	250	ns
	LOW-to-HIGH Level	$V_{DD} = 10V$	50	100	ns
		$V_{DD} = 15V$	35	70	ns
t_{THL}, t_{TLH}	Transition Time	$V_{DD} = 5V$	90	200	ns
		$V_{DD} = 10V$	50	100	ns
		$V_{DD} = 15V$	40	80	ns
C_{IN}	Average Input Capacitance	Any Input	5	7.5	pF
C_{PD}	Power Dissipation Capacity	Any Gate	18		pF

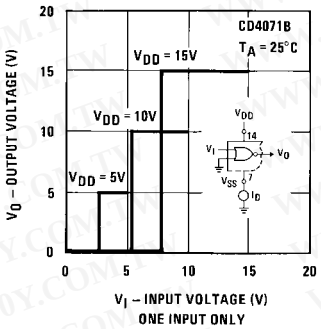
Note 5: AC Parameters are guaranteed by DC correlated testing.

Typical Performance Characteristics

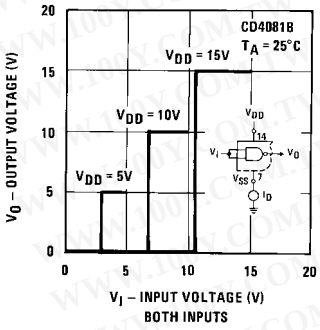
Typical Transfer Characteristics



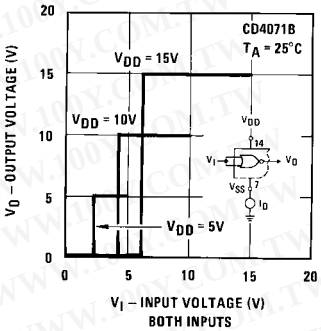
Typical Transfer Characteristics

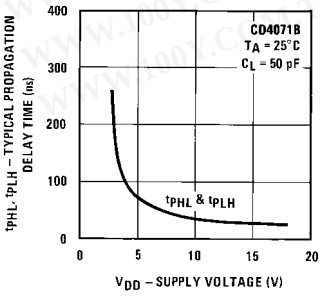


Typical Transfer Characteristics

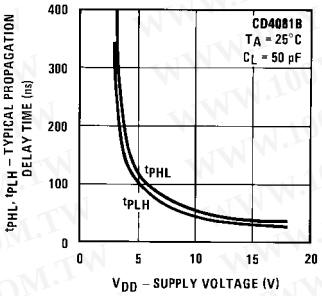


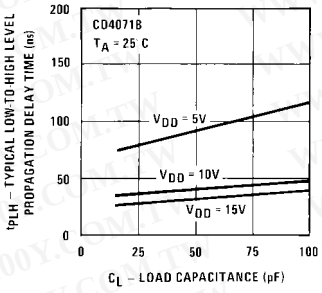
Typical Transfer Characteristics

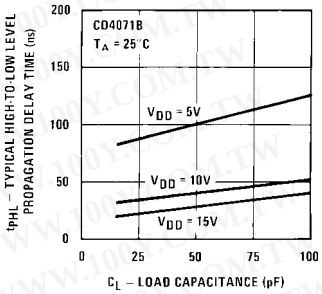


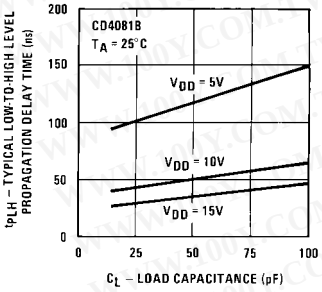


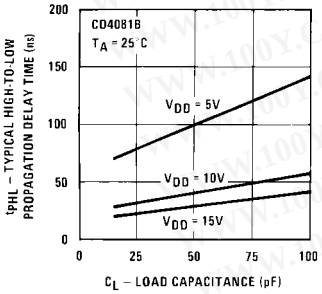
Typical Performance Characteristics (Continued)

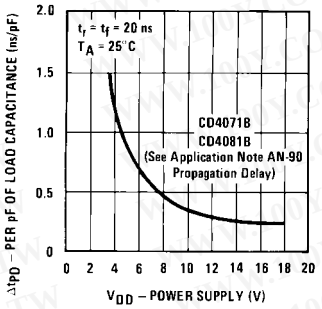


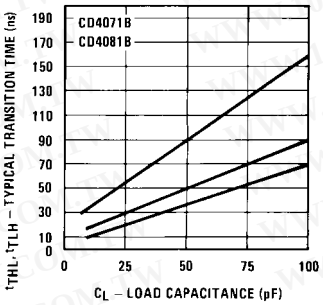


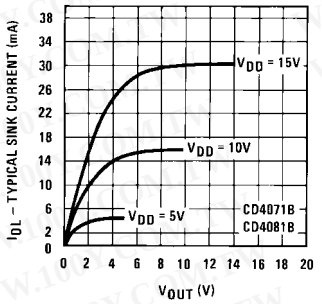


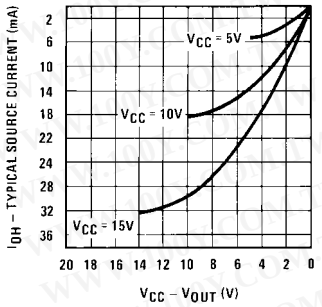




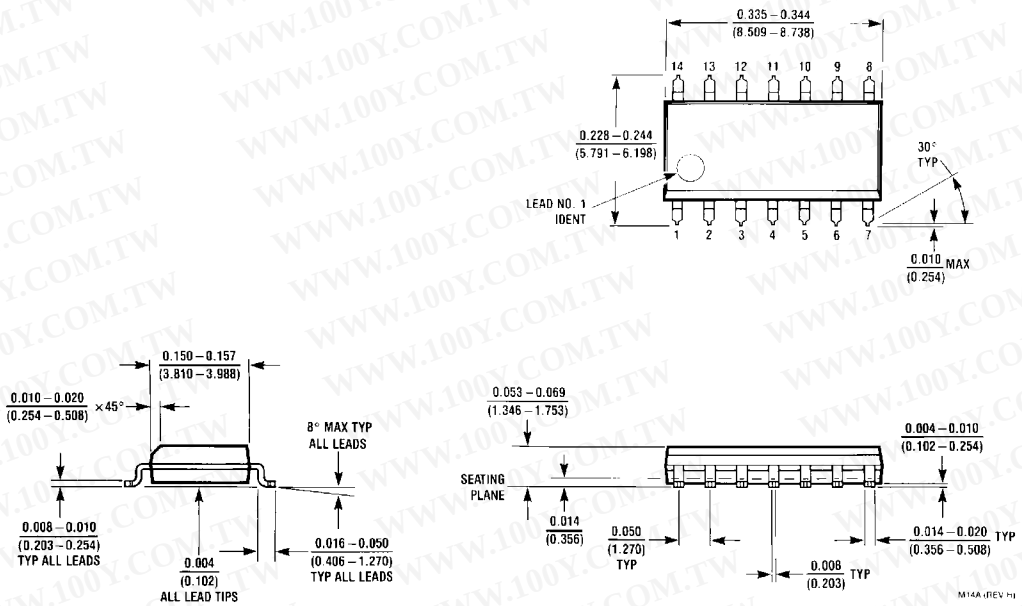






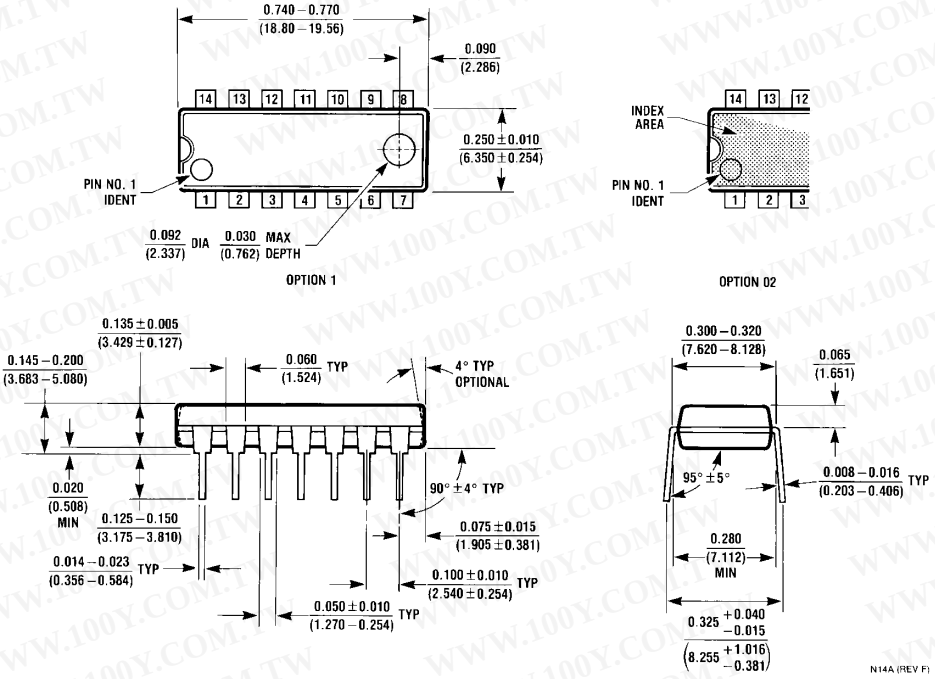


Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-120, 0.150” Narrow
Package Number M14A

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



14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
Package Number N14A

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