

MNCD4070BM-X REV 1A0

 Original Creation Date: 10/12/95
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QUAD 2-INPUT EXCLUSIVE-OR GATE
General Description

Employing complementary MOS (CMOS) transistors to achieve wide power supply operating range, low power consumption, and high noise margin, this gate provides basic functions used in the implementation of digital integrated circuit systems. The N- and P-channel enhancement mode transistors provide a symmetrical circuit with output swing essentially equal to the supply voltage. No DC power other than that caused by leakage current is consumed during static condition. All inputs are protected from damage due to static discharge by diode clamps to Vdd and Vss.

Industry Part Number

CD4070BM

NS Part Numbers

CD4070BMJ/883

Prime Die

CD4070BM

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- Wide supply voltage range 1.0V to 15V
- High noise immunity 0.45V_{dd} (typ.)
- Low power TTL Fan out of 2 driving 74L
compatibility or 1 driving 74LS
- Pin compatible to CD4030A
- Equivalent to MM54C86/MM74C86 and MC14507B

(Absolute Maximum Ratings)

(Note 1, 2)

DC Supply Voltage (Vdd)	-0.5 to +18Vdc
Input Voltage (Vin)	-0.5 to Vdd +0.5Vdc
Storage Temperature Range (Ts)	-65 C to +150 C
Power Dissipation (Pd)	
Dual-In-Line	700mW
Small Outline	500mW
Lead Temperature (Tl)	
(Soldering, 10 seconds)	260 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: Vss = 0V unless otherwise specified.

Recommended Operating Conditions

(Note 1)

DC Supply Voltage (Vdd)	3V to 15Vdc
Input Voltage (Vin)	0V to Vdd Vdc
Operating Temperature Range (TA)	
CD4070BM	-55 C to +125 C

Note 1: Vss = 0V unless otherwise specified.

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: $V_{ss} = 0V$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
I _{dd}	Quiescent Device Current	V _{dd} = 5V			0.25		uA	1, 3
					7.5		uA	2
		V _{dd} = 10V			0.5		uA	1, 3
					15		uA	2
		V _{dd} = 15V			1		uA	1, 3
					30		uA	2
V _{ol}	Logical "0" Output Voltage	V _{dd} = 5V, I _{out} < 1uA			0.05		V	1, 2, 3
		V _{dd} = 10V, I _{out} < 1uA			0.05		V	1, 2, 3
		V _{dd} = 15V, I _{out} < 1uA			0.05		V	1, 2, 3
V _{oh}	Logical "1" Output Voltage	V _{dd} = 5V, I _{out} < 1uA			4.95		V	1, 2, 3
		V _{dd} = 10V, I _{out} < 1uA			9.95		V	1, 2, 3
		V _{dd} = 15V, I _{out} < 1uA			14.95		V	1, 2, 3
V _{il}	Logical "0" Input Voltage	V _{dd} = 5V, V _{out} = 4.5V, I _{out} < 1uA	1			1.5	V	1, 2, 3
		V _{dd} = 10V, V _{out} = 9V, I _{out} < 1uA	1			3	V	1, 2, 3
		V _{dd} = 15V, V _{out} = 13.5V, I _{out} < 1uA	1			4	V	1, 2, 3
V _{ih}	Logical "1" Input Voltage	V _{dd} = 5V, V _{out} = 0.5V, I _{out} < 1uA	1		3.5		V	1, 2, 3
		V _{dd} = 10V, V _{out} = 1V, I _{out} < 1uA	1		7		V	1, 2, 3
		V _{dd} = 15V, V _{out} = 1.5V, I _{out} < 1uA	1		11		V	1, 2, 3

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
 DC: $V_{ss} = 0V$

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Iol	Logical "0" Output Current	Vdd = 5V, Vout = 0.4V			0.51		mA	1
					0.36		mA	2
					0.64		mA	3
		Vdd = 10V, Vout = 0.5V			1.3		mA	1
					0.9		mA	2
					1.6		mA	3
		Vdd = 15V, Vout = 1.5V			3.4		mA	1
					2.4		mA	2
					4.2		mA	3
Ioh	Logical "1" Output Current	Vdd = 5V, Vout = 4.6V			-0.51		mA	1
					-0.36		mA	2
					-0.64		mA	3
		Vdd = 10V, Vout = 9.5V			-1.3		mA	1
					-0.9		mA	2
					-1.6		mA	3
		Vdd = 15V, Vout = 13.5V			-3.4		mA	1
					-2.4		mA	2
					-4.2		mA	3
Iin	Input Current	Vdd = 15V, Vin = 0V or 15V				+0.1	uA	1, 3
						+1	uA	2

Electrical Characteristics

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
 AC: $V_{ss} = 0V$, t_r & $t_f \leq 20nS$, $C_l = 50pF$, $R_l = 200K$ or equivalent impedance provided by diode load.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPHL	Propagation Delay Time:	Vdd = 5V	3			185	nS	9
			3			260	nS	10
			3			150	nS	11
		Vdd = 10V	2			90	nS	9
			2			125	nS	10
			2			70	nS	11
		Vdd = 15V	2			75	nS	9
			2			105	nS	10
			2			60	nS	11
tPLH	Propagation Delay Time:	Vdd = 5V	3			185	nS	9
			3			260	nS	10
			3			150	nS	11
		Vdd = 10V	2			90	nS	9
			2			125	nS	10
			2			70	nS	11
		Vdd = 15V	2			75	nS	9
			2			105	nS	10
			2			60	nS	11
tTHL	Transition Time	Vdd = 5V	3			200	nS	9
			3			280	nS	10
			3			160	nS	11
		Vdd = 10V	2			100	nS	9
			2			140	nS	10
			2			80	nS	11
		Vdd = 15V	2			80	nS	9
			2			110	nS	10
			2			65	nS	11

Electrical Characteristics

AC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
 AC: $V_{ss} = 0V$, t_r & $t_f \leq 20nS$, $C_l = 50pF$, $R_l = 200K$ or equivalent impedance provided by diode load.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tTLH	Transition Time	Vdd = 5V	3			200	nS	9
			3			280	nS	10
			3			160	ns	11
		Vdd = 10V	2			100	nS	9
			2			140	nS	10
			2			80	nS	11
		Vdd = 15V	2			80	nS	9
			2			110	nS	10
			2			65	nS	11
Cin	Average Input Capacitance	Any Input	2			7.5	pF	9

Note 1: Parameter tested go-no-go only.

Note 2: Guaranteed parameter not tested.

Note 3: Tested at 25 C; guaranteed but not tested at +125 C & -55 C.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002796	06/16/98	Linda Collins	Changes: New update: MNCD4070BM-X rev. 1A0 Deleted the DC Rad Hard stress tests and the Drift values