National Semiconductor

MICROCIRCUIT DATA SHEET

MNCD4011BM-X REV 1A0

Original Creation Date: 10/05/95
Last Update Date: 06/16/98
Last Major Revision Date: 03/03/98

QUAD 2-INPUT NOR BUFFERED B SERIES GATE

General Description

These quad gates are monolithic complementary MOS (CMOS) integrated circuits constructed with N- and P-channel enhancement mode transistors. They have equal source sand 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 are protected against static discharge with diodes to Vdd and Vss.

Industry Part Number

CD4011BM

NS Part Numbers

CD4011BMJ/883
CD4011BMW/883

Prime Die

CD4011BM

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{o}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

- 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 1uA at 15V over full temperature range

(Absolute Maximum Ratings)

(Note 1, 2)

Voltage at Any Pin	-0.5V to Vdd +0.5V
Power Dissipation (Pd)	
Dual-In-Line	700mW
Small Outline	500mW
Vdd Range	-0.5Vdc to +18Vdc
Storage Temperature (Ts)	-65 C to +150 C
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. 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 conidtions for actual device operation.

Note 2: All voltages measured with respect to Vss unless otherwise specified.

Recommended Operating Conditions

Operating Range (Vdd)	3Vdc to 15Vdc
Operating Temperature Range	
CD4011BM	-55 C to +125 C

Electrical Characteristics

DC PARAMETERS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vol	Logical "0" Output Voltage	Vdd = 5V, Vih = 5V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 10V, Vih = 10V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 15V, Vih = 15V, Iout < 1uA				0.05	V	1, 2, 3
Voh	Logical "1" Output Voltage	Vdd = 5V, Vil = 0V, Iout < 1uA			4.95		V	1, 2, 3
		Vdd = 10V, Vil = 0V, Iout < 1uA			9.95		V	1, 2, 3
		Vdd = 15V, Vil = 0V, Iout < 1uA			14.95		V	1, 2, 3
Iih	Logical "1" Input Current	Vdd = 15V, Vin = 15V				100	nA	1, 3
						1000	nA	2
Iil	Logical "0" Input Current	Vdd = 15V, Vin = 0V				-100	nA	1, 3
						-1000	nA	2
Ioh	Logical "1" Output Current	Vdd = 5V, Vil = 0V, Vout = 4.6V			-0.51		mA	1
					-0.36		mA	2
					-0.64		mA	3
		Vdd = 10V, Vil = 0V, Vout = 9.5V			-1.3		mA	1
					-0.9		mA	2
					-1.6		mA	3
		Vdd = 15V, Vil = 0V, Vout = 13.5V			-3.4		mA	1
					-2.4		mA	2
					-4.2		mA	3
Iol	Logical "0" Output Current	Vdd = 5V, Vih = 5V, Vout = 0.4V			0.51		mA	1
					0.36		mA	2
					0.64		mA	3
		Vdd = 10V, Vih = 10V, Vout = 0.5V			1.3		mA	1
					0.9		mA	2
					1.6		mA	3
		Vdd = 15V, Vih = 15V, Vout = 1.5V			3.4		mA	1
					2.4		mA	2
					4.2		mA	3

Electrical Characteristics

DC PARAMETERS(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Idd	Quiescent Drive Current	Vdd = 5V, Vih = 5V, Vil = 0V				0.25	uA	1, 3
						7.5	uA	2
		Vdd = 10V, Vih = 10V, Vil = 0V				0.5	uA	1, 3
						15	uA	2
		Vdd = 15V, Vih = 15V, Vil = 0V				1	uA	1, 3
						30	uA	2
Vih	Logical "1" Input Voltage	Vdd = 5V, Vout = 0.5V (max)	1, 4		3.5		V	1, 2, 3
		Vdd = 10V, Vout = 1V (max)	1, 4		7		V	1, 2, 3
		Vdd = 15V, Vout = 1.5V (max)	1, 4		11		V	1, 2, 3
Vil	Logical "0" Input Voltage	Vdd = 5V, Vout = 4.5V (min)	1, 4			1.5	V	1, 2, 3
		Vdd = 10V, Vout = 9V (min)	1, 4			3	V	1, 2, 3
		Vdd = 15V, Vout = 13.5V (min)	1, 4			4	V	1, 2, 3

AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: tr=tf=20nS, Cl = 50pF, Rl = 200K Ohms

tPHL	Propagation Delay Time	Vdd = 5V	3			250	nS	9
			3			350	nS	10
			3			200	nS	11
		Vdd = 10V	2			100	nS	9
			2			140	nS	10
			2			80	nS	11
		Vdd = 15V	2			70	nS	9
			2			100	nS	10
			2			55	nS	11

Electrical Characteristics

AC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: tr=tf=20nS, Cl = 50pF, Rl = 200K Ohms

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	Propagation Delay Time	Vdd = 5V	3			250	nS	9
			3			350	nS	10
			3			200	nS	11
		Vdd = 10V	2			100	nS	9
			2			140	nS	10
			2			80	nS	11
		Vdd = 15V	2			70	nS	9
			2			100	nS	10
			2			55	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
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		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 and -55 C.
Note 4: Vout condition is measured with inputs at Vih, Vil.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002788	06/16/98	Linda Collins	Converted from RETS4011BX rev. 8C to MDS MNCD4011BM-X rev. 1A0. Deleted the DC Rad Hard stress tests and Drift values.