National Semiconductor

MICROCIRCUIT DATA SHEET

MNCD4014BM-X REV 1A0

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8-STAGE STATIC SHIFT REGISTER

General Description

The CD4014BM is an 8-stage parallel input/serial output shift register. A parallel/serial control input enables individual JAM inputs to each of 8 stages. Q outputs are available from the sixth, seventh and eighth stages. All outputs have equal source and sink current capabilities and conform to standard "B" series output drive.

When the parallel/serial control input is in the logical "0" state, data is serially shifted into the register synchronously with the positive transition of the clock. When the parallel/serial control input is in the logical "1" state, data is jammed into each stage of the register synchronously, with the positive transition of the clock.

Industry Part Number

CD4014BM

NS Part Numbers

CD4014BMJ/883
CD4014BMW/883

Prime Die

CD4014BM

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

- Wide supply voltage range 3.0V to 15V
- High noise immunity 0.45Vdd (typ.)
- 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

Applications

- Automotive
- Data terminals
- Instrumentation
- Medical electronics
- Alarm system
- Industrial electronics
- Remote metering
- Computers

(Absolute Maximum Ratings)
(Note 1, 2)

Supply Voltage (Vdd)	-0.5V to +18V
Input Voltage (Vin)	-0.5V to Vdd +0.5V
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. 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: Vss = 0V unless otherwise specified.

Recommended Operating Conditions
(Note 1)

Supply Voltage (Vdd)	3.0V to 15V
Input Voltage (Vin)	0 to Vdd
Operating Temperature Range (TA)	
CD4014BM	-55 C to +125 C

Note 1: Vss = 0V unless otherwise specified.

Electrical Characteristics

DC PARAMETERS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Iil	Input Current	Vdd = 15V, Vil= 0V				-100	nA	1, 3
						-1000	nA	2
Iih	Input Current	Vdd = 15V, Vih= 15V				100	nA	1, 3
						1000	nA	2
Idd	Quiescent Current	Vdd = 5V, Vin = 5V				5	uA	1, 3
						150	uA	2
		Vdd = 10V, Vin = 10V				10	uA	1, 3
						300	uA	2
		Vdd = 15V, Vin = 15V				20	uA	1, 3
						600	uA	2
Ioh	Logical "1" Output Current	Vdd = 5V, Vout = 4.6V			-510		uA	1
					-360		uA	2
					-640		uA	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
Iol	Logical "0" Output Current	Vdd = 5V, Vout = 0.4V			510		uA	1
					360		uA	2
					640		uA	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

Electrical Characteristics

DC PARAMETERS(Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Voh	Logical "1" Output Voltage	Vdd = 5V, Iout < 1uA			4.95		V	1, 2, 3
		Vdd = 10V, Iout < 1uA			9.95		V	1, 2, 3
		Vdd = 15V, Iout < 1uA			14.95		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vdd = 5V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 10V, Iout < 1uA				0.05	V	1, 2, 3
		Vdd = 15V, Iout < 1uA				0.05	V	1, 2, 3
Vih	Logical "1" Input Voltage	Vdd = 5V, Vih = 3.5V, Vil = 1.5V, Iout < 1uA			4.5		V	1, 2, 3
		Vdd = 10V, Vih = 7V, Vil = 3V, Iout < 1uA			9		V	1, 2, 3
		Vdd = 15V, Vih = 11V, Vil = 4V, Iout < 1uA			13.5		V	1, 2, 3
Vil	Logical "0" Input Voltage	Vdd = 5V, Vih = 3.5V, Vil = 1.5V, Iout < 1uA				0.5	V	1, 2, 3
		Vdd = 10V, Vih = 7V, Vil = 3V, Iout < 1uA				1	V	1, 2, 3
		Vdd = 15V, Vih = 11V, Vil = 4V, Iout < 1uA				1.5	V	1, 2, 3

AC PARAMETERS

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

tPHL	Propagation Delay Time	Vdd = 5V	2			320	nS	9
			2			450	nS	10
			2			255	nS	11
		Vdd = 10V	1			160	nS	9
			1			225	nS	10
			1			130	nS	11
		Vdd = 15V	1			120	nS	9
			1			170	nS	10
			1			95	nS	11

Electrical Characteristics

AC PARAMETERS(Continued)

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

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	Propagation Delay Time	Vdd = 5V	2			320	nS	9
			2			450	nS	10
			2			255	nS	11
		Vdd = 10V	1			160	nS	9
			1			225	nS	10
			1			130	nS	11
		Vdd = 15V	1			120	nS	9
			1			170	nS	10
			1			95	nS	11
tTHL	Transition Time	Vdd = 5V				200	nS	9
		Vdd = 10V	1			100	nS	9
		Vdd = 15V	1			80	nS	9
tTLH	Transition Time	Vdd = 5V				200	nS	9
		Vdd = 10V	1			100	nS	9
		Vdd = 15V	1			80	nS	9
fCL	Maximum Clock Input Frequency	Vdd = 5V	4		643	785	nS	9
tW	Minimum Clock Pulse Width	Vdd = 5V	1			180	nS	9
		Vdd = 10V	1			80	nS	9
		Vdd = 15V	1			50	nS	9
ts	Minimum Setup Time Serial Input tH $\geq$ 200nS	Vdd = 5V	1			120	nS	9
ts	Minimum Setup Time Serial Input tH $\geq$ 200nS	Vdd = 10V	1			80	nS	9
ts	Minimum Setup Time Serial Input tH $\geq$ 200nS	Vdd = 15V	1			60	nS	9
ts	Parallel Input tH $\geq$ 200nS	Vdd = 5V	1			160	nS	9
ts	Parallel Input tH $\geq$ 200nS	Vdd = 10V	1			80	nS	9
ts	Parallel Input tH $\geq$ 200nS	Vdd = 15V	1			60	nS	9

Electrical Characteristics

AC PARAMETERS(Continued)

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

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
ts	Parallel/Serial Control tH ≥ 200nS	Vdd = 5V	1			200	nS	9
ts	Parallel/Serial Control tH ≥ 200nS	Vdd = 10V	1			100	nS	9
ts	Parallel/Serial Control tH ≥ 200nS	Vdd = 15V	1			80	nS	9
		Continuity Tests	3					9, 10, 11

Note 1: Guaranteed parameter not tested.
Note 2: Tested at 25 C; guaranteed but not tested at +125 C and -55 C.
Note 3: Engineering setup tests, no limits.
Note 4: Limit = approximately 2.8MHz.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0000524	05/14/98	Linda Collins	Converted from RETS4014BX rev. 7C to MDS MNCD4014BM-X rev. 1A0. Deleted the Rad Hard stress tests and the Drift values. Added IIH.