National Semiconductor

MNCD4528BM-X REV 1A0

DUAL MONOSTABLE MULTIVIBRATOR

General Description

The CD4258B is a dual monostable multivibrator. Each device is retriggerable and resettable. Triggering can occur from either the rising or falling edge of an input pulse, resulting in an output pulse over a wide range of widths. Pulse duration and accuracy are determined by external timing components Rx and Cx.

Industry Part Number

CD4528BM

Prime Die

CD4528BM

NS Part Numbers

CD4528BMJ/883
CD4528BMW/883

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   3.0V to 18V
- Separate reset available
- Quiescent current = 5.0nA/package (typ.) at 5.0Vdc
- Diode protection on all inputs
- Triggerable from leading or trailing edge pulse
- Capable of driving two low-power TTL loads or one low-power Schottky TTL load over
  the rated temperature range

(Absolute Maximum Ratings)
(Note 1, 2)

DC Supply Voltage (Vdd)

                                      -0.5Vdc to +18Vdc

Input Voltage, All Inputs (Vin)

                                        -0.5Vdc to Vdd +5.0Vdc

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 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)
   CD4528BM   -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: Vss = 0V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Idd	Quiescent Device Current	Vdd = 5V				5	uA	1, 3
						150	uA	2
		Vdd = 10V				10	uA	1, 3
						300	uA	2
		Vdd = 15V				20	uA	1, 3
						600	uA	2
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
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
Vil	Logical "0" Input Voltage	Vdd = 5V, Vout = 0.5V or 4.5V	1			1.5	V	1, 2, 3
		Vdd = 10V, Vout = 1.0V or 9.0V	1			3	V	1, 2, 3
		Vdd = 15V, Vout = 1.5V or 13.5V	1			4	V	1, 2, 3
Vih	Logical "1" Input Voltage	Vdd = 5V, Vout = 0.5V or 4.5V	1		3.5		V	1, 2, 3
		Vdd = 10V, Vout = 1.0V or 9.0V	1		7		V	1, 2, 3
		Vdd = 15V, Vout = 1.5V or 13.5V	1		11		V	1, 2, 3

Electrical Characteristics

DC PARAMETERS(Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC:　Vss = 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			-0.2		mA	1
					-0.14		mA	2
					-0.25		mA	3
		Vdd = 10V, Vout = 9.5V			-0.5		mA	1
					-0.35		mA	2
					-0.62		mA	3
		Vdd = 15V, Vout = 13.5V			-1.5		mA	1
					-1.1		mA	2
					-1.8		mA	3
Iin	Input Current	Vdd = 15V, Vin = 0V				-0.1	uA	1, 3
						-1	uA	2
		Vdd = 15V, Vin = 15V				0.1	uA	1, 3
						1	uA	2

AC PARAMETERS

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

tr	Output Rise Time	Vdd = 5V	4			400	nS	9
		Vdd = 10V	2			200	nS	9
		Vdd = 15V	2			160	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, Input tr = tf = 20nS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tf	Output Fall Time	Vdd = 5V	4			200	nS	9
		Vdd = 10V	2			100	nS	9
		Vdd = 15V	2			80	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			500	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			700	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			400	nS	11
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			250	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			350	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			200	nS	11
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			150	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			210	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			120	nS	11
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			500	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			700	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			400	nS	11
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			250	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, Input tr = tf = 20nS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			350	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			200	nS	11
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			150	nS	9
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			210	nS	10
tPLH	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			120	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			500	nS	9
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			700	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			400	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			250	nS	9
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			350	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			200	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			150	nS	9
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			210	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			120	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			500	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, Input tr = tf = 20nS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			700	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 5V, Cx = 100pF, Rx = 10K Ohms	3			400	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			250	nS	9
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			350	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 10V, Cx = 100pF, Rx = 10K Ohms	2			200	nS	11
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			150	nS	9
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			210	nS	10
tPHL	Turn-Off, Turn-On Delay A or B to Q or $\overline{Q}$	Vdd = 15V, Cx = 100pF, Rx = 10K Ohms	2			120	nS	11
tPW(in)	Minimum Input Pulse Width A or B	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	1			150	nS	9
		Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			50	nS	9
		Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			50	nS	9
		Vdd = 5V, Cx = 1000pF, Rx = 10K Ohms	1			150	nS	9
		Vdd = 10V, Cx = 1000pF, Rx = 10K Ohms	2			50	nS	9
		Vdd = 15V, Cx = 1000pF, Rx = 10K Ohms	2			50	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, Input tr = tf = 20nS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	Reset Propagation Delay Time	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			600	nS	9
			3			840	nS	10
			3			480	nS	11
		Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			225	nS	9
			2			315	nS	10
			2			180	nS	11
		Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			170	nS	9
			2			240	nS	10
			2			135	nS	11
tPHL	Reset Propagation Delay Time	Vdd = 5V, Cx = 15pF, Rx = 5K Ohms	3			600	nS	9
			3			840	nS	10
			3			480	nS	11
		Vdd = 10V, Cx = 15pF, Rx = 5K Ohms	2			225	nS	9
			2			315	nS	10
			2			180	nS	11
		Vdd = 15V, Cx = 15pF, Rx = 5K Ohms	2			170	nS	9
			2			240	nS	10
			2			135	nS	11
tPW(out)	Output Pulse Width Q or $\overline{Q}$	Vdd = 5V, Cx = 10,000pF, Rx = 10K Ohms	4		15	45	uS	9
tPW(out)	Output Pulse Width Q or $\overline{Q}$	Vdd = 10V, Cx = 10,000pF, Rx = 10K Ohms	2		10	90	uS	9
tPW(out)	Output Pulse Width Q or $\overline{Q}$	Vdd = 15V, Cx = 10,000pF, Rx = 10K Ohms	2		15	95	uS	9
tPW(match)	Pulse Width Match Between Circuits In the Same Pkg.	Vdd = 5V, Cx = 10,000pF, Rx = 10K Ohms	4			25	%	9
		Vdd = 10V, Cx = 10,000pF, Rx = 10K Ohms	2			35	%	9
		Vdd = 15V, Cx = 10,000pF, Rx = 10K Ohms	2			35	%	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:   Guaranteed not tested.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002615	02/25/98	Donald B. Miller	Initial release of the MDS. Conversion from RETS14528 rev B. Removed the DC drift limits (IDD, IOL and IOH). Changed note 4 from "guaranteed for level B, tested for level S" to "guaranteed but not tested".