National Semiconductor

MICROCIRCUIT DATA SHEET

MNMM54C221-X REV 1A0

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DUAL MONOSTABLE MULTIVIBRATOR

General Description

The MM54C221 dual monostable multivibrator is a monolithic complementary MOS integrated circuit. Each multivibrator features a negative-transition-triggered input and a positive-transition-triggered input, either of which can be used as an inhibit input, and a clear input.

Once fired, the output pulses are independent of further transitions of the A and B inputs and are a function of the external timing components Cext and Rext. The pulse width is stable over a wide range of temperature and Vcc.

Pulse stability will be limited by the accuracy of external timing components. The pulse width is approximately defined by the relationship tW(OUT) approximately equal to Cext Rext. For further information and applications, see AN-138.

Industry Part Number

MM54C221

NS Part Numbers

MM54C221J/883
MM54C221W/883

Prime Die

MM54C221

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	4.5V to 15V
- Guaranteed noise margin	1.0V
- High noise immunity	0.45 Vcc (typ.)
- Low power TTL compatible	Fan out of 2 driving 74L

(Absolute Maximum Ratings)

(Note 1)

Voltage at Any Pin	-0.3V to Vcc +0.3V
Operating Temperature Range	-55 C to +125 C
Storage Temperature Range	-65 C to +150 C
Power Dissipation (Pd)	
Dual-In-Line	700mW
Small Outline	500mW
Operating Vcc Range	4.5V to 15V
Absolute Maximum Vcc	18V
Rext $\geq$ 80 Vcc (Ohm)	
Lead Temperature (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.

Electrical Characteristics

DC PARAMETERS:

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Voh	Logical "1" Output Voltage	Vcc = 5V, Iout = -10uA			4.5		V	1, 2, 3
		Vcc = 10V, Iout = -10uA			9		V	1, 2, 3
		Vcc = 4.5V, Iout = -360uA			2.4		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 5V, Iout = 10uA				0.5	V	1, 2, 3
		Vcc = 10V, Iout = 10uA				1	V	1, 2, 3
		Vcc = 4.5V, Iout = 360uA				0.4	V	1, 2, 3
Iih	Logical "1" Input Current	Vcc = 15V, Vin = 15V				0.15	uA	1, 3
						1	uA	2
Iil	Logical "0" Input Current	Vcc = 15V, Vin = 0V			-0.15		uA	1, 3
					-1		uA	2
Icc	Supply Current: Standy Leakage Current at R/Cext Pin	Vcc = 15V				10	uA	1, 3
						300	uA	2
		Vcc = 15V, VCext = 5V				3	uA	1, 2, 3
Isource	Output Source Current	Vcc = 5V, Vout = 0V			-1.75		mA	1
		Vcc = 10V, Vout = 0V			-8		mA	1
Isink	Output Sink Current	Vcc = 5V, Vout = Vcc			1.75		mA	1
		Vcc = 10V, Vout = Vcc			8		mA	1
Vih	Logical "1" Input Voltage	Vcc = 5V	1		3.5		V	1, 2, 3
		Vcc = 10V	1		8		V	1, 2, 3
		Vcc = 4.5V	1		3		V	1, 2, 3
Vil	Logical "0" Input Voltage	Vcc = 5V	1			1.5	V	1, 2, 3
		Vcc = 10V	1			2	V	1, 2, 3
		Vcc = 4.5V	1			0.8	V	1, 2, 3

Electrical Characteristics

AC PARAMETERS: PROPAGATION DELAY TIME:

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: Cl = 50pF or equivalent impedance provided by diode load.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLH	A, B to Q	Vcc = 5V	2			500	nS	9
			2			625	nS	10, 11
		Vcc = 10V	2			250	nS	9
			2			300	nS	10, 11
tPHL	A, B to $\overline{Q}$	Vcc = 5V	2			500	nS	9
tPHL	A, B to $\overline{Q}$	Vcc = 5V	2			625	nS	10, 11
tPHL	A, B to $\overline{Q}$	Vcc = 10V	2			250	nS	9
tPHL	A, B to $\overline{Q}$	Vcc = 10V	2			300	nS	10, 11
tPLH	Clear to $\overline{Q}$	Vcc = 5V	2			500	nS	9
tPLH	Clear to $\overline{Q}$	Vcc = 5V	2			625	nS	10, 11
tPLH	Clear to $\overline{Q}$	Vcc = 10V	2			250	nS	9
tPLH	Clear to $\overline{Q}$	Vcc = 10V	2			300	nS	10, 11
tPHL	Clear to Q	Vcc = 5V	2			500	nS	9
			2			625	nS	10, 11
		Vcc = 10V	2			250	nS	9
			2			300	nS	10, 11

AC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: Cl = 50pF or equivalent impedance provided by diode load.

tW(OUT)	Q or $\overline{Q}$ Output Pulse Width	Vcc = 5V, Rext = 10K, Cext = 100pF	2		9	12.2	uS	9
tW(OUT)	Q or $\overline{Q}$ Output Pulse Width	Vcc = 5V, Rext = 10K, Cext = 100pF	2		6.7	15.3	uS	10, 11
tW(OUT)	Q or $\overline{Q}$ Output Pulse Width	Vcc = 10V, Rext = 10K, Cext = 100pF	1		9	11	uS	9
tW(OUT)	Q or $\overline{Q}$ Output Pulse Width	Vcc = 10V, Rext = 10K, Cext = 100pF	1		6.7	13.7	uS	10, 11
Ron	On Resistance of Transistor	Vcc = 5V				150	Ohms	9
		Vcc = 10V				65	Ohms	9

Note 1: Parameter tested go-no-go only.
Note 2: Tested at 25 C; guaranteed, but not tested at +125 C and -55 C.