

MNMM54C74-X REV 1A0

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DUAL D FLIP-FLOP

General Description

The MM54C74 dual D flip-flop is a monolithic complementary MOS (CMOS) integrated circuit constructed with N- and P-channel enhancement transistors. Each flip-flop has independent data, preset, clear and clock inputs and Q and $\bar{Q}$ outputs. The logic level present at the data input is transferred to the output during the positive going transition of the clock pulse. Preset or clear is independent of the clock and accomplished by a low level at the preset or clear input.

Industry Part Number

MM54C74

NS Part Numbers

 MM54C74J/883
 MM54C74W/883

Prime Die

MM54C74

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

- Supply voltage range 3V to 15V
- Tenth power TTL compatible drives 2 LPTTL loads
- High noise immunity 0.45 V_{CC} (typ.)
- Low power 50nW (typ.)
- Medium speed operation 10MHz (typ.) with 10V supply

Applications

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

(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
Lead Temperature (Soldering, 10 seconds)	260 C
Operating Vcc Range	3V to 15V
Vcc(Max)	18V

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, Vih = 3.5V, Vil = 1.5V, Iout = -10uA			4.5		V	1, 2, 3
		Vcc = 10V, Vih = 8V, Vil = 2V, Iout = -10uA			9		V	1, 2, 3
		Vcc = 4.5V, Vih = 3V, Vil = 0.8V, Iout = -360uA			2.4		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 5V, Vih = 3.5V, Vil = 1.5V, Iout = 10uA				0.5	V	1, 2, 3
		Vcc = 10V, Vih = 8V, Vil = 2V, Iout = 10uA				1	V	1, 2, 3
		Vcc = 4.5V, Vih = 3V, Vil = 0.8V, Iout = 360uA				0.4	V	1, 2, 3
Iih	Logical "1" Input Current	Vcc = 15V, Vin = 15V, other inputs at 0V				0.15	uA	1, 3
						1	uA	2
Iil	Logical "0" Input Current	Vcc = 15V, Vin = 0V, other inputs at 15V				-0.15	uA	1, 3
						-1	uA	2
Icc	Quiescent Device Current	Vcc = 15V, Vih = 15V, Vil = 0V				2	uA	1, 3
						60	uA	2
Ioh	Output Source Current	Vcc = 5V, Vih = 5V, Vil = 0V, Vout = 0V			-1.75		mA	1, 3
					-1.2		mA	2
		Vcc = 10V, Vih = 10V, Vil = 0V, Vout = 0V			-8		mA	1, 3
					-5.6		mA	2
Iol	Output Sink Current	Vcc = 5V, Vih = 5V, Vil = 0V, Vout = 5V			1.75		mA	1, 3
					1.2		mA	2
		Vcc = 10V, Vih = 10V, Vil = 0V, Vout = 10V			8		mA	1, 3
					5.6		mA	2
		Vcc = 4.5V, Vih = 3V, Vil = 0.8V, Vout = 0.4V			360		uA	1, 2, 3
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 (LP to CMOS)	1		3		V	1, 2, 3
		Vcc = 4.5V (CMOS to LP)	1		4		V	1, 2, 3

Electrical Characteristics

DC PARAMETERS: (Continued)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
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 (LP to CMOS)	1			0.8	V	1, 2, 3
		Vcc = 4.5V (CMOS to LP)	1			1	V	1, 2, 3
Pd	Power Dissipation	Vcc = 15V	1			2.25	uW	1, 3
			1			225	uW	2
Voh	Logical "1" Output Voltage	Vcc = 4.5V, Iout = -10uA	2		4.4		V	1, 2, 3
Vol	Logical "0" Output Voltage	Vcc = 4.5V, Iout = 10uA	2			0.4	V	1, 2, 3

AC PARAMETERS: PROPAGATION DELAY TIME:

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: Vcc = 5V, Cl = 50pF, or equivalent impedance provided by diode load.

tPLH	From Preset to Clear	Vcc = 5V	1, 3			400	nS	9
			1, 3			560	nS	10
			1, 3			320	nS	11
		Vcc = 10V	1, 2			150	nS	9
			1, 2			210	nS	10
			1, 2			120	nS	11
tPHL	From Preset to Clear	Vcc = 5V	1, 3			300	nS	9
			1, 3			420	nS	10
			1, 3			240	nS	11
		Vcc = 10V	1, 2			110	nS	9
			1, 2			155	nS	10
			1, 2			90	nS	11
tPLH	From Clock	Vcc = 5V	1, 3			300	nS	9
		Vcc = 10V	1, 2			110	nS	9
tPHL	From Clock	Vcc = 5V	1, 3			300	nS	9
		Vcc = 10V	1, 2			110	nS	9

Electrical Characteristics

AC PARAMETERS:

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: Vcc = 5V, Cl = 50pF, or equivalent impedance provided by diode load.

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tSETUP	Setup Time	Vcc = 5V	1		100		nS	9
		Vcc = 10V	2		40		nS	9
tHOLD	Hold Time	Vcc = 5V	1			0	nS	9
		Vcc = 10V	2			0	nS	9
tw	Minimum Pulse Width	Vcc = 5V, Clock	1			250	nS	9
		Vcc = 10V, Clock	2			100	nS	9
		Vcc = 5V, Preset or Clear	1			160	nS	9
		Vcc = 10V, Preset or Clear	2			70	nS	9
tr/tf	Maximum Clock Rise and Fall Time	Vcc = 5V	2		15		uS	9
		Vcc = 10V	2		5		uS	9
fMAX	Maximum Clock Frequency	Vcc = 5V	2		2		MHz	9
		Vcc = 10V	2		5		MHz	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.