

MN54F109-X REV 1A0

Original Creation Date: 03/13/96
Last Update Date: 07/30/96
Last Major Revision Date: 03/13/96

DUAL JK POSITIVE EDGE-TRIGGERED FLIP-FLOP

General Description

The F109 consists of two high-speed, completely independent transition clocked JK flip-flops. The clocking operation is independent of rise and fall times of the clock waveform. The JK design allows operation as a D flip-flop (refer to F74 data sheet) by connecting the J and K inputs.

Asynchronous Inputs:

- LOW input to \overline{SD} sets Q to HIGH level
- LOW input to \overline{CD} sets Q to LOW level
- Clear and Set are independent of clock
- Simultaneous LOW on \overline{CD} and \overline{SD} makes both Q and \overline{Q} HIGH

Industry Part Number

54F109

Prime Die

M109

NS Part Numbers

54F109DM
54F109DMQB
54F109FMQB
54F109LMQB

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

- Guaranteed 4000V minimum ESD protection.

(Absolute Maximum Ratings)

(Note 1)

Storage Temperature	-65 C to +150 C
Ambient Temperature under Bias	-55 C to +125 C
Junction Temperature under Bias	-55 C to +175 C
Vcc Pin Potential to Ground Pin	-0.5V to +7.0V
Input Voltage (Note 2)	-0.5V to +7.0V
Input Current (Note 2)	-30 mA to +5.0mA
Voltage Applied to Output in HIGH State (with Vcc=0V)	
Standard Output	-0.5V to Vcc
TRI-STATE Output	-0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated Iol(mA)

Note 1: Absolute Maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0 C to +70 C
Military	-55 C to +125 C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

Electrical Characteristics

DC PARAMETER

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: VCC 4.5V to 5.5V, Temp range: -55C to 125C

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
IIH	Input High Current	VCC=5.5V, VM=2.7V, VINH=5.5V, VINL=0.0V	1, 3	INPUTS		20	uA	1, 2, 3
IBVI	Input High Current	VCC=5.5V, VM=7.0V, VINH=5.5V, VINL=0.0V	1, 3	INPUTS		100	uA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VM=0.5V, VINH=5.5V	1, 3	J, \bar{K} , CP		-0.6	mA	1, 2, 3
IIL3	Input LOW Current	VCC=5.5V, VM=0.5V, VINH=5.5V	1, 3	SET/CLR		-1.8	mA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIH=2.0V, IOL=20mA, VINH=5.5V, VIL=0.8V	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, VIH=2.0V, IOH=-1.0mA, VINH=5.5V	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short Circuit Current	VCC=5.5V, VINL=0.0V, VM=0.0V	1, 3	OUTPUTS	-60	-150	mA	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IM=-18mA, VINH=5.5V	1, 3	INPUTS		-1.2	V	1, 2, 3
ICC	Supply Current	VCC=5.5V, VINL=0.0V, VINH=5.5V	1, 3	VCC		17.0	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINL=0.0V, VINH=5.5V, VM=5.5V	1, 3	OUTPUTS		250	uA	1, 2, 3

Electrical Characteristics

AC PARAMETER

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: CL=50pf, RL=500 OHMS, TR=2.5ns, TF=2.5ns, SEE AC FIGS

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH(1)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	CPn to Qn/Qn	3.8	7.0	ns	9
			2, 4	CPn to Qn/Qn	3.8	9.0	ns	10, 11
tpHL(1)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	CPn to Qn/Qn	4.4	8.0	ns	9
			2, 4	CPn to Qn/Qn	4.4	10.5	ns	10, 11
tpLH(2)	Propagation Delay CDn/SDn to Qn/Qn	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4		3.2	7.0	ns	9
tpLH(2)	Propagation Delay CDn/SDn to Qn/Qn	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4		3.2	9.0	ns	10, 11
tpHL(2)	Propagation Delay CDn/SDn to Qn/Qn	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4		3.5	9.0	ns	9
tpHL(2)	Propagation Delay CDn/SDn to Qn/Qn	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4		3.5	11.5	ns	10, 11
ts(H)	Setup Time (HIGH)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	Jn/Kn to CPn	3.0		ns	9, 10, 11
ts(L)	Setup Time (LOW)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	Jn/Kn to CPn	3.0		ns	9
			5	Jn/Kn to CPn	4.0		ns	10, 11
th(H/L)	Hold Time (HIGH or LOW)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	Jn/Kn to CPn	1.0		ns	9, 10, 11
tw(H)	Pulse Width (HIGH)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR=1.0ns, TF=1.0ns	5	CPn	4.0		ns	9, 10, 11
tw(L)	Pulse Width (LOW)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR=1.0ns, TF=1.0ns	5	CPn	5.0		ns	9, 10, 11
tw (L)	Pulse Width (LOW)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR=1.0ns, TF=1.0ns	5	CDn or SDn	4.0		ns	9, 10, 11
tREC	Recovery Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	CDn/SDn to CP	2.0		ns	9, 10, 11
fMAX	Maximum Count Frequency	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR=1.0ns, TF=1.0ns	5		100		MHZ	9
			5		70		MHZ	10, 11

Note 1: Screen tested 100% on each device at +25C, +125C & -55C temperature, subgroups A1, 2, 3, 7 & 8.

Note 2: Screen tested 100% on each device at +25C temperature only, subgroup A9.

Note 3: Sample tested (Method 5005, table 1) on each MFG. lot at +25C, +125C & -55C temperature, subgroups A1, 2, 3, 7 & 8.

Note 4: Sample tested (Method 5005, Table 1) on each MFG. lot at +25C subgroup A9, and periodically at +125C & -55C temperature, subgroups 10 & 11.

Note 5: Guaranteed but not tested. (DESIGN CHARACTERIZATION ONLY).

National Semiconductor was acquired by Texas Instruments.

http://www.ti.com/corp/docs/investor_relations/pr_09_23_2011_national_semiconductor.html

This file is the datasheet for the following electronic components:

JM38510/34102B2A - <http://www.ti.com/product/jm38510/34102b2a?HQS=TI-null-null-dscatalog-df-pf-null-ww>

JM38510/34102BEA - <http://www.ti.com/product/jm38510/34102bea?HQS=TI-null-null-dscatalog-df-pf-null-ww>

JM38510/34102BFA - <http://www.ti.com/product/jm38510/34102bfa?HQS=TI-null-null-dscatalog-df-pf-null-ww>

JM38510/34102SEA - <http://www.ti.com/product/jm38510/34102sea?HQS=TI-null-null-dscatalog-df-pf-null-ww>

54F109DMQB - <http://www.ti.com/product/54f109dmqb?HQS=TI-null-null-dscatalog-df-pf-null-ww>

JM38510/34102SF - <http://www.ti.com/product/jm38510/34102sf?HQS=TI-null-null-dscatalog-df-pf-null-ww>

54F109LMQB - <http://www.ti.com/product/54f109lmqb?HQS=TI-null-null-dscatalog-df-pf-null-ww>

54F109FMQB - <http://www.ti.com/product/54f109fmqb?HQS=TI-null-null-dscatalog-df-pf-null-ww>



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.