

MN54F164A-X REV 1A0

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SERIAL-IN, PARALLEL-OUT SHIFT REGISTER

General Description

The F164A is a high-speed 8-bit serial-in/parallel-out shift register. Serial data is entered through a 2-input AND gate synchronous with the LOW-to-HIGH transition of the clock. The device features an asynchronous Master Reset which clears the register, setting all outputs LOW independent of the clock.

Industry Part Number

54F164A

Prime Die

M164A

NS Part Numbers

 54F164ADMQB
 54F164AFMQB
 54F164ALMQB

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

- Asynchronous Master Reset
- Gated Serial Data Input
- Fully Synchronous Data Transfers

(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)
ESD Last Passing Voltage (Min)	4000V

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, VINL=0.0V	1, 3	INPUTS		-0.6	mA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIL=0.8V, IOL=20mA	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, VIL=0.8V, IOH=-1.0mA, VIH=2.0V, VINH=5.5V	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short Circuit Current	VCC=5.5V, VINH=5.5V, 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		55	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINL=0.0V, VINH=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	CP to Qn	2.5	7.0	ns	9
			2, 4	CP to Qn	2.5	9.0	ns	10, 11
tpHL(1)	Propagation Delay	VCC= 5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	CP to Qn	3.0	7.5	ns	9
			2, 4	CP to Qn	3.0	8.5	ns	10, 11
tpHL	Propagation Delay	VCC= 5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	MR to Qn	4.0	10.5	ns	9
			2, 4	MR to Qn	4.0	12.5	ns	10, 11
ts(L)	Setup Time (Low)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	A or B to CP	3.0		ns	9
			5	A or B to CP	4.0		ns	10, 11
ts(H)	Setup Time (High)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	A or B to CP	4.5		ns	9
			5	A or B to CP	5.5		ns	10, 11
th(H/L)	Hold Time (High or Low)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	A or B to CP	1.0		ns	9, 10, 11
tw(L)	Pulse Width (Low)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR/TF=1.0ns	5	CP	7.0		ns	9, 10, 11
			5	CP			ns	
tw(H)	Pulse Width (High)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR/TF=1.0ns	5	CP	4.0		ns	9, 10, 11
tw (L)	Pulse Width (Low)	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR/TF=1.0ns	5	MR	5.0		ns	9, 10, 11
tREC	Recovery Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	5	MR to CP	5.5		ns	9
			5	MR to CP	6.5		ns	10, 11
fMAX	Maximum Count Frequency	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C, TR/TF=1.0ns	5		80		MHZ	9
			5		60		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.

(Continued)

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