National Semiconductor

MILITARY DATA SHEET

MN54F251A-X REV 1A0

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8-INPUT MULTIPLEXER WITH 3-STATE OUTPUTS

General Description

The 'F251A is a high-speed 8-input digital multiplexer. It provides, in onepackage, the ability to select one bit of data from up to eight sources. It can be used as universal function generator to generate any logic function of four variables. Both assertion and negation outputs are provided.

Industry Part Number

54F251A

NS Part Numbers

54F251ADMQB
54F251AFMQB
54F251ALMQB

Prime Die

M251A

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (^{o}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

- Multifunctional Capability
- On-Chip Select Logic Decoding
- Inverting and Non-Inverting 3-State Outputs

(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)	-30mA 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 PARAMETERS

(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, VIH=2.0V, IOL=20mA	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, VIL=0.8V, VIH=2.0V, VINL=0.0V, IOH=-1.0mA, VINH=5.5V	1, 3	OUTPUTS	2.5		V	1, 2, 3
VOH3	Output HIGH Voltage	VCC=4.5V, VIH=2.0V, VINH=5.5V, VINL=0.0V, IOH3=-3.0mA, VIL=0.8V	1, 3	OUTPUTS	2.4		V	1, 2, 3
IOS	Short Circuit Current	VCC=5.5V, VINH=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		22	mA	1, 2, 3
ICCZ	Supply Current	VCC=5.5V, VINH=5.5V	1, 3	VCC		24	mA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VINH=5.5V, VINL=0.0V, VM=5.5V	1, 3	OUTPUTS		250	uA	1, 2, 3
IOZH	Output Leakage Current	VCC=5.5V, VM=2.7V, VIH=2.0V, VINH=5.5V, VINL=0.0V	1, 3	OUTPUTS		50	uA	1, 2, 3
IOZL	Output Leakage Current	VCC=5.5V, VM=0.5V, VIH=2.0V, VINH=5.5V, VINL=0.0V	1, 3	OUTPUTS		-50	uA	1, 2, 3

AC PARAMETERS

(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

tpLH(1)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	In to Z	3.5	7.0	ns	9
			2, 4	In to Z	2.5	9.0	ns	10, 11
tpHL(1)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	In to Z	3.5	7.0	ns	9
			2, 4	In to Z	3.5	9.0	ns	10, 11
tpLH(2)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	In to Z	3.0	6.5	ns	9
			2, 4	In to Z	2.5	8.0	ns	10, 11
tpHL(2)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	In to Z	1.5	4.0	ns	9
			2, 4	In to Z	1.5	6.0	ns	10, 11

Electrical Characteristics

AC PARAMETERS(Continued)

(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(3)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	Sn to Zn	4.5	10.5	ns	9
			2, 4	Sn to Zn	3.5	14.0	ns	10, 11
tpHL(3)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	Sn to Zn	4.0	8.5	ns	9
			2, 4	Sn to Zn	3.0	10.5	ns	10, 11
tpLH(4)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	Sn to Zn	3.5	9.0	ns	9
			2, 4	Sn to Zn	3.5	11.5	ns	10, 11
tpHL(4)	Propagation Delay	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	Sn to Zn	3.2	7.5	ns	9
			2, 4	Sn to Zn	3.2	8.0	ns	10, 11
tpZH(1)	Output Enable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	3.5	7.0	ns	9
			2, 4	$\overline{OE}$ to Z	3.0	8.5	ns	10, 11
tpZL(1)	Output Enable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	3.5	7.5	ns	9
			2, 4	$\overline{OE}$ to Z	3.5	9.0	ns	10, 11
tpHZ(1)	Output Disable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	2.5	5.5	ns	9
			2, 4	$\overline{OE}$ to Z	2.5	6.0	ns	10, 11
tpLZ(1)	Output Disable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	1.5	4.5	ns	9
			2, 4	$\overline{OE}$ to Z	1.5	5.0	ns	10, 11
tpZH(2)	Output Enable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	2.5	6.0	ns	9
			2, 4	$\overline{OE}$ to Z	2.0	7.0	ns	10, 11
tpZL(2)	Output Enable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	2.5	6.0	ns	9
			2, 4	$\overline{OE}$ to Z	2.5	7.5	ns	10, 11
tpHZ(2)	Output Disable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	2.0	5.5	ns	9, 10, 11
tpLZ(2)	Output Disable Time	VCC=5.0V @25C, VCC=4.5V & 5.5V @-55/125C	2, 4	$\overline{OE}$ to Z	1.5	4.5	ns	9
			2, 4	$\overline{OE}$ to Z	1.5	5.5	ns	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.

(Continued)

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.

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:

54F251ADMQB - http://www.ti.com/product/54f251admqb?HQS=TI-null-null-dscatalog-df-pf-null-wwe

54F251AFMQB - http://www.ti.com/product/54f251afmqb?HQS=TI-null-null-dscatalog-df-pf-null-wwe

54F251ALMQB - http://www.ti.com/product/54f251almqb?HQS=TI-null-null-dscatalog-df-pf-null-wwe

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