



## MICROCIRCUIT DATA SHEET

**CN54F251A-X REV 0A0**

Original Creation Date: 06/25/97  
Last Update Date: 07/08/97  
Last Major Revision Date: 06/25/97

### 8-INPUT MULTIPLEXER WITH TRI-STATE OUTPUTS

#### General Description

The F251A is a high-speed 8-input digital multiplexer. It provides, in one package, the ability to select one bit of data from up to eight sources. It can be used as a 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

54F251ADC

#### Prime Die

M251A

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#### Processing

#### Quality Conformance Inspection

#### Subgrp Description Temp ( °C)

1	Static tests at	+25
2	Static tests at	+70
3	Static tests at	0
4	Dynamic tests at	+25
5	Dynamic tests at	+70
6	Dynamic tests at	0
7	Functional tests at	+25
8A	Functional tests at	+70
8B	Functional tests at	0
9	Switching tests at	+25
10	Switching tests at	+70
11	Switching tests at	0

### **Features**

- Multifunctional Capability
- On-Chip Select Logic Decoding
- Inverting and Non-Inverting Tri-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
Supply Voltage 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: 0C to +70C

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
VIH	Input HIGH Voltage	Recognized as a HIGH Signal	1	INPUTS	2.0		V	1, 2, 3
VIL	Input LOW Voltage	Recognized as a LOW Signal	1	INPUTS		0.8	V	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IIN=-18mA	2, 3	INPUTS		-1.2	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, IOH=-1.0mA	2, 3	OUTPUTS	2.5		V	1, 2, 3
		VCC=4.5V, IOH=-3.0mA	2, 3	OUTPUTS	2.4		V	1, 2, 3
		VCC=4.75V, IOH=-1.0mA	2, 3	OUTPUTS	2.7		V	1, 2, 3
		VCC=4.75V, IOH=-3.0mA	2, 3	OUTPUTS	2.7		V	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, IOL=24mA	2, 3	OUTPUTS		0.5	V	1, 2, 3
IIH	Input HIGH Current	VCC=5.5V, VIN=2.7V	2, 3	INPUTS		5.0	uA	1, 2, 3
IBVI	Input HIGH Current Breakdown Test	VCC=5.5V, VIN=7.0V	2, 3	INPUTS		7.0	uA	1, 2, 3
ICEX	Output HIGH Leakage Current	VCC=5.5V, VOUT = VCC	2, 3	OUTPUTS		100	uA	1, 2, 3
VID	Input Leakage Test	VCC = 0.0V, IID = 1.9uA, All other pins grounded	2, 3	INPUTS	4.75		V	1, 2, 3
IOD	Output Leakage Circuit Current	VCC = 0.0V, VIOD = 150mV, All other pins grounded	2, 3	OUTPUTS		4.75	uA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VIN=0.5V	2, 3	INPUTS		-0.6	mA	1, 2, 3
IOZH	Output Leakage Current	VCC=5.5V, VOUT=2.7V	2, 3	OUTPUTS		50	uA	1, 2, 3
IOZL	Output Leakage Current	VCC=5.5V, VOUT=0.5V	2, 3	OUTPUTS		-50	uA	1, 2, 3
IOS	Output Short Circuit Current	VCC=5.5V, VOUT = 0V	2, 3	OUTPUTS	-60	-150	mA	1, 2, 3
IZZ	Bus Drainage Test	VCC = 0.0V, VOUT = 5.25V	2, 3			500	uA	1, 2, 3
ICCL	Power Supply Current	VCC=5.5V, VO = LOW	2, 3	VCC		22	mA	1, 2, 3
ICCZ	Power Supply Current	VCC=5.5V, VO = HIGH Z	2, 3	VCC		24	mA	1, 2, 3

## Electrical Characteristics

### 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. Temp Range: 0C to +70C

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH(1)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	Sn to $\bar{Z}$	3.5	9.0	ns	9
			2, 3	Sn to $\bar{Z}$	3.5	9.5	ns	10, 11
tpHL(1)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	Sn to $\bar{Z}$	3.2	7.5	ns	9, 10, 11
			2, 3	Sn to Z	4.5	10.5	ns	9
tpLH(2)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	Sn to Z	4.5	10.5	ns	9
			2, 3	Sn to Z	4.5	12.5	ns	10, 11
tpHL(2)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	Sn to Z	4.0	8.5	ns	9
			2, 3	Sn to $\bar{Z}$	4.0	9.0	ns	10, 11
tpLH(3)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	In to $\bar{Z}$	3.0	6.5	ns	9
			2, 3	In to $\bar{Z}$	3.0	7.0	ns	10, 11
tpHL(3)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	In to $\bar{Z}$	1.4	4.0	ns	9
			2, 3	In to $\bar{Z}$	1.5	5.0	ns	10, 11
tpLH(4)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	In to Z	3.5	7.0	ns	9
			2, 3	In to Z	2.5	8.0	ns	10, 11
tpHL(4)	Propagation Delay	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	In to Z	3.5	7.0	ns	9
			2, 3	In to Z	3.5	7.5	ns	10, 11
tpZH(1)	Output Enable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	6.0	ns	9
			2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	7.0	ns	10, 11
tpZL(1)	Output Enable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	6.0	ns	9
			2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	6.5	ns	10, 11
tpHZ(1)	Output Disable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	5.5	ns	9
			2, 3	$\bar{O}E$ to $\bar{Z}$	2.5	6.0	ns	10, 11
tpLZ(1)	Output Disable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to $\bar{Z}$	1.5	4.5	ns	9, 10, 11
			2, 3	$\bar{O}E$ to Z	3.5	7.0	ns	9
tpZH(2)	Output Enable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to Z	3.5	7.0	ns	9
			2, 3	$\bar{O}E$ to Z	3.0	7.5	ns	10, 11
tpZL(2)	Output Enable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to Z	3.5	7.5	ns	9
			2, 3	$\bar{O}E$ to Z	3.5	8.0	ns	10, 11
tpHZ(2)	Output Disable Time	VCC=+5.0V @ +25C, VCC=4.5V & 5.5V @ 0/+70C	2, 3	$\bar{O}E$ to Z	2.0	5.5	ns	9, 10, 11
			2, 3	$\bar{O}E$ to Z	1.5	4.5	ns	9, 10, 11

Note 1: Guaranteed by applying specific input condition and testing VOL & VOH.

*(Continued)*

- Note 2: Screen tested 100% on each device at +75C temperature only, subgroups A2 & A10.  
Note 3: Sample tested (Method 5005, Table 1) on each MFG. lot at +75C temperature only, subgroups A2 & A10.

**Revision History**

<b>Rev</b>	<b>ECN #</b>	<b>Rel Date</b>	<b>Originator</b>	<b>Changes</b>
0A0	M0001726	07/08/97	Linda Collins	Legal issue with Fairchild, due to the Fairchild/National split, is forcing the change from CN74F which is 'Fairchilds' product code to CN54F which is 'Nationals' product code.