

MN54F283-X REV 1A0

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4-BIT FULL ADDER WITH FAST CARRY
General Description

The F283 high-speed 4-bit binary full adder with internal carry lookahead accepts two 4-bit binary words (A0-A3, B0-B3) and a Carry input (C0). It generates the binary Sum outputs (S0-S3), and the Carry output (C4) from the most significant bit. The F283 will operate with either active HIGH or active LOW operands (positive or negative logic).

Industry Part Number

54F283

NS Part Numbers

 54F283DMQB
 54F283FMQB
 54F283LMQB

Prime Die

M283

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	-65C to +150C
Ambient Temperature under Bias	-55C to +125C
Junction Temperature under Bias	-55C to +175C
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 +5.0 mA
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)	4000 V

Note 1: Absolute maximum ratings are 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 (Co)	1, 3	INPUTS		-0.6	mA	1, 2, 3
		VCC= 5.5V, VM=0.5V, VINH=5.5V (An,Bn)	1, 3	INPUTS		-1.2	mA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIL=0.8V, IOL=20mA, VINH=5.5V	1, 3	OUTPUTS		0.5	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, VIH=2.0V, IOH=-1.0mA	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Output 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	Power 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, VM=5.5V	1, 3	OUTPUTS		250	uA	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

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH(1)	Propagation Delay	VCC=5.5V @25C, VCC=4.5V & 5.5V @ -55/125C	2, 4	C0 to Sn	3.5	9.5	ns	9
			2, 4	C0 to Sn	3.5	14.0	ns	10, 11
tpHL(1)	Propagation Delay	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4	C0 to Sn	3.0	9.5	ns	9
			2, 4	C0 to Sn	3.0	14.0	ns	10, 11
tpLH(2)	Propagation Delay	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4	An/Bn to Sn	3.0	9.5	ns	9
			2, 4	An/Bn to Sn	3.0	17.0	ns	10, 11
tpHL(2)	Propagation Delay	VCC=5.0V, VCC=4.5V & 5.5V @ -55/125C	2, 4	An/Bn to Sn	3.0	9.5	ns	9
			2, 4	An/Bn to Sn	3.0	14.0	ns	10, 11
tpLH(3)	Propagation Delay	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4	C0 to C4	3.0	7.5	ns	9
			2, 4	C0 to C4	3.0	10.5	ns	10, 11
tpHL(3)	Propagation Delay	VCC=5.0V, VCC=4.5V & 5.5V @ -55/125C	2, 4	C0 to C4	3.0	7.0	ns	9
			2, 4	C0 to C4	2.5	10.0	ns	10, 11
tpLH(4)	Propagation Delay	VCC=5.0V @ 25C, VCC=4.5V & 5.5V @ -55/125C	2, 4	An/Bn to C4	3.0	7.5	ns	9
			2, 4	An/Bn to C4	3.0	10.5	ns	10, 11
tpHL(4)	Propagation Delay	VCC=5.0V, VCC=4.5V & 5.5V @ -55/125C	2, 4	An/Bn to C4	2.5	7.0	ns	9
			2, 4	An/Bn to C4	2.5	10.0	ns	10, 11

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

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

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

Note 4: Sample Tested (Method 5005, Table 1) on each MFG. lot at +25 C Subgroup A9, & periodically at +125 C & -55 C temp., Subgroups 10 & 11.