



## MICROCIRCUIT DATA SHEET

**MNDM54LS283-X REV 1B0**

Original Creation Date: 04/13/98  
Last Update Date: 07/10/02  
Last Major Revision Date: 04/13/98

### 4-BIT BINARY FULL ADDER with FAST CARRY

#### General Description

The 'LS283 is a high-speed 4-bit binary full adder. With internal carry lookahead it 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 'LS283 will operate with either active HIGH or active LOW operands (positive or negative logic).

#### Industry Part Number

54LS283

#### NS Part Numbers

DM54LS283J-MLS

#### Prime Die

L283

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#### 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**

**(Absolute Maximum Ratings)**

(Note 1)

Storage Temperature	-65 C to +150 C
Ambient Temperature under Bias	-55 C to +125 C
Input Voltage	-0.5V to +10.0V
VCC Pin Potential to Ground Pin	-0.5V to +7.0V
Junction Temperature under Bias	-55 C to +175 C
Current Applied to Output in LOW state (Max)	twice the rated I <sub>ol</sub> (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.

**Recommended Operating Conditions**

Free Air Ambient Temperature	
Military	-55 C to +125 C
Supply Voltage	
Military	+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=4.5V	1, 3	C0		20.0	uA	1, 2, 3
IIH 2	Input High Current	VCC=5.5V, VM=2.7V, VINH=4.5V, VINL=0.0V	1, 3	An or Bn		40.0	uA	1, 2, 3
IBVI	Input High Current	VCC=5.5V, VM=10.0V, VINH=4.5V, VINL=0.0V	1, 3	C0		100	uA	1, 2, 3
IBVI 2	Input High Current	VCC=5.5V, VM=10.0V, VINH=4.5V, VINL=0.0V	1, 3	An or Bn		200	uA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VM=0.4V, VINH=4.5V	1, 3	C0	-30.0	-400	uA	1, 2, 3
IIL 2	Input LOW Current	VCC=5.5V, VM=0.4V, VINH=4.5V	1, 3	An or Bn	-60.0	-800	uA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, IOL=4.0mA, VINH=4.5V, VIL=0.7V	1, 3	OUTPUTS		0.4	V	1, 2, 3
VOH	Output HIGH Voltage	VCC=4.5V, IOH=-400uA, VINH=4.5V, VIH=2.0V	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short-Circuit Current	VCC=5.5V, VM=0.0V, VINH=4.5V	1, 3	OUTPUTS	-20	-100	mA	1, 2, 3
VCD	Input Clamp Diode Voltage	VCC=4.5V, IM=-18mA, VINH=4.5V	1, 3	INPUTS		-1.5	V	1, 2, 3
ICCH	Supply Current	VCC=5.5V, VINL=0.0V	1, 3	VCC		39.0	mA	1, 2, 3
ICCL	Supply Current	VCC=5.5V, VINL=0.0V, VINH=4.5V	1, 3	VCC		34.0	mA	1, 2, 3

### AC PARAMETER - 15pF

(The following conditions apply to all the following parameters, unless otherwise specified.)  
AC: CL=15pF, RL=2k ohms Temp range: +25C

tpLH/HL 1	Propagation Delay	VCC=5.0V	5	C0 to Sn		24.0	ns	9
tpLH/HL 2	Propagation Delay	VCC=5.0V	5	C0 to C4		17.0	ns	9
tpLH/HL 3	Propagation Delay	VCC=5.0V	5	An/Bn to Sn		24.0	ns	9
tpLH/HL4	Propagation Delay	VCC=5.0V	5	An/Bn to C4		17.0	ns	9

## Electrical Characteristics

### AC PARAMETER - 50pF

(The following conditions apply to all the following parameters, unless otherwise specified.)  
 AC: CL=50pF, RL=2k ohms Temp range: -55C to +125C

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tpLH 1	Propagation Delay	VCC=5.0V	2, 4	C0 to Sn	2.0	30.0	ns	9
			2, 4	C0 to Sn	2.0	39.0	ns	10, 11
tpHL 1	Propagation Delay	VCC=5.0V	2, 4	C0 to Sn	2.0	35.0	ns	9
			2, 4	C0 to Sn	2.0	40.0	ns	10, 11
tpLH 2	Propagation Delay	VCC=5.0V	2, 4	C0 to C4	2.0	25.0	ns	9
			2, 4	C0 to C4	2.0	32.0	ns	10, 11
tpHL 2	Propagation Delay	VCC=5.0V	2, 4	C0 to C4	2.0	28.0	ns	9
			2, 4	C0 to C4	2.0	35.0	ns	10, 11
tpLH/HL 3	Propagation Delay	VCC=5.0V	2, 4	An/Bn to Sn	2.0	35.0	ns	9
			2, 4	An/Bn to Sn	2.0	40.0	ns	10, 11
tpLH 4	Propagation Delay	VCC=5.0V	2, 4	An/Bn to C4	2.0	25.0	ns	9
			2, 4	An/Bn to C4	2.0	32.0	ns	10, 11
tpHL 4	Propagation Delay	VCC=5.0V	2, 4	An/Bn to C4	2.0	28.0	ns	9
			2, 4	An/Bn to C4	2.0	35.0	ns	10, 11

Note 1: Screen tested 100% on each device at -55C, +25C & +125C 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. Subgroups 10 & 11 are guaranteed, not tested.

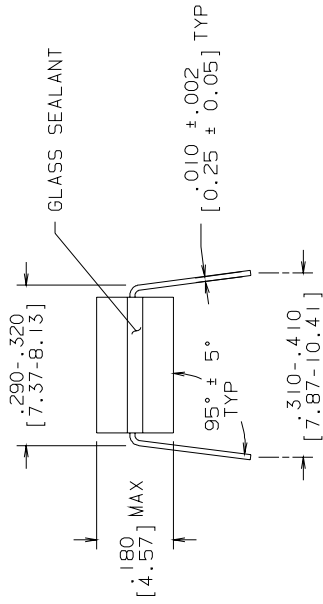
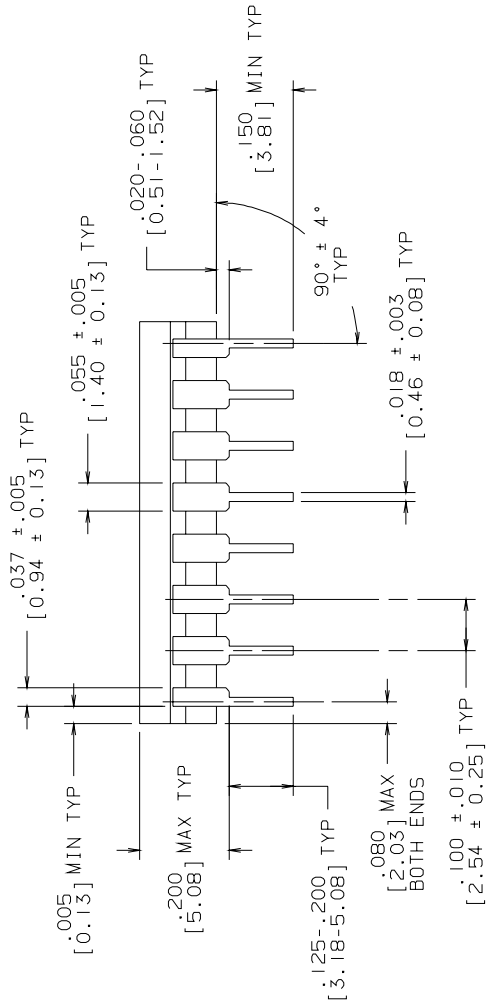
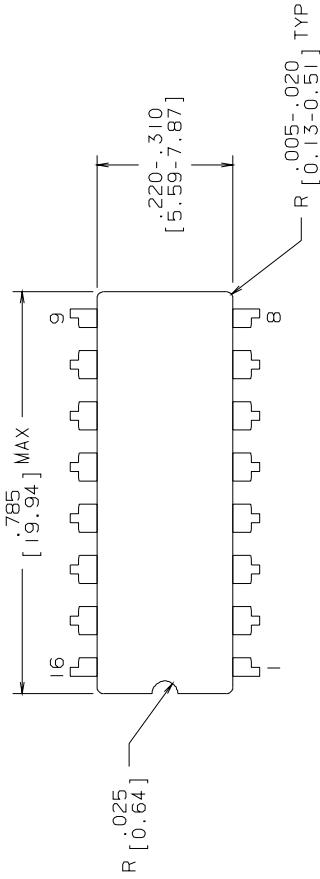
Note 5: Guaranteed, not tested.

## Graphics and Diagrams

GRAPHICS#	DESCRIPTION
J16ARL	CERDIP (J), 16 LEAD (P/P DWG)

See attached graphics following this page.

R E V I S I O N S			
LTR	DESCRIPTION	E. C. N.	DATE
L	REVISE PER CURRENT STD; REDRAW	09996	09/15/93
			TL/



MILIAERO  
CONFIGURATION CONTROL

MIL-M-38510  
CONFIGURATION CONTROL

CONTROLLING DIMENSION: INCH			
APPROVALS	DATE		
DRAWN <b>T. LEQUANG</b>	09/15/93		
DFTG. CHK.			
ENGR. CHK.			
APPROVAL			
PROJECTION 			
	INCH [MM]		
SCALE	SIZE	DRAWING NUMBER	REV
N/A	B	MKT-J16A	L
DO NOT SCALE DRAWING	SHEET	1	OF 1

NOTES: UNLESS OTHERWISE SPECIFIED

- LEAD FINISH TO BE 200 MICROMETERS / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
- JEDEC REGISTRATION MO-036, VARIATION AD, DATED 04/1981.

NATIONAL SEMICONDUCTOR CORPORATION  
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CERDIP (J),  
16 LEAD

**Revision History**

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002933	07/10/02	Linda Collins	Initial MDS release:: MNDM54LS283-X Rev. 1A0. Changed note 5 (guaranteed not tested) in the AC 50pF notes reference column to note 2 (Screen tested 100% at +25C, subgroup 9) and to note 4 (sample tested at +25C, subgroup 9. Subgroups 10 & 11 are guaranteed, not tested). Changed note 2 in the AC 15pF notes reference column to note 5. Reworded the phrase in note 4 from 'and periodically at +125C & -55C, subgroups 10 & 11' to 'Subgroups 10 & 11 are guaranteed, not tested.
1B0	M0004028	07/10/02	Rose Malone	Update MDS: MNDM54LS283-X, Rev. 1A0 to MNDM54LS283-X, Rev. 1B0. Updated NS Part Numbers on Main Table. Added Mkt Dwg.'s in Graphics Section.