National Semiconductor

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

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

(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 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.

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

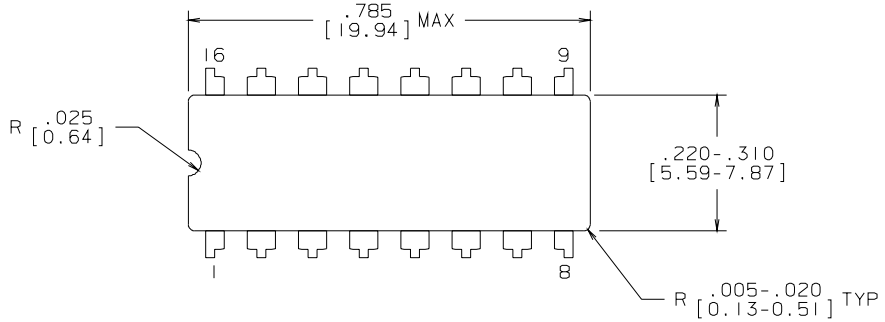
Note 1: Screen tested 100% on each device at -55C, +25C & +125C temperature, subgroups A1, 2, 3, 7 & 8.
Note 2: Screen tested 100% on each device at +25C temperature only, subgroup A9.
Note 3: Sample tested (Method 5005, Table 1) on each MFG. lot at +25C, +125C & -55C temperature, subgroups A1, 2, 3, 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.

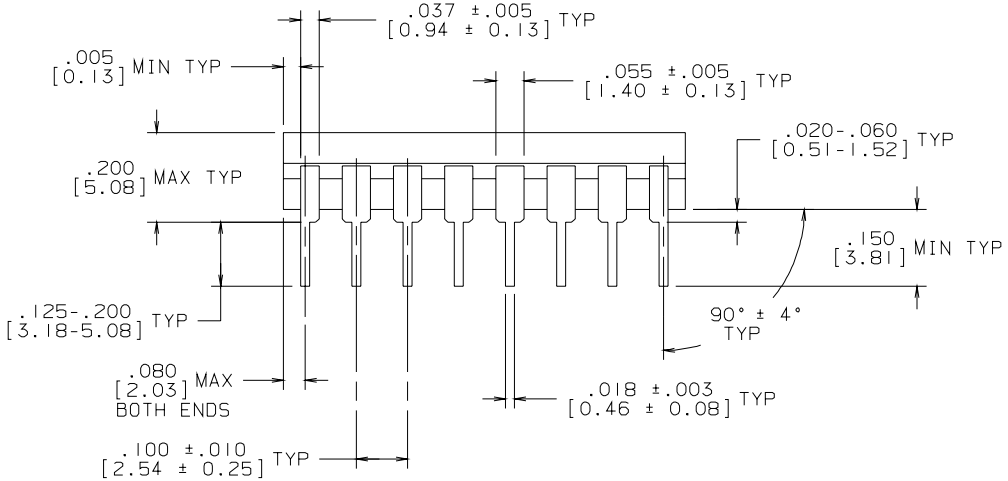
Graphics and Diagrams

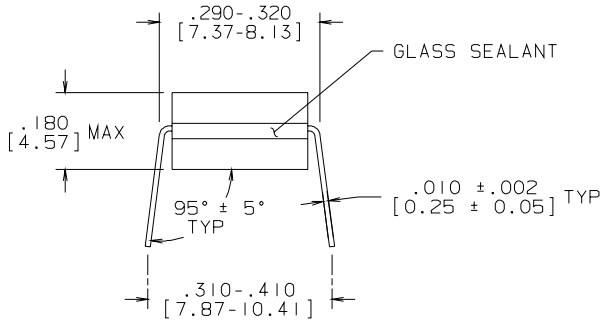
GRAPHICS#	DESCRIPTION
J16ARL	CERDIP (J), 16 LEAD (P/P DWG)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
L	REVISE PER CURRENT STD; REDRAW	09996	09/15/93	TL/







MIL/AERO CONFIGURATION CONTROL

MIL-M-38510 CONFIGURATION CONTROL

CONTROLLING DIMENSION: INCH

APPROVALS	DATE
DRAWN T. LEQUANG	09/15/93
DFTG. CHK.	
ENGR. CHK.	
APPROVAL	

NATIONAL SEMICONDUCTOR CORPORATION
2900 Semiconductor Drive, Santa Clara, CA 95052-8090

CERDIP (J), 16 LEAD

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

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

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 'Subroups 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.