National Semiconductor

MICROCIRCUIT DATA SHEET

MNDM54LS241-X REV 1A0

Original Creation Date: 04/31/98
Last Update Date: 08/24/98
Last Major Revision Date: 04/31/98

OCTAL BUFFERS/LINE DRIVERS (with 3-state outputs)

General Description

The 'LS241 is an octal buffer and line driver designed to be employed as memory address drivers, clock drivers and bus-oriented transmitter/receivers which provide improved PC board density.

Industry Part Number

54LS241

NS Part Numbers

DM54LS241J/883

Prime Die

L241

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

- Tri-state outputs drive bus lines or buffer memory address registers
- Outputs sink 12 mA
- 12 mA source current
- Input clamp diodes limit high-speed termination effects
- Hysteresis at inputs to improve noise margins

(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	-55C to +175C
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	INPUTS		20.0	uA	1, 2, 3
IBVI	Input High Current	VCC=5.5V, VM=10.0V, VINH=4.5V	1, 3	INPUTS		100	uA	1, 2, 3
IIL	Input LOW Current	VCC=5.5V, VM=0.4V, VINH=4.5V	1, 3	INPUTS	-0.5	-200	uA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, IOL=12.0mA, VINH=4.5V, VIL=0.7V	1, 3	OUTPUTS		0.4	V	1, 2, 3
VOH	High Level Output Voltage	VCC=4.5V, IOH=-3.0mA, VIL=0.7V, VINH=4.5V, VIH=2.0V	1, 3	OUTPUTS	2.4		V	1, 2, 3
VOH 1	High Level Output Voltage	VCC=4.5V, IOH=-12mA, VIL=0.5V, VINH=4.5V, VIH=2.0V	1, 3	OUTPUTS	2.0		V	1, 2, 3
IOS	Short Circuit Output Current	VCC=5.5V, VINH=4.5V, VOUT=0.0V, VINL=0.0V	1, 3	OUTPUT	-50.0	-225	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
ICCL	Supply Current	VCC=5.5V, VINL=0.0V	1, 3	VCC		46.0	mA	1, 2, 3
ICCZ	Supply Current	VCC=5.5V, VINH=4.5V, VINL=0.0V	1, 3	VCC		54.0	mA	1, 2, 3
ICCH	Supply Current	VCC=5.5V, VINL=0.0V, VINH=4.5V	1, 3	VCC		23.0	mA	1, 2, 3
IOZH	Off-State Output Current (High)	VCC=5.5V, VINH=4.5V, VM=2.7V, VIH=2.0V, VINL=0.0V, VIL=0.7V	1, 3	OUTPUTS		20.0	uA	1, 2, 3
IOZL	Off-State Output Current (Low)	VCC=5.5V, VINH=4.5V, VM=0.4V, VIH=2.0V, VIL=0.7V	1, 3	OUTPUTS		-20.0	uA	1, 2, 3

Electrical Characteristics

AC PARAMETER - Alternate Load

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: CL=50pF, RL=110 ohms, R=2.4K 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	Data to Outputs	2.0	18.0	ns	9
			2, 4	Data to Outputs	2.0	23.0	ns	10, 11
tpHL (1)	Propagation Delay	VCC=5.0V	2, 4	Data to Outputs	2.0	18.0	ns	9
			2, 4	Data to Outputs	2.0	23.0	ns	10, 11
tpLZ	Output Disable	VCC=5.0V	2, 4	$\overline{OE}$/OE to On	2.0	30.0	ns	9
			2, 4	$\overline{OE}$/OE to On	2.0	39.0	ns	10, 11
tpHZ	Output Disable	VCC=5.0V	2, 4	$\overline{OE}$/OE to On	2.0	35.0	ns	9
			2, 4	$\overline{OE}$/OE to On	2.0	45.0	ns	10, 11
tpZL	Output Enable	VCC=5.0V	2, 4	$\overline{OE}$/OE to On	2.0	30.0	ns	9
			2, 4	$\overline{OE}$/OE to On	2.0	39.0	ns	10, 11
tpZH	Output Enable	VCC=5.0V	2, 4	$\overline{OE}$/OE to On	2.0	30.0	ns	9
			2, 4	$\overline{OE}$/OE to On	2.0	39.0	ns	10, 11

AC PARAMETER - Standard Load

(The following conditions apply to all the following parameters, unless otherwise specified.)
AC: VCC=5.0V Temp range: +25C

tpLH	Propagation Delay	VCC=5.0V, CL=50pF	5, 6	Data to Output		18.0	ns	9
tpHL	Propagation Delay	VCC=5.0V, CL=50pF	5, 6	Data to Outputs		18.0	ns	9
tpLZ	Output Disable	VCC=5.0V, CL=5pF, RL=667 ohms, R=5K ohms	5, 6	$\overline{OE}$/OE to On		25.0	ns	9
tpHZ	Output Disable	VCC=5.0V, CL=5pF, RL=667 ohms, R=5K ohms	5, 6	$\overline{OE}$/OE to On		18.0	ns	9
tpZL	Output Enable	VCC=5.0V, CL=50pF, RL=667 ohms, R=5K ohms	5, 6	$\overline{OE}$/OE to On		30.0	ns	9
tpZH	Output Enable	VCC=5.0V, CL=50pF, RL=667 ohms, R=5K ohms	5, 6	$\overline{OE}$/OE to On		23.0	ns	9

(Continued)

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.
Note 6: NATIONAL TESTS TRI-STATE PROPAGATION DELAYS USING AN EQUIVALENT LOAD WITH CORRELATED LIMITS.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0002090	08/24/98	Linda Collins	Initial MDS release:: MNDM54LS241-X Rev. 1A0. Added note 4 to the AC (Alternate Load) notes reference column. Reworded the phrase in note 4 from "and periodically at +125C & -55C, subgroups 10 & 11" to "Subgroups 10 & 11 are guaranteed, not tested".