



MICROCIRCUIT DATA SHEET

MNDM54LS139-X REV 1A0

Original Creation Date: 04/13/98
 Last Update Date: 06/17/98
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DUAL 1 - of - 4 DECODER

General Description

The 'LS139 is a high-speed, dual 1-of-4 decoder/demultiplexer. The device has two independent decoders, each accepting two inputs and providing four mutually exclusive active LOW outputs. Each decoder has an active LOW Enable input which can be used as a data input for a 4-output demultiplexer. Each half of the 'LS139 can be used as a function generator providing all four minterms of two variables. The 'LS139 is fabricated with the Schottky barrier diode process for higher speed.

Industry Part Number

54LS139

NS Part Numbers

DM54LS139E/883
 DM54LS139J/883
 DM54LS139W/883

Prime Die

L139

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

- Multifunction Capability
- Two Completely Independent 1-of-4 Decoders
- Active LOW Mutually Exclusive Outputs

(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 I _{ol} (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	-30.0	-400	uA	1, 2, 3
VOL	Output LOW Voltage	VCC=4.5V, VIH=2.0V, IOL=4.0mA, VINH=4.5V, VIL=0.7V, VINL=0.0V	1, 3	OUTPUTS		0.4	V	1, 2, 3
VOH	High Level Output Voltage	VCC=4.5V, VIH=2.0V, IOH=-0.4mA, VIL=0.7V, VINH=4.5V, VINL=0.0V	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short Circuit Output Current	VCC=5.5V, VINH=4.5V, VOUT=0.0V, VINL=0.0V	1, 3	OUTPUT	-20.0	-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
ICC	Supply Current	VCC=5.5V, VINL=0.0V, VINH=4.5V	1, 3	VCC		11.0	mA	1, 2, 3

AC PARAMETER - 15pF

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

tpLH (1)	Propagation Delay	VCC=5.0V	5	\bar{E} to $\bar{O}n$		15.0	ns	9
tpHL (1)	Propagation Delay	VCC=5.0V	5	\bar{E} to $\bar{O}n$		24.0	ns	9
tpLH (2)	Propagation Delay	VCC=5.0V	5	A0/A1 to $\bar{O}n$		18.0	ns	9
tpHL (2)	Propagation Delay	VCC=5.0V	5	A0/A1 to $\bar{O}n$		27.0	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	\bar{E} to $\bar{O}n$	2.0	29.0	ns	9
			2, 4	\bar{E} to $\bar{O}n$	2.0	44.0	ns	10, 11
tpHL (1)	Propagation Delay	VCC=5.0V	2, 4	\bar{E} to $\bar{O}n$	2.0	37.0	ns	9
			2, 4	\bar{E} to $\bar{O}n$	2.0	56.0	ns	10, 11
tpLH (2)	Propagation Delay	VCC=5.0V	2, 4	A0/A1 to $\bar{O}n$	2.0	34.0	ns	9
			2, 4	A0/A1 to $\bar{O}n$	2.0	51.0	ns	10, 11
tpHL (2)	Propagation Delay	VCC=5.0V	2, 4	A0/A1 to $\bar{O}n$	2.0	43.0	ns	9
			2, 4	A0/A1 to $\bar{O}n$	2.0	65.0	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.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
1A0	M0001607	06/17/98	Linda Collins	Initial release: MNDM54LS139-X Rev. 1A0. Added note 4 to the AC (50pF) 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".