



MICROCIRCUIT DATA SHEET

MNDM54LS138-X REV 1A0

Original Creation Date: 04/27/98
 Last Update Date: 06/17/98
 Last Major Revision Date: 04/27/98

1 - of - 8 DECODER/DEMULTIPLEXERS

General Description

The LS138 is a high-speed 1- of - 8 decoder/demultiplexer. This device is ideally suited for high-speed bipolar memory chip select address decoding. The multiple input enables allow parallel expansion to a 1- of - 24 decoder using just three '138 devices or to a 1- of - 32 decoder using four '138 devices and one inverter. The '138 is fabricated with the Schottky barrier diode process for high speed.

Industry Part Number

54LS138

NS Part Numbers

DM54LS138E/883
 DM54LS138J/883
 DM54LS138W/883

Prime Die

L138

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

- Demultiplexing Capability
- Multiple Input Enable for Easy Expansion
- 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		0.1	mA	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, VIL=0.7V	1, 3	OUTPUTS		0.4	V	1, 2, 3
VOH	High Level Output Voltage	VCC=4.5V, VIL=0.7V, VIH=2.0V, VINH=4.5V, VINL=0.0V, IOH=-0.4mA	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short Circuit Output Current	VCC=5.5V, VINH=4.5V, VINL=0.0V, VOUT=0.0V	1, 3	OUTPUTS	-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		10.0	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	Propagation Delay	VCC=5.0V	5	An to $\bar{O}n$		18.0	ns	9
tpHL	Propagation Delay	VCC=5.0V	5	An to $\bar{O}n$		23.0	ns	9
tpLH (2)	Propagation Delay	VCC=5.0V	5	$\bar{E}1/\bar{E}2$ to $\bar{O}n$		15.0	ns	9
tpHL (2)	Propagation Delay	VCC=5.0V	5	$\bar{E}1/\bar{E}2$ to $\bar{O}n$		23.0	ns	9
tpLH (3)	Propagation Delay	VCC=5.0V	5	E3 to $\bar{O}n$		18.0	ns	9
tpHL (3)	Propagation Delay	VCC=5.0V	5	E3 to $\bar{O}n$		23.0	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	Propagation Delay	VCC=5.0V	2, 4	An to $\bar{O}n$	2.0	23.0	ns	9
			2, 4	An to $\bar{O}n$	2.0	30.0	ns	10, 11
tpHL	Propagation Delay	VCC=5.0V	2, 4	An to $\bar{O}n$	2.0	28.0	ns	9
			2, 4	An to $\bar{O}n$	2.0	37.0	ns	10, 11
tpLH (2)	Propagation Delay	VCC=5.0V	2, 4	$\bar{E}1/\bar{E}2$ to $\bar{O}n$	2.0	20.0	ns	9
			2, 4	$\bar{E}1/\bar{E}2$ to $\bar{O}n$	2.0	26.0	ns	10, 11
tpHL (2)	Propagation Delay	VCC=5.0V	2, 4	$\bar{E}1/\bar{E}2$ to $\bar{O}n$	2.0	28.0	ns	9
			2, 4	$\bar{E}1/\bar{E}2$ to $\bar{O}n$	2.0	37.0	ns	10, 11
tpLH (3)	Propagation Delay	VCC=5.0V	2, 4	E3 to $\bar{O}n$	2.0	23.0	ns	9
			2, 4	E3 to $\bar{O}n$	2.0	30.0	ns	10, 11
tpHL (3)	Propagation Delay	VCC=5.0V	2, 4	E3 to $\bar{O}n$	2.0	28.0	ns	9
			2, 4	E3 to $\bar{O}n$	2.0	37.0	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	M0001628	06/17/98	Linda Collins	Initial release: MNDM54LS138-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".