

MNDM54LS42-X REV 1A0

 Original Creation Date: 04/23/98
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BCD/DECIMAL DECODER
General Description

The LS42 is a mutipurpose decoder. For any valid input combination, one and only one output is LOW. For all invalid input combinations, all outputs are HIGH. The LS42 accepts four BCD inputs and provides ten mutually exclusive outputs.

Industry Part Number

54LS42

NS Part Numbers

 DM54LS42J/883
 DM54LS42W/883

Prime Die

L042

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
- Demultiplexing capability
- 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	-55 C to +175 C
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	-0.03	-0.4	mA	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, IOH=-0.4mA	1, 3	OUTPUTS	2.5		V	1, 2, 3
IOS	Short Circuit Output Current	VCC=5.5V, VINH=4.5V, 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	1, 3	VCC		12.0	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/ \bar{O} n 2 Levels		18.0	ns	9
tpHL	Propagation Delay	VCC=5.0V	5	An/ \bar{O} n 2 Levels		25.0	ns	9
tpLH (2)	Propagation Delay	VCC=5.0V	5	An/ \bar{O} n 3 Levels		20.0	nS	9
tpHL (2)	Propagation Delay	VCC=5.0V	5	An/ \bar{O} n 3 Levels		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	Propagation Delay	VCC=5.0V	2, 4	An/ \bar{O} n 2 Levels	2.0	30.0	ns	9
			2, 4	An/ \bar{O} n 2 Levels	2.0	45.0	ns	10, 11
tpHL	Propagation Delay	VCC=5.0V	2, 4	An/ \bar{O} n 2 Levels	2.0	30.0	ns	9
			2, 4	An/ \bar{O} n 2 Levels	2.0	45.0	ns	10, 11
tpLH (2)	Propagation Delay	VCC=5.0V	2, 4	An/ \bar{O} n 3 Levels	2.0	35.0	nS	9
			2, 4	An/ \bar{O} n 3 Levels	2.0	53.0	nS	10, 11
tpHL (2)	Propagation Delay	VCC=5.0V	2, 4	An/ \bar{O} n 3 Levels	2.0	35.0	nS	9
			2, 4	An/ \bar{O} n 3 Levels	2.0	53.0	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	M0001253	06/16/98	Linda Collins	Initial MDS release: MNDM54LS42-X Rev. 1A0. Corrected the IBVI test condition (VINH) . Changed note 5 (Guaranteed, not tested) in the AC (50pF) notes reference column to note 2 (Screen tested 100% at +25C, subgroup 9) & note 4 (sample tested at +25C, subgroup 9. Subgroups 10 & 11 are guaranteed, not tested). Changed note 2 to note 5 in the AC (15pF) 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'.