

MNDS26LV31-X REV 1A0

 Original Creation Date: 07/31/98
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3V ENHANCED CMOS QUAD DIFFERENTIAL LINE DRIVER
General Description

The DS26LV31 is a high-speed quad differential CMOS driver that is comparable to the TIA/EIA-422-B and ITU-T V.11 standards. The CMOS DS26LV31 features low static ICC of 125 uA Max which makes it ideal for battery powered and power conscious applications.

Differential outputs have the same VOD guarantee ($\geq 2V$) as the 5V version.

The EN and \overline{EN} inputs allow active Low or active High control of the TRI-STATE outputs. The enables are common to all four drivers. Protection diodes protect all the driver inputs against electrostatic discharge. The driver and enable inputs (DI, EN, \overline{EN}) are compatible with low voltage LVTTL and LVCMOS devices.

Industry Part Number

DS26LV31

NS Part Numbers

DS26LV31W-QML

Prime Die

DS26LV31

Controlling Document

9858401QFA

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

- Outputs won't load line when Vcc = 0V
- Comparable to both EIA RS-422 and ITU-T V.11 standards.
- TRI-STATE outputs for connection to system buses
- Low quiescent current
- ESD Rating (HBM, 1.5K ohm, 100pF) $\geq 2500V$
- Typical Part to Part Skew < TBD

(Absolute Maximum Ratings)

(Note 1, 2)

Supply Voltage (Vcc)	-0.5V to 7.0V
DC Input Voltage (Vin)	-0.5V to Vcc +0.5V
DC Output Voltage (Vout) Power off	-0.5V to 7V
Clamp Diode Current (Iik, Iok)	± 20mA
DC Output Current, per Pin (Iout)	± 150mA
Storage Temperature Range (Tstg)	-65 C to +150 C
Lead Temperature (Tl) (Soldering, 4 seconds)	260 C
Maximum Power Dissipation +25C (Note 3)	1119mW
Thermal Resistance. (Theta JA)	134 C/Watt
Thermal Resistance. (Theta JC)	12.5 C/Watt

Note 1: Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the device should be operated at these limits. The table of "Electrical Characteristics" provide conditions for actual device operation.

Note 2: Unless otherwise specified, all voltages are referenced to ground. All currents into device pins are positive, all currents out of device pins are negative.

Note 3: Derate W package 7.5mW/C above +25C.

Recommended Operating Conditions

Supply Voltage (Vcc)	3.0V to 3.6V
DC Input or Output Voltage (Vin, Vout)	0V to Vcc
Operating Temperature Range (TA)	-55 C to +125 C

Electrical Characteristics

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vih	Logical "1" Input Voltage		3		2.0		V	1, 2, 3
Vil	Logical "0" Input Voltage		3			0.8	V	1, 2, 3
Vod1	Differential Output Voltage	Rl= (No Load), Vcc=3.0/3.6V	1			4.0	V	1, 2, 3
Vod2	Differential Output Voltage	Rl= 100 Ohms, Vcc=3.0/3.6V	1		2.0	3.2	V	1, 2, 3
Vod2- $\overline{\text{Vod2}}$	Difference in Differential Output	Rl=100 Ohms, Vcc=3.0/3.6V	1		-0.4	0.4	V	1, 2, 3
Vod3	Differential Output Voltage	Rl=3900 Ohms, Vcc=3.0/3.6V	1			3.6	V	1, 2, 3
Voc	Common Mode Output Voltage	Rl=100 Ohms, Vcc=3.0/3.6V	1			2.0	V	1, 2, 3
Voc- $\overline{\text{Voc}}$	Difference in Common Mode Output	Rl=100 Ohms, Vcc=3.0/3.6V	1		-0.4	0.4	V	1, 2, 3
Iil	Low Level Input Current	Vin=Gnd, Vcc=3.6V			-10		uA	1, 2, 3
Iih	High Level Input Current	Vin=Vcc, Vcc=3.6V				10	uA	1, 2, 3
Vcl	Input Clamp Voltage	Iin=-18mA, Vcc=3.0V				-1.5	V	1, 2, 3
Icc	Quiescent Power Supply Current	Iout=0uA, Vin=Vcc or Gnd, Vcc=3.6V				125	uA	1, 2, 3
Ioz	TRI-STATE Output Leakage Current	Vout=Vcc or Gnd, Enable=Vil, Vcc=3.6V, $\overline{\text{Enable}} = \text{Vih}$				± 20	uA	1, 2, 3
Isc	Output Short Circuit Current	Vin=Vcc or Gnd, Vcc=3.0/3.6V Vout=0.0V	1, 2		-30	-160	mA	1, 2, 3
Ioff	Output Leakage Current "Power Off"	Vcc=0V, Vout=6.0V or 3.0V				100	uA	1, 2, 3
		Vcc=0V, Vout= -0.25V				-200	uA	1, 2, 3

Electrical Characteristics

AC PARAMETERS: PROPAGATION DELAY TIME:

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: Vcc=3.0/3.6V

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
tPLHD	Differential Propagation Delay (Low to High)	Rl=100 Ohms, Cl=50pF	4		5	25	nS	9, 10, 11
tPHLD	Differential Propagation Delay (High to Low)	Rl=100 Ohms, Cl=50pF	4		5	25	nS	9, 10, 11
tSKD	Differential Skew tpHLD-tpLHD (same channel)	Rl=100 Ohms, Cl=50pF	4			5	nS	9, 10, 11
tSK1	Pin to Pin Skew (same device)	Rl=100 Ohms, Cl=50pF	4			5	nS	9, 10, 11
tpZH	Output Enable Time	Rl=110 Ohms to Gnd, Cl=50pF	5			40	nS	9, 10, 11
tpZL	Output Enable Time	Rl=110 Ohms to Vcc, Cl=50pF	5			40	nS	9, 10, 11
tpHZ	Output Disable Time	Rl=110 Ohms to Gnd, Cl=50pF	5			35	nS	9, 10, 11
tPLZ	Output Disable Time	Rl=110 Ohms to Vcc, Cl=50pF	5			35	nS	9, 10, 11

Note 1: See EIA specification RS-422 for exact test condition.

Note 2: This is a current sourced when a high output is shorted to Gnd. Only one output at a time should be shorted.

Note 3: Parameter tested Go-no-Go only.

Note 4: Generator waveform is specified as follows: f=1MHZ, duty cycle=50%, Zo=50 Ohms, tr=tf≤6nS. Driver input=0V to 3V with measure points equal to 1.5V. Differential output Vdiff=Do- $\overline{\text{Do}}$ with measure point equal to 0V.

Note 5: Generator waveform is specified as follows: f=1MHZ, duty cycle=50%, Zo=50 Ohms, tr=tf≤6nS. EN/ $\overline{\text{EN}}$ inputs = 0V to 3V with measure points equal to 1.5V on the inputs, to 1.3V on the outputs for ZL and ZH, and (Vol+0.3V) for LZ, and (Voh-0.3V) for HZ.

Graphics and Diagrams

GRAPHICS#	DESCRIPTION
W16ARL	CERPACK (W), 16 LEAD (P/P DWG)

See attached graphics following this page.

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0A0	M0002976	07/19/99	Mike Fitzgerald	Initial MDS Release
1A0	M0003417	07/19/99	Linda Collins	Changed General Description wording. Added Max limit to VOD2. New update: MNDS26LV31-X Rev. 1A0.