DS26LV31QML 3V Enhanced CMOS Quad Differential Line Driver

Check for Samples: DS26LV31QML

FEATURES

- **Comparable to Both TIA/EIA-422 and ITU-T V.11 Standards.**
- **Interoperable with Existing 5V RS-422 Networks**
- **Low Quiescent Current**
- **Pin Compatible with DS26C31**

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 I_{CC} of 125 µA Max which makes it ideal for battery powered and power conscious applications. Differential outputs have the same V_{OD} guarantee (≥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.

Connection Diagram

Top View

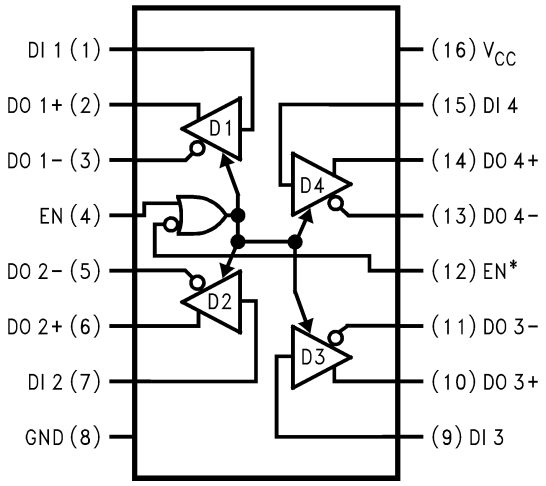

Figure 1. CLGA Package
See Package Number NAD0016A

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

Absolute Maximum Ratings (1)(2)

Supply Voltage (V_{CC})	-0.5V to 7.0V
DC Input Voltage (V_I)	-0.5V to V_{CC}+0.5V
DC Output Voltage (V_O) Power off	-0.5V to 7V
Clamp Diode Current (I_{IK}, I_{OK})	±20mA
DC Output Current, per Pin (I_O)	±150mA
Storage Temperature Range (T_{Stg})	-65°C ≤ T_A ≤ +150°C
Lead Temperature (T_L) Soldering, 4 seconds	260°C
Maximum Power Dissipation +25°C (3)	1119mW
Thermal Resistance	
θ_{JA}	134°C/W
θ_{JC}	12.5°C/W

(1) Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.
(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.
(3) Derate W package 7.5mW/°C above +25°C.

Recommended Operating Conditions

Supply Voltage (v_{CC})	3.0V to 3.6V
DC input or Output Voltage (V_I, V_O)	0V to V_{CC}
Operating Temperature Range (T_A)	−55°C ≤ T_A ≤ +125°C

Table 1. Quality Conformance Inspection Mil-Std-883, Method 5005 - Group A

Subgroup	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
12	Settling time at	25
13	Settling time at	125
14	Settling time at	-55

DS26LV31M Electrical Characteristics DC Parameters

Parameter		Test Conditions	Notes	Min	Max	Units	Sub-groups
V_{IH}	Logical "1" Input Voltage		(1)	2.0		V	1, 2, 3
V_{IL}	Logical "0" Input Voltage		(1)		0.8	V	1, 2, 3
V_{OD1}	Differential Output Voltage	R_L = No Load, V_{CC} = 3.0/3.6V	(2)		4.0	V	1, 2, 3
V_{OD2}	Differential Output Voltage	R_L = 100Ω, V_{CC} = 3.0/3.6V	(2)	2.0		V	1, 2, 3
V_{OD2}-$\overline{V_{OD2}}$	Difference in Differential Output	R_L = 100Ω, V_{CC} = 3.0/3.6V	(2)	-0.4	0.4	V	1, 2, 3
V_{OD3}	Differential Output Voltage	R_L = 3900Ω, V_{CC} = 3.0/3.6V	(2)		3.6	V	1, 2, 3
V_{OC}	Common Mode Output Voltage	R_L = 100Ω, V_{CC} = 3.0/3.6V	(2)		2.0	V	1, 2, 3
V_{OC}-$\overline{V_{OC}}$	Difference in Common Mode Output	R_L = 100Ω, V_{CC} = 3.0/3.6V	(2)	-0.4	0.4	V	1, 2, 3
I_{IL}	Low Level Input Current	V_I = Gnd, V_{CC} = 3.6V		-10		µA	1, 2, 3
I_{IH}	High Level Input Current	V_I = V_{CC}, V_{CC} = 3.6V			10	µA	1, 2, 3
V_{CL}	Input Clamp Voltage	I_I = -18mA, V_{CC} = 3.0V			-1.5	V	1, 2, 3
I_{CC}	Quiescent Power Supply Current	I_O = 0uA, V_I = V_{CC} or Gnd, V_{CC} = 3.6V			125	µA	1, 2, 3
I_{OZ}	TRI-STATE Output Leakage Current	V_O = V_{CC} or Gnd, Enable = Vil, V_{CC} = 3.6V, $\overline{Enable}$ = V_{IH}			±20	µA	1, 2, 3
I_{SC}	Output Short Circuit Current	V_I = V_{CC} or Gnd, V_{CC} = 3.0/3.6V, V_O = 0.0V	(2), (3)	-30	-160	mA	1, 2, 3
I_{Off}	Output Leakage Current "Power Off"	V_{CC} = 0V, V_O = 6.0V or 3.0V			100	µA	1, 2, 3
		V_{CC} = 0V, V_O = -0.25V			-200	µA	1, 2, 3

(1) Parameter tested Go-No-Go only.
(2) See EIA specification RS-422 for exact test condition.
(3) This is a current sourced when a high output is shorted to Gnd. Only one output at a time should be shorted.

DS26LV31M Electrical Characteristics AC Parameters - Propagation Delay Time

The following conditions apply to all the following parameters, unless otherwise specified. AC: V_{CC} = 3.0/3.6V

Parameter		Test Conditions	Notes	Min	Max	Units	Sub-groups
t_{PLHD}	Differential Propagation Delay (Low to High)	R_L = 100Ω, C_L = 50pF	(1)	5.0	25	ns	9, 10, 11
t_{PHLD}	Differential Propagation Delay (High to Low)	R_L = 100Ω, C_L = 50pF	(1)	5.0	25	ns	9, 10, 11
t_{SKD}	Differential Skew t_{PHLD}-t_{PLHD} (same channel)	R_L = 100Ω, C_L = 50pF	(1)		5.0	ns	9, 10, 11
t_{SK1}	Pin to Pin Skew (same device)	R_L = 100Ω, C_L = 50pF	(1)		5.0	ns	9, 10, 11
t_{PZH}	Output Enable Time	R_L = 110Ω to Gnd, C_L = 50pF	(2)		40	ns	9, 10, 11
t_{PZL}	Output Enable Time	R_L = 110Ω to V_{CC}, C_L = 50pF	(2)		40	ns	9, 10, 11
t_{PHZ}	Output Disable Time	R_L = 110Ω to Gnd, C_L = 50pF	(2)		35	ns	9, 10, 11
t_{PLZ}	Output Disable Time	R_L = 110Ω to V_{CC}, C_L = 50pF	(2)		35	ns	9, 10, 11

(1) Generator waveform is specified as follows: f = 1MHz, Duty Cycle = 50%, Z_O = 50Ω, t_R = t_F ≤ 6nS. Driver input = 0V to 3V with measure points equal to 1.5V. Differential output V_{Diff} = D_O - $\overline{D^O}$ with measure point equal to 0V.
(2) Generator waveform is specified as follows: f = 1MHz, Duty Cycle = 50%, Z_O = 50Ω, t_R = t_F ≤ 6nS. En/$\overline{En}$ inputs = 0V to 3V with measure points equal to 1.5V on the inputs, to 1.3V on the outputs for Z_L and Z_H, and (V_{OL} + 0.3V) for L_Z, and (V_{OH}.- 0.3V) for H_Z.

REVISION HISTORY

Released	Revision	Section	Originator	Changes
03/01/06	A	New Release, Corporate format	L. Lytle	1 MDS data sheets converted into one Corp. data sheet format. MNDS26LV31-X Rev 1A0 will be archived.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings (4)	Samples
5962-9858401QFA	ACTIVE	CLGA	NAD	16	19	TBD	CU SNPB	Level-1-NA-UNLIM	-55 to 125	DS26LV31W-QML Q 5962-98584 01QFA ACO 01QFA >T	Samples
DS26LV31W-QML	ACTIVE	CLGA	NAD	16	19	TBD	CU SNPB	Level-1-NA-UNLIM	-55 to 125	DS26LV31W-QML Q 5962-98584 01QFA ACO 01QFA >T	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) Only one of markings shown within the brackets will appear on the physical device.

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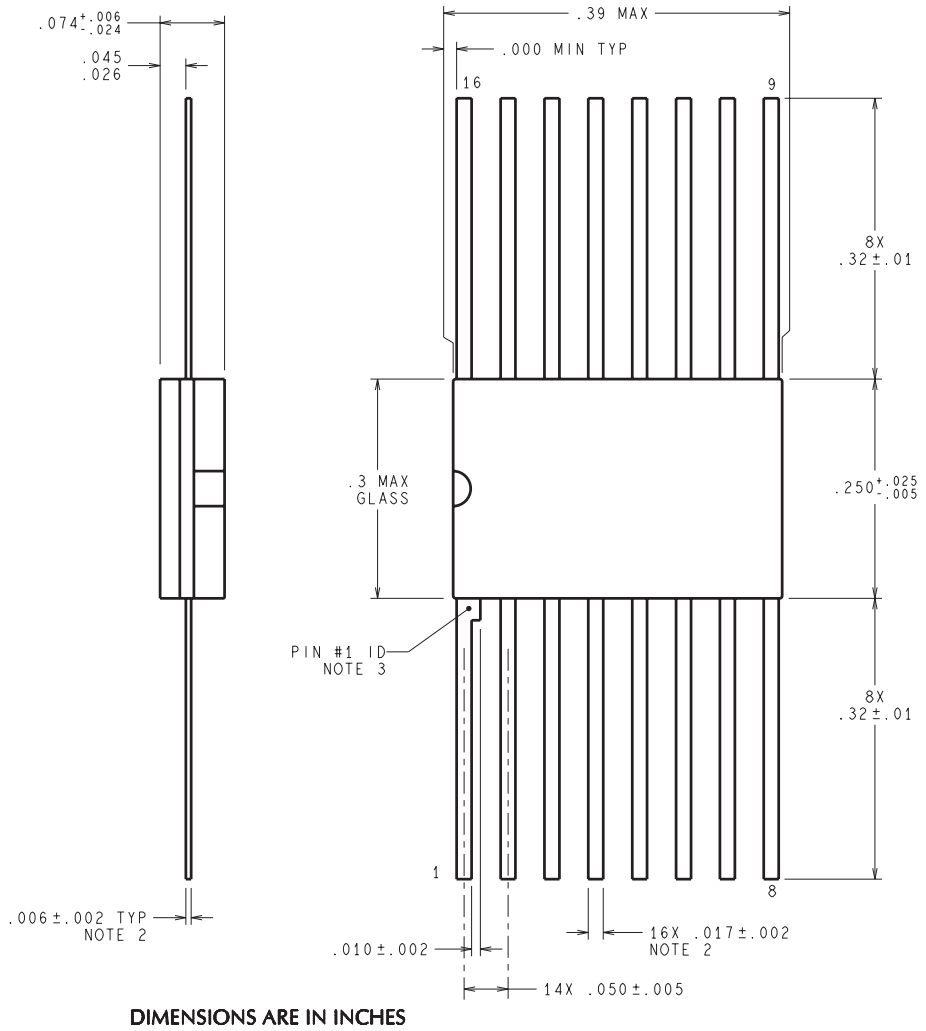

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