

DS90LV017 LVDS Single High-Speed Differential Driver

Check for Samples: [DS90LV017](#)

FEATURES

- Ultra Low Power Dissipation
- Operating Range Above 155 Mbps
- Flow-through Pinout Simplifies PCB Layout
- Conforms to TIA/EIA-644 Standard
- 8-Lead SOIC Package Saves Space
- $V_{CM} \pm 1V$ Center Around 1.2V
- Low Differential Output Swing Typical 340 mV
- Power-Off Protection
(Outputs in High Impedance)

DESCRIPTION

The DS90LV017 is a single LVDS driver device optimized for high-data-rate and low-power applications. The DS90LV017 is a current mode driver allowing power dissipation to remain low even at high frequency. In addition, the short circuit fault current is also minimized. The device is in a 8-lead SOIC package. The DS90LV017 has a flow-through design for easy PCB layout. The differential driver outputs provides low EMI with its low output swings typically 340 mV.

CONNECTION DIAGRAM

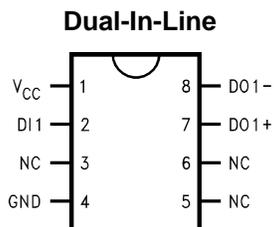


Figure 1. 8-Lead SOIC (D Package)

FUNCTIONAL DIAGRAM

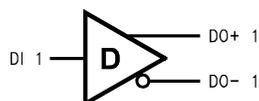


Figure 2.



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.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

All trademarks are the property of their respective owners.

ABSOLUTE MAXIMUM RATINGS⁽¹⁾⁽²⁾

Supply Voltage (V_{CC})	-0.3V to +6V
Input Voltage (DI)	-0.3V to ($V_{CC} + 0.3V$)
Output Voltage (DO \pm)	-0.3V to +3.9V
Maximum Package Power Dissipation @ +25°C	
D Package	1190 mW
Derate D Package	9.5 mW/°C above +25°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature Range	
Soldering (4 sec.)	+260°C
ESD Rating ⁽³⁾	
(HBM 1.5 k Ω , 100 pF)	≥ 4.5 kV

- (1) "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be ensured. They are not meant to imply that the devices should be operated at these limits. [ELECTRICAL CHARACTERISTICS](#) specifies conditions of device operation.
- (2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.
- (3) ESD Rating: HBM (1.5 k Ω , 100 pF) ≥ 4.5 kV

RECOMMENDED OPERATING CONDITIONS

	Min	Typ	Max	Units
Supply Voltage (V_{CC})	3.0	3.3	3.6	V
Temperature (T_A)	0	25	70	°C

ELECTRICAL CHARACTERISTICS⁽¹⁾⁽²⁾⁽³⁾

Over Supply Voltage and Operating Temperature ranges, unless otherwise specified.

Symbol	Parameter	Conditions	Pin	Min	Typ	Max	Units	
DIFFERENTIAL DRIVER CHARACTERISTICS								
V_{OD}	Output Differential Voltage	$R_L = 100\Omega$ (Figure 3)	DO+, DO-	250	340	450	mV	
ΔV_{OD}	V_{OD} Magnitude Change			0	10	35	mV	
V_{OH}	Output High Voltage				1.43	1.6	V	
V_{OL}	Output Low Voltage				0.9	1.09	V	
V_{OS}	Offset Voltage				0.9	1.25	1.6	V
ΔV_{OS}	Offset Magnitude Change				0	5	25	mV
I_{OZD}	TRI-STATE Leakage	$V_{OUT} = V_{CC}$ or GND		0	± 1	± 10	μA	
I_{OXD}	Power-off Leakage	$V_{OUT} = 3.6V$ or GND, $V_{CC} = 0V$		0	± 1	± 10	μA	
I_{OSD}	Output Short Circuit Current				-4	-6	mA	
V_{IH}	Input High Voltage		DI	2.0		V_{CC}	V	
V_{IL}	Input Low Voltage			GND			0.8	V
I_{IH}	Input High Current	$V_{IN} = 3.6V$ or 2.4V			± 1	± 10	μA	
I_{IL}	Input Low Current	$V_{IN} = GND$ or 0.5V			± 1	± 10	μA	
V_{CL}	Input Clamp Voltage	$I_{CL} = -18$ mA		-1.5	-0.8		V	
I_{CC}	Power Supply Current	No Load	$V_{IN} = V_{CC}$ or GND	V_{CC}	1	4	mA	
		$R_L = 100\Omega$			4.5	7	mA	

- (1) Current into device pins is defined as positive. Current out of device pins is defined as negative. All voltages are referenced to ground except V_{OD} .
- (2) All typicals are given for: $V_{CC} = +3.3V$ and $T_A = +25^\circ C$.
- (3) The DS90LV017 is a current mode device and only function with datasheet specification when a resistive load is applied to the drivers outputs.

SWITCHING CHARACTERISTICS⁽¹⁾⁽²⁾

Over Supply Voltage and Operating Temperature Ranges, unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Units
DIFFERENTIAL DRIVER CHARACTERISTICS						
t_{PHLD}	Differential Propagation Delay High to Low	$R_L = 100\Omega, C_L = 5\text{ pF}$ (Figure 4 and Figure 5)	1.5	3.4	6	ns
t_{PLHD}	Differential Propagation Delay Low to High		1.5	3.5	6	ns
t_{SKD}	Differential Skew $ t_{PHLD} - t_{PLHD} $		0	0.1	1.9	ns
t_{TLH}	Transition Low to High Time		0	1	3	ns
t_{THL}	Transition High to Low Time		0	1	3	ns

(1) C_L includes probe and fixture capacitance.

(2) Generator waveform for all tests unless otherwise specified: $f = 1\text{ MHz}, Z_O = 50\Omega, t_r \leq 6\text{ ns}, t_f \leq 6\text{ ns}$ (10%-90%).

PARAMETER MEASUREMENT INFORMATION

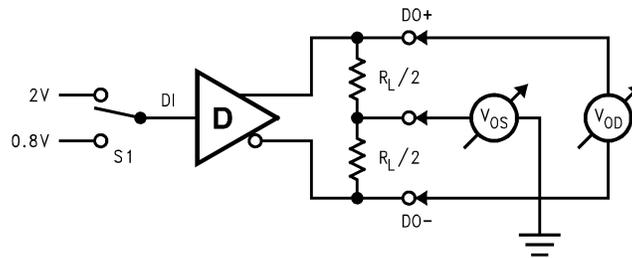


Figure 3. Differential Driver DC Test Circuit

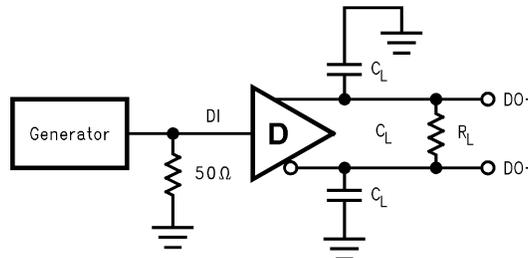


Figure 4. Differential Driver Propagation Delay and Transition Time Test Circuit

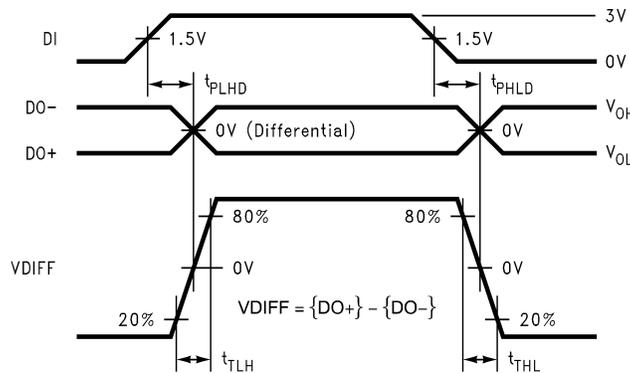


Figure 5. Differential Driver Propagation Delay and Transition Time Waveforms

APPLICATION INFORMATION

Table 1. Truth Table⁽¹⁾

Input/Output		
DI	DO+	DO-
L	L	H
H	H	L
DI > 0.8V and DI < 2.0V	X	X

- (1) H = Logic high level
L = Logic low level
X = indeterminant

Table 2. PIN DESCRIPTIONS

Pin #	Name	Description
2	DI	TTL/CMOS driver input pins
7	DO+	Non-inverting driver output pin
8	DO-	Inverting driver output pin
4	GND	Ground pin
1	V _{CC}	Positive power supply pin, +3.3V ± 0.3V
3, 5, 6	NC	No connect

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI's terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers' products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers' products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Applications Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community

e2e.ti.com