LVDS Interface ICs

4bit LVDS Driver

BU90LV047A

●Description

LVDS Interface IC of ROHM "Serializer" "Deserializer" operate from 8MHz to 150MHz wide clock range, and number of bits range is from 35 to 70. Data is transmitted seven times (7X) stream and reduce cable number by 3(1/3) or less. The ROHM's LVDS has low swing mode to be able to expect further low EMI.
Driver and Receiver of 4 bits operate to 250MHz. It can be used for a variety of purposes, home appliances such as LCD-TV, business machines such as decoders, instruments, and medical equipment.

●Features

- ■>500 Mbps (250 MHz) switching rates
- ■Flow-through pinout simplifies PCB layout.
- ■300 ps typical differential skew
- ■400 ps maximum differential skew
- ■2.8 ns maximum propagation delay
- ■3.3V power supply design
- ■±200mV and ±350mV Selectable differential signaling
- ■Interoperable with existing 5V LVDS receivers
- ■High impedance on LVDS outputs on power down
- ■Conforms to TIA/EIA-644 LVDS Standard
- ■Industrial operating temperature range (-40℃ to +85℃)

●Applications

Car Navigation System
Copier
Digital TV (Signal System)
FA equipment
Medical equipment
Vending machine, Ticket vending machine

●Precaution

- ■This chip is not designed to protect from radioactivity.
- ■This document may be used as strategic technical data which subjects to COCOM regulations.

Jun.2008

●Block Diagram

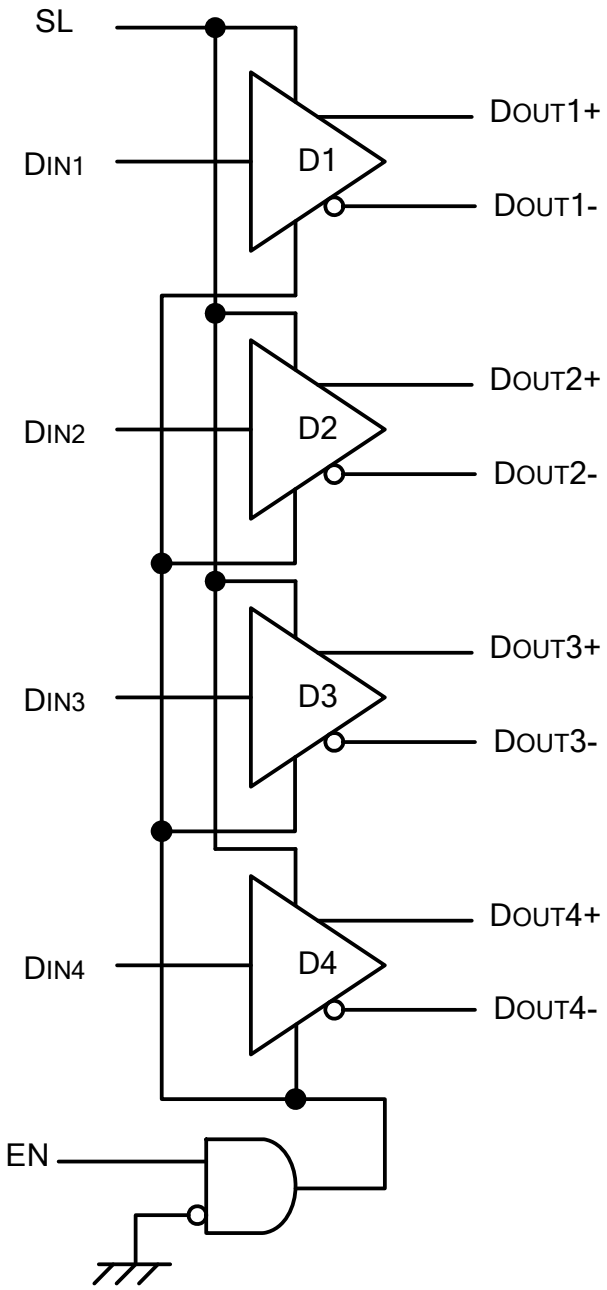

Figure 1. Block Diagram

●SSOP-B16　Package Outline and Specification

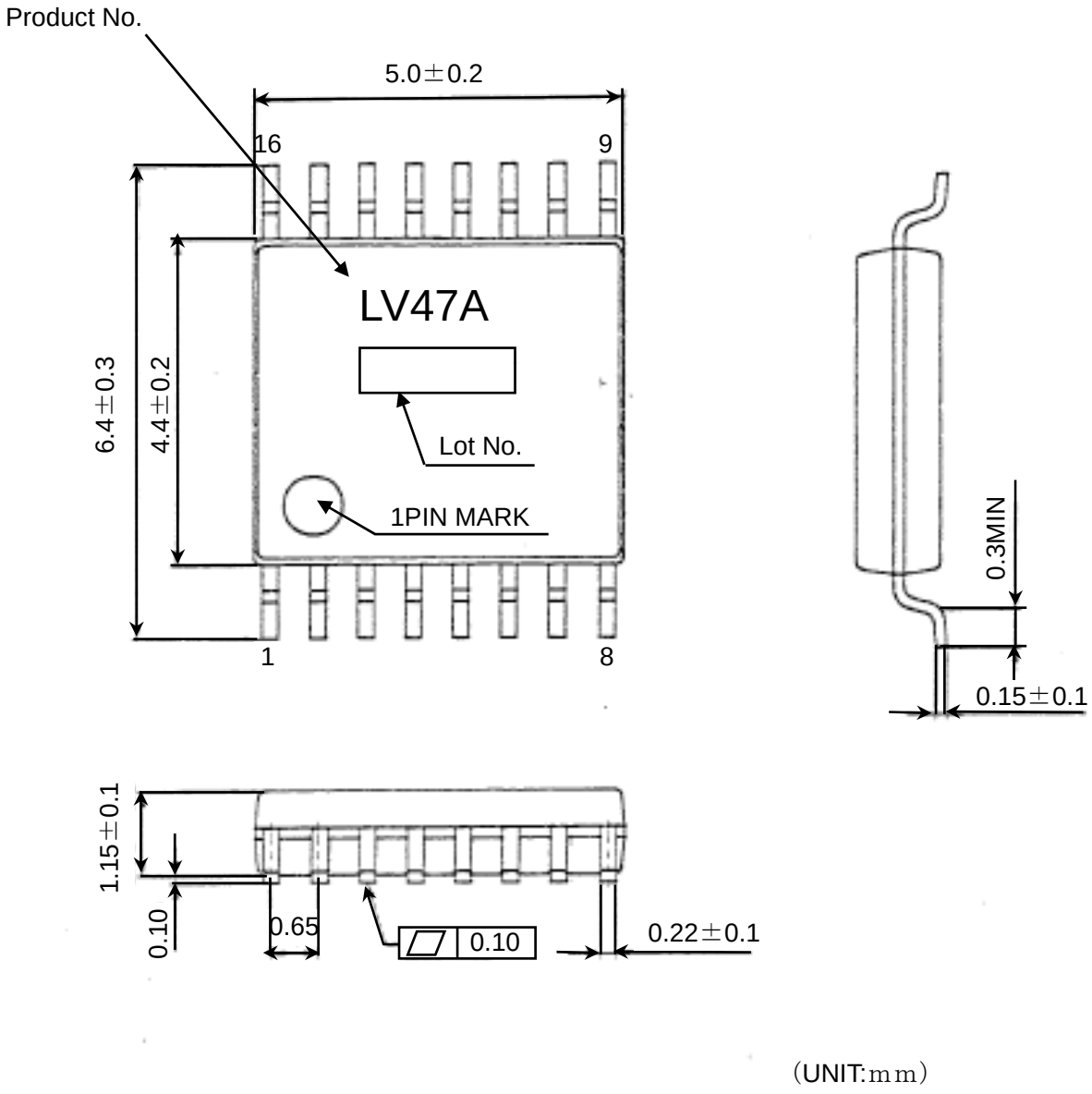

Figure 2.　SSOP-B16 Package Outline and Specification

●Pin Configuration

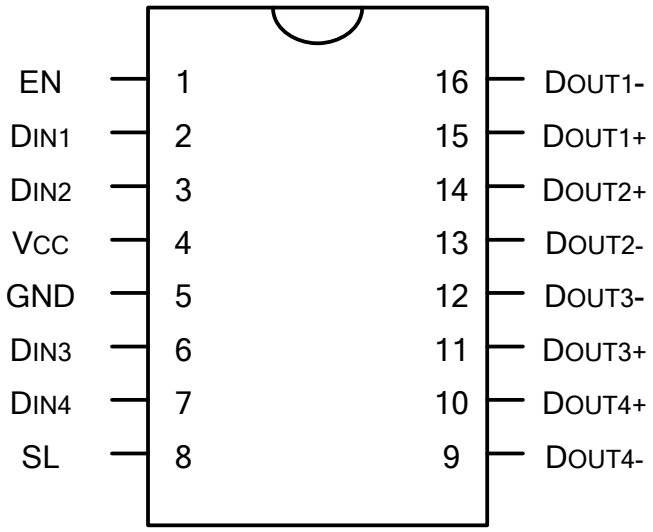

Figure 3. Pin Diagram (Top View)

●Pin Description

Table 1 : Pin Description

Pin Name	Pin No.	Type	Descriptions
DIN	2, 3, 6, 7	LVCMOS In	Driver input pin, LVCMOS compatible
DOUT+	10, 11, 14, 15	LVDS Out	Non-inverting driver output pin, LVDS levels
DOUT-	9, 12, 13, 16	LVDS Out	Inverting driver output pin, LVDS levels
SL	8	LVCMOS In	Swing Level select pin : When SL is high, the driver is reduce swing level (200mV). When SL is low or open, the driver is normal swing level (350mV).
EN	1	LVCMOS In	Driver enable pin: When EN is low or open, the driver is disabled. When EN is high, the driver is enabled.
VCC	4	Power	Power supply pin, 3.3V±0.3V
GND	5	GND	Ground pin

●Function Description

		INPUT	OUTPUTS		Swing Level
EN	SL	DIN	DOUT+	DOUT-	
H	L or Open	L	L	H	350mV
		H	H	L	
H	H	L	L	H	200mV
		H	H	L	
All other combinations of EN, SL inputs		X	Z	Z	

●Absolute Maximum Ratings

Item	Symbol	Value		Unit
		Min.	Max.	
Supply voltage	VCC	−0.3	4.0	V
Input voltage	VIN	−0.3	VCC+0.3	V
Output voltage	VOUT	−0.3	VCC+0.3	V
Storage temperature range	Tstg	−55	125	℃

●Package Power

Package	PD(mW)	DERATING(mW/℃) ※1
SSOP-B16	400	4.0
	450*2	4.5*2

※1 At temperature Ta > 25℃

※2 Package power when mounting on the PCB board.

The size of PCB board :70×70×1.6 (mm^3)

The material of PCB board :The FR4 glass epoxy board.(3% or less copper foil area)

●Recommended Operating Conditions

Item	Symbol	Value			Unit	Condition
		Min.	Typ.	Max.		
Supply voltage	Vcc	3.0	3.3	3.6	V	
Operating temperature range	Topr	−40	−	85	℃	

●DC Characteristics

Symbol	Parameter	Conditions	Pin	Min	Typ	Max	Units
V_{OD1}	Differential Output Voltage	SL= GND, R_L = 100Ω (Figure 4)	D_{OUT-} D_{OUT+}	250	350	450	mV
V_{OH1}	Output High Voltage			–	1.42	1.6	V
V_{OL1}	Output Low Voltage			0.90	1.08	–	V
V_{OD2}	Differential Output Voltage	SL= V_{CC} , R_L = 100Ω (Figure 4)		120	200	300	mV
V_{OH2}	Output High Voltage			–	1.35	1.50	V
V_{OL2}	Output Low Voltage			1.00	1.15	–	V
$\triangle V_{OD}$	Change in Magnitude of V_{OD} for Complementary Output States	SL = V_{CC} or GND, R_L = 100Ω (Figure 4)		–	1	35	|mV|
V_{OS}	Offset Voltage			1.125	1.25	1.375	V
$\triangle V_{OS}$	Change in Magnitude of Vos for Complementary Output States			–	1	25	|mV|
V_{IH}	Input High Voltage		$D_{IN,}$	V_{CC} × 0.8	–	V_{CC}	V
V_{IL}	Input Low Voltage		SL	GND	–	V_{CC} × 0.2	V
I_I	Input Current	V_{IN} = 0V or V_{CC}, Other Input = V_{CC} or GND	EN	−10	–	+10	μA
V_{CL}	Input Clamp Voltage	I_{CL} = −18mA		−1.5	−0.8	–	V
I_{OS}	Output Short Circuit Current	ENABLED, D_{IN} = V_{CC}, D_{OUT+} = 0V or D_{IN} = GND, D_{OUT-} = 0V	D_{OUT-} D_{OUT+}	–	−5.4	−9.0	mA
I_{OSD}	Differential Output Short Circuit Current	ENABLED, V_{OD} = 0V		–	−5.4	−9.0	mA
I_{OFF}	Power−off Leakage	V_{OUT} = 0V or 3.6V, V_{CC} =0V or Open		−20	±1	+20	μA
I_{CC}	No Load Supply Current Drivers Enabled	D_{IN} = V_{CC} or GND	V_{CC}	–	20	–	mA
I_{CCL}	Load Supply Current Drivers Enabled	R_L = 100Ω All Channels, D_{IN} = V_{CC} or GND (all outputs)		–	20	–	mA
I_{CCZ}	No Load Supply Current Drivers Disabled	D_{IN} = V_{CC} or GND, EN = GND, SL = GND		–	3	–	mA

●Switching Characteristics

V_{CC} = +3.3V ±0.3V, T_{opr} = −40℃ to +85℃

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHLD}	Differential Propagation Delay High to Low	R_L = 100Ω, C_L = 15pF	0.5	1.7	2.8	ns
t_{PLHD}	Differential Propagation Delay Low to High	(Figure 5 and Figure 6)	0.5	1.7	2.8	ns
t_{SKD1}	Differential Pulse Skew $\|t_{PHLD} - t_{PLHD}\|$		0	0.3	0.4	ns
t_{SKD2}	Channel-to-Channel Skew		0	0.4	0.5	ns
t_{SKD3}	Differential Part to Part Skew		0	−	1.0	ns
t_{SKD4}	Differential Part to Part Skew		0	−	1.2	ns
t_{TLH}	Rise Time		−	0.5	1.5	ns
t_{THL}	Fall Time		−	0.5	1.5	ns
t_{PHZ}	Disable Time High to Z	R_L = 100Ω, C_L = 15pF	−	2	5	ns
t_{PLZ}	Disable Time Low to Z	(Figure 7 and Figure8)	−	2	5	ns
t_{PZH}	Enable Time Z to High		−	3	7	ns
t_{PZL}	Enable Time Z to Low		−	3	7	ns
f_{Max}	Maximum Operating Frequency		250	−	−	MHz

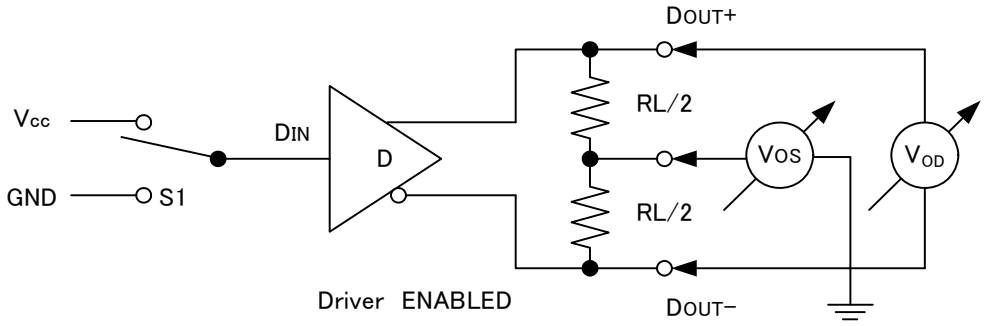

Figure 4. Driver VOD and VOS Test Circuit

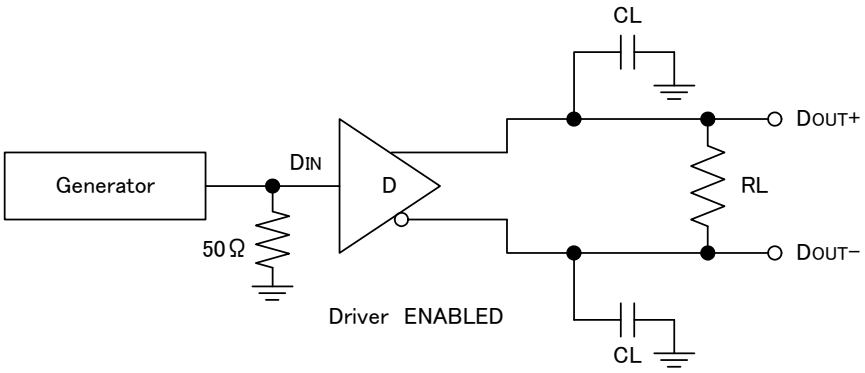

Figure 5. Driver Propagation Delay and Transition Time Test Circuit

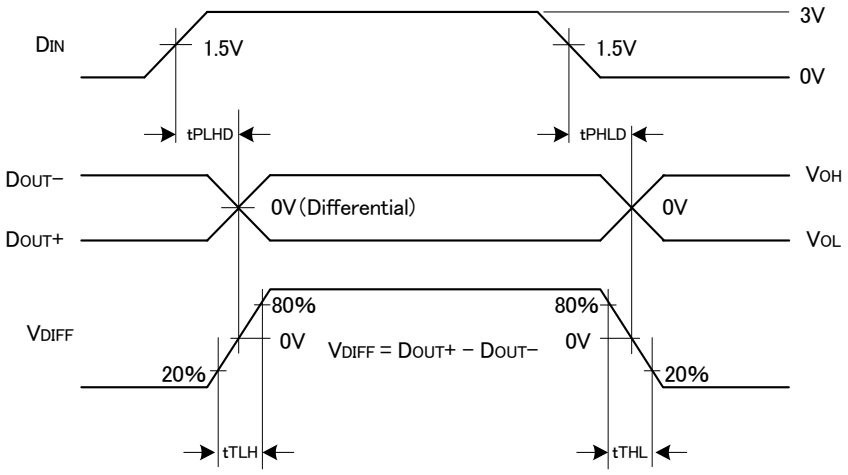

Figure 6. Driver Propagation Delay and Transition Time Waveforms

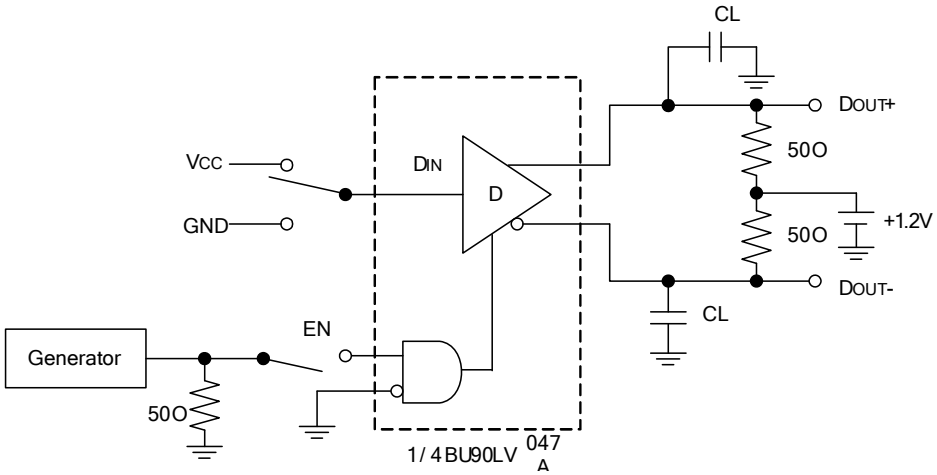

Figure 7. Driver 3-STATE Delay Test Circuit

Parameter Measurement Information (Continued)

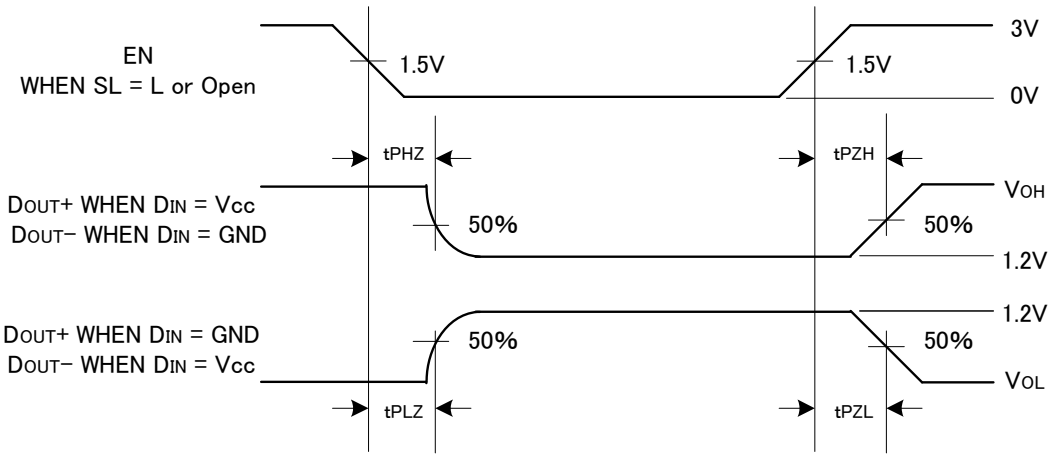

Figure 8. Driver 3-STATE Delay Waveform

Typical Application

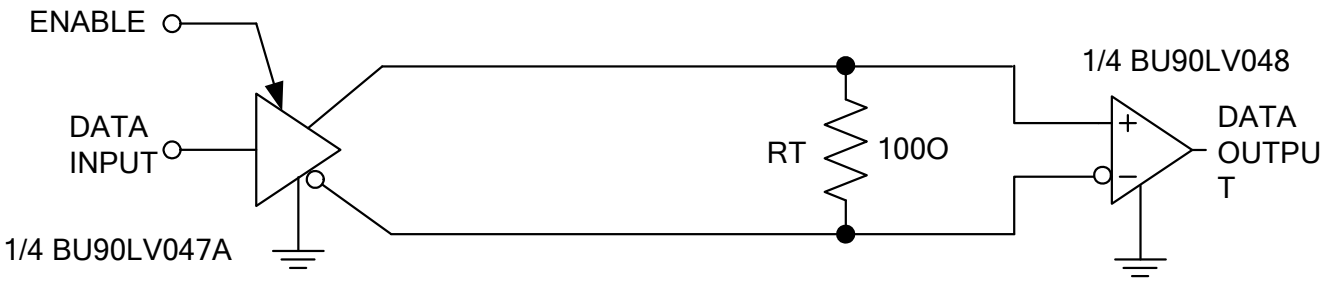

Figure 9. Point-to-Point Application

Typical Application (Continued)

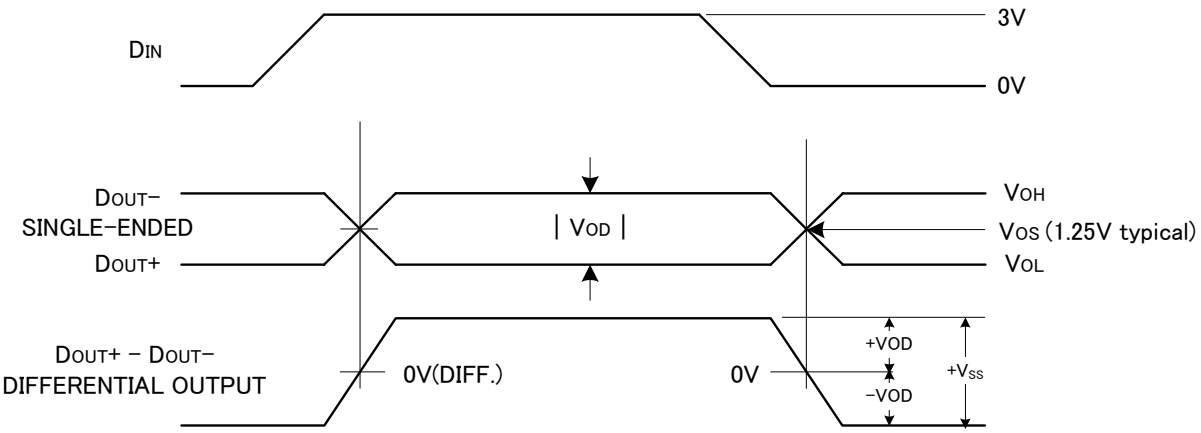

Figure 10. Driver Output Levels

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