LVDS Interface ICs

4bit LVDS Receiver

BU90LV048

●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
- ■150 ps channel-to-channel skew (typical)
- ■100 ps differential skew (typical)
- ■3.7 ns maximum propagation delay
- ■3.3V power supply design
- ■6mA and 8mA selectable output drive strength
- ■Accepts small swing (200 mV typical) differential signal levels
- ■Supports open, short and terminated input fail-safe
- ■Conforms to ANSI/TIA/EIA-644 Standard
- ■Industrial temperature operating 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.

●Block Diagram

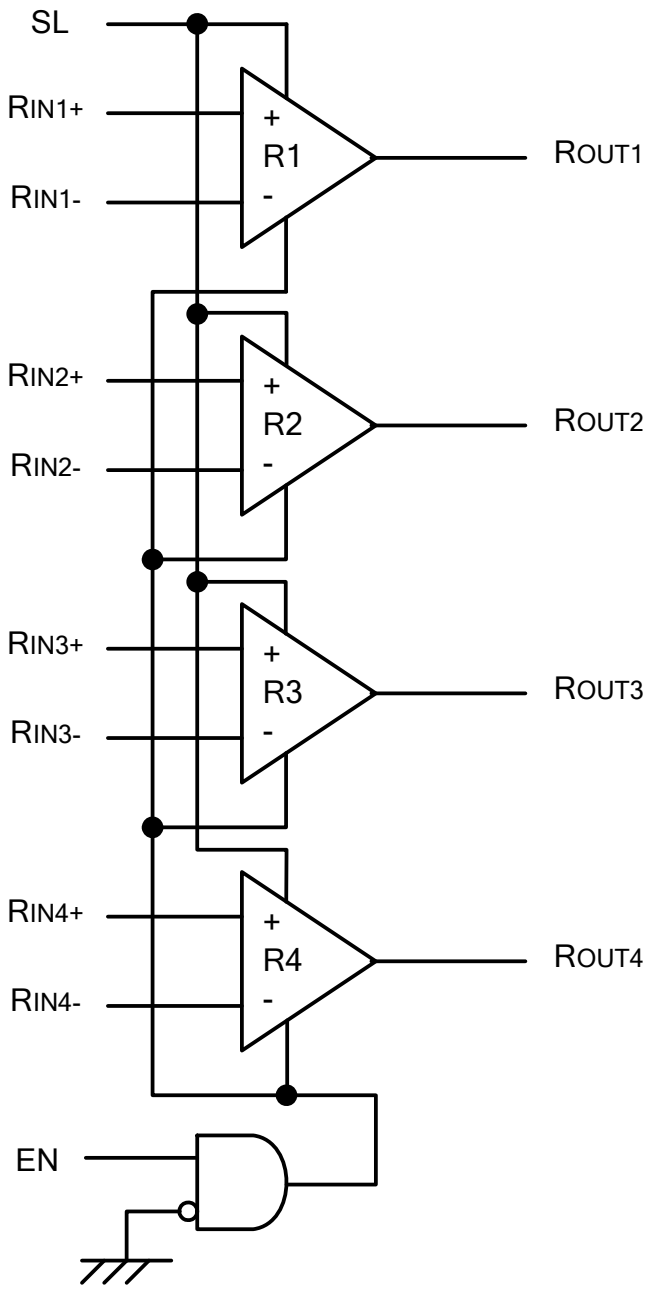

Figure 1. Block Diagram

●SSOP-B16 Package Outline and Specification

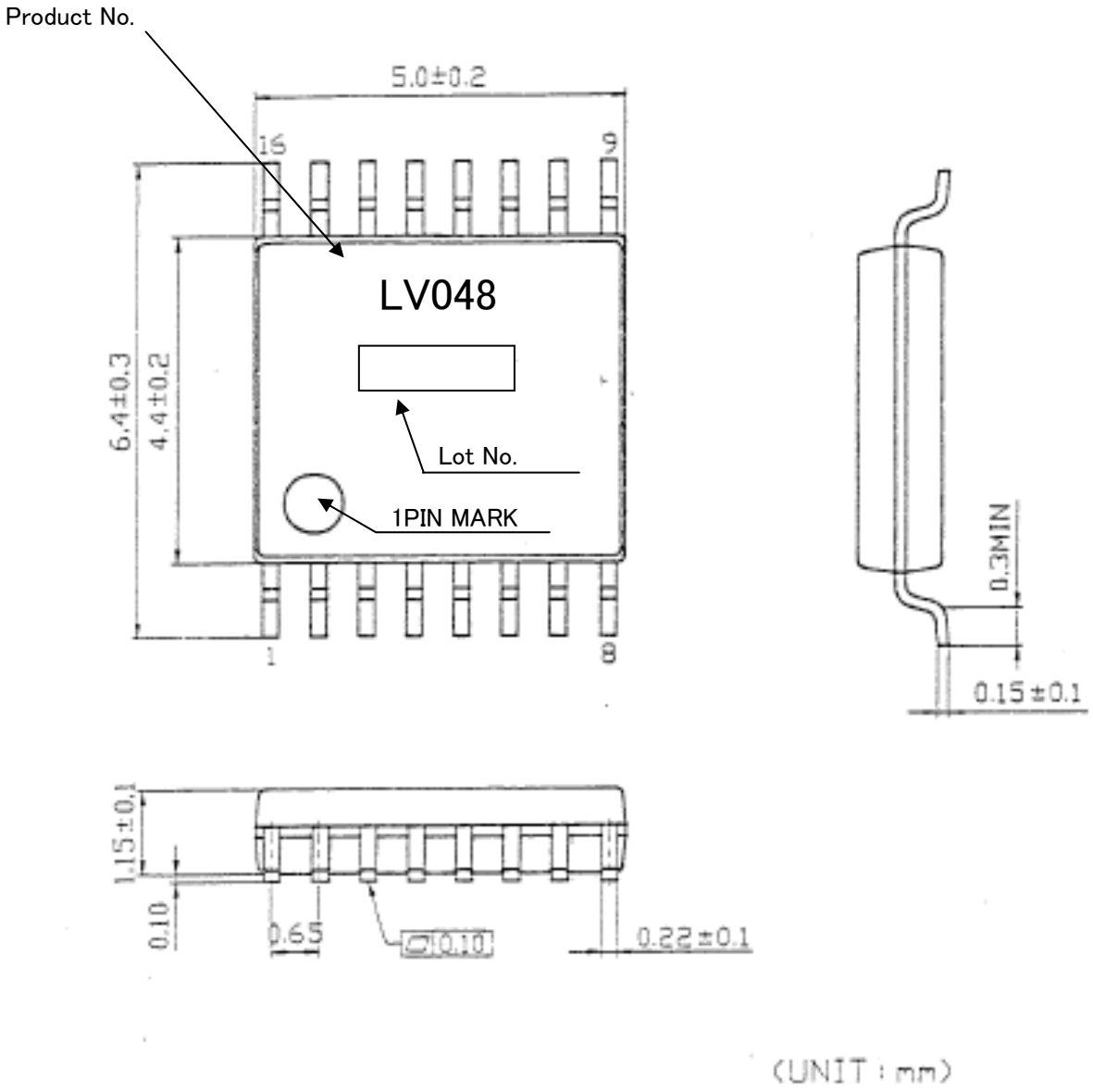

Figure 2. SSOP-B16 Package Outline and Specification

●Pin Configuration

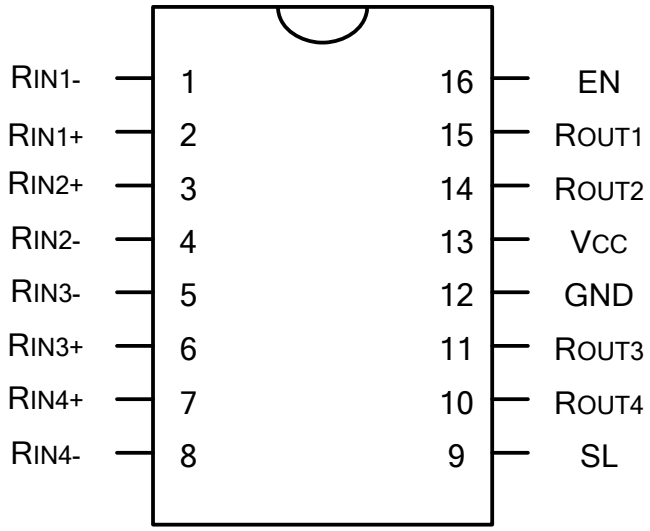

Figure 3. Pin Diagram (Top View)

●Pin Description

Table 1 : Pin Description

Pin Name	Pin No.	Type	Descriptions
R_{IN+}	2, 3, 6, 7	LVDS In	Non-inverting receiver input pin
R_{IN-}	1, 4, 5, 8	LVDS In	Inverting receiver input pin
R_{OUT}	10, 11, 14, 15	LVCMOS Out	Receiver output pin
SL	9	LVCMOS In	Drive strength select pin : When SL is low or open, Rout set 8mA mode. When SL is high, Rout set 6mA mode.
EN	16	LVCMOS In	Receiver enable pin: When EN is Low or open, the receiver is disabled. When EN is high, the receiver is enabled.
V_{CC}	13	Power	Power supply pin, +3.3V±0.3V
GND	12	GND	Ground pin

●Function Description

		INPUT	OUTPUTS	Drive Strength
EN	SL	$R_{IN+} - R_{IN-}$	R_{OUT}	
H	L or Open	VID ≥ 0V	H	8mA
		VID ≤ −0.1V	L	
		Full Fail-safe OPEN/SHORT or Terminated	H	
H	H	VID ≥ 0V	H	6mA
		VID ≤ −0.1V	L	
		Full Fail-safe OPEN/SHORT or Terminated	H	
All other combinations of EN, SL inputs		X	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_{TH}	Differential Input High Threshold	V_{CM} = +1.2V, 0.05V, 2.95V	R_{IN+},	–	–	100	mV
V_{TL}	Differential Input Low Threshold		R_{IN-}	−100	–	–	mV
VCMR	Common-Mode Voltage Range	VID = 200mV pk to pk		0.1	–	2.3	V
I_{IN}	Input Current	V_{IN} = 0 or Vcc		−20	–	+20	μA
V_{OH1}	Output High Voltage	I_{OH} = −8 mA, V_{ID} = +200 mV, SL=low	R_{OUT}	V_{CC}− 0.4	–	–	V
V_{OH2}	Output High Voltage	I_{OH} = −6 mA, V_{ID} = +200 mV, SL= high		V_{CC}− 0.4	–	–	V
V_{OL1}	Output Low Voltage	I_{OL} = 8 mA, V_{ID} = −200 mV, SL=low		–	–	0.4	V
V_{OL2}	Output Low Voltage	I_{OL} = 6 mA, V_{ID} = −200 mV, SL= high		–	–	0.4	V
I_{OS}	Output Short Circuit Current	Enabled, V_{OUT} = 0V		−15	−80	–	mA
I_{OZ}	Output 3-STATE Current	Disabled, V_{OUT} = 0V or V_{CC}		−10	±1	+10	uA
V_{IH}	Input High Voltage		SL	V_{CC} × 0.8	–	V_{CC}	V
V_{IL}	Input Low Voltage		EN	GND	–	V_{CC} × 0.2	V
I_I	Input Current	V_{IN} = 0V or V_{CC}, Other Input = V_{CC} or GND		−10	–	+10	μA
V_{CL}	Input Clamp Voltage	I_{CL} = −18 mA		−1.5	−0.8	–	V
I_{CC}	No Load Supply Current Receivers Enabled	EN = V_{CC}, Inputs Open	V_{CC}	–	1	–	mA
I_{CCZ}	No Load Supply Current Receivers Disabled	EN= GND, SL = GND, Inputs Open		–	0.5	–	mA

●Switching Characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
t_{PHLD}	Differential Propagation Delay High to Low	C_L = 15pF V_{ID} = 200mV (Figure 4 and Figure 5)	1.2	2.0	3.7	ns
t_{PLHD}	Differential Propagation Delay Low to High		1.2	1.9	3.7	ns
t_{SKD1}	Differential Pulse Skew $\|t_{PHLD} - t_{PLHD}\|$		0	0.1	0.4	ns
t_{SKD2}	Differential Channel-to-Channel Skew; same device		0	0.15	0.5	ns
t_{SKD3}	Differential Part to Part Skew		−	−	1.0	ns
t_{SKD4}	Differential Part to Part Skew		−	−	1.5	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 = 2kΩ C_L = 15pF (Figure 6 and Figure 7)	−	8	14	ns
t_{PLZ}	Disable Time Low to Z		−	8	14	ns
t_{PZH}	Enable Time Z to High		−	3	14	ns
t_{PZL}	Enable Time Z to Low		−	9	14	ns
f_{Max}	Maximum Operating Frequency	All Channels Switching	250	−	−	MHz

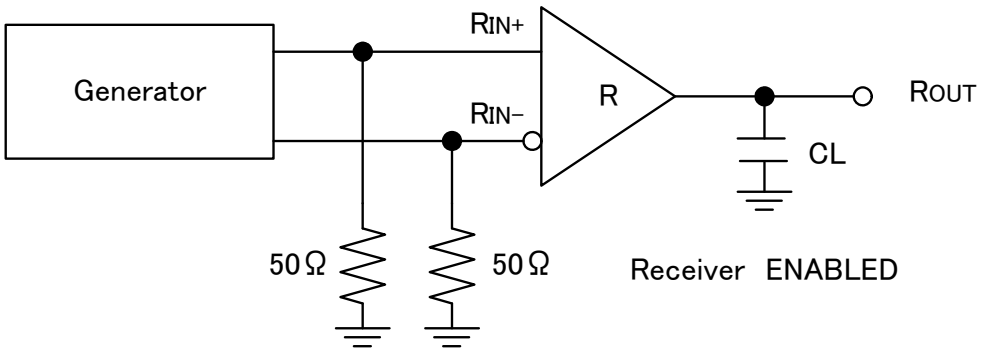

Figure 4. Receiver Propagation Delay and Transition Time Test Circuit

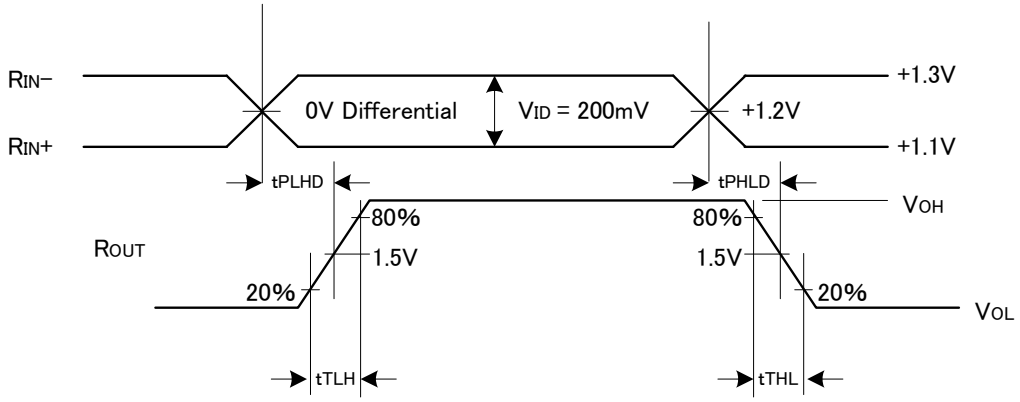

Figure 5. Receiver Propagation Delay and Transition Time Waveforms

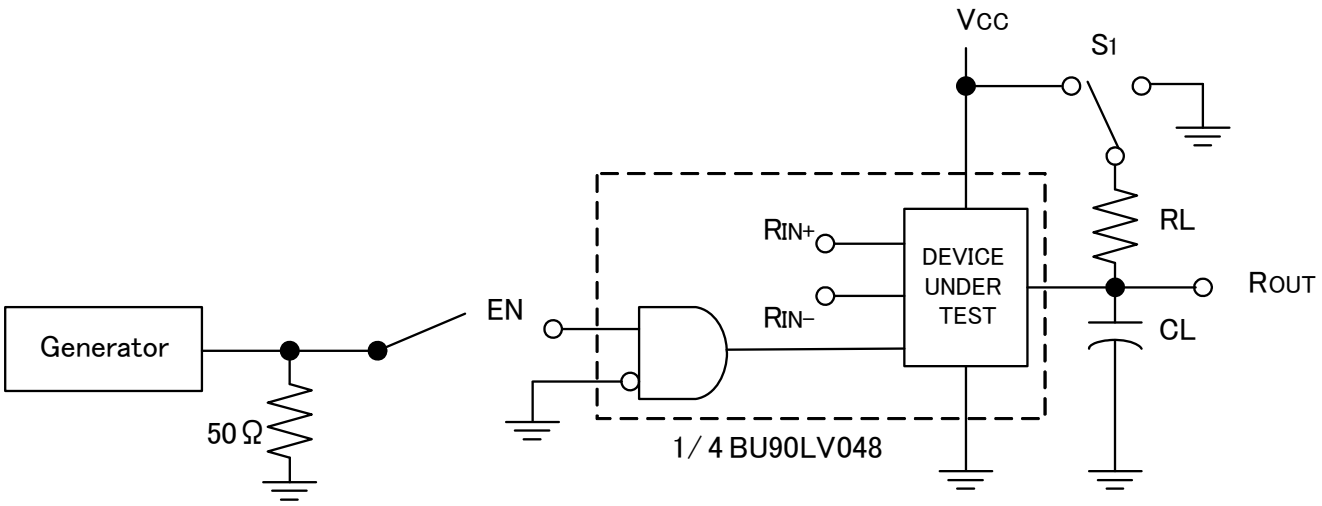

Figure 6. Receiver 3-STATE Delay Test Circuit

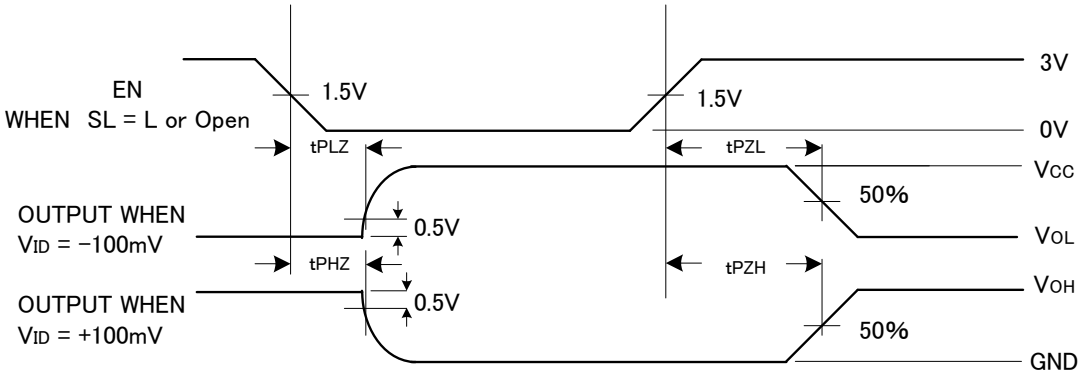

Figure7. Receiver 3-STATE Delay Waveforms

Typical Application

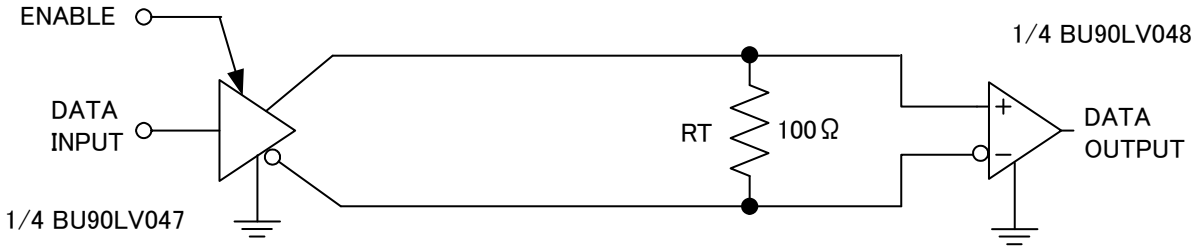

Figure 8. Point-to-Point Application

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