

# RS90LV011B 3.3V LVDS Single High Speed Differential Driver

## 1 FEATURES

- **Conforms to TIA/EIA-644-A Standard**
- **>400Mbps (200MHz) Switching Rates**
- **700ps Maximum Differential Skew**
- **1.5ns Maximum Propagation Delay**
- **Single 3.3V Power Supply**
- **±350mV Differential Signaling**
- **Power Off Protection (Outputs in TRI-STATE)**
- **Pinout Simplifies PCB layout**
- **Low Power Dissipation (24mW@3.3V Typical)**
- **SOT23-5 Lead Package**
- **Industrial Temperature Operating Range (-40°C ~85°C )**

## 2 APPLICATIONS

- **Multifunction Printers**
- **LVC MOS-LVDS Translation**
- **Building and Factory Automation**
- **Grid Infrastructure**

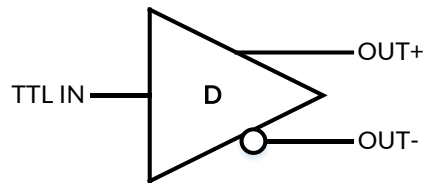
## 3 ADVANTAGES

- >400Mbps Switching Rates.
- provide Power Off Protection.
- 4mA output short current.
- 24mW low power dissipation.
- SOT23-5 Lead Package.

**Device Information <sup>(1)</sup>**

PART NUMBER	PACKAGE	BODY SIZE(NOM)
RS90LV011B	SOT23-5	2.92mm×1.60mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.



**Figure 1. Functional Diagram**

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## 4 Revision History

Note: Page numbers for previous revisions may differ from page numbers in the current version.

VERSION	Change Date	Change Item
A.0	2023/08/14	Initial version
A.1	2024/03/25	1. Added Min and Max measurement results 2. Added PACKAGE/ORDERING INFORMATION and TAPE AND REEL INFORMATION

**5 PACKAGE/ORDERING INFORMATION (1)**

PRODUCT	ORDERING NUMBER	PACKAGE LEAD	TEMPERATURE RANGE	PACKAGE MARKING (2)	MSL (3)	PACKAGE OPTION
RS90LV011B	RS90LV011B YF5	SOT23-5	-40°C ~+85°C	LV011B	MSL3	Tape and Reel,3000

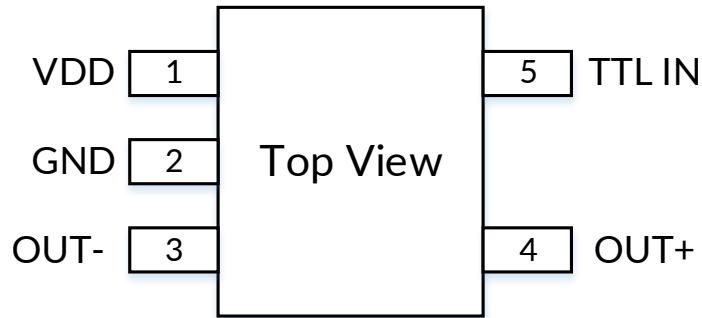
## NOTE:

- (1) This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the right-hand navigation.
- (2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.
- (3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

## **6 DESCRIPTIONS**

The RS90LV011B is positioned as a single-channel LVDS driver for high-speed, low-power application scenarios. The RS90LV011B is a current-mode driver, so it can be used at high frequencies and still guarantee low power consumption. The RS90LV011B can support LVDS data rates up to 400Mbps (200MHz). The target markets for this product are communications and industrial.

## 7 PIN CONFIGURATIONS



**Figure 2. Pin Definition**

### Pin Descriptions

PIN	NAME	FUNCTION
SOT23-5		
5	TTL IN	LVTTL/LVCMOS driver input pins
4	OUT+	Non-inverting driver output pin
3	OUT-	Inverting driver output pin
2	GND	Ground pin
1	VDD	Power supply pin, +3.3±0.3V

## 8 SPECIFICATIONS

### 8.1 Absolute Maximum Ratings

PARAMETER	MIN	MAX	UNIT
Supply Voltage (VDD)	-0.3	4	V
LVC MOS input voltage (TTL IN)	-0.3	3.6	V
LVDS output voltage (OUT±)	-0.3	3.9	V
Thermal Resistance ( $\theta_{JA}$ )		138.5	°C/W
Storage Temperature	-65	150	°C
Maximum Junction Temperature		150	°C

Note:

1. "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be specified. They are not meant to imply that the devices should be operated at these limits.

### 8.2 Recommended Operating Conditions

	MIN	TYP	MAX	UNIT
Supply Voltage(VDD)	3	3.3	3.6	V
Temperature ( $T_A$ )	-40	25	85	°C

### 8.3 ESD Ratings

The following ESD information is provided for handling of ESD-sensitive devices in an ESD protected area only.

		VALUE	UNIT
$V_{(ESD)}$	HBM(1.5k $\Omega$ ,100pF)	$\geq 7000$	V
	CDM(0 $\Omega$ ,0pF)	$\geq 2000$	V
	LATCH UP	$\geq 400$	mA



Electric devices and circuit boards may discharge undetected. Although this product has a patented or proprietary protection circuit, the device may be damaged when exposed to high energy ESD. Therefore, appropriate ESD prevention measures should be taken to avoid device performance degradation or loss of function.

## 8.4 Electrical Characteristics

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

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>OD</sub>	Output Differential Voltage	R <sub>L</sub> =100Ω (Figure 3)	250	350	450	mV
V <sub>OS</sub>	VOD Magnitude Change	R <sub>L</sub> =100Ω (Figure 3)	1.125	1.23	1.375	V
I <sub>OFF</sub>	Power-off Leakage	V <sub>OUT+</sub> =3.6V or GND, V <sub>DD</sub> =0V		0	±10	uA
I <sub>OS</sub>	Output Short Circuit Current	V <sub>OUT+</sub> =0 and V <sub>OUT-</sub> =0		-6	-12	mA
I <sub>OSD</sub>	Differential Output Short Circuit Current	V <sub>OD</sub> =0		-4.5	-10	mA
C <sub>OUT</sub>	Output Capacitance			3		pF
V <sub>IH</sub>	Input High Voltage		2		V <sub>DD</sub>	V
V <sub>IL</sub>	Input Low Voltage		GND		0.8	V
I <sub>IH</sub>	Input High Current	V <sub>IN</sub> =3.3V or 2.4V		0.4	±10	uA
I <sub>IL</sub>	Input Low Current	V <sub>IN</sub> =0 or 0.5V		0.4	±10	uA
C <sub>IN</sub>	Input Capacitance			3		pF
I <sub>DD</sub>	Power Supply Current	No Load	V <sub>IN</sub> =V <sub>DD</sub> or 0	0.7	2	mA
		R <sub>L</sub> =100Ω		7	10	mA

Note:

1. Current into device pins is defined as positive. Current out of device pins is defined as negative.
2. All typicals are given for: V<sub>DD</sub>=3.3V and T<sub>A</sub>=25°C.

## 8.5 Switching Characteristics

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

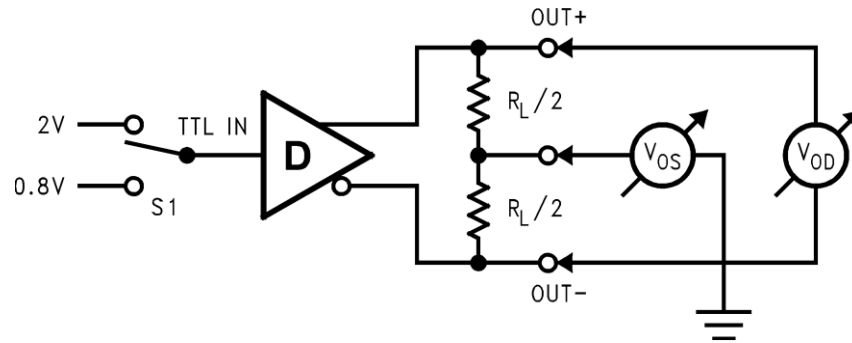
SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PHLD</sub>	Differential Propagation Delay High to Low	R <sub>L</sub> =100Ω (Figure 4 and Figure 5)	0.3	0.85	1.5	ns
t <sub>PLHD</sub>	Differential Propagation Delay Low to High		0.3	0.85	1.5	ns
t <sub>SKD1</sub>	Differential Pulse Skew  t <sub>PHLD</sub> - t <sub>PLHD</sub>		0	0.1	0.7	ns
t <sub>TLH</sub>	Transition Low to High Time		0.2	0.4	1	ns
t <sub>THL</sub>	Transition High to Low Time		0.2	0.4	1	ns
f <sub>MAX</sub>	Maximum Operating Frequency		200	250		MHz

Note:

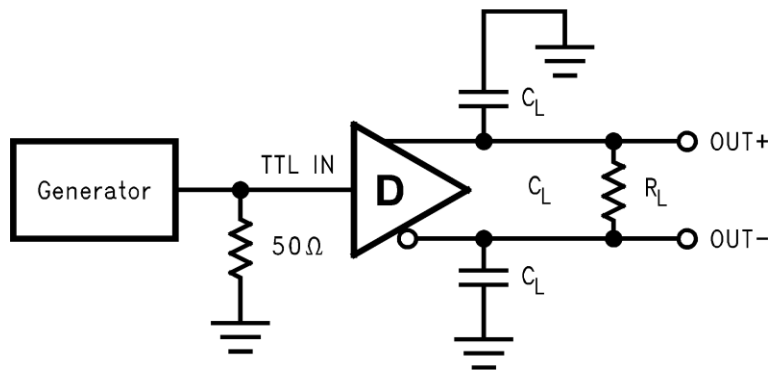
1. Generator waveform for all tests unless otherwise specified: f=1MHz, Z<sub>o</sub>=50Ω, t<sub>r</sub>≤1ns, t<sub>f</sub>≤1ns (10%-90%).
2. f<sub>MAX</sub> generator input conditions: t<sub>r</sub>=t<sub>f</sub><1 ns (0%-100%), 50%, 0 to 3V. Output criteria: duty cycle = 45%-55%, V<sub>OD</sub>>250mV.
3. Figure 3 shows the test circuits used for |V<sub>OD</sub>| and V<sub>OS</sub> tests, and Figure 4 shows the test circuits used for switching characteristics.



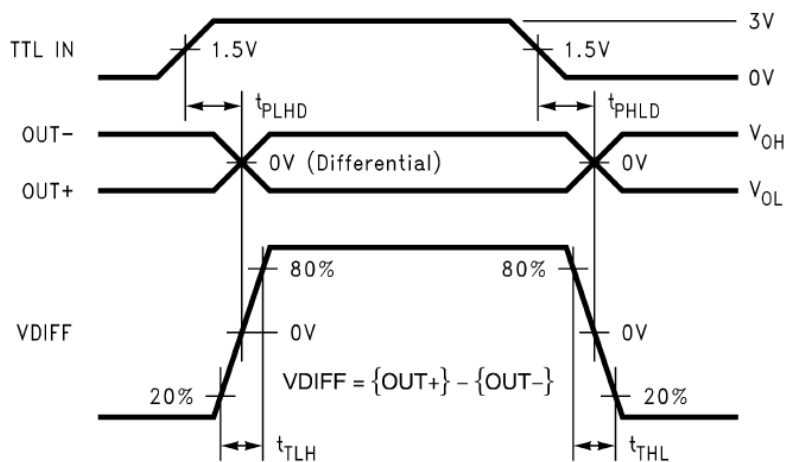
## 9 Parameter Measurement Information



**Figure 3. Differential Driver DC Test Circuit**



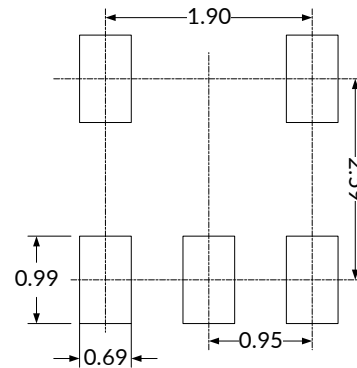
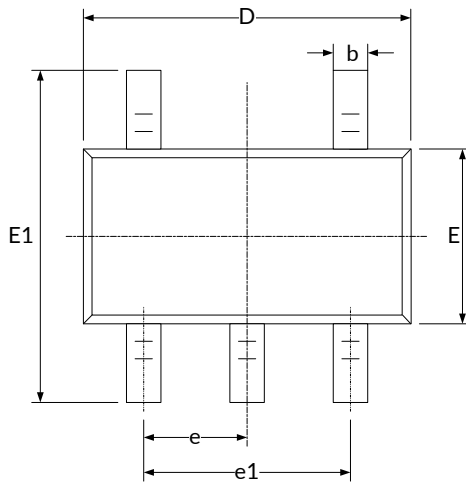
**Figure 4. Differential Driver Propagation Delay and Transition Time Test Circuit**



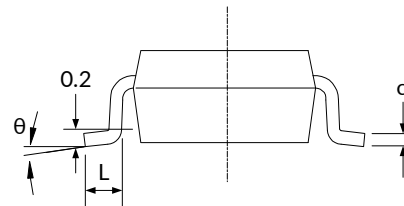
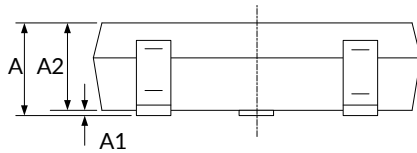
**Figure 5. Differential Driver Propagation Delay and Transition Time Waveforms**

# 10 PACKAGE OUTLINE DIMENSIONS

## SOT23-5<sup>(3)</sup>



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A <sup>(1)</sup>	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D <sup>(1)</sup>	2.820	3.020	0.111	0.119
E <sup>(1)</sup>	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC) <sup>(2)</sup>		0.037(BSC) <sup>(2)</sup>	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

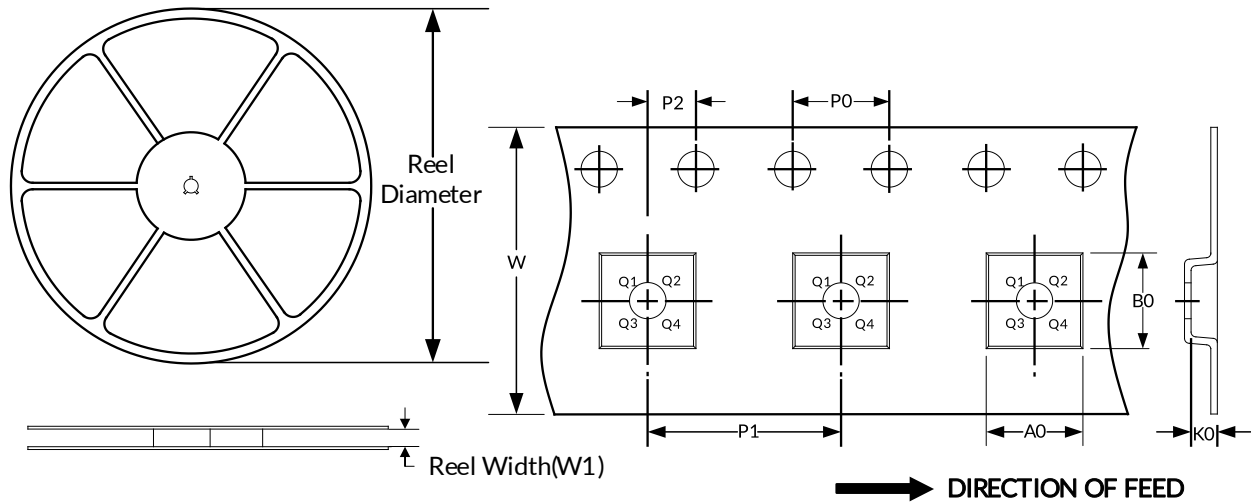
NOTE:

1. Plastic or metal protrusions of 0.15mm maximum per side are not included.
2. BSC (Basic Spacing between Centers), "Basic" spacing is nominal.
3. This drawing is subject to change without notice.

# 11 TAPE AND REEL INFORMATION

## REEL DIMENSIONS

## TAPE DIMENSION



NOTE: The picture is only for reference. Please make the object as the standard.

### KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOT23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.

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