

RS-232 Arduino Shield Module

FEATURES

- RS-232 Arduino Shield Module
- Data Rate: 120kbps
- Recommended Vcc Voltage: DC 5.0V
- Meets All EIA/TIA-232E and V.28/V.24 Specifications
- Indicator LED
- DB9 Connectors(female)
- Compatible with Arduino Uno

APPLICATIONS

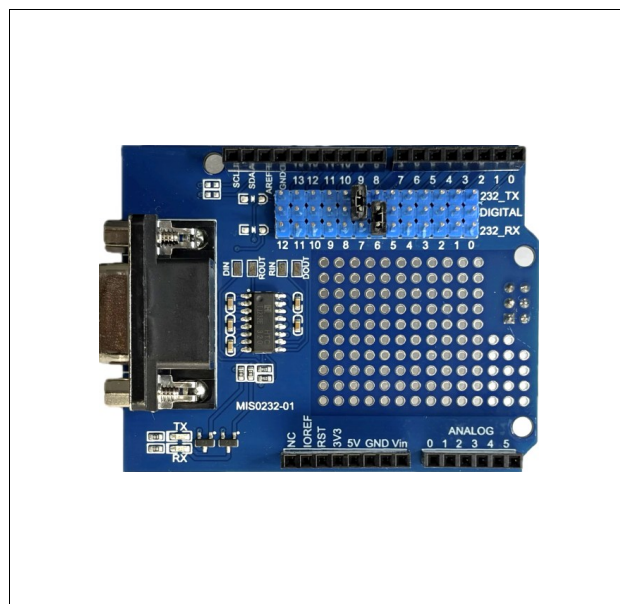
- Arduino Board

DESCRIPTION

RS-232 Arduino Shield Module is a standard communication port for industry equipment. This module is based on MAX232, which is a dual driver/receiver that includes a capacitive voltage generator to supply TIA/EIA-232-F voltage levels from a single 5.0V supply

APPLICATION GUIDE

This shield integrates DB9 connectors (female) that provide connection to various devices with RS232 interface. Also, the RS232 headers will facilitate your connections and commissioning. It provides the welding areas to make full use of extra space on it, which is highly convenient for prototyping.

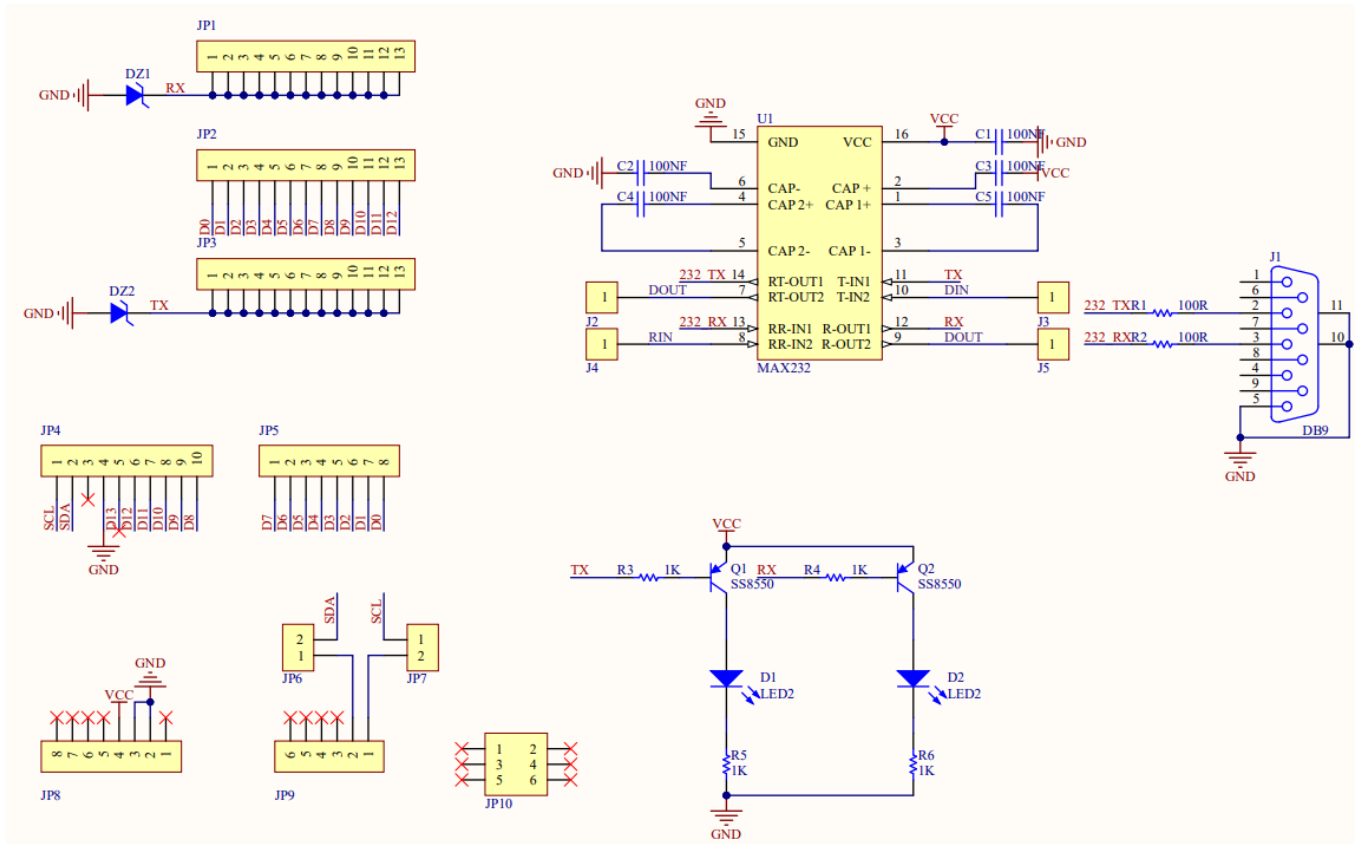


ORDERING INFORMATION

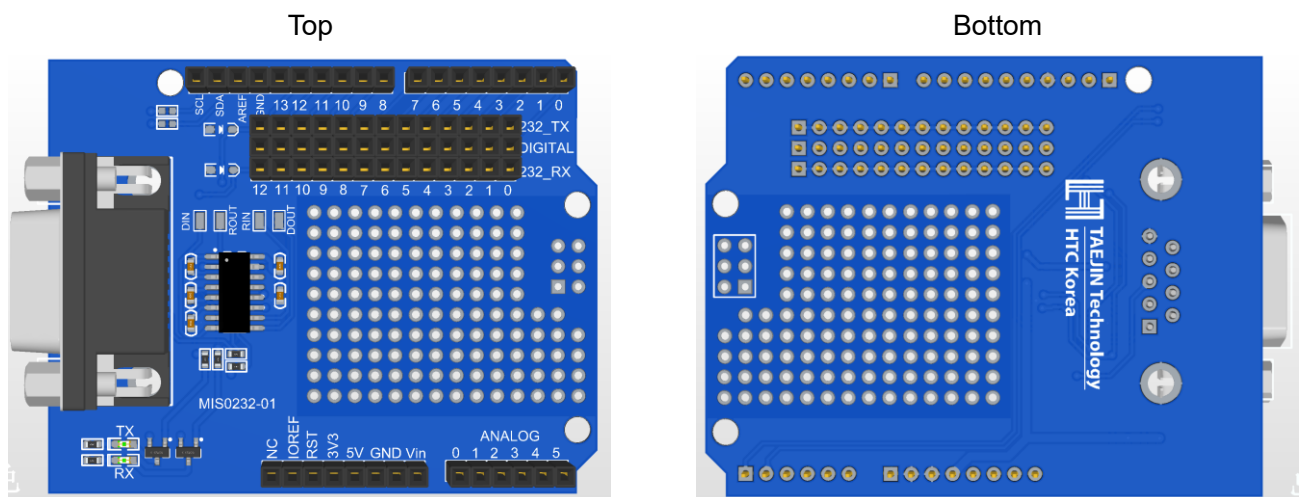
Part Number	MIS0232-01
Device	RS-232 Arduino Shield Module
Package	Assembled Module (69mm X 54mm)

RS-232 Arduino Shield Module

SCHEMATICS

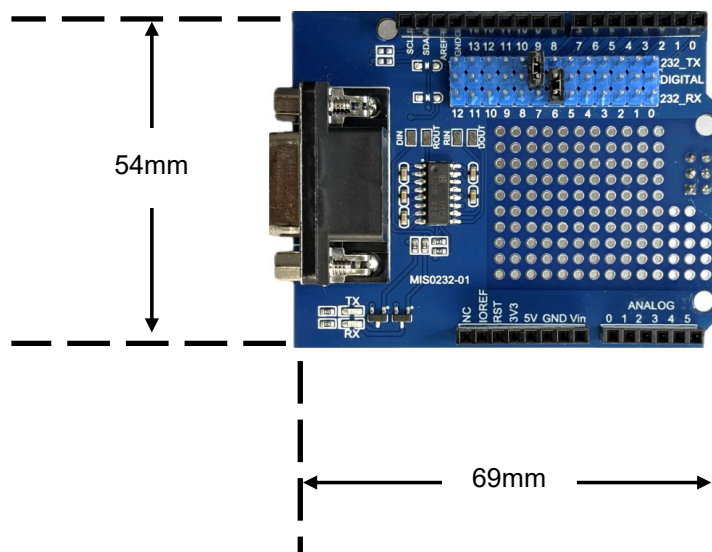


LAYOUT

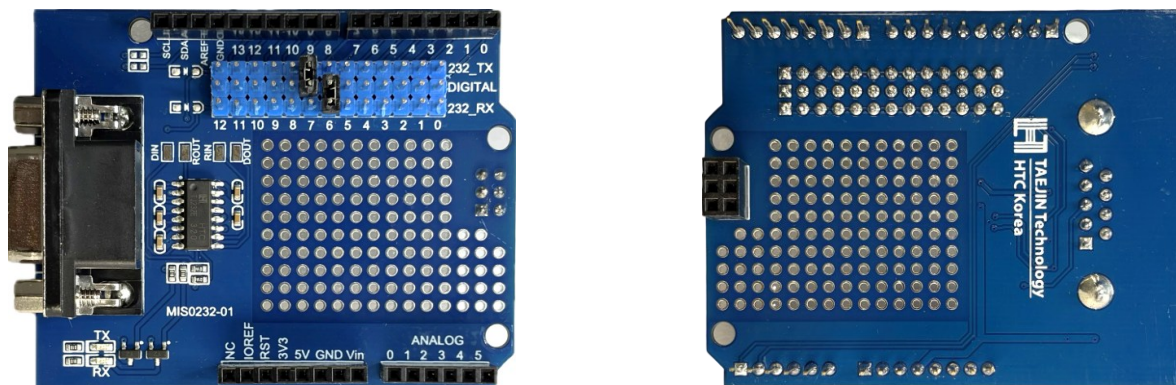


RS-232 Arduino Shield Module

SIZE INFORMATION

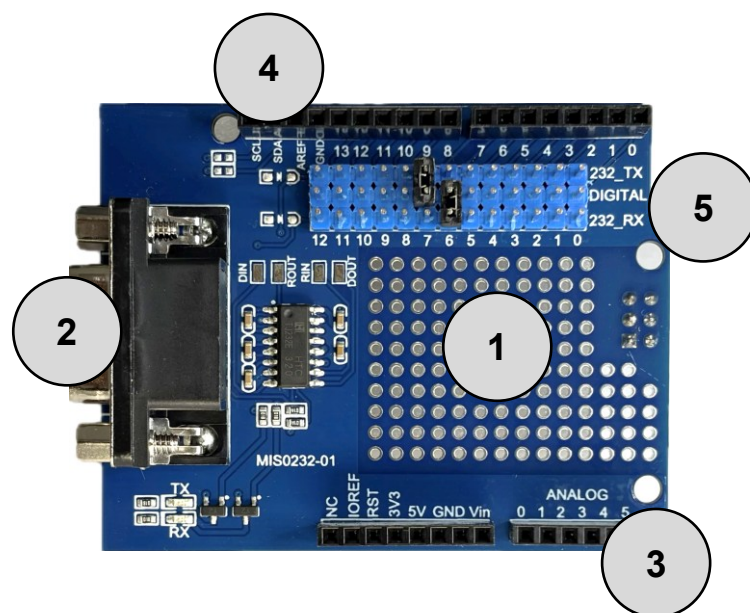


PRODUCT IMAGE



RS-232 Arduino Shield Module

I/O PORT CONFIGURATION AND DESCRIPTION



Designator	Port Name & Port Description
1	Weldable Area
2	RS232 Interface (DB9)
3	Analog Pins
4	Digital Pins
5	RS232 TX / RX

RS-232 Arduino Shield Module

REVISION NOTICE

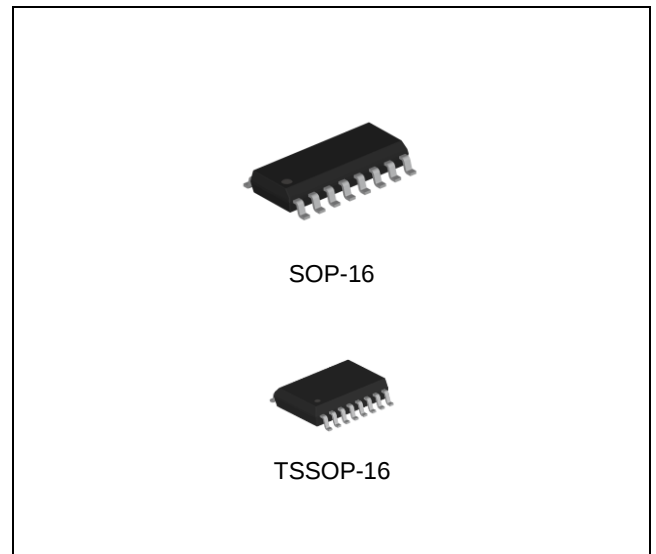
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FEATURES

- Output voltage levels are compatible with input levels of CMOS and TTL integrated circuits
- Meets All EIA/TIA-232E and V.28/V.24 Specifications
- Supply voltage range from 4.5 to 5.5V
- Low input current: 1.0 μ A at 25°C
- Output current 24mA
- Tolerable value of static potential not less than 2kV
- Available in SOP-16, TSSOP-16 Package

APPLICATIONS

- Portable Computers
- Battery-Powered RS-232 Systems
- Interface Translation
- Low-Power Modems
- Terminals

**ORDERING INFORMATION**

Device	Package
TJ232ED	SOP-16
TJ232ETD	TSSOP-16

* Refer to the ordering information for the details.

DESCRIPTION

The TJ232 is a dual driver/receiver of RS-232 standard with a single supply voltage and bipolar output voltage of the transmitter formed by a built-in voltage multiplying generator on four 1.0 μ F external capacitors, designed for use in state-of-the-art high performance computing systems, high-speed electronic devices with high reliability of information exchange between remote objects.

Input voltage levels are compatible with standard CMOS and TTL levels.

ABSOLUTE MAXIMUM RATINGS

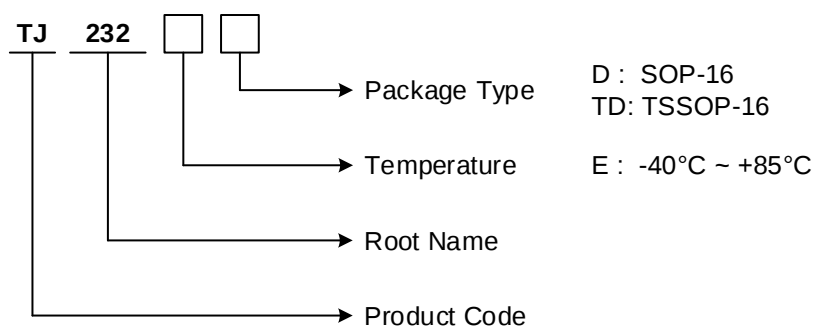
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V _{CC}	-0.3	6.0	V
Transmitter High Output Voltage	V ₊	V _{CC} -0.3	14	V
Transmitter Low Output Voltage	V ₋	-14	0.3	V
Transmitter Input Voltage	V _{TIN}	-0.3	V ₊ +0.3	V
Receiver Input Voltage	V _{RIN}	-30	30	V
Voltage Applied to Transmitter Output	V _{TOUT}	V ₋ -0.3	V ₊ +0.3	V
Voltage Applied to Receiver Output	V _{ROUT}	-0.3	V _{CC} +0.3	V
Storage Temperature Range	T _{STG}	-65	150	°C

RECOMMENDED OPERATING CONDITIONS

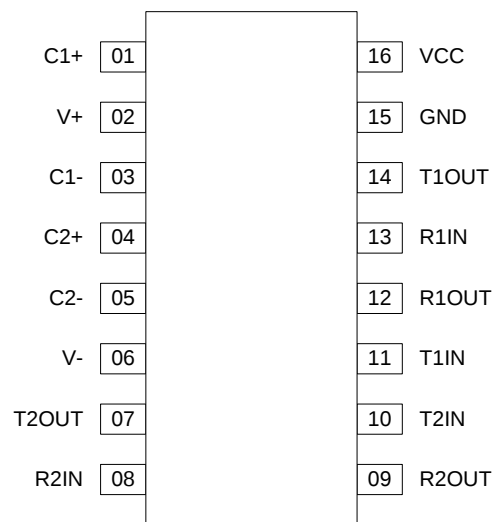
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	4.5	5.5	V
Transmitter Input Voltage	V_{TIN}	0	V_{CC}	V
Receiver Input Voltage	V_{RIN}	-30	30	V
Output Current of Transmitter Short Circuit	I_{SC}	-	± 60	mA
Ambient Temperature Range	T_A	-40	+85	°C

ORDERING INFORMATION

Package	Order No.	Package Marking	Compliance	Supplied As
SOP-16	TJ232ED	TJ232E	RoHS, Green	Reel
TSSOP-16	TJ232ETD	TJ232E	RoHS, Green	Reel



PIN CONFIGURATION

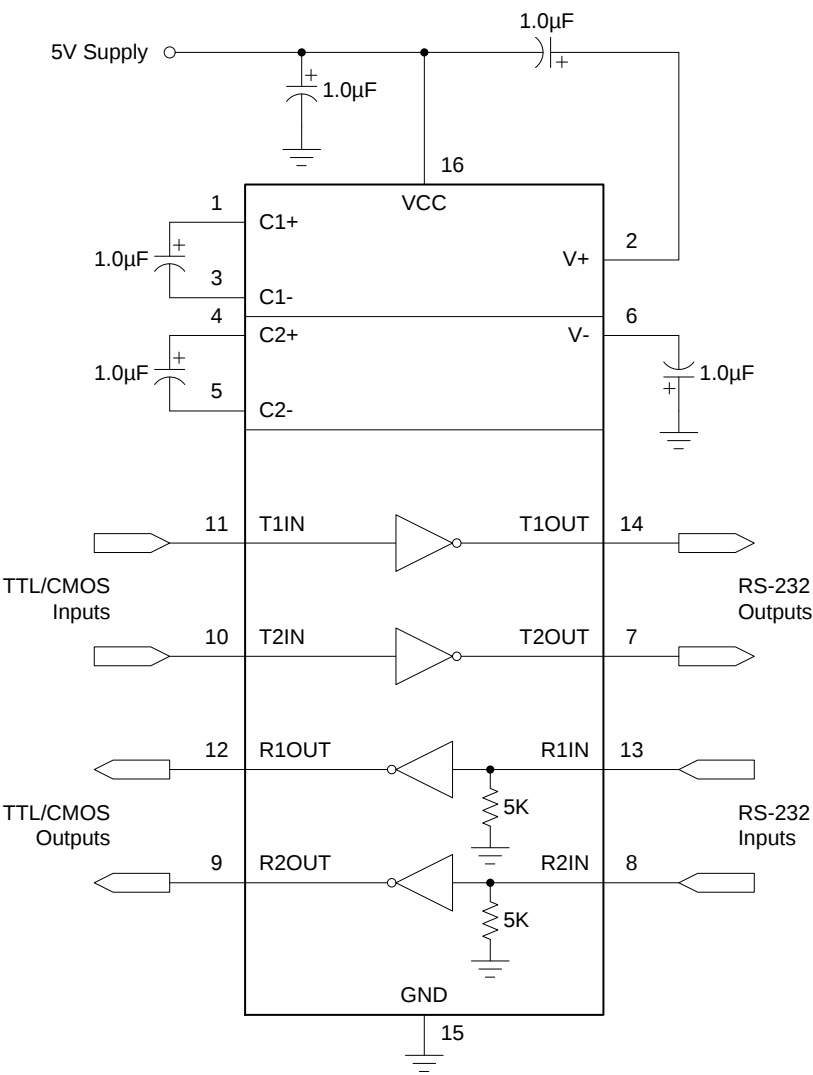


SOP-16 / TSSOP-16 PKG

PIN DESCRIPTION

Pin No.	Pin Name	Pin Description
1	C1+	Terminal for Positive Charge-Pump C1 Capacitor
2	V+	Positive Voltage Generated by the Charge-Pump
3	C1-	Terminal for Negative Charge-Pump C1 Capacitor
4	C2+	Terminal for Positive Charge-Pump C2 Capacitor
5	C2-	Terminal for Negative Charge-Pump C2 Capacitor
6	V-	Negative Voltage Generated by the Charge-Pump
7	T2OUT	RS-232 Driver Output (Levels RS-232)
8	R2IN	RS-232 Receiver Input (Levels RS-232)
9	R2OUT	RS-232 Receiver Output (Levels TTL/CMOS)
10	T2IN	RS-232 Driver Input (Levels TTL/CMOS)
11	T1IN	RS-232 Driver Input (Levels TTL/CMOS)
12	R1OUT	RS-232 Receiver Output (Levels TTL/CMOS)
13	R1IN	RS-232 Receiver Input (Levels RS-232)
14	T1OUT	RS-232 Driver Output (Levels RS-232)
15	GND	Ground
16	VCC	Supply Voltage Input

TYPICAL APPLICATION CIRCUIT



FUNCTION TABLE

INPUT (RIN, TIN)	OUTPUT (ROUT, TOUT)
L (Low Level)	H (High Level)
H (High Level)	L (Low Level)

ELECTRICAL CHARACTERISTICS

(Limits in standard typeface are for $T_A=25^{\circ}\text{C}$, and the limits in boldface type apply over full operating temperature range.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNIT
Supply Current	I _{CC}	V _{CC} = 5.5V V _{IL} = 0V		-	-	10.0 14.0	mA
Receiver Parameters							
Hysteresis Voltage	V _h	V _{CC} = 5.0V		0.2 0.2	-	0.9 1.0	V
On (Operation) Voltage	V _{on}	V _O ≤ 0.1V, I _{OL} ≤ 20μA		-	-	2.4 2.3	V
Off (Dropout) Voltage	V _{off}	V _O ≥ V _{CC} - 0.1V I _{OH} ≤ -20μA		0.8 0.9	-	-	V
Output Low Voltage	V _{OL}	I _L = 3.2mA, V _{CC} = 4.5V, V _{IH} = 2.4V		-	-	0.3 0.4	V
Output High Voltage	V _{OH}	I _{OH} = -1.0mA, V _{CC} = 4.5V, V _{IL} = 0.8V		3.6 3.5	-	-	V
Input Resistance	R _I	V _{CC} = 5.0V		3.0 3.0	-	7.0 7.0	kΩ
Transmitter Parameters							
Output Low Voltage	V _{OL}	V _{CC} = 4.5V, V _{IH} = 2.0V, R _L = 3.0kΩ		-	-	-5.2 -5.0	V
Output High Voltage	V _{OH}	V _{CC} = 4.5V, V _{IL} = 0.8V, R _L = 3.0kΩ		5.2 5.0	-	-	V
Input Low Current	I _{IL}	V _{CC} = 5.5V, V _{IL} = 0V		-	-	-1.0 -10.0	μA
Input High Current	I _{IH}	V _{CC} = 5.5V, V _{IH} = V _{CC}		-	-	1.0 10.0	μA
Speed Of Output Front Charge	SR	V _{CC} = 5.0V, C _L = 50 - 1000pF, R _L = 3.0 - 7.0kΩ		3.0 2.7	-	30 27	V/μs
Output Resistance	R _O	V _{CC} = V ₊ = V ₋ = 0V V _O = ±2V		350 300	-	-	Ω
Short Circuit Output Current	I _{SC}	V _{CC} = 5.5V V _O = 0V	V _I = V _{CC}	-	-	-50 -60	mA
			V _I = 0	-	-	50 60	
Speed Of Information Transmission	ST	V _{CC} = 4.5V, C _L = 1000pF, R _L = 3.0kΩ, t _w = 7μs (for extreme, t _w = 8μs)		140 120	-	-	kbit/s
Dynamic Parameters							
Signal Propagation Delay Time When Switching On (Off)	t _{PHLR} (t _{PLHR})	V _{CC} = 4.5V, C _L = 150pF, V _{IL} = 0V, V _{IH} = 3.0V, t _{LH} = t _{HL} ≤ 10ns		-	-	9.7 10.0	μs
Signal Propagation Delay Time When Switching On (Off)	t _{PHLT} (t _{PLHT})	V _{CC} = 4.5V, C _L = 2500pF, V _{IL} = 0V, V _{IH} = 3.0V, R _L = 3kΩ, t _{LH} = t _{HL} ≤ 10ns		-	-	5.0 6.0	μs

TIMING DIAGRAM

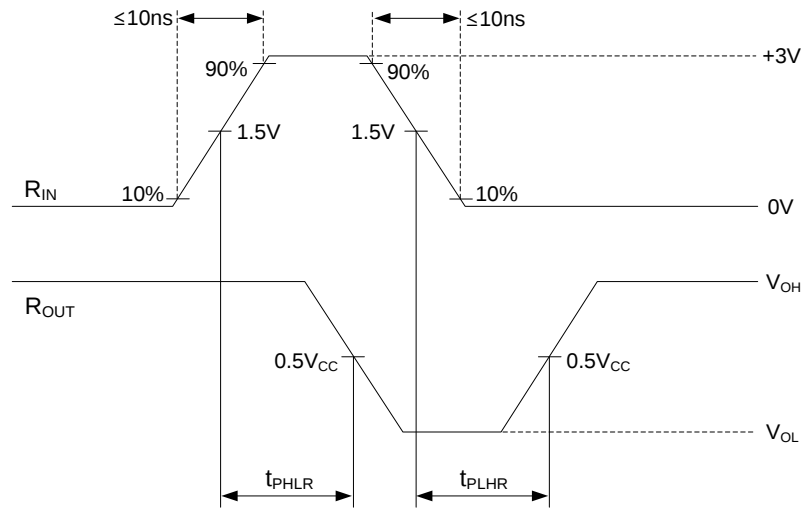


Figure 1. t_{PHL} and t_{PLH} waveforms of Receiver

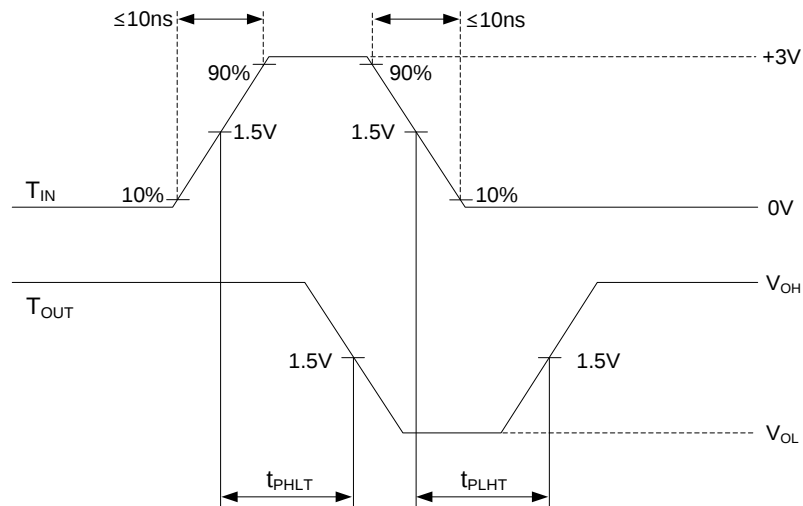
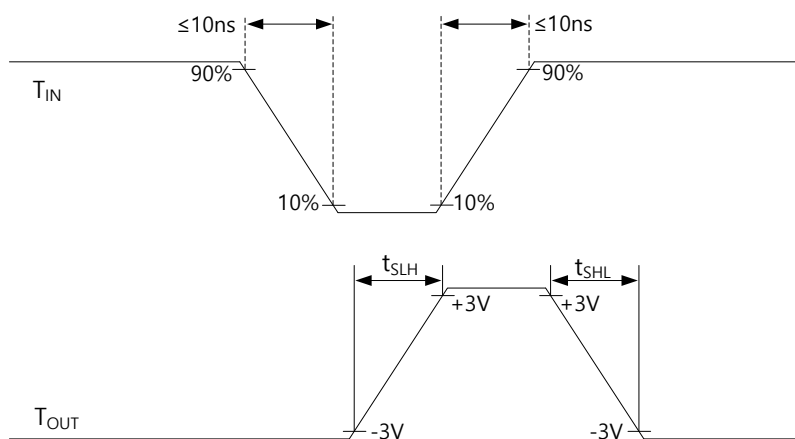


Figure 2. t_{PHL} and t_{PLH} waveforms of Transmitter

Figure 3. t_{SLH} and t_{SHL} waveforms of Transmitter

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