

5V Supply Dual-Channel RS232 Transceiver**Features**

- ◆ 5V±10% Power Supply
- ◆ Dual Channel
- ◆ 120kbps Communication Rate
- ◆ Drive input compatible with TTL/CMOS logic level
- ◆ RS232 output compatible TTL level input circuit
- ◆ Minimum input impedance of receiver 3KΩ

Applications

- ◆ Automobile electronics
- ◆ Industrial Control Automation
- ◆ Security System
- ◆ Instruments and apparatus
- ◆ Road traffic control automation
- ◆ Building automation system

General Description

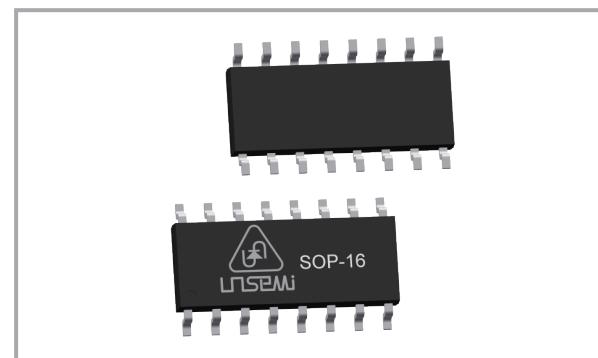
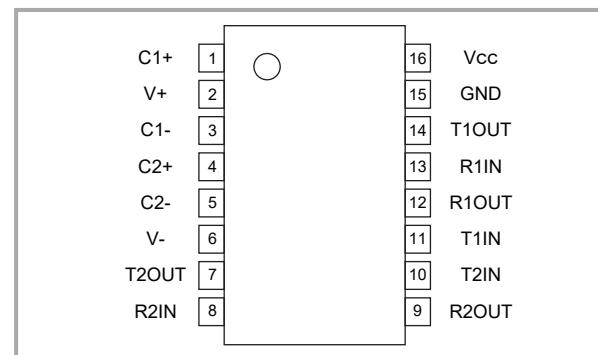
UN232 is a 5V-power-supply, dual-channel, low-power RS-232 transceiver that fully meets the requirements of the TIA/EIA-232 standard.

UN232 includes two drives and two receivers, all of which can be used independently. Receiver converts RS-232 signal to CMOS logic output level. EIA/TIA-232E defines a voltage greater than 3V as logic 0, UN232 all receivers are reversed, so the TTL responding level of the receiver is consistent with the EIA/TIA-232E level.

Powered by 5V power supply, The charge pump requires only four 1uF external capacitance to work at a rate of at least 120Kbps error-free data transmission, both of which can be independently enabled and closed. Each driver and receiver can be used independently.



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Configuration**Functional Block****Limiting Values**

Parameter	Symbol	Value	Unit
Power Supply	VCC	-0.3~+6	V
Positive Charge Pump	V+	VCC-0.3~+14	V
Negative Charge Pump	V-	+0.3~-14	V
V+ + V-	-	+13	V
Transmitter Input Pins	T1IN- T2IN	-0.3~VCC+0.3	V
Receiver Input Pins	R1IN- R2IN	±30	V
Transmitter Output Pins	T1OUT- T2OUT	V+ +0.3~V- -0.3	V
Receiver Output Pins	R1OUT- R2OUT	-0.3~VCC+0.3	V
Operating Temperature	-	-40~85	°C
Storage Temperature Range	-	-60~150	°C
Soldering Temperature	-	300	°C
Continuous Power	SOP16	696	mW

Limiting Values

Absolute Maximum Ratings The maximum limited parameter means that exceeding these values may cause unrecoverable damage to the device. Under these conditions, it is not conducive to the normal operation of the device. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. The reference point for all voltages is the ground.

Pin Description

Pin Number	Pin Name	Function
1	C1+	Positive lead of C1 capacitor
2	V+	Positive charge pump output for storage capacitor only
3	C1-	Negative lead of C1 capacitor
4	C2+	Positive lead of C2 capacitor
5	C2-	Negative lead of C2 capacitor
6	V-	Negative charge pump output for storage capacitor only
7	T2OUT	RS232 line data output (to remote RS232 system)
8	R2IN	RS232 line data input (from remote RS232 system)
9	R2OUT	Logic data output (to UART)
10	T2IN	Logic data input (from UART)
11	T1IN	Logic data input (from UART)
12	R1OUT	Logic data output (to UART)
13	R1IN	RS232 line data input (from remote RS232 system)
14	T1OUT	RS232 line data output (to remote RS232 system)
15	GND	Ground
16	VCC	Power supply

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Supply Current

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Current with no Load	I_{sup}	-	-	5	10	mA

(If there is no additional explanation, typical value is tested when $VCC=+5V$, $Temp=25^\circ C$, $C1\sim C4=1\mu F$)

Logic Input Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Logic Control Low Level	V_{TIN_L}	$T1IN, T2IN$	-	-	0.8	V
Logic Control High Level	V_{TIN_H}	$T1IN, T2IN$	2.0	-	-	V
Logic Control Hysteresis	-	$T1IN, T2IN$	-	0.3	-	V
Input Logic Current	I_{TIN}	$T1IN, T2IN$	-	± 1	± 10	μA

(If there is no additional explanation, typical value is tested when $VCC=+5V$, $Temp=25^\circ C$, $C1\sim C4=1\mu F$)

Receiver Output Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Receiver Output Logic-Low Voltage	V_{ROL}	$I_{OUT}=3.2mA$	-	-	0.4	V
Receiver Output Logic-High Voltage	V_{ROH}	$I_{OUT}=-1mA$	3.5	-	-	V

(If there is no additional explanation, typical value is tested when $VCC=+5V$, $Temp=25^\circ C$, $C1\sim C4=1\mu F$)

Receiver Input Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Receiver Input Range	V_{RIN}	-	-30	-	+30	V
Receiver Input Low Threshold	V_{RIL}	-	0.8	1.1	-	V
Receiver Input High Threshold	V_{RIH}	-	-	1.5	2.4	V
Receiver Input Hysteresis	-	-	-	0.4	-	V
Receiver Input Impedance	R_{RIN}	-	3.0	5.0	7.0	$K\Omega$

(If there is no additional explanation, typical value is tested when $VCC=+5V$, $Temp=25^\circ C$, $C1\sim C4=1\mu F$)

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Transmitter Output Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Transmitter Output Swing	V_{TOUT}	All output ports of transmitter connect $3k\Omega$ load to ground	± 5.0	± 7.3	-	V
Transmitter Output Impedance	R_{TOUT}	$V_{CC}=0V$, Transmitter Input = $\pm 2V$	300	-	-	Ω
Transmitter Short-Circuit Current	I_{TSC}	-	-	± 10	± 60	mA

(If there is no additional explanation, typical value is tested when $V_{CC}=+5V$, Temp=25°C, C1~C4=1uF)

Switching Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Rate	Speed	$RL=3k\Omega$, $CL=1000pF$	-	120	-	kbps
Receiver Propagation delay	t_{RPHL}	$CL=150pF$	-	0.5	10	us
	t_{RPLH}		-	0.5	10	us
Transmitter Slew Rate	SR	$RL=3k\Omega \sim 7k\Omega$, $CL=50pF \sim 1000pF$ from -3.0V to 3.0V or from 3.0V to -3.0V	-	4.0	-	V/us

(If there is no additional explanation, typical value is tested when $V_{CC}=+5V$, Temp= 25°C, C1~C4=1uF)

Summary

1 Dual Charge-Pump Operation

UN232 has a two-way charge pump inside to support the chip's voltage conversion work. Dual-electric pump converts 5V supply voltage to $\pm 10V$ (no-load) voltage for 232 drives. Each charge pump requires a capacitor (C1,C2) and an energy storage capacitor (C3,C4) to generate V+ and V-power supplies, as shown in Fig 1.

2 RS232 Transmitter

Convert the TTL/CMOS logic voltage to a voltage compatible with the EIA/TIA-232 standard. UN232 Transmitter can guarantee 120kbps data rate under the worst operating conditions (3k Ω resistor and 4.5V supply voltage).

Transmitter can drive multiple receivers in parallel. The swing rate of the driver is limited to 30v/us in accordance with EIA/TIA-232E requirements.

3 RS232 Receiver

The UN232 has two separate receivers that convert the RS-232 signal to the CMOS logic output level.

EIA/TIA-232E defines a voltage greater than 3V as logic 0, UN232 all receivers are reversed, so the receiver responding TTL voltage is consistent with the EIA/TIA-232E level.

4 Typical Application

Typical dual-Path application scenarios are shown in Fig 1, where the C1-C5 typical capacitance value is 1uF.

The power supply VCC should connect a decoupling capacitor to the ground with the same capacitance as the C1,C2 and is as close to the device as possible.

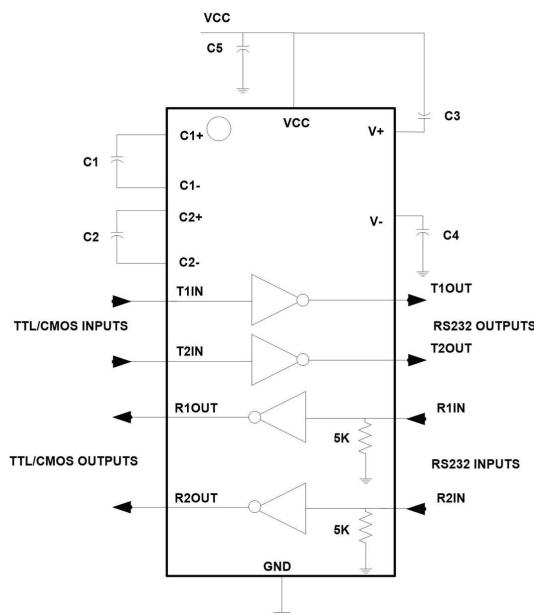


Fig1. Typical dual-path application scheme

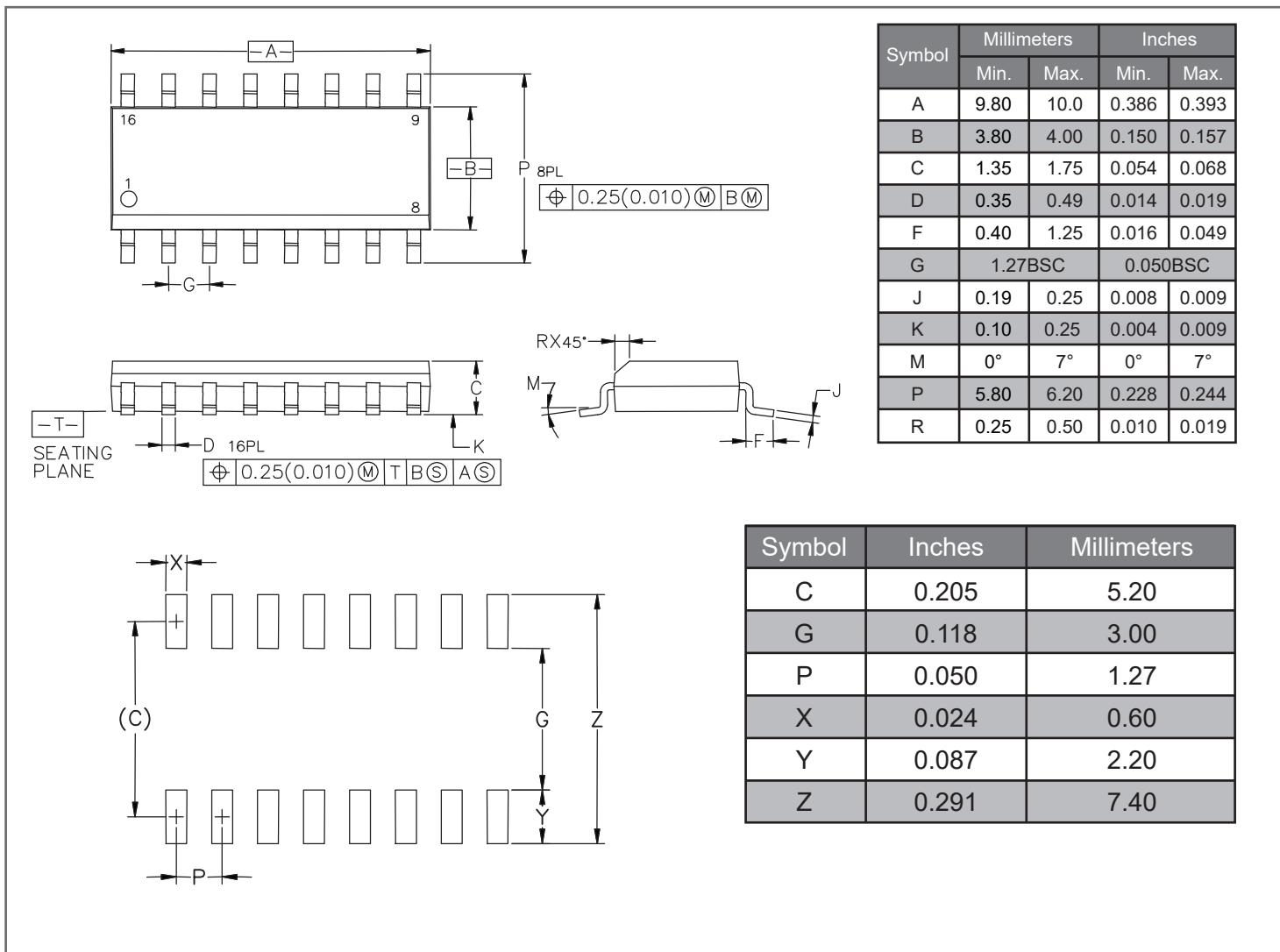


UN232

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Package Outline



Ordering Information

Type	Temperature	Packaging	Quantity
UN232	-40°C~85°C	SOP-16	2500pcs



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