# UN232

ROHS

## 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.

## Configuration

SOP-16

## Functional Block

| | | |
|---|---|---|
| C1+ | 1 | 16 Vcc |
| V+ | 2 | 15 GND |
| C1- | 3 | 14 T1OUT |
| C2+ | 4 | 13 R1IN |
| C2- | 5 | 12 R1OUT |
| V- | 6 | 11 T1IN |
| T2OUT | 7 | 10 T2IN |
| R2IN | 8 | 9 R2OUT |
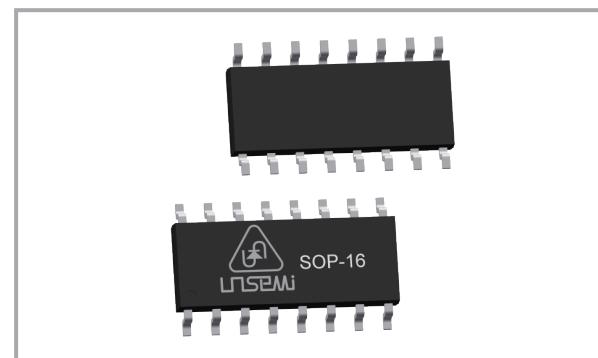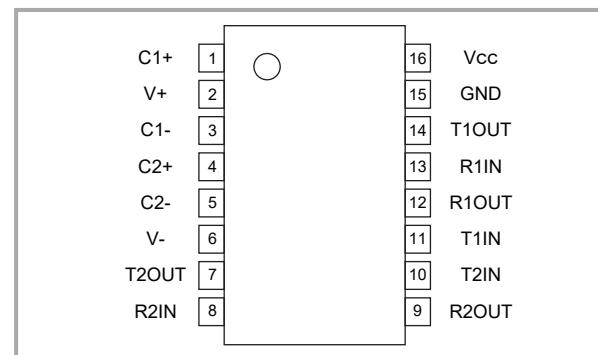
## Limiting Values

| 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 RatingsThe 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 |

Revision March 1,2022

For technical questions, contact: tech@unsemi.com.tw

2/6

www.unsemi.com.tw

Specifications are subject to change without notice.
Please refer to www.unsemi.com.tw for current information.

## Supply Current

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Supply Current with no Load | Isup | - | - | 5 | 10 | mA |

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

## Logic Input Electrical Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Logic Control Low Level | VTTIN_L | T1IN、T2IN | - | - | 0.8 | V |
| Logic Control High Level | VTTIN_H | T1IN、T2IN | 2.0 | - | - | V |
| Logic Control Hysteresis | - | T1IN、T2IN | - | 0.3 | - | V |
| Input Logic Current | ITIN | T1IN、T2IN | - | ±1 | ±10 | uA |

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

## Receiver Output Electrical Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Receiver Output Logic-Low Voltage | VROL | IOUT=3.2mA | - | - | 0.4 | V |
| Receiver Output Logic-High Voltage | VROH | IOUT=-1mA | 3.5 | - | - | V |

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

## Receiver Input Electrical Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Receiver Input Range | VRIN | - | -30 | - | +30 | V |
| Receiver Input Low Threshold | VRIL | - | 0.8 | 1.1 | - | V |
| Receiver Input High Threshold | VRIH | - | - | 1.5 | 2.4 | V |
| Receiver Input Hysteresis | - | - | - | 0.4 | - | V |
| Receiver Input Impedance | RRIN | - | 3.0 | 5.0 | 7.0 | KΩ |

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

Revision March 1,2022

www.unsemi.com.tw

For technical questions, contact: tech@unsemi.com.tw

3/6

Specifications are subject to change without notice.
Please refer to www.unsemi.com.tw for current information.

## Transmitter Output Electrical Characteristics

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

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

## Switching Characteristics

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Rate | Speed | RL=3kΩ, 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=3kΩ~7kΩ, CL=50pF~1000pF form-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 VCC=+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 ±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 (3kΩ 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.
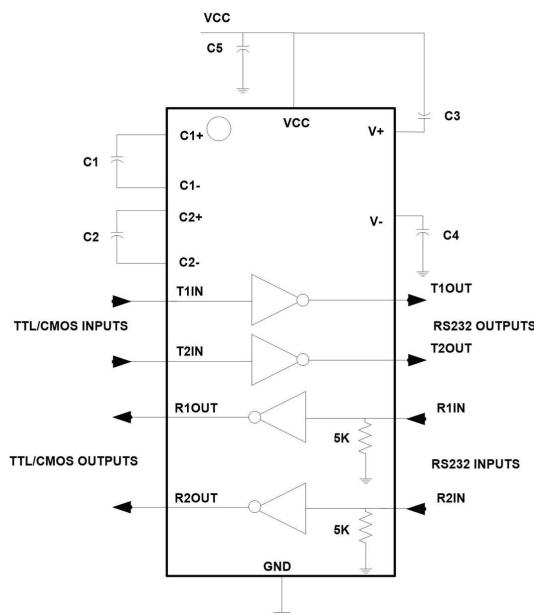


Fig1. Typical dual-path application scheme

## Package Outline



| Symbol | Millimeters | | Inches | |
|--------|------|------|------|------|
| | Min. | Max. | Min. | Max. |
| A | 9.80 | 10.0 | 0.386 | 0.393 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.054 | 0.068 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.40 | 1.25 | 0.016 | 0.049 |
| G | 1.27BSC | | 0.050BSC | |
| J | 0.19 | 0.25 | 0.008 | 0.009 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° | 7° | 0° | 7° |
| P | 5.80 | 6.20 | 0.228 | 0.244 |
| R | 0.25 | 0.50 | 0.010 | 0.019 |

| Symbol | Inches | Millimeters |
|--------|--------|-------------|
| C | 0.205 | 5.20 |
| G | 0.118 | 3.00 |
| P | 0.050 | 1.27 |
| X | 0.024 | 0.60 |
| Y | 0.087 | 2.20 |
| Z | 0.291 | 7.40 |
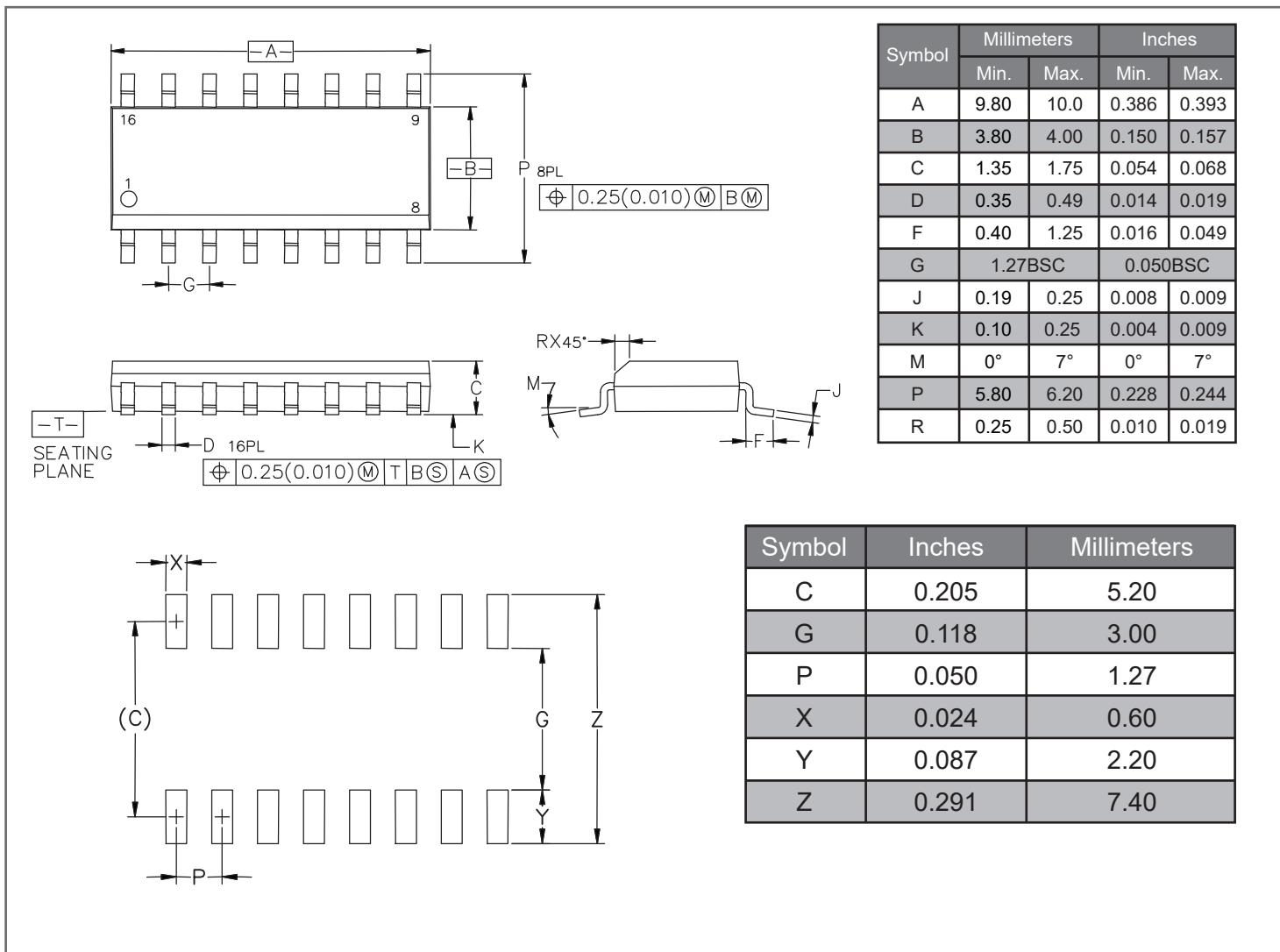
## Ordering Information

| Type | Temperature | Packaging | Quantity |
|------|-------------|-----------|----------|
| UN232 | -40℃~85℃ | SOP-16 | 2500pcs |

# Disclaimer