

**RS232 CHIP**

**MAX232DR**

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**Product Data Sheet**

|                 |
|-----------------|
| <b>AOTE DCC</b> |
| <b>RELEASE</b>  |

### ◆ Summary :

The MAX232XXX 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 1.0μF 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.

### ◆ Product features

- Encapsulation: SOP-16
- Output voltage levels are compatible with input levels of CMOS and TTL integrated circuits
- Meets AI EIA/TIA-232E and V.28/N.24 Specifications
- Supply voltage range from 5.5V
- Low input current: 1.0μA at 25°C
- Output current 30mA

### ◆ Applications

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

### ◆ Absolute maximum rated value

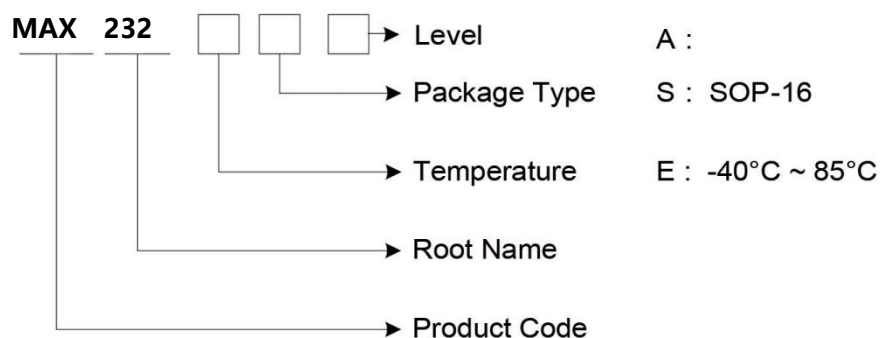
| Parameter                             | Symbol     | Min          | Max            | Unit |
|---------------------------------------|------------|--------------|----------------|------|
| Supply Voltage                        | $V_{CC}$   | -0.3         | 6.0            | V    |
| Transmitter High Output Voltage       | $V_+$      | $V_{CC}-0.3$ | 9.8            | V    |
| Transmitter Low Output Voltage        | $V_-$      | -9.0         | 0.3            | V    |
| Transmitter Input Voltage             | $V_{TIN}$  | -0.3         | $V_+ + 0.3$    | V    |
| Receiver Input Voltage                | $V_{RIN}$  | -20          | 20             | 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 working conditions

| Parameter                                   | Symbol           | Min | Max             | Unit |
|---------------------------------------------|------------------|-----|-----------------|------|
| Supply Voltage                              | V <sub>CC</sub>  | 4.5 | 5.5             | V    |
| Transmitter Input Voltage                   | V <sub>TIN</sub> | 0   | V <sub>CC</sub> | V    |
| Receiver Input Voltage                      | V <sub>RIN</sub> | -20 | 20              | V    |
| Output Current of Transmitter Short Circuit | I <sub>SC</sub>  | -   | ±60             | mA   |
| Ambient Temperature Range                   | T <sub>A</sub>   | -40 | +85             | °C   |

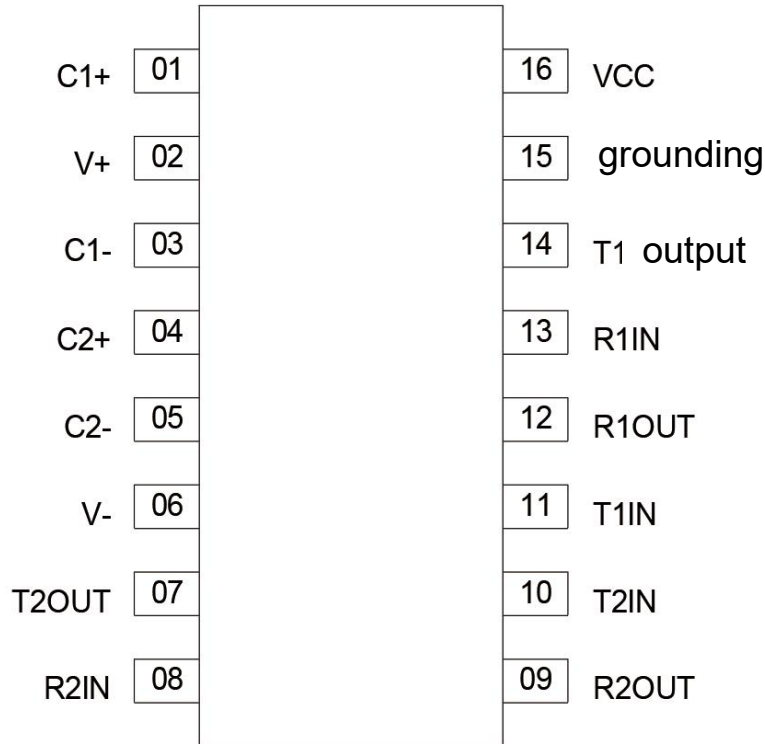
## ◆ Order Information

| Packaging | Order Number | Packaging Marking | compliance | as   |
|-----------|--------------|-------------------|------------|------|
| SOP-16    | MAX232XXX    | MAX232XXX         | RoHS,Green | Tube |



MAX232XXX(XXX:CSE、CDR、EESE、ESE、IDR)

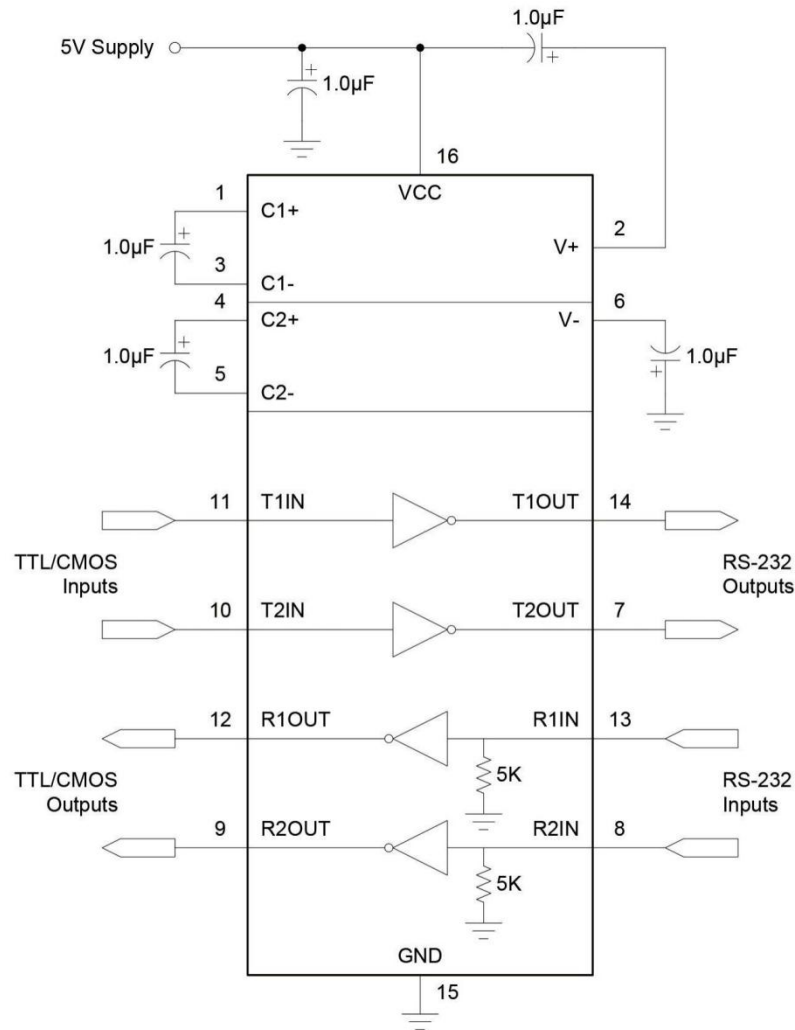
### ◆ Pin configuration



SOP -16 PKG

| Pin number | 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(LevelsTTLCMOS)          |
| 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 Menu**

| Input(RIN, TIN) | Output(ROUT, TOUT) |
|-----------------|--------------------|
| L(low level)    | H(high level)      |
| H(high level)   | L(low level)       |

### ◆ Electrical Characteristics

(The limit values in standard fonts apply to TA=25 °C, while bold font limits apply to the entire operating temperature range)

| Parameter                                            | Symbol           | Test conditions                                                      |        | Min        | Typ | Max           | Unit       |
|------------------------------------------------------|------------------|----------------------------------------------------------------------|--------|------------|-----|---------------|------------|
| Supply Current                                       | ICC              | VCC=5.5V    VIL=0V                                                   |        | -          | -   | 10.0<br>14.0  | mA         |
| Receiver Parameters                                  |                  |                                                                      |        |            |     |               |            |
| Hysteresis Voltage                                   | Vh               | VCC=5.0V                                                             |        | 0.2<br>0.2 | -   | 0.9<br>1.0    | V          |
| On(Operation) Voltage                                | Von              | VO ≤0.1V, IOL ≤20 μA                                                 |        | -          | -   | 2.4<br>2.3    | V          |
| Off(Dropout) Voltage                                 | Voff             | VO ≥VCC-0.1V<br>IOH ≤-20 μA                                          |        | 0.8<br>0.9 | -   | -             | V          |
| Output Low Voltage                                   | VOL              | IL=3.2mA,<br>Vcc=4.5V,<br>VIH=2.4V                                   |        | -          | -   | 0.4<br>0.4    | V          |
| Output High Voltage                                  | VOH              | IOH=-1.0mA,Vcc=4.5V,<br>VIL=0.8V                                     |        | 3.6<br>3.5 | -   | -             | V          |
| Input Resistance                                     | RI               | VCC=5.0V                                                             |        | 3.0<br>3.0 | -   | 7.0<br>7.0    | k Ω        |
| Transmitter Parameters                               |                  |                                                                      |        |            |     |               |            |
| Output Low Voltage                                   | VOL              | VCC=4.5V,VIH=2.0V, RL=3.0k Ω                                         |        | -          | -   | -5.2<br>-5.0  | V          |
| Output High Voltage                                  | VOH              | VCC=4.5V,VIL=0.8V, RI=3.0k Ω                                         |        | 5.2<br>5.0 | -   | -             | V          |
| Input Low Current                                    | IL               | VCC=5.5V,VIL=0V                                                      |        | -          | -   | -1.0<br>-10.0 | μA         |
| Input High Current                                   | IIH              | VCC=5.5V,VIH=VCC                                                     |        | -          | -   | 1.0<br>10.0   | μA         |
| Speed Of Output Front Charge                         | SR               | VCC=5.0V,<br>CL=50-1000pF,RL=3.0-7. 0k Ω                             |        | 3.0<br>2.7 | -   | 30<br>27      | V/ μs      |
| Output Resistance                                    | RO               | VCC=V+=V-=0V<br>VO=±2V                                               |        | 350<br>300 | -   | -             | Ω          |
| Short Circuit Output Current                         | ISC              | VCC=5.5V<br>VO=0V                                                    | VI=VCC | -          | -   | -50<br>-60    | mA         |
|                                                      |                  |                                                                      | VI=0   | -          | -   | 50<br>60      |            |
| Speed Of Information Transmission                    | ST               | VCC=4.5V, CL=1000pF, RL=3.0k Ω ,<br>tW=7 μs(for extreme,<br>tW=8 μs) |        | 140<br>120 | -   | -             | kbit/<br>s |
| Dynamic Parameters                                   |                  |                                                                      |        |            |     |               |            |
| Signal Propagation Delay Time When Switching On(off) | tPHLR<br>(tPLHR) | VCC=4.5V,CL=150pF,<br>VIL=0V,VIH=3.0V, tLH=tHL<br>≤10ns              |        | -          | -   | 9.7<br>10.0   | μs         |
| Signal Propagation Delay Time When Switching On(off) | tPHLT<br>(tPLHT) | VCC=4.5V,CL=2500pF, VIL= 0V,<br>VIH=3.0V,R=3k Ω , tLH=tHL<br>≤10ns   |        | -          | -   | 5.0<br>6.0    | μs         |

◆ **Sequence diagram**

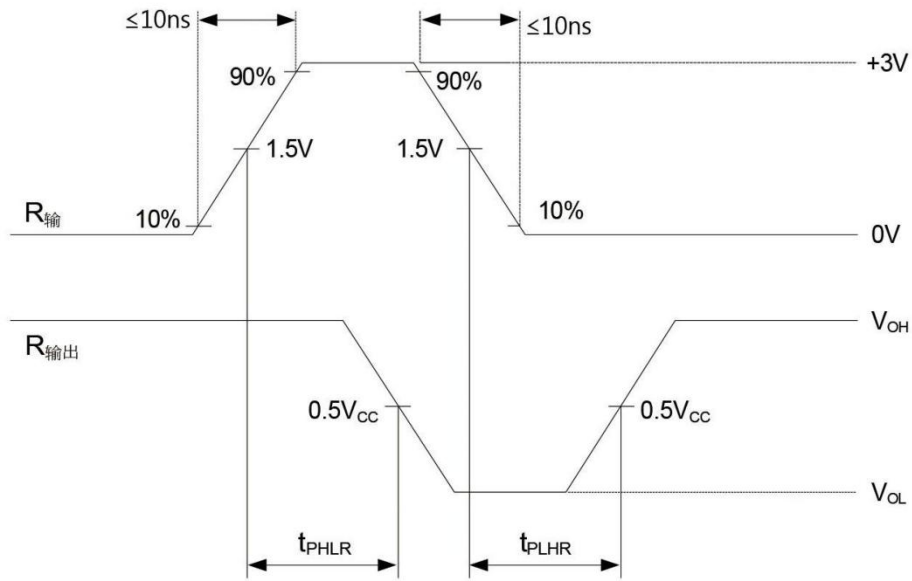


Figure 1. t<sub>PHL</sub> and t<sub>PLH</sub> waveforms

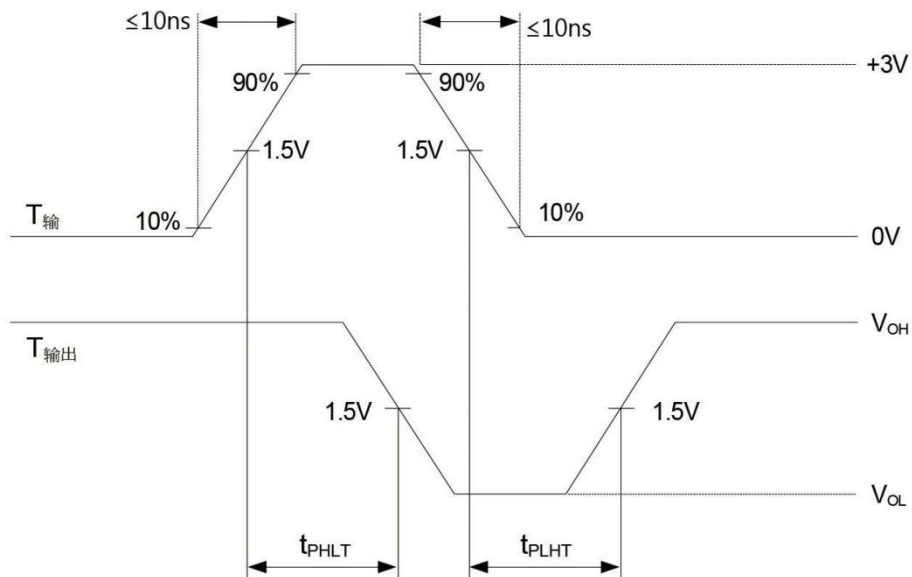


Figure 2. t<sub>PHL</sub> and t<sub>PLH</sub> transmitter waveforms

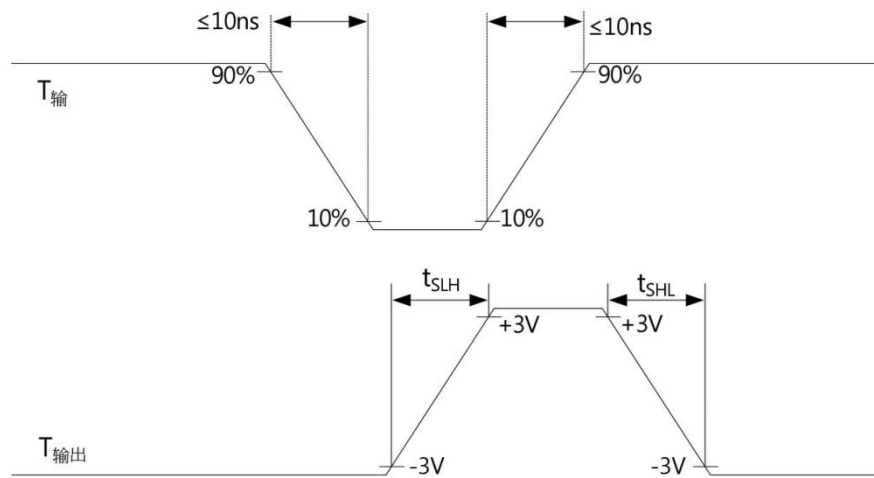


Figure 3.  $t_{\text{SLH}}$  and  $t_{\text{SHL}}$  transmitter waveforms

**◆ Attention**

- AOTE implements dynamic technical updates. Specifications are subject to change. Refer to the official website for the latest version.
- Users must strictly adhere to specified conditions. Failures caused by misuse (overload, high temperature, incompatible circuits) are excluded from warranty.
- Contact technical support for customized validation in critical applications (medical devices, industrial control).
- This document is valid until December 31, 2026 Updates will be notified on the official website.
- For further clarification on technical specifications or application solutions, please contact us through official channels: