±18K ESD Protection, RS-485 Transceiver

PRELIMINARY DATASHEET

Datasheet Brierf

■ Description

The **RS485** is 4.5V~5.5V powered transceivers that meet the RS-485 and RS-422 standards for balanced communication. Driver outputs and receiver inputs are protected against ±18 kV ESD strikes without latch-up.

Transmitters in this family deliver exceptional differential output voltages as 2.5V (min) in 5Vcc power supplier, into the RS-485 required 54Ω load, for better noise immunity. These devices have very low bus currents so they present a true "1/8 unit load" to the RS-485 bus. This allows up to 256 transceivers on the network without using repeaters. Receiver(RX) inputs feature a "Full Fail-Safe" design, which ensures a logic high Rx output if Rx inputs are floating, shorted, or on a terminated but undriven bus.

The RS485 is available in an SOP-8L package, and is characterized from –40°C to 125°C.

Device Information (1)

PART NUMBER	**PACKAGE**	BODY SIZE **(NOM)**
RS485	SOP (8)	4.90 mm × 3.91 mm

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

■ Features

- Exceeds Requirements of EIA-485 Standard
- Data Rate: 500kbps
- Support Failsafe function
- Low Power Consumption: <1.0μA Standby Supply Current
- Large Receiver Hysteresis: 60mV
- Up to 256 Nodes on a Bus (1/8 unit load)
- Wide Supply Voltage 4.5V to 5.5V
- SOP8 Package for Backward Compatibility
- Bus-Pin Protection:
- ±18kV HBM protection
- ±12kV IEC61000-4-2 Contact Discharge

■ Applications

- E-Metering Networks
- HVAC Systems
- Video Surveillance Systems
- DMX512-Networks

■ Simplified Schematic

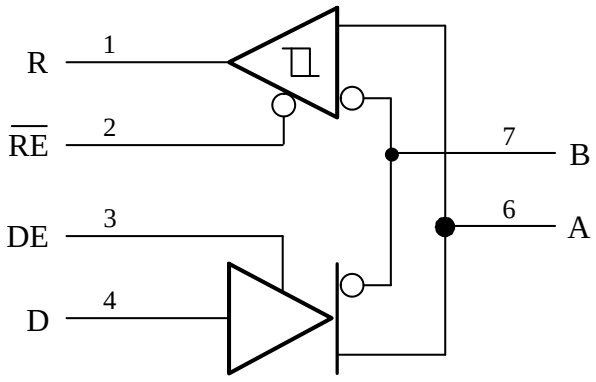
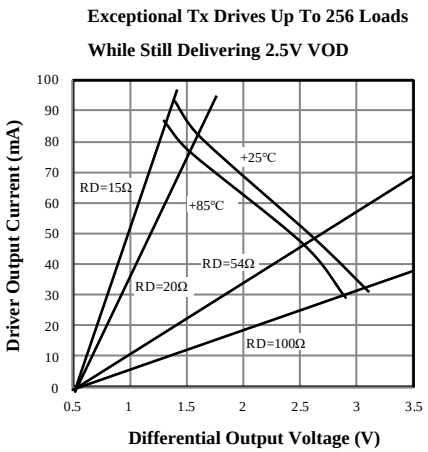
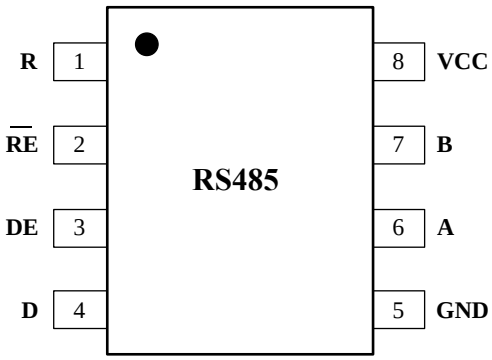


Figure 1. RS485 Simplified schematic



■ Pin Configuration

(TOP VIEW)



SOP-8L

■ Pin Functions

Pin No.	Pin Name	I/O	Description
1	RO	Digital output	Receiver Output.
2	/RE	Digital input	Receiver Output Enable.
3	DE	Digital input	Driver Output Enable.
4	DI	Digital input	Driver Input.
5	GND	Ground	Ground.
6	A	Bus input/output	Noninverting Receiver Input A and Noninverting Driver Output A.
7	B	Bus input/output	Inverting Receiver Input B and Inverted Driver Output B.
8	V_{CC}	Power	Power Supply.

■ Functional Table

DRIVER PIN FUNCTIONS

INPUT	ENABLE	OUTPUTS		DESCRIPTION
D	**DE**	**A**	**B**	
NORMAL MODE				
H	H	H	L	Actively drives bus High
L	H	L	H	Actively drives bus Low
X	L	Z	Z	Driver disabled
X	OPEN	Z	Z	Driver disabled by default
OPEN	H	H	L	Actively drives bus High

RECEIVER PIN FUNCTIONS

DIFFERENTIAL INPUT	ENABLE	OUTPUT	DESCRIPTION
$V_{ID} = V_A - V_B$	**/RE**	**R**	
NORMAL MODE			
$V_{IT+} < V_{ID}$	L	H	Receive valid bus High
$V_{IT-} < V_{ID} < V_{IT+}$	L	?	Indeterminate bus state
$V_{ID} < V_{IT-}$	L	L	Receive valid bus Low
X	H	Z	Receiver disabled
X	OPEN	Z	Receiver disabled
Open, short, idle Bus	L	H	Out of polarity correction time

具有±15kV ESD 保护，256 节点 RS485/RS422 收发器

器件描述

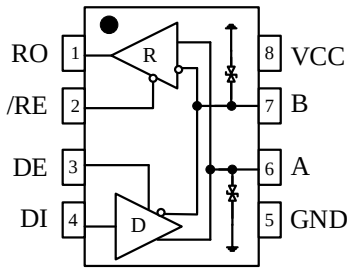
RS485 是一款 5.0V 供电、半双工、低功耗、低摆率，完全满足 TIA/EIA-485 标准要求的 RS-485 收发器。

RS485 包括一个驱动器和一个接收器，两者均可独立使能与关闭。当两者均禁用时，驱动器与接收器均输出高阻态。RS485 具有 1/8 负载，允许 256 个发送器并接在同一通信总线上。使用限压摆率驱动器，能显著减小 EMI 和由于不恰当的终端匹配电缆所引起的反射，32 节点可达到 2.5Mbps 通讯速率。

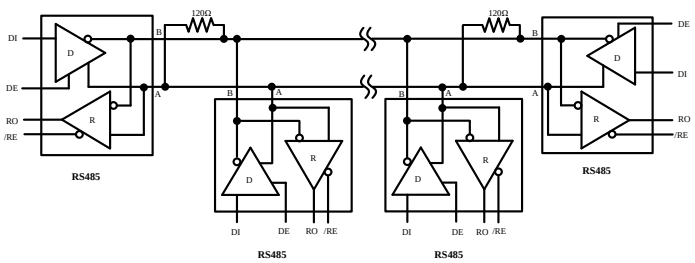
RS485 工作电压范围为 4.75V~5.25V，具备失效安全（fail-safe）、过温保护、限流保护、过压保护，控制端口热插拔输入等功能。

RS485 具有优秀的 ESD 释放能力，HBM 达到±15kV，接触放电，IEC61000-4-2±15kV。

引脚分布



典型 RS-485 半双工通讯网络



电气特点

- 5.0V 电源供电，半双工；
- 1/8 单位负载，允许最多 256 个器件连接到总线；
- 驱动器短路输出保护；
- 过温保护功能；
- 低功耗关断功能；
- /RE、DE 端口允许热插拔输入
- 接收器开路失效保护；
- 具有较强的抗噪能力；
- 集成的瞬变电压抵制功能；
- 32 节点通讯达到 2.5Mbps；
- A、B 端口防护：接触放电±15kV；HBM±15kV

工作原理

RS485 是用于 RS-485/RS-422 通信的半双工高速收发器，包含一个驱动器和接收器。具有失效安全，过压保护、过流保护、过热保护功能。允许/RE，DE 端口热插拔输入。

RS485 具有低摆率驱动器，能够减小 EMI 和由于不恰当的电缆端接所引起的反射，32 节点实现达到 2.5Mbps 的无差错数据传输。

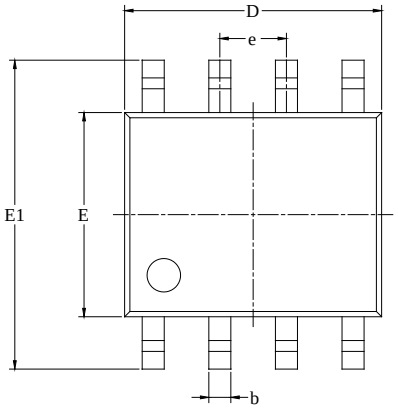
失效安全

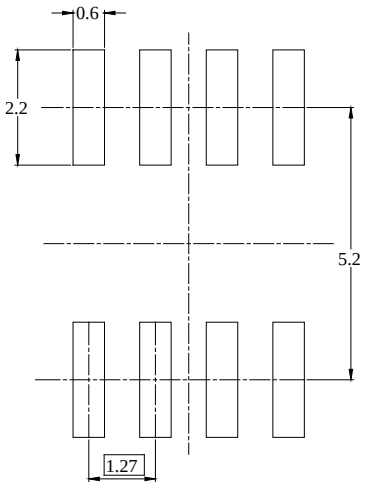
接收器输入短路或开路，或挂接在终端匹配传输线上的所有驱动器均处于禁用状态时（idle），RS485 可确保接收器输出逻辑高电平。这是通过将接收器输入门限分别设置为-50mV 和-200mV 实现的。若差分接收器输入电压(A-B)≥-50mV，RO 为逻辑高电平；若电压(A-B)≤-200mV，RO 为逻辑低电平。当挂接在终端匹配总线上的所有发送器都禁用时，接收器差分输入电压将通过终端电阻拉至 0V。

依据接收器门限，可实现具有 50mV 最小噪声容限的逻辑高电平。-50mV 至-200mV 门限电压是符合±200mV 的 EIA/TIA-485 标准的。

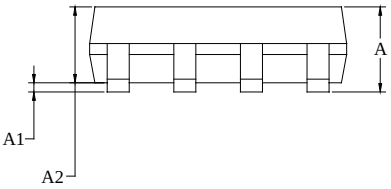
■ Package Outline Dimensions

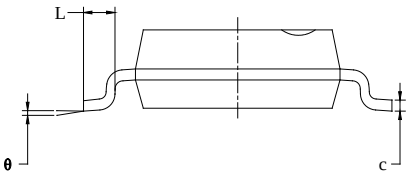
- Type: **SOP-8L**





RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.050 BSC	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

■ Order Information

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
RS485S8	4.5 ~ 5.5V	● Transceivers EIA-485 Standard ● Data rate: 500kbps ● 256 Nodes on a Bus	-40℃ to +85℃	RS485-8L	**485 YY WW LL	4000EA/Reel

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