

±18K ESD Protection, Bus-Polarity Correcting RS-485 Transceiver

PRELIMINARY DATASHEET

Description

Datasheet Briefer

The RS485N is a low-power RS-485 transceiver with automatic bus-polarity correction and transient protection. Upon hot plug-in, the device detects and corrects the bus polarity within the first 100ms of bus idling. On-chip transient protection protects the device against IEC61000 ESD and EFT transients. This device has robust drivers and receivers for demanding industrial applications. The bus pins are robust to electrostatic discharge(ESD) events, with high levels of protection to Human-Body Model (HBM), Air-Gap Discharge, and Contact Discharge specifications. The device combines a differential driver and a differential receiver, which operate together from a single 5.0V power supply. The driver differential outputs and the receiver differential inputs are connected internally to form a bus port suitable for half-duplex (two-wire bus) communication. The device features a wide common-mode voltage range making the device suitable for multi-point applications over long cable runs. The RS485N is available in 8-pin SOP package, and is characterized from -40°C to 125°C.

Features

- Wide Supply Voltage 3.0V or 5.5V
- Exceeds Requirements of EIA-485 Standard
- Bus-Polarity Correction within 100ms meet SGCC spec
- Data Rate: 300bps to 500kbps
- Works with Two Configurations:
 - ▲ Failsafe Resistors Only
 - ▲ Failsafe and Differential Termination Resistors
- Up to 256 Nodes on a Bus (1/8 unit load)
- SOP-8L Package for Backward Compatibility
- Bus-Pin Protection:
 - ▲ ±18kV HBM protection
 - ▲ ±12kV IEC61000-4-2 Contact Discharge
 - ▲ ±15kV IEC61000-4-2 Air Discharge

Applications

- E-Metering Networks
- HVAC Systems
- DMX512-Networks

Device Information (1)

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RS485N	SOP (8)	4.90mm × 3.91mm

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

Typical Application

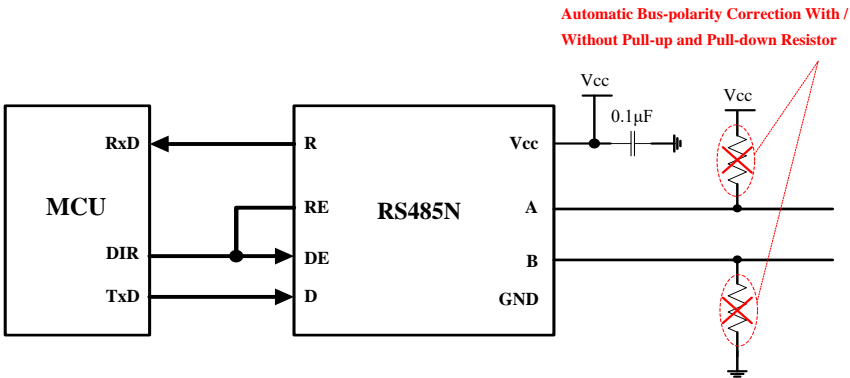
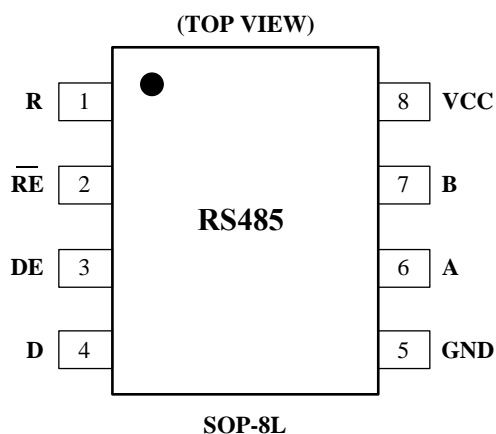


Figure 1. RS485N Typical Application

Pin Configuration



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.

Function 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
POLARITY-CORRECTING MODE ⁽¹⁾				
H	H	L	H	Actively drives bus Low
L	H	H	L	Actively drives bus High
X	L	Z	Z	Driver disabled
X	OPEN	Z	Z	Driver disabled by default
OPEN	H	L	H	Actively drives bus Low

(1) The polarity-correcting mode is entered when $V_{ID} < V_{IT-}$ and $t > t_{FS}$ and $DE = \text{low}$. This state is latched when $/RE$ turns from Low to 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
POLARITY-CORRECTING MODE ⁽²⁾			
V _{IT+} < V _{ID}	L	L	Receive valid bus Low
V _{IT-} < V _{ID} < V _{IT+}	L	?	Indeterminate bus state
V _{ID} < V _{IT-}	L	H	Receive polarity corrected bus High
X	H	Z	Receiver disabled
X	OPEN	Z	Receiver disabled
Open, short, idle Bus	L	H	Out of polarity correction time

(2) The polarity-correcting mode is entered when $V_{ID} < V_{IT-}$ and $t > t_{FS}$ and $DE = \text{low}$. This state is latched when $/RE$ turns from Low to High.

±18kV ESD 保护、具有失效保护功能、限摆率的 RS-485 收发器

产品概述

RS485N 是一款半双工的 RS-485 收发器，内部集成 TVS 保护管，可以更好地抵抗耦合到总线上的瞬变噪声，总线引脚 ESD 保护能力可达±18kV。

RS485N 使用限摆率驱动器，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，并实现高达 500kbps（5V 供电时）的无差错数据传输。

RS485N 内置失效保护电路，保证接收器输入端在开路或短路时，接收器的输出端处于逻辑高电平状态。

RS485N 接收器输入阻抗为 1/8 单位负载，允许多达 256 个收发器挂接在总线上，实现半双工通信。

极限参数

参数	符号	极限值	单位
工作电压	V _{CC}	+7.0	V
控制输出电压	/RE, DE	-0.3 ~ V _{CC} +0.3	V
驱动器输入电压	DI	-0.3 ~ V _{CC} +0.3	V
驱动器输出电压	A, B	+13	V
接收器输入电压	A, B	+13	V
接收器输出电压	RO	-0.3 ~ V _{CC} +0.3	V
工作温度范围	T _A	-40 ~ +85	°C
存储温度范围	T _{STG}	-65 ~ +150	°C

电气特性

- +3.3V 或+5V 工作电压
- 内置失效保护电路
- 最高传输速率：
500kbps（5V 供电时） 250kbps（3.3V 供电时）
- 总线允许挂接多达 256 个收发器
- 总线端口 ESD 保护：
±18kV IEC 61000-4-2，接触放电
- 封装形式 SOP-8L

应用领域

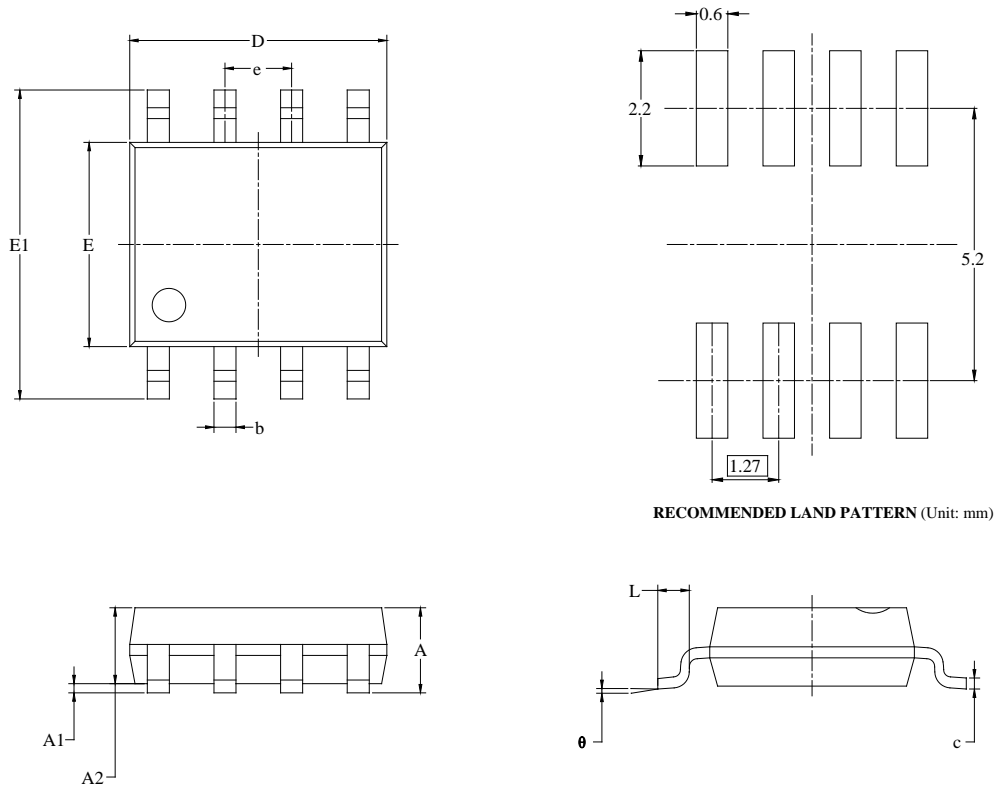
- 智能电表
- 采集终端
- 工业控制
- 安防监控

管脚功能

序号	名称	功能描述
1	RO	接收器输出
2	/RE	接收器输出使能。当/RE 为低电平时 RO 输出有效；当/RE 为高电平时 RO 为高阻态
3	DE	驱动器输出使能。DE 为高电平时驱动器输出有效，DE 为低电平时输出为高阻态
4	DI	驱动器输入
5	GND	接地
6	A	接收器同相输入和驱动器同相输出
7	B	接收器反相输入和驱动器反相输出
8	VCC	电源

Package Outline Dimensions

- Type: SOP-8L



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°

ORDERING INFORMATION

Part Number	Input Voltage	Features	Operating Temperature	Package Type	Top Mark	SPQ
RS485NS8	3.0 ~ 5.5V	<ul style="list-style-type: none"> • Transceivers EIA-485 Standard • Data rate: 300bps to 500kbps • 256 Nodes on a Bus • Works with or without fail-safe biasing resistors 	-40°C to +85°C	RS485-8L	**485N <u>YY WW LL</u>	4000EA/Reel

Note:

- RS485N devices are Pb-free and RoHs compliant.
- The surface prints of our semiconductor devices are subject to change during the production process and do not involve changes in electrical parameters, and we will not separately state the notice.
- If you have any other custom purchase needs, please contact our sales department.
- FOCMCU Inc. reserves the right to amend and legally interpret the electrical parameters of this chip device. (<http://www.fordevices.com>)



ESD SENSITIVITY CAUTION

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.



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