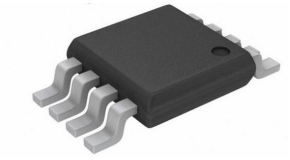
Non-polar RS-485 interface circuit

PRODUCT DESCRIPTION

The MS1585/MS1585M/MS1585D is a RS-485 transceiver with with automatic bus-polarity correction.The bus pins are robust to electrosta discharge (ESD) events, with high levels of protection to Human-Body Model (HBM, ±20kV), Air-Gap Discharge, and Contact Discharge specifications, the Data Rate can transmit up to 10Mbps. The driver differential outputs and the receiver differential inputs are connected internally to form a bus port suitable for half-duplex communication.

SOP8



MSOP8

DIP8

FEATURES

- Bus-Pin Protection:
  - ±20 kV HBM protection
  - ±12 kV IEC61000-4-2 Contact Discharge
  - +4 kV IEC61000-4-4 Fast Transient Burst
- Up to 256 Nodes on a Bus
- Bus-Polarity Correction Within 76 ms
- Data Rate: 300 bps to 10Mbps
- Power range:4.5V-6.0V

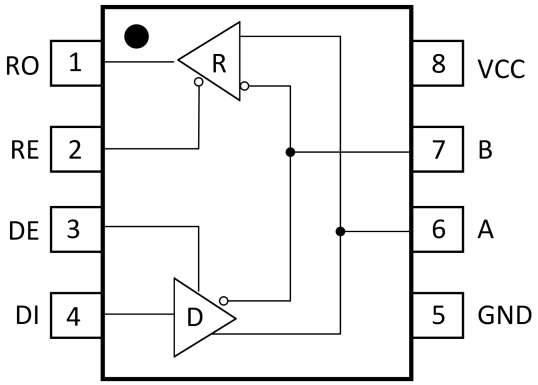
APPLICATIONS

- E-Metering Networks
- Industrial Automation
- HVAC Systems
- Process Control
- Battery-Powered Applications
- Motion Control
- RS-485 interface

PACKAGE/ORDERING INFORMATION

Part Number	Package	Marking
MS1585	SOP8	MS1585
MS1585M	MSOP8	MS1585M
MS1585D	DIP8	MS1585D

PIN CONFIGURATIONS



SOP8/MSOP8/DIP8

Pin	Symbol	Type	Description
1	RO	O	Receive data output
2	RE	I	Receiver enable, active low
3	DE	I	Driver enable, active high
4	DI	I	Driver data input
5	GND	I	ground
6	A	I/O	Driver output or receiver input (complementary to B)
7	B	I/O	Driver output or receiver input (complementary to A)
8	VCC	POWER	supply

ABSOLUTE MAXIMUM RATINGS

Stresses below those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions below those indicated in the operational section of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Parameter	Symbol	Ratings	Unit
Supply voltage	VCC	-0.5～+8	V
Input voltage at control pin	VDE、VRE	-0.5～+8	V
Driver Input Voltage	VDI,IN	-0.5～+8	V
Driver Output Voltage	VA,OUT 、VB,OUT	-0.5～+8	V
Receiver Input Voltage	VA,IN、VB,IN	-7～+12	V
Receiver Output Voltage	VRO	-0.5～+8	V
Continuous Power Dissipation(at 70℃)	PC	470(SOP8)	mW
		725(DIP8)	
Operating Temperature Ranges	TWORK	-40～+120	℃
Storage temperature	TSTORE	-60～+150	℃
Lead Temperature（10s）	TSOLDERING	+260	℃

Electrical Characteristics

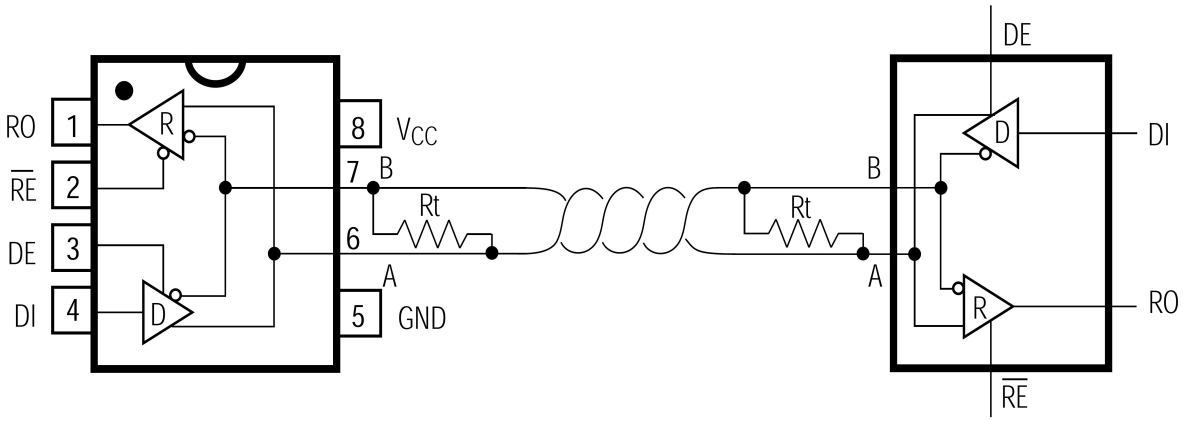
DC ELECTRICAL CHARACTERISTICS (VCC=5.0V, TA = 25℃, unless otherwise noted.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Driver differential-output voltage magnitude	V_{OD}	No load			4	V
		R_L=50Ω	2	2.5		
Change in magnitude of driver differential-output	ΔV_{OD}	R_L=50Ω			0.2	V
driver commonmode output voltage	V_{OC}	R_L=50Ω			3	V
Change in differential driver common-mode output voltage	ΔV_{OC}	R_L=50Ω			0.2	V
Input High Voltage	V_{IH}	DE，RE，DI	2			V
Input Low Voltage	V_{IL}	DE，RE，DI			0.8	V
logic input current	$I_{IN,LOGIC}$	DE，RE，DI			±2	uA
input Current(A, B)	$I_{IN,BUS}$	DE=0V，V_{CC}=5V, V_{IN}=5V		40	90	uA
		DE=0V，V_{CC}=5V, V_{IN}=0V		60	100	
Receiver Differential Threshold Voltage	V_{TH}	-7V≤V_{CM}≤12V	-0.1		0.1	V
Receiver Input Hysteresis	ΔV_{TH}	V_{CM}=0V		25		mV
Receiver Output High Voltage	V_{OH}	I_{OUT}=-1.5mA，V_{ID}=200mV	4.2		4.8	V
Receiver Output Low Voltage	V_{OL}	I_{OUT}=-1.5mA，V_{ID}=200mV		0.1	0.2	V
Three-StateOutput Current at Receiver	I_{OSR}	V_{CC}=5V，0V≤V_{OUT}≤V_{CC}			±1	uA
Receiver Input Resistance	R_{IN}	-7V≤V_{CM}≤12V		100		kΩ
Supply Current	I_{CC}	No load，RE=DE=DI=0V or V_{CC}		0.48	0.9	mA
Driver Short-Circuit Current,	I_{OSD}	V_{OUT} = -7V	25			mA
		V_{OUT} = 12V	25			
Receiver Short-Circuit Current	I_{OSR}	0V≤V_{RO}≤V_{CC}	7			mA
ESD Protection(A,B)	V_{ESD}	Human Body Model		±20		kV

SWITCHING CHARACTERISTICS (VCC=5.0V, TA = 25℃, unless otherwise noted.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Driver Input to Output	t_{PLH}	R_{DIFF}=50Ω，C_{LA}=C_{LB}=100pF	10	35	70	ns
	t_{PHL}		10	50	90	
Driver Input to Output	t_{PDS}	R_{DIFF}=50Ω，C_{LA}=C_{LB}=100pF		30		ns
Driver Rise l Time	t_{TTR}	R_{DIFF}=50Ω，C_{LA}=C_{LB}=100pF		40	70	ns
Driver Fall Time	t_{TTF}	R_{DIFF}=50Ω，C_{LA}=C_{LB}=100pF		40	70	ns
Driver Enable to Output High	t_{PZH}	C_L=100pF		30	70	ns
Driver Enable to Output Low	t_{PZL}	C_L=100pF		30	70	ns
Driver Disable Time from Low	t_{PHZ}	C_L=100pF		90	110	ns
Driver Disable Time from High	t_{PLZ}	C_L=100pF		100	120	ns
Receiver Input to Output	t_{PLH}	C_L=15pF	20	60	200	ns
	t_{PHL}		20	40	200	
Differential Receiver Skew	t_{PDS}	C_L=15pF，$\lvert t_{PLH} - t_{PHL} \rvert$		20		ns
Receiver Enable to Output High	t_{PZH}	C_L=15pF		50	80	ns
Receiver Enable to Output Low	t_{PZL}	C_L=15pF		60	90	ns
Receiver Disable Time from High	t_{PHZ}	C_L=15pF		50	80	ns
Receiver Disable Time from Low	t_{PLZ}	C_L=15pF		60	90	ns
Maximum Data Rate	f_{MAX}				10	Mbps
Bus failsafe time	tC	DE=RE=0， RO=0	44	58	76	ms

APPLICATIONS INFORMATION



PACKAGE OUTLINE DIMENSIONS

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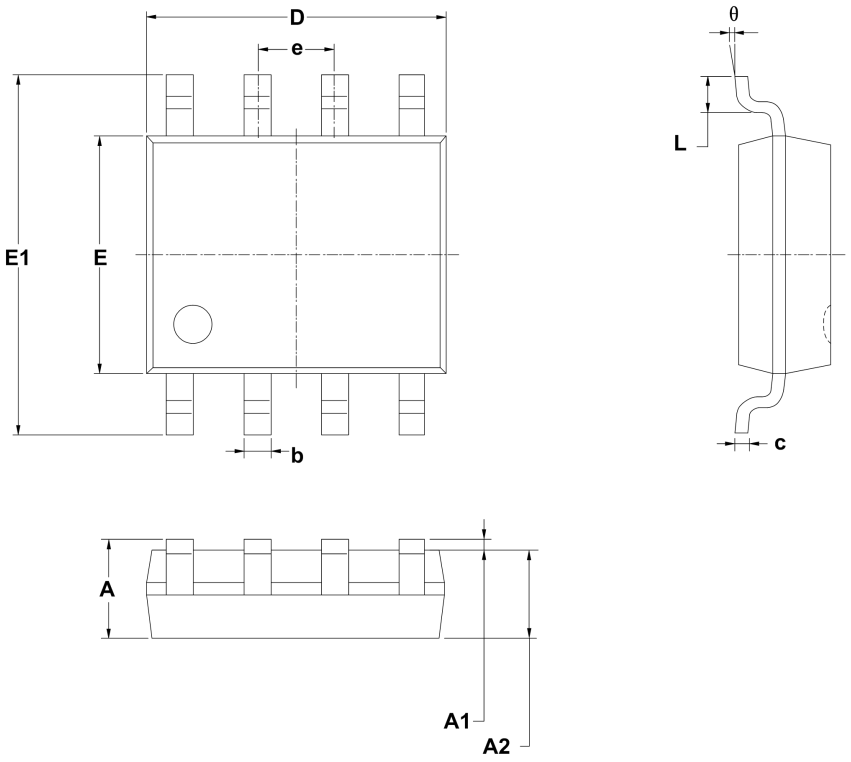
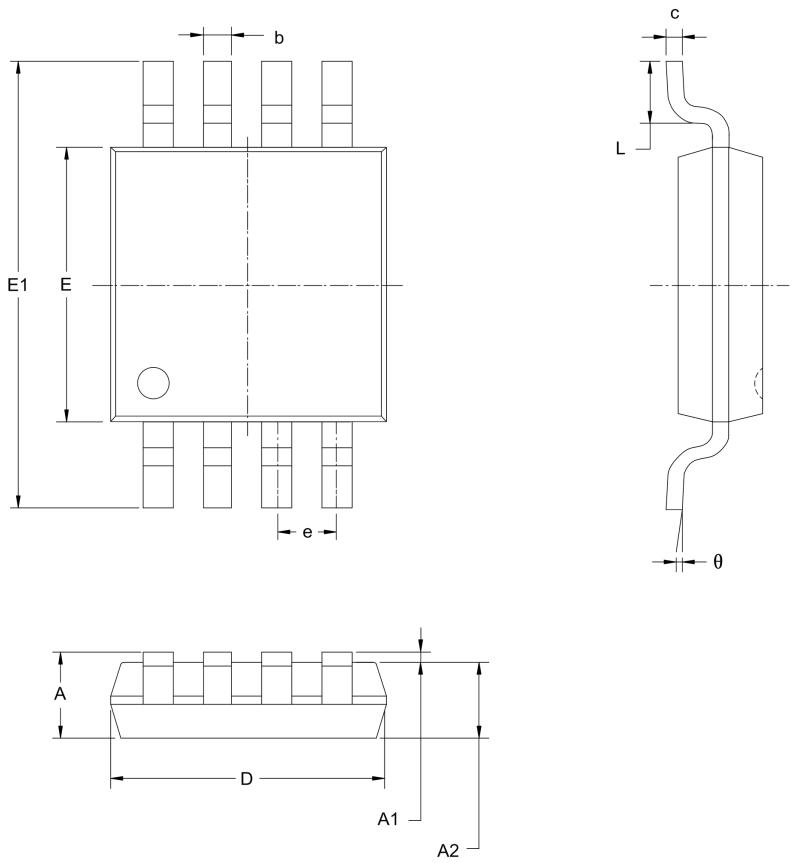


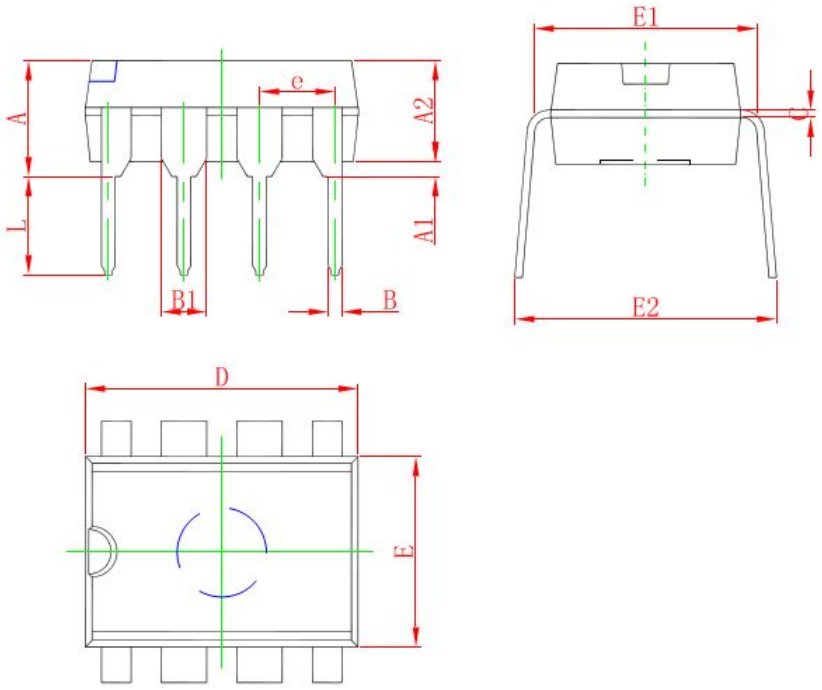
Symbol	Dimensions In Millimeters		Dimensions in Inches	
	MIN	MAX	MIN	MAX
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.27(BSC)		0.050(BSC)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

MSOP8:



Symbol	Dimensions In Millimeters		Dimensions in Inches	
	MIN	MAX	MIN	MAX
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.250	0.380	0.010	0.015
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
e	0.650BSC		0.026BSC	
L	0.400	0.800	0.016	0.031
θ	0º	6º	0º	6º

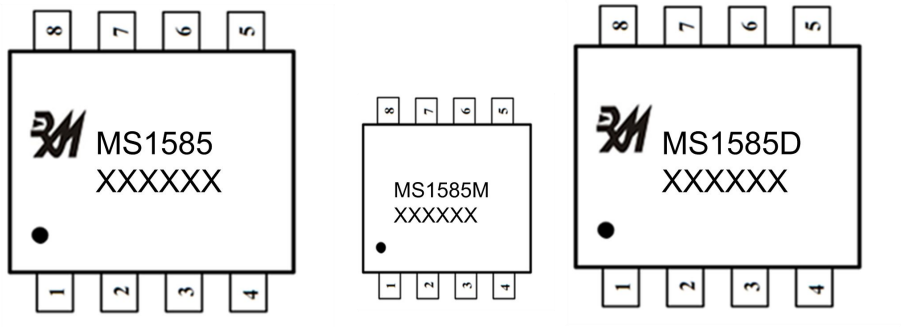
DIP8：



Symbol	Dimensions In Millimeters		Dimensions in Inches	
	MIN	MAX	MIN	MAX
A	3.710	4.310	0.146	0.170
A1	0.510		0.020	
A2	3.200	3.600	0.126	0.142
B	0.380	0.570	0.015	0.022
B1	1.524(BSC)		0.060(BSC)	
C	0.204	0.360	0.008	0.014
D	9.000	9.400	0.354	0.370
E	6.200	6.600	0.244	0.260
E1	7.320	7.920	0.288	0.312
e	2.540(BSC)		0.100(BSC)	
L	3.000	3.600	0.118	0.142
E2	8.400	9.000	0.331	0.354

Marking and Packaging Specifications

1、Marking drawing description



MS1585,MS1585M,MS1585D: product name

XXXXXX: Product code

2、Marking drawing pattern

Laser printing,contents in the middle, font type Arial.

3、Packaging Specifications

Device	Package	piece/reel	reel/box	piece /box	box/carton	piece/carton
MS1585	SOP8	2500	1	2500	8	20000
MS1585M	MSOP8	3000	1	3000	8	24000

Device	Package	piece/tube	tube/box	piece /box	box/carton	piece/carton
MS1585D	DIP8	50	40	2000	10	20000

MOS circuit operation precautions:

Static electricity can be generated in many places. The following precautions can be taken to effectively prevent the damage of MOS circuit caused by electrostatic discharge:

1,The operator shall ground through the anti-static wristband.

2,The equipment shell must be grounded.

3,The tools used in the assembly process must be grounded.

4,must be used conductor packaging or antistatic materials packaging or transportation.

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