

Low Dissipation RS-485 Interface Circuit

PRODUCT DESCRIPTION

The MS2561 is a RS-485 communication interface circuit, which is featured by low dissipation and high ESD capacity. In receiver mode, the dissipation is only 120uA. While in shut-down mode, the dissipation is less than 1uA. The electrostatic discharge (ESD) in A/B terminal can be up to $\pm 25\text{kV}$ and no self-excited phenomena. The maximum transmission data rate can be 250kbp.

FEATURES

- Low Dissipation
Receiver Mode: 120uA(5V)/90uA(3.3V)
Shut-down Mode: 1uA at most
- ESD: A/B $\pm 25\text{kV}$ (HBM)
- Bus Maximum Connection: 128 Nodes
- Data Rate: 250kbps (Max)
- Compatible with other 485 chips
- Three-state Output

APPLICATIONS

- Industrial Automation
- Electricity Meter, Water Meter
- HVAC Systems
- Process Control
- Motion Control
- RS-485 interface

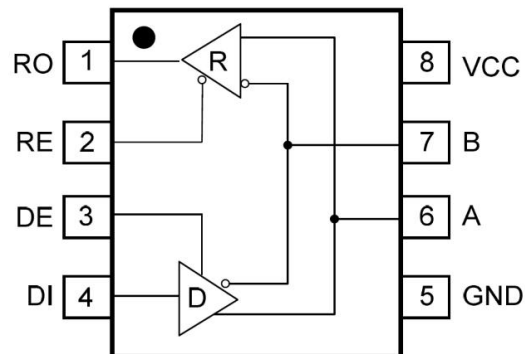
PRODUCT SPECIFICATION

Part Number	Package	Marking
MS2561	SOP8	MS2561



SOP8

PIN CONFIGURATION



PIN DESCRIPTION

Pin	Name	Type	Description
1	RO	O	Receiver 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	Bus Terminal A
7	B	I/O	Bus Terminal B
8	VCC	POWER	Power Supply. RE=VCC, DE=0V in Shut-down Mode

ABSOLUTE MAXIMUM RATINGS

Any exceeding absolute maximum rating application causes permanent damage to device. Because long-time absolute operation state affects device reliability. Absolute ratings just conclude from a series of extreme tests. It doesn't represent chip can operate normally in these extreme conditions.

Parameter	Symbol	Ratings	Unit
Supply Voltage	VCC	-0.5 ~ +6	V
Input Voltage on Control Pin	VDE, VRE	-0.5 ~ +6	V
Driver Input Voltage	VDI, IN	-0.5 ~ +6	V
Driver Output Voltage	VA, OUT; VB, OUT	-0.5 ~ +6	V
Receiver Input Voltage	VA, IN; VB, IN	-7 ~ +10	V
Receiver Output Voltage	VRO	-0.5 ~ +6	V
Storage Temperature Range	TSTORE	-60 ~ +150	°C
Lead Temperature(5s)	TSOLDERING	260	°C
ESD(HBM, Bus A, B to GND)		±25	kV

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VCC	+2.5		+5.5	V
Input Voltage on DI, DE, RE	VDE, VRE	-0.5		VCC	V
Bus Voltage	VA, VB	-7		+12	V
Operating Temperature Range	TWORK	-40		+125	°C

ELECTRICAL CHARACTERISTICS
DC Characteristics

VCC = 5V, TA=+25°C. Unless otherwise noted.

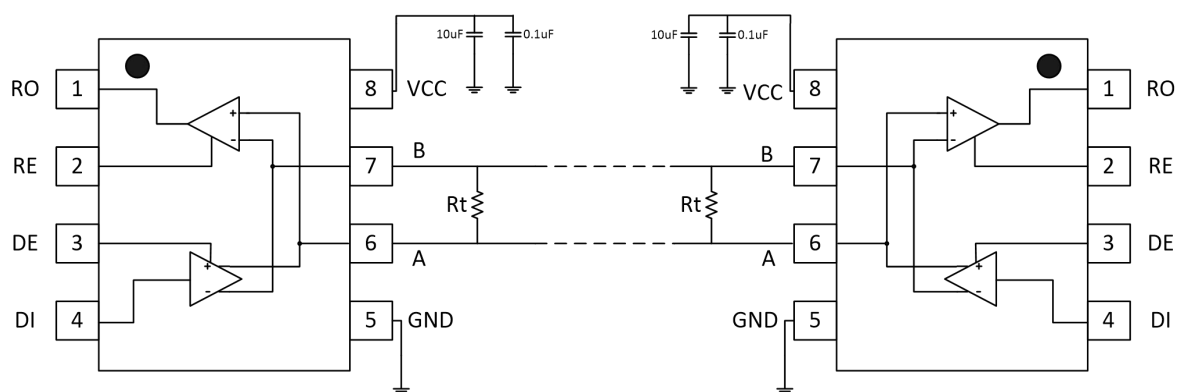
Parameter	Symbol	Condition	Min	Typ	Max	Unit
Differential Output Voltage(No Load)	VOD1			4.7	5	V
Differential Output Voltage(Load)	VOD2	R=50Ω	2	3.6		V
		R=27Ω	1.5	2	5	
Change in Magnitude of Differential Output Voltage	ΔVOD	R=50Ω or 27Ω			0.2	V
Common-mode Output Voltage	VOC	R=50Ω or 27Ω		2.4	3	V
Change in Magnitude of Common-mode Output Voltage	ΔVOC	R=50Ω or 27Ω			0.2	V
Input High Voltage	VIH	DE, DI, RE	2			V
Input Low Voltage	VIL	DE, DI, RE			0.8	V
Input Current	IIN1	DE,DI, RE			±2	uA
Input Current(A, B)	IIN2	VIN=12V			0.25	mA
		VIN=-7V			-0.2	mA
Receiver Differential Threshold Voltage	VTH	-7V≤VCM≤12V	-0.2		0.2	V
Receiver Input Hysteresis	ΔVTH	VCM=0		70		mV
Receiver Output High Voltage	VOH	IO=-4mA, VID=200mV	3.5	4.9		V
Receiver Output Low Voltage	VOL	IO=+4mA, VID=200mV		0.03	0.4	V
Receiver Input Resistance	RIN	-7V≤VCM≤12V		160		kΩ
Three-state Output Current at Receiver	IOZR	0.4V≤VO≤2.4V			±1	uA
No Load Current	ICC	RE=0V, DE=5V		170	400	uA
		RE=0V, DE=0V		120	250	
Shut-down Current	ISHDN	RE=VCC, DE=0V		0.1	10	uA
Driver Short-circuit Current	IOSD2	Driver Mode Short-circuit A, B	35		250	mA
Receiver Short-circuit Current	IOSR	0V ≤ VO ≤ VCC	7		200	mA

Switching Characteristics

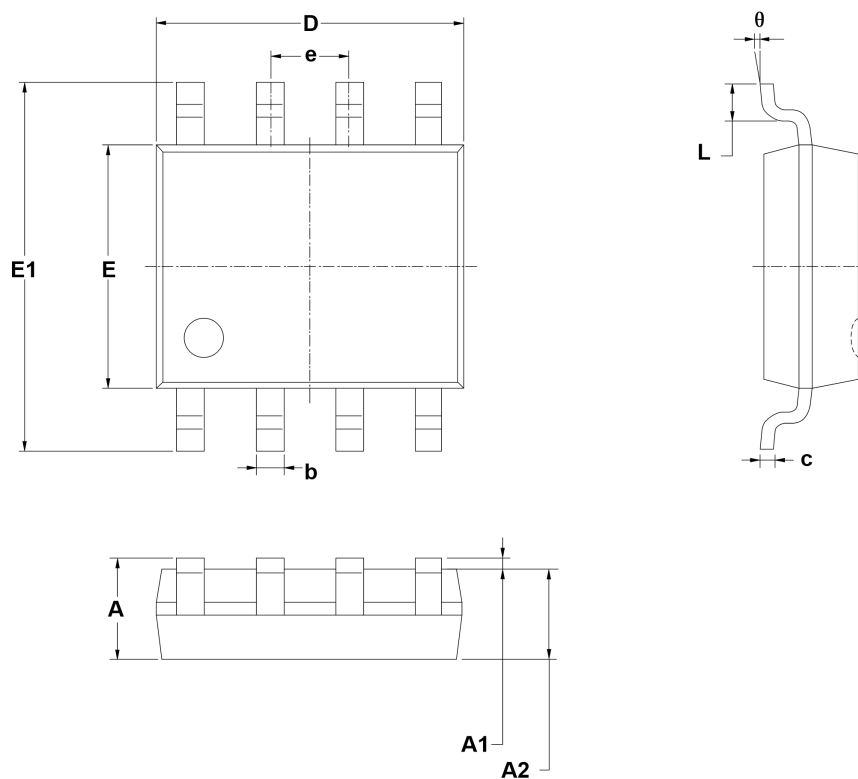
VCC = 5V, TA=+25°C. Unless otherwise noted.

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Driver Input to Output	tPLH	RDIFF= 54Ω, CLA=CLB=100pF	250		2000	ns
	tPHL		250		2000	
Time Difference for Driver Output Level Change	tSKEW	RDIFF= 54Ω, CLA=CLB=100pF			800	ns
Driver Output Rising and Falling Edge	tR, tF	RDIFF= 54Ω, CLA=CLB=100pF	50		2000	ns
Driver Enable to Output High	tZH	CL=100pF	250		2000	ns
Driver Enable to Output Low	tZL	CL=100pF	250		2000	ns
Driver Disable Time from Low	tLZ	CL=15pF	100		3000	ns
Driver Disable Time from High	tHZ	CL=15pF	300		3000	ns
Receiver Input to Output	tPLH	RDIFF= 54Ω, CLA=CLB=100pF	250		2000	ns
	tPHL		250		2000	
Receiver Input Delay Skew	tSKD	RDIFF= 54Ω, CL1=CL2=100pF			100	ns
Receiver Enable to Output Low	tZL	CL=15pF		20	50	ns
Receiver Enable to Output High	tZH	CL=15pF		20	50	ns
Receiver Disable Time from Low	tLZ	CL=15pF		20	50	ns
Receiver Disable Time from High	tHZ	CL=15pF		20	50	ns
Maximum Data Rate	fMAX	tPLH, tPHL<50% Data Period	250			kbps
Shut-down Time	tSHDN		50	200	600	ns
Driver Enable, Shut-down to Output High	tZH(SHDN)	CL=100pF			2000	ns
Driver Enable, Shut-down to Output Low	tZL(SHDN)	CL=100pF			2000	ns
Receiver Enable, Shut-down to Output High	tZH(SHDN)	CL=15pF			2000	ns
Receiver Enable, Shut-down to Output Low	tZL(SHDN)	CL=15pF			2000	ns

TYPICAL APPLICATION DIAGRAM



MS2561 Basic Connection Diagram

PACKAGE OUTLINE DIMENSIONS
SOP8


Symbol	Dimensions In Millimeters		
	Min	Typ	Max
A	--	--	1.750
A1	0.100	--	0.225
A2	1.300	1.400	1.500
b	0.390	--	0.470
c	0.200	--	0.240
D	4.800	4.900	5.000
E	3.800	3.900	4.000
E1	5.800	6.000	6.200
e	1.27(BSC)		
L	0.500	--	0.800
θ	0 °	--	8 °

MARKING and PACKAGING SPECIFICATIONS

1. Marking Drawing Description



Product Name : MS2561

Product Code : XXXXXX

2. Marking Drawing Demand

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

3. Packaging Specifications

Device	Package	Piece/Reel	Reel/Box	Piece /Box	Box/Carton	Piece/Carton
MS2561	SOP8	2500	1	2500	8	20000

STATEMENT

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**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 use conductor packaging or anti-static materials packaging or transportation.



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