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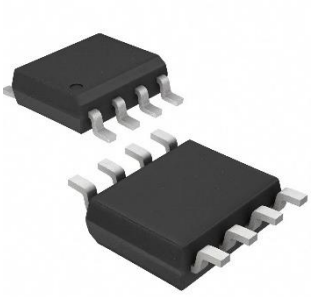
HX13082-S bus transceiver

The HX13082-S is a high-speed RS485/RS-422 transceiver circuit that supports +5V power supply with half-duplex functionality. The interior contains one driver and one receiver, which can achieve a transfer rate of up to 10Mbps. The circuit has ± 15KV ESD protection function, which can effectively prevent the damage of electrostatic discharge to the chip . Both the driver and receiver have enable pins (DE and RE) that drive and receive outputs in a high resistance state when the enable pins are off. In addition, the HX13082-S has a fail-safe circuit that ensures that the output remains correct when the receiver input is open or short-circutioned. The input impedance of the receiver is 1/8 unit load, allowing up to 256 transceivers to be attached to the same bus.



SOP-8

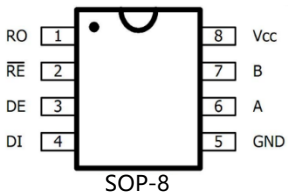
Peculiarity

- Three-state output
- Electrostatic protection (ESD) : A/B ± 15KV, in line with the human body mode (HBM) standard
- The bus allows up to 256 transceivers to be attached
- Strong swing rate limits help achieve error-free data transmission
- SOP8 package.

Apply

- Industrial control
- RS485/RS422 port
- Industrial motor drive
- Ammeter
- Automated heating, ventilation and air conditioning (HVAC) systems

Chip pin description		
ID	Name	Feature
1	RO	Receiver data output
2	$\overline{RE}$	Receiver output enables the low level to be active, and the receive output is high when it is high
3	DE	Send enable end: The high level is valid. When DE is low, the send output is high
4	DI	Driver data entry
5	GND	Ground
6	A	Driver data output receiver data input
7	B	Driver data output receiver data input
8	Vcc	Power source



SOP-8

Drive truth table			
Input	Enable	exportation	
DI	DE	A	B
H	H	H	L
L	H	L	H
X	L	Z	Z

Receiver truth table			
Input			exportation
$\overline{RE}$	DE	A-B	RO
L	X	≥-50mV	H
L	X	≤-200mV	L
L	X	Open a way	H
L	X	short-circuit	H
H	H	X	Z
H	L	X	Z

Dc electrical parameter

Limiting parameter

Symbol	Parameter name	Min	Max	Unit
VCC	Supply voltage		+6.0	V
DE，RE	Control input voltage	-0.5	+6.0	V
DI	Drive input voltage	-0.5	+6.0	V
A,B	Drive output voltage/receive input voltage	-7.0	+12.0	V
RO	Receiving output voltage	-0.3	VCC+0.3	V
TSTG	Storage temperature range	-55	+150	℃
TOP	Operating temperature range	-40	+85	℃
TMOP	Maximum operating temperature range	-55	+125	℃
P_D	SOP-8 (+70℃ or above)		470	mW
T_L	Solder temperature (10 seconds)		+300	℃

Dc characteristics (if not specified Vcc=5V ± 5%, TA=25℃) 2

Argument	Symbol	Test condition		Mi	Typ	Max	Unit
Operating voltage range	Vcc			4.5		5.5	V
Driver differential output (no load)	VOD1	-		-		5	V
Differential driver output (with load)	VOD2	R=54Ω **or** R=27Ω 图 1		1.5		-	V
Differential output voltage of the driver1	ΔV_{OD}			-		0.2	V
Driver common-mode output voltage	VOC			1		3	V
The amplitude of variation of the driver's common mode output voltage1	ΔV_{OC}					0.2	V
Input high voltage	VIH	DE,RE ,DI		2			V
Input undervoltage	VIL	DE,RE ,DI				0.8	V
Input current	IIN1	DE,RE ,DI				±2	uA
Input current (A,B)	IIN2	DE=0V,Vcc=5V	V_{IN}=5V		40	90	uA
			V_{IN}=0V		60	100	
Receiver differential input threshold voltage	VTH	-7V ≤V_{CM}≤+12V		-		-50	mV
Receiver input lag	ΔV_{TH}			200	25		mV
Receiver output high level	VOH	I_O=-8mA		4			V
Receiver output low level	VOL	I_O=8mA				0.4	V
Receiver end three-state (high resistance) output current	IOZR	0.4V ≤V_o≤2.4V				1	uA
Receiver input impedance	RIN	-7V ≤V_{CM}≤+12V		96			kΩ
No load operating current	ICC	no-load RE=DI=GND or Vcc	DE = Vcc		480	600	uA
			DE=GND		450	600	uA
Receiver output short-circuit current	IOSR	0V ≤VRO≤VCC				95	mA
ESD protection		A/B ESD protection between human body modes		±8	±15		kV

Switch characteristics are not specified Vcc=5V±5%, TA=25℃

Argument	Symbol	Test condition	Min	Typ	Max	Unit
Drive input to output	tDPLH	R_{DIFF}=50Ω	250		1000	nS
	tDPHL		250		1000	nS
Driver output offset |tDPLH – tDPHL|	tDSKEW	C_{L1}=C_{L2}=100Pf		-3	±100	nS
Drive rise and fall time	tDR	Figure 3，5	200		750	nS
	tDF		200		752	nS
The drive is enabled to output high	tDZH	C_L 00pF Figure 4,6S2 is closed			2500	nS
The drive is enabled to low output	tDZL	C_L=100pF Figure 4,6S1 is closed			2500	nS
Drive from low to off	tDLZ	C_L=15pF Figure 4,6S1 is closed			100	nS
Drive from high to off	tDHZ	C_L=15pF Figure 4,6S2 is closed			100	nS
Receiver input to output	tRPLH	| V_{ID} | ≥2.0V;V_{ID} Rise and fall time ≤15nS Figure 7,9			200	nS
	tRPHL				200	nS
Differential receiver migration|	tRSKEW			3	±30	nS
The receiver is enabled to low output	tRZL	C_L=100pF Figure 2,8		20	50	nS
The receiver is enabled to the output as high	tRZH	C_L=100pF Figure 2,8		20	50	nS
Receiver from low to off	tRLZ	C_L=100pF Figure 2,8		20	50	nS
Receiver from high to off	tRHZ	C_L=100pF Figure 2,8		20	50	nS

Maximum data speed	fMAX		250	500		Mbps
Communication bit error rate		Communication rate 250kbps			10^{-7}	

Note: 1 VOD and VOC indicate the amount of change in VOD and VOC, respectively, when DI changes.
2 The current is positive when it flows into the device and negative when it flows out of the device.
Unless otherwise specified, all voltages are ground reference points.

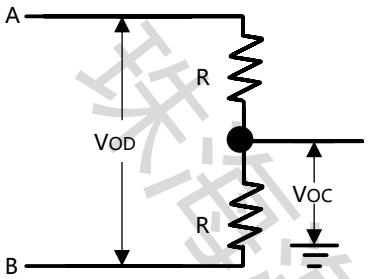


Figure 1 Driver DC characteristic test load

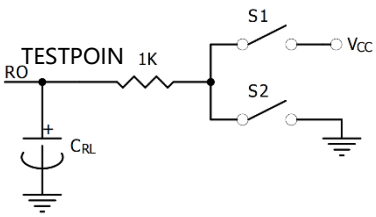


Figure 2 Receiver enable/Off switch characteristic test load

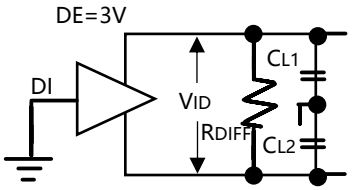


Figure 3. Driver switch characteristic test circuit

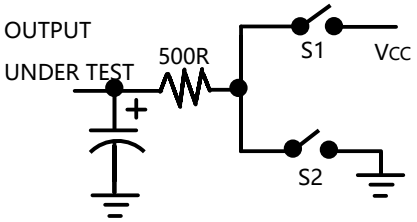


Figure 4 Driver enable/Off switch characteristic test load

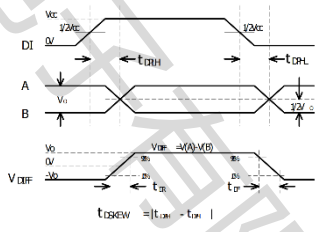


Figure 5 Transmission rate of the drive system in the whole system

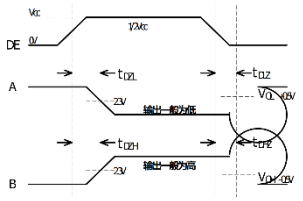
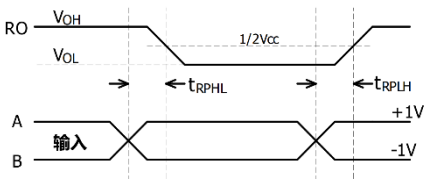


Figure 6 Drive enable/disable sequence



c7 Receiver transmission delay c

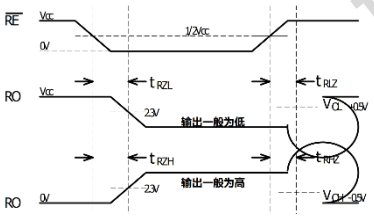


Figure 8 Receiver on/Off sequence

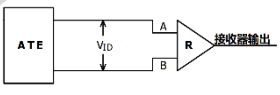
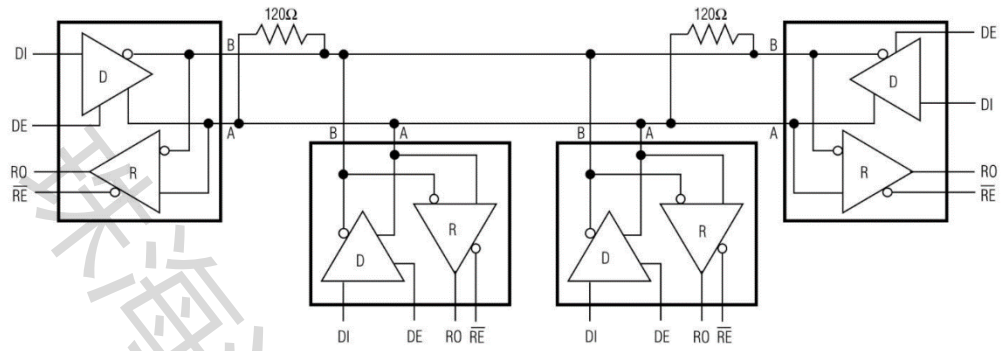


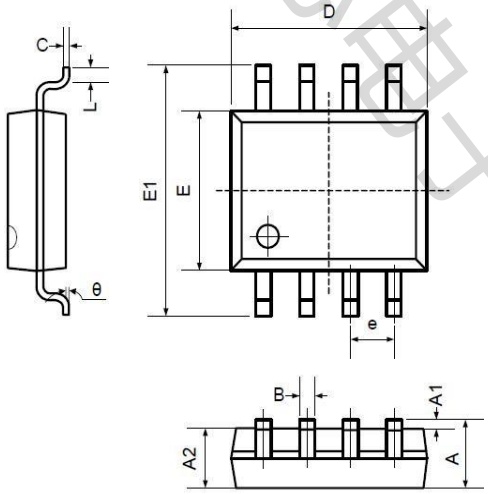
Figure 9 Receiver transmission delay test electrical

Typical application diagram

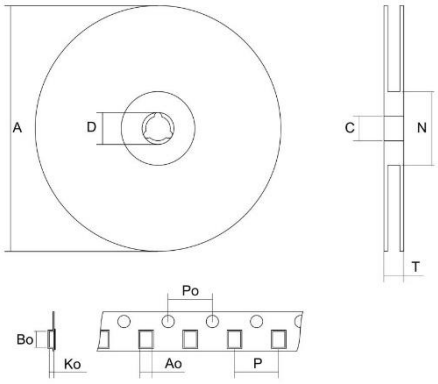


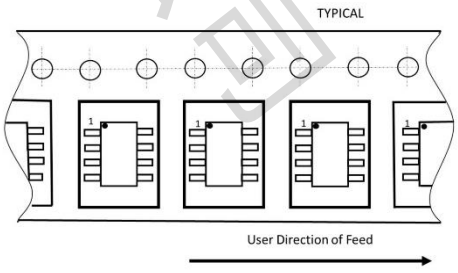
Packaging

SOP8 (Package Outline Dimensions)



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	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°





Packing method	Quantity
Braid	2500PCS/Disk