钛地半导体
Tudi Semiconductor

Product Specification

TUDI-MAX3072

+3.3V, ±15kV ESD-Protected, Fail-Safe, Hot-Swap, RS-485/RS-422 Transceivers

网址 www.sztdbdt.com

用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

FEATURES

● Robust performance protection
- ±15kV human model ESD on I/O pins
- True safe receiver maintains EIA/T485 compatibility
● Enhanced rate limiting for error-free data transmission
● DE and RE hot-pluggable input structure
● Flexible design characteristics
● 256 transceivers allowed on the bus
● Industry standard SO and DIP packages available
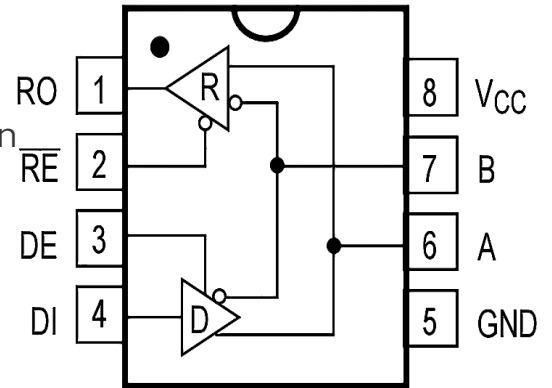● Low current mode in shutdown for energy

Figure 1. Pin Diagram

Description

The MAX3075E is an RS-485/RS-422 transceiver with one driver and one receiver for .3V, ± 15kV ESD. These devices include protection circuitry to guarantee a logic high receiver output when the receiver input is open or shorted. If drivers on the terminated bus are disabled (high impedance), the receiver output is logic high. These devices include plug-and-play functionality to eliminate spurious transitions on the bus power-up or warm insertion.

The MAX3075E features a slew-rate-limited driver that allows for data rates up to 500kbps

The MAX3075E is designed for half-duplex communication.

The devices all feature a 1/8 unit load receiver input impedance allowing for up to256 drivers on a bus.

Applications

Lighting Systems
Industrial Control
Telecom
Security Systems
Instrumentation

Pin description

Pin Number	Pin Name	FUNCTION
1	RO	Receiver Output.When enabled,ifA-B≥-10mV,then RO=high.IfA-B ≤-200 mV,then RO=low
2	/RE	Receiver Output Enable.Alow level enables the RO;a high level places it in a high impedance state.
3	DE	Driver Output Enable.A high level enables the driver differential outputs,Pin A and Pin B;a low level places the driver in a high impedance state.
4	DI	Driver Input.When the driver is enabled,a logic low on DI forces Pin A low and Pin B high;a logic high on DI forces PinA high and Pin B low.
5	GND	Ground Connection (0V).
6	A	No inverting Receiver Input A/Driver Output A
7	B	Inverting Receiver Input B/Driver Output B.
8	VCC	Power Supply

Parameter limit

PARAMETER	Symbol	Value	Unit
CTR Port	/RE,DE,DI	-0.3~VCC+0.3	V
Driver Output Voltage	A、B	-7~13	V
Receiver Output Voltage	RO	-0.3~VCC+0.3	V
Supply Voltage	VCC	+7	V
Continuous Power Dissipation	MSOP8.SOP8.DIP8	830	mW
Soldering Temperature (reflow)		300	℃
Storage Temperature Range		-60~150	℃
Temperature Range		- 40 ~ 125	℃

Stresses beyond those listed under " Parameter limit" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability

Receiver Switching Characteristics						
Parameter	symbol	Test condition	Minimum	Typical case	Maximum	Unit
Propagation delay from receiver input to output, from low to high	tRPLH	CL=15pF See Figures 7 and 8		80	150	ns
The propagation delay from receiver input to output is from high to low	tRPHL			80	150	ns
|tRPLH-tRPHL	tRPDS			7	10	ns
Enable low time out	tRPZL	CL=15pF See Figures 7 and 8		20	50	ns
Enable to output high time	tRPZH	CL=15pF See Figures 7 and 8		20	50	ns
Time from output low to disa- ble	tpRLZ	CL=15pF See Figures 7 and 8		20	45	ns
Time from out-put high to disable	tpRHZ	CL=15pF See Figures 7 and 8		20	45	ns
Off stateEnable to output high time	tRPSH	CL=15pF See Figures 7 and 8		200	1400	ns
Off stateEnable low time out	tRPSL	CL=15pF See Figures 7 and 8		200	1400	ns
Time to turn off	tsHDN	NOTE	80		300	ns

NOTE: When /RE=1 and DE=0, the device will not enter shutdown mode if the duration is less than 80ns;however, it will definitely enter shutdown mode if the duration exceeds 300ns

supply current						
Parameter	symbol	Test condition	Minimum	Typical canse	Maximum	Unit
Supply current	Icc_1	/RE=0V,DE=0V		520	800	uA
	Icc_2	/RE=VCC,DE=VCC		540	700	uA
Turn-off current	IsHDN	/RE=VCC,DE=0V		0.5	10	uA
Drive Switch Characterist-ics						
Parameter	symbol	Test condition	Minimum	Typical case	Maximum	Unit
Driver differen-tial output delay	tDD	RDIFF=60 ,CL_1=CL2=100pF(see Fi-gure 3 and Figure 4)		10	35	ns
Drive differentialoutput transition time	tTD			12	25	ns
Drive propagation delay from low to high	tPLH	RDIFE=27 (see Figure 3 and Figure 4)		8	35	ns
Drive propagationdelay from high to low	tPHL			8	35	ns
|tPLH-tPHL|	tPDS			1	8	ns
Enable to output high	tpZH	RL=110 (see Figure 5 and 6)		20	90	ns
Enable to output low	tpzL			20	90	ns
Input low to disable	tPLZ	RL=110 (see Figure 5 and 6)		20	80	ns
Enable high input	tPHZ			20	80	ns
Enable high outputunder off condition	tDSH	R=110 (see Figure 5 and 6)		500	900	ns
Enable low output under shutdown conditions	tDSL	RL=110 (see Figure 5 and 6)		500	900	ns

WWW.SZTDBDT.COM

DC electrical characteristics of the driver						
Parameter	symbol	Test condition	Minimum	Typical case	Maximum	Unit
Driver differential output (non-loaded)	VoD_1			3.3		V
Drive differential output	VoD_2	graph 2,RL=54	1.5		VCC	V
		graph 2,RL=100	2		VCC	
Variation in the amplitude of the output voltage (NOTE1)	VoD	graph 2,RL=54			0.2	V
Output common mode voltage	Voc	graph 2,RL=54			3	V
Amplitude Variation of Common Mode Output Voltage (NOTE1)	Voc	graph 2,RL=54			0.2	V
High-level input	VH	DE,DI,/RE	2.0			V
Low level input	V	DE,DI,/RE			0.8	V
Logic input current	IN1	DE,DI,/RE	-2		2	uA
Output the current during ashort circuit,with highshort-circuit	$IosD_1$	Short circuit to 0V~12V			250	mA
Output the current during ashort circuit, down to low	$IosD_2$	Short circuit to -7V~0V	-250			mA
Overtemperature shutdown threshold temperature				140		
Overtemperature turm-off hysteresis temp-erature				20		

DC Electrical Characteristics of the Receiver						
Parameter	symbol	Test condition	Minimum	Typical case	Maximum	Unit
Input current(A,B)	IN2	DE=0V,VCC=0 or 3.3V VIn=12V			125	uA
		DE=0V,VCC=0 or 3.3V VIn=-7V	-100			uA
Forward input threshold voltage	VIT+	-7V Vcm 12V			+200	mV
Reverse input threshold voltage	VIT-	-7V Vcm 12V	-200			mV
Input hysteresis voltage	Vhys	-7V Vcm 12V	10	30		mV
High level output voltage	VoH	IoUT=-2.5mA,VID=+200 mV	VCC-1.5			V
Low level output voltage	VoL	IoUT=+2.5mA,VD=-200 mV			0.4	V
Three-state input leakage cur-rent	IozR	0.4V<Vo<2.4V			±1	uA
Input resistance of receiver	RIn	-7V Vcm 12V	96			k
Receiver short circuit curr-ent	IosR	0V Vo VCC	±8		±60	mA

FUNCTION TABLES

		TRANSMITTING				RECEIVING			
CTR	/RE	X	X	0	1	0	0	0	1
	DE	1	1	0	0	X	X	X	X
INPUTS	DI	1	0	X	X				
	A-B					≥-10mV	≤-200mV	Open/shorted	X
OUTPUTS	A	H	L	Z					
	B	L	H	Z					
	RO					H	L	H	Z
X:Don't care;Z:high impedance.									

TEST CIRCUIT
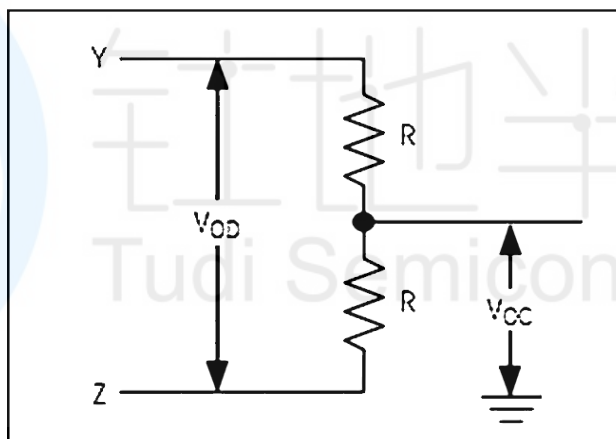
Figure 2 DC test load of the driver

CL includes the probe and stray capacitance (the same applies below).
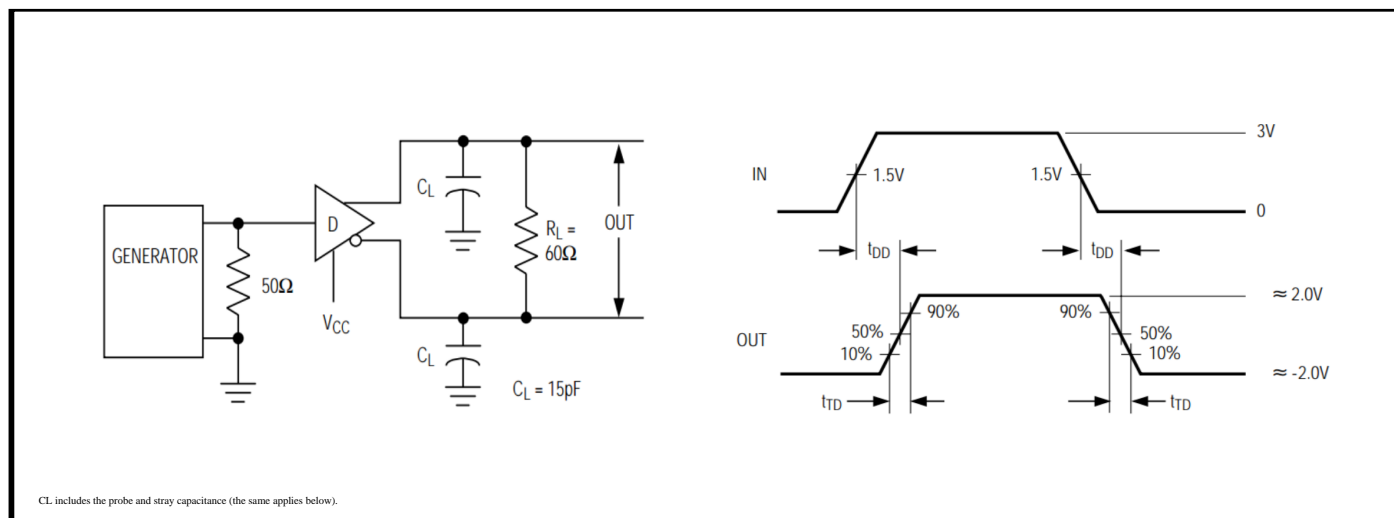
Figure 3 Differential delay and transit time of driver
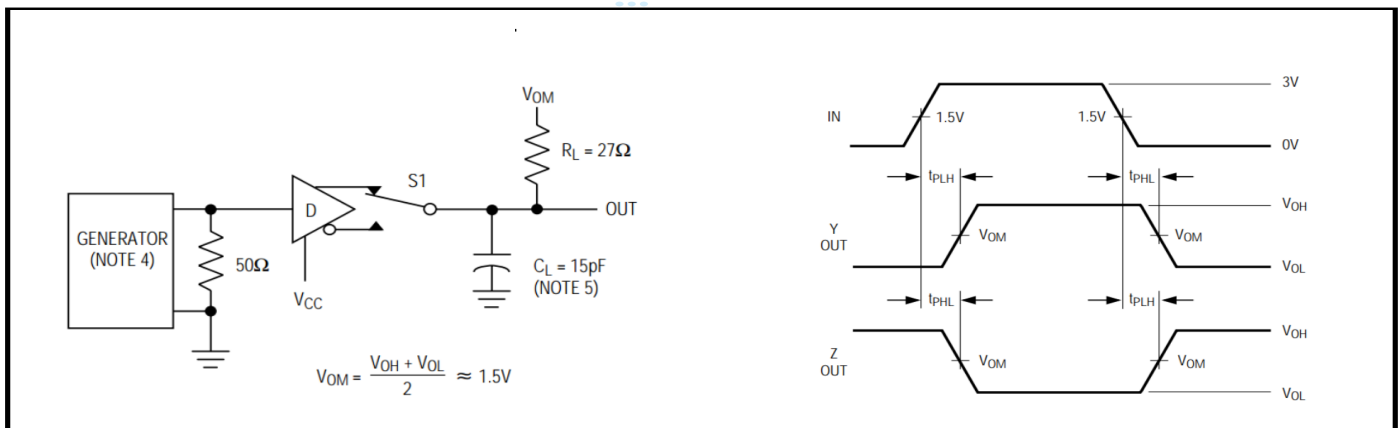
Figure 4 Propagation Delay of Driver
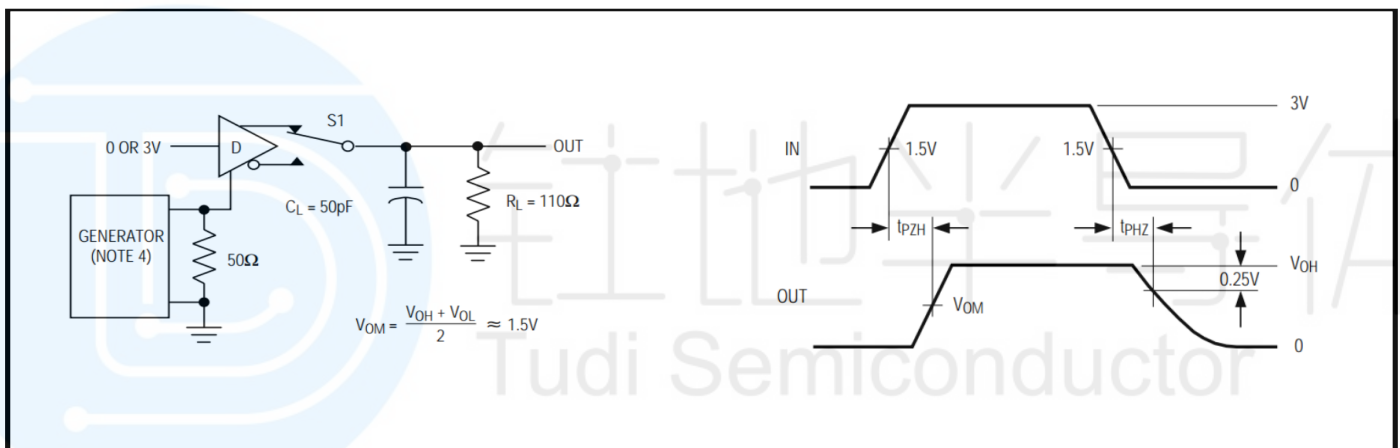
Figure 5 Driver enable and disable time
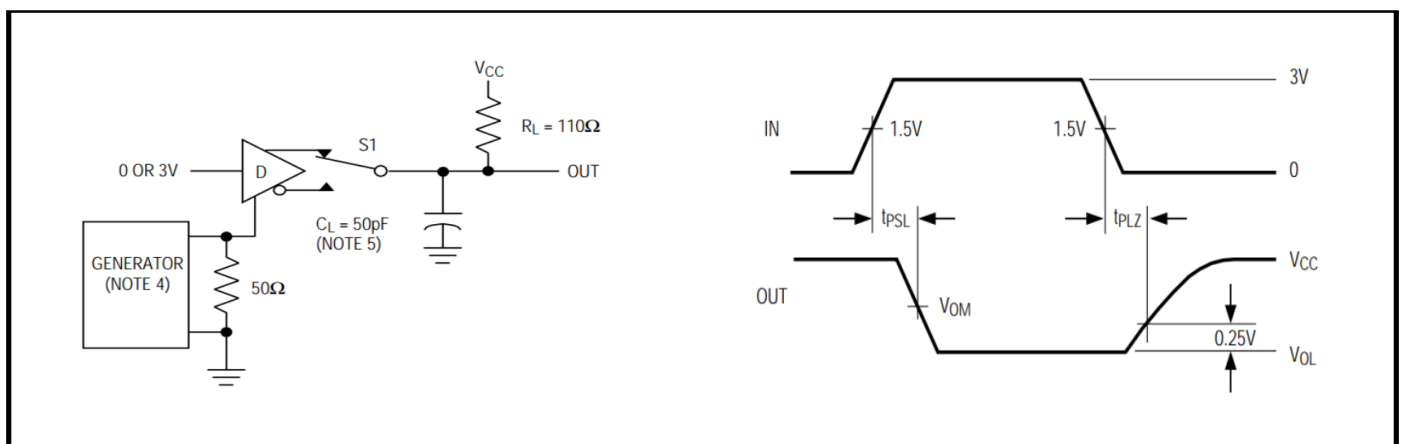
Figure 6 Driver enable and disable time
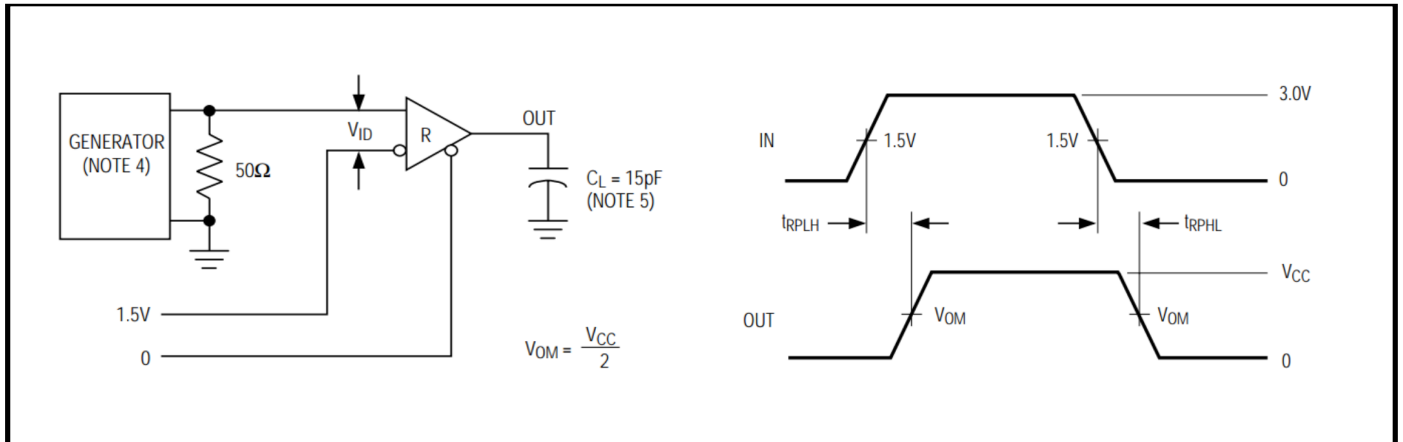
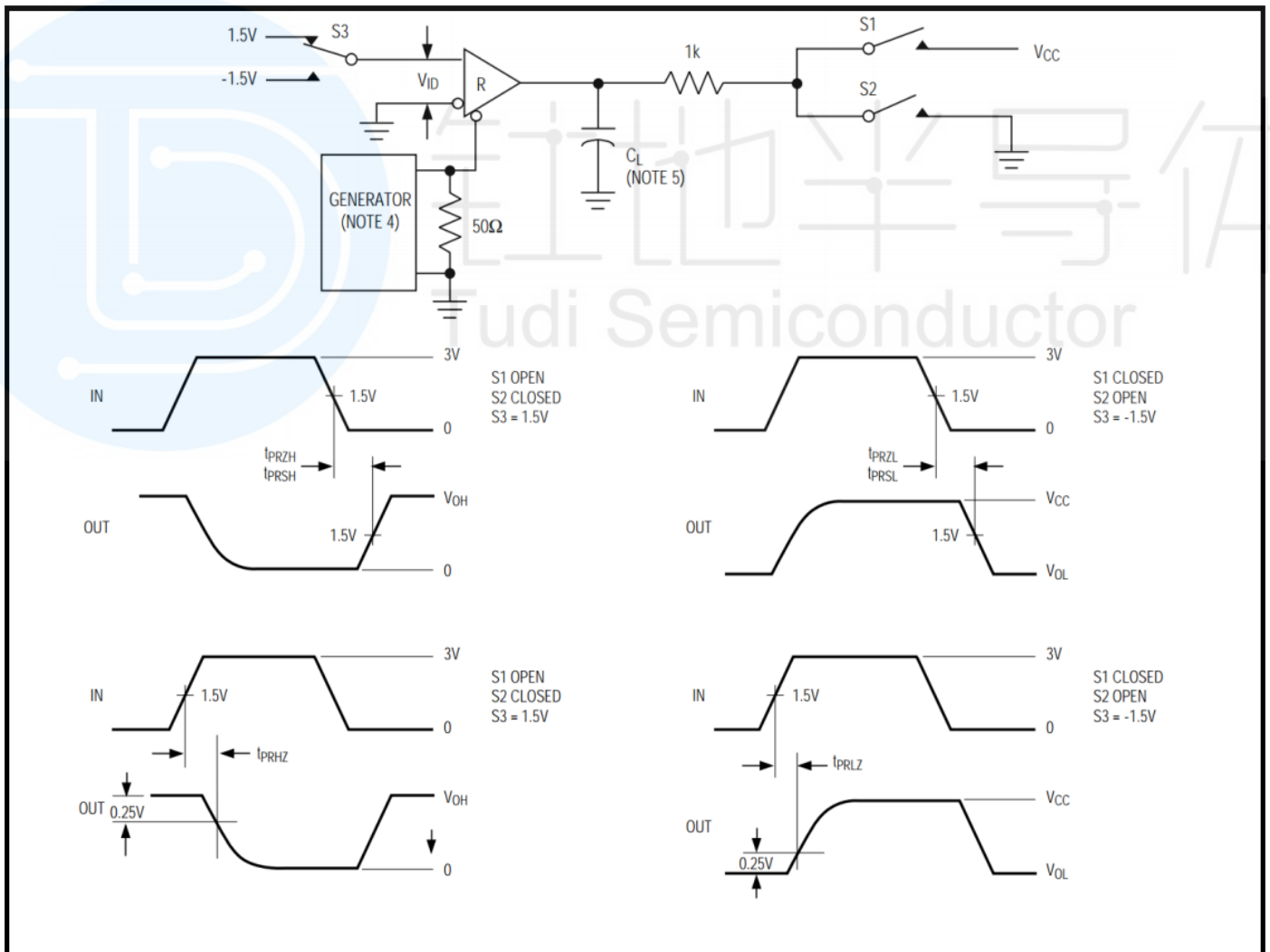Figure 7 Receiver propagation delay test circuit
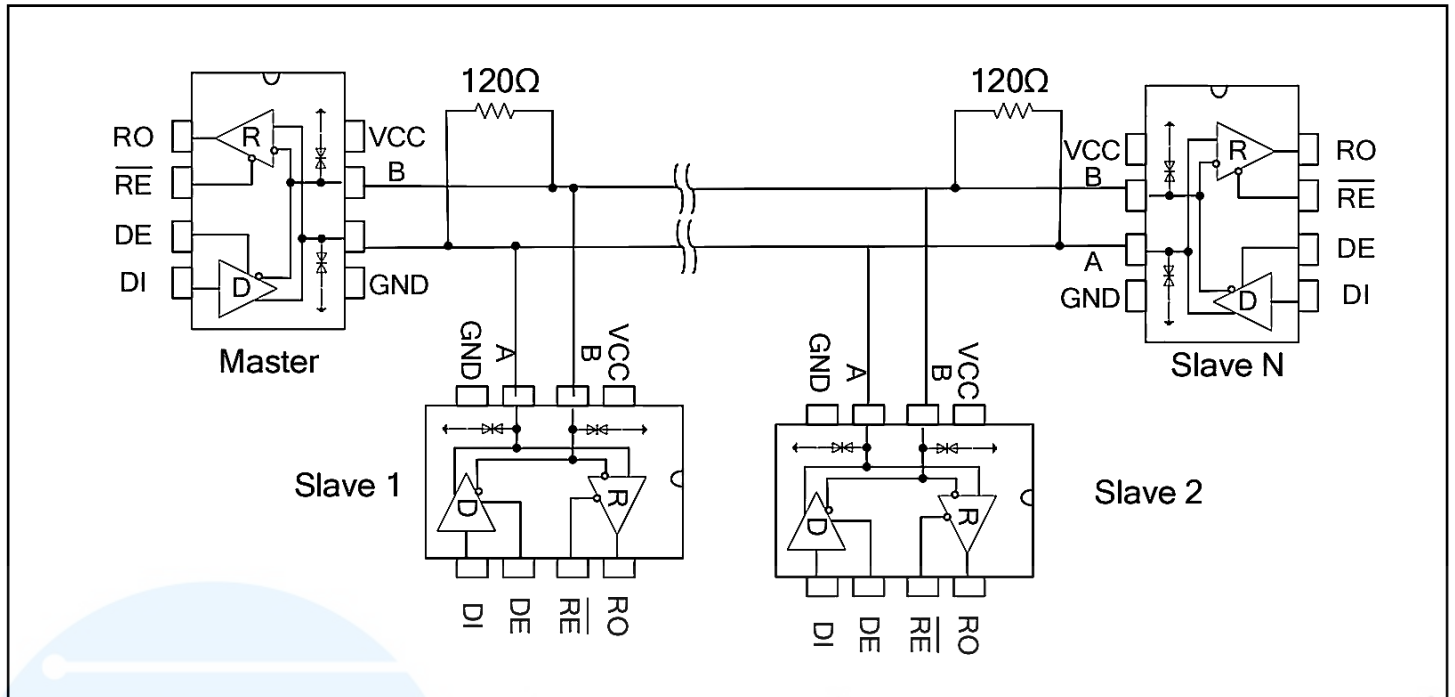

Figure 8 Receiver Enable and Disable Time

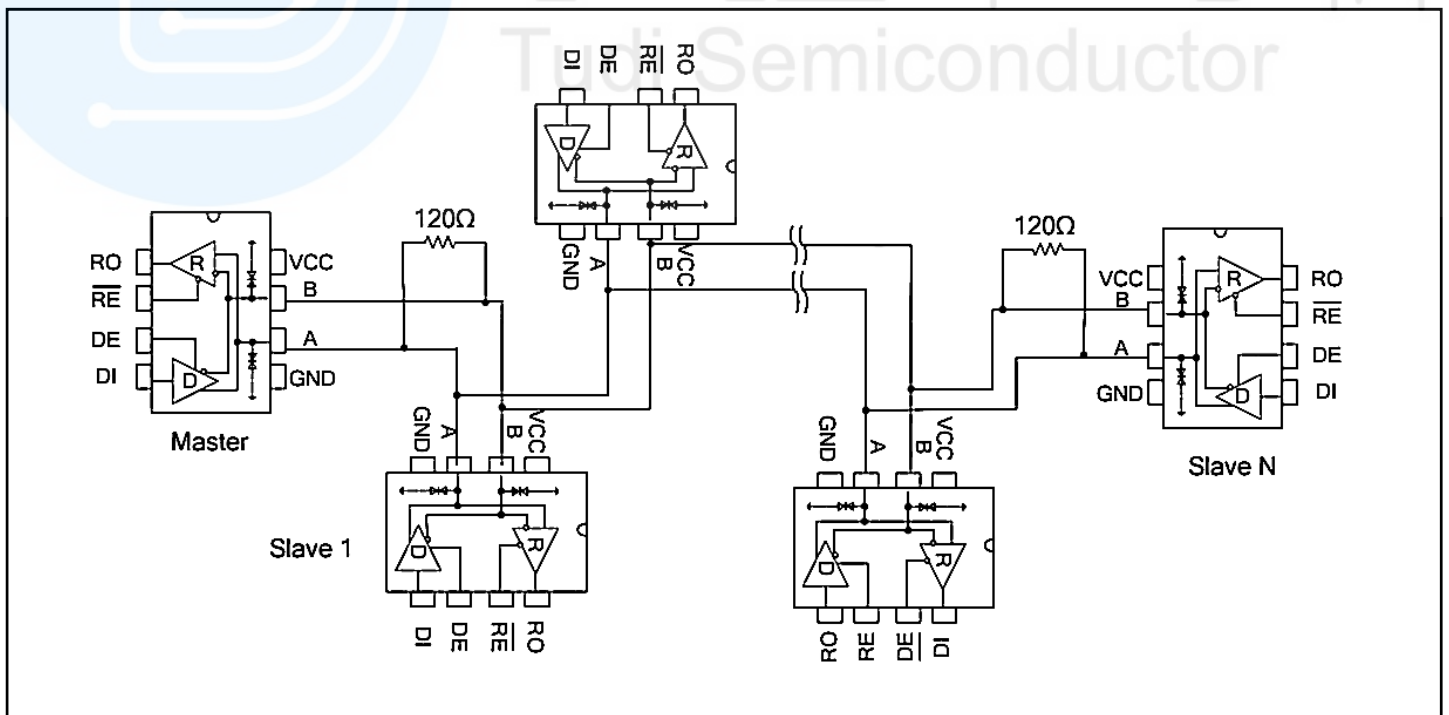Fig11 Backbone cable type RS485 communications network

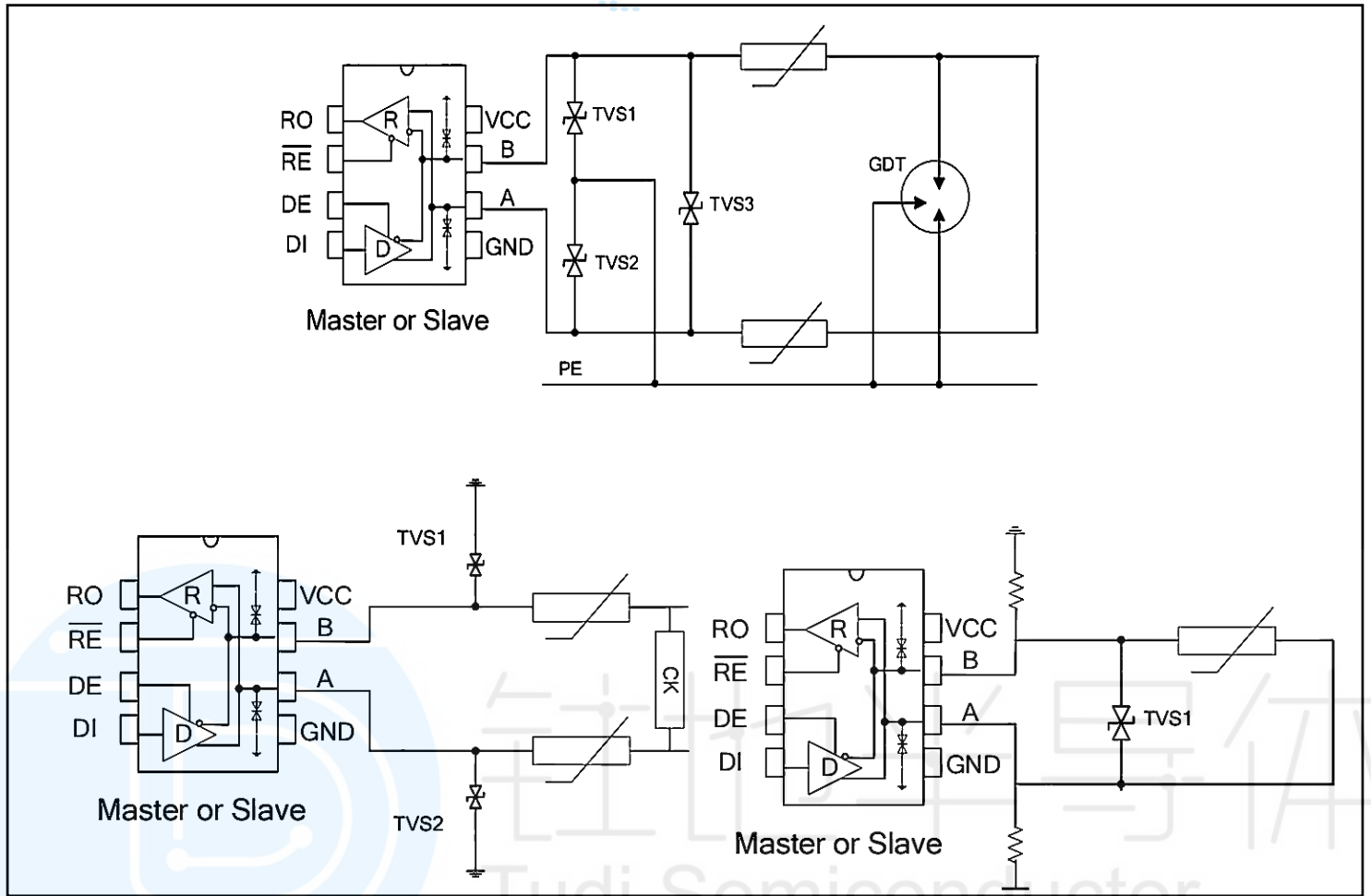Fig12 Daisy chain topology type RS485 communications network

Fig13 RS485 bus ports Protection configuration

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
MAX3075EEPA-TUDI	DIP8	Tube,50A box of 2000	MAX3075EEPA	- 40°C to 85°C
MAX3075EESA-TUDI	SOP8	Tape,Reel,2500	MAX3075EESA	
MAX3075EAPA-TUDI	DIP8	Tube,50A box of 2000	MAX3075EAPA	- 40°C to 125°C
MAX3075EASA-TUDI	SOP8	Tape,Reel,2500	MAX3075EASA	

Package SOP8
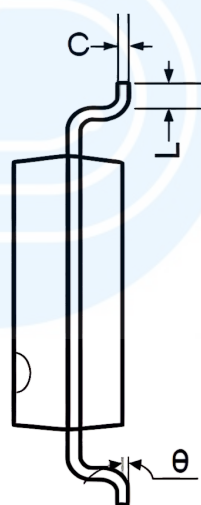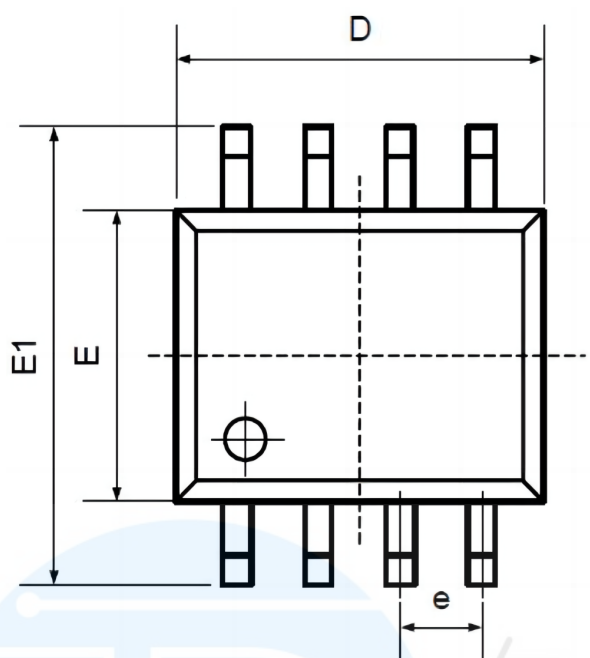
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°
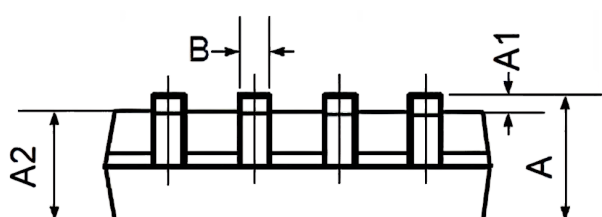
Package DIP8
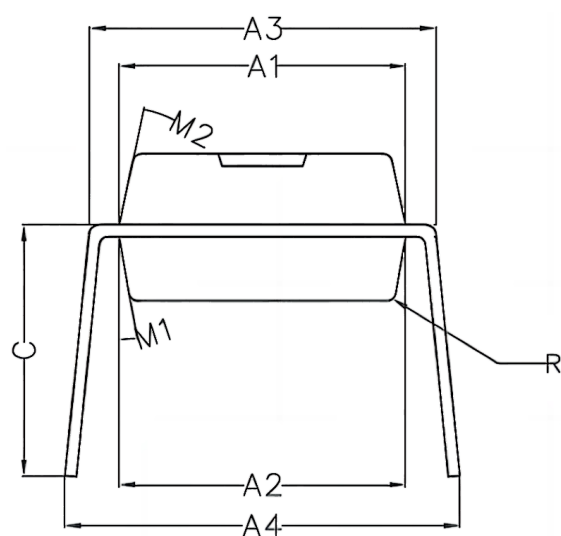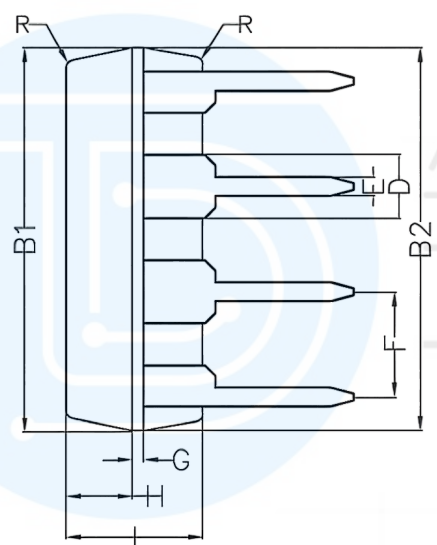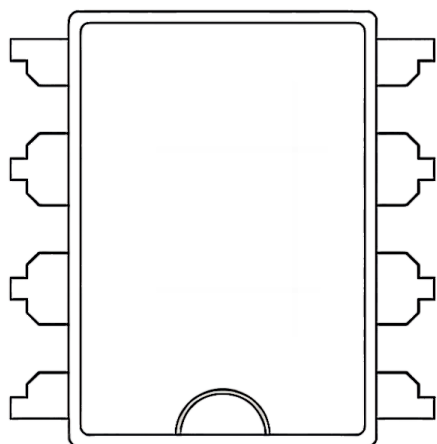
Symbol	Min	Non	Max
A1	6.28	6.33	6.38
A2	6.33	6.38	6.43
A3	7.52	7.62	7.72
A4	7.80	8.40	9.00
B1	9.15	9.20	9.25
B2	9.20	9.25	9.30
C		5.57	
D		1.52	
E	0.43	0.45	0.47
F		2.54	
G		0.25	
H	1.54	1.59	1.64
工	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°

Important statement:

●TUDI Semiconductor reserves the right to modify the product manual without prior notice! Before placing an order, customers need to confirm whether the obtained information is the latest version and verify the completeness of the relevant information.

●Any semi-guide product is subject to failure or malfunction under specified conditions. It is the buyer's responsibility to comply with safety standards when using TUDI Semiconductor products for system design and whole machine manufacturing.And take the appropriate safety measures to avoid the potential in the risk of loss of personal injury or loss of property situation!

●TUDI Semiconductor products have not been licensed for life support, military, and aerospace applications,and therefore TUDI Semiconductor is not responsible for any consequences arising from the use of this product in these areas.

●If any or all TUDI Semiconductor products (including technical data, services) described or contained in this document are subject to any applicable local export control laws and regulations, they may not be exported without an export license from the relevant authorities in accordance with such laws.

●The specifications of any and all TUDI Semiconductor products described or contained in this document specify the performance, characteristics, and functionality of said products in their standalone state, but do not guarantee the performance, characteristics, and functionality of said products installed in Customer's products or equipment. In order to verify symptoms and conditions that cannot be evaluated in a standalone device, the Customer should ultimately evaluate and test the device installed in the Customer's product device.

●TUDI Semiconductor documentation is only allowed to be copied without any alteration of the content and with the relevant authorization.TUDI Semiconductor assumes no responsibility or liability for altered documents.

●TUDI Semiconductor is committed to becoming the preferred semiconductor brand for customers, and TUDI Semiconductor will strive to provide customers with better performance and better quallity products.