



钛迪半导体
Tudi Semiconductor

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Product Specification

TUDI-SP3490

3.3V Low Power Full-Duplex RS-485 Transceivers
with 10Mbps Data Rate

网址 www.sztbdbdt.com 

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**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- Full-duplex RS-485 and RS-422 transceivers
- Operates from a single 3.3V supply
- Interoperable with 5.0V logic
- -7V to 12V common-mode input voltage range
- $\pm 200\text{mV}$ receiver input sensitivity
- Allows up to 32 transceivers on the serial bus

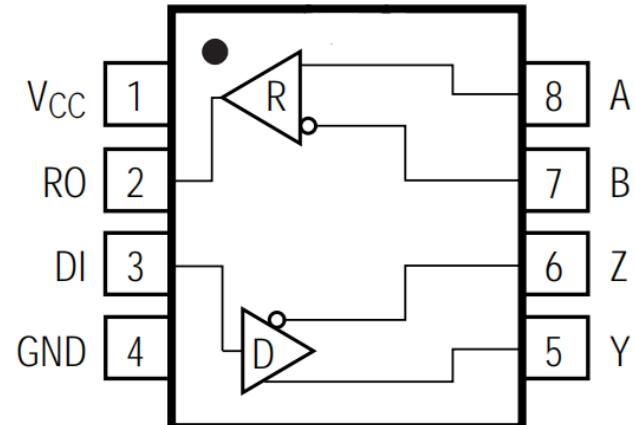


Figure 1. Pin Diagram

Description

The 3490 is a low-power 3.3 transceiver with $\pm 15\text{kV}$ ESD protection for RS-485 and RS-422 communication. Each device contains a driver and a receiver.

The 3490 has a maximum transmission speed of 10 Mbps. All feature enhanced electrostatic discharge (ESD) protection. All driver outputs and receiver inputs are protected by IEC 1000-4-2 air gap discharge ($\pm 1\text{kV}$), IEC 1000-2 contact discharge ($\pm 8\text{kV}$), and human body model ($\pm 15\text{kV}$).

The driver short-circuit current limiting and a thermal shutdown circuit that places the driver output into a high-impedance state. The receiver input features a safe-function that guarantees a high output if both inputs are open.

The 3490 features full-duplex communication capability.

Function table

Send function table					Receiving function table			
input	A-B	$\geq +200\text{mV}$	$\leq -200\text{mV}$	Open/short circuit	input	DI	1	0
output	RO	H	L	H	output	Y	H	L
						Z	L	H



Pin description

Pin number	Pin name	Pin function
1	VCC	Power supply:3.0V VCC 5.5V
2	RO	Receiver output. If A-B is greater than or equal to +200mV, RO output is high level; if A-B is less than or equal to -200mV, RO output is low level.
3	DI	DI driver input. A low level on DI causes the in-phase terminal Y output to be low and the out-of-phase terminal Z output to be high; a high level on DI causes the in-phase terminal Y output to be high and the out-of-phase terminal Z output to be low.
4	GND	Landing
5	Y	Drive in-phase output terminal
6	Z	The inverting output of the driver
7	B	Receiver inverting input
8	A	Receiver in-phase input

Extreme parameter

Parameter	Symbol	Big or small	Unit
Welding temperature range		300	°C
Operating temperature range		-40~125	°C
Storage operating temperature range		-60~150	°C
Continuous power consumption	SOP8	400	mW
	DIP8	700	mW
Supply voltage	VCC	+7	V
Control the port voltage	DI	-0.3~VCC+0.3	V
Bus-side input voltage	A、B	-8~13	V
Receiver output voltage	RO	-0.3~VCC+0.3	V

The maximum limit parameter value is the value beyond which irreversible damage to the device may occur. Under these conditions, the device will not function properly and continuous operation at the maximum allowable rating may affect the reliability of the device. All voltage reference points are ground.



Parameter	Symbol	Test condition	Minimum	Typical case	Maximum	Unit
supply current						
Supply current	Icc	DI=0 or VCC		240	400	μA
ESD protect						
A、B、Y、Z		Mannequin (HBM)		±16		kV
Other ports		Mannequin (HBM)		±6		kV
Drive switch characteristics						
Drive input to output propagation delay(low to high)	tDPLH	RDIFF=54 Ω, CL1=CL2=100pF (see Figure 3 and Figure 4)		15	35	ns
Drive input to output propagation delay(high to low)	tDPHL			15	35	ns
tDPLH-tDPHL	tSKEW1			7	10	ns
Rise time /fall time	tDR,tDF			10	25	ns
Acceptor The propagation delay from input to output is from low to high	tRPLH	See Figure 5 and Figure 6 VID 2.0V; The rise and fall time VID is less than 15ns	20	60	90	ns
Acceptor The propagation delay from input to output is from high to low	tRPHL		20	60	90	ns
tRPLH-tRPHL	tSKEW2			7	10	ns
DC electrical characteristics of the driver						
High-level input	VIH	DI	2.0			V
Low level input	VIL	DI			0.8	V
Logic input current	IIN1	DI	-2		2	μA
Differential output of the driver(non-loaded)	VoD1			5		V
Drive differential output	VoD2	Graph 2,RL=27Ω	1.5		VCC	V
		Graph 2,RL=50Ω	2		VCC	
The current output is short-circuited to high	IosD1	Short circuit to 0V~12V	35		250	mA
The current output is short-circuited to low	IosD2	Short circuit to -7V~0V	-250		-35	mA
Change in the amplitude of the output voltage (NOTE1)	△VoD	Graph 2,RL=27Ω			0.2	V
Output common mode voltage	Voc	Graph 2,RL=27Ω			3	V
Change in the amplitude of the common-mode output voltage(NOTE1)	△Voc	Graph 2,RL=27Ω			0.2	V



Parameter	Symbol	Test condition	Minimum	Typical case	Maximum	Unit
DC electrical characteristics of the receiver						
Positive input threshold voltage	VIT+	$-7V \leq V_{cM} \leq 12V$			+200	mV
Reverse input threshold voltage	VIT-	$7V \leq V_{cM} \leq 12V$	-200			mV
Enter the hysteresis voltage	V _{hys}	$-7V \leq V_{cM} \leq 12V$	10	30		mV
Input current(A,B)	I _{IN2}	V _{CC} =0 or 3.3V V _{IN} =12 V			125	μA
		V _{CC} =0 or 3.3V V _{IN} =-7 V	-100			μA
Three state input leakage current	I _{oZ} R	$0.4V < V_o < 2.4V$			±1	μA
Receiver input resistance	R _{IN}	$-7V \leq V_{cM} \leq 12V$	96			kΩ
Receiver short circuit current	I _{oS} R	$0V \leq V_o \leq V_{CC}$	±7		±95	mA
High level output voltage	V _{oH}	I _{oUT} =-4mA, V _{ID} =+200 mV	V _{CC} -1.5			V
Low level output voltage	V _{oL}	I _{oUT} =+4mA, V _{ID} =-200 mV			0.4	V

(If not otherwise specified, V_{CC}=3.3V±10%, Temp=TMIN~TMAX, typical value is V_{CC}=+3.3 V, Temp = 25)

Test Circuit

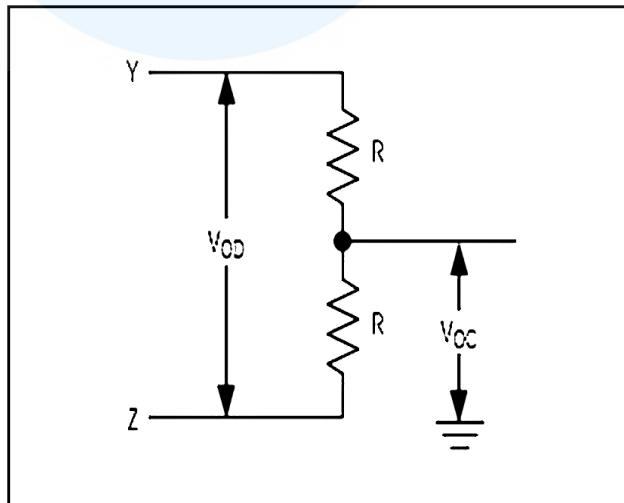


Figure 2 DC test load of the driver

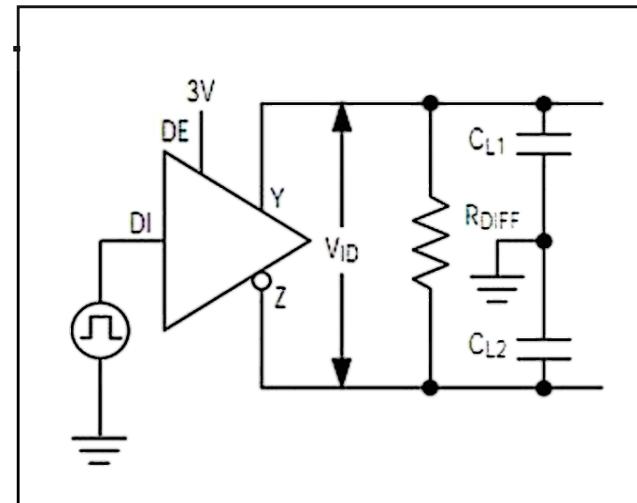


Figure 3 Driver timing test circuit

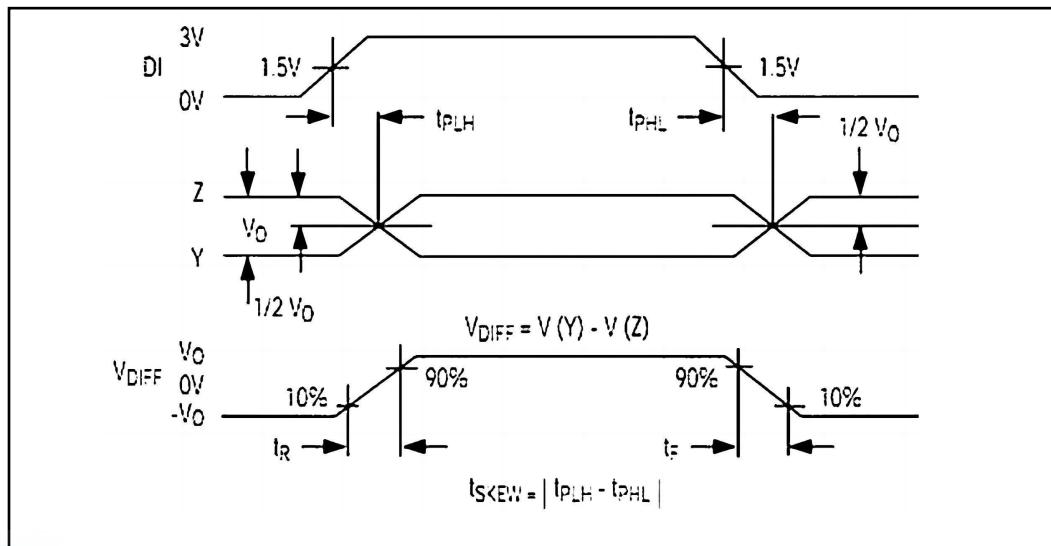


Figure 4 Driver propagation delay

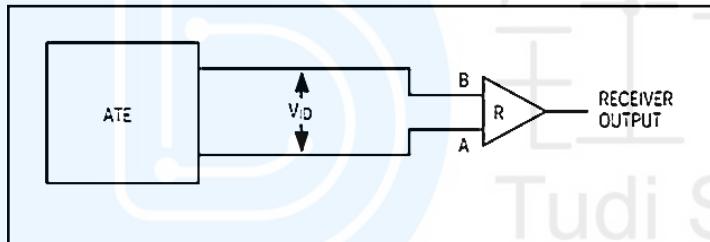


Figure 5 Receiver propagation delay test circuit

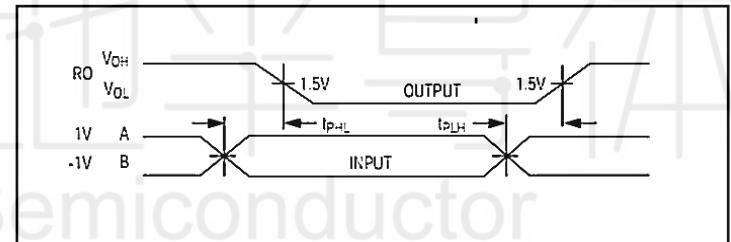


Figure 6 Receiver propagation delay timing

Additional description

resume

The 3490 is a full-duplex, high-speed transceiver for RS-485/RS-422 communication, incorporating driver and a receiver. It features fail-safe, overvoltage protection, and overcurrent protection. The 3490 achieves error-free data transmission up to 10Mbps.

The bus is connected to 32 transceivers

The input impedance of the standard RS485 receiver is 12k (1 unit load), and the standard driver can drive up to 32 unit loads. The receiver of the 3490 transceiver has an input impedance of 1/8 unit load (96k), allowing up 32 transceivers to be connected in parallel on the same communication bus. These devices can be combined arbitrarily, or combined with other RS485 transceivers as long as the total load does not exceed 32 unit loads, they can be connected to the same bus.

Drive output protection

Protection against excessive output current and dissipation by fault or bus contention is provided by overcurrent and overvoltage protection mechanisms, with fast short-circuit protection throughout the common-mode voltage range (see Typical Operating Characteristics).

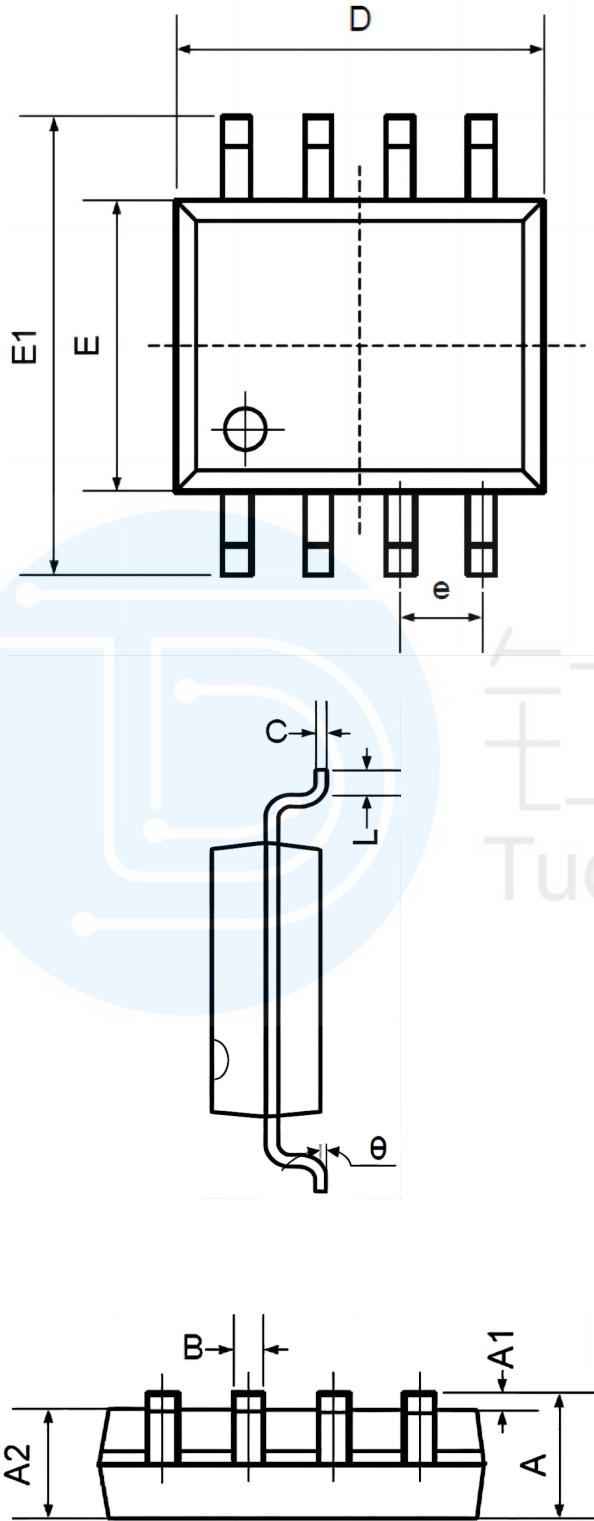


Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
SP3490CN-L/TR-TUDI	SOP8	Tape,Reel,2500	SP3490C	0°C to 70°C
SP3490CP-L-TUDI	DIP8	Tube,50,A box of 2000	SP3490CP	
SP3490EN-L/TR-TUDI	SOP8	Tape,Reel,2500	SP3490E	- 40°C to 85°C
SP3490EP-L-TUDI	DIP8	Tube,50,A box of 2000	SP3490EP	



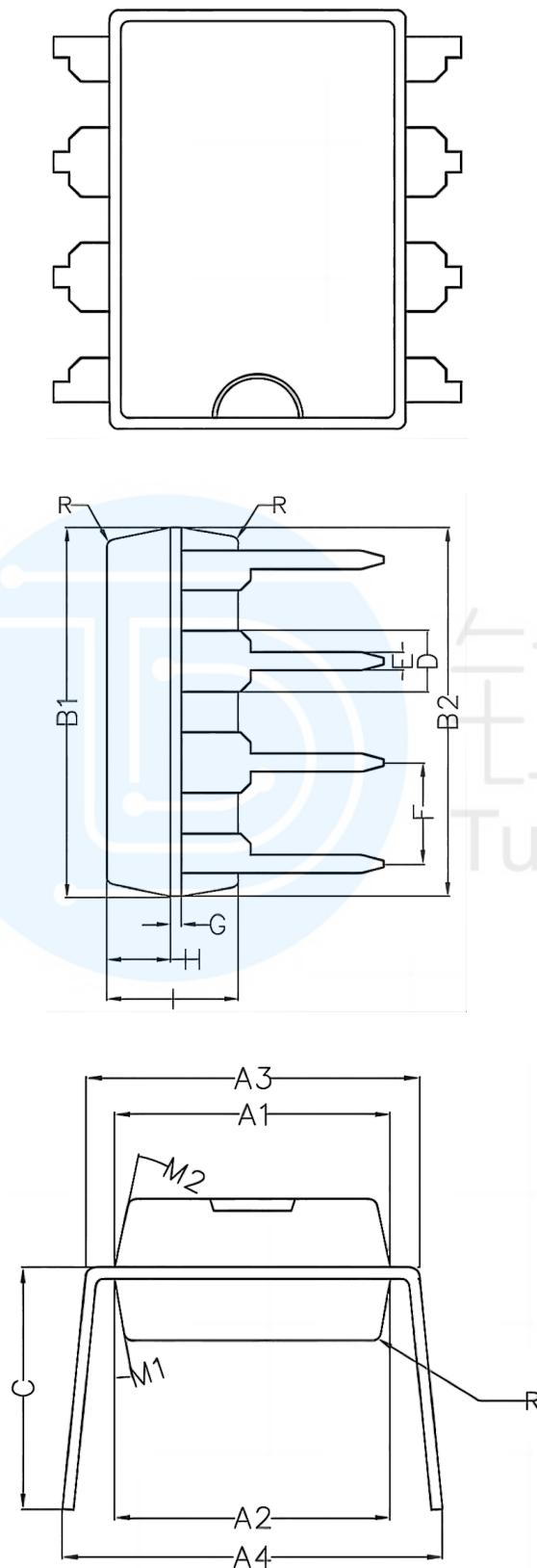
Package SOP8



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°



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