



钜地半导体  
Tudi Semiconductor

## Product Specification

TUDI-LTC2851

3.3V 15Mbps RS485/RS422 Transceivers

网址 [www.sztdbdt.com](http://www.sztdbdt.com)

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## Features

- 3.3V Supply Voltage
- Maximum data rate 15Mbps
- Up to  $\pm 15\text{kV}$  HBM damage or lockup
- Input impedance supports 256 nodes
- Operating temperature up to  $125^{\circ}\text{C}$
- Fault-safe receiver operation guaranteed throughout the common mode range
- Current limiting driver thermal shutdown
- Delayed micro power shutdown
- No fail power-on/off driver outputs
- Low operating current
- Compatible with TIA/EIA-485- specifications

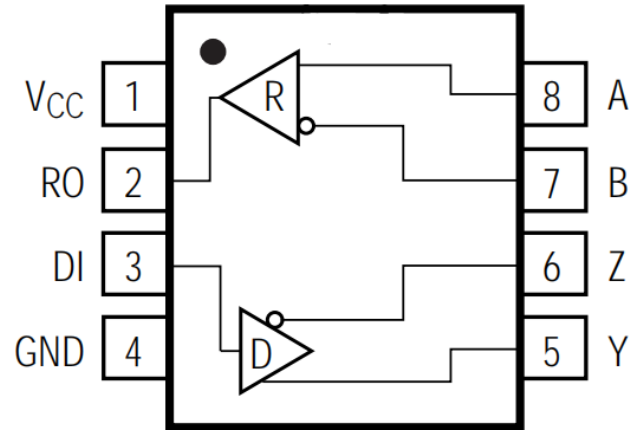


Figure 1. Pin Diagram

## Description

The LTC2851 is a low power, 15Mbps RS85/RS422 transceiver, operating from 3.3V supply. The receiver supports one-eighth unit load, allowing a maximum of 256 nodes on each bus, and has a fail-safe feature guarantees a high output state under floating or shorted input conditions. When disabled or when power is removed, the driver maintains a high output impedance over the entire common mode range. Excessive power dissipation due to bus contention or fault is prevented by current limiting all outputs and a thermal shutdown. Enhanced ESD protection allows these parts to withstand up to  $\pm 1\text{kV}$  (Human Model) of voltage on the transceiver interface pins without triggering or damaging.

## Applications

- Low Power RS485/RS422 Transceiver
- Level Translator
- Backplane Transceiver



## 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 vol-tage	A、B	-8~13	V
Receiver output vo-ltage	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~oV	-250		-35	mA
Change in the amplitude of the output voltage (NOTE1)	ΔVoD	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)	ΔVoc	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	Vhys	$-7V \leq V_{CM} \leq 12V$	10	30		mV
Input current(A,B)	IIN2	VCC=0 or 3.3V VIN=12 V			125	$\mu A$
		VCC=0 or 3.3V VIN = -7 V	-100			$\mu A$
Three state input leakage current	IozR	$0.4V < V_o < 2.4V$			$\pm 1$	$\mu A$
Receiver input resistance	RIN	$-7V \leq V_{CM} \leq 12V$	96			k $\Omega$
Receiver short circuit current	IosR	$0V \leq V_o \leq V_{CC}$	$\pm 7$		$\pm 95$	mA
High level output voltage	VoH	IoUT=-4mA, VID=+200 mV	VCC-1.5			V
Low level output voltage	VoL	IoUT=+4mA, VID=-200 mV			0.4	V

(If not otherwise specified, VCC=3.3V $\pm$ 10%, Temp=TMIN~TMAX, typical value is VCC=+3.3V, Temp = 25 )

## Test Circuit

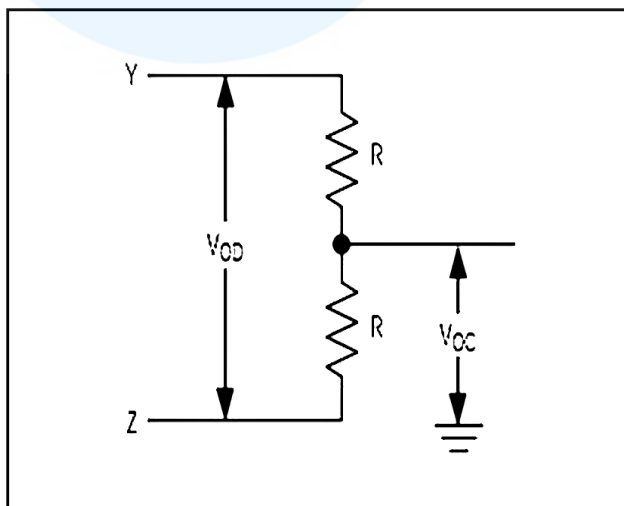


Figure 2 DC test load of the driver

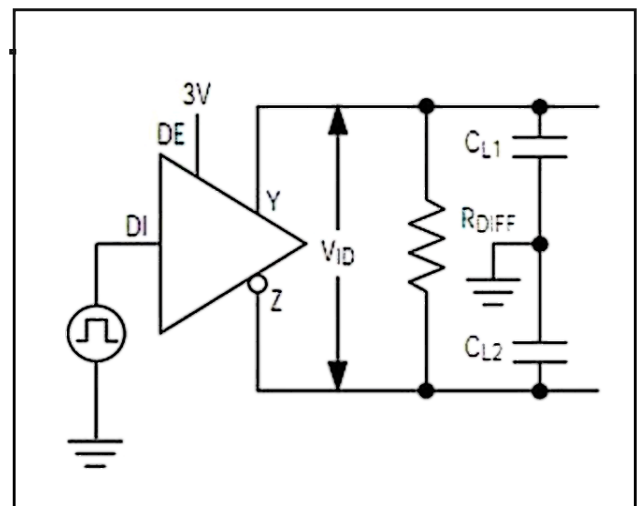


Figure 3 Driver timing test circuit

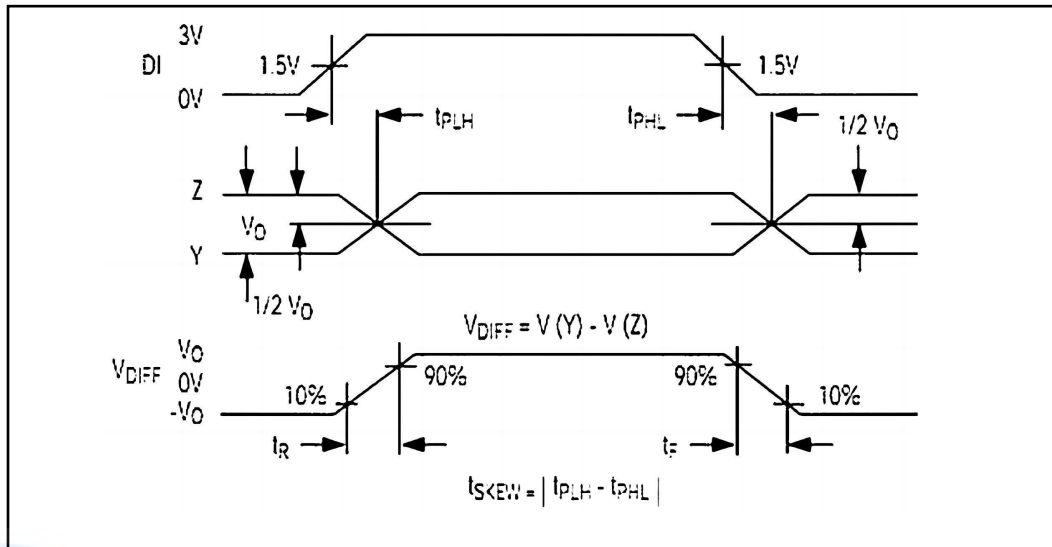


Figure 4 Driver propagation delay

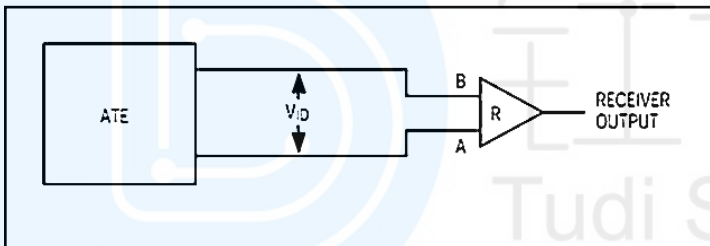


Figure 5 Receiver propagation delay test circuit

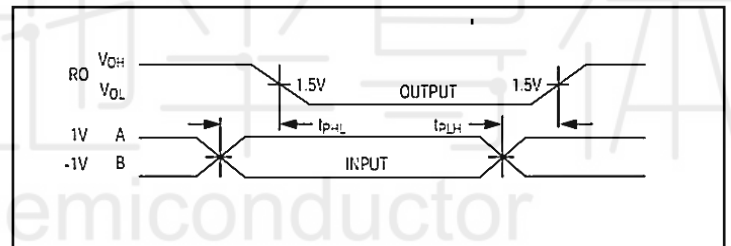


Figure 6 Receiver propagation delay timing

## Additional description

### resume

The 2851 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 2851 achieves error-free data transmission up to 15Mbps.

### The bus is connected to 256 transceivers

The input impedance of the standard RS485 receiver is 12k (1 unit load), and the standard driver can drive up to 256 unit loads. The receiver of the 2851 transceiver has an input impedance of 1/8 unit load (96k ), allowing up to 256 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).



## Function table

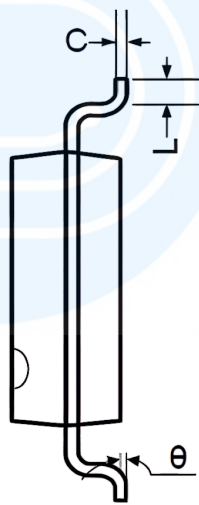
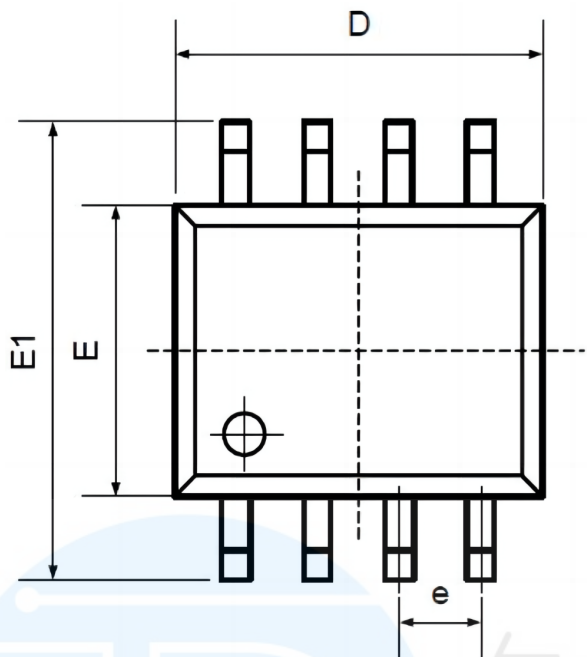
Send function table					Receiving function table			
input	A-B	$\geq +200\text{mV}$	$\leq -200\text{mV}$	Open/short circuit	input	DI	1	0
					output	Y	H	L
output	RO	H	L	H		Z	L	H

## Order information

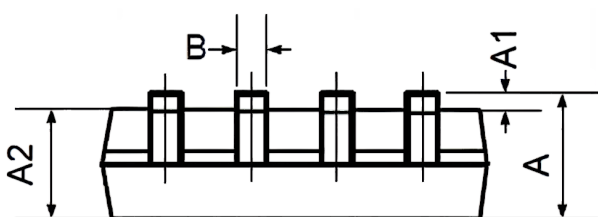
Order Number	Package	Package Quantity	Marking On The park	Temperature
LTC2851CS8-TUDI	SOP8	Tape,Reel,2500	2851	0°C to 70°C
LTC2851CMS8-TUDI	MSOP8	Tape,Reel,2500	LTCWF	
LTC2851IS8-TUDI	SOP8	Tape,Reel,2500	2851I	- 40°C to 85°C
LTC2851IMS8-TUDI	MSOP8	Tape,Reel,2500	LTCWG	
LTC2851HS8-TUDI	SOP8	Tape,Reel,2500	2851H	- 40°C to 105°C
LTC2851HMS8-TUDI	MSOP8	Tape,Reel,2500	TLCWH	
LTC2851MPS8-TUDI	SOP8	Tape,Reel,2500	2851MP	- 40°C to 125°C
LTC2851MPMS8-TUDI	MSOP8	Tape,Reel,2500	LTFYG	



## Package SOP8

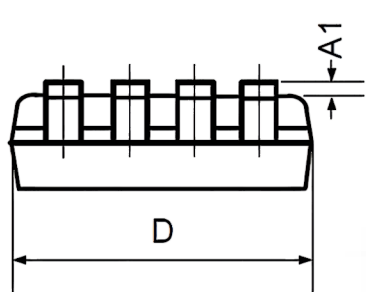
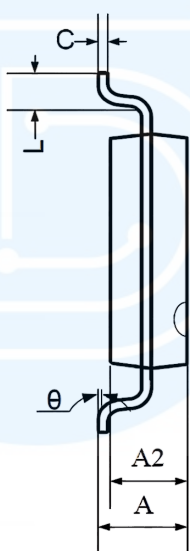
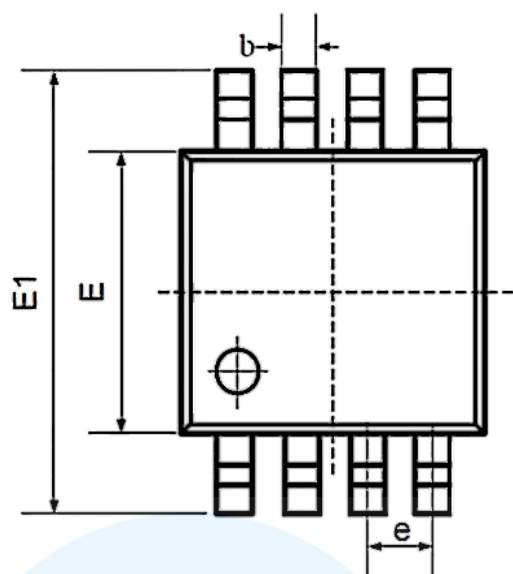


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°





## Package MSOP8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
C	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201
L	0.410	0.650	0.016	0.026
θ	0°	6°	0°	6°



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