



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-ADM4854

3.3V-Powered, $\pm 15\text{kV}$ ESD-Protected, 12Mbps and
Slew-Rate-Limited True RS-485/RS-422 Transceivers

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**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- 3.0V~5.5V power supply, full-duplex;
- 1/8 unit load, allowing up to 56 devices to be connected to the bus;
- Short-circuit output protection for the driver;
- With strong anti-noise capability
- Integrated transient voltage suppression function;
- The data transmission rate can reach 12Mbps in an electrical noise environment;
- A, B port protection: HBM15KV;

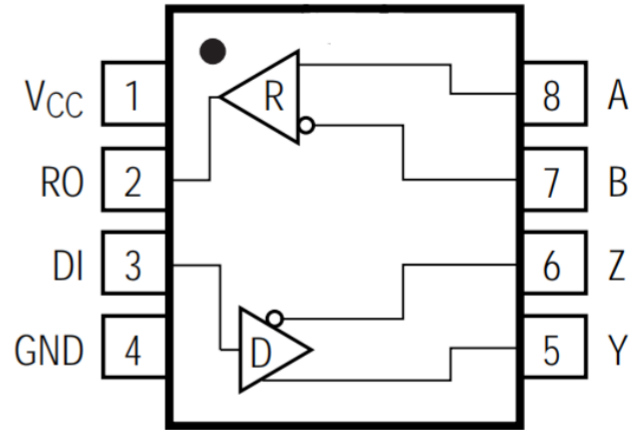


Figure 1. Pin Diagram

Description

The 4854 is a low-power 3.3 transceiver with $\pm 15\text{kV}$ ESD protection for RS-48 and RS-422 communication. Each device contains a driver and a receiver.

The 4854 has a maximum transmission speed of 12 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 4854 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
						Y	H	L
output	RO	H	L	H	output	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~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	μA
		VCC=0 or 3.3V VIN = -7 V	-100			μA
Three state input leakage current	IozR	$0.4V < V_o < 2.4V$			± 1	μA
Receiver input resistance	RIN	$-7V \leq V_{CM} \leq 12V$	96			k Ω
Receiver short circuit current	IosR	$0V \leq V_o \leq V_{CC}$	± 7		± 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=+3.3 V, Temp = 25)

Test Circuit

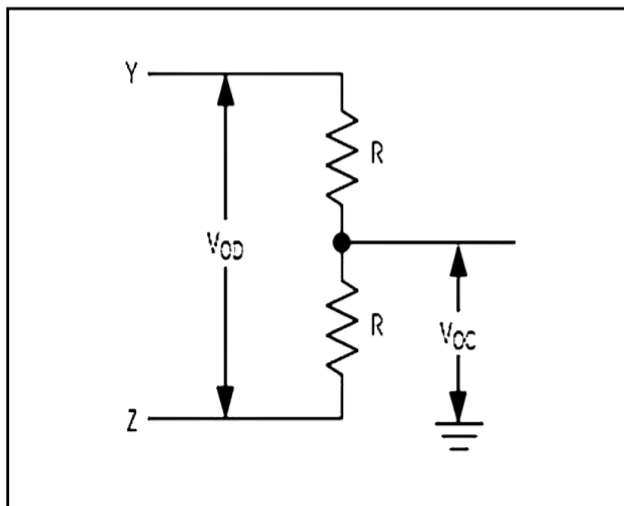


Figure 2 DC test load of the driver

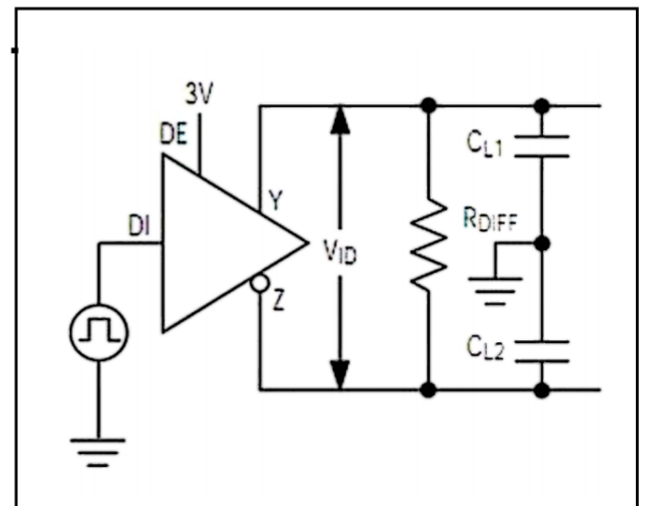


Figure 3 Driver timing test circuit

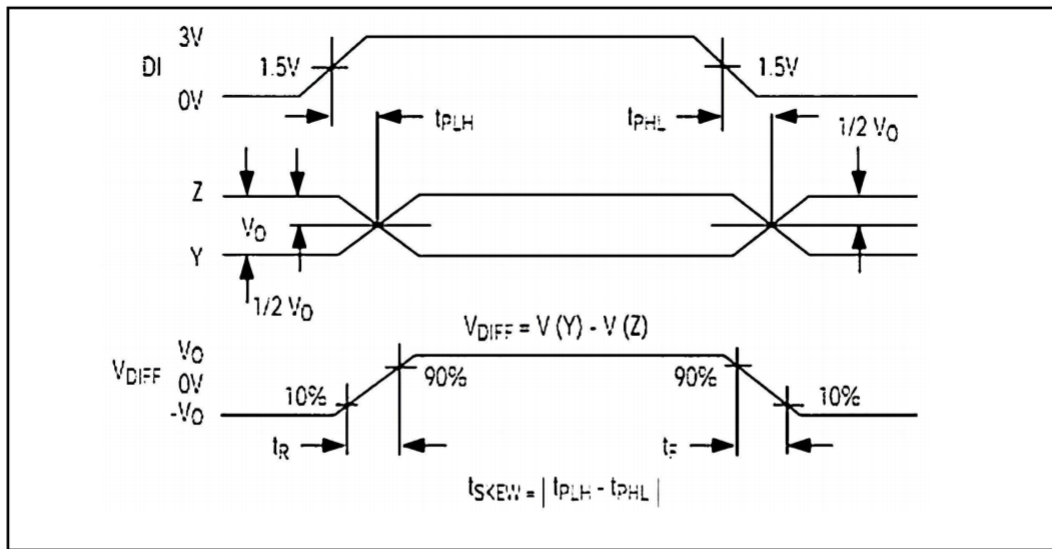


Figure 4 Driver propagation delay

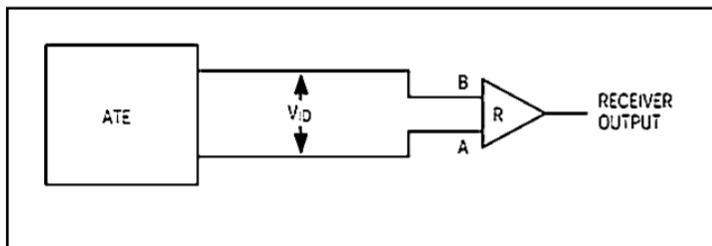


Figure 5 Receiver propagation delay test circuit

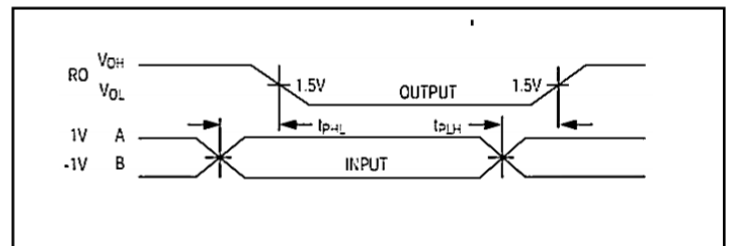


Figure 6 Receiver propagation delay timing

Additional description

resume

The 4854 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 4854 achieves error-free data transmission up to 12Mbps.

The bus is connected to 256 transceivers

The input impedance of the standard RS485 receiver is 12kΩ (1 unit load), and the standard driver can drive up to 2 unit loads. The receiver of the 4854 transceiver has an input impedance of 1/8 unit load (96kΩ), 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.

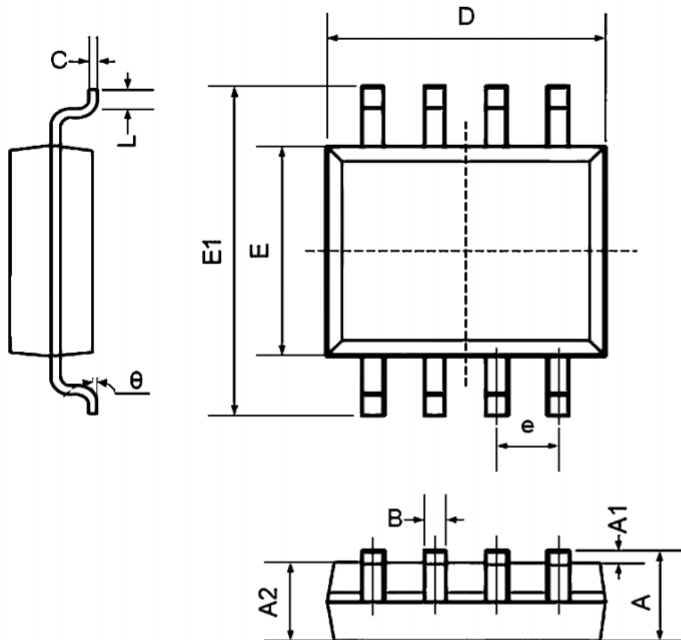
Drive output protection

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).



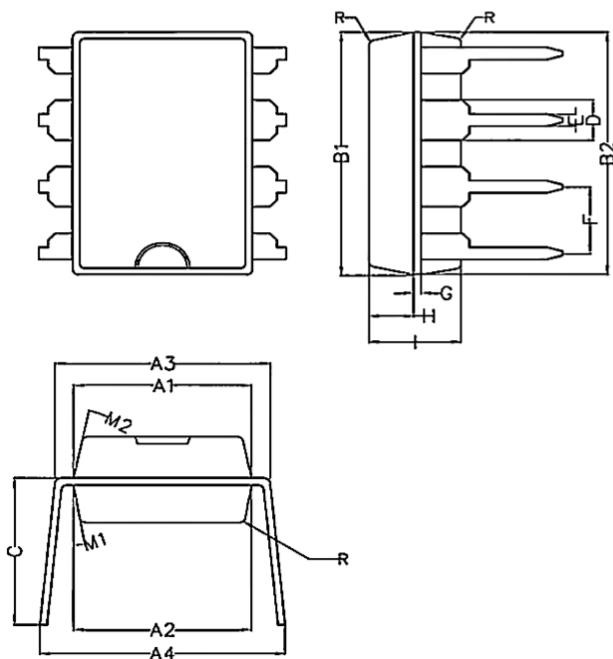
Package Information

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°

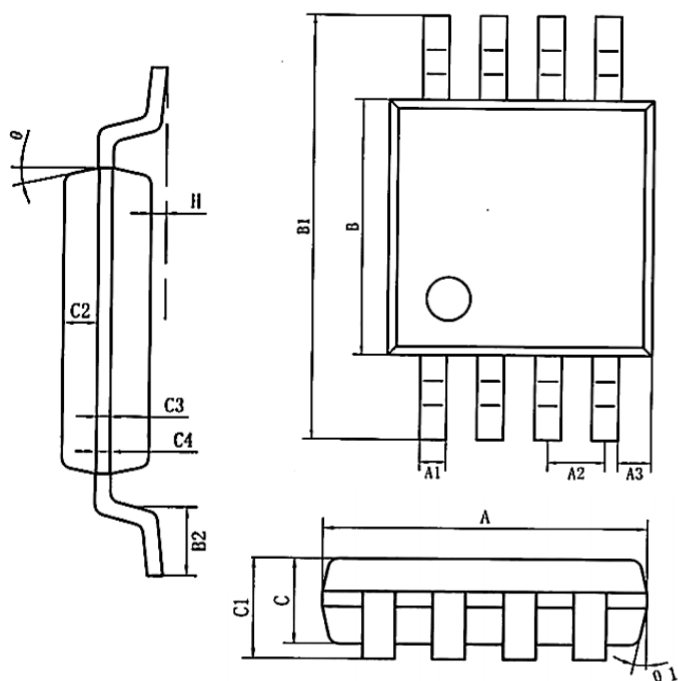
DIP8



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
I	3.22	3.27	3.32
R		0.20	
M1	9°	10°	11°
M2	11°	12°	13°



MSOP8



Symbol	Min/mm	Typ/mm	Max/mm
A	2.90	3.0	3.10
A1	0.28		0.35
A2	0.65typ		
A3	0.375typ		
B	2.90	3.0	3.10
B1	4.70		5.10
B2	0.45		0.75
C	0.75		0.95
C1			1.10
C2	0.328typ		
C3	0.152		
C4	0.15		0.23
H	0.00		0.09
θ	12°typ		

Order information

Order Number	Package	Package Quantity	Marking On The park
ADM4854ARZ-REEL-TUDI	SOP8	Tape,Reel,2500	ADM4854A
ADM4854ARMZ-REEL-TUDI	MSOP8	Tape,Reel,2500	4854
ADM4854ANZ-TUDI	DIP8	Tube,50,A box of 2000	ADM4854ANZ



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