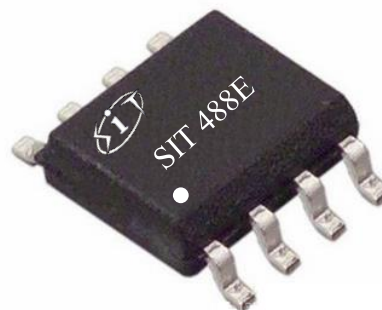


FEATURES

- 5V power supply, Full-Duplex;
- 1/8 unit load, allow up to 256 transceivers on the bus;
- Driver short-circuit output protection;
- Receiver open fail-safe;
- Strong anti-noise capability;
- Integrated transient voltage suppression function;
- Data transmission up to 1Mbps in an electric noise environment;
- A and B port protection: HBM $\pm$ 16KV;

OUTLINE



Provide green and environmentally friendly lead-free package

DESCRIPTION

SIT488E is a 5V-powered, Full-Duplex, Low-Power RS-485 transceiver that fully meets the requirements of the TIA/EIA-485 standard.

SIT488E includes a driver and a receiver, both of which transmit signals independently. SIT488E has 1/8 load, allows 256 SIT488E transceivers to be connected to the same communication bus. Error-free data transfer up to 1Mbps can be achieved.

SIT488E operating voltage range of 4.5~5.5 V, with fail-safe (fail-safe), current limiting protection, overvoltage protection, control port hot-swappable input and other functions.

SIT488E has excellent ESD release capability with HBM up to $\pm$ 16KV.

PIN CONFIGURATION

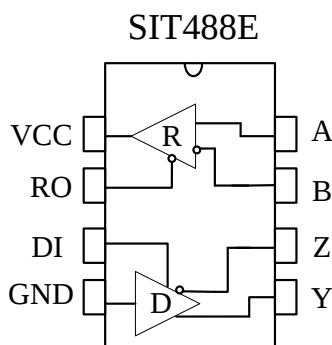


Figure 1 SIT488E pin configuration

LIMITING VALUES

PARAMETER	SYMBOL	VALUE	UNIT
Supply voltage	VCC	+7	V
Control 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
Operating temperature ranges		-40~85	°C
Storage temperature range		-60~150	°C
Lead temperature		300	°C
Continuous power dissipation	SOP8	400	mW
	DIP8	700	mW

The maximum limit parameter value means that exceeding these values may cause irreversible damage to the device. Under these conditions, it is not conducive to the normal operation of the device. Continuous operation of the device under the maximum allowable rating may affect the reliability of the device. The reference point of all voltages is ground.

PINNING

PIN	SYMBOL	DESCRIPTION
1	VCC	Power supply: $4.5V \leq VCC \leq 5.5V$
2	RO	Receiver output. If $A-B \geq -50mV$, RO output is high level; if $A-B \leq -200mV$, RO output is low level.
3	DI	DI driver input. The low level on DI makes the output of the non-inverting terminal Y of the driver low and the output of the inverting terminal Z of the driver high; the high level of DI will make the non-inverting terminal Y output high and the inverting terminal Z output is low.
4	GND	Ground
5	Y	Driver in-phase output
6	Z	Driver inverted output
7	B	Receiver inverting input
8	A	Receiver non-inverting input

DRIVER DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Differential Driver Output (No load)	V_{OD1}			5		V
Differential Driver Output	V_{OD2}	Figure 2, $R_L = 27\ \Omega$	1.5		VCC	V
		Figure 2, $R_L = 50\ \Omega$	2		VCC	
Change in Magnitude of Driver Differential Output Voltage (NOTE1)	ΔV_{OD}	Figure 2, $R_L = 27\ \Omega$			0.2	V
Driver Common-Mode Output Voltage	V_{OC}	Figure 2, $R_L = 27\ \Omega$			3	V
Change in Magnitude of Common-Mode Output Voltage (NOTE1)	ΔV_{OC}	Figure 2, $R_L = 27\ \Omega$			0.2	V
Input High Voltage	V_{IH}	DI	2.0			V
Input Low Voltage	V_{IL}	DI			0.8	V
Logic Input Current	I_{IN1}	DI	-2		2	μA
Output short-circuit current, short-circuit to high	I_{OSD1}	short-circuit to 0V~12V	35		250	mA
Output short-circuit current, short-circuit to low	I_{OSD2}	short-circuit to -7V~0V	-250		-35	mA

(Unless otherwise stated, $V_{CC}=5V\pm 10\%$, $Temp=T_{MIN}\sim T_{MAX}$, the typical value is $V_{CC}=+5V$, $Temp=25^{\circ}C$)

NOTE1: ΔV_{OD} and ΔV_{OC} are the V_{OD} and V_{OD} caused by the state change of the input signal DI, respectively Changes in V_{OC} amplitude.

RECEIVER DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Input current (A, B)	I_{IN2}	$V_{CC}=0$ or $5V$ $V_{IN} = 12V$			125	μA
		$V_{CC}=0$ or $5V$ $V_{IN} = -7V$	-100			μA
Positive input threshold voltage	V_{IT+}	$-7V \leq V_{CM} \leq 12V$			-50	mV
Reverse input threshold voltage	V_{IT-}	$-7V \leq V_{CM} \leq 12V$	-200			mV
Input hysteresis voltage	V_{hys}	$-7V \leq V_{CM} \leq 12V$	10	30		mV

Receiver Output High Voltage	V_{OH}	$I_{OUT} = -4mA$, $V_{ID} = +200\text{ mV}$	$V_{CC}-1.5$			V
Receiver Output Low Voltage	V_{OL}	$I_{OUT} = +4mA$, $V_{ID} = -200\text{ mV}$			0.4	V
Three-State Output Current at Receiver	I_{OZR}	$0.4\text{ V} < V_O < 2.4\text{ V}$			± 1	μA
Receiver Input Resistance	R_{IN}	$-7V \leq V_{CM} \leq 12V$	96			$k\Omega$
Receiver Short-Circuit Output Current	I_{OSR}	$0\text{ V} \leq V_O \leq V_{CC}$	± 7		± 95	mA

(If not otherwise stated, $V_{CC}=5V \pm 10\%$, $Temp=T_{MIN} \sim T_{MAX}$, the typical value is $V_{CC}=+5V$, $Temp=25^{\circ}C$)

SUPPLY CURRENT

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	DI=0 or VCC		250	400	μA

ESD PROTECTION

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
A、B、Y、Z		Human phantom (HBM)		± 16		KV
Other ports		Human phantom (HBM)		± 6		KV

DRIVER SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Driver input to output propagation delay (low to high)	t_{DPLH}	$R_{DIFF} = 54\ \Omega$, $C_{L1}=C_{L2}=100pF$ (See Figure 3 and Figure 4)		100	150	ns
Driver input to output propagation delay (high to low)	t_{DPHL}			100	150	ns
$ t_{DPLH} - t_{DPHL} $	t_{SKEW1}				10	ns

Rising edge time / Falling edge time	t_{DR}, t_{DF}			190	250	ns
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RECEIVER SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Receiver Input to output from low to high	t_{RPLH}	See Figure 5 and Figure 6 $V_{ID} \geq 2.0V$; Rising and falling edges Time $V_{ID} \leq 15ns$	20	50	80	ns
Receiver Input to output from high to low	t_{RPHL}		20	50	80	ns
$ t_{RPLH} - t_{RPHL} $	t_{SKEW2}			5	15	ns

FUNCTION TABLE

Send menu

Input	Output	
DI	Y	z
1	H	L
0	L	H
X	Z	Z
X	Z(shutdown)	

Receive menu

Input	Output
A-B	RO
$\geq -50mV$	H
$\leq -200mV$	L
On / short circuit	H
X	Z

Note: X: any level; Z: high impedance.

TEST CIRCUIT

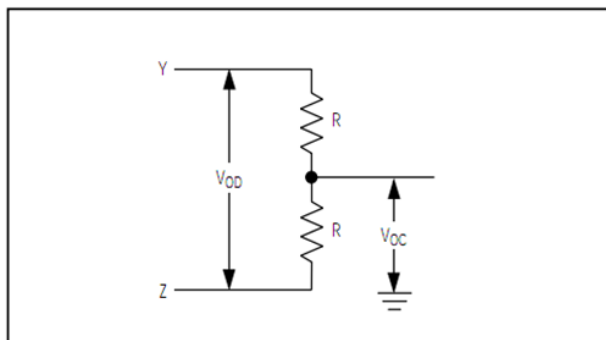


Figure 2 driver DC test load

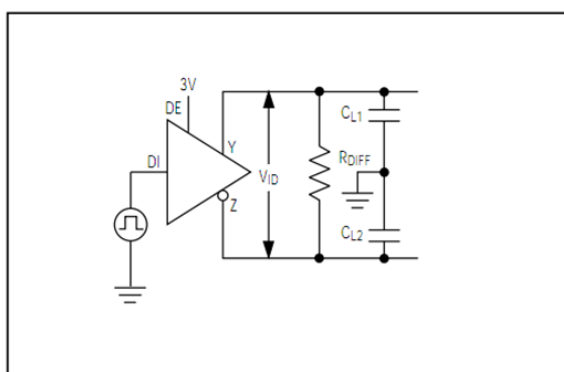


Figure 3 driver timing test circuit

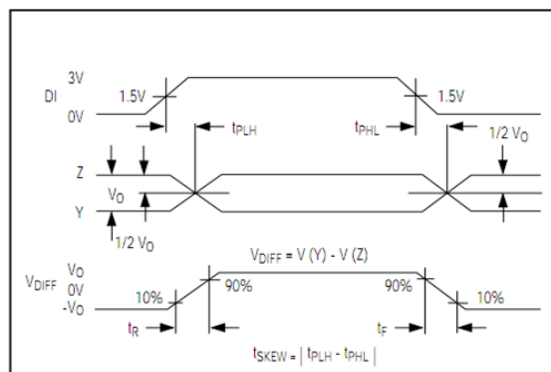


Figure 4 drive propagation delay

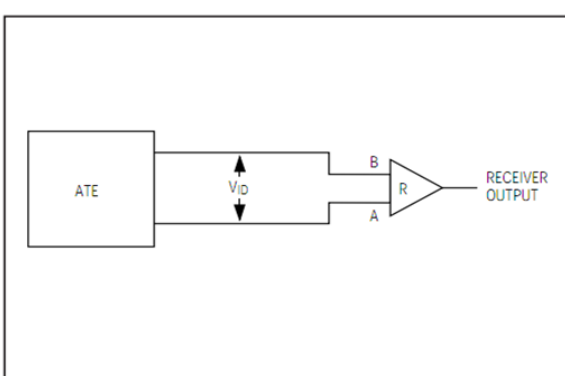


Figure 5 receiver propagation delay test circuit

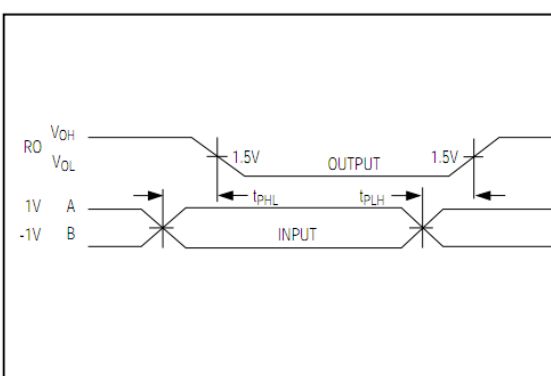


Figure 6 receiver propagation delay timing

DESCRIPTION

1 Brief description

SIT488E is a full-duplex high-speed transceiver for RS-485/RS-422 communication, including a driver and receiver. With fail-safe, over-voltage protection, over-current protection. SIT488E realizes error-free data transmission up to 1Mbps.

2 Fail-safe

When the receiver input is short-circuited or open, or all drivers connected to the terminal matching transmission line are in a disabled state (idle), SIT488E can ensure that the receiver outputs a logic high level. This is achieved by setting the receiver input threshold to -50mV and -200mV respectively. If the differential receiver input voltage $(A-B) \geq -50\text{mV}$, RO is a logic high level; if the voltage $(A-B) \leq -200\text{mV}$, RO is a logic low level. Depending on the receiver threshold, a logic high level with a minimum noise margin of 50mV can be achieved. The -50mV to -200mV threshold voltage complies with the EIA/TIA-485 standard of $\pm 200\text{mV}$.

3 Allowing up to 256 transceivers mounted on the bus

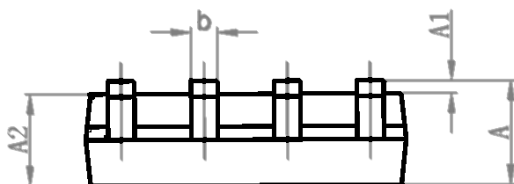
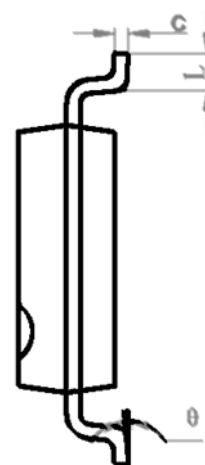
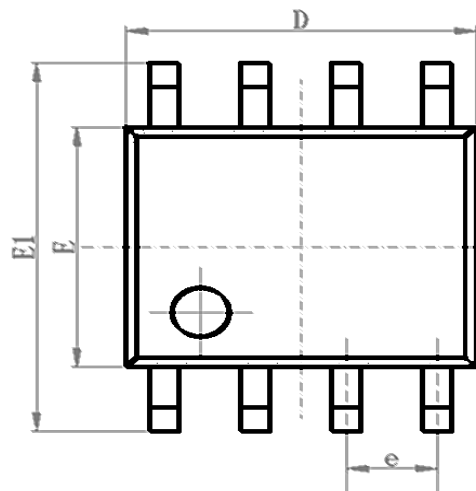
The input impedance of the standard RS485 receiver is $12\text{k}\Omega$ (1 unit load), and the standard driver can drive up to 32 unit loads. The receiver of the SIT488E transceiver has 1/8 unit load input impedance ($96\text{k}\Omega$), allowing up to 256 transceivers to be connected in parallel on 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 all be connected to the same bus.

4 Drive output protection

Over-current and over-voltage protection mechanisms are used to avoid excessive output current and high power consumption caused by faults or bus conflicts, and provide fast short-circuit protection within the entire common-mode voltage range (refer to typical operating characteristics).

SOP8 DIMENSIONS
Package size

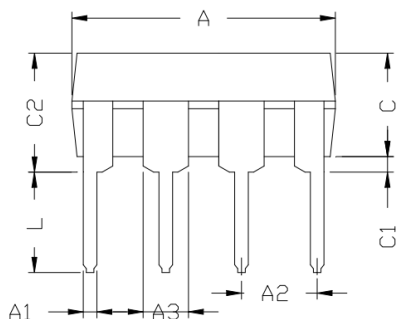
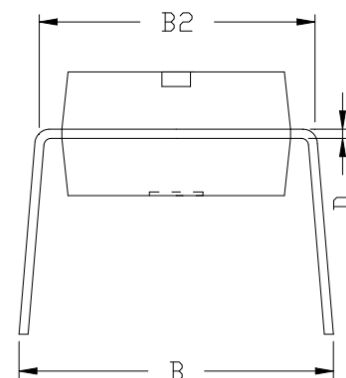
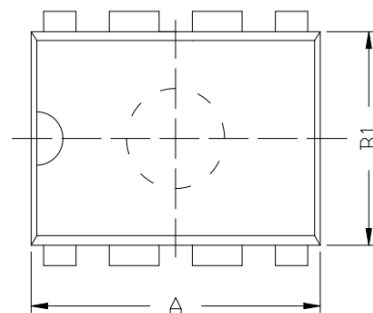
SYMBOL	MIN./mm	TYP./mm	MAX./mm
A	1.50	1.60	1.70
A1	0.1	0.15	0.2
A2	1.35	1.45	1.55
b	0.355	0.400	0.455
D	4.800	4.900	5.00
E	3.780	3.880	3.980
E1	5.800	6.000	6.200
e		1.270BSC	
L	0.40	0.60	0.80
c	0.153	0.203	0.253
θ	-2 °	-4 °	-6 °



DIP8 DIMENSIONS

Package size

SYMBOL	MIN./mm	TYP./mm	MAX./mm
A	9.00	9.20	9.40
A1	0.33	0.45	0.51
A2	2.54TYP		
A3	1.525TYP		
B	8.40	8.70	9.10
B1	6.20	6.40	6.60
B2	7.32	7.62	7.92
C	3.20	3.40	3.60
C1	0.50	0.60	0.80
C2	3.71	4.00	4.31
D	0.20	0.28	0.36
L	3.00	3.30	3.60



ORDERING INFORMATION

TYPE NUMBER	TEMPERATURE	PACKAGE
SIT488EESA	-40℃~85℃	8 SO
SIT488EEPA	-40℃~85℃	DIP8

Taping type packaging is 2500 pcs/reel