



钲地半导体
Tudi Semiconductor

Product Specification

TUDI-TRS232E

TRS232E Dual RS-232 driver and receiver with IEC61000-4-2 protection

网址 www.sztdbdt.com Q

用芯智造 · 卓越品质

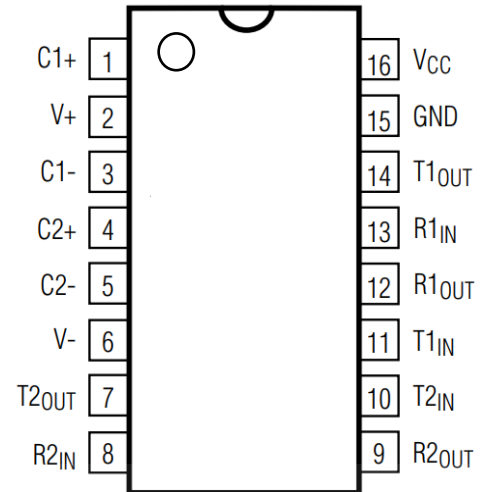
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- Meets or exceeds requirements of TIA/RS-232-F and ITU Recommendation V.28
- Powered from a 5V supply with 1 μ F charge pump capacitor
- Data rates up to 250kbit/s
- Two drivers and two receivers
- ± 30 V input levels
- Low power current
- Provides ESD protection for RS-232 bus pins
 - ± 15 kV Human Body Model (H)
 - ± 8 kV IEC61000-4-2 Contact Discharge
 - ± 15 kV IEC61000-42 Air Gap Discharge



Description

TRS232E is a dual driver/receiver that contains a charge pump voltage generator that can supply TIA/RS-232F voltage levels from a single 5V supply. Each receiver converts TIA/RS-232-F inputs to 5V TTL/CMOS levels. receiver has a typical threshold of 1.3V, a typical hysteresis of 0.5V, and can accept ± 30 V inputs. Each driver converts T/CMOS input levels to TIA/RS-232-F levels.

Applications

- TIA/EIA-232-F
- Battery-powered system
- Terminal
- Modem
- Computer



Pin description

Pin No	Symbol	Pin name
01	C1+	Output of external capacitance of positive voltage multiplier unit
02	V+	Output of positive voltage of multiplier unit
03	C1-	Output of external capacitance of positive voltage multiplier unit
04	C2+	Output of external capacitance of negative voltage multiplier unit
05	C2-	Output of external capacitance of negative voltage multiplier unit
06	V-	Output of negative voltage of multiplier unit
07	T2oUT	Output of transmitter data(levels RS-232)
08	R2IN	Input of receiver data(levels RS-232)
09	R2oUT	Output of receiver data(levels TTL/KMOS)
10	T2IN	Input of transmitter data(levels TTL/KMOS)
11	T1n	Input of transmitter data(levels TTL/KMOS)
12	R1oUT	Output of receiver data(levels TTL/KMOS)
13	R1n	Input of receiver data(levels RS-232)
14	T1oUT	Output of transmitter data(levels RS-232)
15	GND	Common output
16	Vcc	Supply output of voltage source



Recommended Operating Conditions

Symbol	Parameter	Rate		Unit
		min	max	
Vcc	Supply voltage	4.5	5.5	V
V+	Transmitter output high voltage	5.0	-	
V-	Transmitter output low voltage	-5.0	-	
VTIN	Transmitter input voltage	0	Vcc	
VRIN	Receiver input voltage	-30	30	
Isc	Transmitter short circuit output current	-	±60	mA
Ta	Ambient temperature	-40	85	C

Maximum conditions

Symbol	Parameter	Rate		Unit
		min	max	
Vcc	Supply voltage	-0.3	6.0	V
V+	Transmitter high output voltage	Vcc-0.3	14	
V-	Transmitter low output voltage	-0.3	-14	
VTIN	Transmitter input voltage	-0.3	V++0.3	
VRIN	Receiver input voltage	-30	30	
Pp	Dissipated powerDIP-package	-		mW
Isc	Output current of transmitter short circuit	-	Continuously	mA
Ta	Ambient temperature	-60	150	C



Receiver electrical parameters							
Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40°C to 85°C		
			min	max	min	max	
Vh	Hysteresis voltage	Vcc=5.0V	0.2	0.9	0.2	1.0	V
Von	On(operation)voltage	Vo ≤ 0.1VloL ≤ 20 uA		2.4		2.3	
Voff	Off(dropout)voltage	Vo ≥ Vcc-01VloH ≤ -20 uA	0.8		0.9		
VoL	Output low voltage	loL=3.2 mA Vcc=4.5V	-	0.3		0.4	
VoH	Output high voltage	loH=-1.0 mA Vcc=4.5V	3.6		3.5	-	
RI	Input resistance	Vcc=5.0V	3.0	7.0	3.0	7.0	kOhm
Transmitter electrical parameters							
Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40°C to 85°C		
			min	max	min	max	
VoL	Output low voltage	Vcc=4.5V VH=2.0V	-	-5.2		-5.0	V
VoH	Output high voltage	Vcc=4.5V VL=0.8V	5.2		5.0	-	
I	Input low current	Vcc=5.5V Vπ= 0V	-	-1.0		-10.0	uA
IH	Input high current	Vcc=5.5V VH=Vcc		1.0		10.0	
SR	Speed of output frontchange	Vcc=5.0V CL=50 -1000 pF	3.0	30	2.7	27	V/uS
Ro	Output resistance	Vcc=V+=V-=0V Vo=±2V	350	-	300	-	Ohm
Isc	Short circuit outputcurrent	Vcc=5.5V Vo=0V		-5050		-6060	mA kbps
ST	Speed of information transmission	Vcc=4.5V CL=1000 pF	140		150	-	



Dynamic parameters

Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40°C to 85°C		
			min	max	min	max	
tPHLR (tPLHR)	Signal propagation delay time	Vcc=4.5V CL=150 pF		9.7	-	10	us
tPHLT (tPLHT)	Signal propagation delay time	Vcc=4.5V CL=2500 pF		5.0*		6.0*	

Capacitance

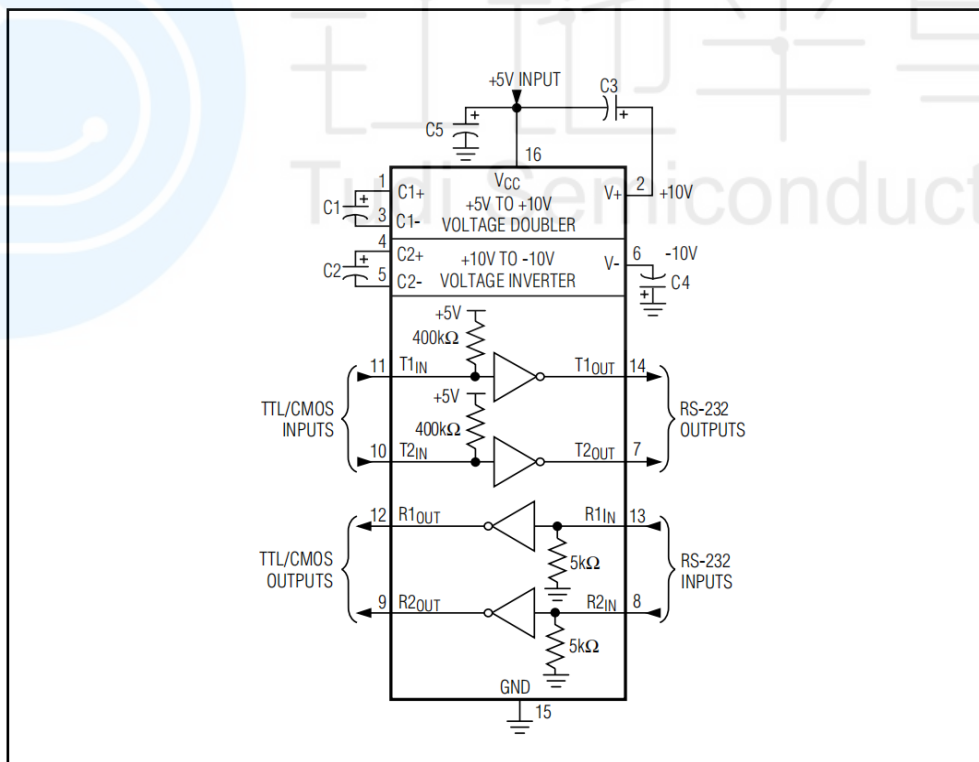
Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40°C to 85°C		
			min	max	min	max	
CIN	Input capacitance	5.0	9.0				pF
CpD	Dynamic capacitance		90				

Static parameters

Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40°C to 85°C		
			min	max	min	max	
Icc	Consumption current static	Vcc=5.0V Vπ=0V		10.0		14	mA



Truth table			
Inputs	RIn,TIN	H	L
Outputs	RoVT,TovT	L	H
H-vol-L	Note: Itage high level; ow voltage level		



Typical Operating Circuit

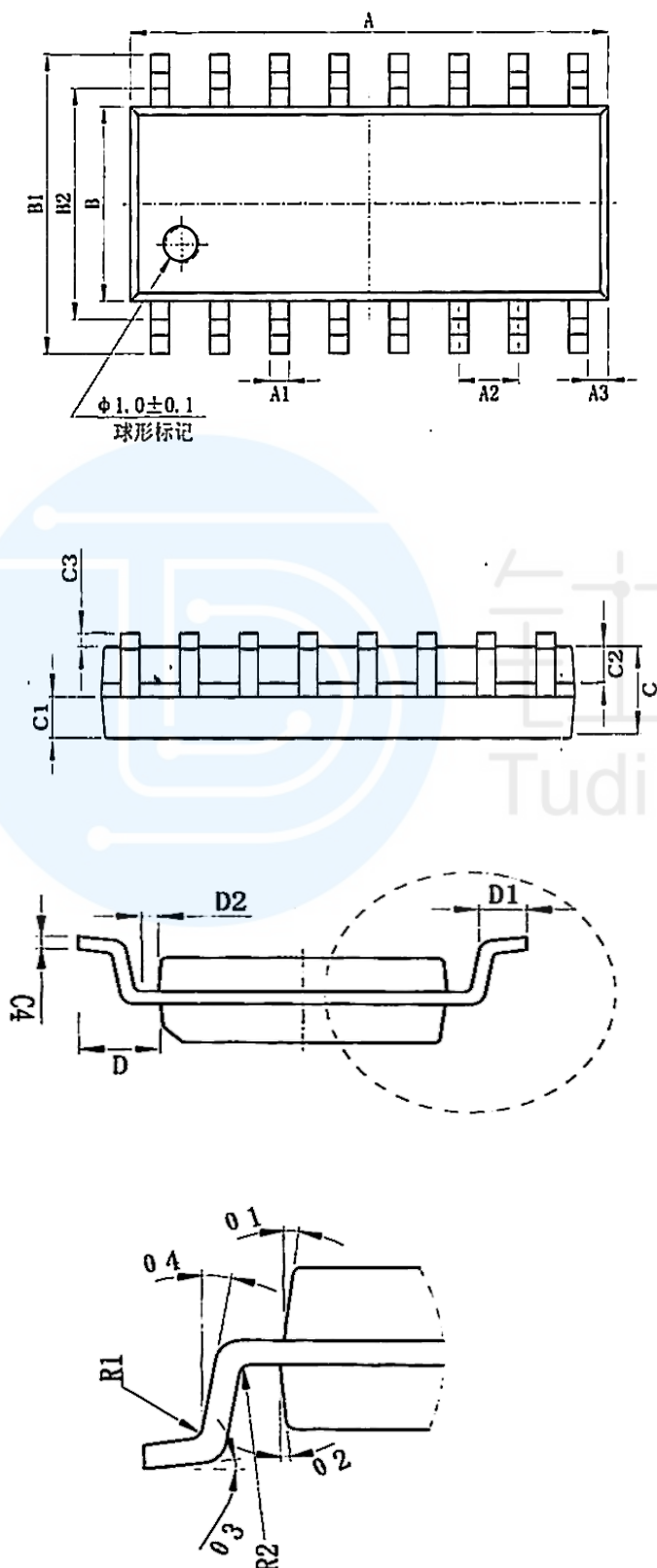


Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
TRS232ECDR-TUDI	SOP16	Tape,Reel,2500	TRS232EC	0°C to 70°C
TRS232ECDWR-TUDI	SMD16	Tape,Reel,1000	TRS232EC	
TRS232ECN-TUDI	DIP16	Tube,25,A box of 1000	TRS232ECN	
TRS232ECPWR-TUDI	TSSOP16	Tape,Reel,2000	RU32EC	
TRS232EIDR-TUDI	SOP16	Tape,Reel,2500	TRS232EI	- 40°C to 85°C
TRS232EIDWR-TUDI	SMD16	Tape,Reel,1000	TRS232EI	
TRS232EIN-TUDI	DIP16	Tube,25,A box of 1000	TRS232EIN	
TRS232EIPWR-TUDI	TSSOP16	Tape,Reel,2000	RU32EI	

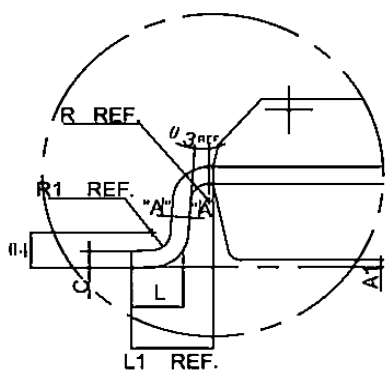
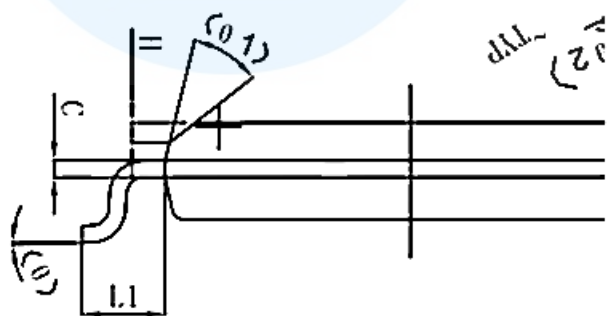
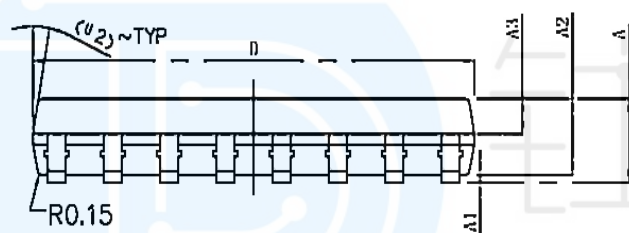
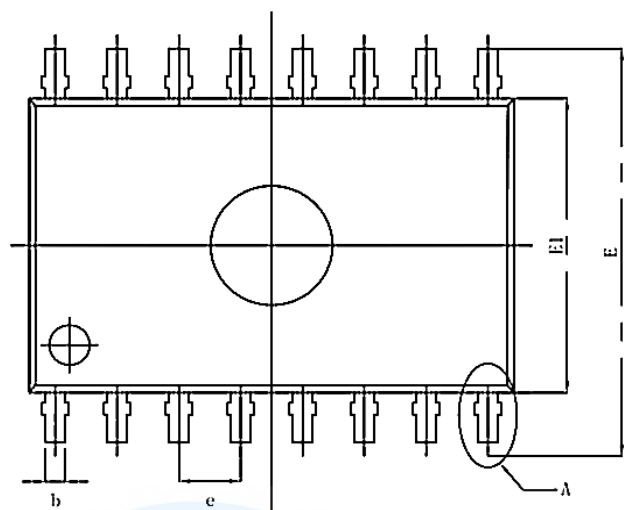


Package SOP16



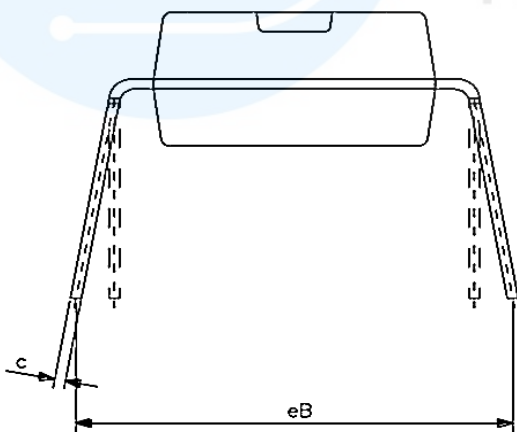
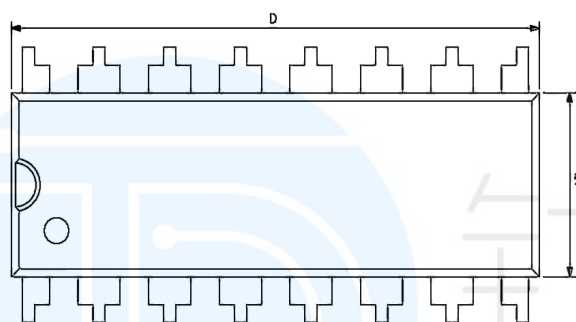
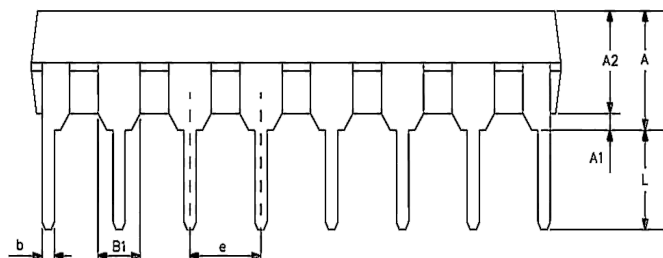
SIZE SYMBOL	MIN./mm	MAX./mm
A	9.80	10.00
A1	0.356	0.456
A2	1.27TYP	
A3	0.302TYP	
B	3.85	3.95
B1	5.84	6.24
B2	5.00 TYP	
C	1.40	1.60
C1	0.61	0.71
C2	0.54	0.64
C3	0.05	0.25
C4	0.203	0.233
D	1.05 TYP	
D1	0.40	0.70
D2	0.15	0.25
R1	0.20TYP	
R2	0.20TYP	
O1	8°~12°TYP4	
O2	8°~12°TYP4	
O3	0°~8°	
O4	4°~12°	

Package SMD16



SIZE SYMBOL	MIN./mm	MAX./mm
A	—	2.65
A1	0.10	0.30
A2	2.25	2.35
A3	0.97	1.07
D	10.10	10.50
E	10.26	10.60
E1	7.30	7.70
e	1.27BSC	
L	0.55	0.85
L1	1.4BSC	
H	0.345	0.365
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
θ_1	45° TYP	
θ_2	12° TYP	
θ_3	0°	8°
θ_4	0°	10°

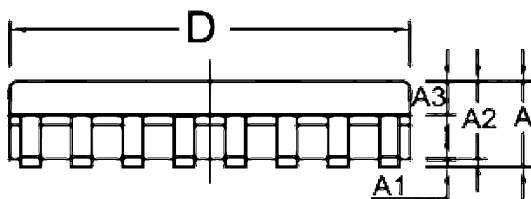
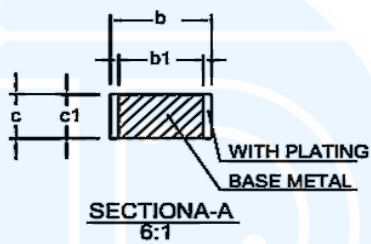
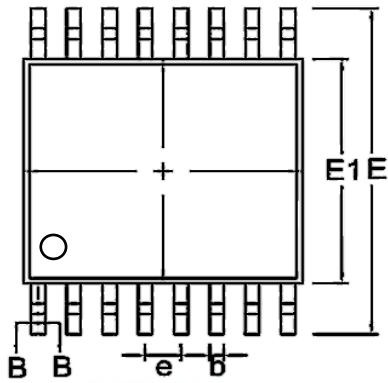
Package DIP16



SIZE SYMBOL	MIN./mm	MAX./mm
A2	3.20	3.60
A1	0.51	—
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
C	0.20	0.36
eB	7.62	9.30
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
θ1	45°TYP	
02	12°TYP	
03	0°	8°
04	0°	10°



Package TSSOP16



SIZE SYMBOL	MIN./mm	TYP./mm	MAX./mm
A	--	--	1.20
A1	0.05		0.15
A2	0.90	1.00	1.05
b	0.20	--	0.30
b1	0.19	0.22	0.25
C	0.110	0.127	0.145
cl	0.12	0.13	0.14
D	4.86	4.96	5.06
E	6.20	6.40	6.60
E1	4.30	4.40	4.50
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00BSC		
	0°	--	8°



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 quality products.