

钛地半导体
Tudi Semiconductor

Product Specification

TUDI-MAX232E

±15kV ESD-Protected, 5V RS-232 Transceivers

网址 www.sztdbdt.com

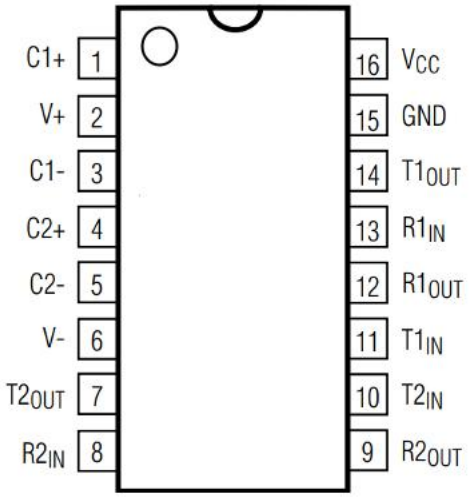
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

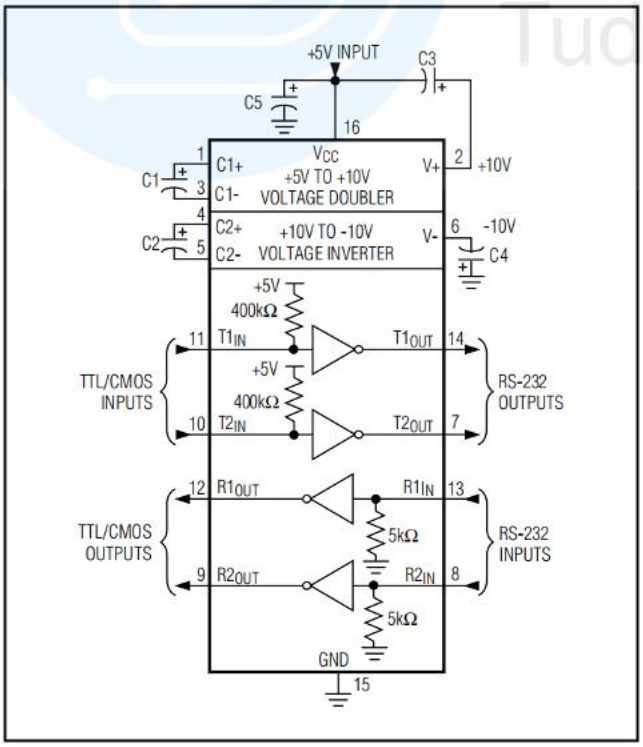
Features

- Saves Board Space
- Integrated High ±15kV HBM ESD Protection
- Integrated Charge Pump Circuitry
- Eliminates the Need for a Bipolar ±12V Supply
- Enables Single Supply Operation From +5V Supply



Applications

- Battery-Powered Equipment
- Hand-Held Equipment
- Portable Diagnostics Equipment



Typical Operating Circuit

Description

The MAX232E is a series of RS-232 transceivers with high ±15kV ESD HBM protection and integrated charge pump circuit for single 5V operation. The combination of features is outlined in the selection guide. All ten devices meet the EIA /TIA-232 specifications for drivers and receivers with data rates up to 120kbps when loaded.
The MAX232E is available in 16-pin TSSOP narrow SO, wide SO, and DIP packages.

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	TloUT	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℃		-40℃ to 85℃		
			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℃		-40℃ to 85℃		
			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		120	-	

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

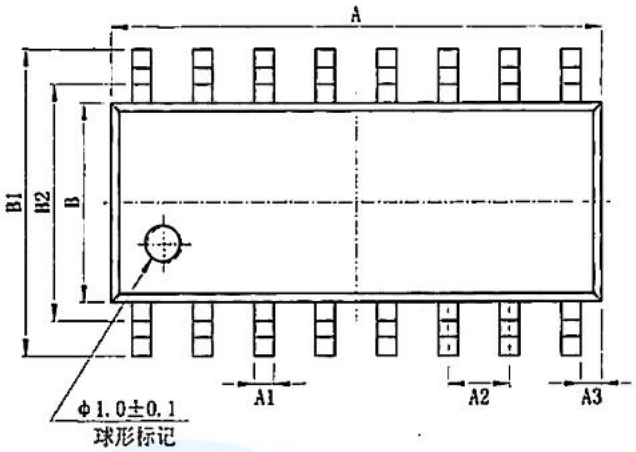
Static parameters							
Symbol	Parameter	Test conditions	Rate				Unit
			25℃		-40℃ to 85℃		
			min	max	min	max	
Icc	Consumption current static	Vcc=5.0V Vπ=0V		10.0		14	mA

Truth table			
Inputs	RIn,TIN	H	L
Outputs	RovT,TovT	L	H
H-voL-l	Note: Itage high level; ow voltage level		

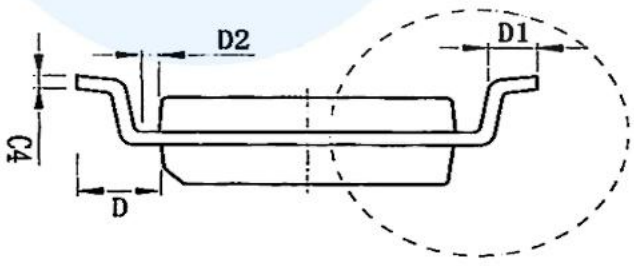
Order information

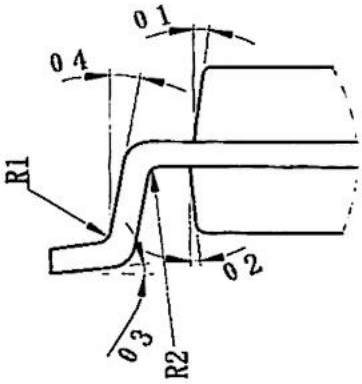
Order Number	Package	Package Quantity	Marking On The park	Temperature
MAX232ECSE-TUDI	SOP16	Tape,Reel,2500	MAX232ECSE	0℃ to 70℃
MAX232ECPE-TUDI	DIP16	Tube,25,A box of 1000	MAX232ECPE	
MAX232ECWE-TUDI	SMD16	Tape,Reel,1000	MAX232ECWE	
MAX232EESE-TUDI	SOP16	Tape,Reel,2500	MAX232EESE	- 40°C to 85°C
MAX232EEPE-TUDI	DIP16	Tube,25,A box of 1000	MAX232EEPE	
MAX232EEWE-TUDI	SMD16	Tape,Reel,1000	MAX232EEWE	

Package SOP16



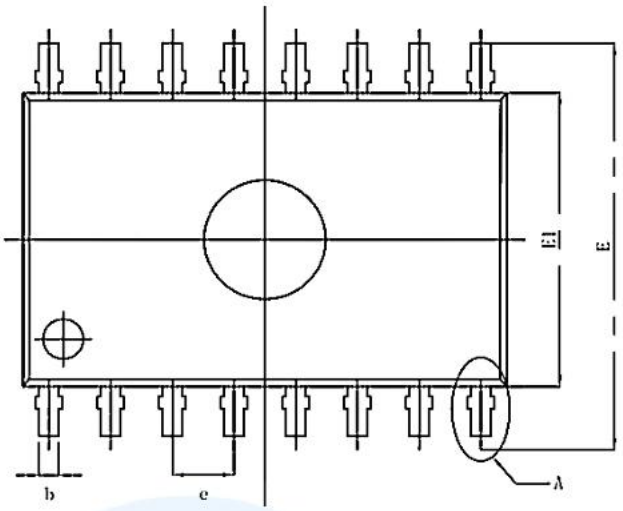


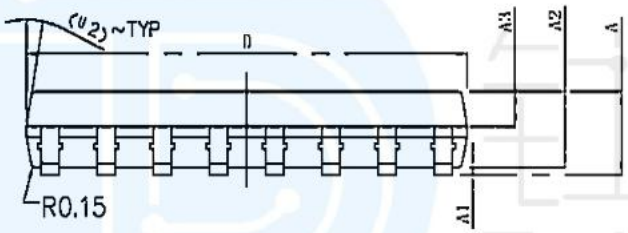


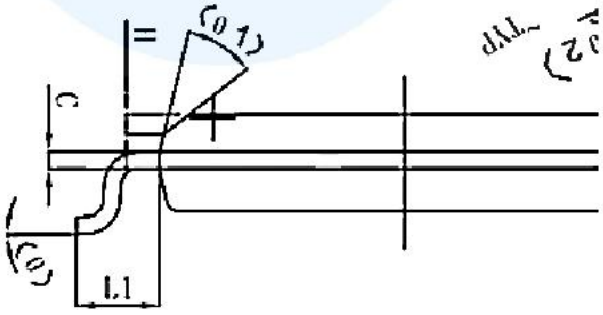


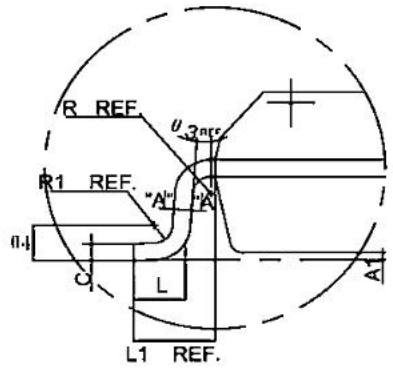
SIZE / SYMBOL	MIN./mm	MAX./mm
A	9.80	10.00
A1	0.356	0.456
A2	1.27TYP	
A3	0.302TYP	
B	3.85	3.95
B1	5.84	6.24
B2	5.00 TYP	
C	1.40	1.60
C1	0.61	0.71
C2	0.54	0.64
C3	0.05	0.25
C4	0.203	0.233
D	1.05 TYP	
D1	0.40	0.70
D2	0.15	0.25
R1	0.20TYP	
R2	0.20TYP	
01	8°~12°TYP4	
02	8°~12°TYP4	
03	0°~8°	
04	4°~12°	

Package SMD16



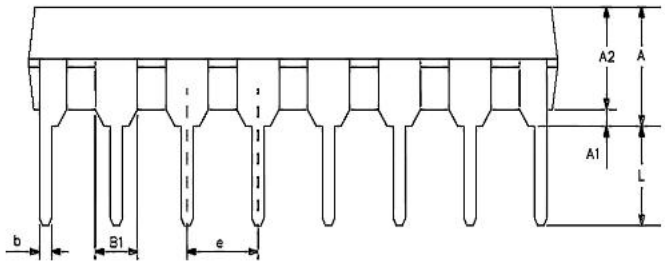


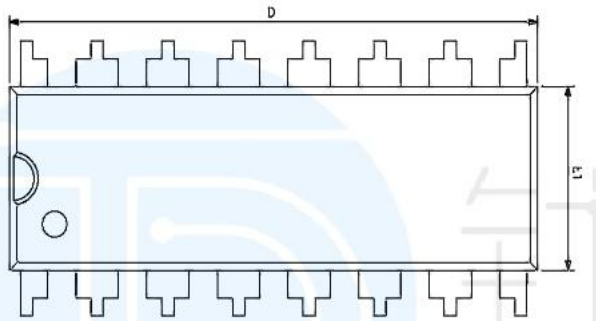


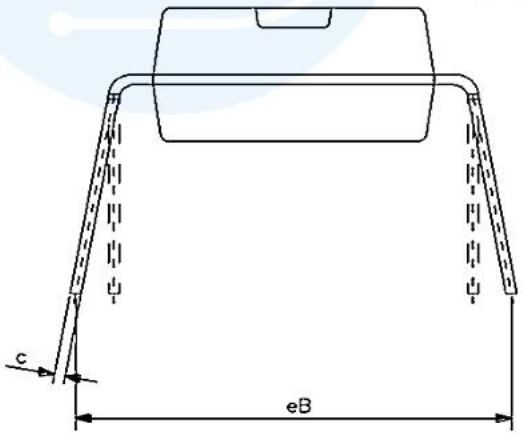


SIZE / SYMBOL	MIN./mm	MAX./mm
A	_	2.65
A1	0.10	0.30
A2	2.25	2.35
A3	0.97	1.07
D	10.10	10.50
E	10.26	10.60
E1	7.30	7.70
e	1.27BSC	
L	0.55	0.85
L1	1.4BSC	
H	0.345	0.365
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
θ1	45° TYP	
02	12° TYP	
03	0°	8°
04	0°	10°

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°

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