

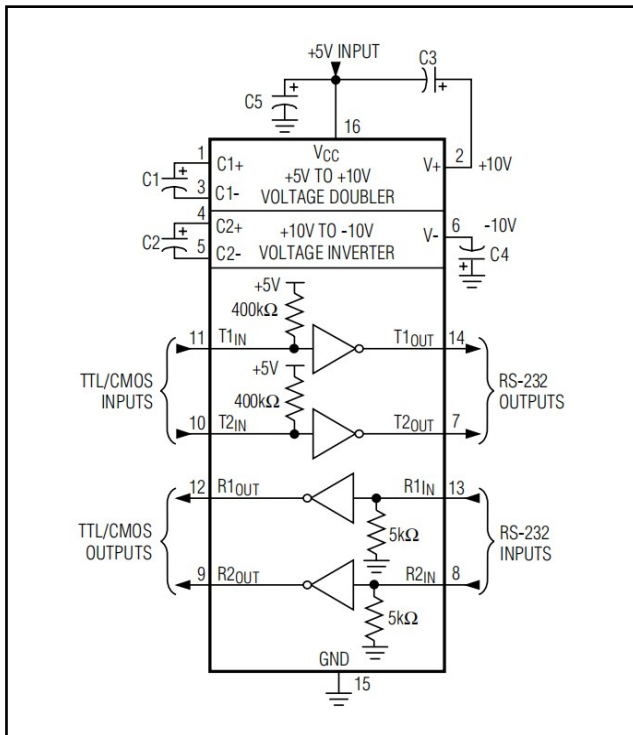
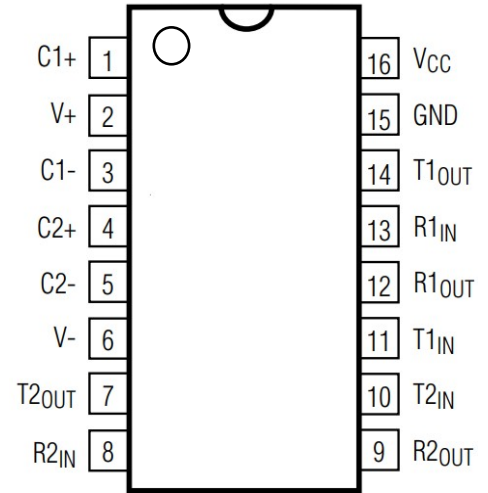


Features

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

Applications

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



Typical Operating Circuit

Description

The MAX202E is a series of RS-232 transceivers with high $\pm 15\text{kV}$ 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 MAX202E 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	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	$V_o \leq 0.1V_{IoL}$ $\leq 20 \mu A$		2.4		2.3	
Voff	Off(dropout)voltage	$V_o \geq V_{cc} - 0.1V_{IoH}$ $\leq -20 \mu A$	0.8		0.9		
VoL	Output low voltage	$I_{oL} = 3.2 \text{ mA}$ Vcc=4.5V	-	0.3		0.4	
VoH	Output high voltage	$I_{oH} = -1.0 \text{ mA}$ 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		120	-	



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	V _{CC} =4.5V CL=150 pF		9.7	-	10	us
tPHLT (tPLHT)	Signal propagation delay time	V _{CC} =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	
I _{CC}	Consumption current static	V _{CC} =5.0V V _π =0V		10.0		14	mA



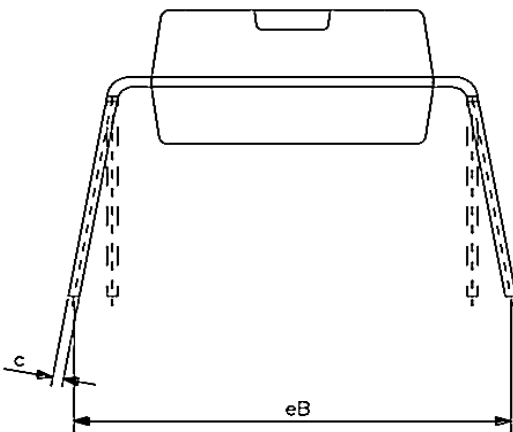
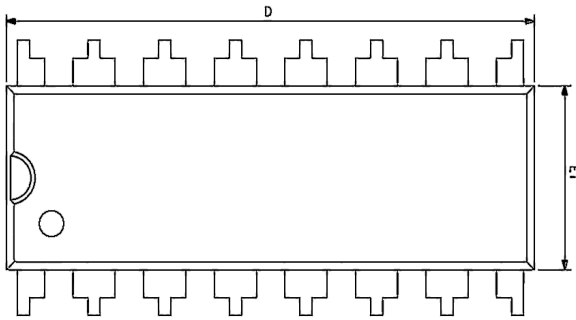
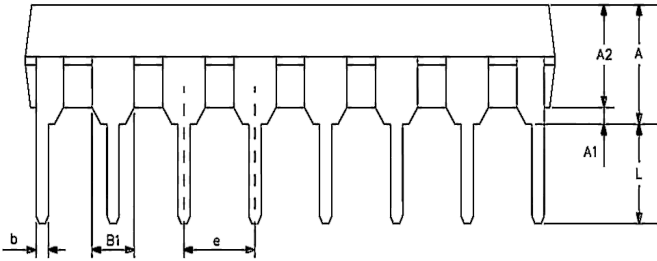
Truth table			
Inputs	RIn,TIN	H	L
Outputs	RovT,TovT	L	H
H-vol-I	Note: Itage high level; ow voltage level		

Order information

Order Number	Package	Package Quantity	Marking On The park	Temperature
MAX202ECSE-TUDI	SOP16	Tape,Reel,2500	MAX202ECSE	0°C to 70°C
MAX202ECUE-TUDI	TSSOP16	Tape,Reel,2500	MAX202ECUE	
MAX202ECPE-TUDI	DIP16	Tube,25,A box of 1000	MAX202ECPE	
MAX202ECWE-TUDI	SMD16	Tape,Reel,1000	MAX202ECWE	
MAX202EESE-TUDI	SOP16	Tape,Reel,2500	MAX202EESE	- 40°C to 85°C
MAX202EEUE-TUDI	TSSOP16	Tape,Reel,2500	MAX202EEUE	
MAX202EEPE-TUDI	DIP16	Tube,25,A box of 1000	MAX202EEPE	
MAX202EEWE-TUDI	SMD16	Tape,Reel,1000	MAX202EEWE	



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°
θ_1	45°TYP	
θ_2	12°TYP	
θ_3	0°	8°
θ_4	0°	10°