+5V, Interface transceiver of RS-232 standard with 0.1μF External Capacitors

■ Description

IC TK202 are a family of RS-232 and V.28 transceivers with integrated charge pump circuitry for single +5V supply operation. The drivers maintain the ±5V EIA/TIA-232E output signal levels at data rates in excess of 120kbps when loaded in accordance with the EIA/TIA-232E specification,particularly applications where ±12V is not available.

Input voltage levels are compatible with standard CMOS levels.

■ Features

- Output voltage levels are compatible with input levels of K-MOS, N-MOS and TTL integrated circuits
- Supply voltage : 5V
- Low input current: 1.0 μA; 0.1 μA at T = 25 °C
- Ultra-low-power, industry-standard pinout
- Output current 24 mA
- Latching current not less than 450 mA at T = 25°C
- Enhanced ESD Specifications(EC and EE_ only):
  ±15kV IEC61000-4-2 Air Discharge
  ±8kV IEC61000-4-2 Contact Discharge

■ Applications

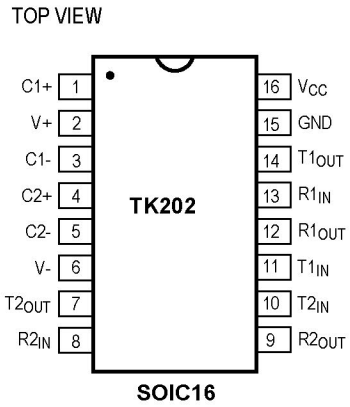
- Battery-Powered Equipment
- Handheld Equipment
- Portable Diagnostics Equipment

■ ORDERING INFORMATION

Part Number	Package	Packing	Temperature(TA)	Package Qty	ESD
TK202CSE	SOIC-16	Reel	0°C ~ 70°C	2500	
TK202ESE	SOIC-16	Reel	-40°C ~ 85°C	2500	
TK202ECSE	SOIC-16	Reel	0°C ~ 70°C	2500	±15KV
TK202EESE	SOIC-16	Reel	-40°C ~ 85°C	2500	±15KV

Note: Please contact us to customize DIP packaging device.

■ Pin Assignment



■ Table of pin description

Pin No.	Symbol	
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	$T2_{OUT}$	Output of transmitter data (levels RS – 232)
08	$R2_{IN}$	Input of receiver data (levels RS – 232)
09	$R2_{OUT}$	Output of receiver data (levels TTL/KMOS)
10	$T2_{IN}$	Input of transmitter data (levels TTL/KMOS)
11	$T1_{IN}$	Input of transmitter data (levels TTL/KMOS)
12	$R1_{OUT}$	Output of receiver data (levels TTL/KMOS)
13	$R1_{IN}$	Input of receiver data (levels RS – 232)
14	$T1_{OUT}$	Output of transmitter data (levels RS – 232)
15	GND	Common output
16	V_{CC}	Supply output of voltage source

■ Maximum conditions

Symbol	Parameter	Rate		Unit
		min	max	
V_{CC}	Supply voltage	-0.3	6.0	V
V+	Transmitter high output voltage	V_{CC} -0.3	10	
V-	Transmitter low output voltage	-0.3	-10	
V_{TIN}	Transmitter input voltage	-0.3	V+ +0.3	
V_{RIN}	Receiver input voltage	-30	30	
P_D	Dissipated power SO - package	-	696	mW
I_{SC}	Output current of transmitter short circuit	-	Continu-ously	mA
Ta	Ambient temperature	-40	85	°C

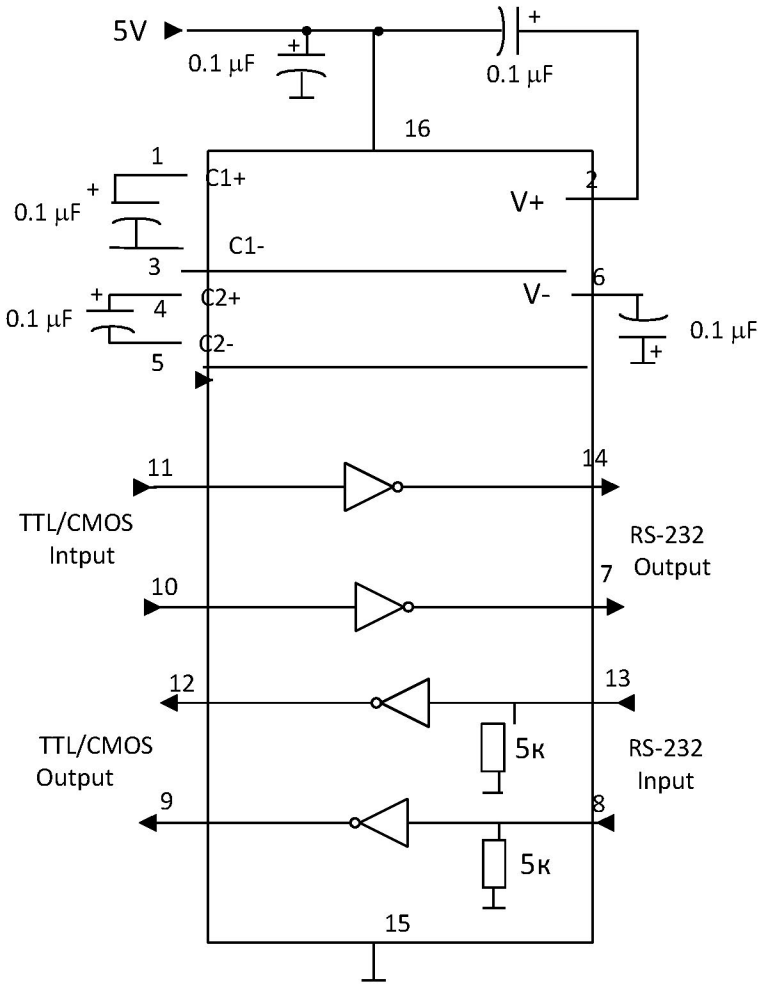
* Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device.

These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

■ Recommended Operating Conditions

Symbol	Parameter	Rate		Unit
		min	max	
V_{CC}	Supply voltage	4.5	5.5	V
V+	Transmitter output high voltage	5.0	-	
V-	Transmitter output low voltage	-5.0	-	
V_{TIN}	Transmitter input voltage	0	V_{CC}	
V_{RIN}	Receiver input voltage	-30	30	
I_{SC}	Transmitter short circuit output current	-	±60	mA
Ta	Ambient temperature	-40	85	°C



■ 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}=5.0 V V_{IL} = 0 V	-	8.0	-	15.0	mA
Receiver electrical parameters							
V_h	Hysteresis voltage	V_{CC}=5.0 V	0.2	0.9	0.2	1.0	V
V_{On}	On (operation) voltage	$V_O \le 0.1$ V $I_{OL} \le 20$ uA	-	2.4	-	2.3	
V_{off}	Off (dropout) voltage	$V_O \ge V_{CC}$ -0.1 V $I_{OH} \le$ -20 uA	0.8	-	0.9	-	
V_{OL}	Output low voltage	I_{OL} = 3.2 mA V_{CC} = 4.5 V V_{IH} = 2.4 V	-	0.3	-	0.4	
V_{OH}	Output high voltage	I_{OH} = -1.0 mA V_{CC} = 4.5 V V_{IL} = 0.8 V	3.6	-	3.5	-	
R_I	Input resistance	V_{CC} = 5.0 V	3.0	7.0	3.0	7.0	kOhm
Transmitter electrical parameters							
V_{OL}	Output low voltage	V_{CC} = 4.5 V V_{IH} = 2.0 V R_L = 3.0 kOhm	-	-5.2	-	-5.0	V
V_{OH}	Output high voltage	V_{CC} = 4.5 V V_{IL} = 0.8 V R_L = 3.0 kOhm	5.2	-	5.0	-	
I_{IL}	Input low current	V_{CC} =5.5 V V_{IL} = 0 V	-	-1.0	-	-10.0	uA
I_{IH}	Input high current	V_{CC} =5.5 V V_{IH} = V_{CC}		1.0		10.0	
SR	Speed of output front change	V_{CC} =5.0 V C_L =50 - 1000 pF R_L = 3.0 - 7.0 kOhm	3.0	30	2.7	27	V/μs
R_O	Output resistance	V_{CC} = V+ = V- = 0 V V_O = ± 2 V	350	-	300	-	Ohm
I_{SC}	Short circuit output current	V_{CC} =5.5 V V_O = 0 V V_I = V_{CC} V_I = 0 V		-50 50		-60 60	mA
ST	Speed of information transmission	V_{CC} =4.5 V C_L = 1000 pF R_L = 3.0 kOhm t_W = 7us (for extreme -t_W = 8us)	140	-	120	-	kbps

■ Dynamic parameters

Symbol	Parameter	Test conditions	Rate				Unit
			25 °C		from -40 °C to 85 °C		
			min	max	min	max	
t_{PHLR} (t_{PLHR})	Signal propagation delay time when switching on (off)	V_{CC} = 4.5 V C_L = 150 pF V_{IL} = 0 V V_{IH} = 3.0 V $t_{LH} = t_{HL} \leq 10$ ns	-	9.7	-	10	us
t_{PHLT} (t_{PLHT})	Signal propagation delay time when switching on (off)	V_{CC} = 4.5 V C_L = 2500 pF V_{IL} = 0 V V_{IH} = 3.0 V R_L = 3 kOhm $t_{LH} = t_{HL} \leq 10$ ns		5.0*		6.0*	

■ Capacitance

Symbol	Parameter	V_{CC},	Rate	Unit
C_{IN}	Input capacitance	5.0	9.0	pF
C_{PD}	Dynamic capacitance		90	

Timing diagram when measuring IC dynamic parameters

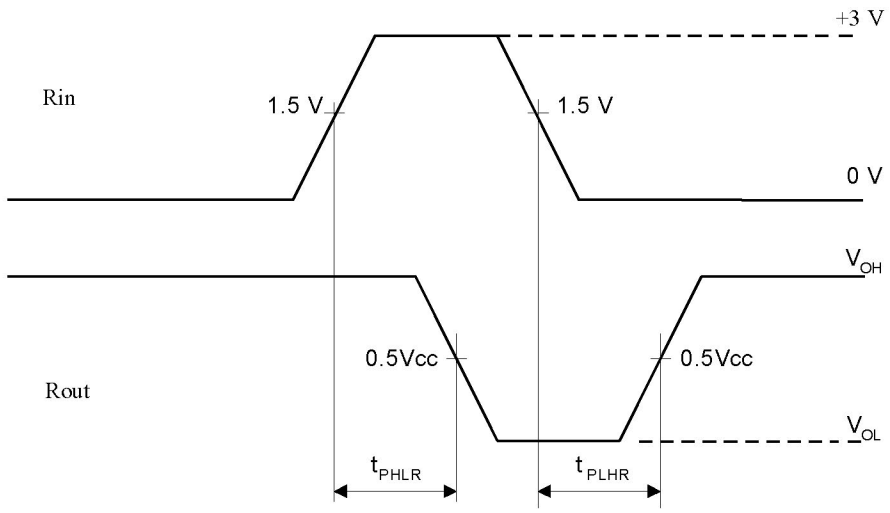


Figure 3

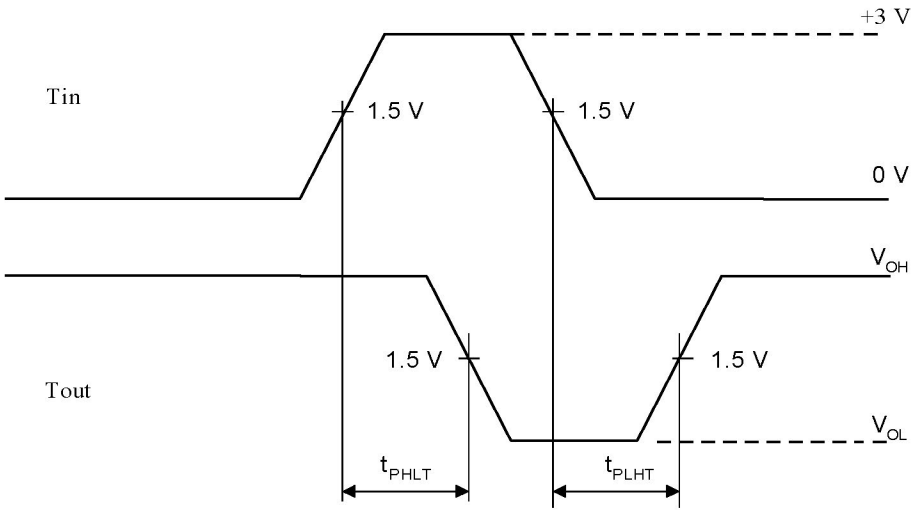


Figure 4

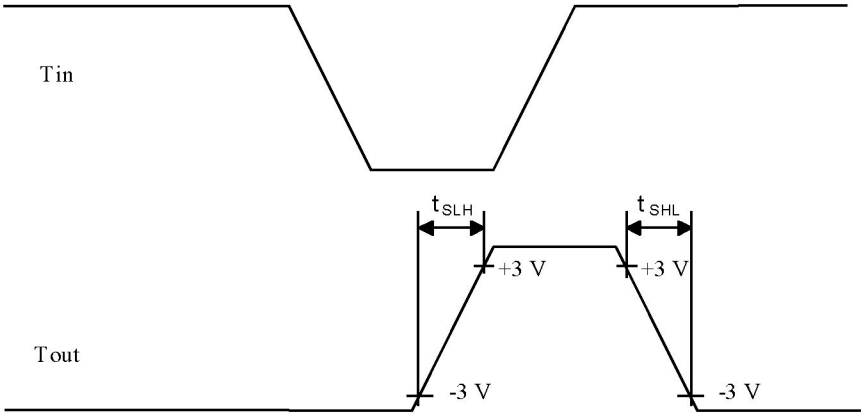


Figure 5

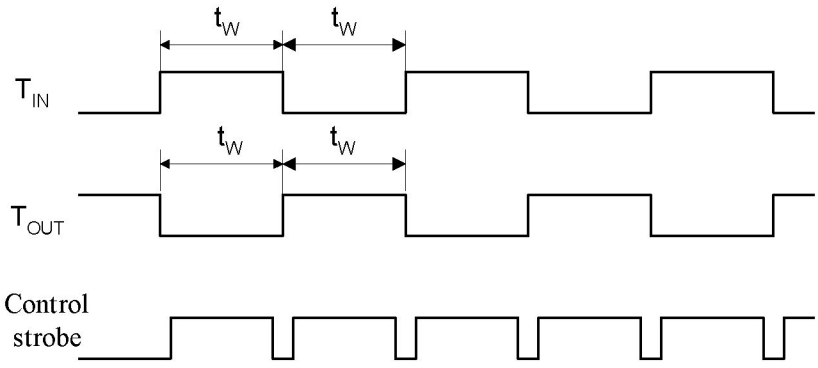
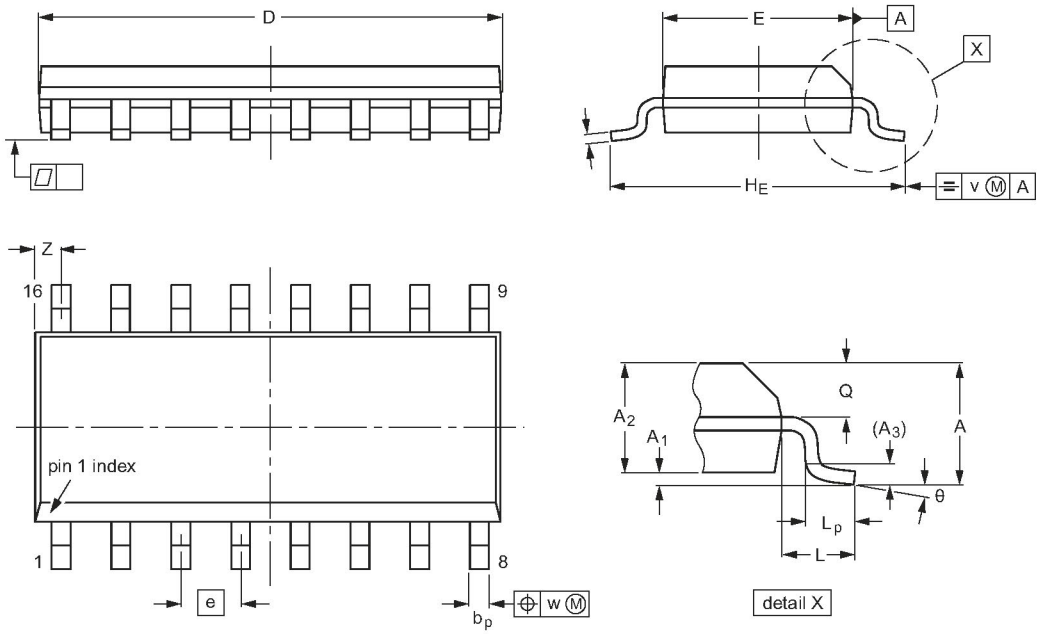


Figure 6

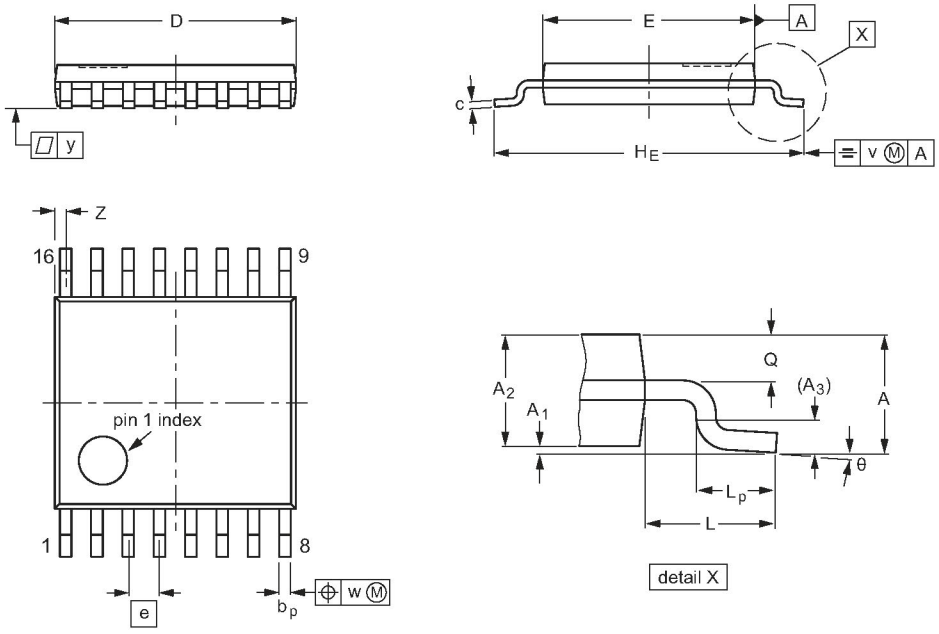
SOIC16: plastic small outline package; 16 leads; body width 3.9 mm



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.40 0.06	8° 0°