

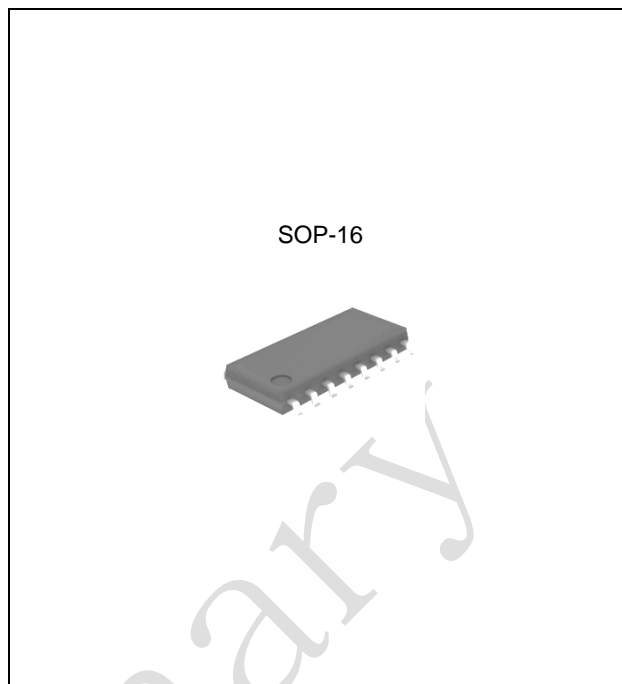
**DESCRIPTION**

The TJ232ED is purposed for application in high-performance information processing systems and control devices of wide application.

Input voltage levels are compatible with standard CMOS levels.

**FEATURES**

- Output voltage levels are compatible with input levels of C-MOS, N-MOS and TTL integrated circuits.
- Meets All EIA/TIA-232E and V.28/V.24 Specifications
- Supply voltage range from 4.5 to 5.5V
- Low input current: 1.0uA; 0.1uA at T=25°C
- Output current 24mA
- Tolerable value of static potential not less than 2000V

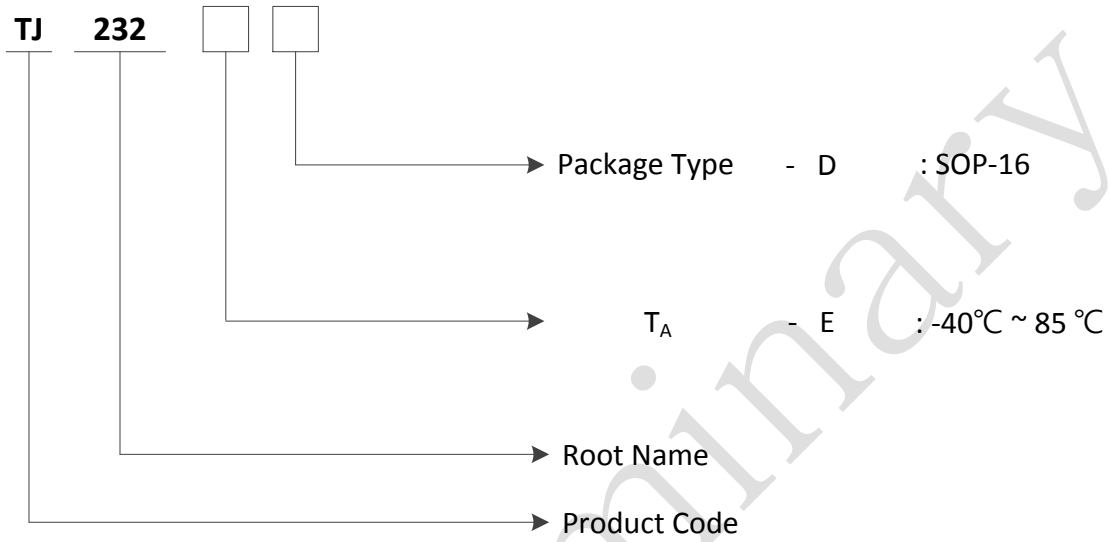
**TRUTH TABLE**

Inputs	Outputs
R <sub>IN</sub> , T <sub>IN</sub>	R <sub>OUT</sub> , T <sub>OUT</sub>
L	H
H	L
Note - H: High voltage level L: Low voltage level	

**Interface transceiver of RS-232 standard with one supply voltage TJ232**

**Ordering Information**

Package	Oder No.	Description	Marking	Compliance	Status
SOP-16	TJ232ED	Interface transceiver of RS-232	TJ232E	RoHS, Green	Active



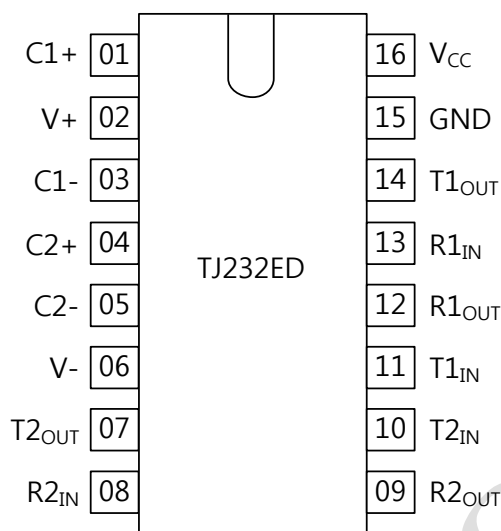
**Absolute Maximum Ratings**

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	$V_{CC}$	-0.3	6.0	V
Transmitter high output voltage	$V_{+}$	$V_{CC}-0.3$	14	V
Transmitter low output voltage	$V_{-}$	-0.3	-14	V
Transmitter input voltage	$V_{TIN}$	-0.3	$V_{+} + 0.3$	V
Receiver input voltage	$V_{RIN}$	-30	30	V
Dissipated power	$P_D$	-	762	mW
Output current of transmitter short circuit	$I_{SC}$	-	continuously	mA
Storage Temperature Range	$T_{STG}$	-65	150	°C

**Operating Ratings**

Characteristic	Symbol	Min	Max	Unit
Supply Voltage	$V_{CC}$	4.5	5.5	V
Transmitter high output voltage	$V_{+}$	5.0	-	V
Transmitter low output voltage	$V_{-}$	-5.0	-	V
Transmitter input voltage	$V_{TIN}$	0	$V_{CC}$	V
Receiver input voltage	$V_{RIN}$	-30	30	V
Output current of transmitter short circuit	$I_{SC}$	-	±60	mA
Ambient Temperature Range	$T_A$	-40	+85	°C

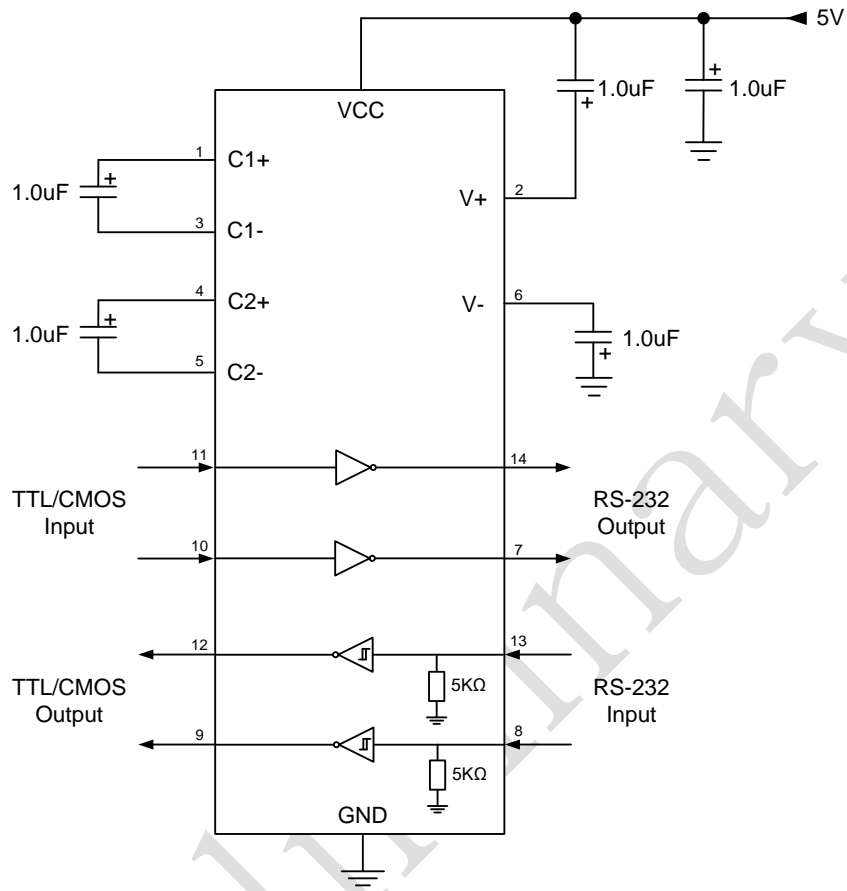
## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	Symbol	Pin name
1	C1+	Output of external capacitance of positive voltage multiplier unit
2	V+	Output of positive voltage of multiplier unit
3	C1-	Output of external capacitance of positive voltage multiplier unit
4	C2+	Output of external capacitance of negative voltage multiplier unit
5	C2-	Output of external capacitance of negative voltage multiplier unit
6	V-	Output of negative voltage of multiplier unit
7	T2 <sub>OUT</sub>	Output of transmitter data (levels RS-232)
8	R2 <sub>IN</sub>	Input of receiver data (levels RS-232)
9	R2 <sub>OUT</sub>	Output of receiver data (levels TTL/CMOS)
10	T2 <sub>IN</sub>	Input of transmitter data (levels TTL/CMOS)
11	T1 <sub>IN</sub>	Input of transmitter data (levels TTL/CMOS)
12	R1 <sub>OUT</sub>	Output of receiver data (levels TTL/CMOS)
13	R1 <sub>IN</sub>	Input of receiver data (levels RS-232)
14	T1 <sub>OUT</sub>	Output of transmitter data (levels RS-232)
15	GND	Common output
16	V <sub>CC</sub>	Supply output of voltage source

TYPICAL APPLICATION CIRCUIT



**STATIC PARAMETERS**

PARAMETER	Symbol	CONDITIONS	Rate				UNITS	
			25°C		-40°C ~ 85°C			
			min	max	min	max		
Supply Current	I <sub>CC</sub>	V <sub>CC</sub> = 5.5V V <sub>IL</sub> = 0V	-	10.0	-	14.0	mA	
<b>Receiver electrical parameters</b>								
Hysteresis voltage	V <sub>h</sub>	V <sub>CC</sub> = 5.0V	0.2	0.9	0.2	1.0	V	
On(operation) voltage	V <sub>on</sub>	V <sub>O</sub> ≤ 0.1V I <sub>OL</sub> ≤ 20uA	-	2.4	-	2.3	V	
Off (dropout) voltage	V <sub>off</sub>	V <sub>O</sub> ≥ V <sub>CC</sub> - 0.1V I <sub>OH</sub> ≤ -20uA	0.8	-	0.9	-	V	
Output low voltage	V <sub>OL</sub>	I <sub>L</sub> = 3.2mA V <sub>CC</sub> = 4.5V V <sub>IH</sub> = 2.4V	-	0.3	-	0.4	V	
Output high voltage	V <sub>OH</sub>	I <sub>OH</sub> = -1.0mA V <sub>CC</sub> = 4.5V V <sub>IL</sub> = 0.8V	3.6	-	3.5	-	V	
Input resistance	R <sub>i</sub>	V <sub>CC</sub> = 5.0V	3.0	7.0	3.0	7.0	KΩ	
<b>Transmitter electrical parameters</b>								
Output low voltage	V <sub>OL</sub>	V <sub>CC</sub> = 4.5V V <sub>IH</sub> = 2.0V R <sub>L</sub> = 3.0KΩ	-	-5.2	-	-5.0	V	
Output high voltage	V <sub>OH</sub>	V <sub>CC</sub> = 4.5V V <sub>IL</sub> = 0.8V R <sub>L</sub> = 3.0KΩ	5.2	-	5.0	-	V	
Input low current	I <sub>IL</sub>	V <sub>CC</sub> = 5.5V V <sub>IL</sub> = 0V	-	-1.0	-	-10.0	uA	
Input high current	I <sub>IH</sub>	V <sub>CC</sub> = 5.5V V <sub>IH</sub> = V <sub>CC</sub>	-	1.0	-	10.0	uA	
Speed of output front charge	SR	V <sub>CC</sub> = 5.0V C <sub>L</sub> = 50 - 1000pF R <sub>L</sub> = 3.0 - 7.0KΩ	3.0	30	2.7	27	V/us	
Output resistance	R <sub>O</sub>	V <sub>CC</sub> = V <sub>+</sub> = V <sub>-</sub> = 0V V <sub>O</sub> = ±2V	350	-	300	-	Ω	
Short circuit output current	I <sub>sc</sub>	V <sub>CC</sub> = 5.5V V <sub>O</sub> = 0V	V <sub>I</sub> = V <sub>CC</sub>	-	-50	-	-60	mA
			V <sub>I</sub> = 0	-	50	-	60	
Speed of information transmission	ST	V <sub>CC</sub> = 4.5V C <sub>L</sub> = 1000pF R <sub>L</sub> = 3.0KΩ t <sub>w</sub> = 7us (for extreme, t <sub>w</sub> = 8us)	140	-	120	-	Kbit/s	

**DYNAMIC PARAMETERS**

PARAMETER	Symbol	CONDITIONS	Rate				UNITS
			25°C		-40°C ~ 85°C		
			min	max	min	max	
Signal propagation delay Time when switching on (off)	$t_{PHLR}$ ( $t_{PLHR}$ )	$V_{CC} = 4.5V$ $C_L = 150pF$ $V_{IL} = 0V$ $V_{IH} = 3.0V$ $t_{LH} = t_{HL} \leq 10ns$	-	9.7	-	10	us
Signal propagation delay Time when switching on (off)	$t_{PLHT}$ ( $t_{PLHT}$ )	$V_{CC} = 4.5V$ $C_L = 2500pF$ $V_{IL} = 0V$ $V_{IH} = 3.0V$ $R_L = 3K\Omega$ $t_{LH} = t_{HL} \leq 10ns$	-	5.0	-	6.0	us

**CAPACITANCE**

PARAMETER	Symbol	VCC [V]	Rate	UNIT
Input Capacitance	$C_{IN}$	5.0	9.0	pF
Dynamic Capacitance	$C_{PD}$	5.0	90	pF

TIMING DIAGRAM

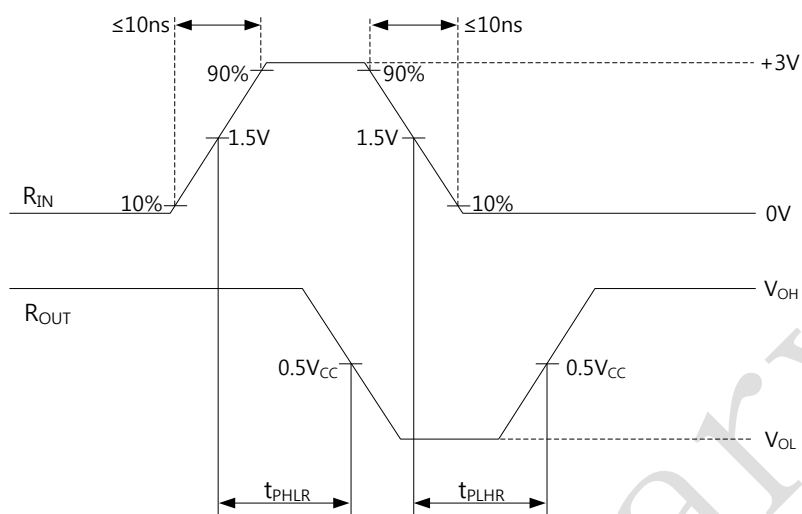


Figure 1.  $t_{PHL}$  and  $t_{PLH}$  waveforms of Receiver

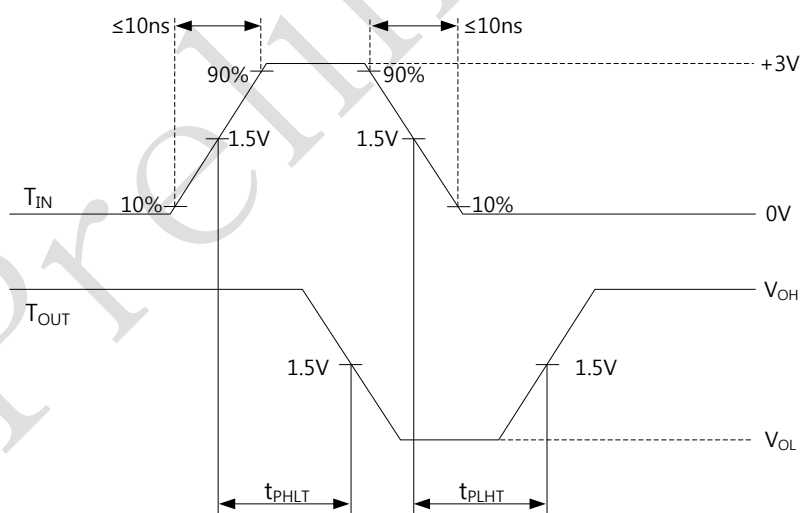


Figure 2.  $t_{PHL}$  and  $t_{PLH}$  waveforms of Transmitter



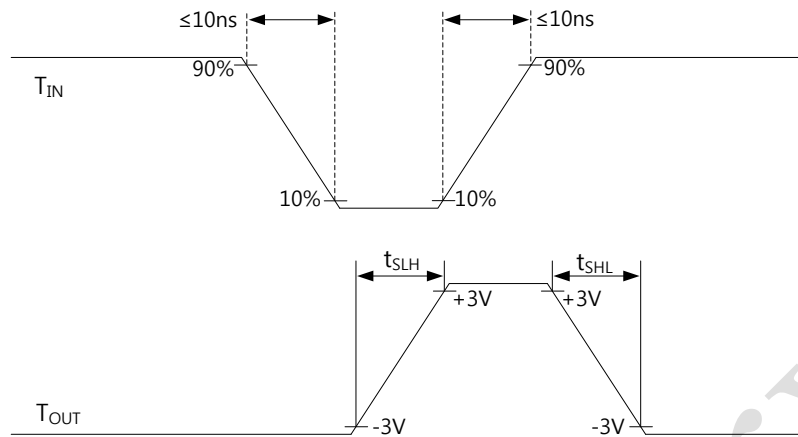


Figure 3.  $t_{\text{SLH}}$  and  $t_{\text{SHL}}$  waveforms of Transmitter

Preliminary

**PRELIMINARY REVISION NOTICE**

The information in this datasheet can be revised without any notice.

Preliminary