Interface transceiver of RS-232 standard with one supply voltage

KKX232-3.3

IC KKX232-3.3 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.

- Output voltage levels are compatible with input levels of K-MOS, N-MOS and TTL integrated circuits.
- Supply voltage : 3.3V
- Low input current: 1.0 μA; 0.1 μA at T = 25 °C.
- Output current 24 mA.
- Latching current not less than 450 mA at T = 25°C
- Tolerable value of static potential not less than 2000V

N SUFFIX
PLASTIC

16

1

D SUFFIX
SOIC

16

1

IC marking in package
KKX232-3.3N Plastic DIP
KKX232-3.3D   SOIC
T_A= from -40 to 85 °C
For all packages
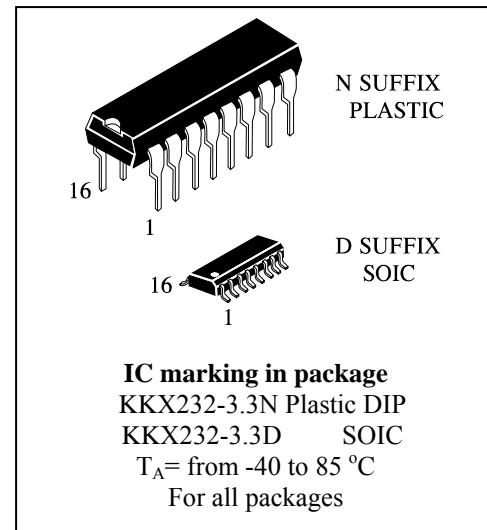
Truth table

Inputs	Outputs
R_{IN}, T_{IN}	R_{OVT}, T_{OVT}
H	L
L	H
Note - H – voltage high level; L – low voltage level	

Pin symbols in package

C1+	01	16 V_{CC}
V+	02	15 GND
C1-	03	14 T1$_{OUT}$
C2+	04	13 R1$_{IN}$
C2-	05	12 R1$_{OUT}$
V-	06	11 T1$_{IN}$
T2$_{OUT}$	07	10 T2$_{IN}$
R2$_{IN}$	08	09 R2$_{OUT}$

KKX232
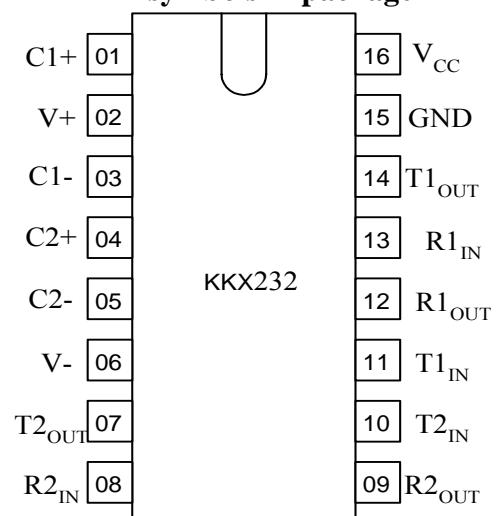
Table of pin description

| 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	$T2_{OUT}$	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	14	
V-	Transmitter low output voltage	-0.3	-14	
V_{TIN}	Transmitter input voltage	-0.3	V+ +0.3	
V_{RIN}	Receiver input voltage	-30	30	
P_D	Dissipated power DIP – package SO - package	-	842 762	mW
I_{SC}	Output current of transmitter short circuit	-	Continu-ously	mA
Ta	Ambient temperature	-60	150	^{O}C

Recommended Operating Conditions

Symbol	Parameter	Rate		Unit
		min	max	
V_{CC}	Supply voltage	3.0	5.5	V
V+	Transmitter output high voltage	Vcc	-	
V-	Transmitter output low voltage	-Vcc	-	
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	^{O}C
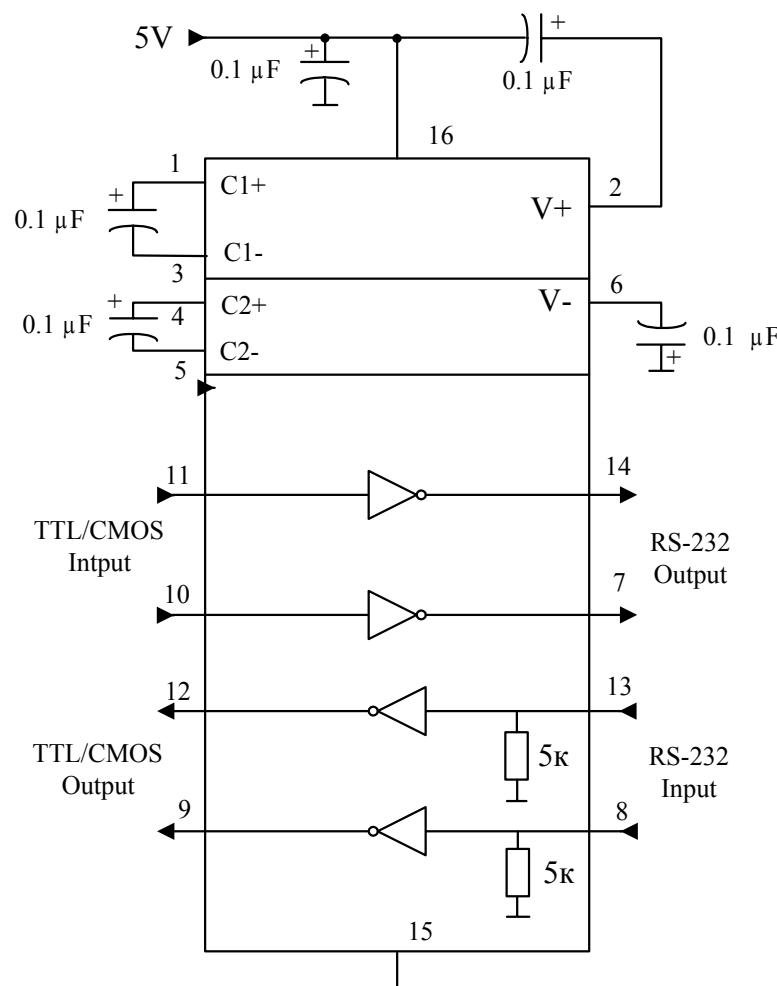
Static parameters

Symbol	Parameter	Test conditions	Rate				Unit
			25°C		-40 °C to 85 °C		
			min	max	min	max	
I_{CC}	Consumption current static	V_{CC} = 3.3 V V_{IL} = 0 V	-	10.0	-	14.0[*]	mA
Receiver electrical parameters							
V_h	Hysteresis voltage	V_{CC} = 3.3 V	0.2	0.9	0.2	1.0	V
V_{On}	On (operation) voltage	$V_O \leq$ 0.1 V $I_{OL} \leq$ 20 μA	-	2.4	-	2.3	
V_{off}	Off (dropout) voltage	$V_O \geq V_{CC}$ -0.1 V $I_{OH} \leq$ -20 μA	0.6	-	0.7	-	
V_{OL}	Output low voltage	I_{OL} = 3.2 мA V_{CC} = 3.0 V V_{IH} = 2.4 V	-	0.3	-	0.4	
V_{OH}	Output high voltage	I_{OH} = -1.0 мA V_{CC} = 3.0 V V_{IL} = 0.8 V	2.4	-	2.3	-	
R_I	Input resistance	V_{CC} =3.3 V	3.0	7.0	3.0	7.0	kOhm
Transmitter electrical parameters							
V_{OL}	Output low voltage	V_{CC} = 3.0 V V_{IH} = 2.0 V R_L = 3.0 kOhm	-	-3.5	-	-3.3	V
V_{OH}	Output high voltage	V_{CC} = 3.0 V V_{IL} = 0.8 V R_L = 3.0 kOhm	3.5	-	3.3	-	
I_{IL}	Input low current	V_{CC} = 3.3 V V_{IL} = 0 V	-	-1.0	-	-10.0	μA
I_{IH}	Input high current	V_{CC} = 3.3 V $V_{IH} = V_{CC}$		1.0		10.0	
SR	Speed of output front change	V_{CC} = 3.3 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 $V_O = \pm$ 2 V	350	-	300	-	Ohm
I_{SC}	Short circuit output current	V_{CC} = 3.3 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} = 3.0 V C_L = 1000 pF R_L = 3.0 kOhm t_W = 7 μs (for extreme -t_W = 8mks)	140	-	120	-	kbit/s

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)	$V_{CC} = 3.0$ V $C_L = 150$ pF $V_{IL} = 0$ V $V_{IH} = 3.0$ V $t_{LH} = t_{HL} \leq 10$ ns	-	9.7	-	10	μs
t_{PHLT} (t_{PLHT})	Signal propagation delay time when switching on (off)	$V_{CC} = 3.0$ 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	3.3	9.0	pF
C_{PD}	Dynamic capacitance		90	

Timing diagram when measuring IC dynamic parameters

Figure 3

Tin

+3 V

1.5 V   1.5 V

0 V

V$_{OH}$

Tout

1.5 V   1.5 V

V$_{OL}$

t$_{PHLT}$ t$_{PLHT}$

Figure 4

Tin

t$_{SLH}$ t$_{SHL}$

+3 V   +3 V

Tout

-3 V   -3 V

Figure 5

t$_W$ t$_W$

T$_{IN}$

t$_W$ t$_W$

T$_{OUT}$

Control strobe
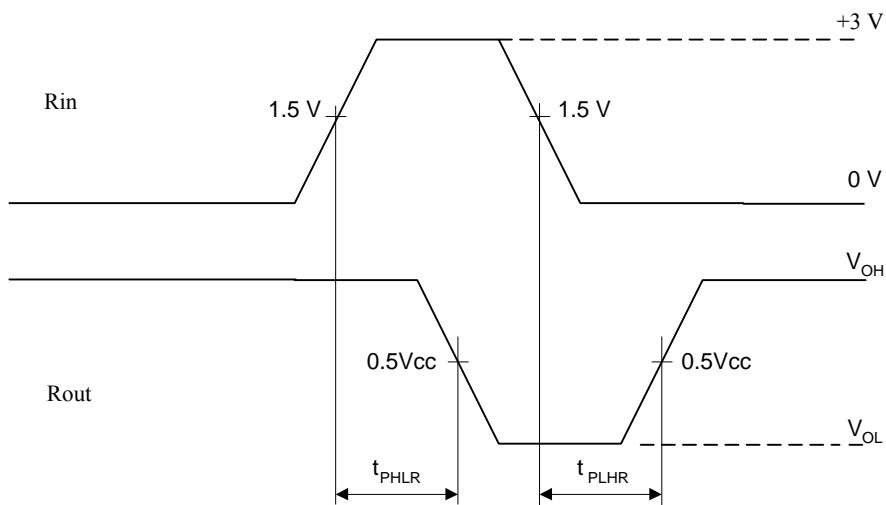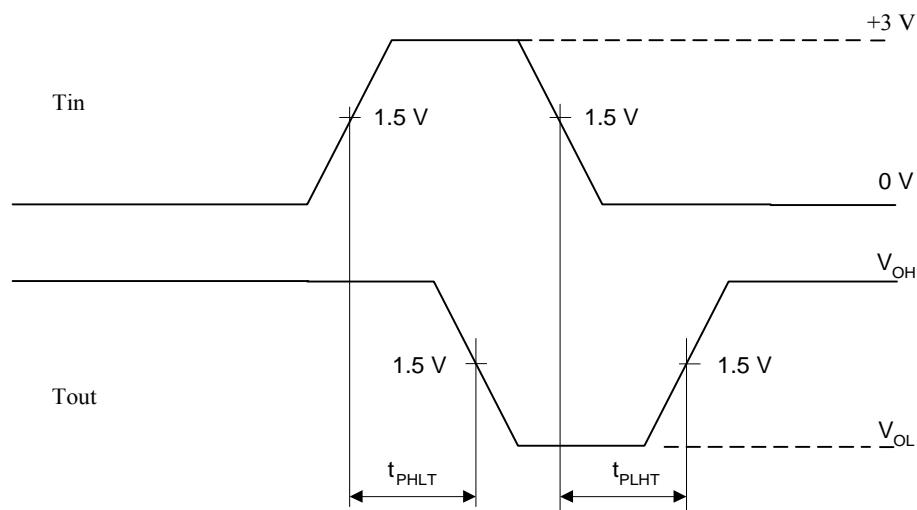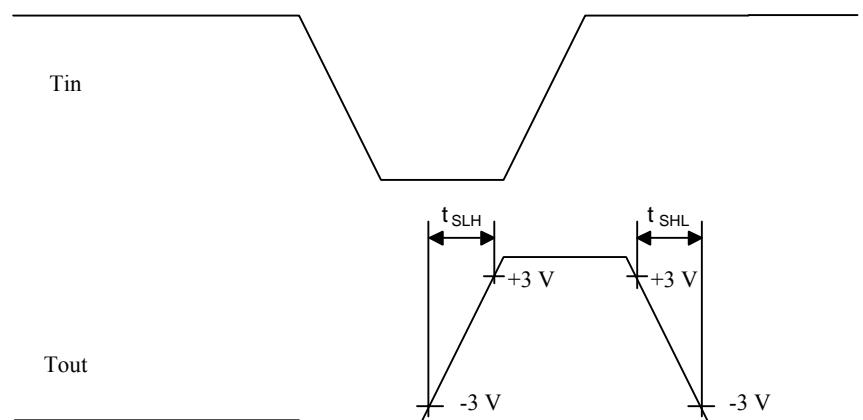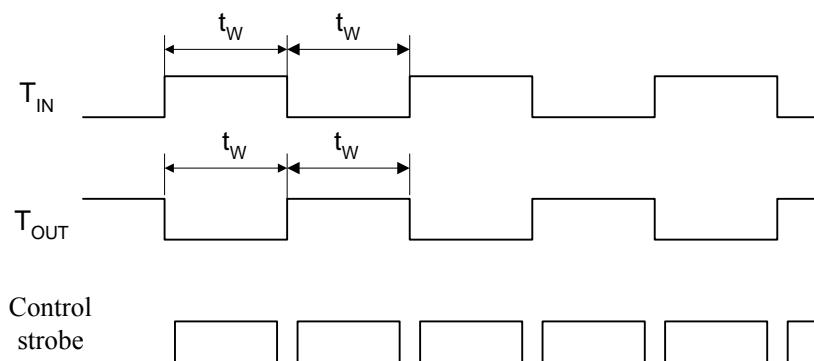
Figure 6

N SUFFIX PLASTIC DIP
(MS - 001BB)

	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	
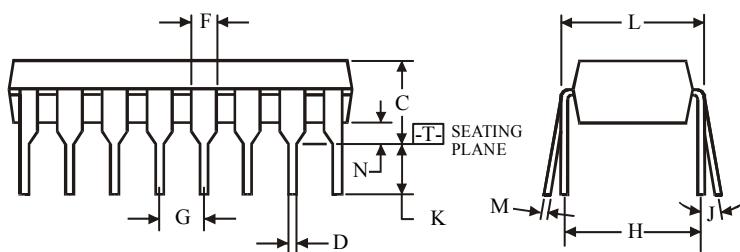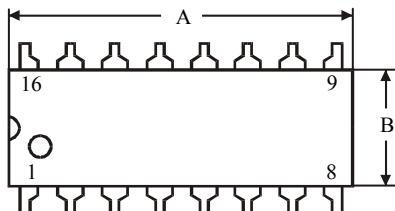
⊕ 0.25 (0.010) Ⓜ T

NOTES:

1. Dimensions "A", "B" do not include mold flash or protrusions.

   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

D SUFFIX SOIC
(MS - 012AC)
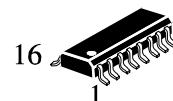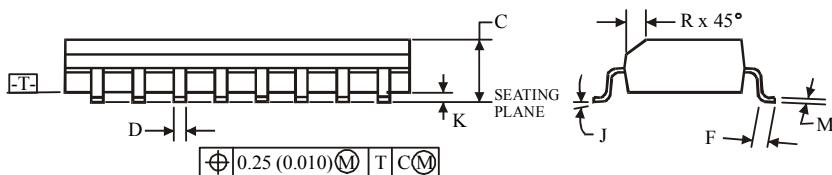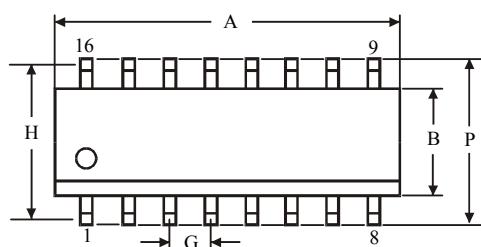
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	9.8	10
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

⊕ 0.25 (0.010) Ⓜ T CⓂ

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.

2. Maximum mold flash or protrusion 0.15 mm (0.006) per side
   for A; for B – 0.25 mm (0.010) per side.