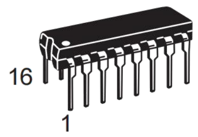
INTERFACE TRANSCEIVER OF RS-232 STANDARD WITH ONE SUPPLY VOLTAGE

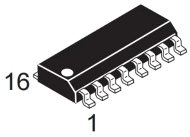
DESCRIPTION

IC HGX232 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 C-MOS, N-MOS and TTL integrated circuits.
- Supply voltage range from 2.0 to 6.0 V.
- Low input current: 1.0 mkA; 0.1 mkA at Ta= 25℃
- Output current 24 mA.
- Latching current not less than 450 mA at Ta= 25℃
- Tolerable value of static potential not less than 2000V



DIP16



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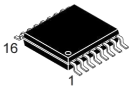


TSSOP16

ORDERING INFORMATION

DEVICE	Package Type	MARKING	Packing	Packing Qty
HGX232ECN	DIP16	HGX232	TUBE	1000pcs/box
HGX232ECM/TR	SOP16	HGX232	REEL	2500pcs/reel
HGX232ECMT/TR	TSSOP16	HGX232	REEL	2500pcs/reel
HGX232EIN	DIP16	HGX232	TUBE	1000pcs/box
HGX232EIM/TR	SOP16	HGX232	REEL	2500pcs/reel
HGX232EIMT/TR	TSSOP16	HGX232	REEL	2500pcs/reel

Pin symbols in package

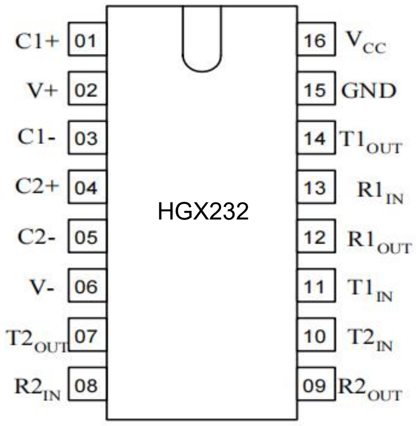


Table of pin description

	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	$R2_{IN}$	Input of receiver data (levels RS – 232)
09	R2OUT	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	R1OUT	Output of receiver data (levels TTL/KMOS)
13	$R1_{IN}$	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

Truth table

Inputs	Outputs
RIN, TIN	ROUT, TOUT
H	L
L	H
Note -H – voltage high level;L – low voltage level	

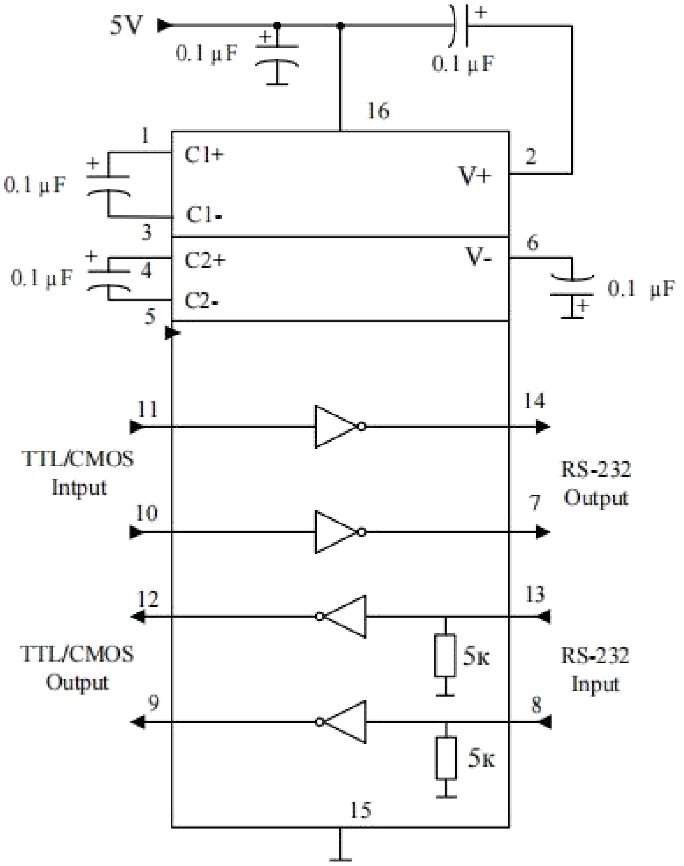
Maximum conditions

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	-		mW
	DIP – package		842	
	SOP - package		762	
I_{SC}	Output current of transmitter short circuit	-	Continu-ously	mA
Ta	Ambient temperature	-60	150	˚C

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	HGX232EC	0	70	˚C
		HGX232EI	-40	85	

TYPICAL APPLICATION



ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test conditions	Rate				Unit
			25℃		-40℃ to 85℃		
			min	max	min	max	
I_{CC}	Consumptioncurrent static	V_{CC} =5.5 VV_{IL} = 0 V	-	10.0	-	14.0	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	$V_O \leqq$ 0.1 V $I_{OL} \leqq$ 20 mkA	-	2.4	-	2.3	
V_{off}	Off (dropout) voltage	$V_O \geqq V_{CC}$ -0.1 V $I_{OH} \leqq$ -20 mkA	0.8	-	0.9	-	
V_{OL}	Output low voltage	I_{OL} = 3.2 мA V_{CC} = 4.5 V V_{IH} = 2.4 V	-	0.3	-	0.4	
V_{OH}	Output high voltage	I_{OH} = -1.0 мA 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	mkA
I_{IH}	Input high current	V_{CC} =5.5 V $V_{IH} = V_{CC}$		1.0		10.0	
SR	Speed of outputfront 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/mks
R_O	Output resistance	V_{CC} = V+ = V- = 0V V_O = 2 V	350	-	300	-	Ohm
I_{SC}	Short circuit output current	V_{CC} =5.5 V V_O = 0V $V_I = V_{CC}$ V_I = 0V		-50 50		-60 60	mA
ST	Speed of information transmission	V_{CC} =4.5 V C_L = 1000pF R_L = 3.0 kOhm t_W = 7mks (for extreme -t_W = 8mks)	140	-	120	-	kbit/c

Symbol	Parameter	Test conditions	Rate				Unit
			25℃		-40℃ to 85℃		
			min	max	min	max	
tPHLR (tPLHR)	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 tLH = tHL≦10 ns	-	9.7	-	10	mks
tPHLT (tPLHT)	Signal propagation delay time when switching on (off)	V_{CC} = 4.5 V C_L = 2500 pFV_{IL} = 0 V V_{IH} = 3.0 V R_L = 3 kOhm tLH = tHL≦10 ns		5.0*		6.0*	

Capacitance

Symbol	Parameter	VCC,V	Rate	Unit
CIN	Input capacitance	5.0	9.0	pF
CPD	Dynamic capacitance		90	

Timing diagram when measuring IC dynamic parameters

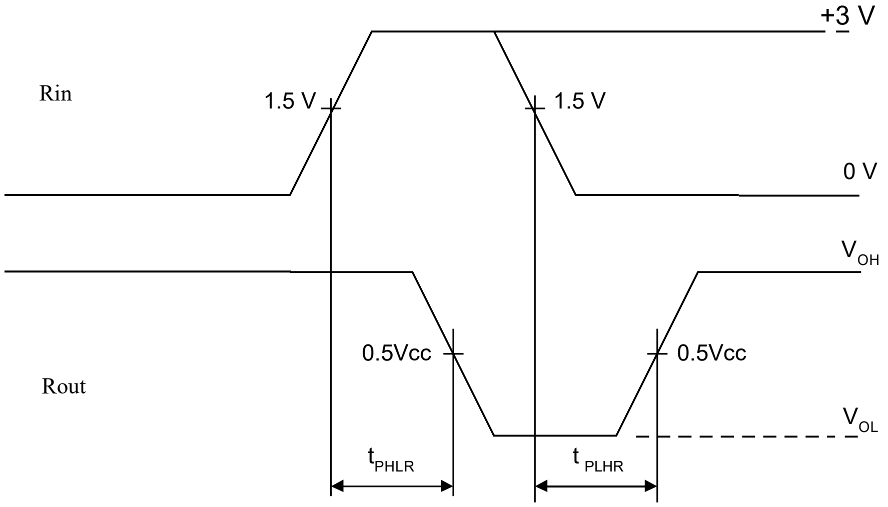


Figure 3

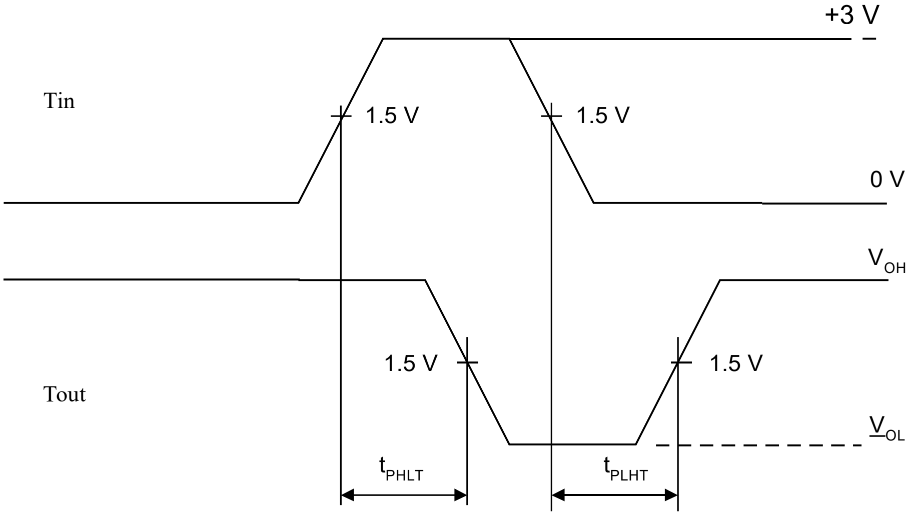


Figure 4

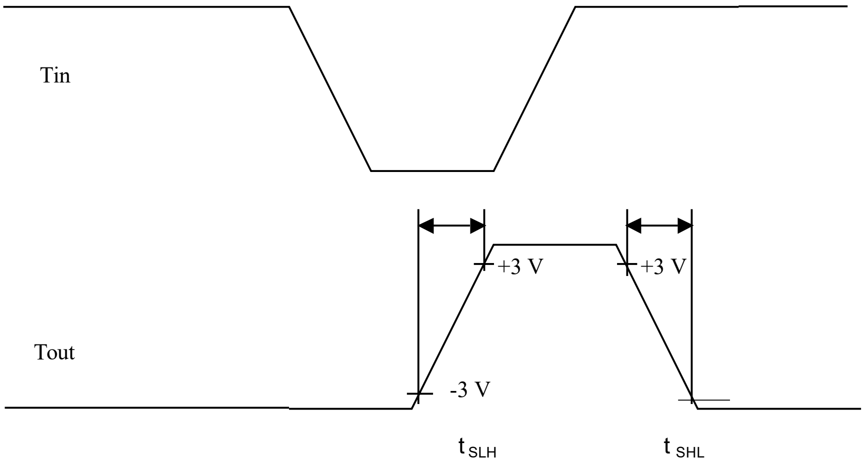


Figure 5

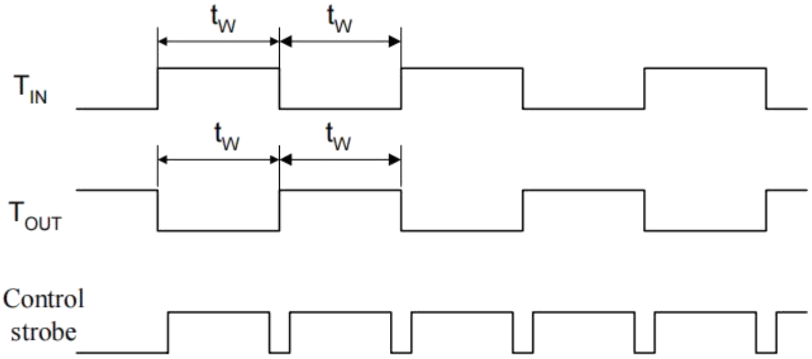
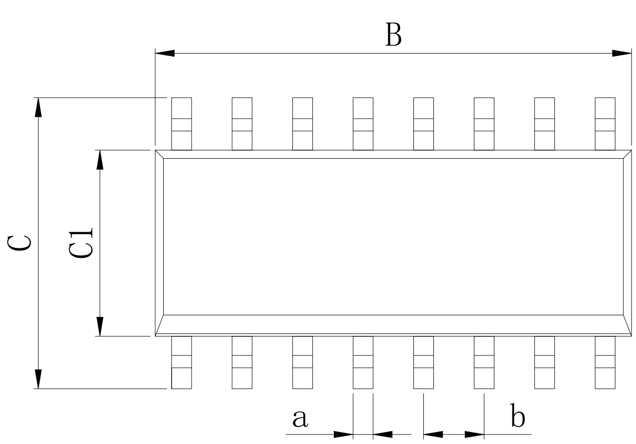
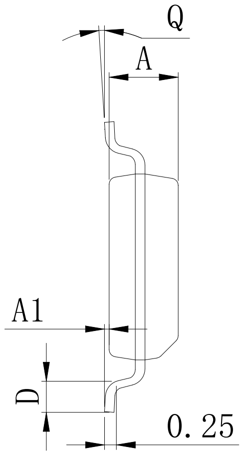


Figure 6

Physical Dimensions

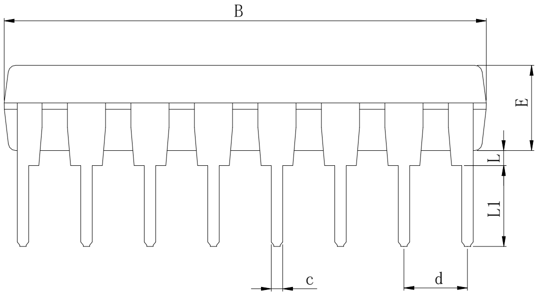
SOP16

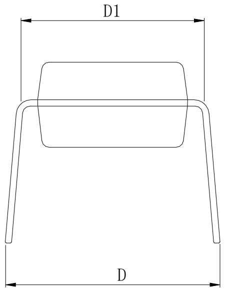


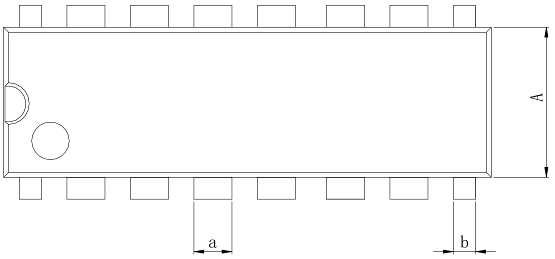


Dimensions In Millimeters(SOP16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

DIP16

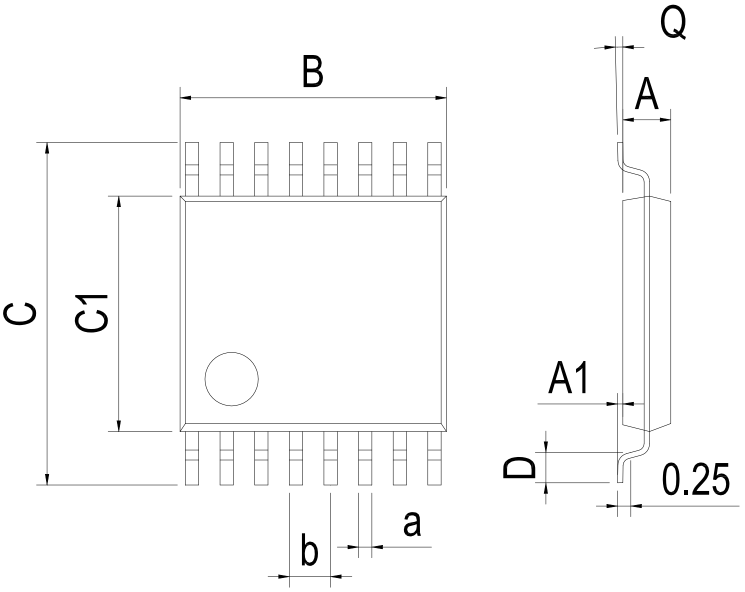






Dimensions In Millimeters(DIP16)											
Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

TSSOP16



Dimensions In Millimeters(TSSOP16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	

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