



Description

MAX232CSE 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.

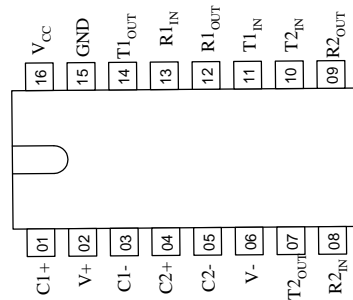
Features

- Output voltage levels are compatible with input levels of K-MOS, N-MOS and TTL integrated circuits.
- Low input current: 1.0 μ A; 0.1 μ A 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

APPLICATIONS

- Portable Computers
- Battery-Powered RS-232 Systems
- Interface Translation
- Low-Power Modems
- Terminals

Pin Configuration



SOP -16
(SOIC-16)

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



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	

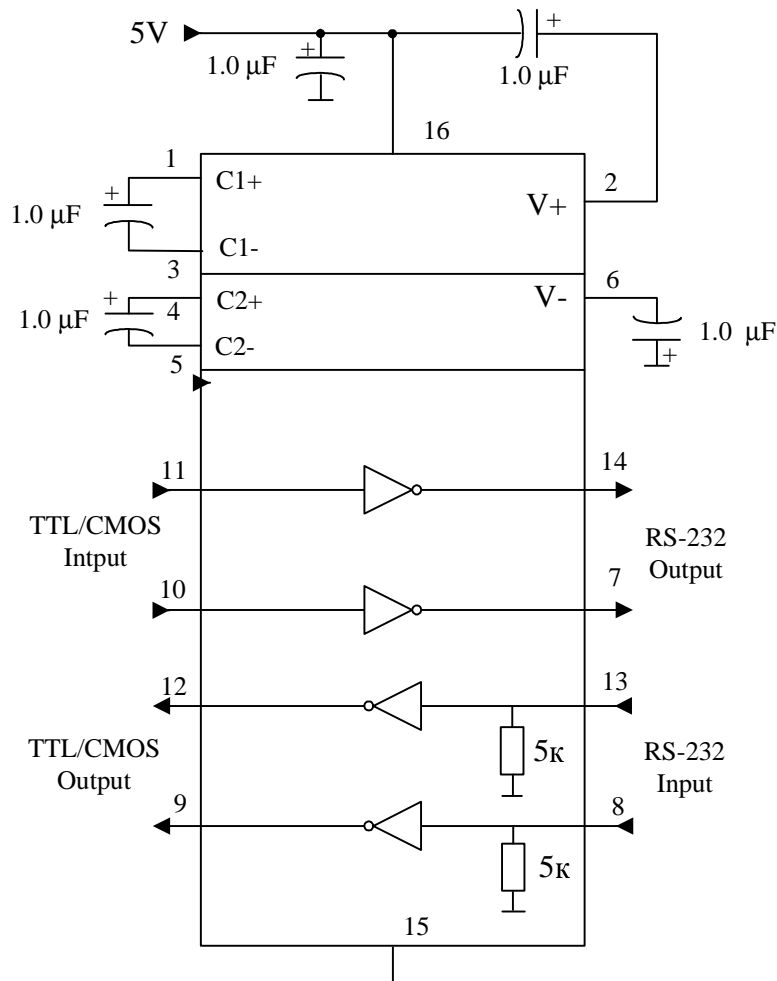
Maximum conditions

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	-	Continuously	mA
T_a	Ambient temperature	-60	150	$^{\circ}C$



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
T_a	Ambient temperature	-40	85	$^{\circ}C$





Static parameters

Symbol	Parameter	Test conditions	Rate				Unit
			25°C		от -40 °C до 85 °C		
			min	max	min	max	
I _{CC}	Consumption current static	V _{CC} = 5.5 V V _{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 ≤ 0.1 V I _{OL} ≤ 20 mA	-	2.4	-	2.3	
V _{off}	Off (dropout) voltage	V _O ≥ V _{CC} - 0.1 V I _{OH} ≤ -20 μA	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	μA
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/mks
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 = 7μS (for extreme -t _w = 8μS)	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)	$V_{CC} = 4.5\text{ V}$ $C_L = 150\text{ pF}$ $V_{IL} = 0\text{ V}$ $V_{IH} = 3.0\text{ V}$ $t_{LH} = t_{HL} \leq 10\text{ ns}$	-	9.7	-	10	μS
t_{PHLT} (t_{PLHT})	Signal propagation delay time when switching on (off)	$V_{CC} = 4.5\text{ V}$ $C_L = 2500\text{ pF}$ $V_{IL} = 0\text{ V}$ $V_{IH} = 3.0\text{ V}$ $R_L = 3\text{ k}\Omega$ $t_{LH} = t_{HL} \leq 10\text{ ns}$		5.0*		6.0*	

Capacitance

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

Timing diagram when measuring IC dynamic parameters

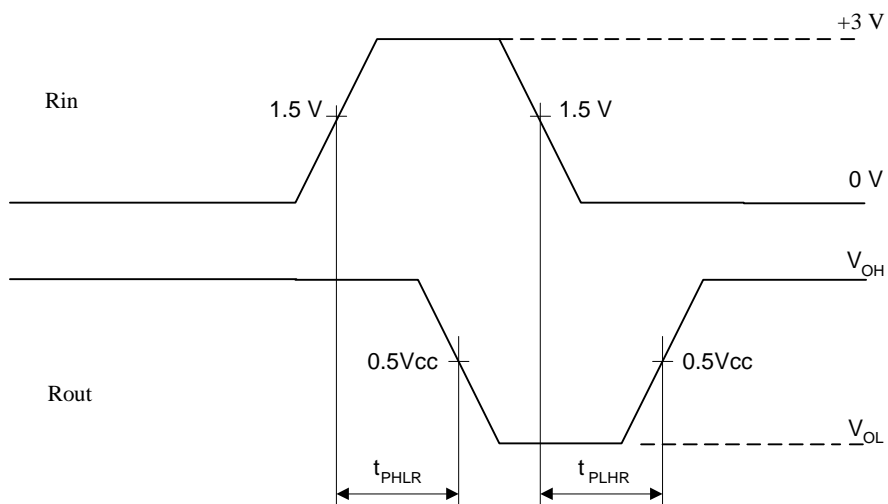


Figure 3

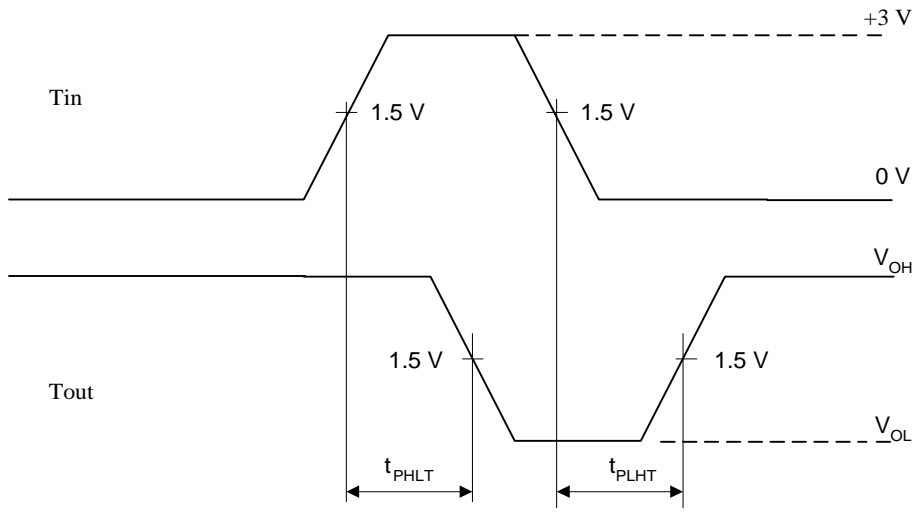


Figure 4

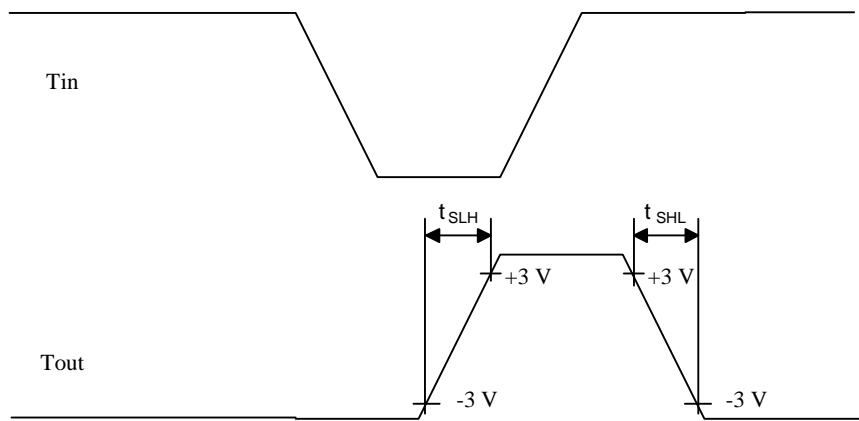


Figure 5

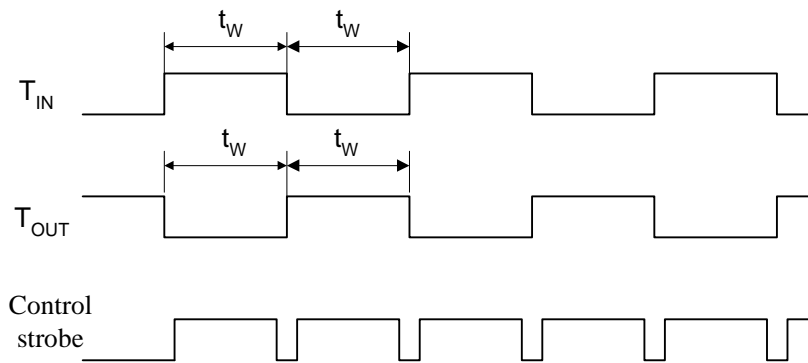
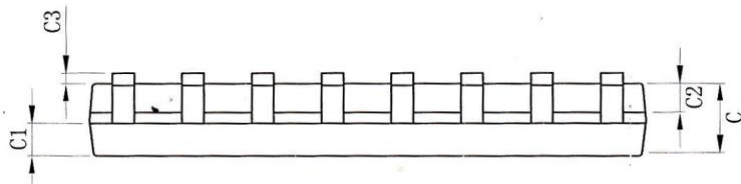
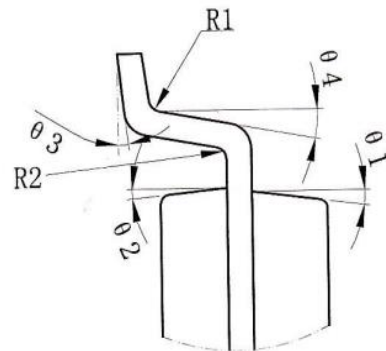
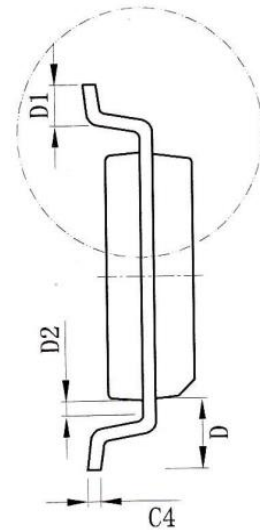
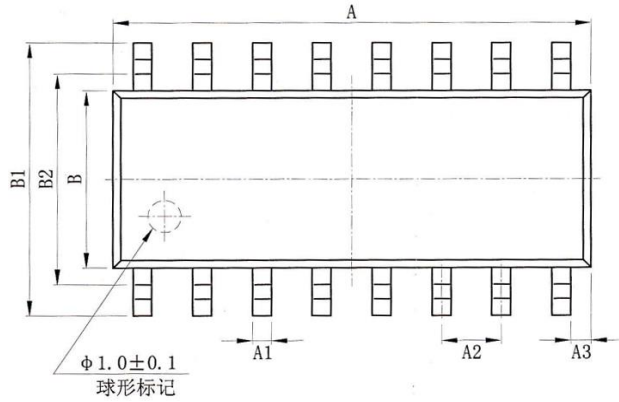


Figure 6



SOP-16(SOIC-16) Package overall dimensions

SYMBOL	MIN/mm	MAX/mm
A	9.80	10.00
A1	0.356	0.456
A2	1.27TYP	
A3	0.302TYP	
B	3.85	3.95
B1	5.84	6.24
B2	5.00 TYP	
C	1.40	1.60
C1	0.61	0.71
C2	0.54	0.64
C3	0.05	0.25
C4	0.203	0.233
D	1.05 TYP	
D1	0.40	0.70
D2	0.15	0.25
R1	0.20TYP	
R2	0.20TYP	
θ1	8°~12°TYP4	
θ2	8°~12°TYP4	
θ3	0°~8°	
θ4	4°~12°	





Attention

- Any and all HUA XUAN YANG ELECTRONICS products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your HUA XUAN YANG ELECTRONICS representative nearest you before using any HUA XUAN YANG ELECTRONICS products described or contained herein in such applications.
- HUA XUAN YANG ELECTRONICS assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein.
- Specifications of any and all HUA XUAN YANG ELECTRONICS products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- HUA XUAN YANG ELECTRONICS CO.,LTD. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all HUA XUAN YANG ELECTRONICS products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of HUA XUAN YANG ELECTRONICS CO.,LTD.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. HUA XUAN YANG ELECTRONICS believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the HUA XUAN YANG ELECTRONICS product that you intend to use.