

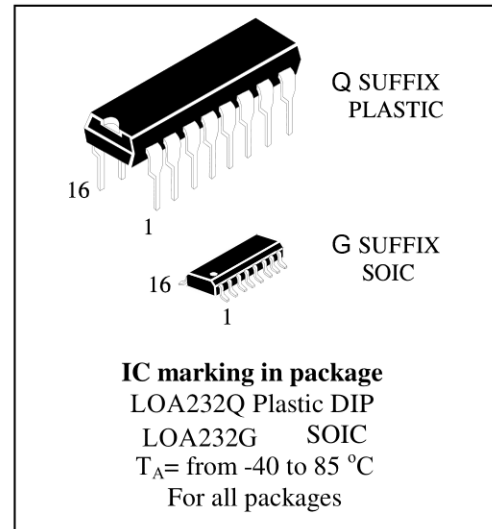
Interface transceiver of RS-232 standard with one supply voltage

LOA232

IC LOA232 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 : 5V
- Low input current: 1.0 μA ; 0.1 μA at $T = 25\text{ }^{\circ}\text{C}$
- Output current 24 mA
- Latching current not less than 450 mA at $T = 25\text{ }^{\circ}\text{C}$
- Enhanced ESD Specifications:
 $\pm 15\text{kV}$ IEC61000-4-2 Air Discharge
 $\pm 8\text{kV}$ IEC61000-4-2 Contact Discharge



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

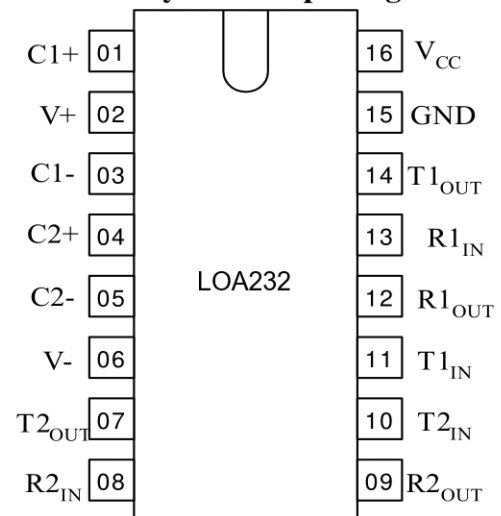


Table of pin description

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

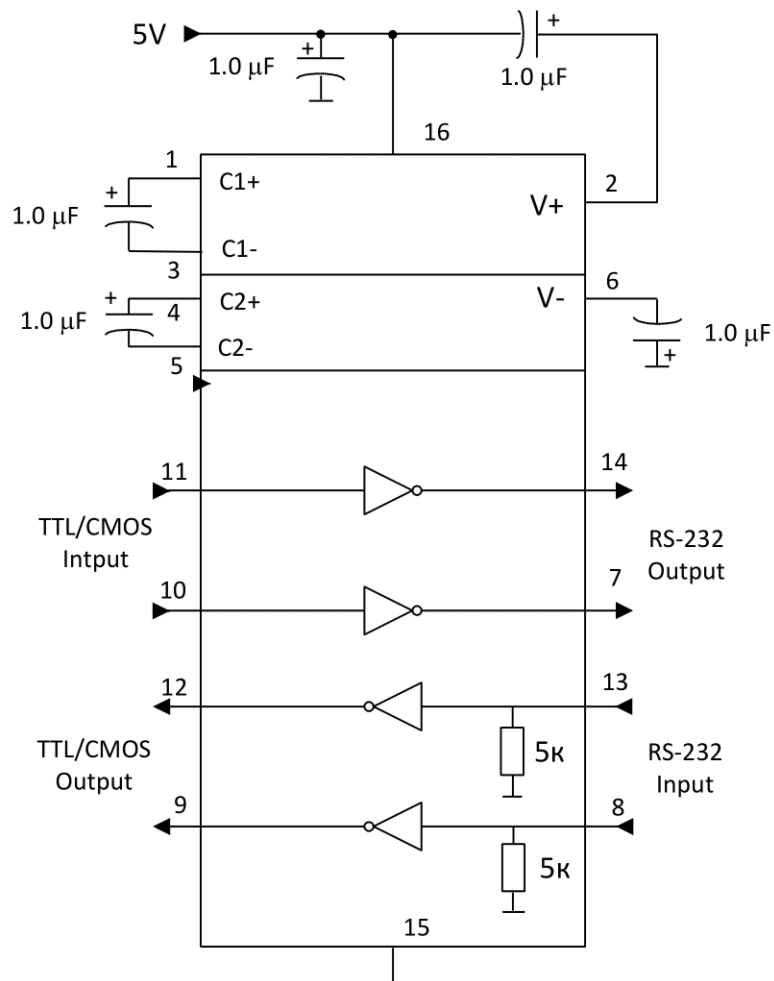
Maximum conditions

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	-	842	mW
	DIP – package			
	SO - package		762	
I _{SC}	Output current of transmitter short circuit	-	Continuously	mA
T _a	Ambient temperature	-60	150	°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
T_a	Ambient temperature	-40	85	$^{\circ}\text{C}$



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	-	10.0	-	14.0 [*]	mA

Receiver electrical parameters

V_h	Hysteresis voltage	$V_{CC}=5.0\text{ V}$	0.2	0.9	0.2	1.0	V
V_{On}	On (operation) voltage	$V_O \leq 0.1\text{ V}$ $I_{OL} \leq 20\text{ uA}$	-	2.4	-	2.3	
V_{off}	Off (dropout) voltage	$V_O \geq V_{CC}-0.1\text{ V}$ $I_{OH} \leq -20\text{ uA}$	0.8	-	0.9	-	
V_{OL}	Output low voltage	$I_{OL} = 3.2\text{ mA}$ $V_{CC} = 4.5\text{ V}$ $V_{IH} = 2.4\text{ V}$	-	0.3	-	0.4	
V_{OH}	Output high voltage	$I_{OH} = -1.0\text{ mA}$ $V_{CC} = 4.5\text{ V}$ $V_{IL} = 0.8\text{ V}$	3.6	-	3.5	-	
R_I	Input resistance	$V_{CC} = 5.0\text{ V}$	3.0	7.0	3.0	7.0	kOhm

Transmitter electrical parameters

V_{OL}	Output low voltage	$V_{CC} = 4.5\text{ V}$ $V_{IH} = 2.0\text{ V}$ $R_L = 3.0\text{ kOhm}$	-	-5.2	-	-5.0	V
V_{OH}	Output high voltage	$V_{CC} = 4.5\text{ V}$ $V_{IL} = 0.8\text{ V}$ $R_L = 3.0\text{ kOhm}$	5.2	-	5.0	-	
I_{IL}	Input low current	$V_{CC}=5.5\text{ V}$ $V_{IL}=0\text{ V}$	-	-1.0	-	-10.0	uA
I_{IH}	Input high current	$V_{CC}=5.5\text{ V}$ $V_{IH}=V_{CC}$		1.0		10.0	
SR	Speed of output front change	$V_{CC}=5.0\text{ V}$ $C_L=50 - 1000\text{ pF}$ $R_L = 3.0 - 7.0\text{ kOhm}$	3.0	30	2.7	27	V/ μ s
R_O	Output resistance	$V_{CC} = V_+ = V_- = 0\text{ V}$ $V_O = \pm 2\text{ V}$	350	-	300	-	Ohm
I_{SC}	Short circuit output current	$V_{CC}=5.5\text{ V}$ $V_O = 0\text{ V}$ $V_I = V_{CC}$ $V_I = 0\text{ V}$		-50 50		-60 60	mA
ST	Speed of information transmission	$V_{CC}=4.5\text{ V}$ $C_L = 1000\text{ pF}$ $R_L = 3.0\text{ kOhm}$ $t_w = 7\text{ us}$ (for extreme $-t_w = 8\text{ us}$)	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} ≤ 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} ≤ 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

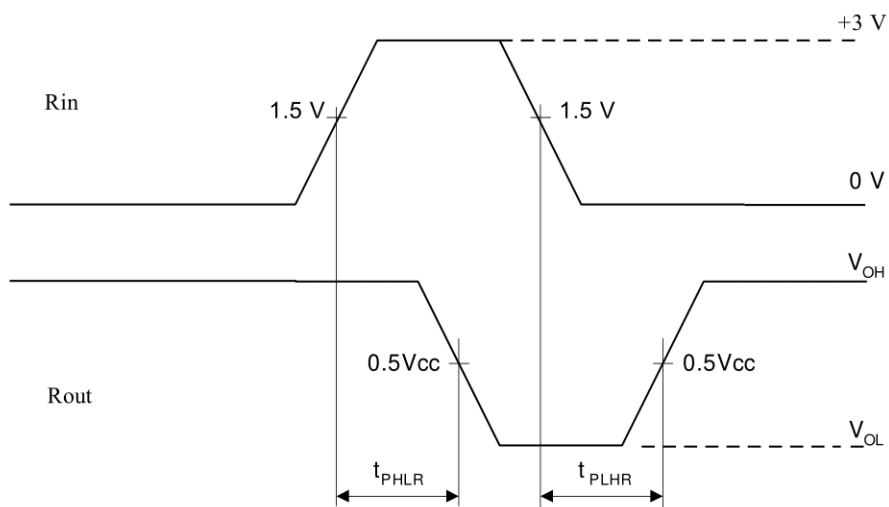


Figure 3

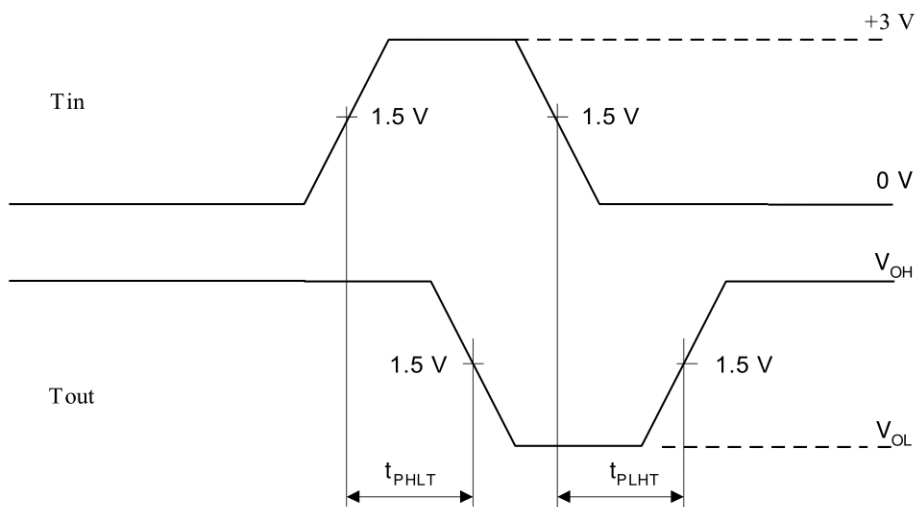


Figure 4

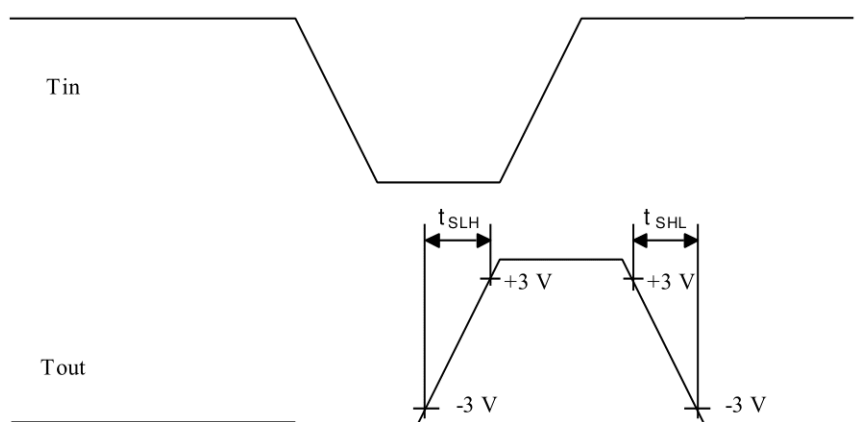


Figure 5

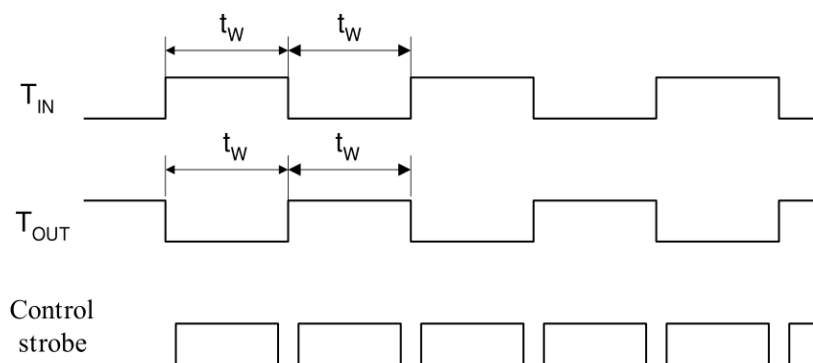
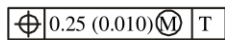
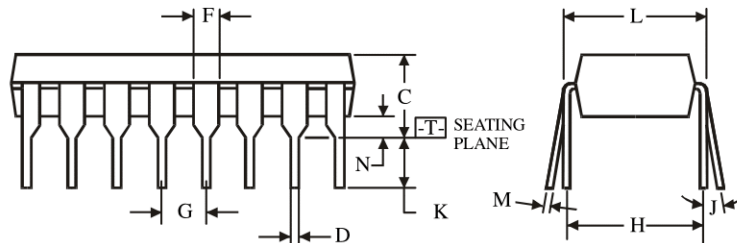
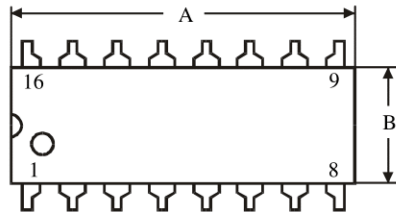


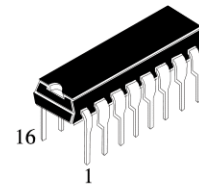
Figure 6

Q SUFFIX PLASTIC DIP
(MS - 001BB)



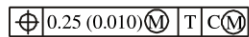
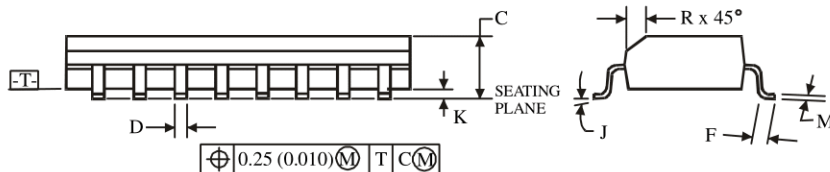
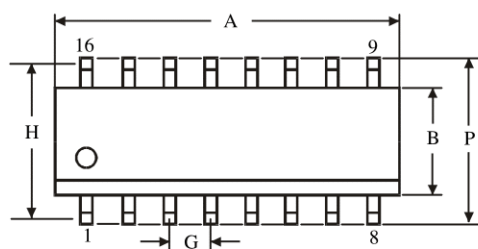
NOTES:

- Dimensions "A", "B" do not include mold flash or protrusions.
Maximum mold flash or protrusions 0.25 mm (0.010) per side.



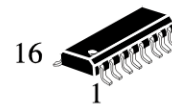
	Dimension, mm	
Symbol	MIN	MAX
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

G SUFFIX SOIC
(MS - 012AC)



NOTES:

- Dimensions A and B do not include mold flash or protrusion.
- Maximum mold flash or protrusion 0.15 mm (0.006) per side
for A; for B - 0.25 mm (0.010) per side.



	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