

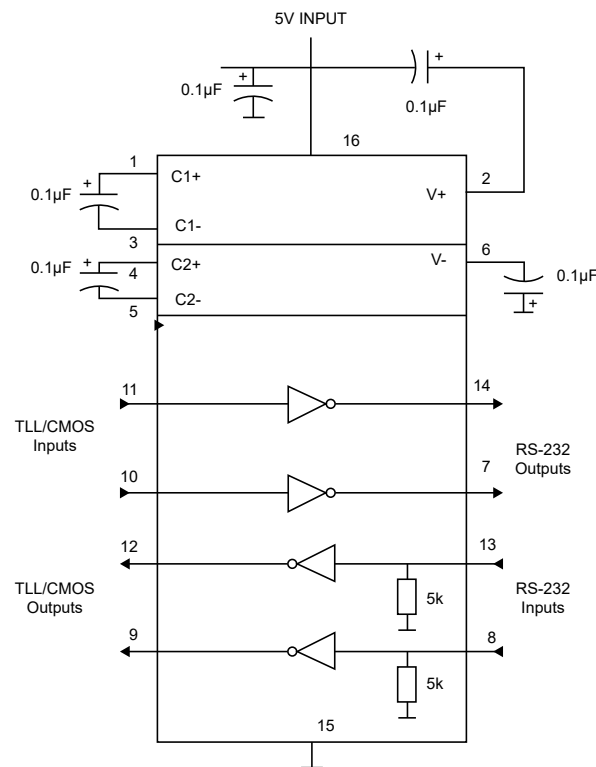
1. Description

The UMW MAX232 have two drives and two receivers. The drivers and receivers meet all EIA/TIA-232 and CCITT V.28 specifications at data rates up to 120kbps when loaded in accordance with the EIA/TIA-232 specification.

2. Features

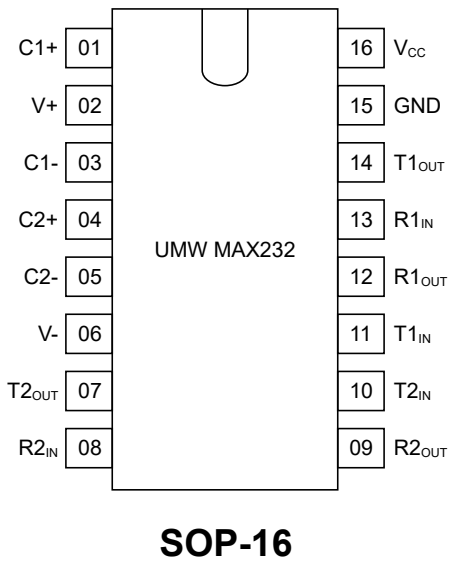
- Operate from Single +5 V Power Supply
- Guaranteed 120 kbps Data Rate
- Latchup Free
- ESD Protection $\pm 2\text{kV}$

3. Typical Operating Circuit





4.Pinning Information



Pin No	Symbol	Function
01	C1+	Terminal for positive charge-pump capacitor
02	V+	+2 V _{CC} voltage generated by the charge-pump
03	C1-	Terminal for positive charge-pump capacitor
04	C2+	Terminal for negative charge-pump capacitor
05	C2-	Terminal for negative charge-pump capacitor
06	V-	-2 V _{CC} voltage generated by the charge-pump
07	T2 _{OUT}	RS-232 Driver Output
08	R2 _{IN}	RS-232 Receiver Input
09	R2 _{OUT}	RS-232 Receiver Output
10	T2 _{IN}	RS-232 Driver Input
11	T1 _{IN}	RS-232 Driver Input
12	R1 _{OUT}	RS-232 Receiver Output
13	R1 _{IN}	RS-232 Receiver Input
14	T1 _{OUT}	RS-232 Driver Output
15	GND	Ground
16	V _{CC}	+ 4.5 V to 5.5 V Supply Voltage Input



5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Units
Supply voltage	V_{CC}	-0.3	6	V
Transmitter high output voltage	V_{+}	$V_{CC}-0.3$	14	
Transmitter low output voltage	V_{-}	-14	+0.3	
Transmitter input voltage	V_{TIN}	-0.3	$V_{CC}+0.3$	
Receiver input voltage	V_{RIN}	-30	30	
Output voltages (transmitters)	V_{TOUT}	$V_{-}-0.3$	$V_{+}+0.3$	
Output voltages (receivers)	V_{ROUT}	-0.3	$V_{CC}+0.3$	
Power dissipation	P_D	-	-	mW
DIP - package (derate 10.53 mW/c above 70°C)		-	842	
So-package (derate 9.52 mW/C above 70°C)		-	762	
Short-Circuit Duration (T_{OUT})	I_{SC}	-	Continuous	
Storage temperature	T_{STG}	-60	150	°C
Operating voltage range	T_A	-20	85	°C



6. Electrical Characteristics

$V_{CC}=4.5V$ to $5.5V$, $C1-C4=0.1\mu F$; $T_A=-40$ to $+85^\circ C$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Max	Units
DC CHARACTERISTICS					
Operating Voltage Range	V_{CC}	$V_{IL}=0V$	4.5	5.5	V
V_{CC} Supply Current	I_{CC}	No load, $T_A=25^\circ C$		10	mA
LOGIC					
Input Leakage Current	I_I	$T_{IN}=0V$ to V_{CC}	0.2	± 10	μA
Input Threshold Low	V_{IL}	T_{IN}		0.8	V
Input Threshold High	V_{IH}	T_{IN}	2		V
Output Voltage Low	V_{OL}	R_{OUT} , $I_{OUT}=3.2mA$		0.4	V
Output Voltage High	V_{OH}	R_{OUT} , $I_{OUT}=-1mA$	3.5		V
RECEIVER INPUTS					
Input Voltage Range	V_{RIN}	All parts, normal operation	-30	30	V
Input Threshold Low	V_{ff}	$T_A=+25^\circ C$, $V_{CC}=5V$	0.8		V
Input Threshold High	I_{on}	$T_A=+25^\circ C$, $V_{CC}=5V$		2.4	V
Input Hysteresis	V_h	$V_{CC}=5V$	0.2	1	V
Input Resistance	R_I	$T_A=+25^\circ C$, $V_{CC}=5V$	3	7	k Ω
TRANSMITTER OUTPUTS					
Output Voltage Swing	ΔV_O	All driver inputs loaded with 3k Ω to ground	± 5		V
Output resistance	R_O	$V_{CC}=V+=V-=0V$, $V_{OUT}=+2V$	300		Ω
Output Short - Circuit Current	I_{SC}			± 60	mA



Parameter	Symbol	Conditions	Min	Max	Units
TIMING CHARACTERISTICS					
Maximum Data Rate	ST	$R_L=3k\Omega$ to 7 k Ω $C_L=50pF$ to 1000pF onetransmitter switching	120		kbps
Reseiver Propagation Delay	t_{PLHR} t_{PHLR}	$C_L=150pF$ All parts, normal operation(Fig. 1)		10	μS
Transmitter Propagation Delay	t_{PLHT} t_{PHLT}	$R_L=3k\Omega$, $C_L=2500pF$ all transmitters loaded (Fig.2)		6	μS
Transition-Region Slew Rate	SR	$T_A=25^{\circ}C$, $V_{CC}= 5V$ $R_L=3k\Omega$ to 7 k Ω $C_L=50pF$ to 2500pF measured from _3V to +3V or +3V to -3V(Fig.3)	3	30	V/ μS



7. Timing Diagram

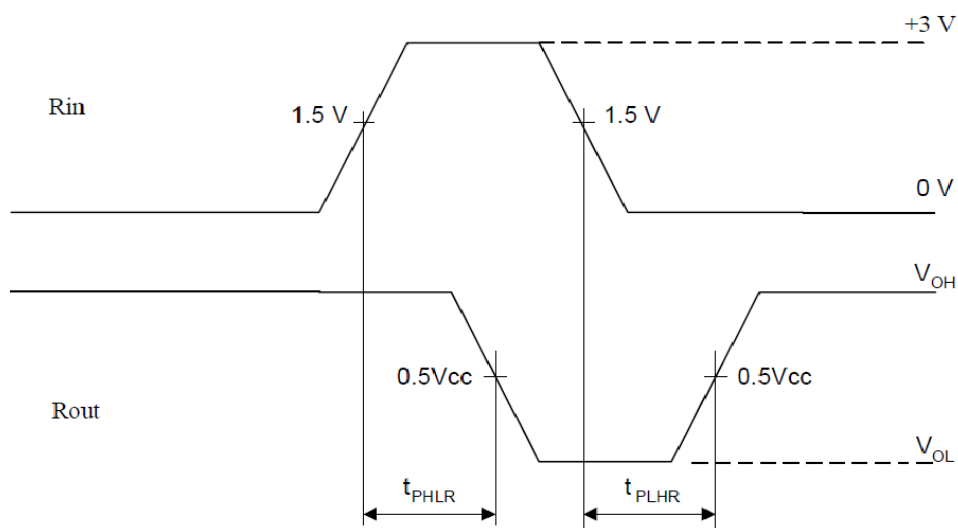


Figure 1

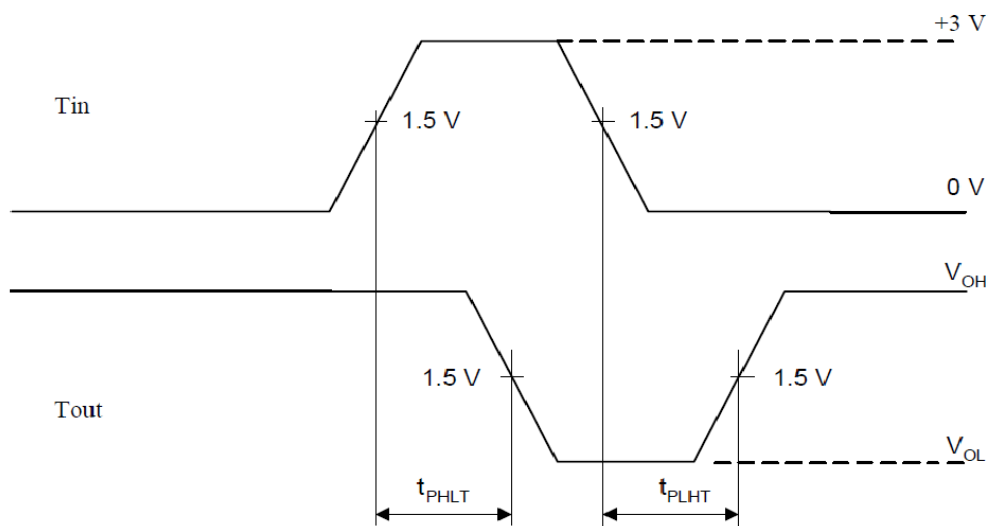


Figure 2

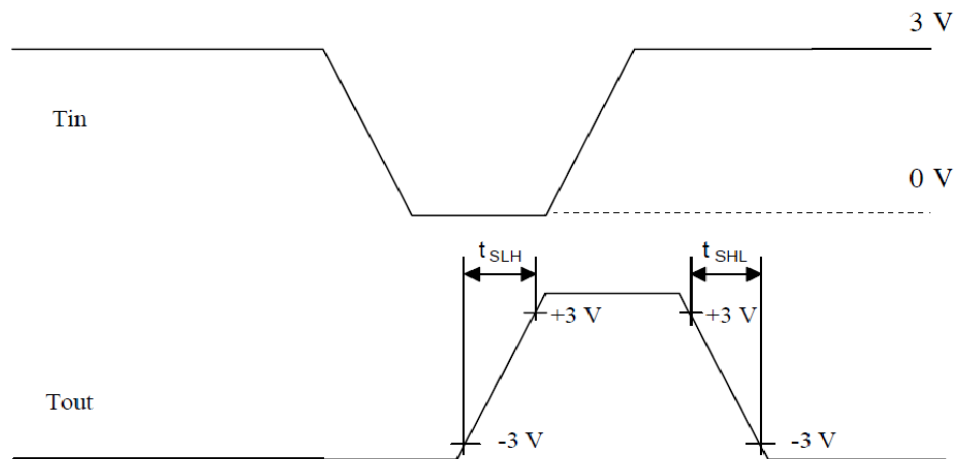
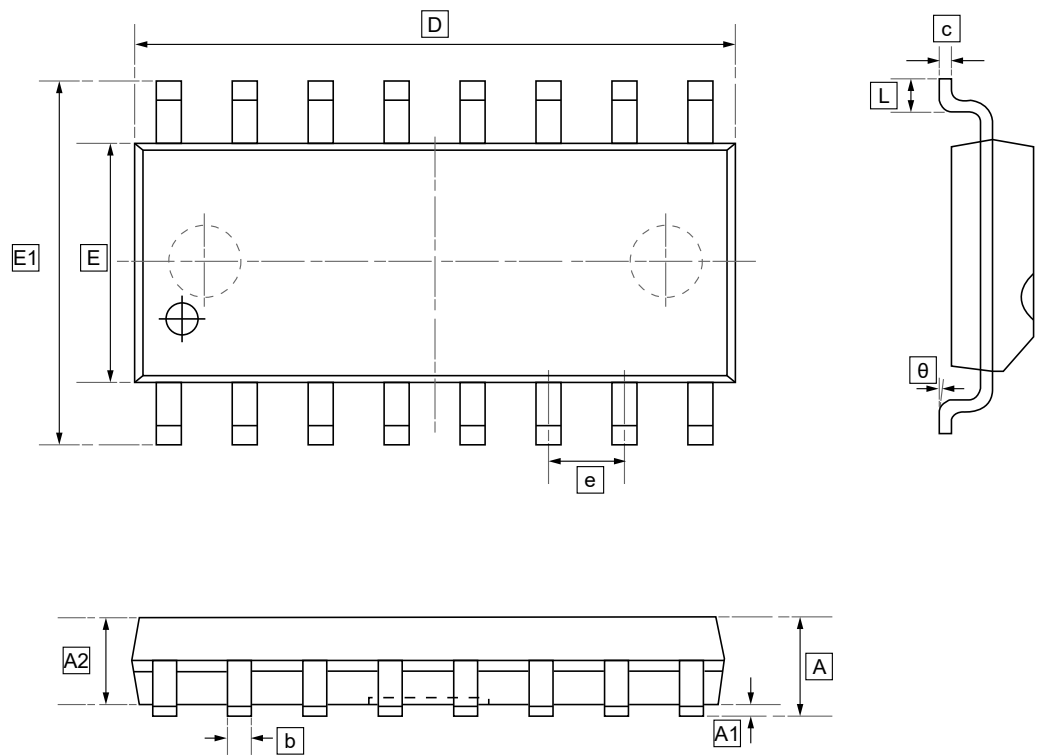


Figure 3



8.1 SOP-16 Package Outline Dimensions

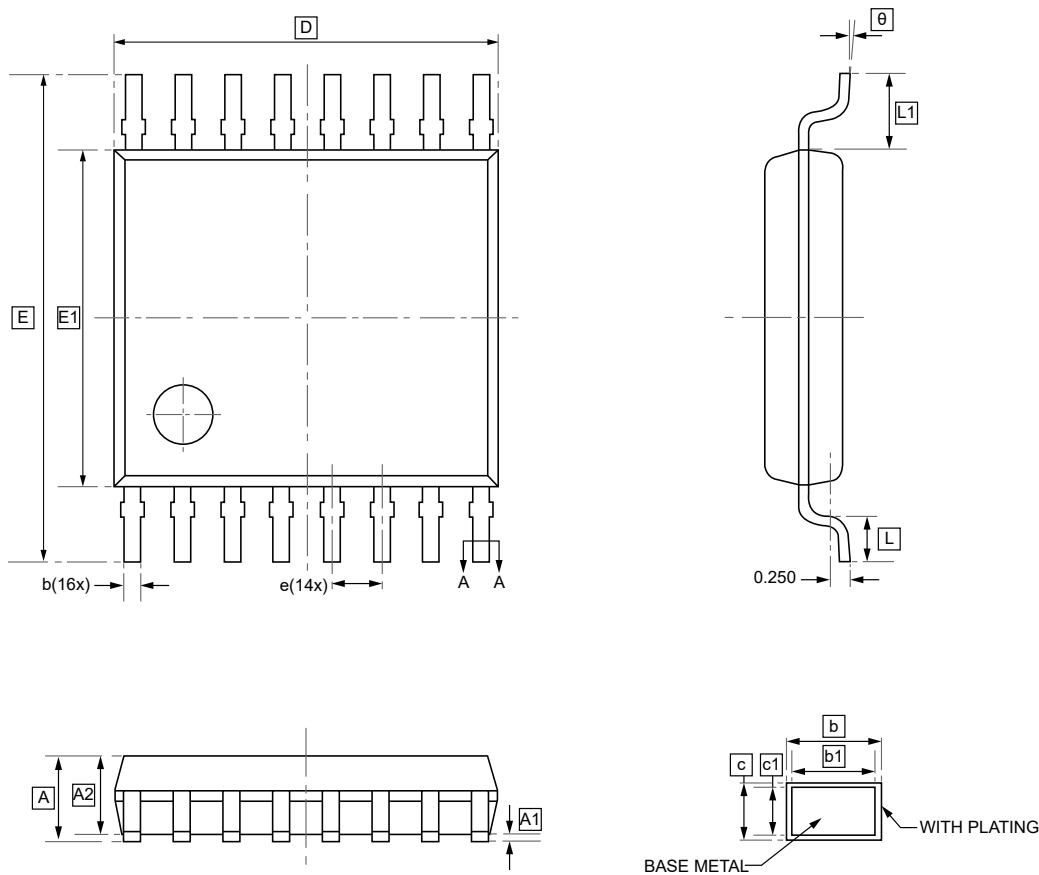


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E	E1	e	L	θ
Min	1.350	0	1.350	0.330	0.170	9.800	3.800	5.800	1.270	0.400	0°
Max	1.750	0.100	1.550	0.510	0.250	10.200	4.000	6.200	BSC	1.270	8°



8.2 TSSOP-16 Package Outline Dimensions



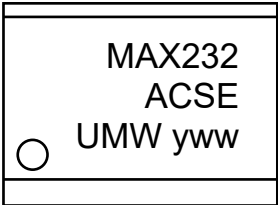
DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	b1	c	c1	D	E	E1	e	L1
Min	-	0.05	0.90	0.20	0.19	0.13	0.120	4.90	6.20	4.30	0.65	0.85
Max	1.20	0.15	1.05	0.28	0.25	0.17	0.14	5.10	6.60	4.50	BSC	1.15

Symbol	L	θ
Min	0.45	0°
Max	0.75	8°



9.Ordering information



yww: Batch Code

Order Code	Marking	Package	Base QTY	Delivery Mode
UMW MAX232ACSE	MAX232 ACSE	SOP-16	2500	Tape and reel
UMW MAX232CSE	MAX232 CSE	SOP-16	2500	Tape and reel
UMW MAX232D	MAX232 D	SOP-16	2500	Tape and reel
UMW MAX232DR	MAX232 DR	SOP-16	2500	Tape and reel
UMW MAX232IDR	MAX232 IDR	SOP-16	2500	Tape and reel
UMW MAX232AEUE	MAX232A EUE	TSSOP-16	4000	Tape and reel



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