



DESCRIPTION

The ~~MAX3232~~ MAX3232ESE is a dual driver/receiver of RS-232 standard with a single supply voltage and bipolar output voltage of the transmitter formed by a built-in voltage multiplying generator on four 1.0 μ F external capacitors, designed for use in state-of-the-art high performance computing systems, high-speed electronic devices with high reliability of information exchange between remote objects.

Input voltage levels are compatible with standard CMOS and TTL levels.

FEATURES

- Output voltage levels are compatible with input levels of CMOS and TTL integrated circuits
- Meets All EIA/TIA-232E and V.28/V.24 Specifications
- Supply voltage range from 3V to 5.5V
- Low input current: 1.0 μ A at 25°C
- Available in SOP-16 Package

APPLICATIONS

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

ABSOLUTE MAXIMUM RATINGS

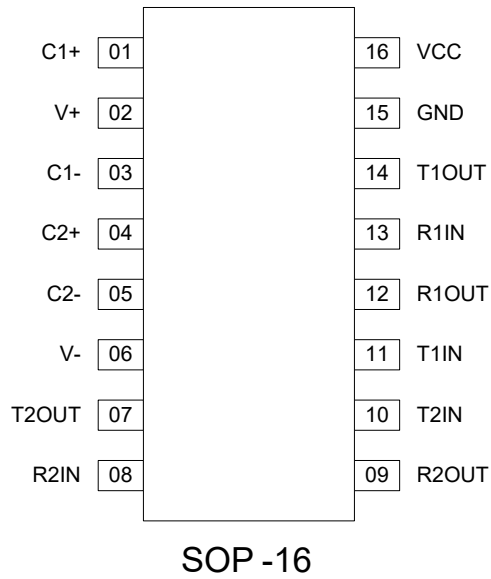
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	-0.3	5.5	V
Transmitter High Output Voltage	V_+	$V_{CC}-0.3$	7	V
Transmitter Low Output Voltage	V_-	-7.0	0.3	V
Transmitter Input Voltage	V_{TIN}	-0.3	$V_++0.3$	V
Receiver Input Voltage	V_{RIN}	-12	12	V
Voltage Applied to Transmitter Output	V_{TOUT}	$V_- - 0.3$	$V_++0.3$	V
Voltage Applied to Receiver Output	V_{ROUT}	-0.3	$V_{CC}+0.3$	V
Storage Temperature Range	T_{STG}	-65	150	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	3.0	5.5	V
Transmitter Input Voltage	V_{TIN}	0	V_{CC}	V
Receiver Input Voltage	V_{RIN}	-12	12	V
Output Current of Transmitter Short Circuit	I_{SC}	-	± 60	mA
Ambient Temperature Range	T_A	-40	+85	°C



PIN CONFIGURATION

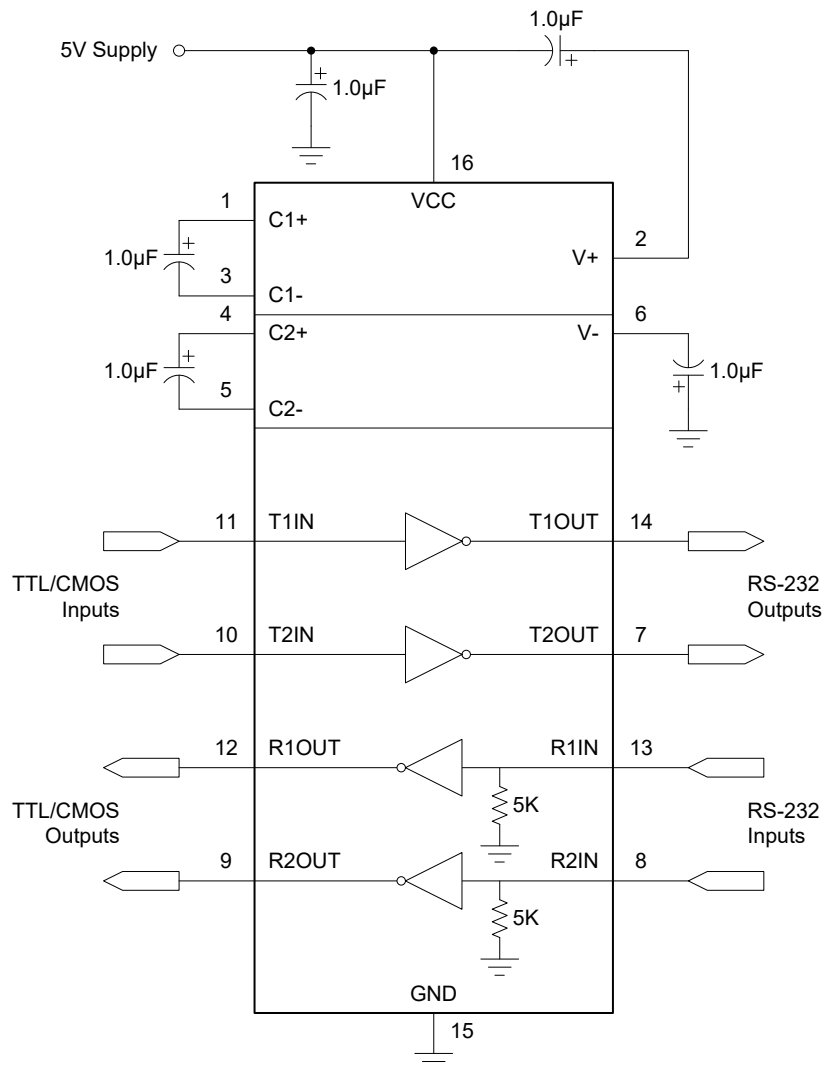


PIN DESCRIPTION

Pin No.	Pin Name	Pin Description
1	C1+	Terminal for Positive Charge-Pump C1 Capacitor
2	V+	Positive Voltage Generated by the Charge-Pump
3	C1-	Terminal for Negative Charge-Pump C1 Capacitor
4	C2+	Terminal for Positive Charge-Pump C2 Capacitor
5	C2-	Terminal for Negative Charge-Pump C2 Capacitor
6	V-	Negative Voltage Generated by the Charge-Pump
7	T2OUT	RS-232 Driver Output (Levels RS-232)
8	R2IN	RS-232 Receiver Input (Levels RS-232)
9	R2OUT	RS-232 Receiver Output (Levels TTL/CMOS)
10	T2IN	RS-232 Driver Input (Levels TTL/CMOS)
11	T1IN	RS-232 Driver Input (Levels TTL/CMOS)
12	R1OUT	RS-232 Receiver Output (Levels TTL/CMOS)
13	R1IN	RS-232 Receiver Input (Levels RS-232)
14	T1OUT	RS-232 Driver Output (Levels RS-232)
15	GND	Ground
16	VCC	Supply Voltage Input



TYPICAL APPLICATION CIRCUIT



FUNCTION TABLE

INPUT (RIN, TIN)	OUTPUT (ROUT, TOUT)
L (Low Level)	H (High Level)
H (High Level)	L (Low Level)



ELECTRICAL CHARACTERISTICS

(Limits in standard typeface are for $T_A=25^{\circ}\text{C}$, and the limits in boldface type apply over full operating temperature range.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT	
Supply Current	I_{CC}	$V_{CC} = 5.5\text{V}$ $V_{IL} = 0\text{V}$	-	-	8 10.0	mA	
Receiver Parameters							
Hysteresis Voltage	V_h	$V_{CC} = 5.0\text{V}$	0.2 0.2	-	0.9 1.0	V	
On (Operation) Voltage	V_{on}	$V_O \leq 0.1\text{V}$, $I_{OL} \leq 20\mu\text{A}$	-	-	2.4 2.3	V	
Off (Dropout) Voltage	V_{off}	$V_O \geq V_{CC} - 0.1\text{V}$ $I_{OH} \leq -20\mu\text{A}$	0.8 0.9	-	-	V	
Output Low Voltage	V_{OL}	$I_L = 3.2\text{mA}$, $V_{CC} = 4.5\text{V}$, $V_{IH} = 2.4\text{V}$	-	-	0.3 0.4	V	
Output High Voltage	V_{OH}	$I_{OH} = -1.0\text{mA}$, $V_{CC} = 4.5\text{V}$, $V_{IL} = 0.8\text{V}$	3.6 3.5	-	-	V	
Input Resistance	R_I	$V_{CC} = 5.0\text{V}$	3.0	-	7.0	k Ω	
Transmitter Parameters							
Output Low Voltage	V_{OL}	$V_{CC} = 4.5\text{V}$, $V_{IH} = 2.0\text{V}$, $R_L = 3.0\text{k}\Omega$	-	-	-5.2 -5.0	V	
Output High Voltage	V_{OH}	$V_{CC} = 4.5\text{V}$, $V_{IL} = 0.8\text{V}$, $R_L = 3.0\text{k}\Omega$	5.2 5.0	-	-	V	
Input Low Current	I_{IL}	$V_{CC} = 5.5\text{V}$, $V_{IL} = 0\text{V}$	-	-	-1.0 -10.0	μA	
Input High Current	I_{IH}	$V_{CC} = 5.5\text{V}$, $V_{IH} = V_{CC}$	-	-	1.0 10.0	μA	
Speed Of Output Front Charge	SR	$V_{CC} = 5.0\text{V}$, $C_L = 50 - 1000\text{pF}$, $R_L = 3.0 - 7.0\text{k}\Omega$	3.0 2.7	-	30 27	V/ μs	
Output Resistance	R_O	$V_{CC} = V_+ = V_- = 0\text{V}$ $V_O = \pm 2\text{V}$	350 300	-	-	Ω	
Short Circuit Output Current	I_{SC}	$V_{CC} = 5.5\text{V}$ $V_O = 0\text{V}$	$V_I = V_{CC}$	-	-	-50 -60	mA
			$V_I = 0$	-	-	50 60	
Speed Of Information Transmission	ST	$V_{CC} = 4.5\text{V}$, $C_L = 1000\text{pF}$, $R_L = 3.0\text{k}\Omega$, $t_W = 7\mu\text{s}$ (for extreme, $t_W = 8\mu\text{s}$)	250 300	-	-	kbit/s	
Dynamic Parameters							
Signal Propagation Delay Time When Switching On (Off)	t_{PHLR} (t_{PLHR})	$V_{CC} = 4.5\text{V}$, $C_L = 150\text{pF}$, $V_{IL} = 0\text{V}$, $V_{IH} = 3.0\text{V}$, $t_{LH} = t_{HL} \leq 10\text{ns}$	-	-	9.7 10.0	μs	
Signal Propagation Delay Time When Switching On (Off)	t_{PHLT} (t_{PLHT})	$V_{CC} = 4.5\text{V}$, $C_L = 2500\text{pF}$, $V_{IL} = 0\text{V}$, $V_{IH} = 3.0\text{V}$, $R_L = 3\text{k}\Omega$, $t_{LH} = t_{HL} \leq 10\text{ns}$	-	-	5.0 6.0	μs	



TIMING DIAGRAM

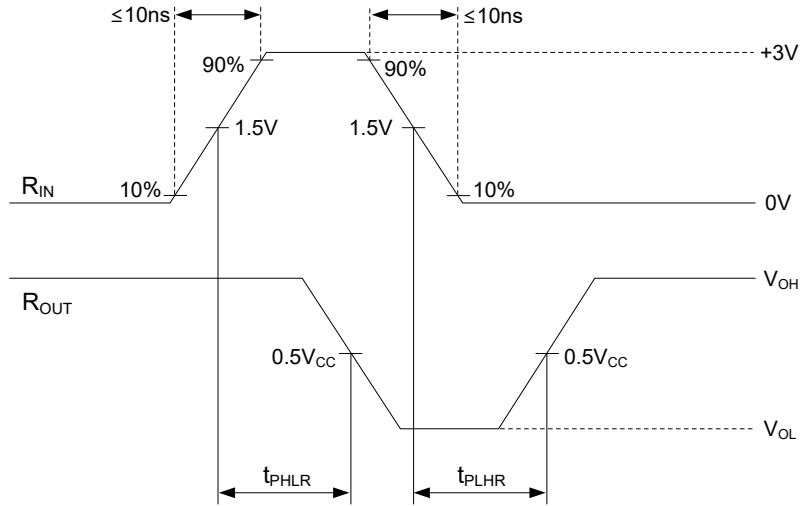


Figure 1. t_{PHL} and t_{PLH} waveforms of Receiver

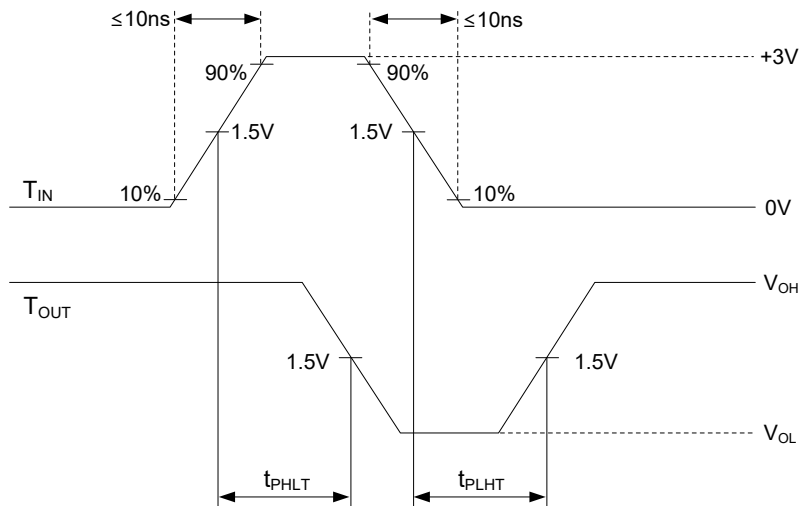


Figure 2. t_{PHL} and t_{PLH} waveforms of Transmitter

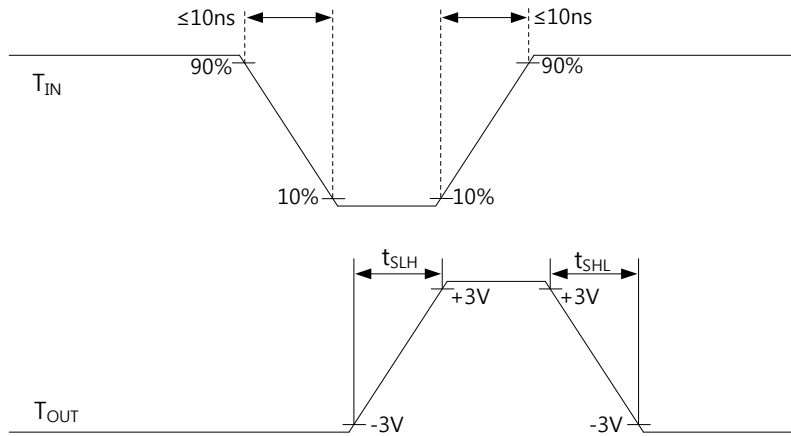
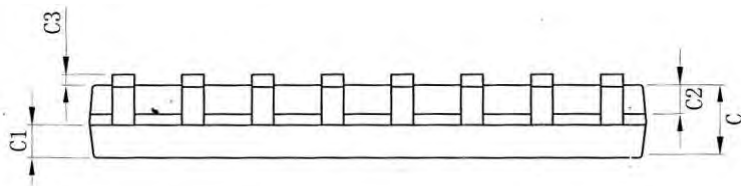
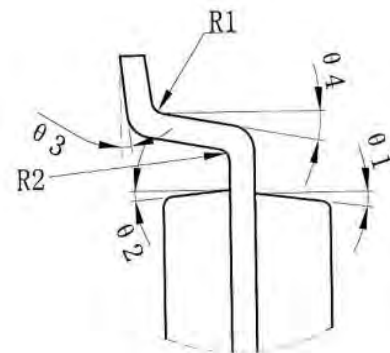
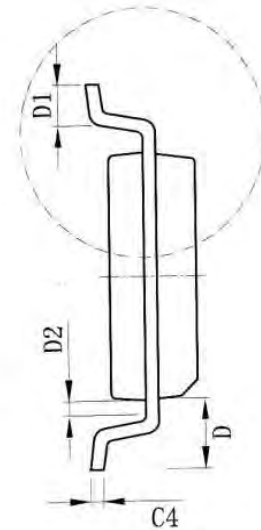
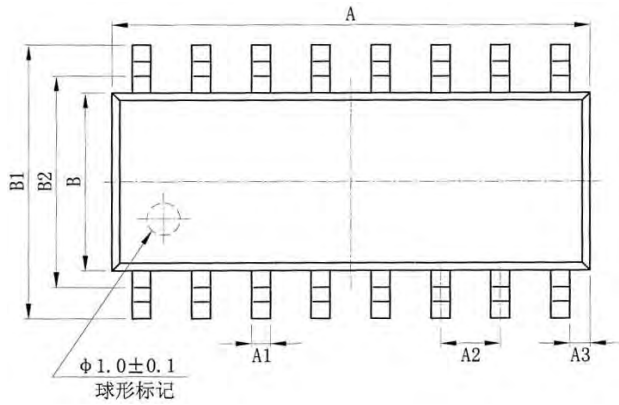


Figure 3. t_{SLH} and t_{SHL} waveforms of Transmitter



SOP-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°	





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