



DESCRIPTION

The 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(SOIC-16) Package

APPLICATIONS

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

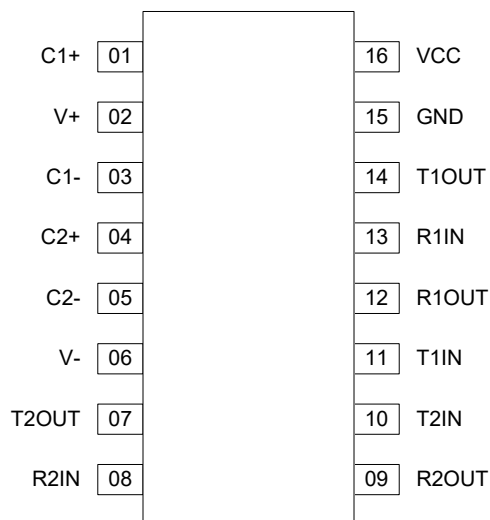
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	-0.3	5.5	V
Transmitter High Output Voltage	V_+	$V_{CC}-0.3$	7	V
Transmitter Low Output Voltage	V_-	-7.0	0.3	V
Transmitter Input Voltage	V_{TIN}	-0.3	$V_++0.3$	V
Receiver Input Voltage	V_{RIN}	-12	12	V
Voltage Applied to Transmitter Output	V_{TOUT}	$V_- - 0.3$	$V_++0.3$	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



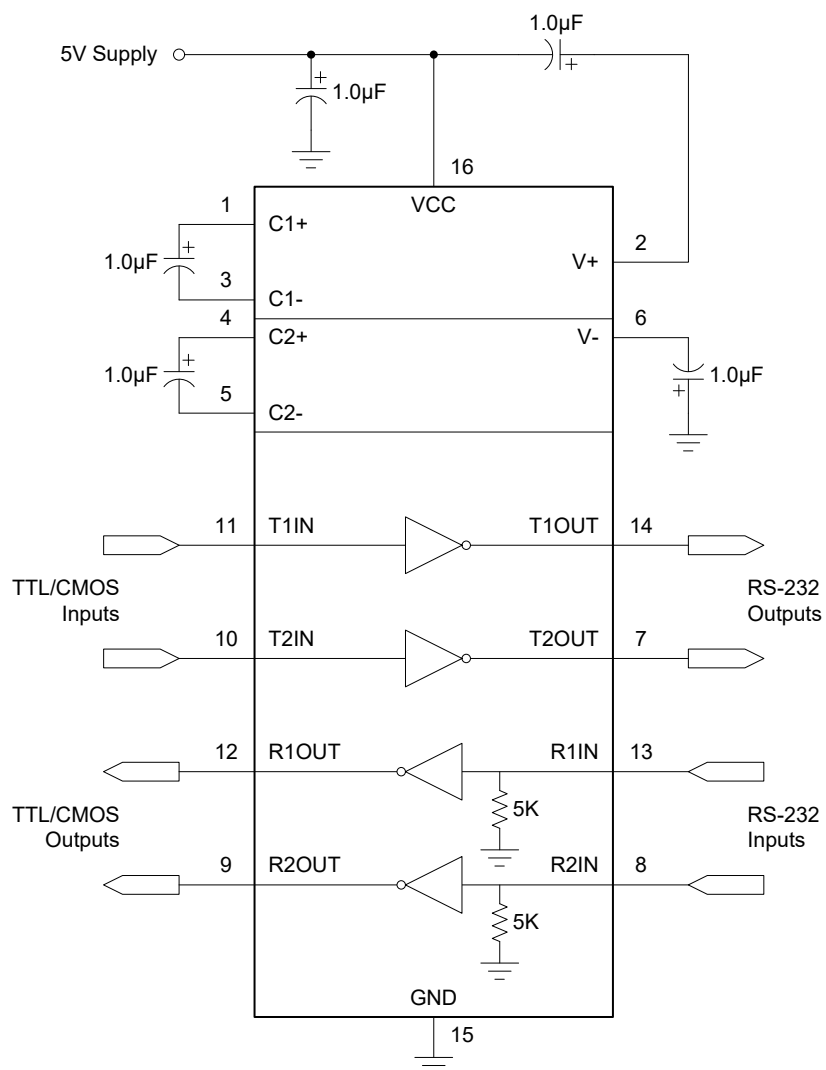
SOP -16(SOIC-16)

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} = 5.5V V _{IL} = 0V		-	-	8 10.0	mA
Receiver Parameters							
Hysteresis Voltage	V _h	V _{CC} = 5.0V		0.2 0.2	-	0.9 1.0	V
On (Operation) Voltage	V _{on}	V _O ≤ 0.1V, I _{OL} ≤ 20μA		-	-	2.4 2.3	V
Off (Dropout) Voltage	V _{off}	V _O ≥ V _{CC} - 0.1V I _{OH} ≤ -20μA		0.8 0.9	-	-	V
Output Low Voltage	V _{OL}	I _L = 3.2mA, V _{CC} = 4.5V, V _{IH} = 2.4V		-	-	0.3 0.4	V
Output High Voltage	V _{OH}	I _{OH} = -1.0mA, V _{CC} = 4.5V, V _{IL} = 0.8V		3.6 3.5	-	-	V
Input Resistance	R _I	V _{CC} = 5.0V		3.0	-	7.0	kΩ
Transmitter Parameters							
Output Low Voltage	V _{OL}	V _{CC} = 4.5V, V _{IH} = 2.0V, R _L = 3.0kΩ		-	-	-5.2 -5.0	V
Output High Voltage	V _{OH}	V _{CC} = 4.5V, V _{IL} = 0.8V, R _L = 3.0kΩ		5.2 5.0	-	-	V
Input Low Current	I _{IL}	V _{CC} = 5.5V, V _{IL} = 0V		-	-	-1.0 -10.0	μA
Input High Current	I _{IH}	V _{CC} = 5.5V, V _{IH} = V _{CC}		-	-	1.0 10.0	μA
Speed Of Output Front Charge	SR	V _{CC} = 5.0V, C _L = 50 - 1000pF, R _L = 3.0 - 7.0kΩ		3.0 2.7	-	30 27	V/μs
Output Resistance	R _O	V _{CC} = V ₊ = V ₋ = 0V V _O = ±2V		350 300	-	-	Ω
Short Circuit Output Current	I _{SC}	V _{CC} = 5.5V V _O = 0V	V _I = V _{CC}	-	-	-50 -60	mA
			V _I = 0	-	-	50 60	
Speed Of Information Transmission	ST	V _{CC} = 4.5V, C _L = 1000pF, R _L = 3.0kΩ, t _W = 7μs (for extreme, t _W = 8μs)		250 300	-	-	kbit/s
Dynamic Parameters							
Signal Propagation Delay Time When Switching On (Off)	t _{PHLR} (t _{PLHR})	V _{CC} = 4.5V, C _L = 150pF, V _{IL} = 0V, V _{IH} = 3.0V, t _{LH} = t _{HL} ≤ 10ns		-	-	9.7 10.0	μs
Signal Propagation Delay Time When Switching On (Off)	t _{PHLT} (t _{PLHT})	V _{CC} = 4.5V, C _L = 2500pF, V _{IL} = 0V, V _{IH} = 3.0V, R _L = 3kΩ, t _{LH} = t _{HL} ≤ 10ns		-	-	5.0 6.0	μs



TIMING DIAGRAM

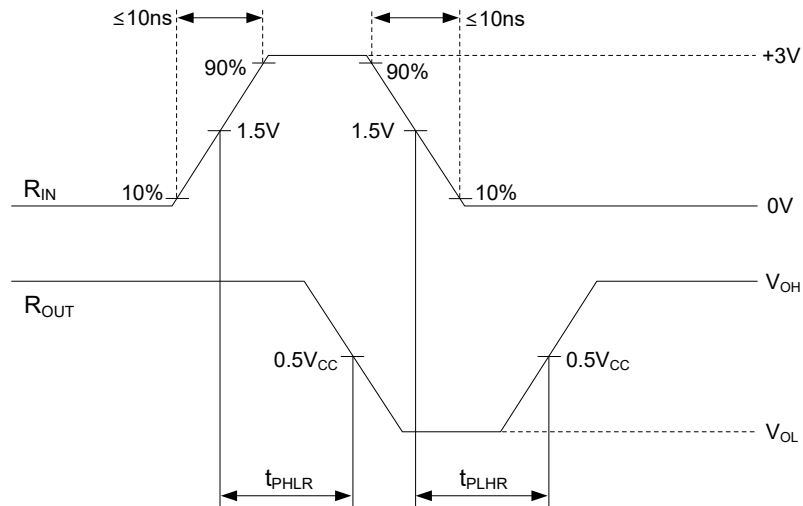


Figure 1. t_{PHL} and t_{PLH} waveforms of Receiver

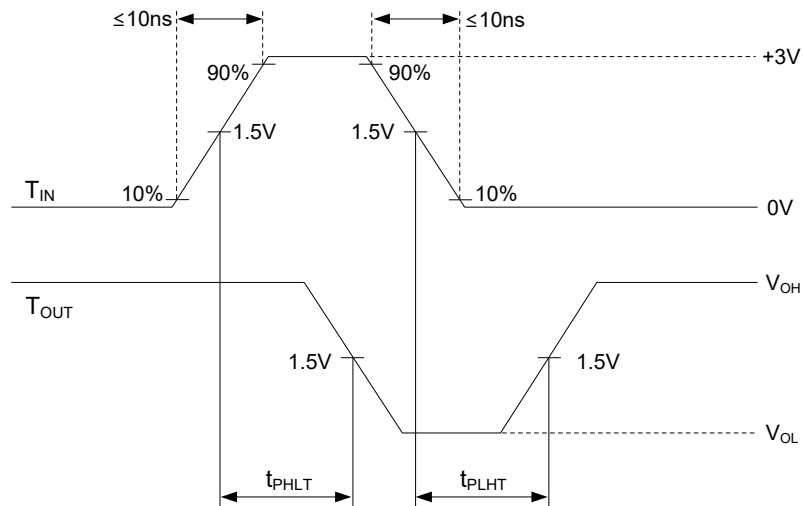


Figure 2. t_{PHL} and t_{PLH} waveforms of Transmitter

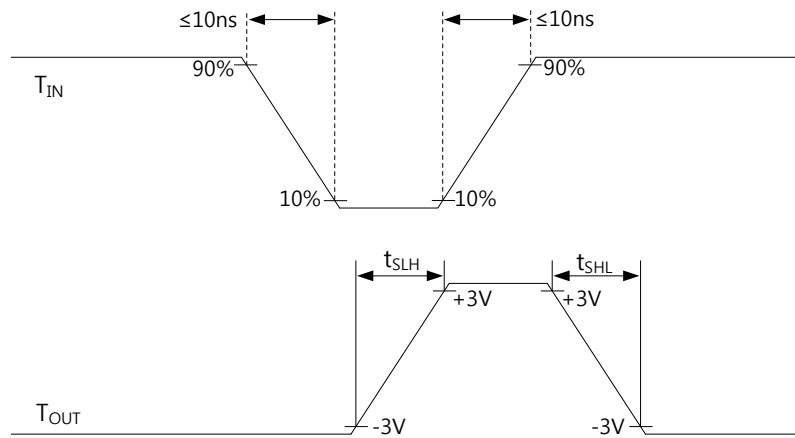
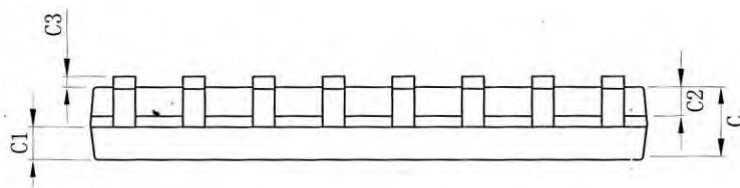
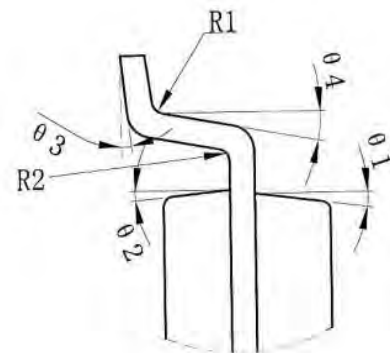
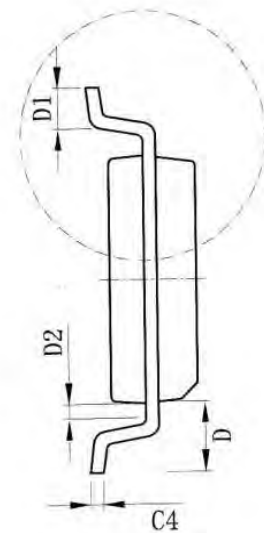
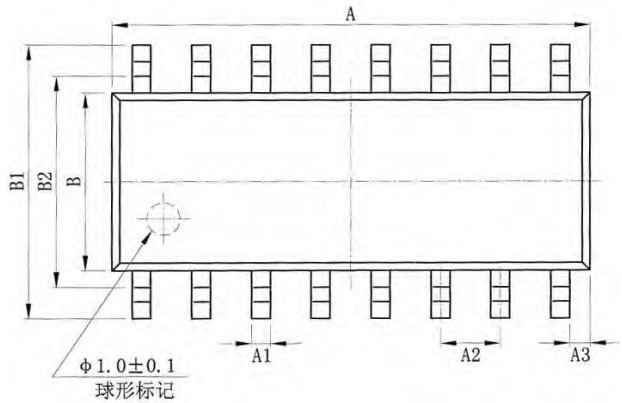


Figure 3. t_{SLH} and t_{SHL} waveforms of Transmitter



SOP-16(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°	





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