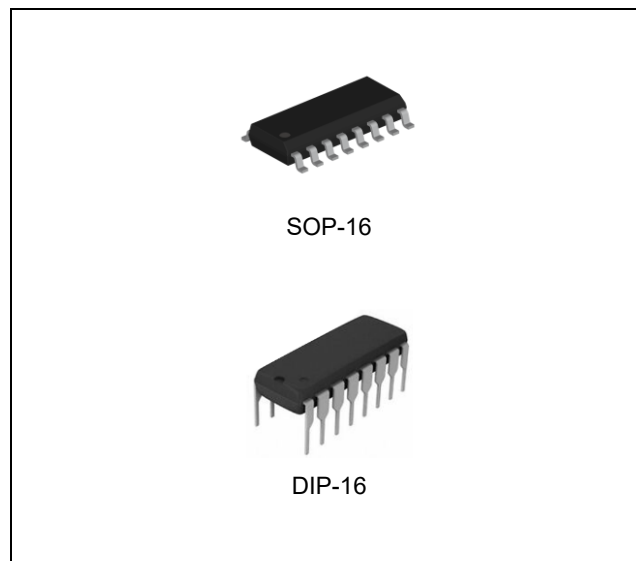


FEATURES

- 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 3.0 to 5.5V
- Available in SOP-16 and DIP-16 Package
- ESD Specifications
 - ±15kV Human Body Mode
 - ±15kV IEC61000-4-2 Air Discharge
 - ±8kV IEC61000-4-2 Contact Discharge

APPLICATIONS

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

**ORDERING INFORMATION**

Device	Package
MAX3232ED	SOP-16
MAX3232EN	DIP-16

* Refer to the ordering information for the details.

DESCRIPTION

The MAX3232 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 0.1μF 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.

ABSOLUTE MAXIMUM RATINGS

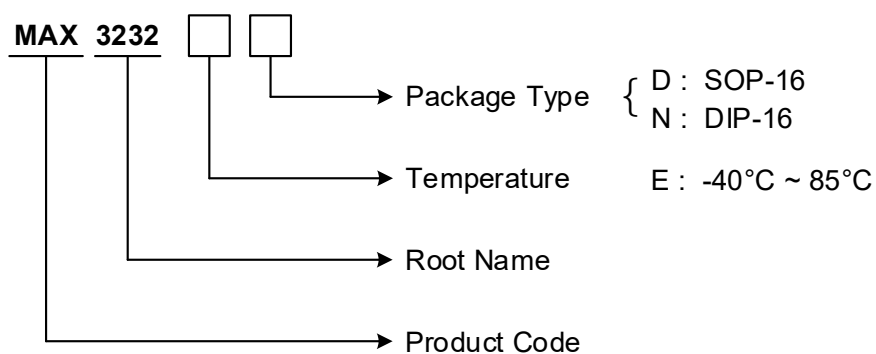
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V_{CC}	-0.3	6.0	V
Transmitter High Output Voltage	V_+	-0.3	7	V
Transmitter Low Output Voltage	V_-	-7	0.3	V
Supply voltage difference	$V_+ - V_-$	-13	13	V
Transmitter Input Voltage	V_{TIN}	-0.3	6.0	V
Receiver Input Voltage	V_{RIN}	-15	15	V
Voltage Applied to Transmitter Output	V_{TOUT}	-13.2	13.2	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

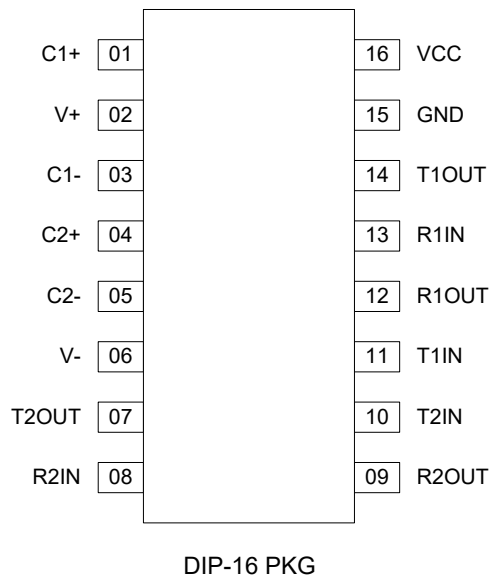
PARAMETER	SYMBOL	MIN.	MAX.	UNIT
Supply Voltage	V _{CC}	3.0	5.5	V
Ambient Temperature Range	T _A	-40	+85	°C

ORDERING INFORMATION

Package	Order No.	Package Marking	Supplied As	Status
SOP-16	MAX3232ED	MAX3232E	Reel	Active
DIP-16	MAX3232EN	MAX3232E	Tube	Contact Us



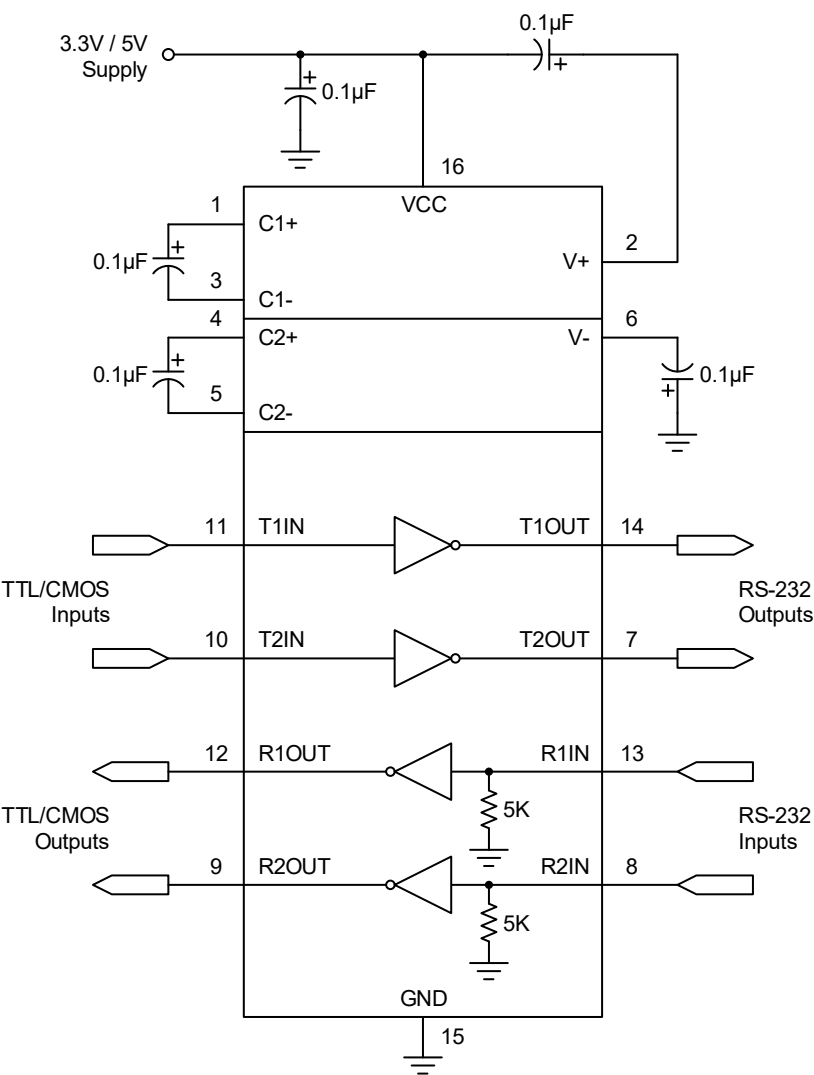
PIN CONFIGURATION



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

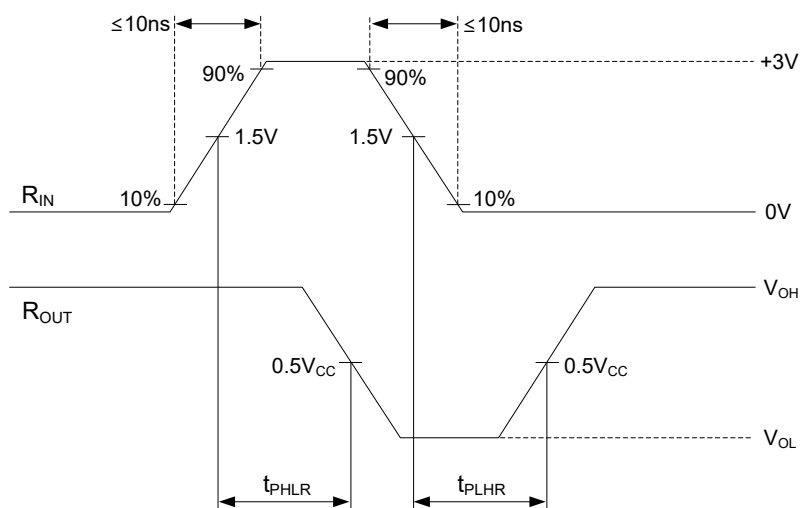
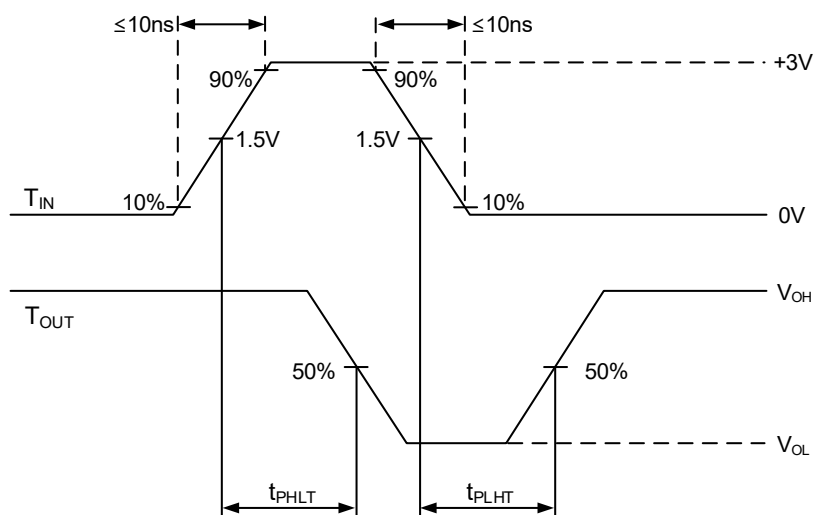
INPUT (RIN, TIN)	OUTPUT (ROUT, TOUT)
L (Low Level)	H (High Level)
H (High Level)	L (Low Level)

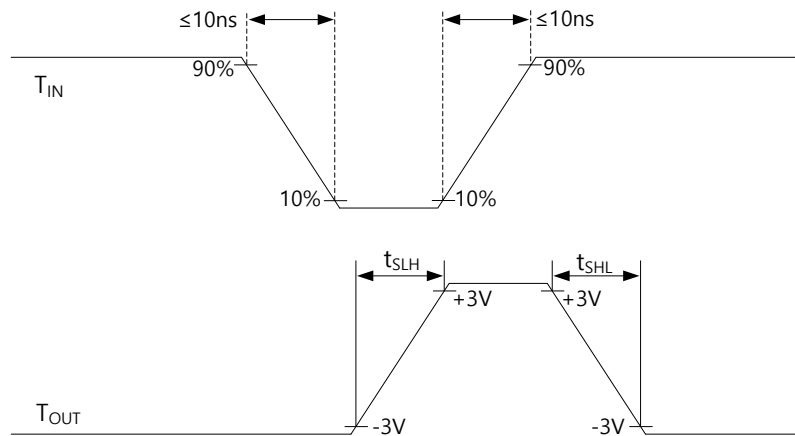
ELECTRICAL CHARACTERISTICS

(Unless otherwise noted, the following specifications apply for $V_{CC} = +3.0V$ to $+5.5V$, $T_A = -40^{\circ}C$ to $+85^{\circ}C$, $C_1 - C_4 = 0.1\mu F$)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Current	I_{CC}	$TxIN = GND$, $V_{CC} = 3.3V$ No Load	-	2.0	3.0	mA
Logic Inputs and Receiver Outputs						
Input Logic Threshold Low	V_{ILTH+}	$V_{CC} = 3.3V$	GND	-	0.8	V
		$V_{CC} = 5.0V$	GND	-	0.8	V
Input Logic Threshold High	V_{ILTH-}	$V_{CC} = 3.3V$	2.0	-	V_{CC}	V
		$V_{CC} = 5.0V$	2.4	-	V_{CC}	V
Output Voltage Low	V_{OL}	$I_{OUT} = 1.6mA$,	-	-	0.4	V
Output Voltage High	V_{OH}	$I_{OUT} = -1.0mA$,	$V_{CC} - 0.6$	$V_{CC} - 0.1$	-	V
Driver Outputs						
Output Voltage Swing	V_{OSW}	All Driver Outputs Loaded with $3k\Omega$ to GND	± 5.0	± 5.4	-	V
Output Resistance	R_O	$V_{CC} = V_+ = V_- = 0V$, $V_{OUT} = \pm 2V$	300	-	-	Ω
Short Circuit Output Current	I_{SC}	$V_{OUT} = 0V$	-	± 35	± 65	mA
Receiver Inputs						
Input Voltage Range	V_I		-15	-	+15	V
Input Threshold Low	V_{ITH+}	$V_{CC} = 3.3V$	0.6	1.2	-	V
		$V_{CC} = 5.0V$	0.8	1.5	-	V
Input Threshold High	V_{ITH-}	$V_{CC} = 3.3V$	-	1.5	2.4	V
		$V_{CC} = 5.0V$	-	1.8	2.4	V
Input Hysteresis	V_{Hys}		-	0.3	-	V
Input Resistance	R_I		3.0	5.0	7.0	$k\Omega$
Timing Characteristics						
Maximum Data Rate	f_{MAX}	$R_L = 3k\Omega$, $C_L = 1000pF$, one driver active	250	-	-	kbps
Receiver Propagation Delay	t_{PHL}	$C_L = 150pF$	-	300	-	ns
	t_{PLH}	$C_L = 150pF$	-	300	-	ns
Driver Skew	t_{DSkew}	$ t_{PHL} - t_{PLH} $	-	300	-	ns
Receiver Skew	t_{RSkew}	$ t_{PHL} - t_{PLH} $	-	300	-	ns
Transition-Region Slew Rate		$R_L = 3k\Omega$, $C_L = 1000pF$, measured from $-3.0V$ to $+3.0V$ or $+3.0V$ to $-3.0V$	-	-	30	$V/\mu s$

TIMING DIAGRAM

Figure 1. t_{PHL} and t_{PLH} waveforms of ReceiverFigure 2. t_{PHL} and t_{PLH} waveforms of Transmitter

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

REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.