UNISONIC TECHNOLOGIES CO., LTD

UT232A   Preliminary   *CMOS*

ENHANCED RS-232 LINE DRIVERS/RECEIVERS
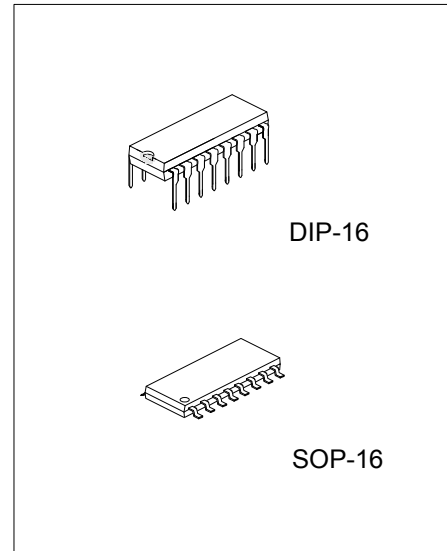
■ **DESCRIPTION**

The UTC **UT232A** is the enhanced versions RS-232 line drivers/receivers. Enhancements of use performance include increased drive current for longer and more flexible cable configurations and 10V/µs slew rate, 120k bits per second guaranteed transmission rate and Ease of use enhancements include enhanced ESD protection, low power dissipation, smaller, 0.1µF charge pump capacitors, and overall ruggedized construction for commercial environments.

■ **FEATURES**

* Receiver input levels:±30V
* Single 5V power supply
* 0.1µF small charge pump capacitors
* High data rate-120kbps
* High output slew rate 10V/µs
* ≤1µA low power shutdown
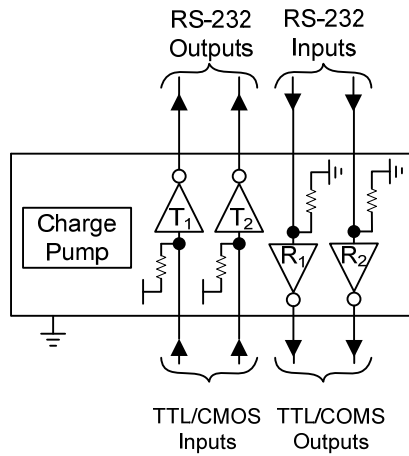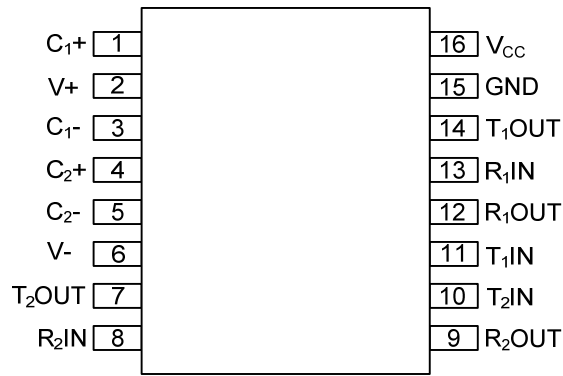* 3-State outputs of TTL/CMOS receiver
* Multiple drivers and receivers

DIP-16

SOP-16

Lead-free: UT232AL
Halogen-free: UT232AG

■ **ORDERING INFORMATION**

Ordering Number			Package	Packing
Normal	Lead Free	Halogen Free		
UT232A-D16-T	UT232AL-D16-T	UT232AG-D16-T	DIP-16	Tube
UT232A-S16-R	UT232AL-S16-R	UT232AG-S16-R	SOP-16	Tape Reel

UT232AL-D16-T

(1)Packing Type
(2)Package Type
(3)Lead Plating

(1) R: Tape Reel, T: Tube

(2) D16: DIP-16, S16: SOP-16

(3) G: Halogen Free, L: Lead Free, Blank: Pb/Sn

■ **PIN CONFIGURATION**

C_1+	1		16	V_{CC}
V+	2		15	GND
C_1-	3		14	T_1OUT
C_2+	4		13	R_1IN
C_2-	5		12	R_1OUT
V-	6		11	T_1IN
T_2OUT	7		10	T_2IN
R_2IN	8		9	R_2OUT

RS-232 Outputs   RS-232 Inputs

Charge Pump

T_1 T_2 R_1 R_2

TTL/CMOS Inputs   TTL/COMS Outputs

■ **ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	RATINGS	UNIT
Supply voltage range	V_{CC}	6	V
Positive-output supply voltage range	V^+	$(V_{CC}$-0.3) ~+13.2	V
Negative-output supply voltage range	V^-	13.2V	V
Input Voltages	T_{IN}	-0.3~$(V_{CC}$+0.3)	V
	R_{IN}	±30	V
Output Voltages	T_{OUT}	(V+, +0.3) ~(V-, -0.3)	V
	R_{OUT}	-0.3~(Vcc+0.3)	V
Short Circuit Duration	T_{OUT}	Continuous	
Power Dissipation	P_D	375	mW
Operating Temperature	T_{OPR}	0 ~ +70	°C

Note Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ **ELECTRICAL CHARACTERISTICS**

(V_{CC}=+5V±10%; 0.1µF charge pump capacitors; T_{MIN} to T_{MAX} unless otherwise specified.)

| PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
TTL INPUT							
Logic Threshold	Low	V_{THR}	T_{IN}; $\overline{EN}$, $\overline{SD}$			0.8	V
	High		T_{IN}; $\overline{EN}$, $\overline{SD}$	2.0			V
Logic Pull up Current			T_{IN}=0V		15	200	µA
Maximum Data Rate			C_L=2500pF, R_L=3kΩ	120			k
TTL OUTPUT							
TTL/CMOS Output Voltage	Low	V_{OL}	I_{OUT}=3.2mA; V_{CC}=+5V			0.4	V
	High	V_{OH}	I_{OUT}=-1.0mA	3.5			V
RS-232 OUTPUT							
Output Voltage Swing		$V_{O(SW)}$	All transmitter outputs loaded With 3kΩ to Ground	±5	±9		V
Output Resistance		R_O	V_{CC}=0V; V_{OUT}=±2V	300			Ω
Output Short Circuit Current		$I_{O(SC)}$	Infinite duration		±18		mA
RS-232 INPUT							
Voltage Range				-30		+30	V
Voltage Threshold	Low	$V_{THR(L)}$	V_{CC}=5V, T_A=+25°C	0.8	1.2		V
	High	$V_{THR(H)}$			1.7	2.4	V
Hysteresis		V_{HYS}	V_{CC}=5V, T_A=+25°C	0.2	0.5	1.0	V
Resistance		R_I	T_A=+25°C, -15V≤V_{IN}≤+15V	3	5	7	kΩ
DYNAMIC CHARACTERISTICS							
Propagation Delay, RS232 to TTL					1.5		µs
Instantaneous Slew Rate		SR	C_L=10pF, R_L=3-7kΩ; T_A=+25°C			30	V/µs
Transition Region Slew Rate		SR	C_L=2500pF, R_L=3kΩ;measured from +3V ~ -3V or -3V ~ +3V		10		V/µs
POWER REQUIREMENTS							
V_{CC} Power Supply Current			No load, T_A=+25°C; V_{CC}=5V	10	15		mA
			All transmitters R_L=3kΩ;T_A=+25°C	25			mA

■ **APPLICATION INFORMATION**

To operate from a single +5V supply, the UTC **UT232A** include charge pump voltage converters which can allow it. To generate the RS-232 output levels these converters convert the +5V input power to the ±10V needed. The current drain due to charge pump operation is considerably reduced, typically to 400µA with this power supplied externally.

The UTC **UT232A** can operate over the commercial, industrial and military temperature ranges.

Protection from Shorts to ±15V

Against shorts to ground, any other driver output, and V$^+$ or V$^-$ the driver outputs are protected. If the outputs is connected to voltages higher than ±15V inadvertently, then the external protection is recommended to be provided. While voltages exceeding ±15V ,for protection, two back-to-back zener diodes which is connected from each output to ground will clamp the outputs to an acceptable voltage level.
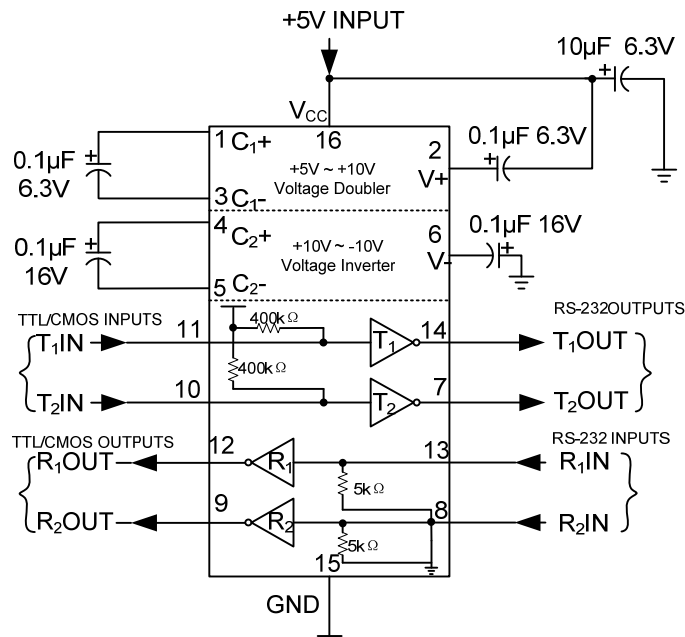
Connecting the capacitor to V$_{CC}$ (+5V) is recommended.
The negative terminal of the V+ storage capacitor can be connected to either V$_{CC}$.

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