

± 15 kV ESD protected 5 V RS-232 transceiver

Features

- ESD protection for RS-232 i/o pins: ±15 kV human body model
- 230kbps data rate
- Guaranteed slew rate 3 V/ms (min.)
- Operates from a single 5 V power supply
- Packaged in SSO-24 and TSSOP24

Description

The ST207E is a 5 driver and 3 receiver devices designed for RS-232 and V.28 communications in harsh environments. Each transmitter output and receiver input is protected against ± 15 KV electrostatic discharge (ESD) shocks. The drivers and receivers of the ST207E meet all EIA/TIA-232E and CCITT V.28 specifications at data rates up to 120 Kbps, when loaded in accordance with the EIA/TIA-232E specification.

The ST207E operates with four 0.1 μ F capacitors. It came in 24-pin SSOP and TSSOP packages.

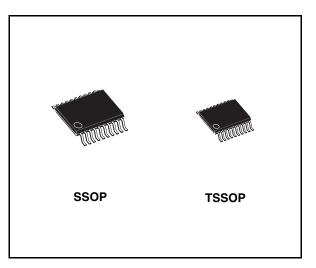


Table 1.	Device	summarv
	DEVICE	Summary

Order codes	Temperature range	Package Packaging	
ST207ECPR	0 to 70 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207EBPR	-40 to 85 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207ECTR	0 to 70 °C	TSSOP24 (Tape & Reel)	2500 parts per reel
ST207EBTR	-40 to 85 °C	TSSOP24 (Tape & Reel)	2500 parts per reel

August 2007

Contents

1	Pin configuration	3
2	Maximum ratings	5
3	Electrical characteristics	ĵ
4	Typical application	3
5	Package mechanical data	9
6	Revision history	1



1 Pin configuration

Figure 1.	Pin connections	(top view)
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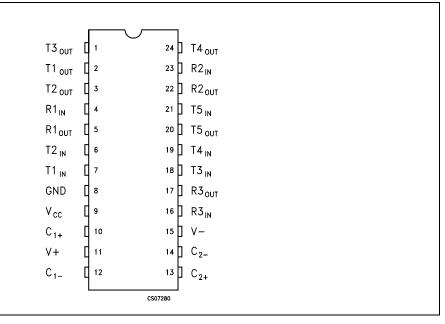


Table 2. Pin description

Pin N°	Symbol	Note
1	T3 _{OUT}	RS-232 driver output
2	T1 _{OUT}	RS-232 driver output
3	T2 _{OUT}	RS-232 driver output
4	R1 _{IN}	RS-232 receiver input
5	R1 _{OUT}	TTL/CMOS receiver output
6	T2 _{IN}	TTL/CMOS driver input internal pull-up to V _{CC}
7	T1 _{IN}	TTL/CMOS driver input internal pull-up to V _{CC}
8	GND	Ground
9	V _{CC}	4.75V to 5.25V supply voltage
10	C ₁₊	Terminal for positive charge-pump capacitor
11	V ₊	2V _{CC} generated by the charge-pump
12	C ₁₋	Terminal for negative charge-pump capacitor
13	C ₂₊	Terminal for positive charge-pump capacitor
14	C ₂₋	Terminal for negative charge-pump capacitor
15	V_	-2V _{CC} generated by the charge-pump
16	R3 _{IN}	RS-232 receiver input
17	R3 _{OUT}	TTL/CMOS receiver output



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Pin N°	Symbol	Note
18	T3 _{IN}	TTL/CMOS driver input internal pull-up to V _{CC}
19	T4 _{IN}	TTL/CMOS driver input internal pull-up to V _{CC}
20	T5 _{OUT}	RS-232 driver output
21	T5 _{IN}	TTL/CMOS driver input internal pull-up to V _{CC}
22	R2 _{OUT}	TTL/CMOS receiver output
23	R2 _{IN}	RS-232 receiver input
24	T4 _{OUT}	RS-232 driver output

Table 2. Pin description

T_{STG}

Unit V V V V V

V

°C

-65 to 150

2 Maximum ratings

Symbol	Parameter	Value
V _{CC}	Supply voltage	-0.3 to 6
V+	Extra positive voltage	(V _{CC} - 0.3) to 14
V-	Extra negative voltage	-14 to 0.3
T _{IN}	Transmitter input voltage range	-0.3 to (V _{CC} + 0.3)
R _{IN}	Receiver input voltage range	± 30
T _{OUT}	Transmitter output voltage range	(V ₋ - 0.3) to (V ₊ + 0.3)
R _{OUT}	Receiver output voltage range	-0.3 to (V _{CC} + 0.3)
T _{SHORT}	Short circuit duration on t _{OUT}	Continuous

Table 3. Absolute maximum ratings

Storage temperature range

Note: Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied. V+ and V- can have a maximum magnitude of +7V, but their absolute addition can not exceed 13 V.



57

3 Electrical characteristics

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
ESD	ESD protection voltage	Human body model	±15			KV
ESD	ESD protection voltage	IEC-1000-4-2 Contact discharge	±8			KV

Table 4. ESD Performance: transmitter outputs, receiver inputs

Table 5.Electrical characteristics

(C₁ - C₄ = 0.1 μ F, V_{CC} = 5 V ± 5%, T_A = min. to max., unless otherwise specified. Typical values are referred to T_A = 25°C).

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
I _{SUPPLY}	V _{CC} power supply current	No Load, $T_A = 25^{\circ}C$		2	5	mA

Table 6. Transmitter electrical characteristics

(C₁ - C₄ = 0.1 μ F, V_{CC} = 5V ± 5%, T_A = min. to max., unless otherwise specified. Typical values are referred to T_A = 25°C).

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V _{TOUT}	Output voltage swing	All Driver loaded with $3K\Omega$ to GND	±5	±8.5		V
R _{OUT}	Transmitter output resistance	$V_{CC} = V + = V - = 0V V_{OUT} = \pm 2V$	300			Ω
I _{SC}	Output short circuit current			±18	±60	mA
I _{IL}	Input pull-up current	T _{IN} = 0V		15	200	μA
V _{TIL}	Input logic threshold low				0.8	V
V _{TIH}	Input logic threshold high		2			V

Table 7. Receiver electrical characteristics

(C₁ - C₄ = 0.1 μ F, V_{CC} = 5 V ± 5%, T_A = min. to max., unless otherwise specified. Typical values are referred to T_A = 25°C).

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
V _{RIN}	Receiver input voltage operating range		-30		30	V
V _{RIL}	Input threshold low	$T_A = 25^{\circ}C V_{CC} = 5V$	0.8	1.2		V
V _{RIH}	Input threshold high	$T_A = 25^{\circ}C V_{CC} = 5V$		1.7	2.4	V
V _{RIHYS}	Input hysteresis	V_{CC} = 5V, no hysteresis in shutdown	0.2	0.5	1	V
R _{RIN}	Input resistance	$T_A = 25^{\circ}C V_{CC} = 5V$	3	5	7	KΩ
V _{OL}	Output voltage low				0.4	V
V _{OH}	Output voltage high	I _{OUT} = -1mA	3.5	V _{CC} -0.4		V

57

Table 8.Timing characteristics

(C₁ - C_4 = 0.1 µF, V_{CC} = 5V ± 5%, T_A = min. to max., unless otherwise specified. Typical values are referred to T_A = 25°C).

Symbol	Parameter	Test condition	Min.	Тур.	Max.	Unit
D _R Ma	Maximum data rate	$R_L = 3k\Omega$ to $7k\Omega$ $C_L = 50pF$ to 1000pF one transmitter switching	150	240		Kbps
		$R_L = 3k\Omega$ to $7k\Omega C_L = 50pF$ to 150pF one transmitter switching	230	300		Kbps
t _{PHLR} t _{PLHR}	Receiver propagation delay	All drivers loaded with $3K\Omega$ to GND		0.2	10	μs
t _{PHLT} t _{PLHT}	Transmitter propagation delay	$R_L = 3k\Omega C_L = 2500pF$ All transmitter loaded		2	3	μs
SR	Transition-region slew rate	$ \begin{array}{l} T_A = 25^\circ C R_L = 3 \text{ to } 7 \text{ k}\Omega \text{ V}_{CC} = 5 \text{ V} \\ C_L = 50 \text{pF to } 1000 \text{pF measured from} \\ +3 \text{V to } -3 \text{V or } -3 \text{V to } +3 \text{V} \end{array} $	3	7	30	V/µs

4 Typical application



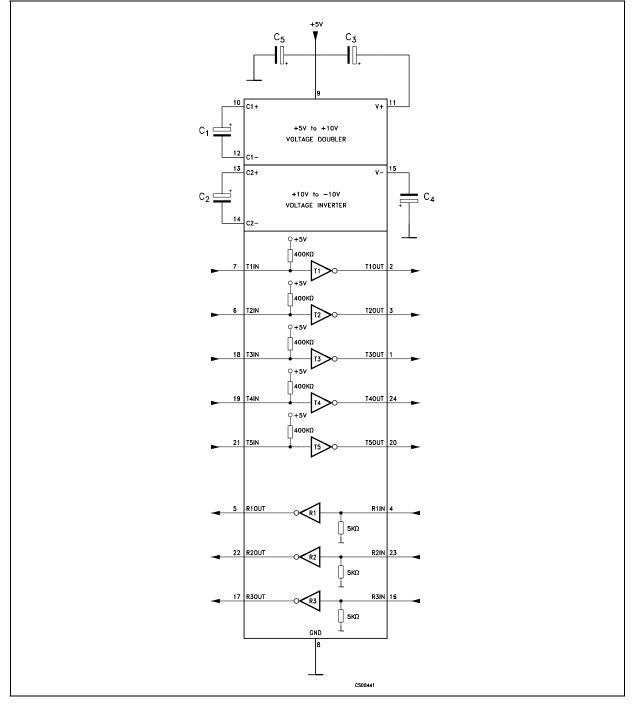


Table 9.	Capacitance value (µF)
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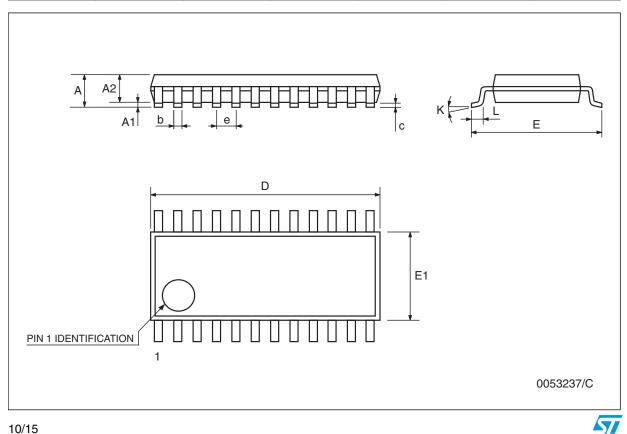
C1	C2	C3	C4	C5
0.1	0.1	0.1	0.1	0.1
8/15				57

5 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK[®] packages. These packages have a Lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: www.st.com.

Dim.		mm.			inch.		
Dim.	Min.	Тур.	Max.	Min.	Тур.	Max.	
А			2			0.079	
A1	0.05			0.002			
A2	1.65	1.75	1.85	0.065	0.069	0.073	
b	0.22		0.38	0.009		0.015	
С	0.09		0.25	0.004		0.010	
D	7.9	8.2	8.5	0.311	0.323	0.335	
E	7.4	7.8	8.2	0.291	0.307	0.323	
E1	5.00	5.3	5.6	0.197	0.209	0.220	
е		0.65 BSC			0.0256 BSC		
К	0°		8°	0°		8°	
L	0.55	0.75	0.95	0.022	0.030	0.037	

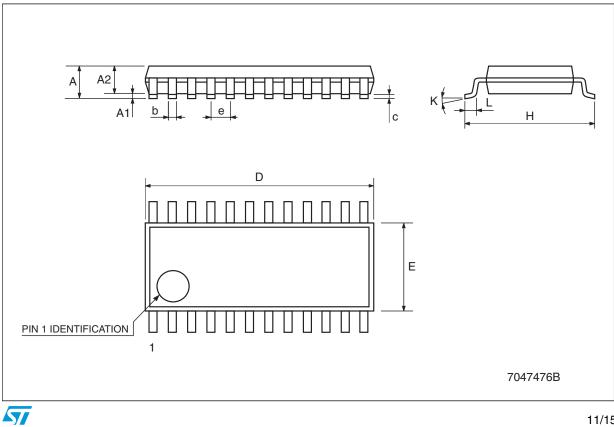
SSOP24 mechanical data



10/15

Dim.		mm.			inch.		
	Min.	Тур.	Max.	Min.	Тур.	Max.	
А			1.1			0.043	
A1	0.05		0.15	0.002		0.006	
A2		0.9			0.035		
b	0.19		0.30	0.0075		0.0118	
С	0.09		0.20	0.0035		0.0079	
D	7.7		7.9	0.303		0.311	
E	4.3		4.5	0.169		0.177	
е		0.65 BSC			0.0256 BSC		
Н	6.25		6.5	0.246		0.256	
К	0°		8°	0°		8°	
L	0.50		0.70	0.020		0.028	

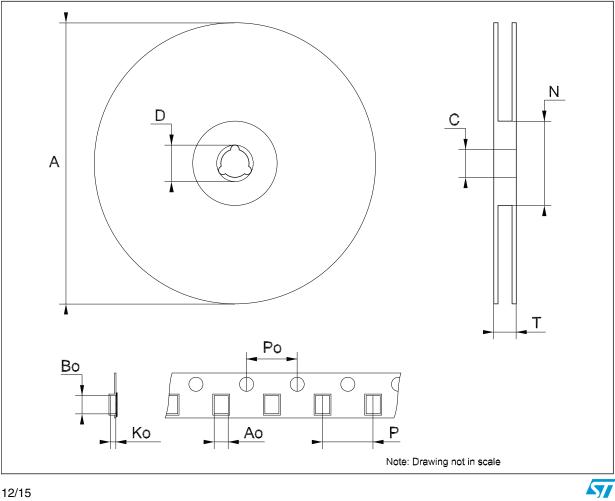
TSSOP24 mechanical data



11/15

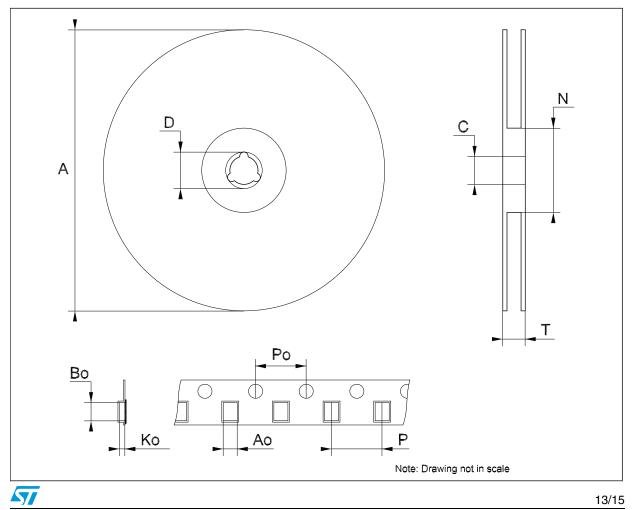
Dim.	mm.			inch.		
	Min.	Тур.	Max.	Min.	Тур.	Max.
А			330			12.992
С	12.8		13.2	0.504		0.519
D	20.2			0.795		
Ν	60			2.362		
Т			22.4			0.882
Ao	8.4		8.6	0.331		0.339
Во	8.7		8.9	0.343		0.351
Ko	2.9		3.1	0.114		0.122
Po	3.9		4.1	0.153		0.161
Р	11.9		12.1	0.468		0.476





Dim.	mm.			inch.		
	Min.	Тур.	Max.	Min.	Тур.	Max.
А			330			12.992
С	12.8		13.2	0.504		0.519
D	20.2			0.795		
Ν	60			2.362		
Т			22.4			0.882
Ao	6.8		7	0.268		0.276
Во	8.2		8.4	0.323		0.331
Ko	1.7		1.9	0.067		0.075
Po	3.9		4.1	0.153		0.161
Р	11.9		12.1	0.468		0.476





57

6 Revision history

Table 10. Revision history

Date	Revision	Changes			
09-Feb-2005	13	Mistake on Table 1.			
14-Mar-2006	14	Order codes has been updated and new template.			
22-Aug-2007	15	Added Table 1. in cover page.			

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