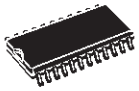
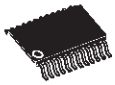
ST207E

± 15KV ESD PROTECTED 5V RS-232 TRANSCEIVER

- ESD PROTECTION FOR RS-232 I/O PINS: ± 15 KV HUMAN BODY MODEL
- 230kbps DATE RATE
- GUARANTEED SLEW RATE 3V/µs (Min)
- OPERATES FROM A SINGLE 5V POWER SUPPLY
- PACKAGED IN SO-24, SSO-24 AND TSSOP24 PACKAGES



D
(Micro Package Large)



P
(SSOP Package)

T
(TSSOP Package)

DESCRIPTION

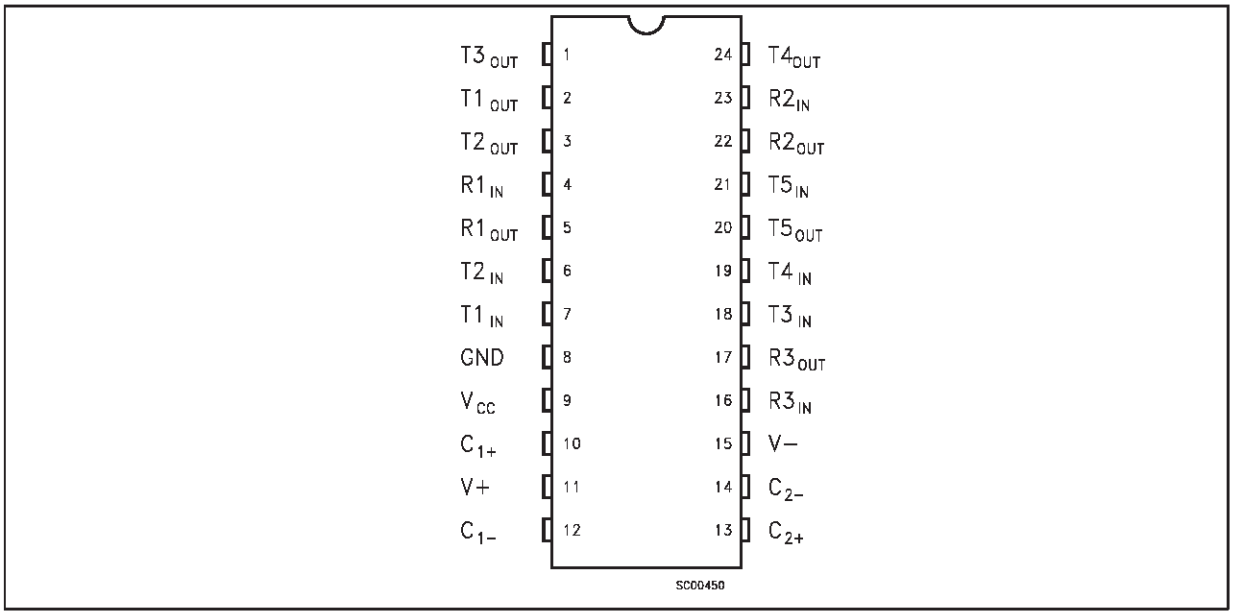
The ST207E is a 5 driver and 3 receiver devices designed for RS-232 and V.28 communications in harsh enviroments. Each transmitter output and receiver input is protected against ±15KV electrostatic discharge (ESD) shocks. The drivers and receivers of the ST207E meet all EIA/TIA-232E and CCITT V.28 specifications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

The ST207E operates with four 0.1µF capacitors. It cames in 24-pin SO and TSSOP packages.

ORDER CODES

Type	Temperature Range	Package	Comments
ST207ECD	0 to 70 °C	SO-24 (Tube)	33 parts per tube / 25 tube per box
ST207EBD	-40 to 85 °C	SO-24 (Tube)	33 parts per tube / 25 tube per box
ST207ECDR	0 to 70 °C	SO-24 (Tape & Reel)	1000 parts per reel
ST207EBDR	-40 to 85 °C	SO-24 (Tape & Reel)	1000 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
ST207ECPR	0 to 70 °C	SSOP24 (Tape & Reel)	1350 parts per reel
ST207EBPR	-40 to 85 °C	SSOP24 (Tape & Reel)	1350 parts per reel

PIN CONFIGURATION



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
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 Positive Charge-pump Capacitor
13	C_2+	Terminal For Negative 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
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 Outputs
23	$R2_{IN}$	RS-232 Receiver Input
24	$T4_{OUT}$	RS-232 Driver Output

ABSOLUTE MAXIMUM RATINGS (Note 1)

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.3 to 6	V
V_+	Extra Positive Voltage	(V_{CC} - 0.3) to 14	V
V_-	Extra Negative Voltage	-14 to 0.3	V
T_{IN}	Transmitter Input Voltage Range	-0.3 to (V_{CC} + 0.3)	V
R_{IN}	Receiver Input Voltage Range	±30	V
T_{OUT}	Transmitter Output Voltage Range	(V- - 0.3) to (V+ + 0.3)	V
R_{OUT}	Receiver Output Voltage Range	-0.3 to (V_{CC} + 0.3)	V
T_{SCTOUT}	Short Circuit Duration on T_{OUT}	Continuous	
T_{stg}	Storage Temperature Range	-65 to +150	^oC

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

ESD PERFORMANCE: TRANSMITTER OUTPUTS, RECEIVER INPUTS

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
ESD	ESD Protection Voltage	Human Body Model		±15		kV

ELECTRICAL CHARACTERISTICS (C_1 -C_4 = 0.1µF, V_{CC} = 5V ± 5% T_A = Min to Max, unless otherwise specified. Typical Valus are referred to T_A = 25 ^oC)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
I_{SUPPLY}	V_{CC} Power Supply Current	No Load, T_A = 25 ^oC		2	5	mA

RECEIVER ELECTRICAL CHARACTERISTICS (C_1 -C_4 = 0.1µF, V_{CC} = 5V ± 5% T_A = Min to Max, unless otherwise specified. Typical Valus are referred to T_A = 25 ^oC)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{RIN}	Receiver Input Voltage Operating Range		-30		30	V
V_{RIL}	Input Threshold Low	T_A = 25 ^oC, V_{CC} = 5 V	0.8	1.2		V
V_{RIH}	Input Threshold High	T_A = 25 ^oC, V_{CC} = 5 V		1.7	2.4	V
V_{RIHYS}	Input Hysteresis	V_{CC} = 5 V, no hysteresis in shutdown	0.2	0.5	1	V
R_{RIN}	Input Resistance	T_A = 25 ^oC, V_{CC} = 5 V	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

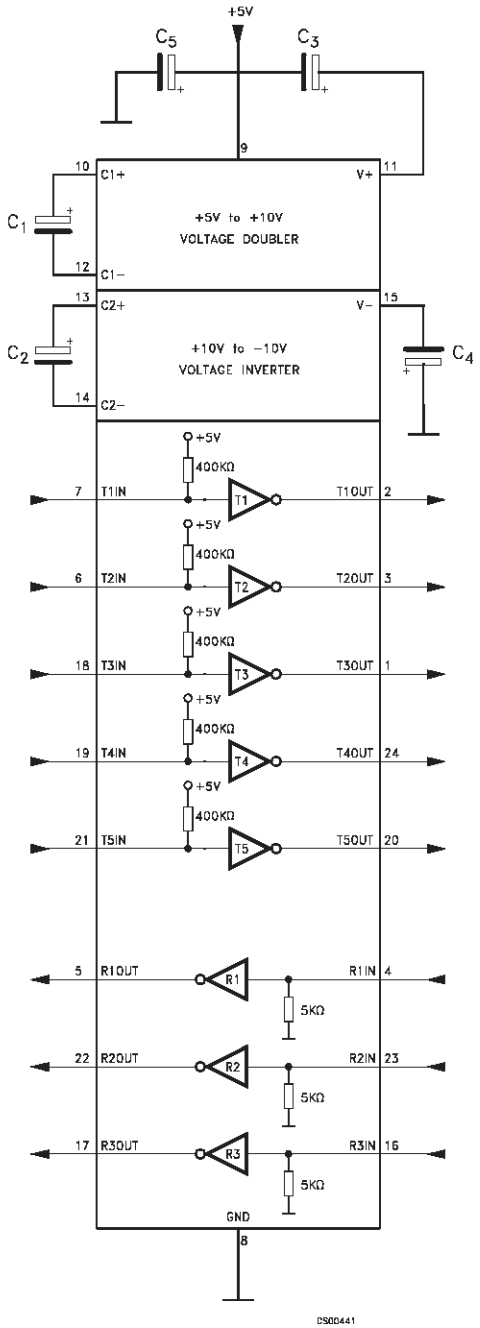
TRANSMITTER ELECTRICAL CHARACTERISTICS (C_1 -C_4 = 0.1µF, V_{CC} = 5V ± 5% T_A = Min to Max, unless otherwise specified. Typical Valus are referred to T_A = 25 °C)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
V_{TOUT}	Output Voltage Swing	All drivers loaded with 3KΩ to GND	±5	±8.5		V
R_{OUT}	Transmitter Output Resistance	V_{CC} = V+ = V- = 0V V_{OUT} = ± 2 V	300			Ω
I_{SC}	Transmitter Output Short Circuit Current			±18	±60	mA
I_{IL}	Input Pull-Up Current	T_{IN} = 0 V		15	200	µA
V_{TIL}	Input Logic Threshold Low				0.8	V
V_{TIH}	Input Logic Threshold High		2			V

TIMING CHARACTERISTICS (C_1 -C_4 = 0.1µF, V_{CC} = 5V ± 5% T_A = Min to Max, unless otherwise specified. Typical Valus are referred to T_A = 25 °C)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
DR	Maximum Data Rate	R_L = 3KΩ to 7 KΩ, one transmitter switching C_L = 50pF to 1000pF C_L = 50pF to 150pF	 180 230	 240 300		 kbps kbps
t_{PLHR} t_{PHLR}	Receiver Propagation Delay	All drivers loaded with 3KΩ to GND		0.2	10	µs
t_{PLHT} t_{PHLT}	Transmitter Propagation Delay	R_L = 3KΩ, C_L = 2500pF all transmitters loaded		2		µs
SR	Transition-Region Slew Rate	T_A =25 °C V_{CC} = 5V R_L = 3KΩ to 7 KΩ, C_L = 50pF to 1000pF measure from -3V to 3V or 3V to -3V	3	7	30	V/µs

APPLICATION CIRCUITS (note 1, note 2)



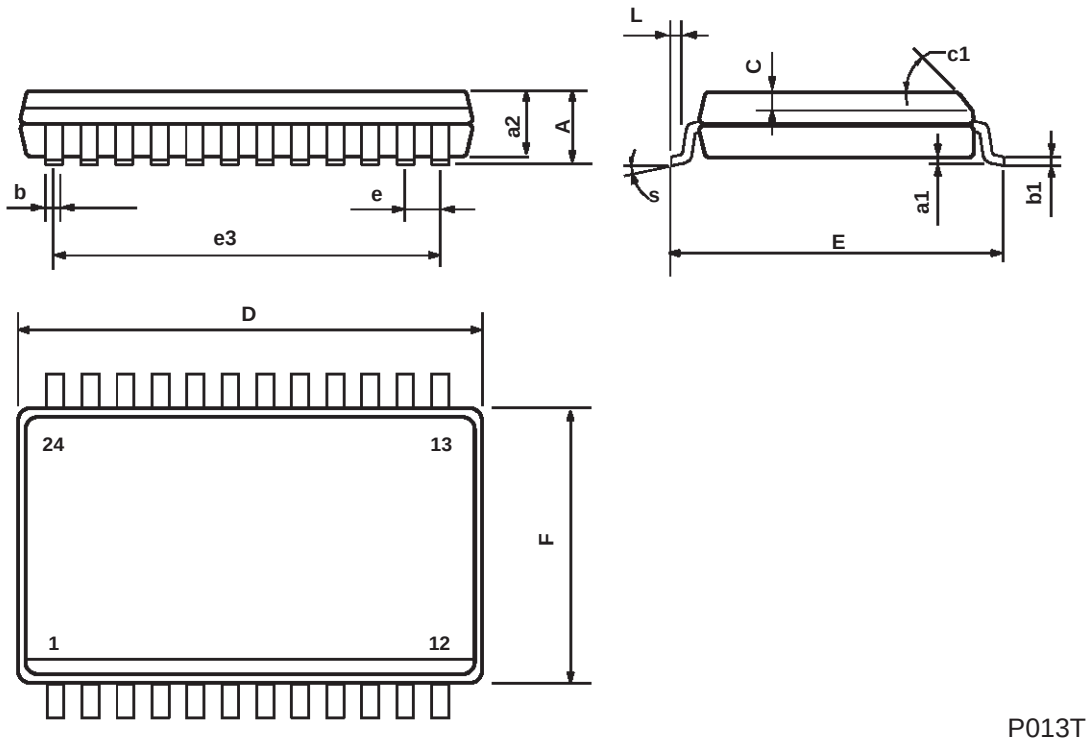
Note 1: $C_{1\text{-}4}$ capacitors can even be 1 µF ones.
Note 2: $C_{1\text{-}4}$ can be common or biased capacitors.

Capacitance Value (µF)

DEVICES	C1	C2	C3	C4	C5
ST207E	0.1	0.1	0.1	0.1	0.1

SO-24 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.10		0.20	0.004		0.007
a2			2.45			0.096
b	0.35		0.49	0.013		0.019
b1	0.23		0.32	0.009		0.012
C		0.50			0.020	
c1	45 (typ.)					
D	15.20		15.60	0.598		0.614
E	10.00		10.65	0.393		0.420
e		1.27			0.05	
e3		13.97			0.55	
F	7.40		7.60	0.291		0.299
L	0.50		1.27	0.19		0.050
S	8 (max.)					



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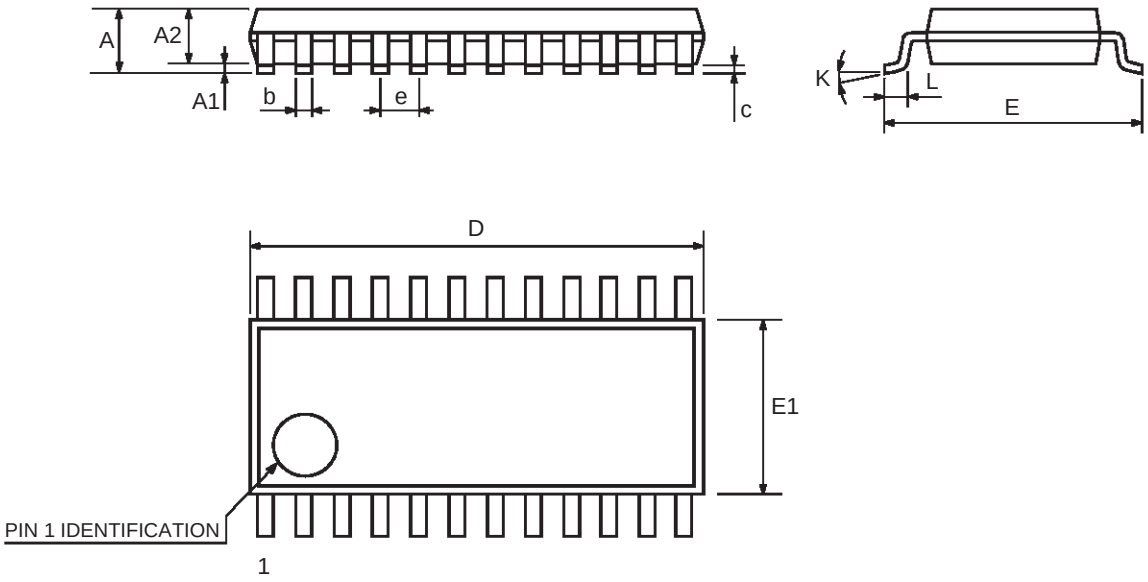
SSOP24 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.00			0.079
A1			0.25			0.010
A2	1.51		2.00	0.059		0.079
b	0.25	0.30	0.35	0.010	0.012	0.014
c	0.10		0.35	0.004		0.014
D	8.35		9.35	0.329		0.368
E	7.6		8.7	0.299		0.343
E1	5.02	6.10	6.22	0.198	0.240	0.245
e		0.65 BSC			0.0256 BSC	
K	0^o		10^o	0^o		10^o
L	0.25	0.50	0.80	0.010	0.020	0.031



TSSOP24 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.1			0.433
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	0.85	0.9	0.95	0.335	0.354	0.374
b	0.19		0.30	0.0075		0.0118
c	0.09		0.2	0.0035		0.0079
D	7.7	7.8	7.9	0.303	0.307	0.311
E	6.25	6.4	6.5	0.246	0.252	0.256
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0^o	4^o	8^o	0^o	4^o	8^o
L	0.50	0.60	0.70	0.020	0.024	0.028