



ST207E

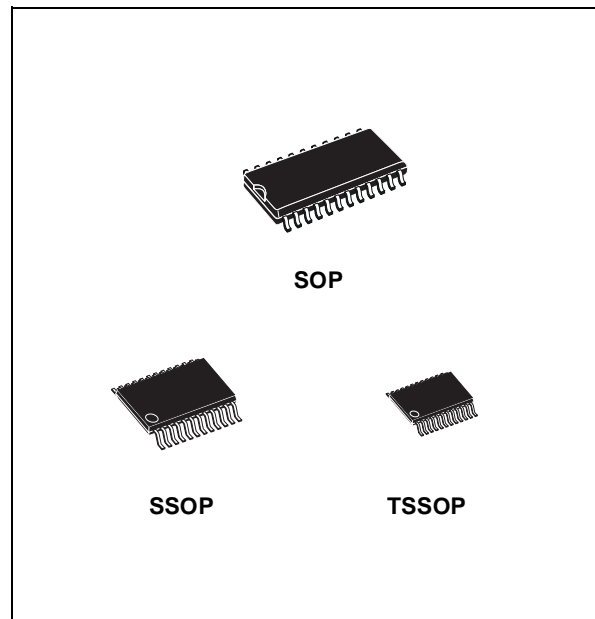
± 15KV ESD PROTECTED 5V RS-232 TRANSCEIVER

- 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

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 ±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.

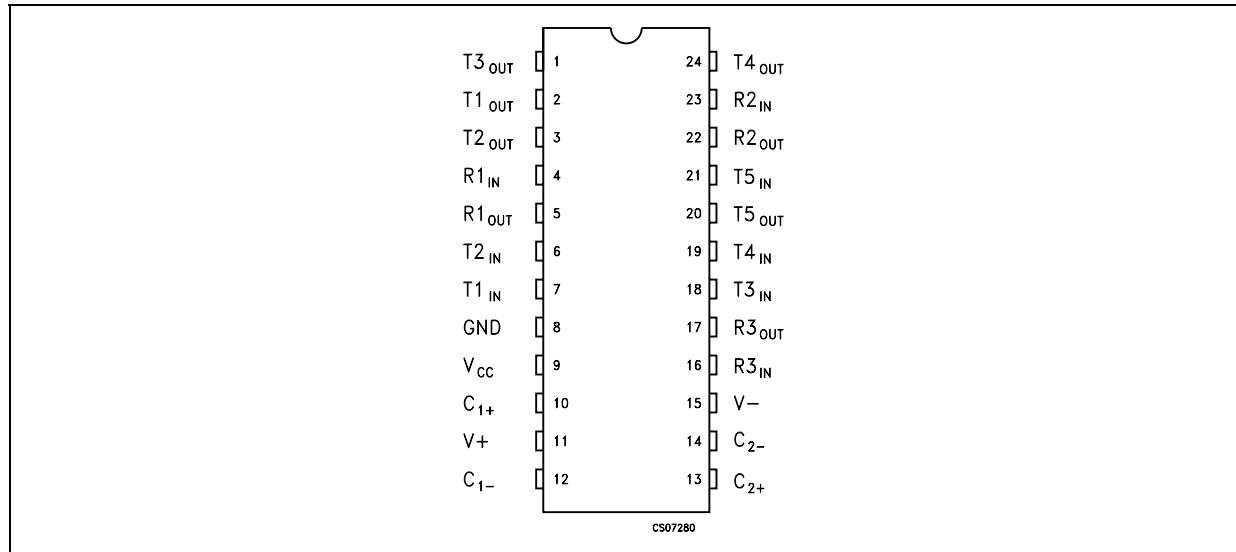
The ST207E operates with four 0.1μF capacitors. It comes in 24-pin SO and TSSOP packages.



ORDERING CODES

Type	Temperature Range	Package	Comments
ST207ECD	0 to 70 °C	SO-24 (Tube)	33parts per tube / 25tube per box
ST207EBD	-40 to 85 °C	SO-24 (Tube)	33parts per tube / 25tube per box
ST207EAD	-40 to 125 °C	SO-24 (Tube)	33parts per tube / 25tube 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
ST207EADR	-40 to 125 °C	SO-24 (Tape & Reel)	1000 parts per reel
ST207ECPR	0 to 70 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207EBDR	-40 to 85 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207EAPR	-40 to 125 °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
ST207EATR	-40 to 125 °C	TSSOP24 (Tape & Reel)	2500 parts per reel

PIN CONFIGURATION



PIN DESCRIPTION

PIN N°	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 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
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

ABSOLUTE MAXIMUM RATINGS

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_{SHORT}	Short Circuit Duration on T_{OUT}	Continuous	
T_{stg}	Storage Temperature Range	-65 to 150	°C

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.

ESD PERFORMANCE: TRANSMITTER OUTPUTS, RECEIVER INPUTS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
ESD	ESD Protection Voltage	Human Body Model	± 15			KV
ESD	ESD Protection Voltage	IEC-1000-4-2 Contact Discharge	± 8			KV

ELECTRICAL CHARACTERISTICS ($C_1 - C_4 = 0.1\mu\text{F}$, $V_{CC} = 5V \pm 5\%$, $T_A = \text{MIN to MAX}$, unless otherwise specified. Typical values are referred to $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SUPPLY}	V_{CC} Power Supply Current	No Load $T_A = 25^\circ\text{C}$		2	5	mA

RECEIVER ELECTRICAL CHARACTERISTICS ($C_1 - C_4 = 0.1\mu\text{F}$, $V_{CC} = 5V \pm 5\%$, $T_A = \text{MIN to MAX}$, unless otherwise specified. Typical values are referred to $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{RIN}	Receiver Input Voltage Operating Range		-30		30	V
V_{RIL}	Input Threshold Low	$T_A = 25^\circ\text{C}$ $V_{CC} = 5V$	0.8	1.2		V
V_{RIH}	Input hreshold High	$T_A = 25^\circ\text{C}$ $V_{CC} = 5V$		1.7	2.4	V
V_{RIHYS}	Input Hysteresys	$V_{CC} = 5V$, no hysteresis in shutdown	0.2	0.5	1	V
R_{RIN}	Input Resistance	$T_A = 25^\circ\text{C}$ $V_{CC} = 5V$	3	5	7	K Ω
V_{OL}	Output Voltage Low				0.4	V
V_{OH}	Output Voltage High	$I_{OUT} = -1\text{mA}$	3.5	$V_{CC}-0.4$		V

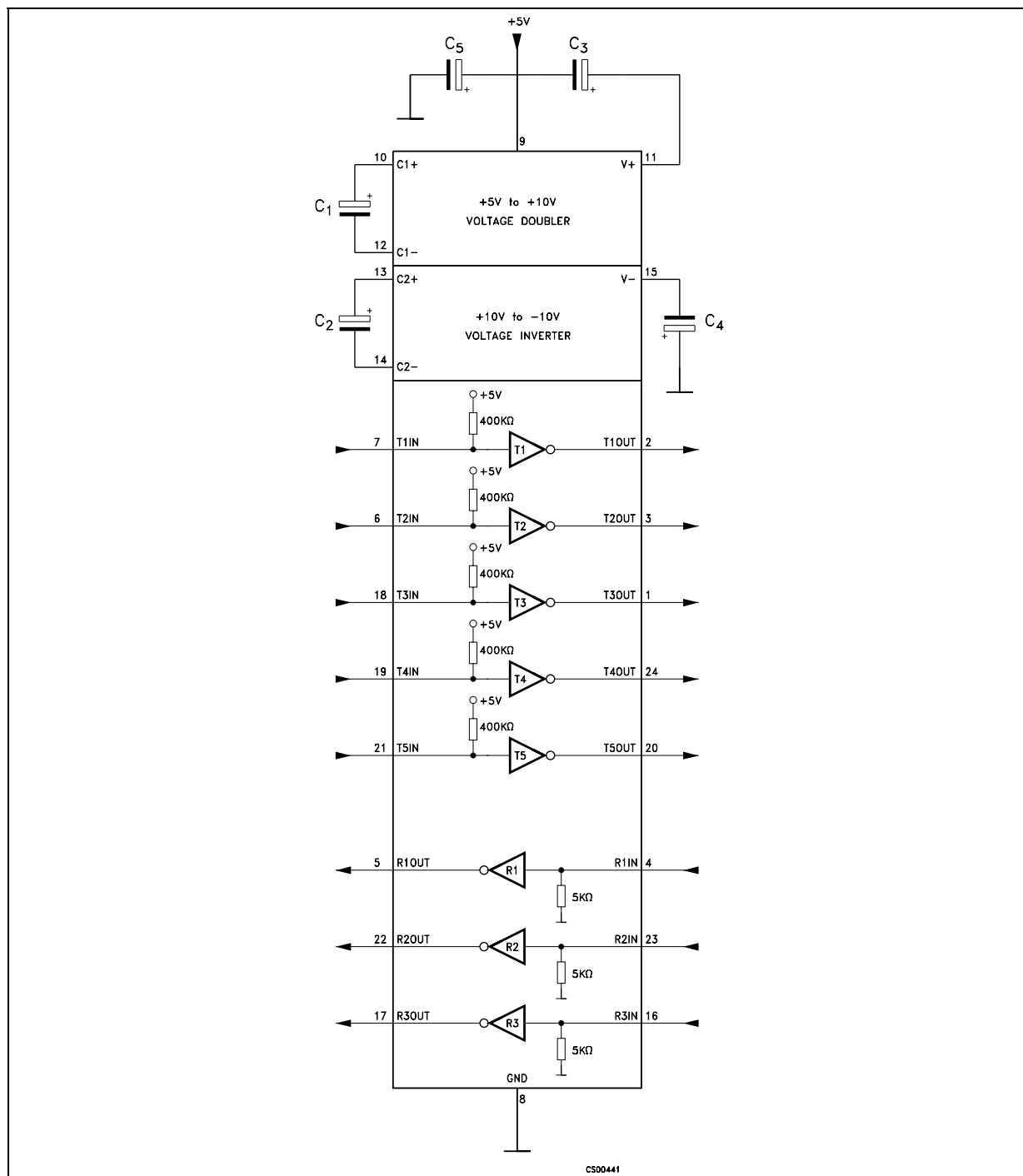
TRANSMITTER ELECTRICAL CHARACTERISTICS ($C_1 - C_4 = 0.1\mu\text{F}$, $V_{CC} = 5\text{V} \pm 5\%$, $T_A = \text{MIN to MAX}$, unless otherwise specified. Typical values are referred to $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{TOUT}	Output Voltage Swing	All Driver loaded with $3\text{K}\Omega$ to GND	± 5	± 8.5		V
R_{OUT}	Transmitter Output Resistance	$V_{CC} = V_+ = V_- = 0\text{V}$ $V_{\text{OUT}} = \pm 2\text{V}$	300			Ω
I_{SC}	Output Short Circuit Current			± 18	± 60	mA
I_{IL}	Input Pull-Up Current	$T_{\text{IN}} = 0\text{V}$		15	200	μA
V_{TIL}	Input Logic Threshold Low				0.8	V
V_{TIH}	Input Logic Threshold High		0.2			V

TIMING CHARACTERISTICS ($C_1 - C_4 = 0.1\mu\text{F}$, $V_{CC} = 5\text{V} \pm 5\%$, $T_A = \text{MIN to MAX}$, unless otherwise specified. Typical values are referred to $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
D_{R}	Maximum Data Rate	$R_{\text{L}} = 3\text{K}\Omega$ to $7\text{K}\Omega$ $C_{\text{L}} = 50\text{pF}$ to 1000pF one trasmitter switching	150	240		Kbps
		$R_{\text{L}} = 3\text{K}\Omega$ to $7\text{K}\Omega$ $C_{\text{L}} = 50\text{pF}$ to 150pF one trasmitter switching	230	300		Kbps
t_{PHLR} t_{PLHR}	Receiver Propagation Delay	All drivers loaded with $3\text{K}\Omega$ to GND		0.2	10	μs
t_{PHLT} t_{PLHT}	Transmitter Propagation Delay	$R_{\text{L}} = 3\text{K}\Omega$ $C_{\text{L}} = 2500\text{pF}$ All transmitter loaded		2	3	μs
SR	Transition-Region Slew Rate	$T_A = 25^\circ\text{C}$ $R_{\text{L}} = 3$ to $7\text{K}\Omega$ $V_{CC} = 5\text{V}$ $C_{\text{L}} = 50\text{pF}$ to 1000pF measured from $+3\text{V}$ to -3V or -3V to $+3\text{V}$	3	7	30	$\text{V}/\mu\text{s}$

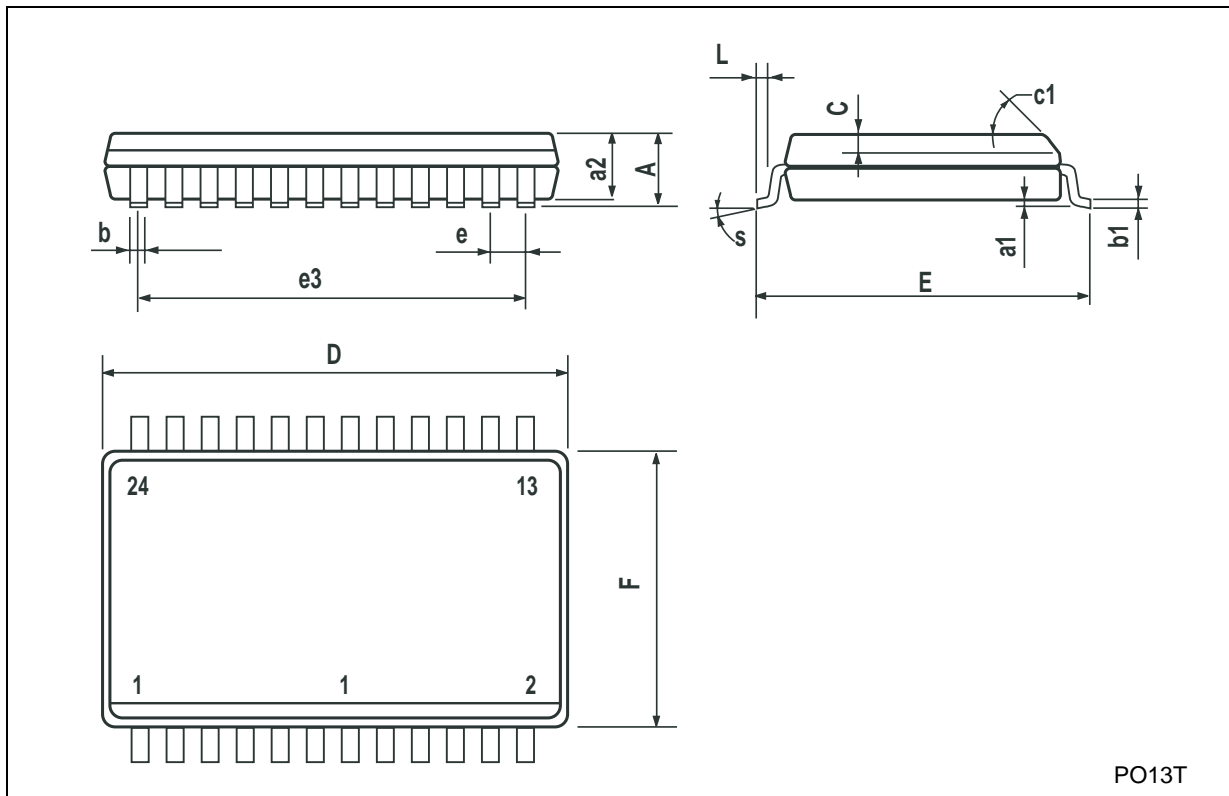
APPLICATION CIRCUITS

CAPACITANCE VALUE (μF)

C1	C2.	C3	C4	C5
0.1	0.1	0.1	0.1	0.1

SO-24 MECHANICAL DATA

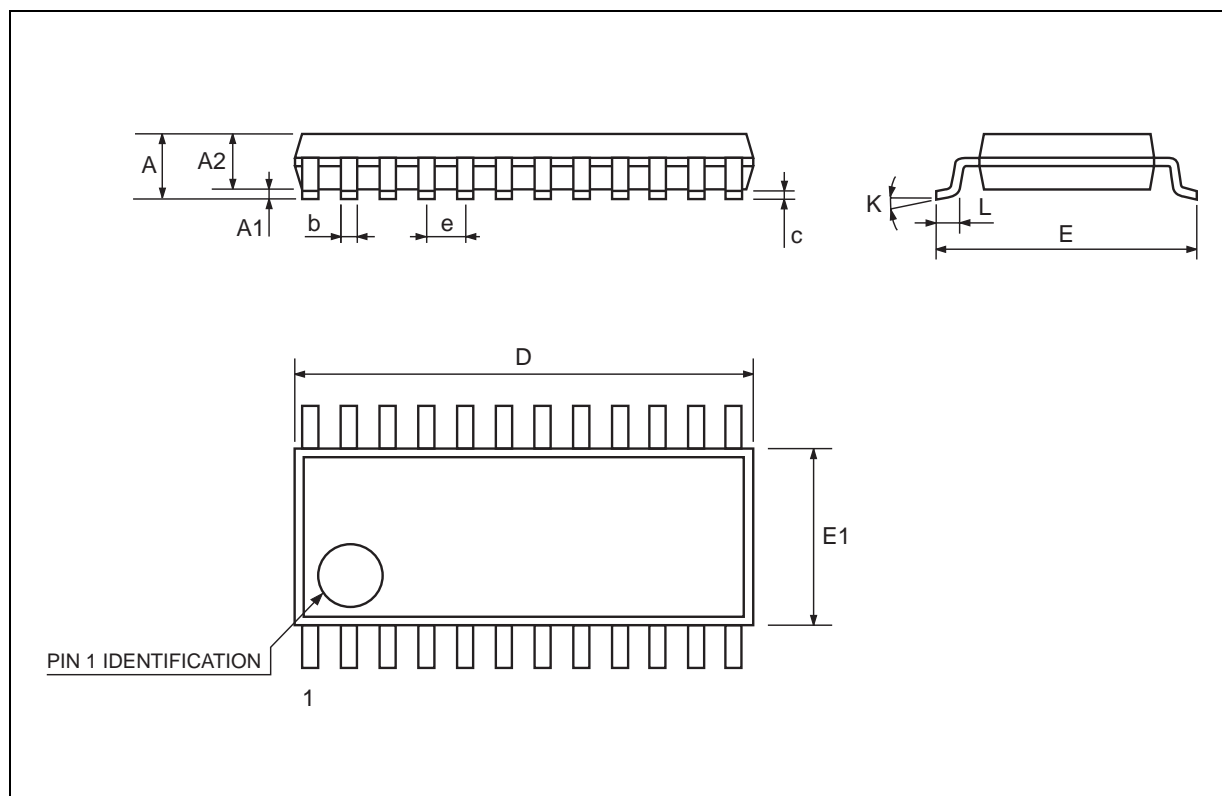
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45° (typ.)					
D	15.20		15.60	0.598		0.614
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
e3		13.97			0.550	
F	7.40		7.60	0.291		0.300
L	0.50		1.27	0.020		0.050
S	8° (max.)					



PO13T

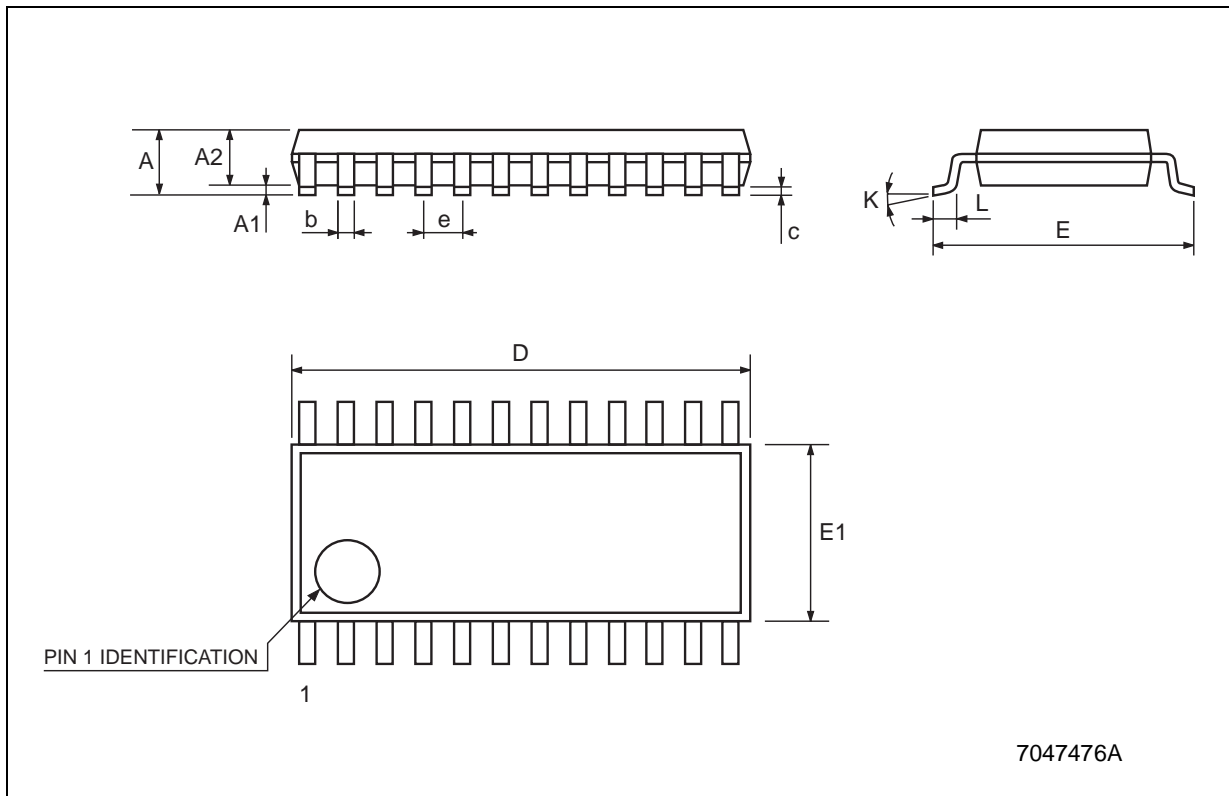
SSOP24 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2			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	0.246	0.252	0.256
E1	5.02	6.10	6.22	0.198	0.240	0.245
e		0.65 BSC			0.0256 BSC	
K	0°		10°	0°		10°
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			0.043
A1	0.05		0.15	0.002		0.006
A2		0.9			0.035	
b	0.19		0.30	0.0075		0.0118
c	0.09		0.20	0.0035		0.0079
D	7.7		7.9	0.303		0.311
E	6.25		6.5	0.246		0.256
E1	4.3		4.5	0.169		0.177
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.50		0.70	0.020		0.028



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2002 STMicroelectronics - Printed in Italy - All Rights Reserved
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>

