



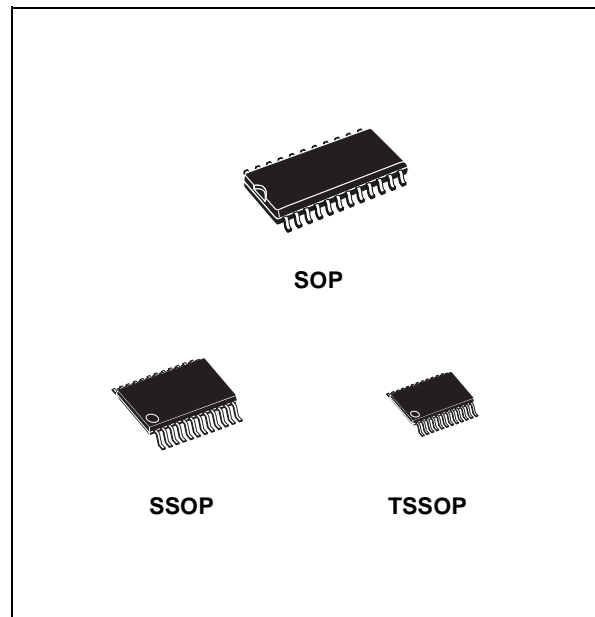
# ST207EH

## ± 15KV ESD PROTECTED 5V HIGH PERFORMANCE RS-232 TRANSCEIVER

- SINGLE +5v SUPPLY OPERATION
- 0.1µF EXTENAL CHARGE PUMP CAPACITORS
- 500kbps DATE RATE UNDER LOAD
- LOWER SUPPLY CURRENT 1.5mA (TYP)
- IDEAL FOR HIGH SPEED RS-232 APPLICATIONS
- PACKAGED IN SO-24, SSO-24 AND TSSOP24
- ESD PROTECTION FOR RS-232 I/O PINS: ±15 KV HUMAN BODY MODEL

### DESCRIPTION

The ST207EH is a high speed enhanced multi-channel RS-232 line transceivers with improved electrical performance. The ST207EH is a superior drop-in replacement to our previous versions as well as popular industry standards. The device feature low-power CMOS construction and the charge pump circuitry that generates the ±10V RS-232 voltag elevels using 01µF charges pump capacitors. The ST207EH include a high transmission rate of 500Kbps, a lower supply current at 1.5mA typical (no load), and a superior ESD performance. The ESD tolerance has been

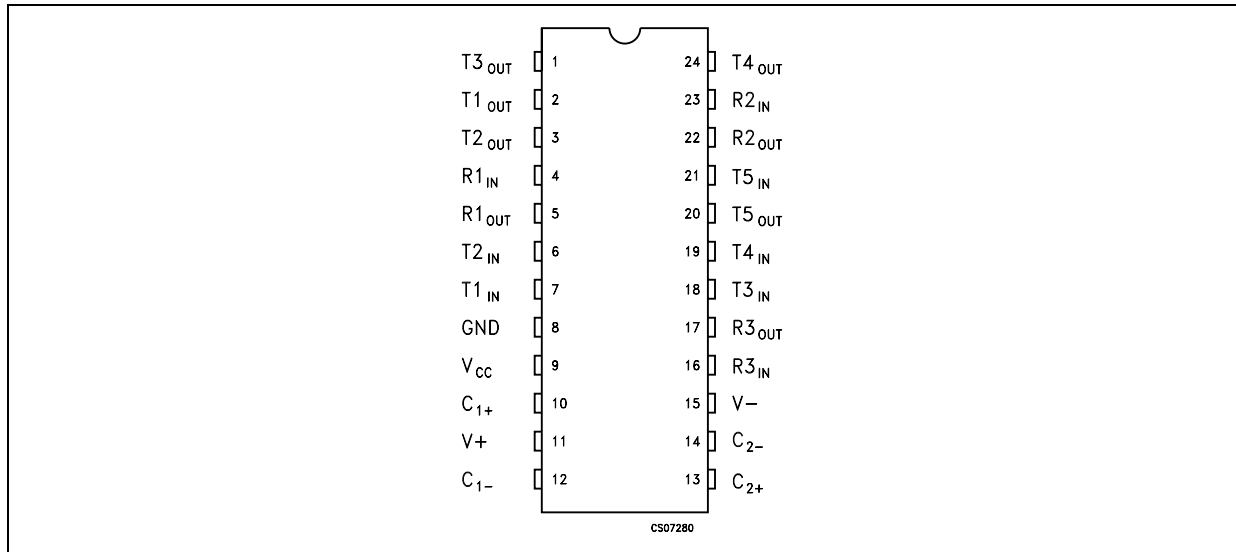


improved for this device over ±15KV for HUMAN Body Model. The ST207EH comes in 24-pin SO, SSO and TSSOP packages.

### ORDERING CODES

Type	Temperature Range	Package	Comments
ST207EHCD	0 to 70 °C	SO-24 (Tube)	33parts per tube / 25tube per box
ST207EHBD	-40 to 85 °C	SO-24 (Tube)	33parts per tube / 25tube per box
ST207EHCDR	0 to 70 °C	SO-24 (Tape & Reel)	1000 parts per reel
ST207EHBDR	-40 to 85 °C	SO-24 (Tape & Reel)	1000 parts per reel
ST207EHCPR	0 to 70 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207EHBDR	-40 to 85 °C	SSOP-24 (Tape & Reel)	1350 parts per reel
ST207EHCTR	0 to 70 °C	TSSOP24 (Tape & Reel)	2500 parts per reel
ST207EBTR	-40 to 85 °C	TSSOP24 (Tape & Reel)	2500 parts per reel

**PIN CONFIGURATION**



**PIN DESCRIPTION**

PIN N°	SYMBOL	NAME AND FUNCTION
1	T3 <sub>OUT</sub>	RS-232 Driver Output
2	T1 <sub>OUT</sub>	RS-232 Driver Output
3	T2 <sub>OUT</sub>	RS-232 Driver Output
4	R1 <sub>IN</sub>	RS-232 Receiver Input
5	R1 <sub>OUT</sub>	TTL/CMOS Receiver Output
6	T2 <sub>IN</sub>	TTL/CMOS Driver Input Internal Pull-up to V <sub>CC</sub>
7	T1 <sub>IN</sub>	TTL/CMOS Driver Input Internal Pull-up to V <sub>CC</sub>
8	GND	Ground
9	V <sub>CC</sub>	4.75V to 5.25V Supply Voltage
10	C <sub>1+</sub>	Terminal For Positive Charge-pump Capacitor
11	V <sub>+</sub>	2V <sub>CC</sub> Generated by The Charge-pump
12	C <sub>1-</sub>	Terminal For Negative Charge-pump Capacitor
13	C <sub>2+</sub>	Terminal For Positive Charge-pump Capacitor
14	C <sub>2-</sub>	Terminal For Negative Charge-pump Capacitor
15	V <sub>-</sub>	-2V <sub>CC</sub> Generated by The Charge-pump
16	R3 <sub>IN</sub>	RS-232 Receiver Input
17	R3 <sub>OUT</sub>	TTL/CMOS Receiver Output
18	T3 <sub>IN</sub>	TTL/CMOS Driver Input Internal Pull-up to V <sub>CC</sub>
19	T4 <sub>IN</sub>	TTL/CMOS Driver Input Internal Pull-up to V <sub>CC</sub>
20	T5 <sub>OUT</sub>	RS-232 Driver Output
21	T5 <sub>IN</sub>	TTL/CMOS Driver Input Internal Pull-up to V <sub>CC</sub>
22	R2 <sub>OUT</sub>	TTL/CMOS Receiver Output
23	R2 <sub>IN</sub>	RS-232 Receiver Input
24	T4 <sub>OUT</sub>	RS-232 Driver Output

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	6	V
V+	Extra Positive Voltage	$(V_{CC} - 0.3)$ to 13.2	V
V-	Extra Negative Voltage	13.2	V
$T_{IN}$	Transmitter Input Voltage Range	-0.3 to $(V_{CC} + 0.3)$	V
$R_{IN}$	Receiver Input Voltage Range	$\pm 20$	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	$^{\circ}C$

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions 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		$\pm 15$		KV

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply Voltage		4.5	5.0	5.5	V
$I_{CC}$	$V_{CC}$ Power Supply Current	No Load $T_A = 25^{\circ}C$ , $V_{CC} = \pm 10\%$		1.5	3	mA

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{RIN}$	Receiver Input Voltage Operating Range		-15		15	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	2.8	V
$V_{RIHYS}$	Input Hysteresis	$V_{CC} = 5V$ ,	0.2	0.5	1	V
$R_{RIN}$	Input Resistance	$T_A = 25^{\circ}C$ $V_{IN} = \pm 15V$	3	5	7	$K\Omega$
$V_{OL}$	Output Voltage Low	$I_{OUT} = 3.2mA$ $V_{CC} = 5V$			0.4	V
$V_{OH}$	Output Voltage High	$I_{OUT} = -1mA$	3.5			V

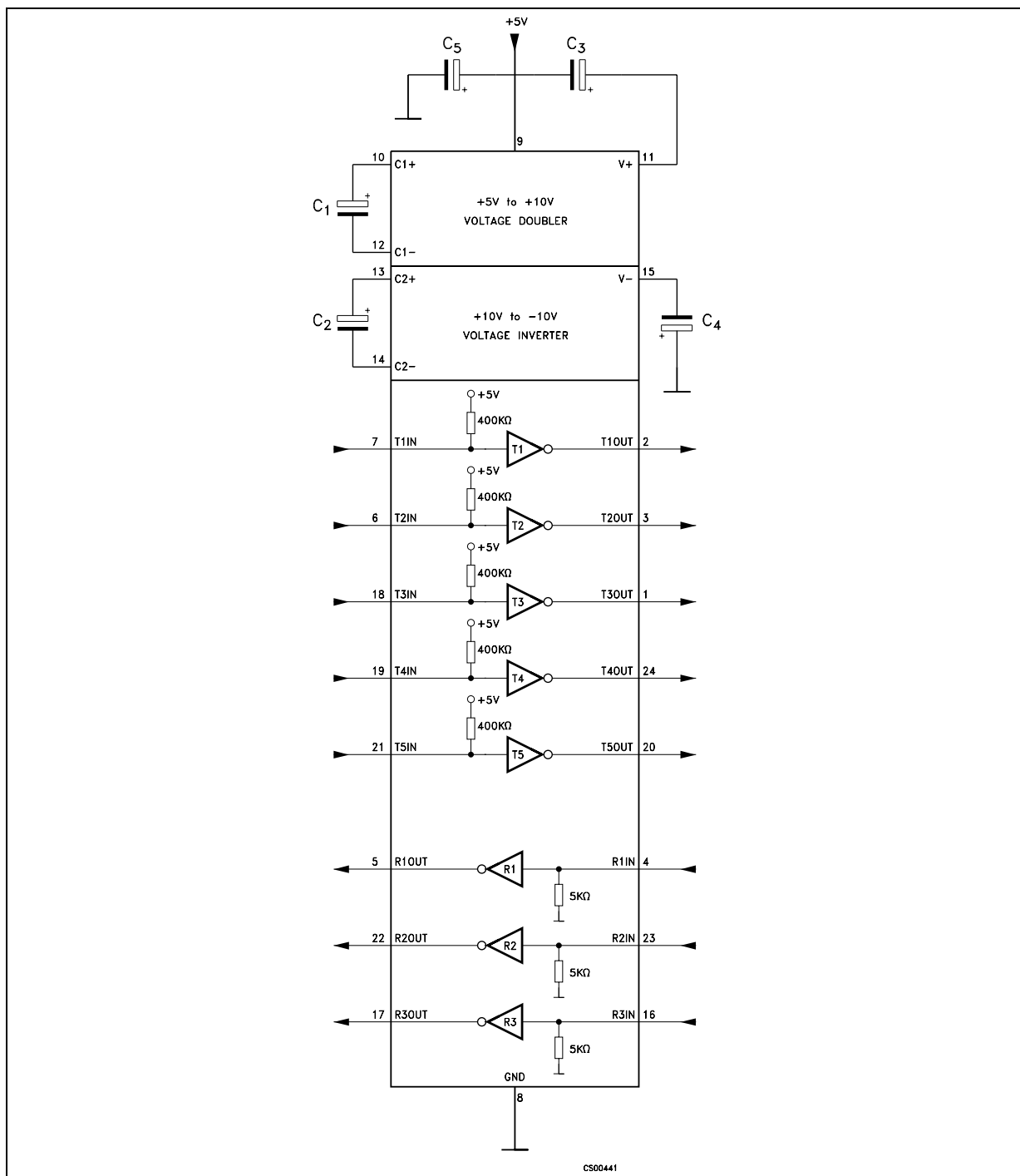
**TRANSMITTER ELECTRICAL CHARACTERISTICS** ( $C_1 - C_4 = 0.1\mu\text{F}$ ,  $V_{CC} = 5\text{V} \pm 5\%$ ,  $T_A = \text{MIN to MAX}$ , unless otherwise specified. Typical values are referred to  $T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{TOUT}$	Output Voltage Swing	All Driver loaded with $3\text{K}\Omega$ to GND	$\pm 5$	$\pm 7$		V
$R_{OUT}$	Transmitter Output Resistance	$V_{CC} = V_+ = V_- = 0\text{V}$ $V_{OUT} = \pm 2\text{V}$	300			$\Omega$
$I_{SC}$	Output Short Circuit Current	Infinite duration $V_{OUT} = 0\text{V}$		$\pm 18$		mA
$I_{IL}$	Input Pull-Up Current	$T_{IN} = 0\text{V}$		15	200	$\mu\text{A}$
$V_{TIL}$	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	$R_L = 3\text{K}\Omega$ $C_L = 1000\text{pF}$	480			Kbps
$t_{PHLR}$ $t_{PLHR}$	Receiver Propagation Delay	RS-232 to TTL		250		ns
$t_{PHLT}$ $t_{PLHT}$	Transmitter Propagation Delay	TTL to RS-232		200	500	ns

APPLICATION CIRCUITS

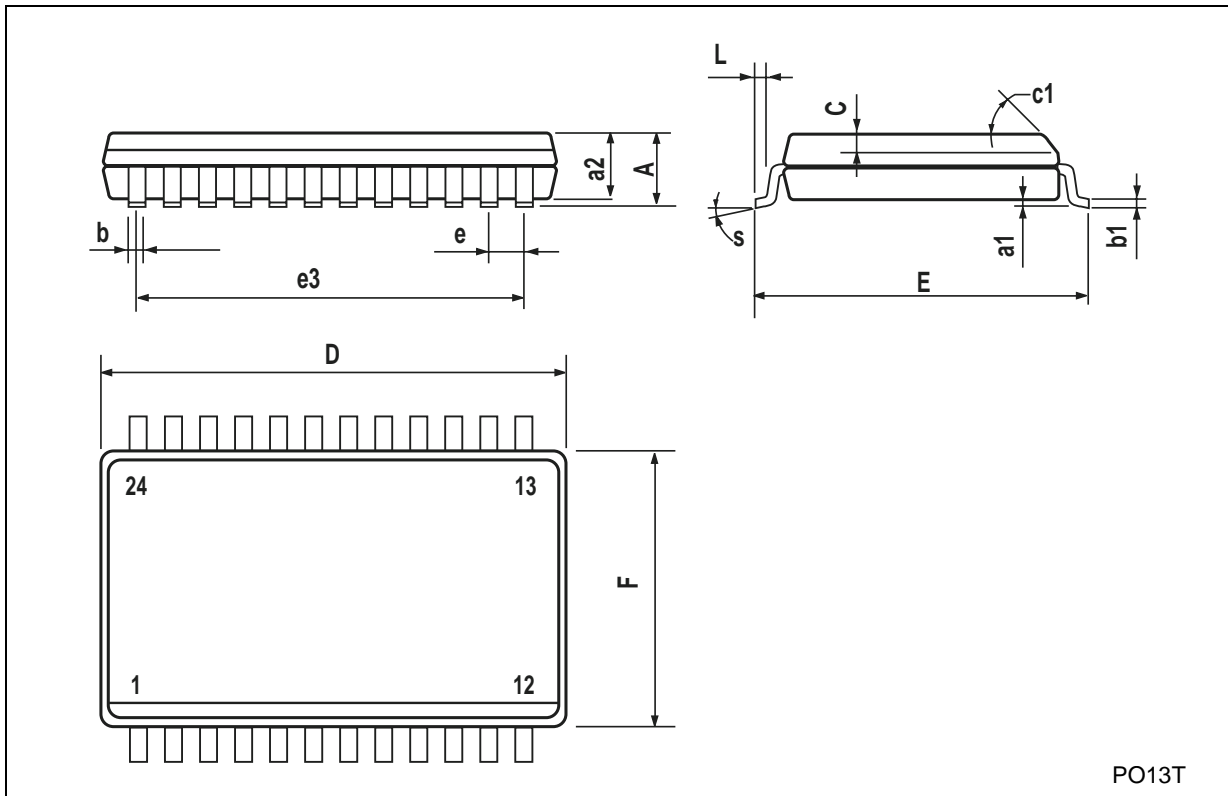


CAPACITANCE VALUE (μF)

C1	C2.	C3	C4	C5
0.1	0.1	0.1	0.1	0.1

**SO-24 MECHANICAL DATA**

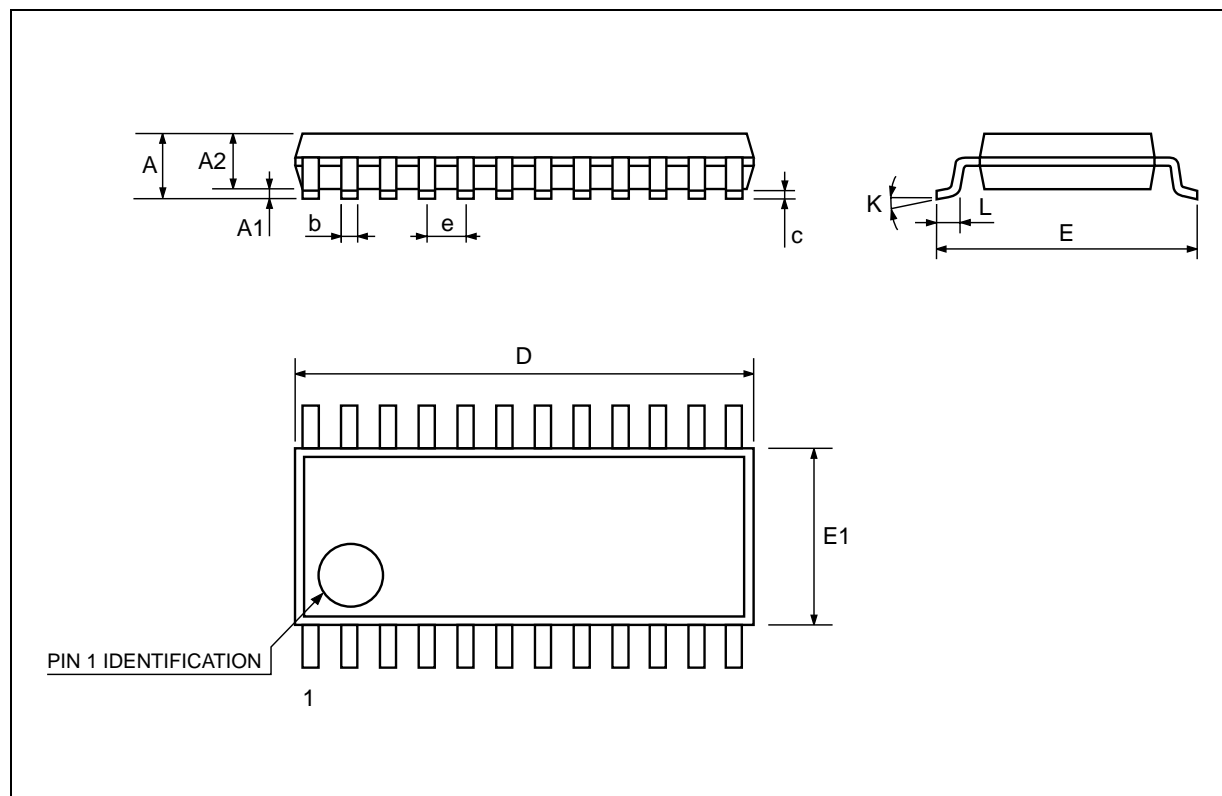
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45° (typ.)					
D	15.20		15.60	0.598		0.614
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
e3		13.97			0.550	
F	7.40		7.60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



PO13T

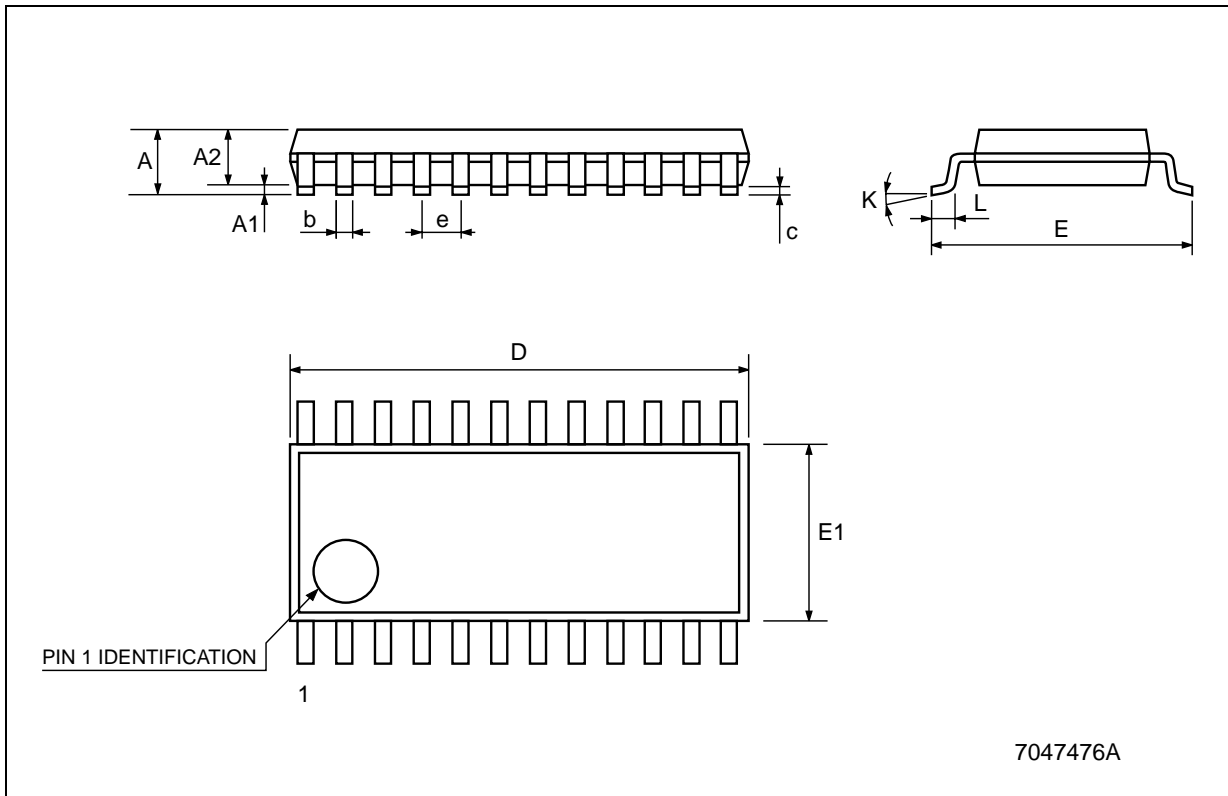
## SSOP24 MECHANICAL DATA

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





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