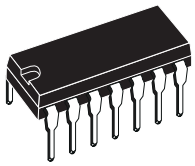
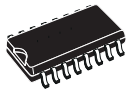
ST232A

VERY HIGH SPEED, ULTRA LOW POWER CONSUMPTION 5V POWERED RS-232 DRIVERS AND RECEIVERS

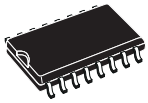
- SUPPLY VOLTAGE RANGE: 4.5 TO 5.5V
- SUPPLY CURRENT NO LOAD (TYP): 1.5mA
- TRASMITTER OUTPUT VOLTAGE SWING (TYP): ± 9V
- TRANSITION SLEW RATE (TYP.): 12V/µs
- RECEIVER PROPAGATION DELAY (TYP.): 0.1µs
- RECEIVER INPUT VOLTAGE RANGE: ± 30V
- DATA RATE (TYP.): 400Kbp/s
- OPERATING TEMPERATURE RANGE: -40 TO 85 °C, 0 TO 70°C



DIP



SOP



SOP Large



TSSOP

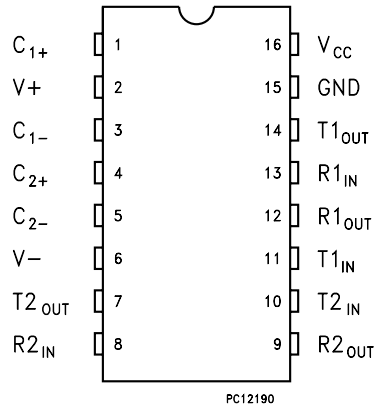
DESCRIPTION

The ST232A is a 2 driver, 2 receiver device following EIA/TIA-232 and V.28 communication standard. It is particularly suitable for applications where ± 12V is not available. The ST232 uses a single 5V power supply and only four external capacitors (0.1µF). Typical application are in: Portable Computers, Low Power Modems, Interfaces Translation, Battery Powered RS-232 Networks.

ORDERING CODES

Type	Temperature Range	Package	Comments
ST232ACN	0 to 70 °C	DIP-16	25parts per tube / 40tube per box
ST232ABN	-40 to 85 °C	DIP-16	25parts per tube / 40tube per box
ST232ACD	0 to 70 °C	SO-16 (Tube)	49parts per tube / 25tube per box
ST232ABD	-40 to 85 °C	SO-16 (Tube)	49parts per tube / 25tube per box
ST232ACDR	0 to 70 °C	SO-16 (Tape & Reel)	2500 parts per reel
ST232ABDR	-40 to 85 °C	SO-16 (Tape & Reel)	2500 parts per reel
ST232ACW	0 to 70 °C	SO-16 Large (Tube)	50parts per tube / 20tube per box
ST232ABW	-40 to 85 °C	SO-16 Large (Tube)	50parts per tube / 20tube per box
ST232ACWR	0 to 70 °C	SO-16 Large (Tape & Reel)	1000 parts per reel
ST232ABWR	-40 to 85 °C	SO-16 Large (Tape & Reel)	1000 parts per reel
ST232ACTR	0 to 70 °C	TSSOP16 (Tape & Reel)	2500 parts per reel
ST232ABTR	-40 to 85 °C	TSSOP16 (Tape & Reel)	2500 parts per reel

PIN CONFIGURATION



PIN DESCRIPTION

PIN N°	SYMBOL	NAME AND FUNCTION
1	C_1+	Positive Terminal for the first Charge Pump Capacitor
2	V+	Doubled Voltage Terminal
3	C_1-	Negative Terminal for the first Charge Pump Capacitor
4	C_2+	Positive Terminal for the second Charge Pump Capacitor
5	C_2-	Negative Terminal for the second Charge Pump Capacitor
6	V-	Inverted Voltage Terminal
7	$T2_{OUT}$	Second Transmitter Output Voltage
8	$R2_{IN}$	Second Receiver Input Voltage
9	$R2_{OUT}$	Second Receiver Output Voltage
10	$T2_{IN}$	Second Transmitter Input Voltage
11	$T1_{IN}$	First Transmitter Input Voltage
12	$R1_{OUT}$	First Receiver Output Voltage
13	$R1_{IN}$	First Receiver Input Voltage
14	$T1_{OUT}$	First Transmitter Output Voltage
15	GND	Ground
16	V_{CC}	Supply Voltage

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 13.2	V
V-	Extra Negative Voltage	0.3 to -13.2	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	± 15	V
R_{OUT}	Receiver Output Voltage Range	-0.3 to (V_{CC} + 0.3)	V
T_{SCTOUT}	Short Circuit Duration on T_{OUT}	infinite	

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

ELECTRICAL CHARACTERISTICS

(C_1 - C_4 = 0.1µF, V_{CC} = 5V ± 10%, T_A = -40 to 85°C, unless otherwise specified.
Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{SUPPLY}	V_{CC} Power Supply Current	No Load		1.5	4	mA

TRANSMITTER ELECTRICAL CHARACTERISTICS

(C_1 - C_4 = 0.1µF, V_{CC} = 5V ± 10%, T_A = -40 to 85°C, unless otherwise specified.
Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{TOUT}	Output Voltage Swing	All Transmitter outputs are loaded with 3KΩ to GND	± 5	± 9		V
I_{TIL}	Logic Pull-Up Current	T_{IN} = 0V		5	40	µA
V_{TIL}	Input Logic Threshold Low		0.8	1.4		V
V_{TIH}	Input Logic Threshold High			1.4	2	V
SR_T	Transition Slew Rate	T_A = 25°C, V_{CC} = 5V R_L = 3 to 7KΩ, C_L = 50 to 2500pF (Note1)	6	12	30	V/µs
D_R	Data Rate	(Note 2)	200	400		Kbits/s
R_{TOUT}	Transmitter Output Resistance	V_{CC} = V+ = V- = 0V V_{OUT} = ± 2V	300			Ω
I_{SC}	Transmitter Output Short Circuit Current	one T_{XOUT} to GND	± 7	± 22		mA
t_{dT}	Propagation Delay Time	TTL-CMOS IN to RS-232 OUT C_L = 150pF (50% to 50%)		1.3	3.5	µs

Note 1: Measured from 3V to -3V or from -3V to 3V.
Note2: One trasmitter output is loaded with R_L = 3KΩ to 7KΩ, C_L = 50 to 1000pF

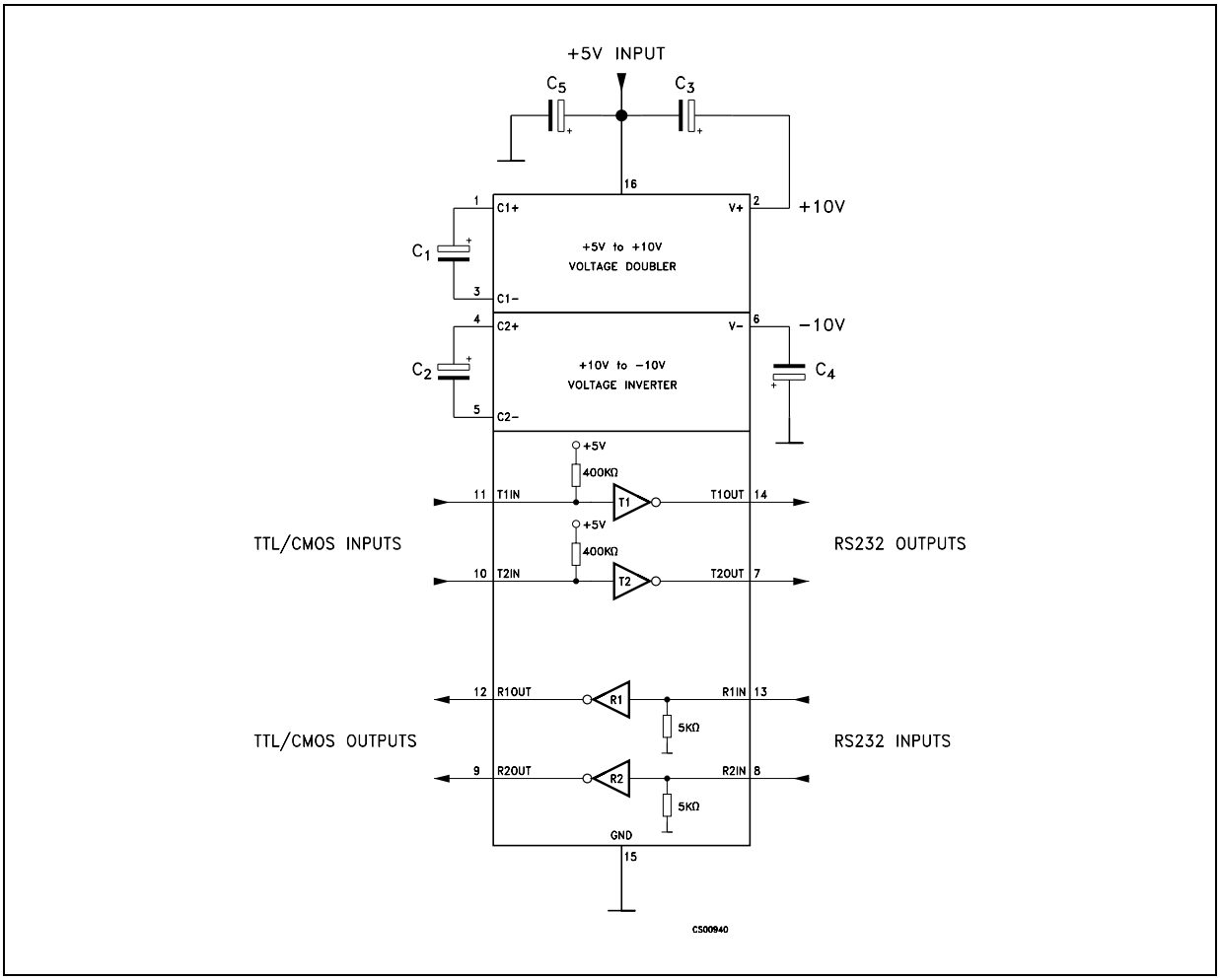
RECEIVER ELECTRICAL CHARACTERISTICS

(C_1 - C_4 = 0.1µF, V_{CC} = 5V ± 10%, T_A = -40 to 85°C, unless otherwise specified.
Typical values are referred to T_A = 25°C)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{RIN}	Receiver Input Voltage Operating Range		-30		30	V
R_{RIN}	RS-232 Input Resistance	T_A = 25°C	3	5	7	KΩ
V_{RIL}	RS-232 Input Threshold Low		0.8	1.3		V
V_{RIH}	RS-232 Input Threshold High			1.8	2.4	V
V_{RIHYS}	RS-232 Input Hysteresis	V_{CC} = 5V	0.2	0.5	1	V
V_{ROL}	TTL/CMOS Output Voltage Low	I_{OUT} = 3.2mA (to V_{CC})		0.2	0.4	V
V_{ROH}	TTL/CMOS Output Voltage High	I_{OUT} = 1mA (to GND)	3.5	V_{CC}-0.2		V
I_{SCR}	Receiver Output Short Circuit Current	to GND to V_{CC}	2 10	10 30		mA mA
t_{dR}	Propagation Delay Time	C_L = 150pF (Note 1)		0.1	0.5	µs

Note 1: RS-232 IN to TTL-CMOS OUT (from 50% to 50%)

APPLICATION CIRCUITS (note 1, note 2)



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

CAPACITANCE VALUE (µF)

C1	C2.	C3	C4	C5
0.1	0.1	0.1	0.1	0.1

TYPICAL PERFORMANCE CHARACTERISTICS (unless otherwise specified T_j = 25°C)

Figure 1 : Driver Voltage Transfer Characteristics

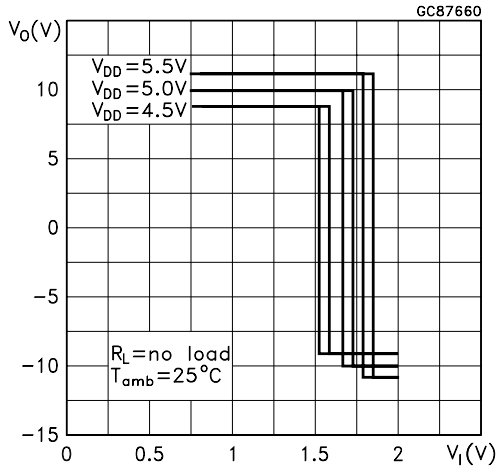


Figure 2 : Drive Short Circuit Output Current vs Temperature

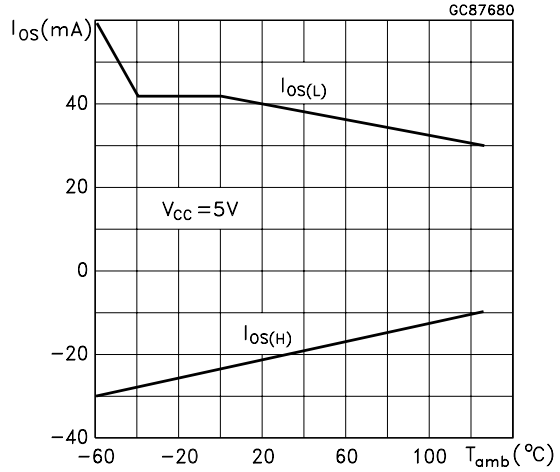


Figure 3 : Receiver Threshold vs Supply Voltage

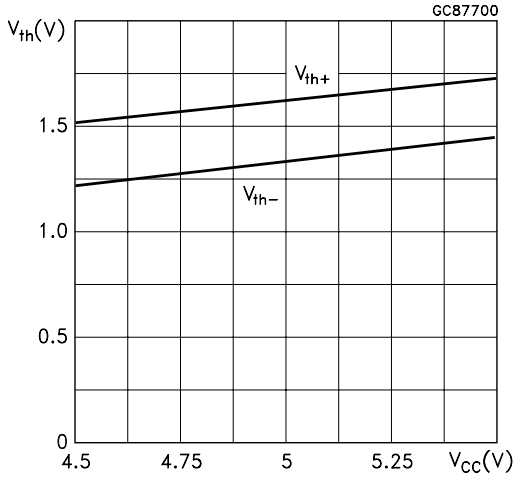


Figure 4 : Driver Output Capability Current vs Output Voltage

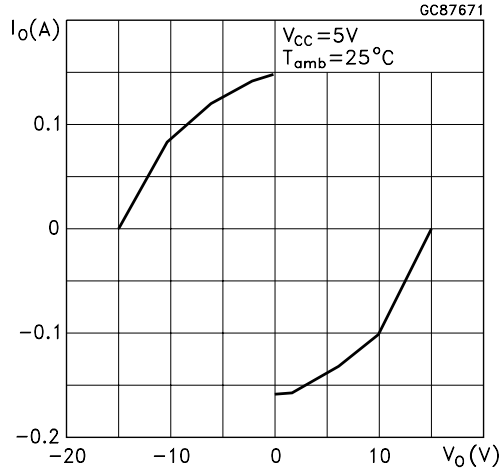


Figure 5 : Driver Short Circuit Supply Current vs Temperature

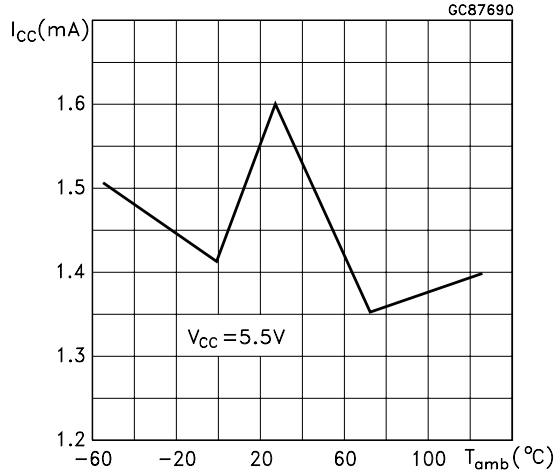
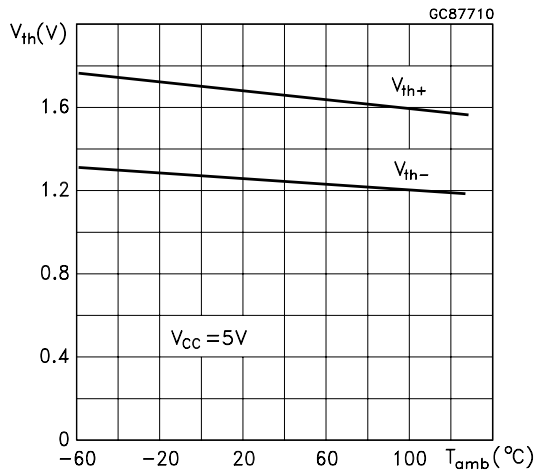
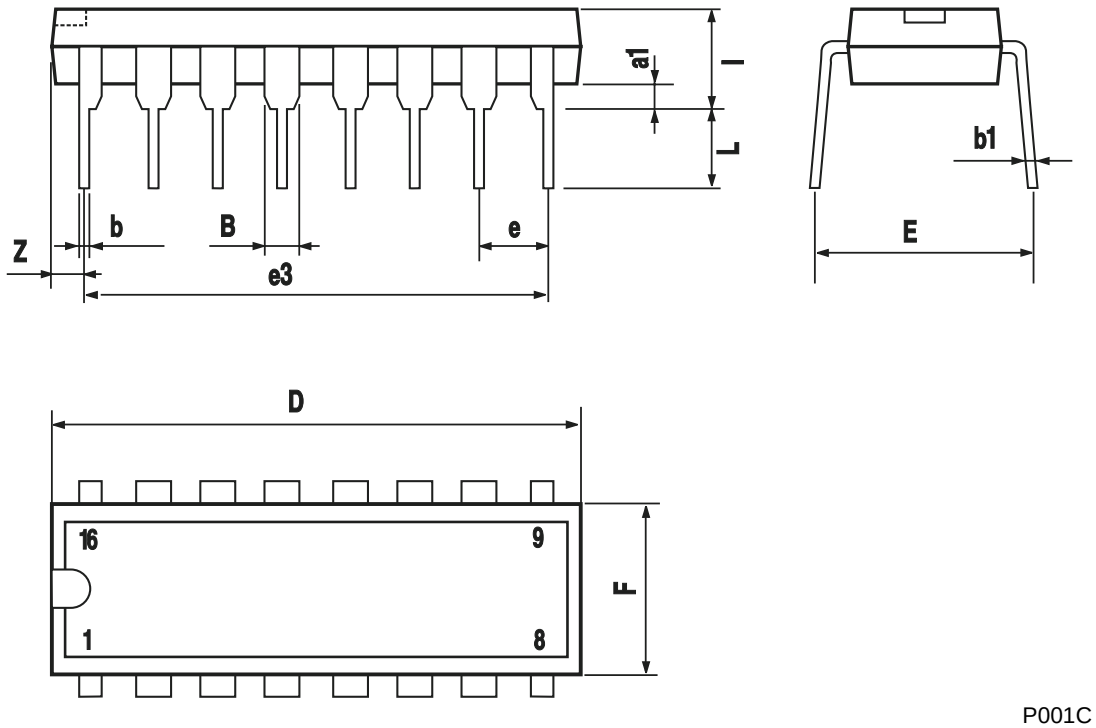


Figure 6 : Receiver Threshold vs Temperature



Plastic DIP-16 (0.25) MECHANICAL DATA

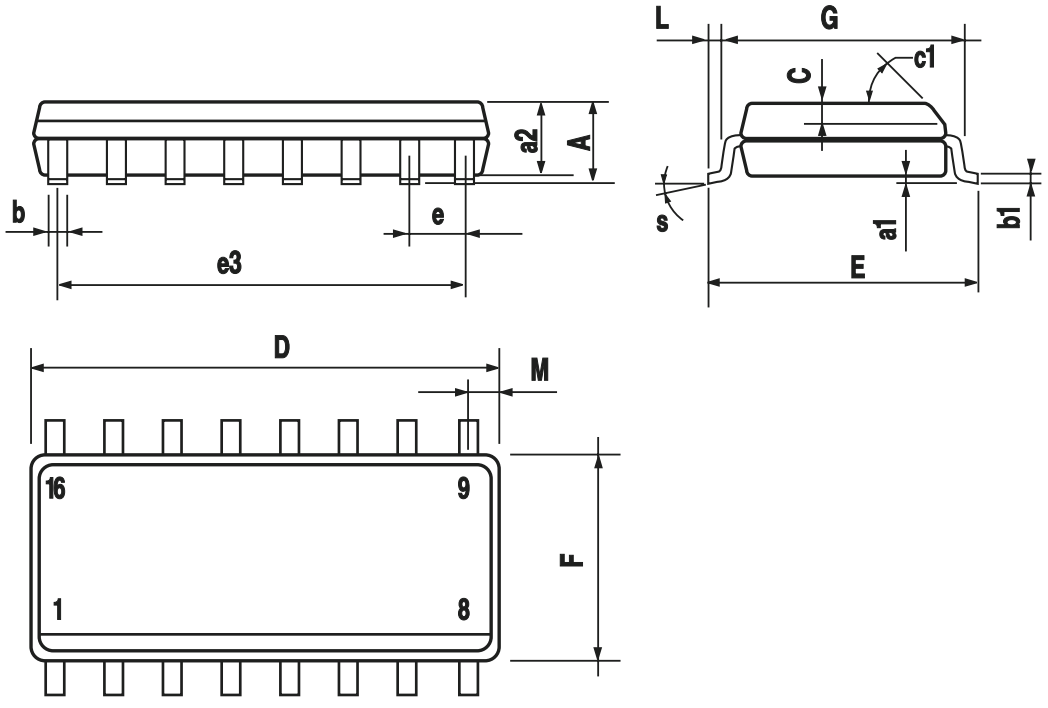
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



P001C

SO-16 MECHANICAL DATA

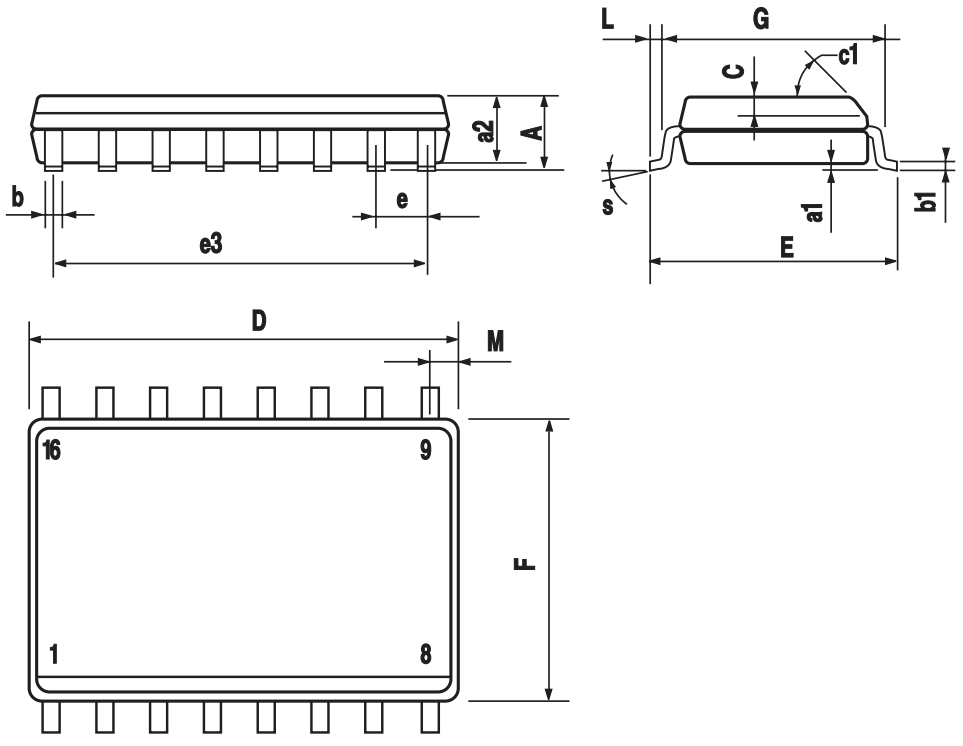
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



PO13H

SO-16L MECHANICAL DATA

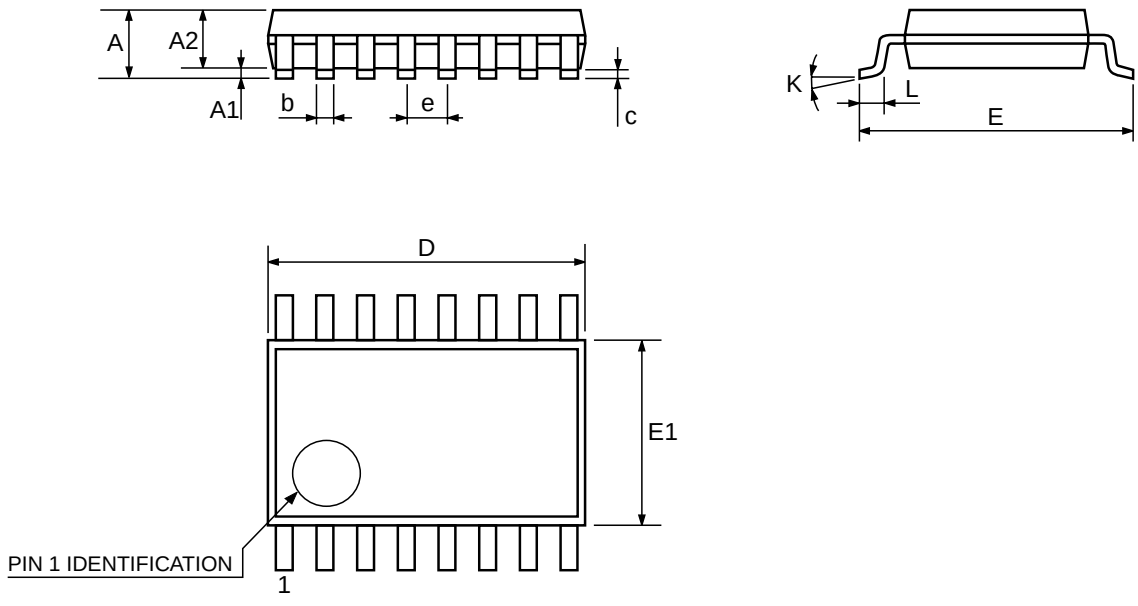
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45° (typ.)					
D	10.1		10.5	0.397		0.413
E	10.0		10.65	0.393		0.419
e		1.27			0.050	
e3		8.89			0.350	
F	7.4		7.6	0.291		0.300
G						
L	0.5		1.27	0.020		0.050
M			0.75			0.029
S	8° (max.)					



PO13I

TSSOP16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



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