



MICROPOWER VOLTAGE SUPERVISOR RESET ACTIVE HIGH

- **ULTRA LOW POWER CONSUMPTION :**
12 μ A max. at $V_{cc} = 5V$
- **PRECISION RESET THRESHOLD** (guaranteed over Temperature)
- **THRESHOLD VOLTAGE:**
4.50V typ. FOR TS831-4
- **GUARANTEED RESET OPERATION FOR V_{cc} DOWN TO 1V**
- **OPEN DRAIN OUTPUT COMPARATOR**
WITH $V_{ol} = 450mV$ typ. @ $I_{ol} = 8mA$ & $V_{cc} = 4V$
- **FAST RESPONSE TIME : 20 μ s FOR A 10mV OVERDRIVE**
- **100mV INTERNAL HYSTERESIS**

DESCRIPTION

The TS836 ultra low power integrated circuit incorporates a high stability band-gap voltage reference and a comparator with open drain output.

The threshold voltage is set at 4.5V for TS836-4 by internal thermally matched resistances.

The comparator exhibits a 20 μ s response (with 10mV overdrive) and has an open drain output active when input voltage is lower than the threshold.

An internal hysteresis of 100mV increases the comparator's noise margin and prevents false reset operation.

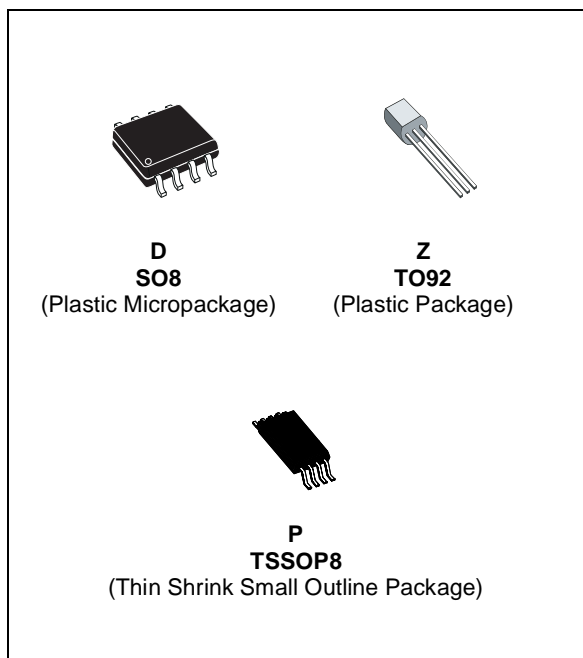
APPLICATION

- Power-on reset generator for microcontroller
- Power failure detector

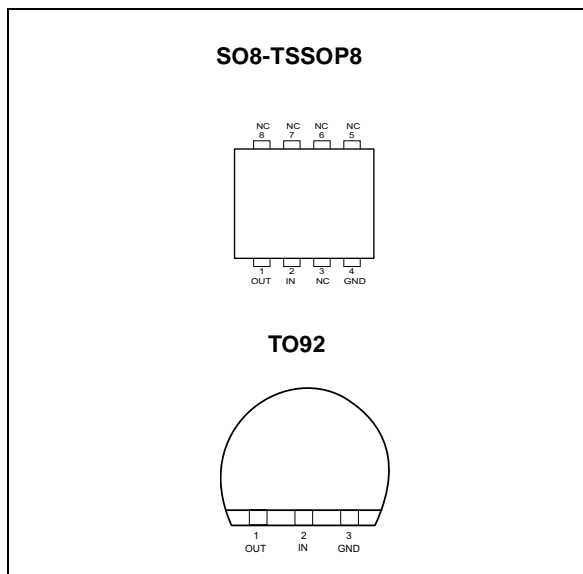
ORDER CODE

Part Number	Temperature Range	Package		
		D	Z	P
TS836-4I	-40, +85°C	•	•	•

Z= TO92 Plastic package
D = Small Outline Package (SO) - also available in Tape & Reel (DT)
P = Thin Shrink Small Outline Package (TSSOP) - only available in Tape & Reel (PT)



PIN CONNECTIONS (top view)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage ¹⁾	7	V
V_{out}	Output Voltage	-0.3 to $V_{CC} + 0.3$	V
I_{out}	Output Current	20	mA
Pd	Power Dissipation	200	mW
T_{oper}	Operating Free Air Temperature Range	-40 to +85	°C
T_{stg}	Storage Temperature	-65 to +150	°C

1. All voltages values, except differential voltage are with respect to network ground terminal.

OPERATING CONDITIONS

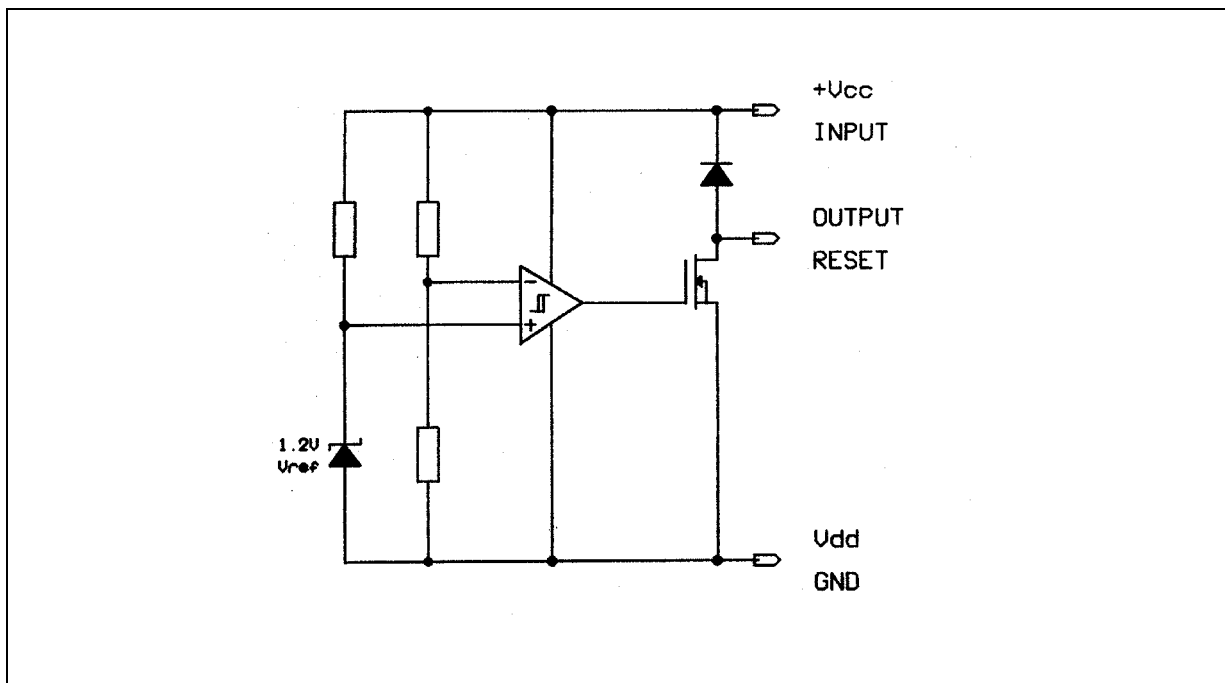
Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	1 to 5.5	V

TS836-4

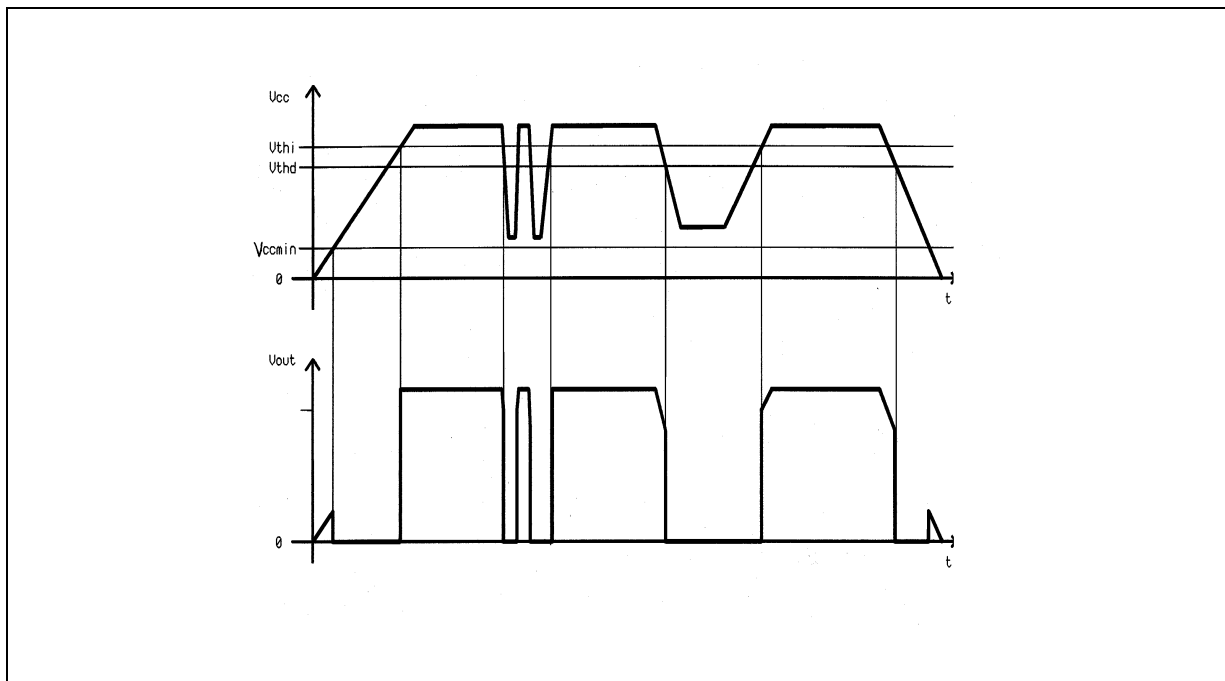
ELECTRICAL CHARACTERISTICS $T_{amb} = 25^{\circ}C$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{thi}	Threshold Voltage - V_{CC} Increasing $T_{min.} \leq T_{amb} \leq T_{max.}$	4.17	4.5	4.66	V
V_{thd}	Threshold Voltage - V_{CC} Decreasing $T_{min.} \leq T_{amb} \leq T_{max.}$	4.17	4.4	4.66	V
V_{hys}	Hysteresis Voltage	50	100	200	mV
I_{CC}	Current Consumption $V_{CC} = 5V$			12	μA
V_{OL}	Low Level Output Voltage $I_{OL} = 8mA, T_{min.} \leq T_{amb} \leq T_{max.}$ $V_{CC} = 4V$		450	800 1000	mV
I_{OH}	Output Off-state Leakage $T_{min.} \leq T_{amb} \leq T_{max.}$ $V_{CC} = 5V$		2	100 1000	nA
tphl	Response Time High to Low $R_L = 10k\Omega, C_L = 15pF, V_{CC} = V_{thd} - 10mV$		20		μs

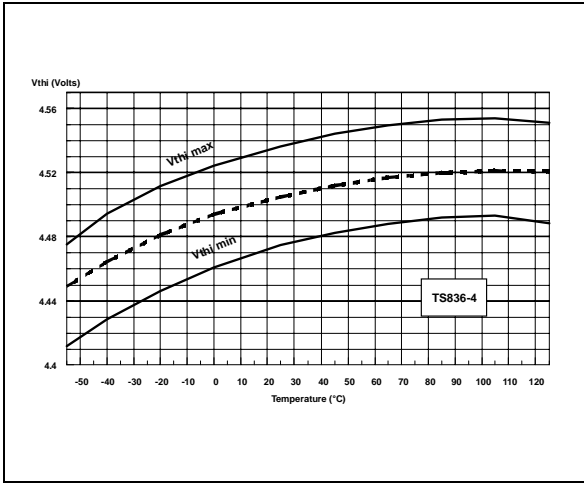
EQUIVALENT SCHEMATIC DIAGRAM



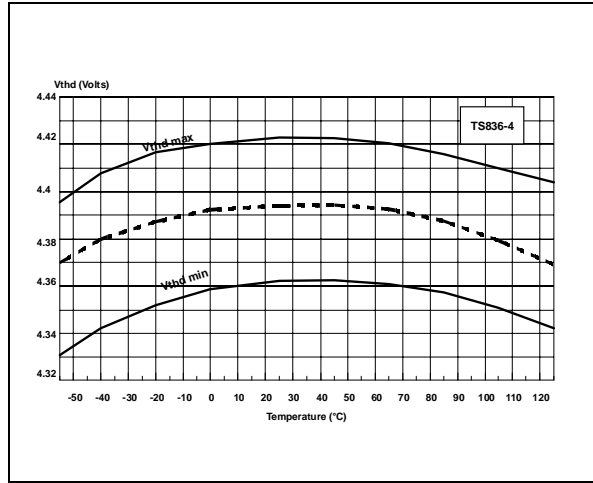
TIMING DIAGRAM



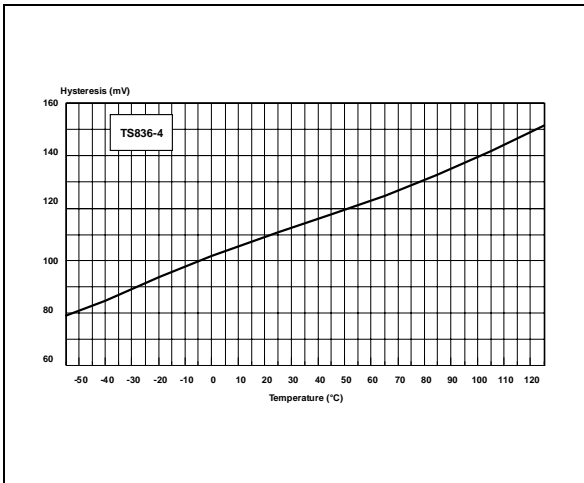
Vth vs Temperature while V_{CC} increasing



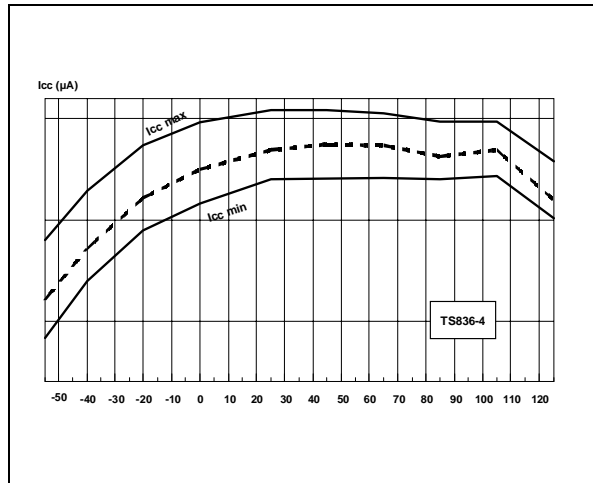
Vth vs Temperature while V_{CC} decreasing



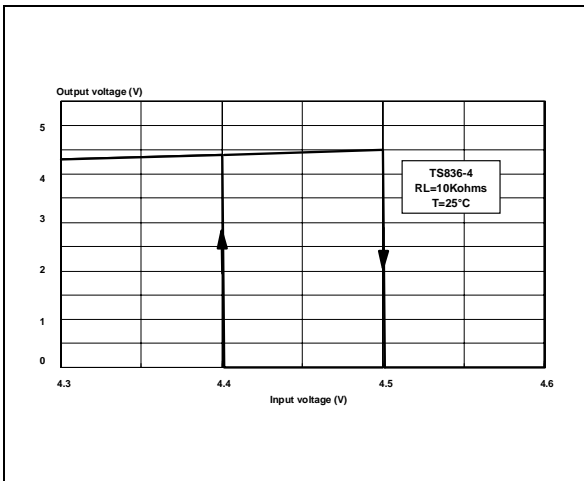
Hysteresis vs Temperature



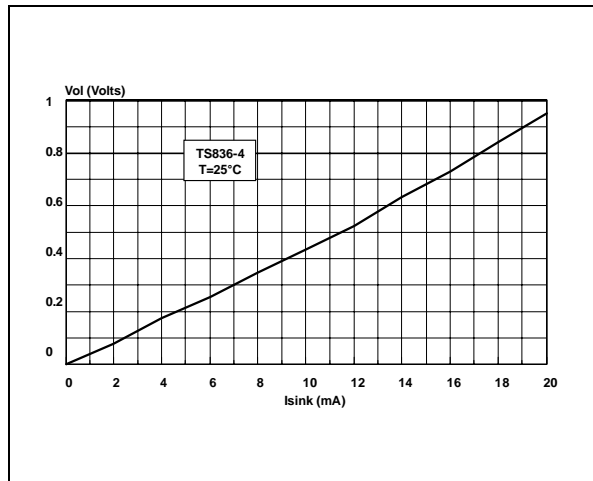
I_{CC} vs Temperature



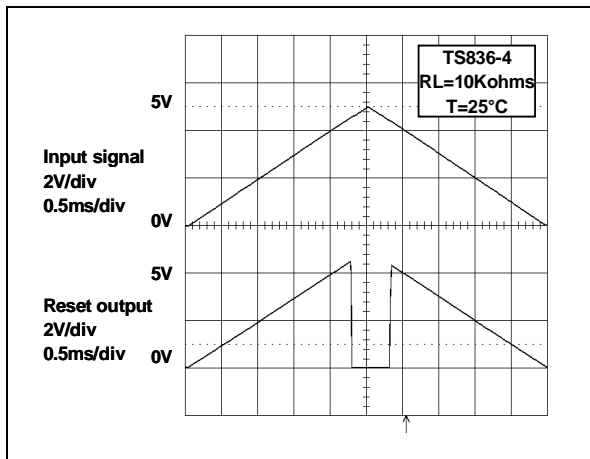
Reset Output Voltage vs Input Voltage



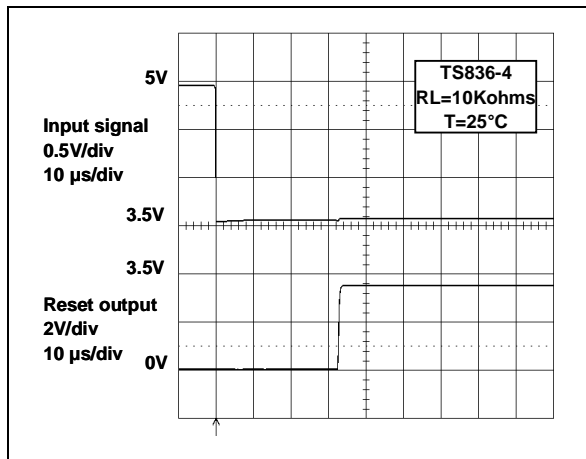
Voltage Output Low vs Sink Current



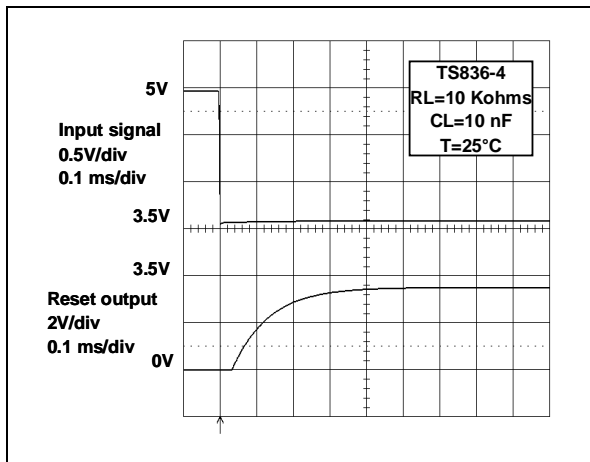
Reset Output Voltage vs Input Voltage



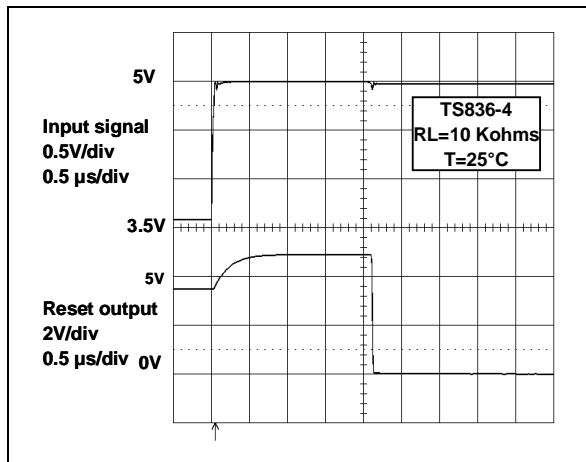
Supply Failing down : Reset Delay Time



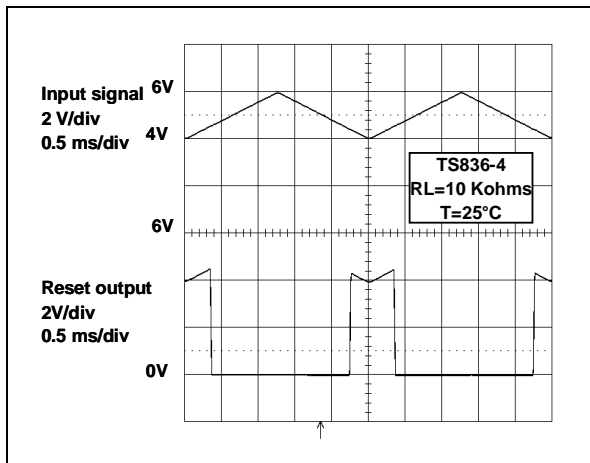
Supply Failing Down : Extended Reset DelayTime with an Additional Capacitor



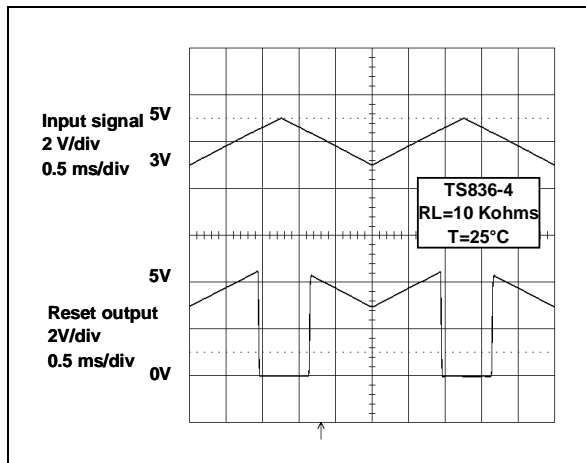
Supply Rising up : Output Delay Time



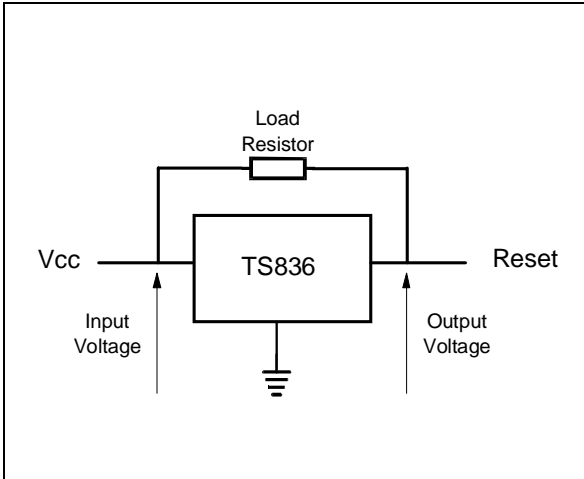
Reset Output Voltage vs Input Voltage (example)



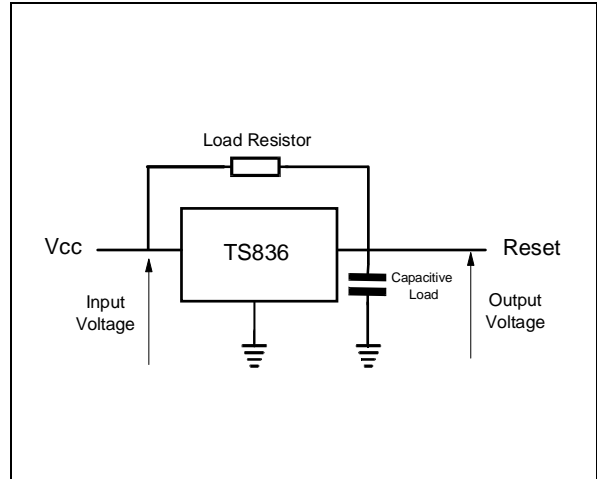
Reset Output Voltage vs Input Voltage (example)



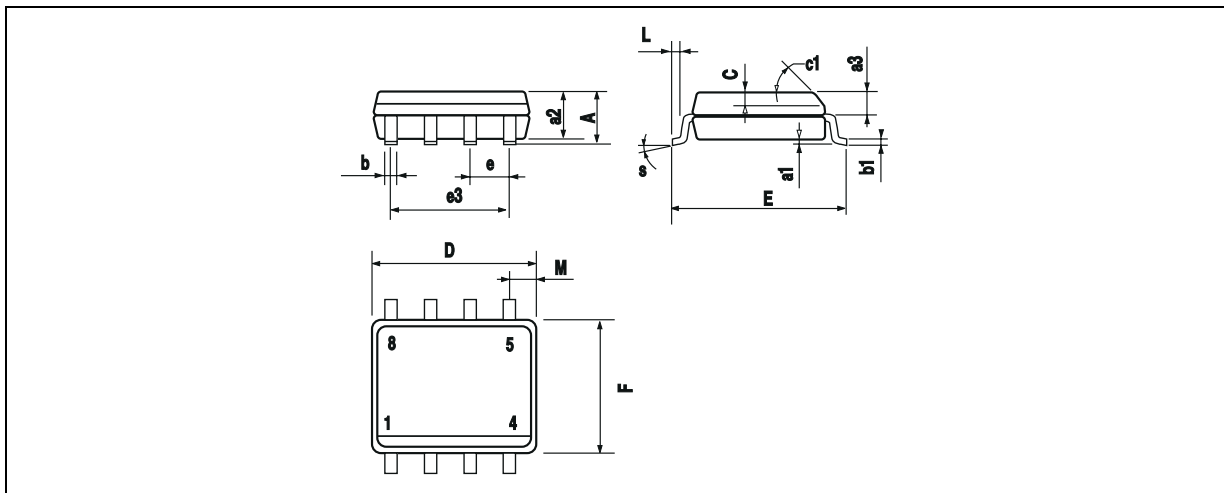
Basic configuration



Configuration with an additional Capacitive Load

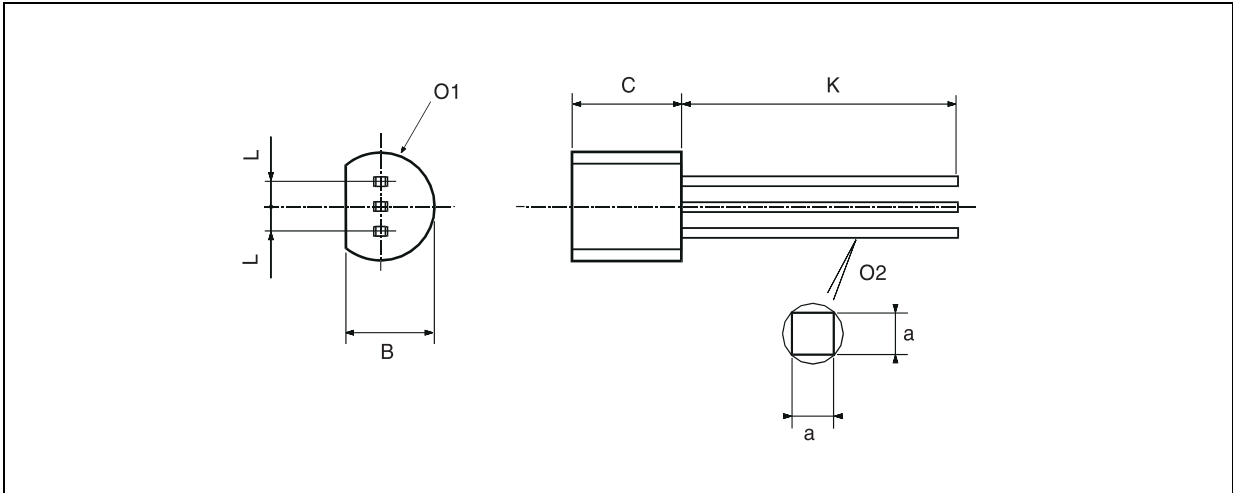


PACKAGE MECHANICAL DATA
8 PINS - PLASTIC MICROPACKAGE (SO)



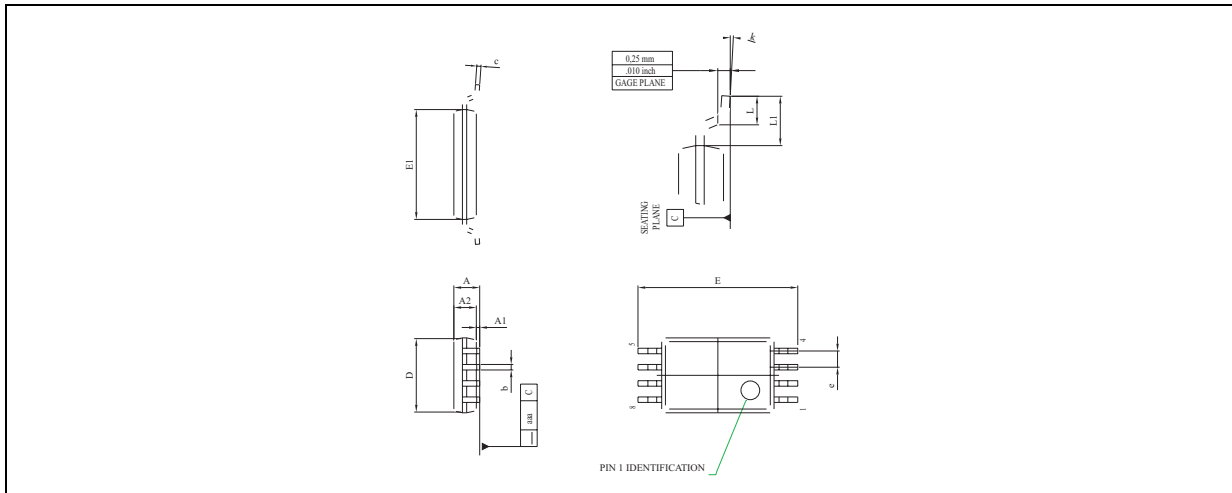
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.016		0.050
M			0.6			0.024
S	8° (max.)					

PACKAGE MECHANICAL DATA
3 PINS - PLASTIC PACKAGE TO92



Dim.	Millimeters			Inches		
	Min	Typ.	Max.	Min.	Typ.	Max.
L		1.27			0.05	
B	3.2	3.7	4.2	0.126	0.1457	0.1654
O1	4.45	5.00	5.2	0.1752	0.1969	0.2047
C	4.58	5.03	5.33	0.1803	0.198	0.2098
K	12.7			0.5		
O2	0.407	0.5	0.508	0.016	0.0197	0.02
a	0.35			0.0138		

PACKAGE MECHANICAL DATA
8 PINS - THIN SHRINK SMALL OUTLINE PACKAGE



Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.20			0.05
A1	0.05		0.15	0.01		0.006
A2	0.80	1.00	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.15
c	0.09		0.20	0.003		0.012
D	2.90	3.00	3.10	0.114	0.118	0.122
E		6.40			0.252	
E1	4.30	4.40	4.50	0.169	0.173	0.177
e		0.65			0.025	
k	0°		8°	0°		8°
l	0.50	0.60	0.75	0.09	0.0236	0.030

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

© 2000 STMicroelectronics - Printed in Italy - All Rights Reserved
STMicroelectronics GROUP OF COMPANIES

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

© <http://www.st.com>

