



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_{oi} = 450mV typ. @ I_{oi} = 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.

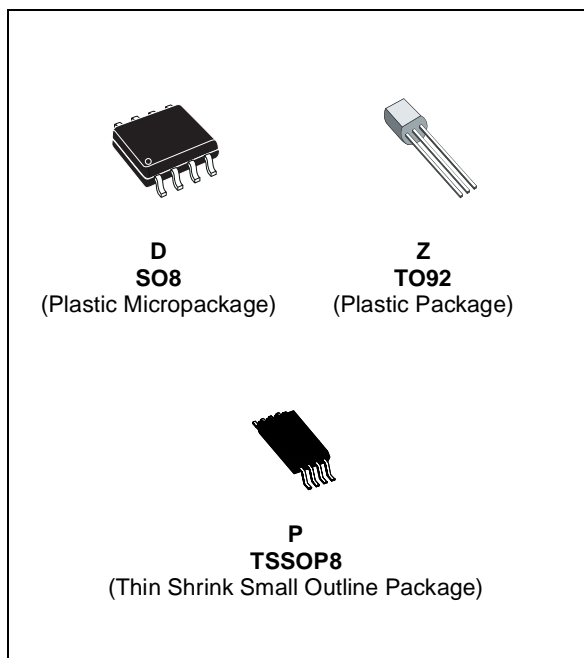
APPLICATION

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

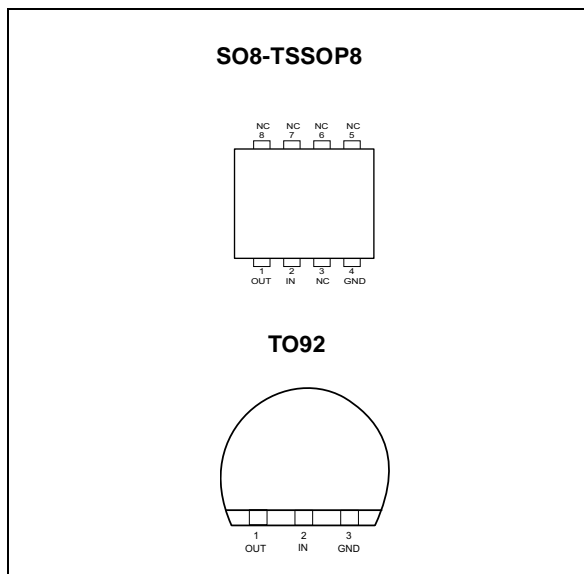
ORDER CODE

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

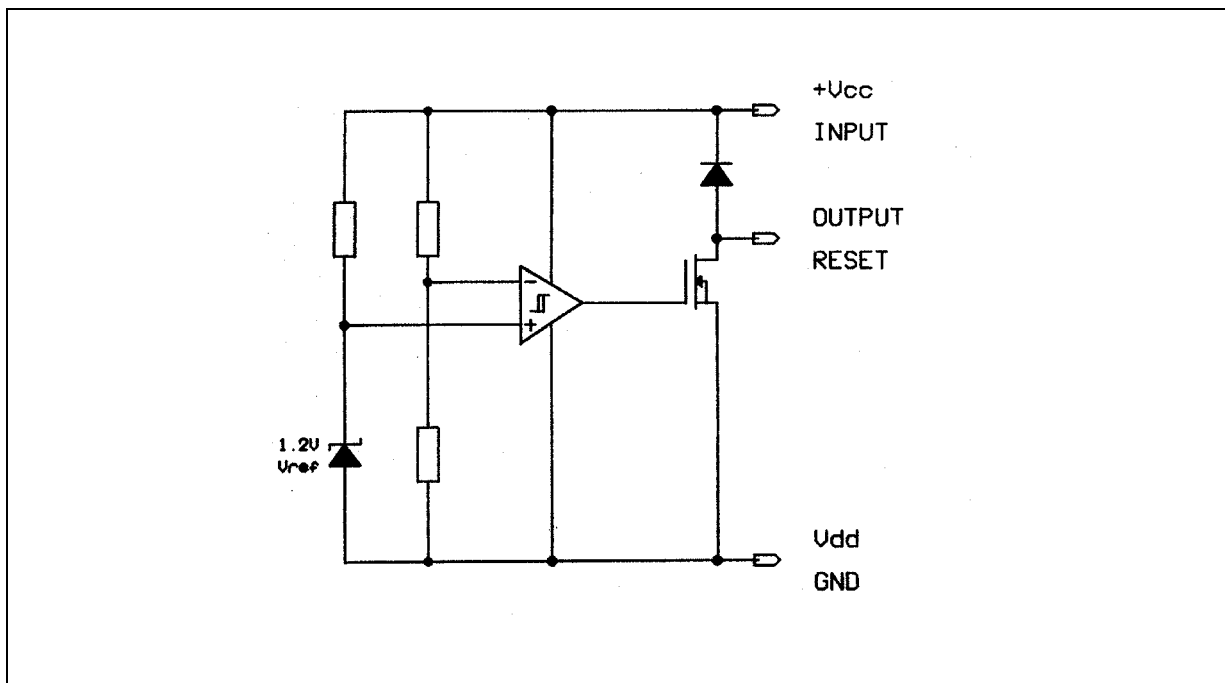
Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	1 to 5.5	V

TS836-4

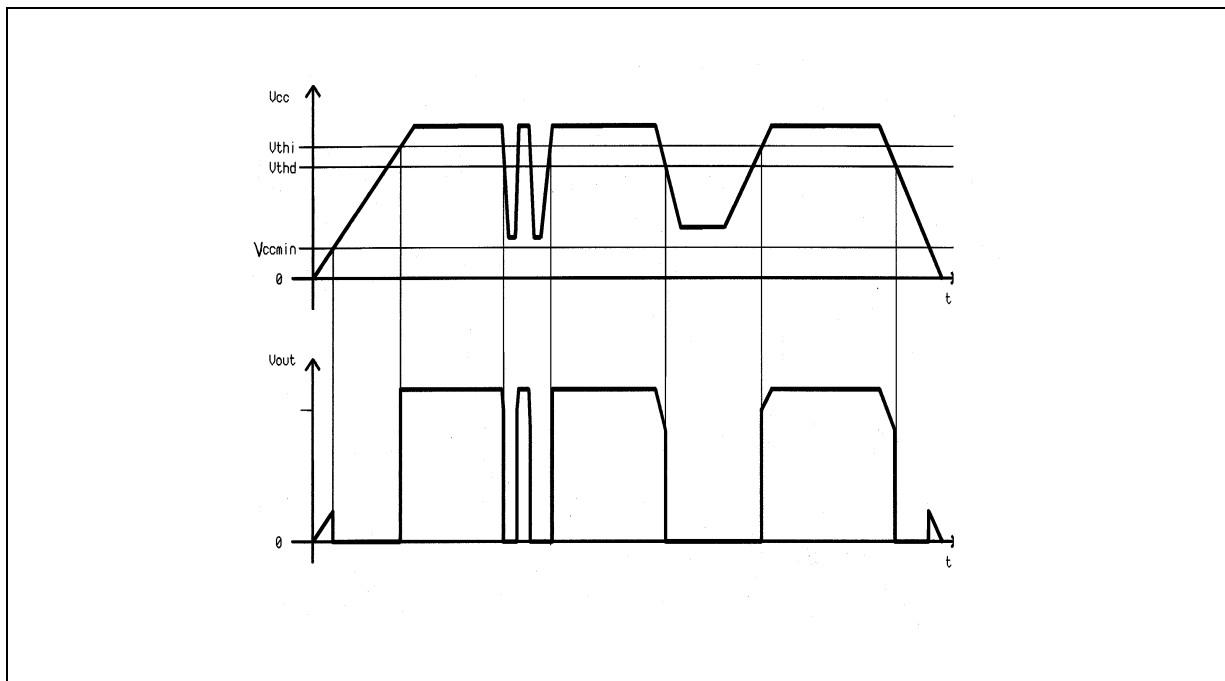
ELECTRICAL CHARACTERISTICS T_{amb} = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V _{thi}	Threshold Voltage - V _{CC} Increasing T _{min.} ≤ T _{amb} ≤ T _{max.}	4.17	4.5	4.66	V
V _{thd}	Threshold Voltage - V _{CC} Decreasing T _{min.} ≤ T _{amb} ≤ 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.} ≤ T _{amb} ≤ T _{max.} V _{CC} = 4V		450	800 1000	mV
I _{OH}	Output Off-state Leakage T _{min.} ≤ T _{amb} ≤ T _{max.} V _{CC} = 5V		2	100 1000	nA
tphl	Response Time High to Low R _L = 10kΩ, C _L = 15pF, V _{CC} = V _{thd} - 10mV		20		μs

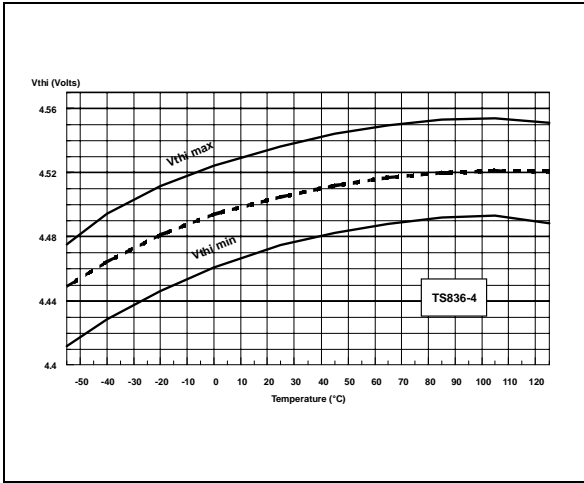
EQUIVALENT SCHEMATIC DIAGRAM



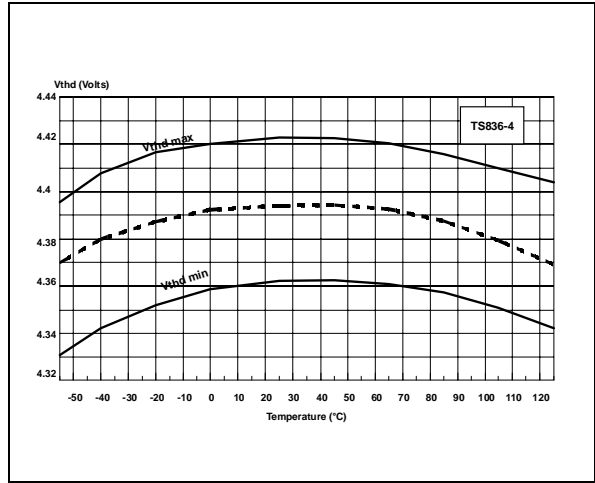
TIMING DIAGRAM



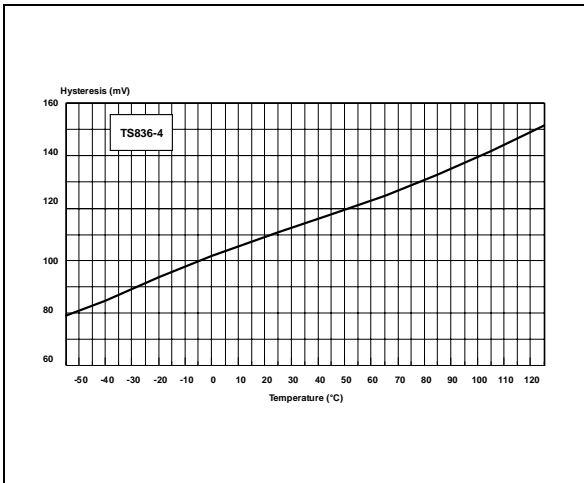
Vth vs Temperature while V_{CC} increasing



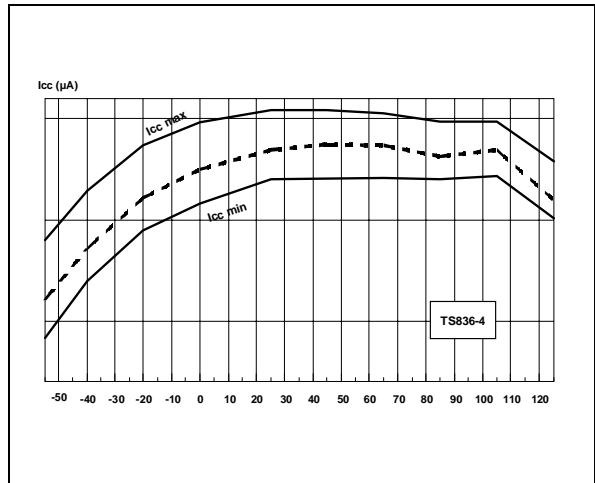
Vth vs Temperature while V_{CC} decreasing



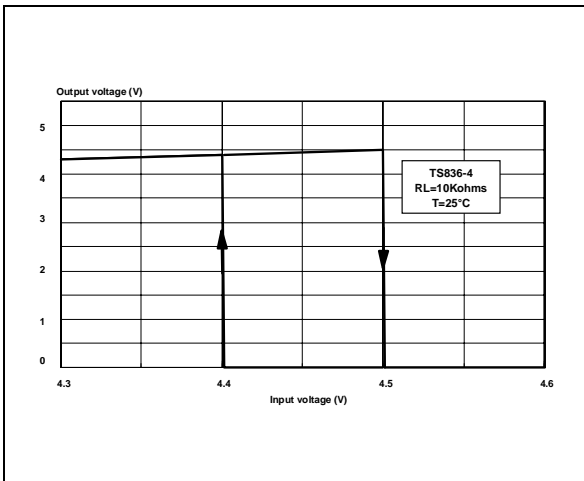
Hysteresis vs Temperature



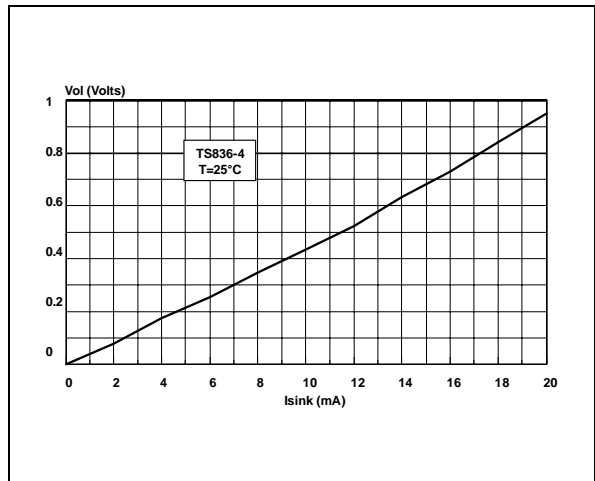
I_{CC} vs Temperature



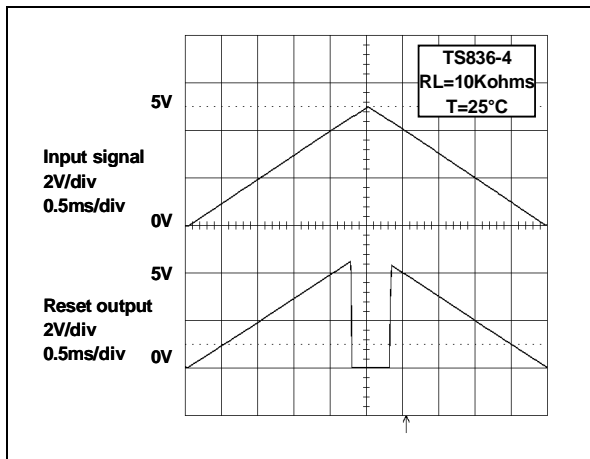
Reset Output Voltage vs Input Voltage



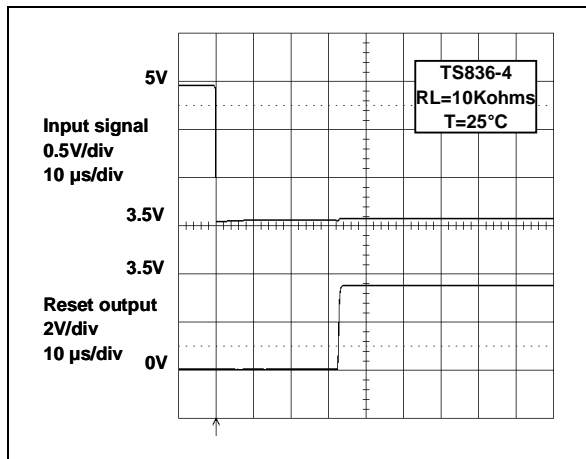
Voltage Output Low vs Sink Current



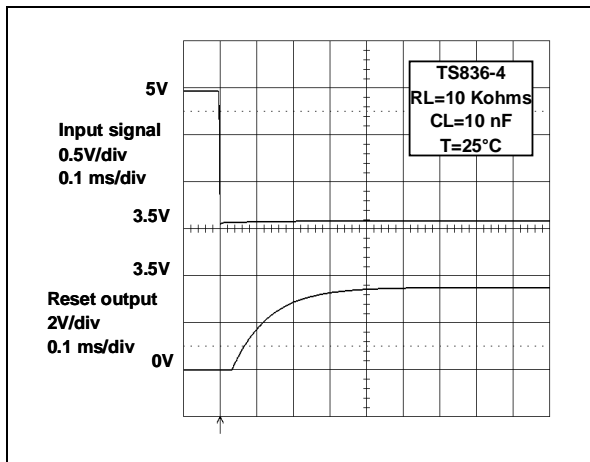
Reset Output Voltage vs Input Voltage



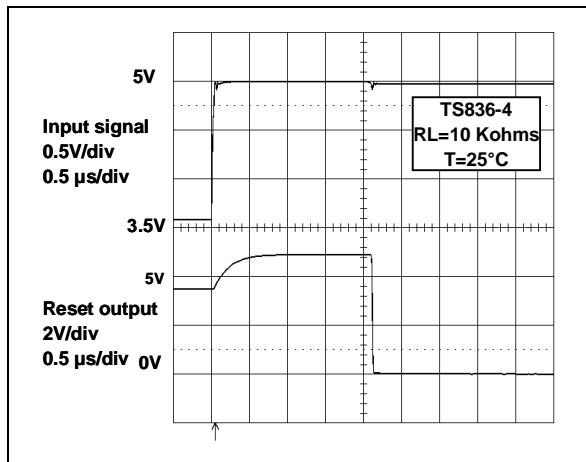
Supply Failing down : Reset Delay Time



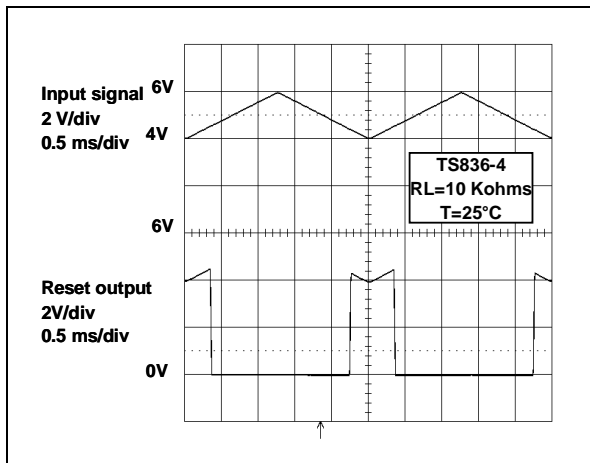
Supply Failing Down : Extended Reset DelayTime with an Additional Capacitor



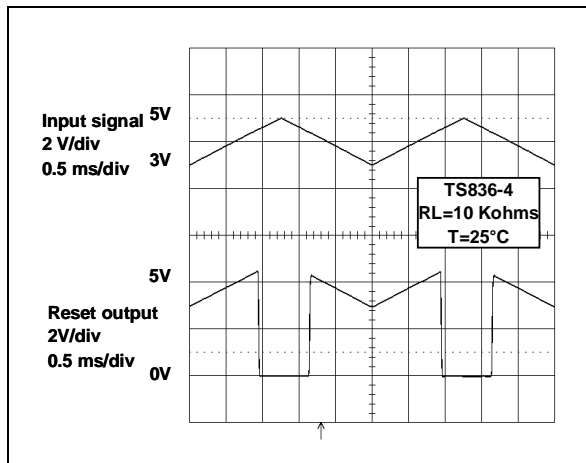
Supply Rising up : Output Delay Time



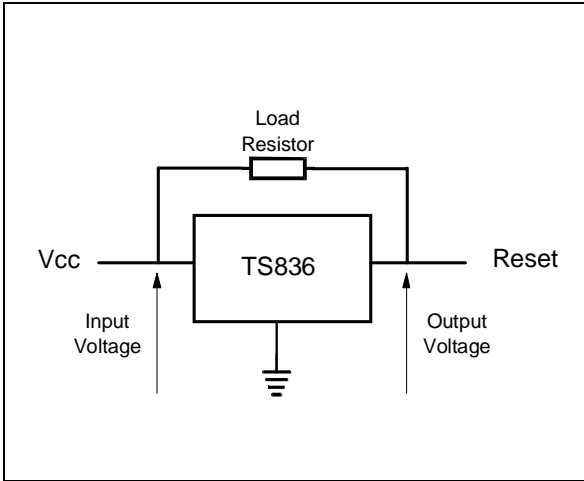
Reset Output Voltage vs Input Voltage (example)



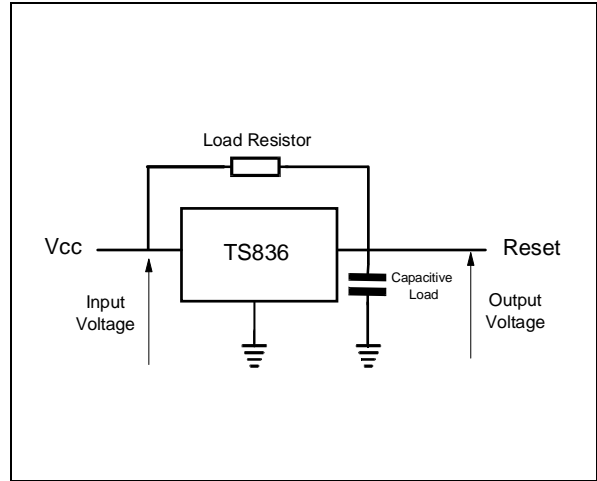
Reset Output Voltage vs Input Voltage (example)



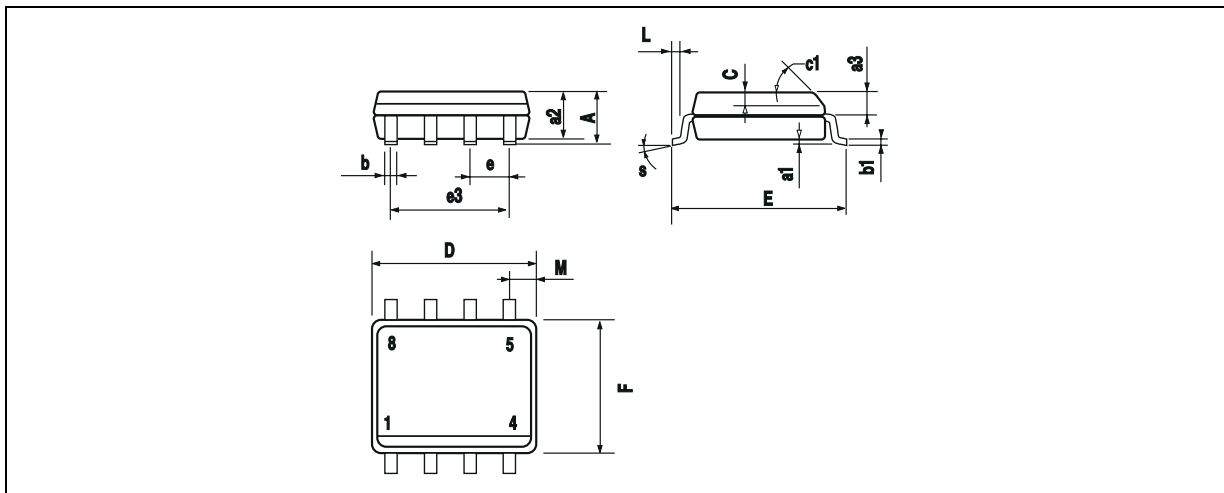
Basic configuration



Configuration with an additional Capacitive Load

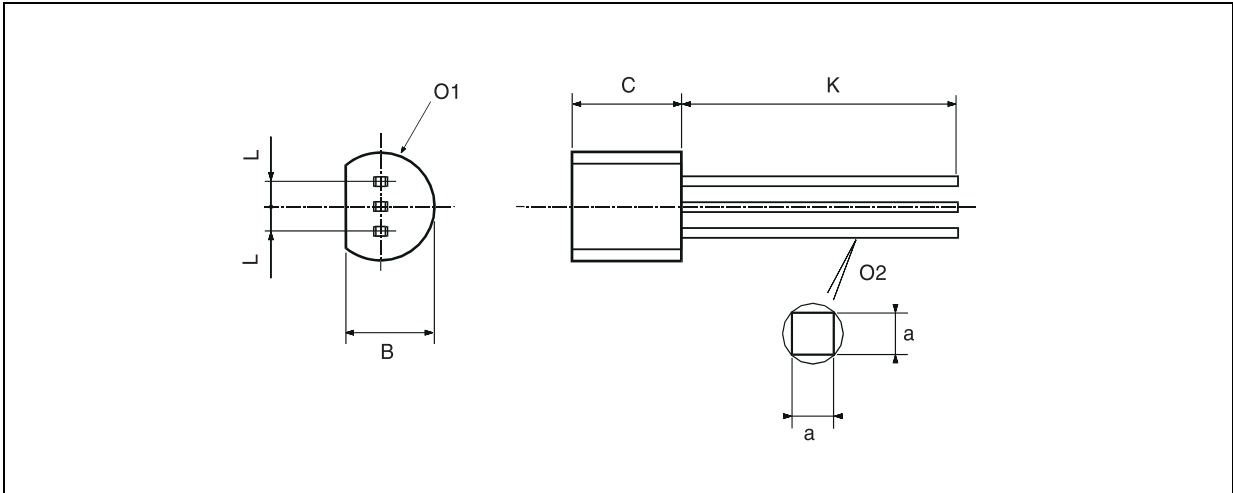


PACKAGE MECHANICAL DATA
8 PINS - PLASTIC MICROPACKAGE (SO)



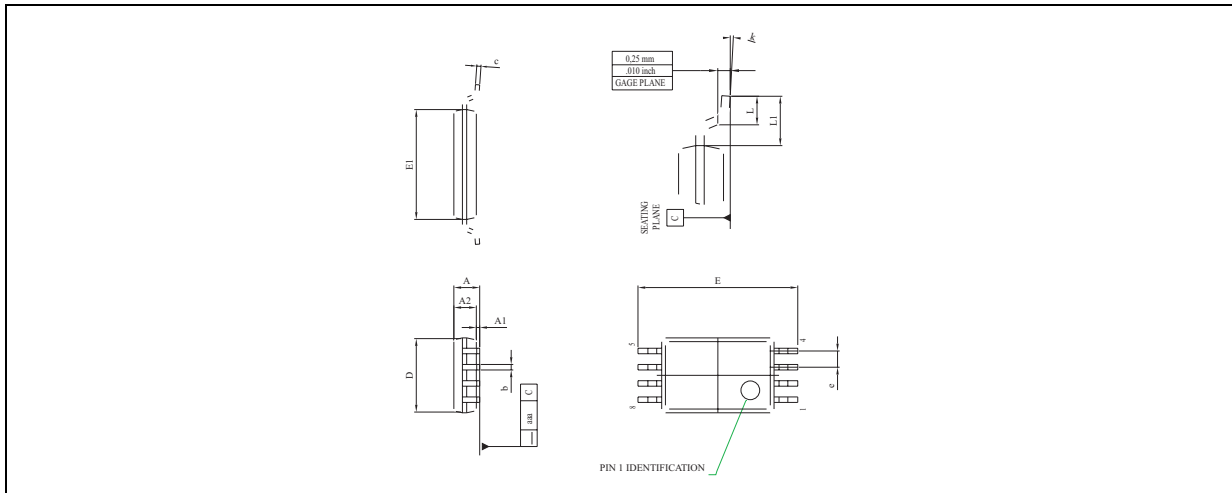
Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			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

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