



# TS831

## MICROPOWER VOLTAGE SUPERVISOR RESET ACTIVE LOW

- ULTRA LOW POWER CONSUMPTION :  
12 $\mu$ A max. @  $V_{CC} = 5V$
- PRECISION RESET THRESHOLD (guaranteed over Temperature)
- 4.33V<sub>typ.</sub> THRESHOLD VOLTAGE (TS831-5)  
4.50V<sub>typ.</sub> THRESHOLD VOLTAGE (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 $\mu$ s FOR A 10mV OVERDRIVE
- 100mV INTERNAL HYSTERESIS
- PIN TO PIN COMPATIBLE WITH MC33064 AND MC33164



### ORDER CODES

Part Number	Temperature Range	Package	
		D	Z
TS831-5I	-40, +125°C	•	ù
TS831-4I	-40, +125°C	•	ù

### DESCRIPTION

The TS831 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 4.33V for TS831-5 and 4.5V for TS831-4 by internal thermally matched resistances.

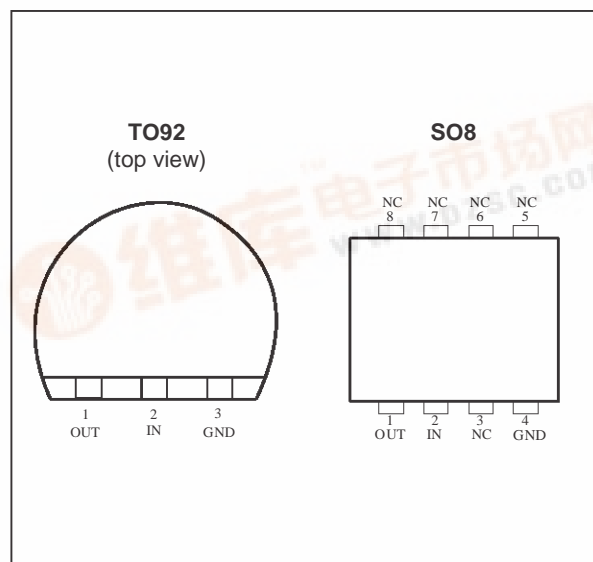
The comparator exhibits a 20 $\mu$ s response (with 10mV overdrive) and has an open drain output active when input voltage is lower than the threshold.

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

### APPLICATIONS

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

### PIN CONNECTIONS



## TS831

### ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage - note 1	7	V
V <sub>out</sub>	Output Voltage	-0.3 to V <sub>CC</sub> + 0.3	V
I <sub>out</sub>	Output Current	20	mA
Pd	Power Dissipation - note 2	650 700	mW
I <sub>F</sub>	Clamp Diode Forward Current, pin 1 to pin 2 - note 3	100	mA
T <sub>oper</sub>	Operating Free Air Temperature Range	-40 to +125	°C
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C

- Note:**
- All voltages values, except differential voltage are with respect to network ground terminal.
  - T<sub>j</sub> = 150°C, T<sub>amb</sub> = 25°C with R<sub>thja</sub> = 200°C/W for TO92 package  
R<sub>thja</sub> = 175°C/W for SO8 package
  - Maximum package power dissipation limits must be observed.

### OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	1 to 5.5	V

### TS831-5

#### ELECTRICAL CHARACTERISTICS T<sub>amb</sub> = 25°C (unless otherwise specified)

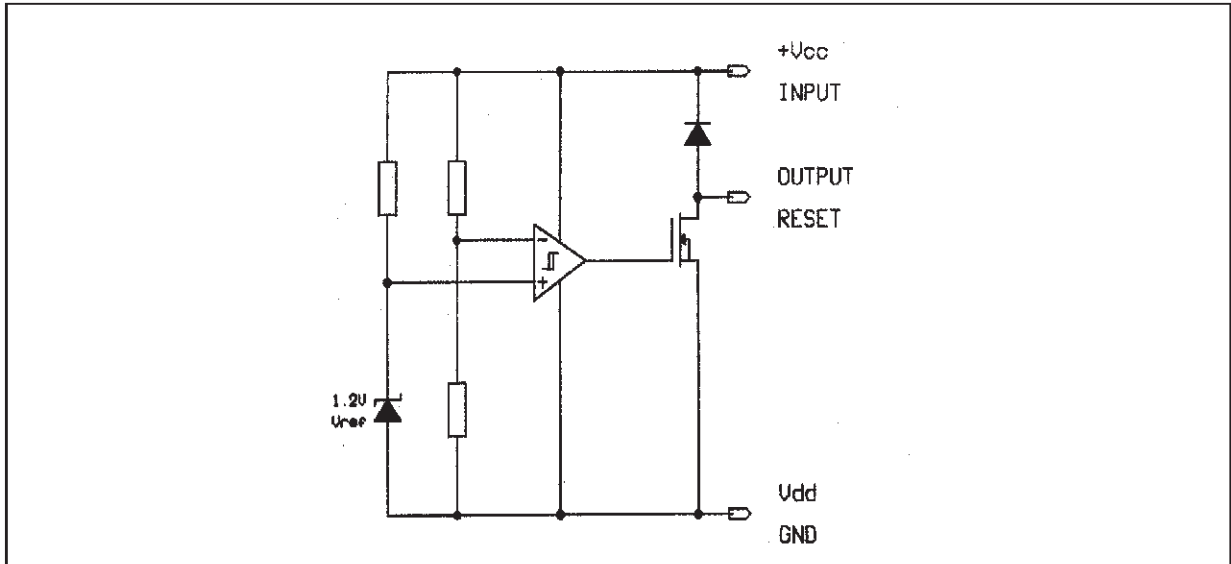
Symbol	Parameter	Min.	Typ.	Max.	Unit
V <sub>thi</sub>	Threshold Voltage - V <sub>CC</sub> Increasing -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C	4.10 4.10	4.33	4.46 4.50	V
V <sub>thd</sub>	Threshold Voltage - V <sub>CC</sub> Decreasing -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C	4.10 4.06	4.21	4.46 4.46	V
V <sub>hys</sub>	Hysteresis Voltage	50	100	200	mV
I <sub>CC</sub>	Current Consumption V <sub>CC</sub> = 5V			12	μA
V <sub>OL</sub>	Low Level Output Voltage -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C		450	800 1000 1300	mV
I <sub>OH</sub>	Output Off-state Leakage -40°C ≤ T <sub>amb</sub> ≤ +125°C		2	100 1000	nA
tphl	Response Time High to Low R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 15pF, V <sub>CC</sub> = V <sub>thd</sub> - 10mV		20		μs

### TS831-4

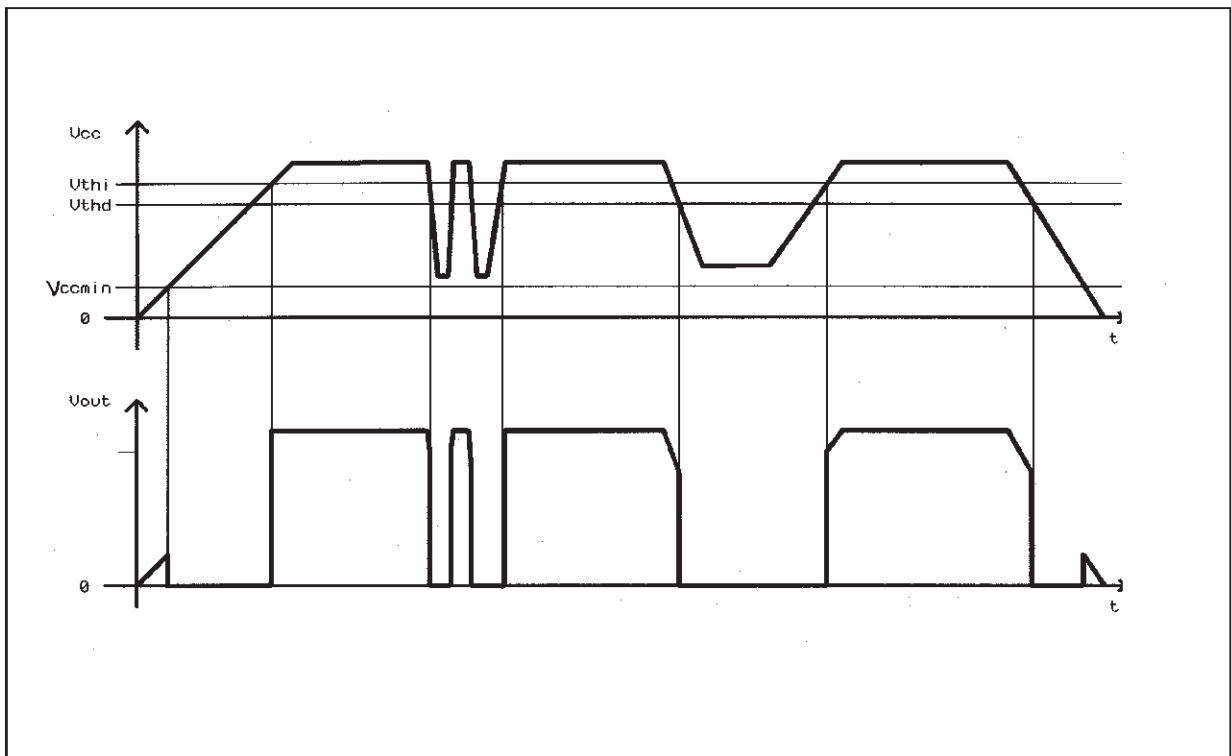
#### ELECTRICAL CHARACTERISTICS T<sub>amb</sub> = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V <sub>thi</sub>	Threshold Voltage - V <sub>CC</sub> Increasing -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C	4.17 4.17	4.5	4.66 4.70	V
V <sub>thd</sub>	Threshold Voltage - V <sub>CC</sub> Decreasing -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C	4.17 4.13	4.4	4.66 4.66	V
V <sub>hys</sub>	Hysteresis Voltage	50	100	200	mV
I <sub>CC</sub>	Current Consumption V <sub>CC</sub> = 5V			12	μA
V <sub>OL</sub>	Low Level Output Voltage -40°C ≤ T <sub>amb</sub> ≤ +125°C -40°C ≤ T <sub>amb</sub> ≤ +125°C		450	800 1000 1300	mV
I <sub>OH</sub>	Output Off-state Leakage -40°C ≤ T <sub>amb</sub> ≤ +125°C		2	100 1000	nA
tphl	Response Time High to Low R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 15pF, V <sub>CC</sub> = V <sub>thd</sub> - 10mV		20		μs

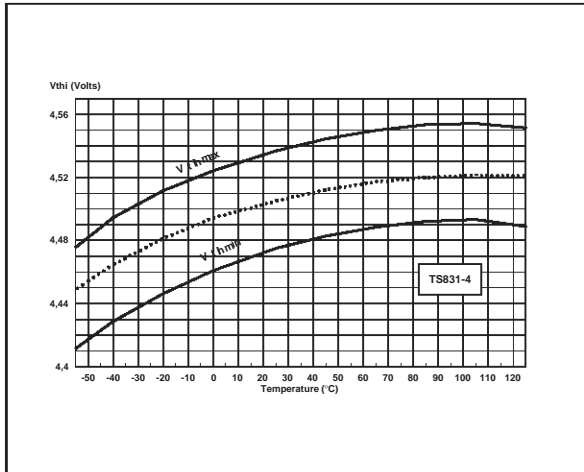
EQUIVALENT SCHEMATIC DIAGRAM



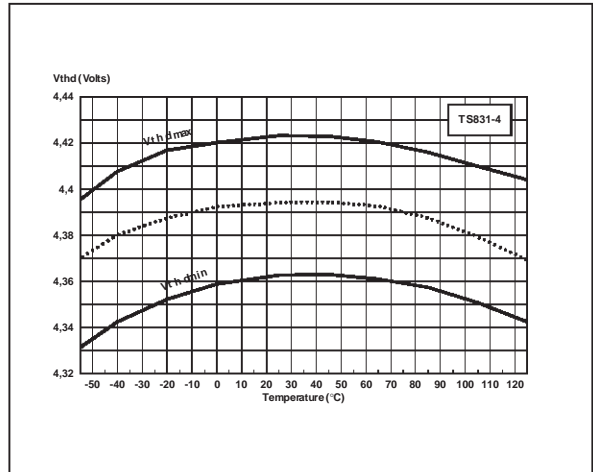
TIMING DIAGRAM



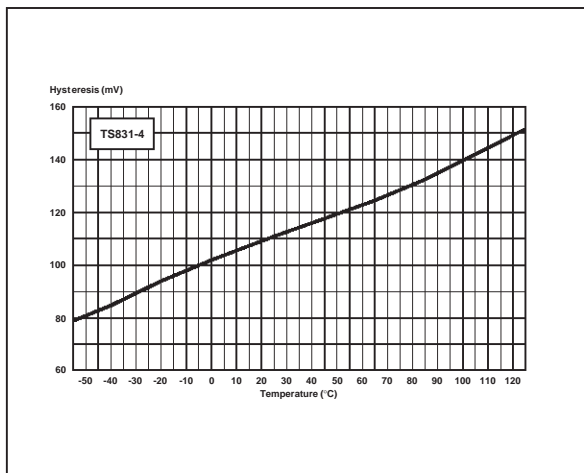
Vth vs Temperature while VCC increasing



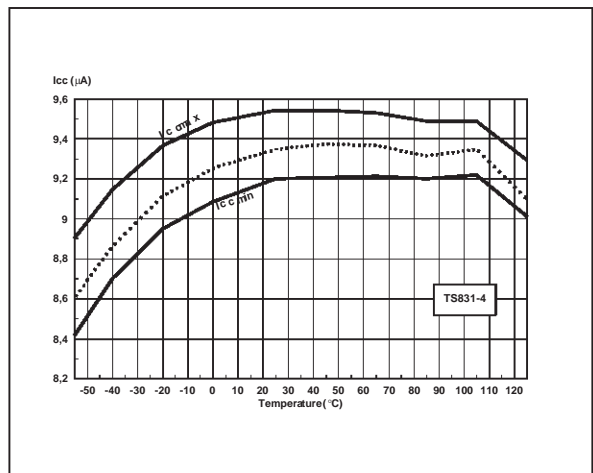
Vth vs Temperature while VCC decreasing



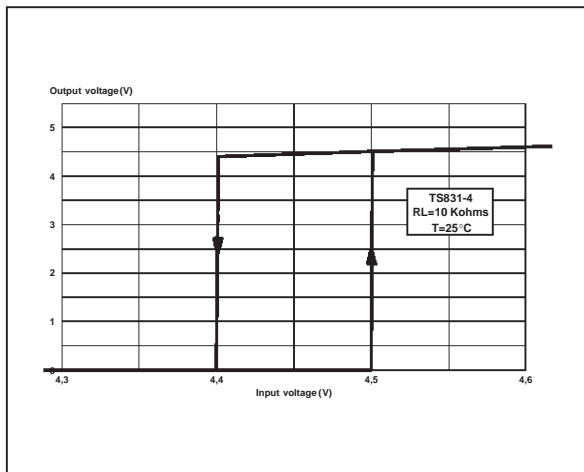
Hysteresis vs Temperature



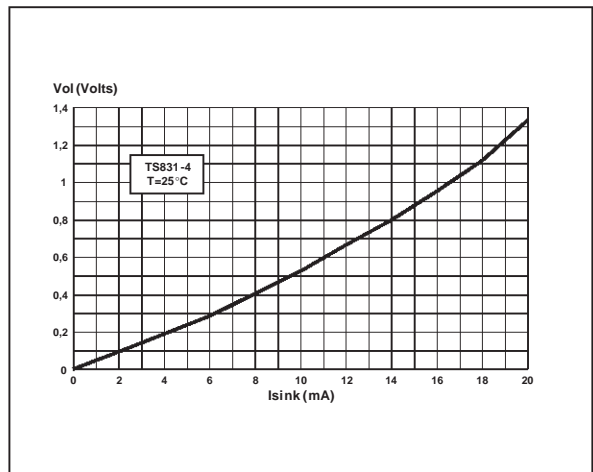
Icc vs Temperature



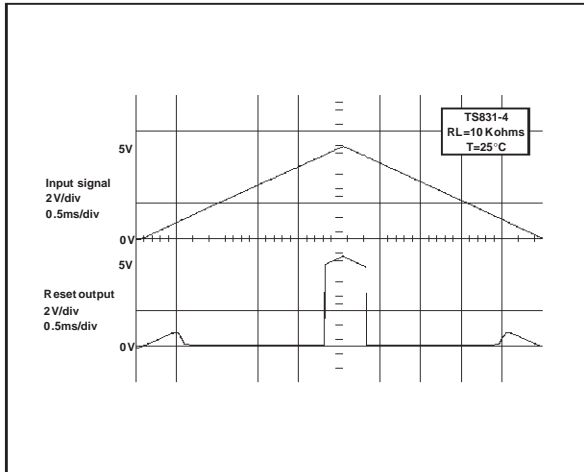
Reset Output Voltage vs Input Voltage



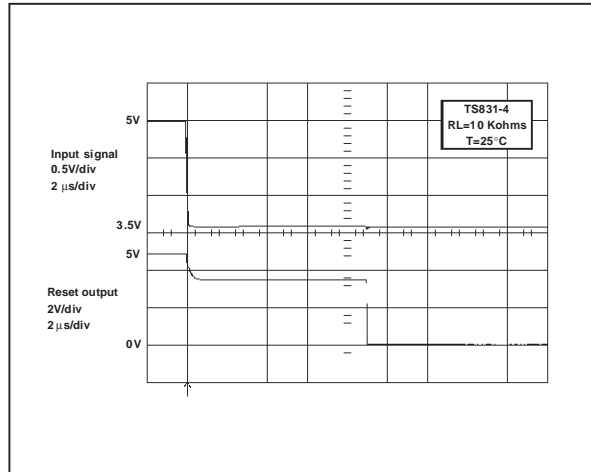
Voltage Output Low vs Sink Current



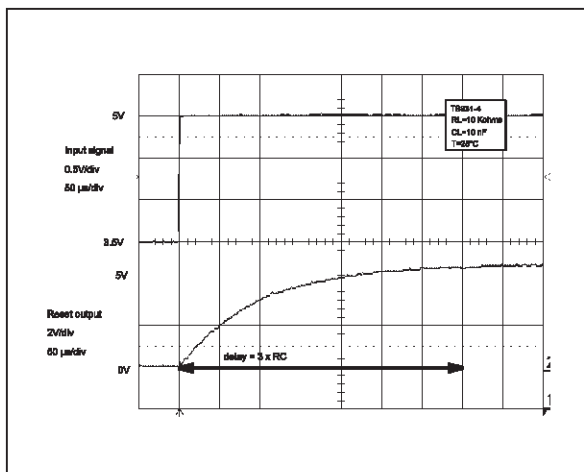
Reset Output Voltage vs Input Voltage



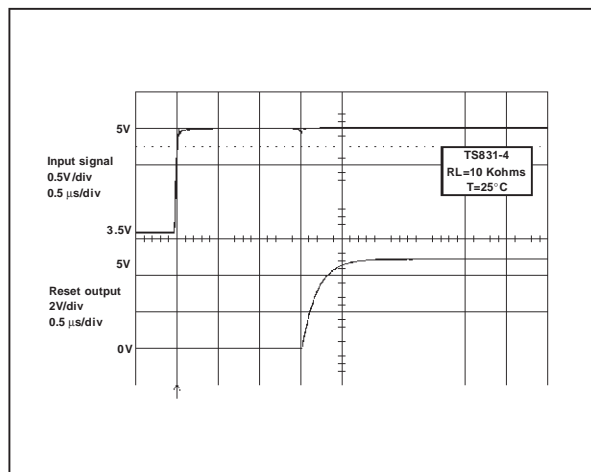
Supply Falling Down : Reset Delay Time



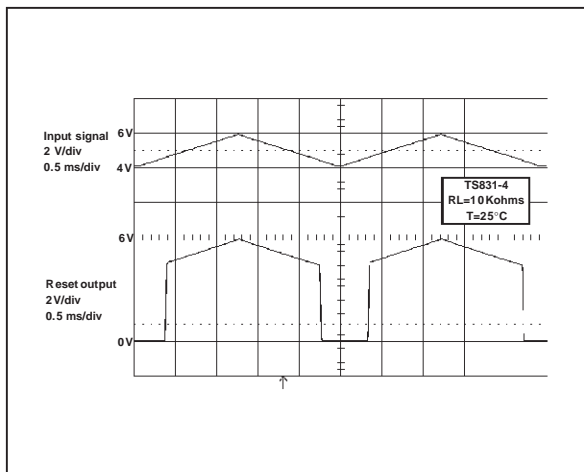
Extended Delay of Power-On-Reset with an External Capacitor



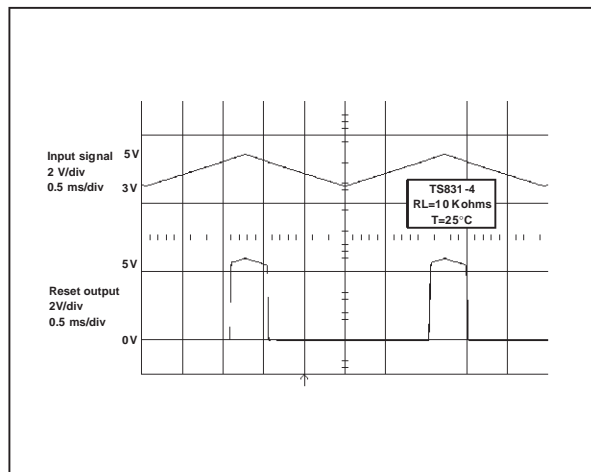
Supply Rising up : Output Delay Time



Reset Output Voltage vs Input Voltage (example)

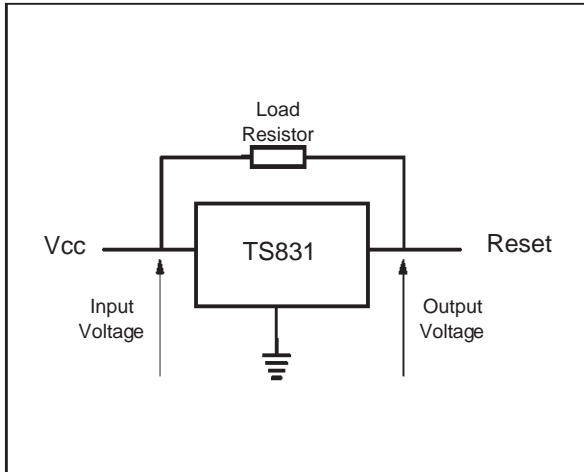


Reset Output Voltage vs Input Voltage (example)

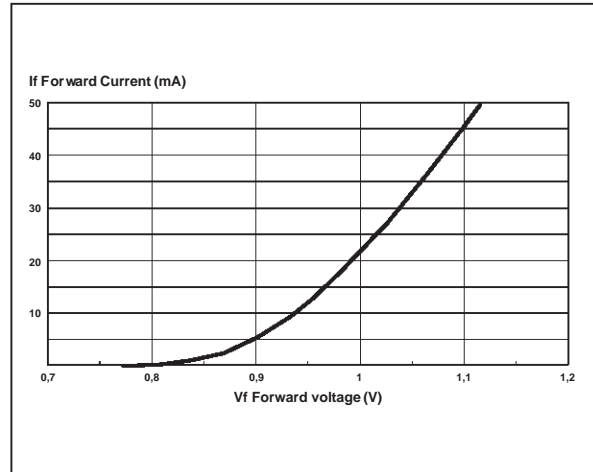


# TS831

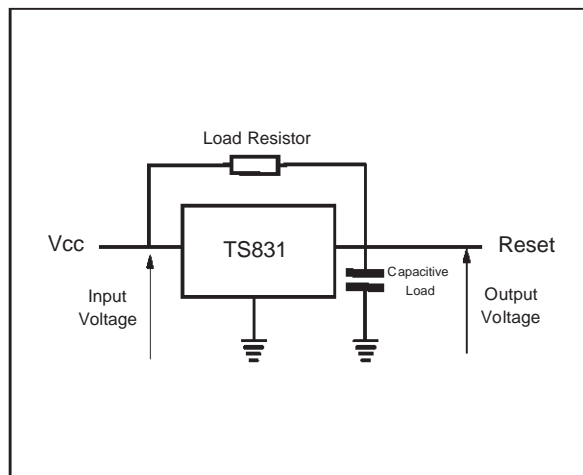
## Basic Configuration



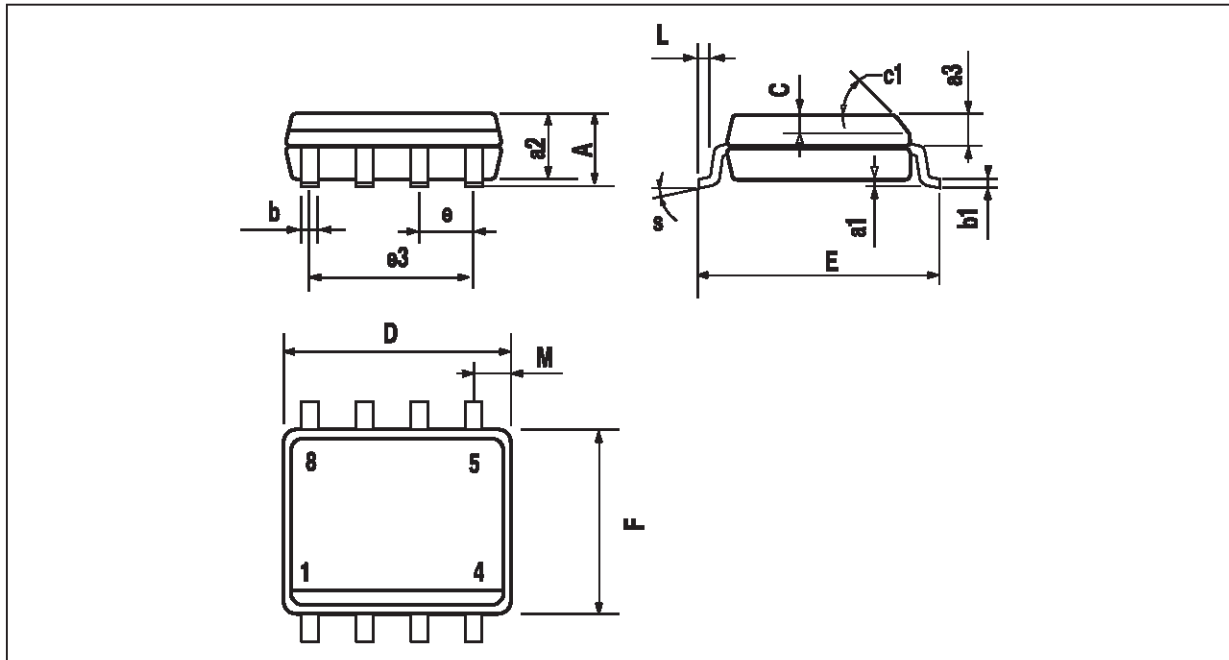
## Clamp Diode Forward Current vs Voltage



## Configuration with an Additional Capacitive Load

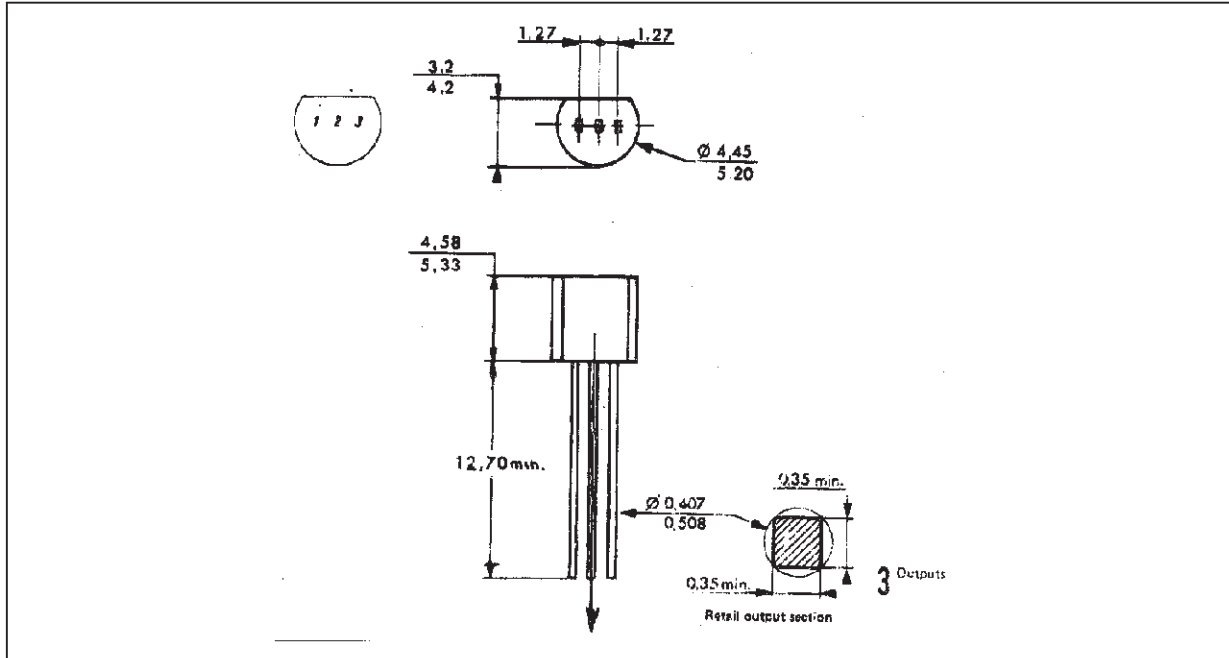


**PACKAGE MECHANICAL DATA**  
**8 PINS - PLASTIC MICROPACKAGE (SO)**



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		

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