



TS831

MICROPOWER VOLTAGE SUPERVISOR RESET ACTIVE LOW

- ULTRA LOW POWER CONSUMPTION :
12μA maximum
- PRECISION RESET THRESHOLD
- THRESHOLD VOLTAGE:
4.33V typ. FOR TS831-5
4.50V typ. FOR TS831-4
2.71V typ. FOR TS831-3
- GUARANTEED RESET OPERATION FOR
V_{CC} DOWN TO 1V
- OPEN DRAIN OUTPUT COMPARATOR
- FAST RESPONSE TIME : 20μs FOR A 10mV
OVERDRIVE
- INTERNAL BUILT-IN HYSTERESIS
- PIN TO PIN COMPATIBLE WITH MC33064
AND MC33164

DESCRIPTION

The TS831 is an ultra low power integrated circuit incorporating a high stability band-gap voltage reference and a comparator with an open drain output.

The threshold voltage is set at 4.33V for TS831-5, 4.5V for TS831-4 and 2.71V for TS831-3 by internal thermally matched resistors.

The comparator exhibits a 20μs response (with 10mV overdrive) and has an open drain output active when input voltage is lower than the threshold. An internal hysteresis, 100mV for TS831-4 / TS831-5 and 60mV for TS831-3, increases the comparator's noise margin and prevents false reset operation.

APPLICATION

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

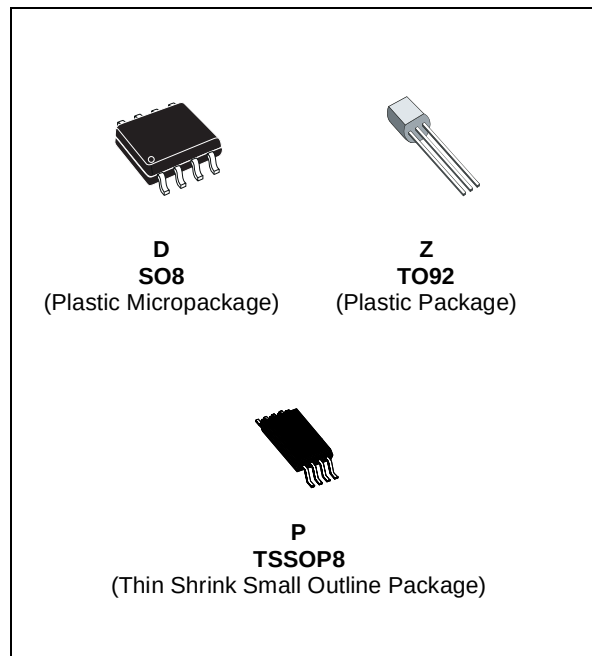
ORDER CODE

Part Number	Temperature Range	Package		
		D	Z	P
TS831-5I	-40, +125°C	•	•	•
TS831-4I		•	•	•
TS831-3I		•	•	•

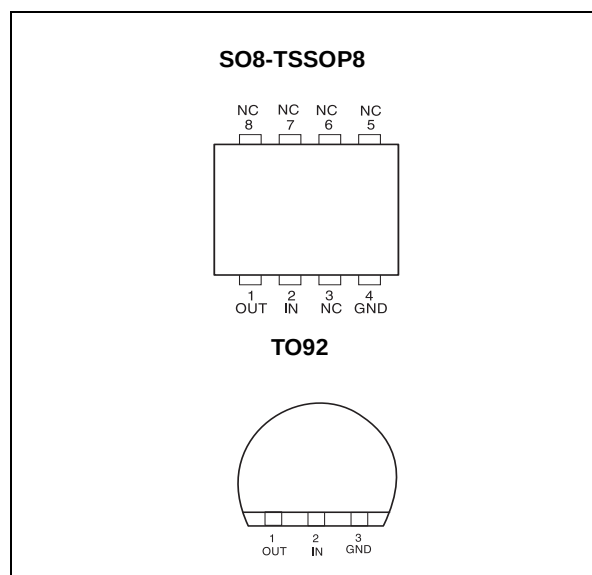
Z= TO92 Plastic package

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 Sink Current TS831-5 and TS831-4 TS831-3	20 5	mA
P_D	Power Dissipation ²⁾ TO92 SO8 TSSOP8	625 700 625	mW
I_F	Clamp Diode Forward Current, pin 1 to pin 2 ³⁾	100	mA
T_{STG}	Storage Temperature	-65 to +150	°C

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

2. $T_j = 150^{\circ}\text{C}$, $T_{amb} = 25^{\circ}\text{C}$ with $R_{thja} = 200^{\circ}\text{C/W}$ for TO-92 package
 $R_{thja} = 175^{\circ}\text{C/W}$ for SO8 package
 $R_{thja} = 200^{\circ}\text{C/W}$ for TSSOP8 package

3. Maximum package power dissipation limits must be observed.

OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	1 to 5.5	V
T_{OPER}	Operating Free Air Temperature Range	-40 to +125	°C

TS831-5
ELECTRICAL CHARACTERISTICS $T_{amb} = 25^{\circ}\text{C}$ (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{THI}	Threshold Voltage with V_{CC} Increasing -40°C ≤ T_{amb} ≤ +85°C -40°C ≤ T_{amb} ≤ +125°C	4.11 4.11	4.33	4.46 4.50	V
V_{THD}	Threshold Voltage with V_{CC} Decreasing -40°C ≤ T_{amb} ≤ +85°C -40°C ≤ T_{amb} ≤ +125°C	4.10 4.06	4.21	4.46 4.46	V
V_{HYS}	Hysteresis Voltage	50	100	200	mV
I_{CC}	Current Consumption $V_{CC} = 5V$			12	μA
V_{OL}	Low Level Output Voltage -40°C ≤ T_{amb} ≤ +85°C -40°C ≤ T_{amb} ≤ +125°C $V_{CC} = 4V$, $I_{OL} = 8mA$		450	800 1000 1300	mV
I_{OH}	High Level Output Current -40°C ≤ T_{amb} ≤ +125°C $V_{CC} = 5V$		2	100 1000	nA
T_{PHL}	Response Time High to Low $R_L = 10k\Omega$, $C_L = 15pF$, $V_{CC} = V_{THD} - 10mV$		20		μs

Note : Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation and by design.

TS831-4**ELECTRICAL CHARACTERISTICS** Tamb = 25°C (unless otherwise specified)

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{THI}	Threshold Voltage with V_{CC} Increasing -40°C ≤ Tamb ≤ +85°C -40°C ≤ Tamb ≤ +125°C	4.18 4.18	4.50	4.66 4.70	V
V_{THD}	Threshold Voltage with V_{CC} Decreasing -40°C ≤ Tamb ≤ +85°C -40°C ≤ Tamb ≤ +125°C	4.17 4.13	4.40	4.66 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 $V_{CC} = 4V, I_{OL} = 8mA$ -40°C ≤ Tamb ≤ +85°C -40°C ≤ Tamb ≤ +125°C		450	800 1000 1300	mV
I_{OH}	High Level Output Current $V_{CC} = 5V$ -40°C ≤ Tamb ≤ +125°C		2	100 1000	nA
T_{PHL}	Response Time High to Low $R_L = 10k\Omega, C_L = 15pF, V_{CC} = V_{THD} - 10mV$		20		μs

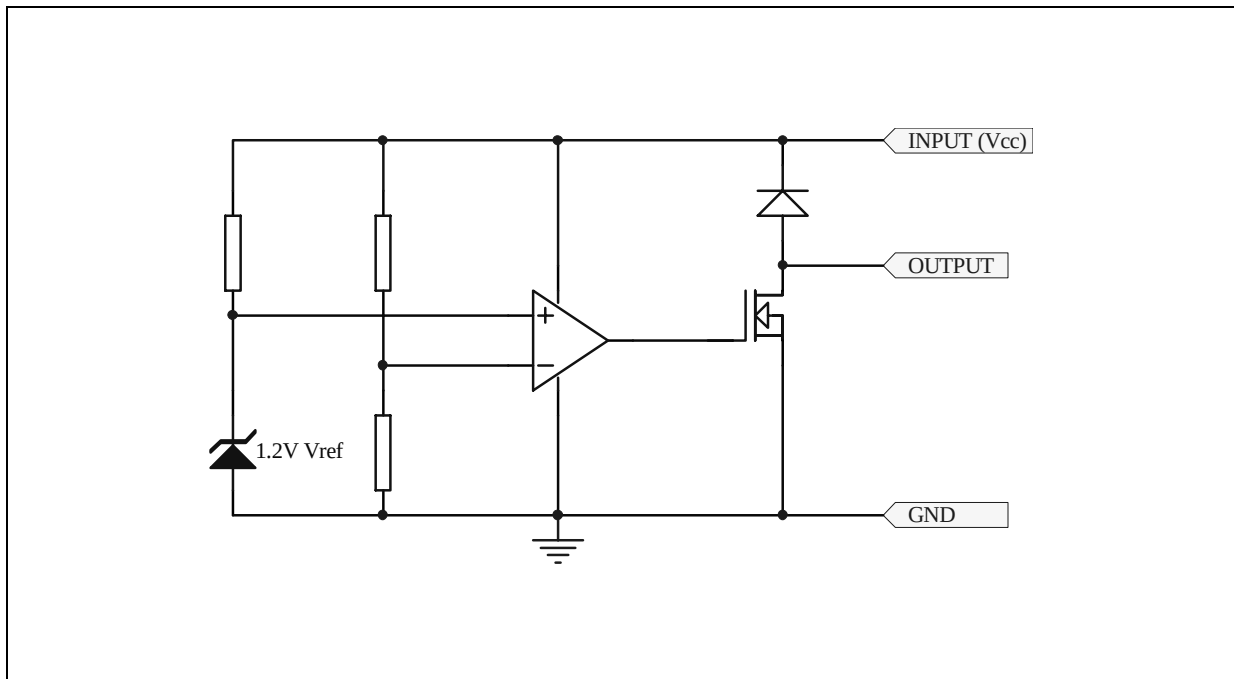
Note : Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation and by design.

TS831-3**ELECTRICAL CHARACTERISTICS** Tamb = 25°C (unless otherwise specified)

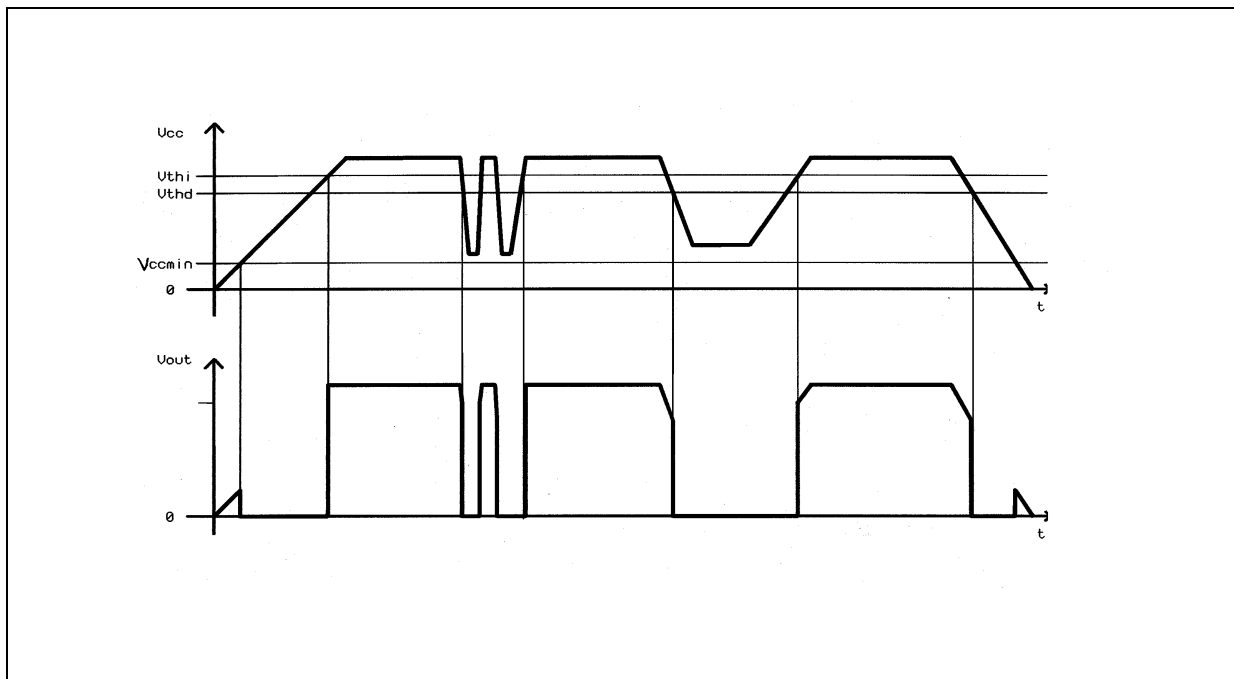
Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{THI}	Threshold Voltage with V_{CC} Increasing -40°C ≤ Tamb ≤ +125°C	2.55	2.71	2.8	V
V_{THD}	Threshold Voltage with V_{CC} Decreasing -40°C ≤ Tamb ≤ +125°C	2.55	2.65	2.8	V
V_{HYS}	Hysteresis Voltage	30	60	100	mV
I_{CC}	Current Consumption $V_{CC} = 3V$			12	μA
V_{OL}	Low Level Output Voltage $V_{CC} = 2.4V, I_{OL} = 1mA$ -40°C ≤ Tamb ≤ +125°C		140	400 500	mV
I_{OH}	High Level Output Current $V_{CC} = 3V$ -40°C ≤ Tamb ≤ +125°C		2	100 1000	nA
T_{PHL}	Response Time High to Low $R_L = 10k\Omega, C_L = 15pF, V_{CC} = V_{THD} - 10mV$		20		μs

Note : Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation and by design.

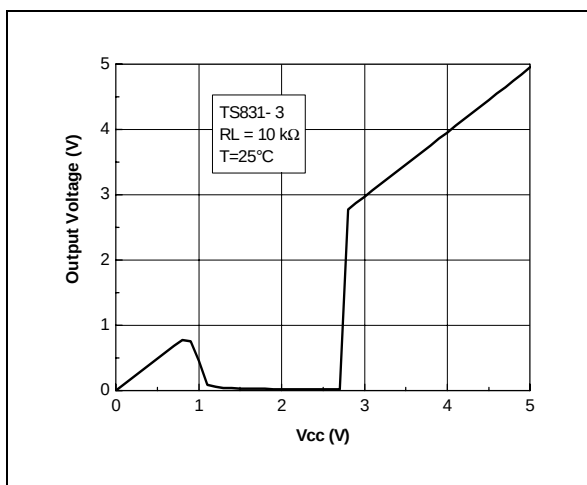
EQUIVALENT SCHEMATIC DIAGRAM



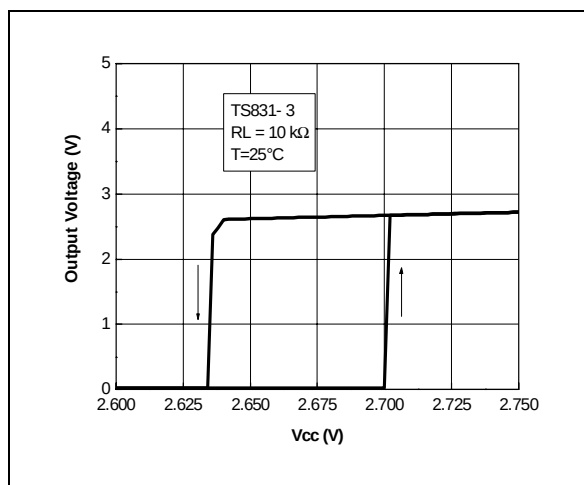
TIMING DIAGRAM



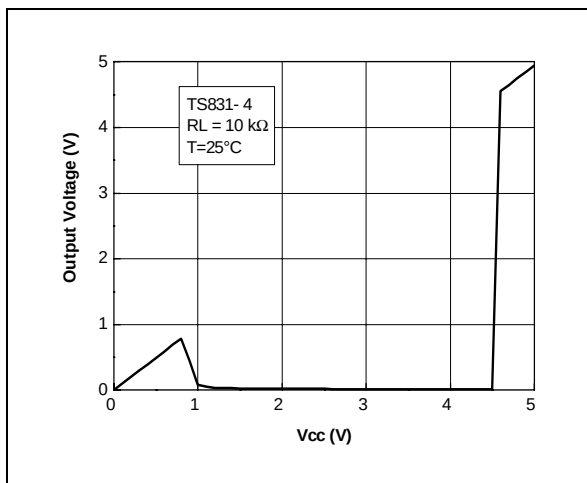
Output voltage versus Vcc



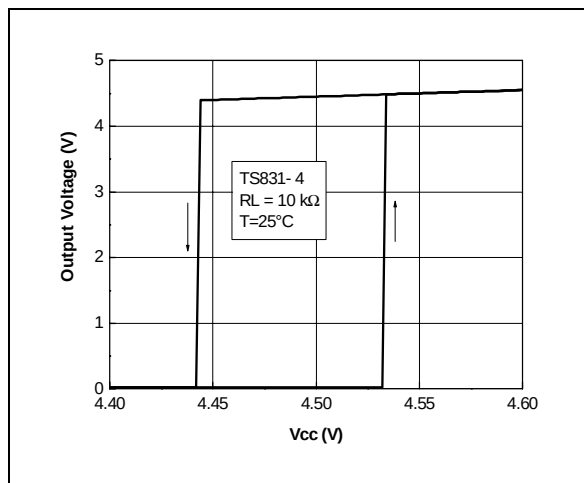
Reset output voltage versus Vcc



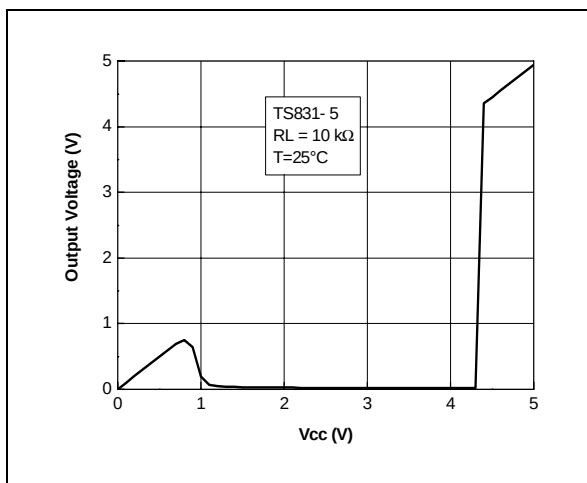
Output voltage versus Vcc



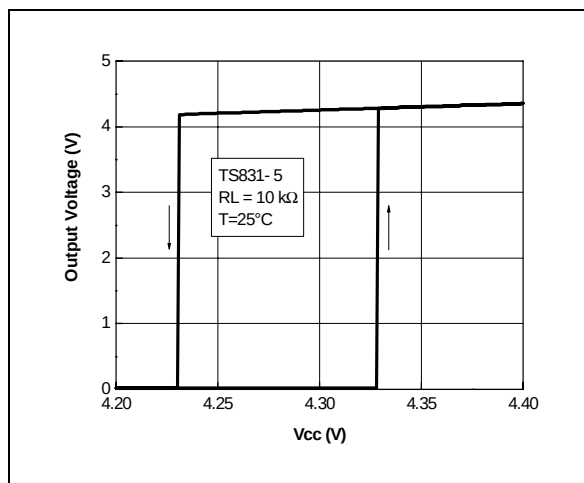
Reset output voltage versus Vcc



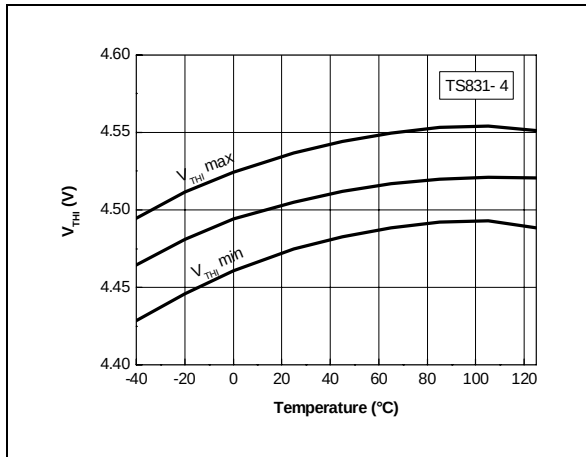
Output voltage versus Vcc



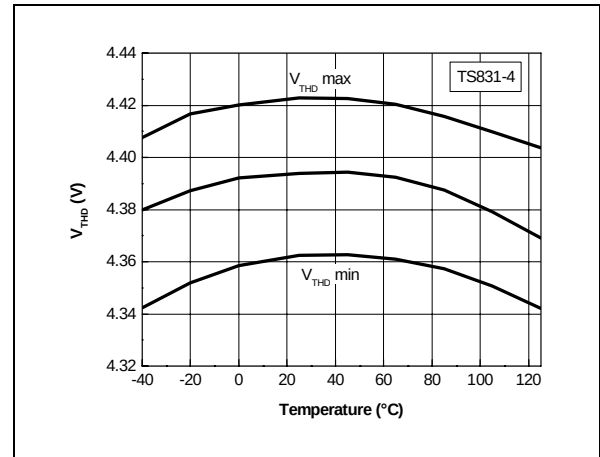
Reset output voltage versus Vcc



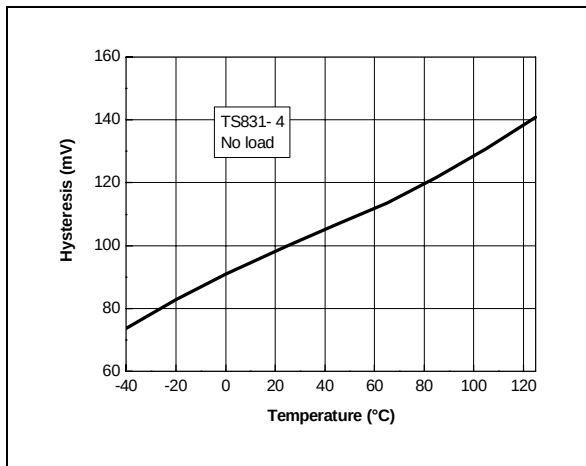
V_{THI} versus temperature



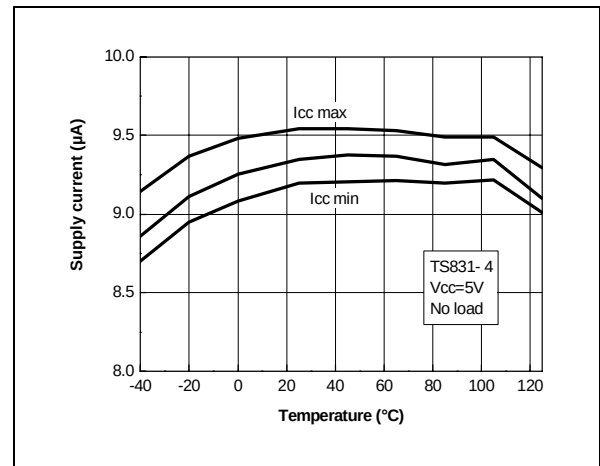
V_{THD} versus temperature



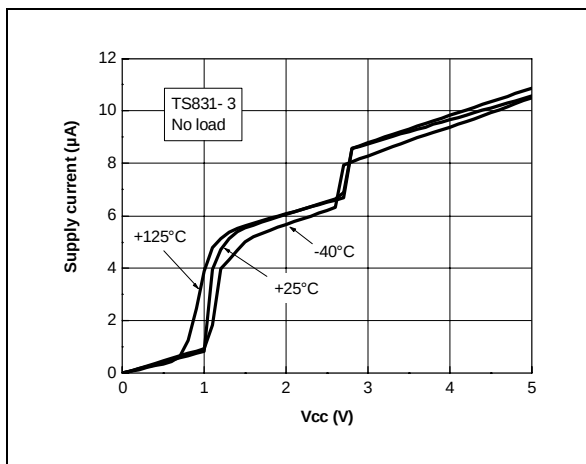
Hysteresis voltage versus temperature



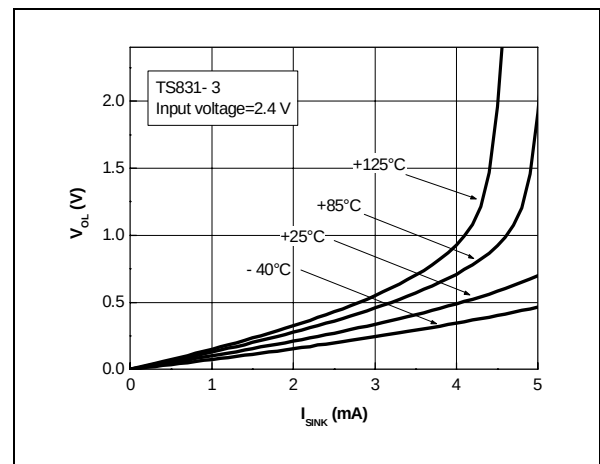
Supply current versus temperature

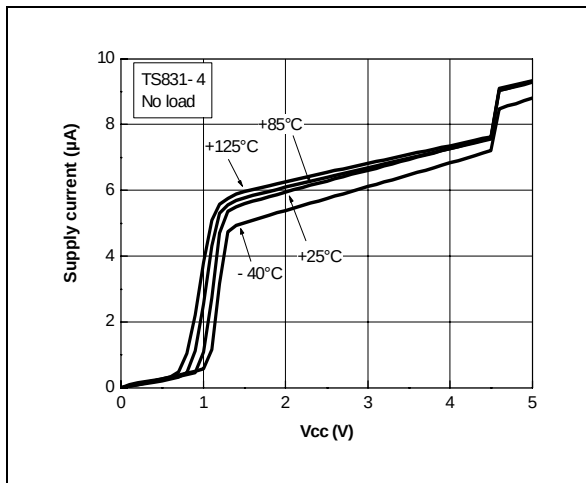
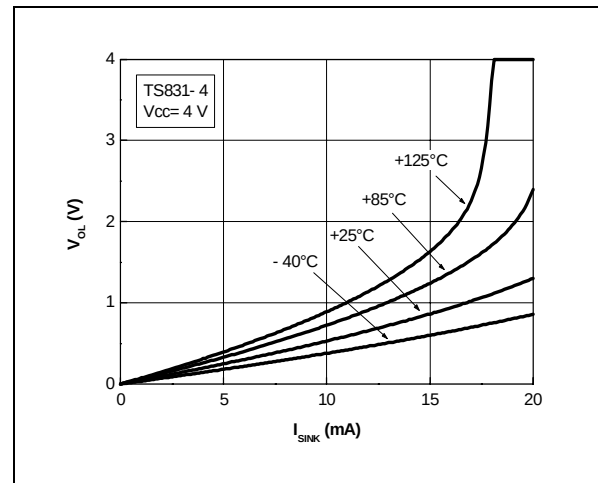
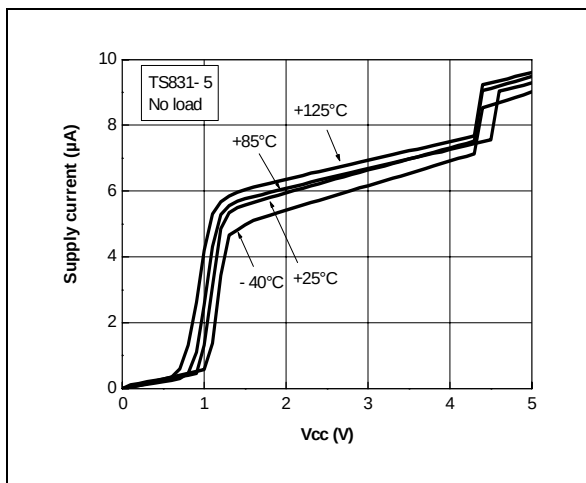
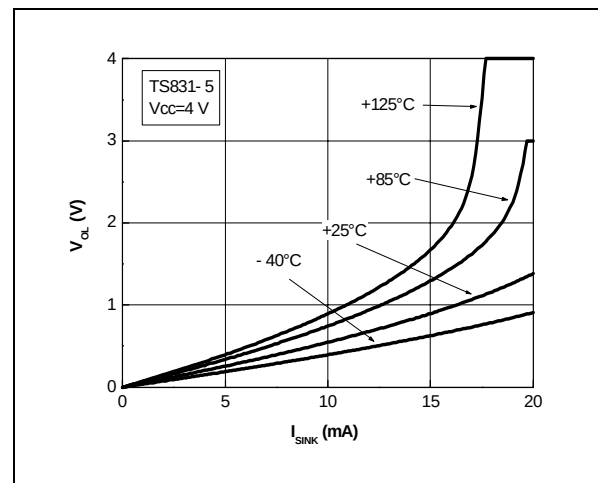


Supply current vs Vcc & temperature

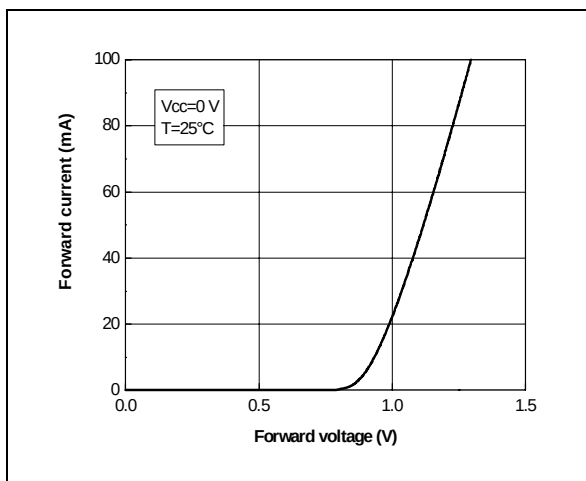


Voltage output low vs I_sink & temperature

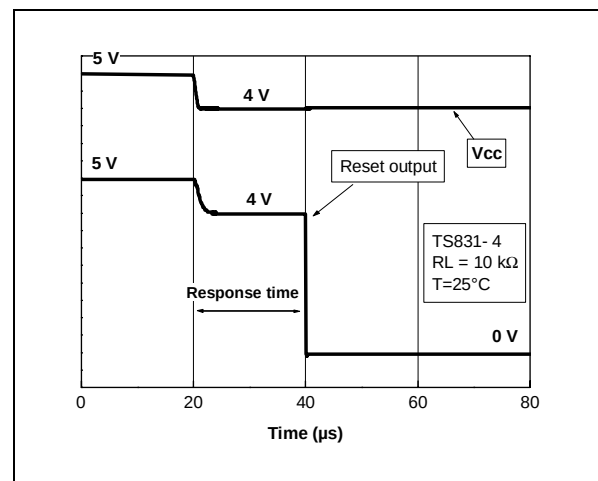


Supply current vs V_{CC} & temperatureVoltage output low vs I_{SINK} & temperatureSupply current vs V_{CC} & temperatureVoltage output low vs I_{SINK} & temperature

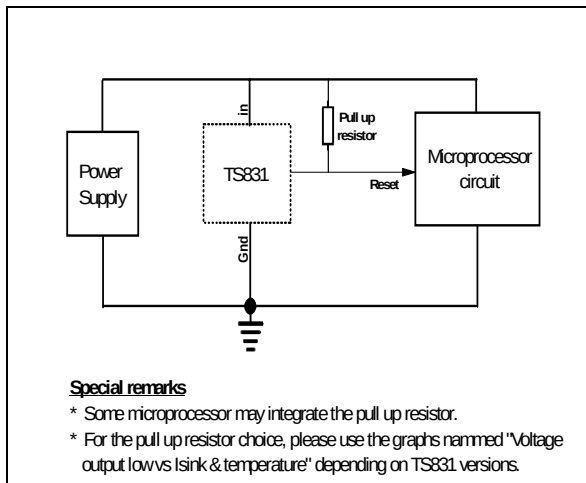
Clamp diode forward current versus voltage



Response time

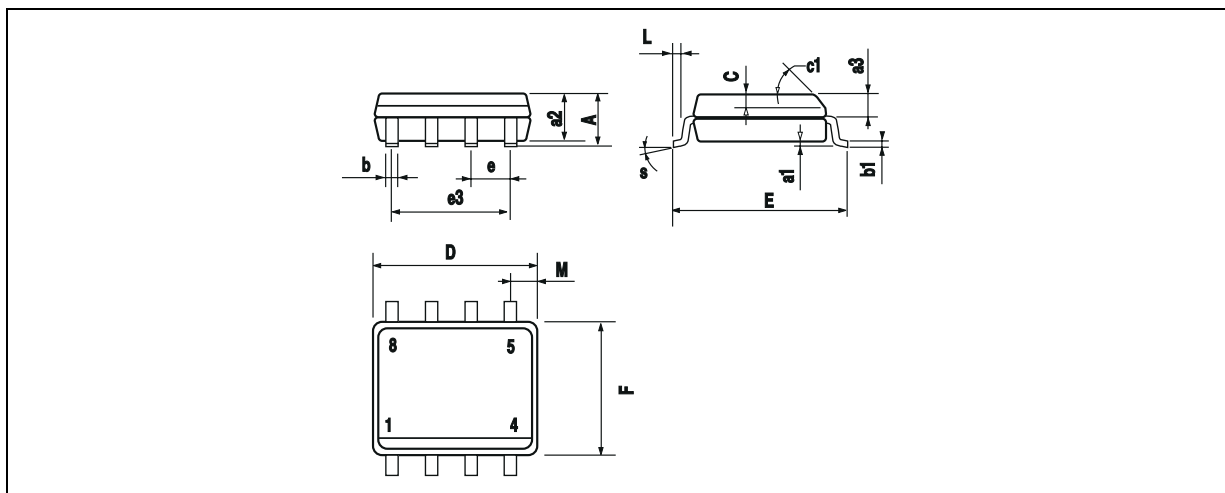


Basic configuration



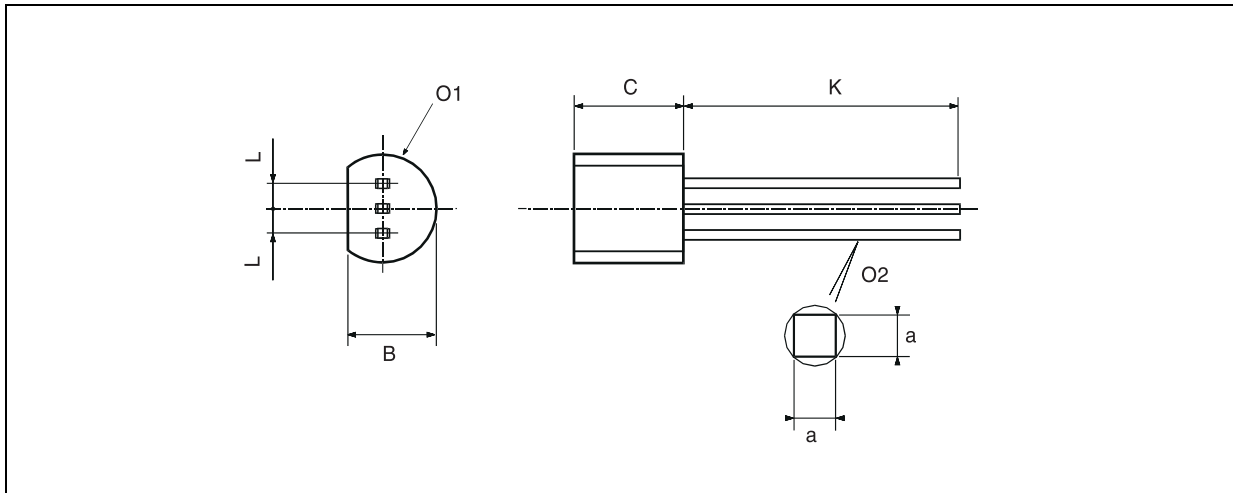
PACKAGE MECHANICAL DATA

8 PINS - PLASTIC MICROPACKAGE (SO)

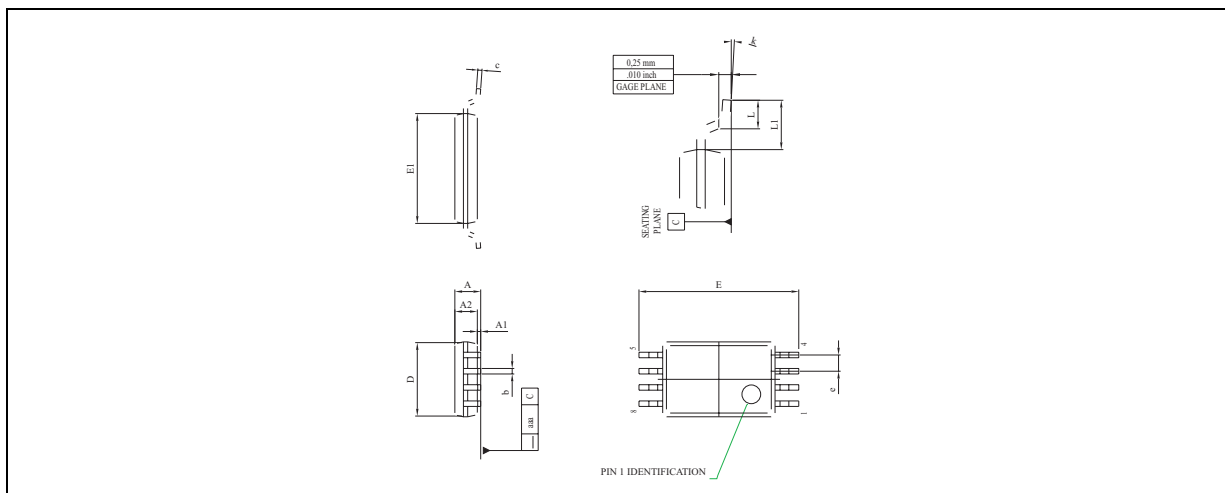


Dim.	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.5	0.010		0.020
c1	45° (typ.)					
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27	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