

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
Vcc 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

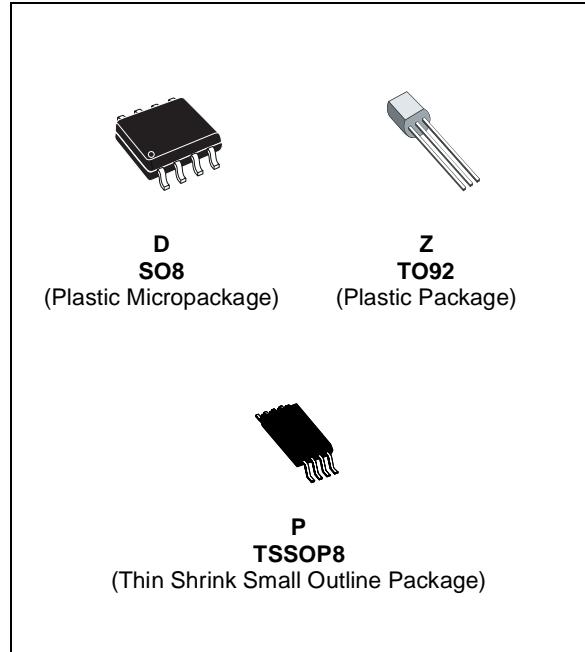
- Power-on reset generator for microcontroller
- Power failure detector

ORDER CODE

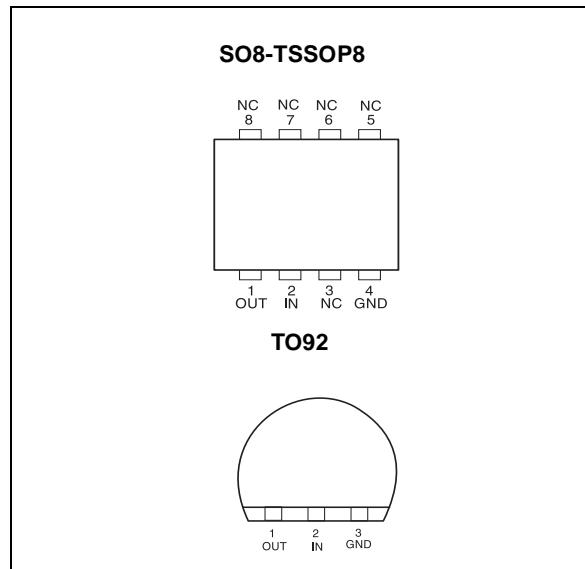
Part Number	Temperature Range	Package		
		D	Z	P
TS831-5I		•	•	•
TS831-4I		•	•	•
TS831-3I		•	•	•

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 $-40^\circ\text{C} \leq T_{amb} \leq +85^\circ\text{C}$ $-40^\circ\text{C} \leq T_{amb} \leq +125^\circ\text{C}$	4.11 4.11	4.33	4.46 4.50	V
V_{THD}	Threshold Voltage with V_{CC} Decreasing $-40^\circ\text{C} \leq T_{amb} \leq +85^\circ\text{C}$ $-40^\circ\text{C} \leq T_{amb} \leq +125^\circ\text{C}$	4.10 4.06	4.21	4.46 4.46	V
V_{HYS}	Hysteresis Voltage	50	100	200	mV
I_{CC}	Current Consumption $V_{CC} = 5\text{V}$			12	µA
V_{OL}	Low Level Output Voltage $V_{CC} = 4\text{V}$, $I_{OL} = 8\text{mA}$ $-40^\circ\text{C} \leq T_{amb} \leq +85^\circ\text{C}$ $-40^\circ\text{C} \leq T_{amb} \leq +125^\circ\text{C}$		450	800 1000 1300	mV
I_{OH}	High Level Output Current $V_{CC} = 5\text{V}$ $-40^\circ\text{C} \leq T_{amb} \leq +125^\circ\text{C}$		2	100 1000	nA
T_{PHL}	Response Time High to Low $R_L = 10\text{k}\Omega$, $C_L = 15\text{pF}$, $V_{CC} = V_{THD} - 10\text{mV}$		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 -40°C ≤ Tamb ≤ +85°C -40°C ≤ Tamb ≤ +125°C	V _{CC} = 4V, I _{OL} = 8mA		450	800 1000 1300
I _{OH}	High Level Output Current -40°C ≤ Tamb ≤ +125°C	V _{CC} = 5V		2	100 1000
T _{PHL}	Response Time High to Low R _L = 10kΩ, C _L = 15pF, V _{CC} = V _{THD} - 10mV		20		µs

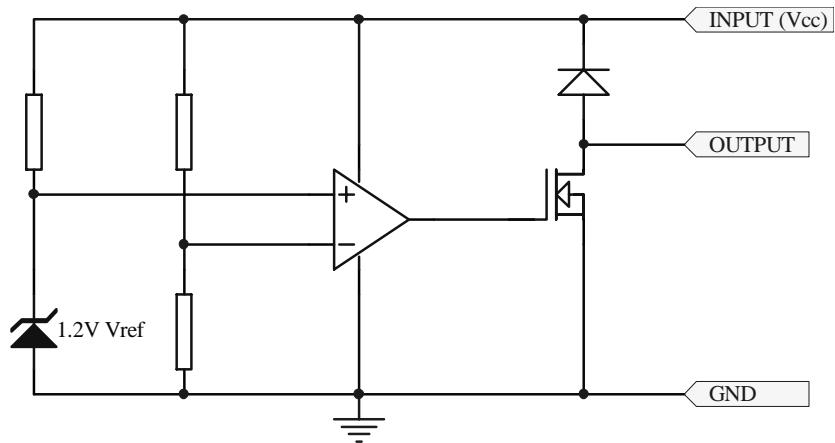
Note : Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation and by design.

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

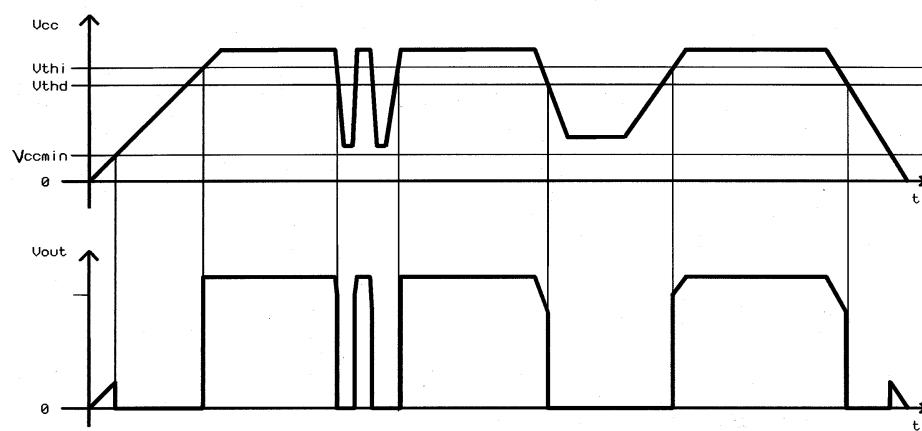
Symbol	Parameter	Min.	Typ.	Max.	Unit
V _{THI}	Threshold Voltage with V _{CC} Increasing -40°C ≤ Tamb ≤ +125°C	2.55	2.71	2.8	V
V _{THD}	Threshold Voltage with V _{CC} Decreasing -40°C ≤ Tamb ≤ +125°C	2.55	2.65	2.8	V
V _{HYS}	Hysteresis Voltage	30	60	100	mV
I _{CC}	Current Consumption	V _{CC} = 3V		12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

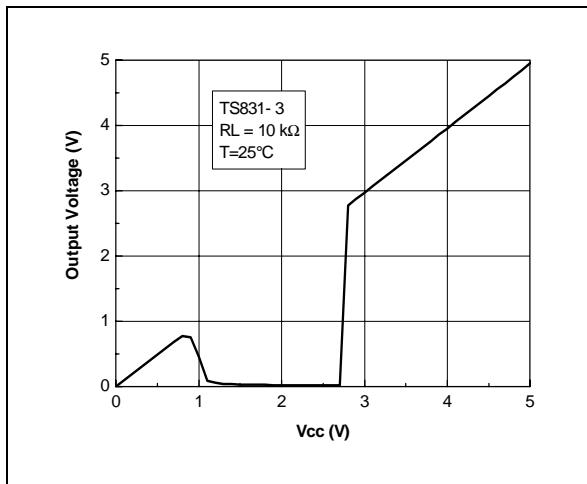
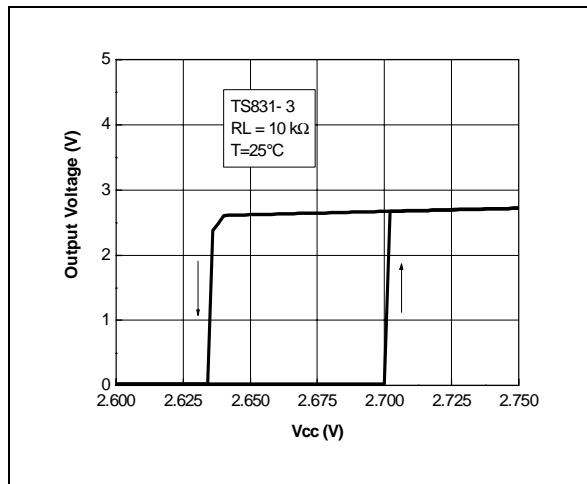
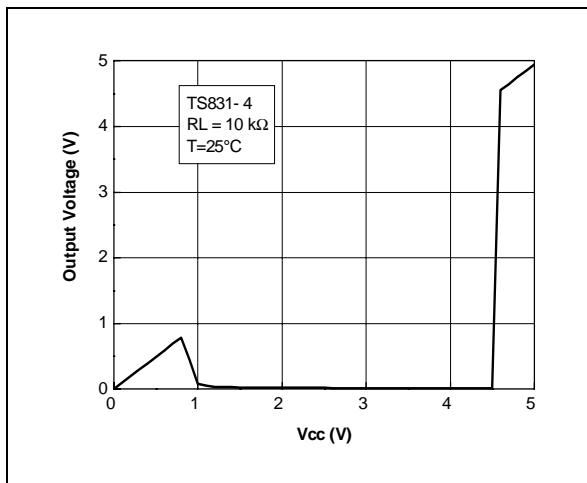
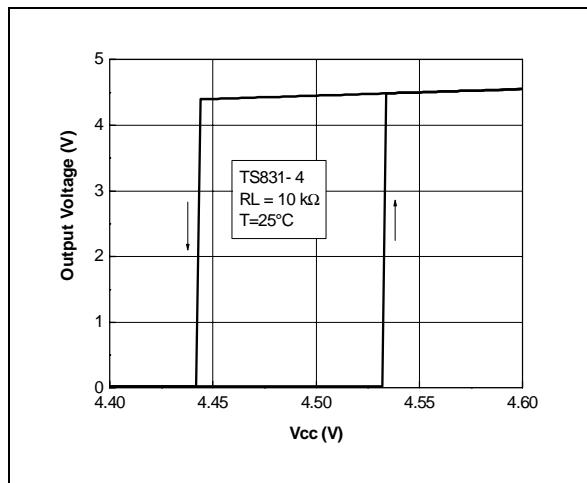
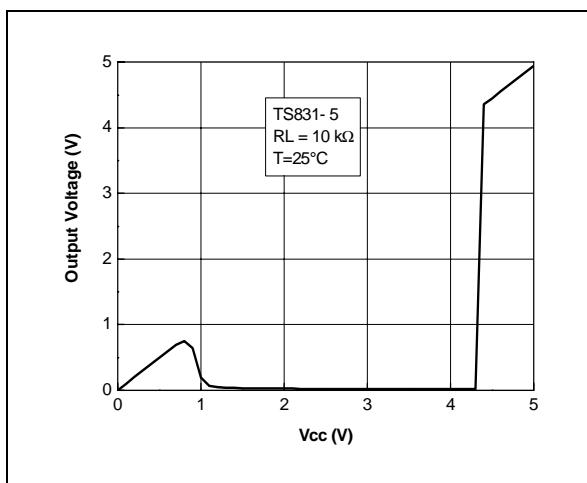
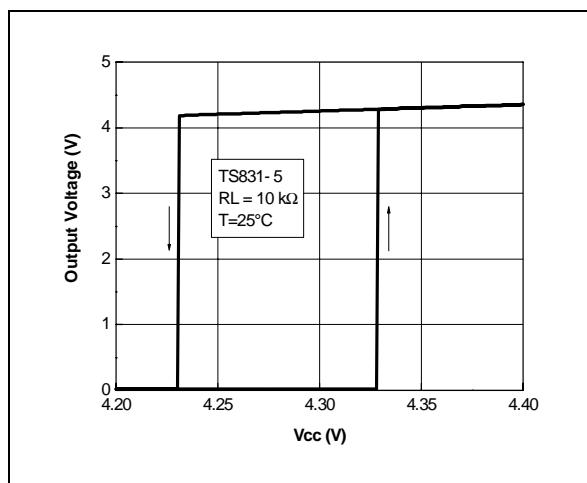
Note : Limits are 100% production tested at 25°C. Limits over temperature are guaranteed through correlation and by design.

EQUIVALENT SCHEMATIC DIAGRAM

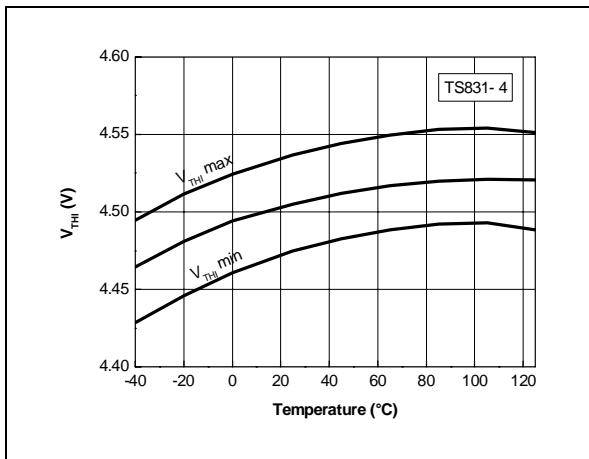


TIMING DIAGRAM

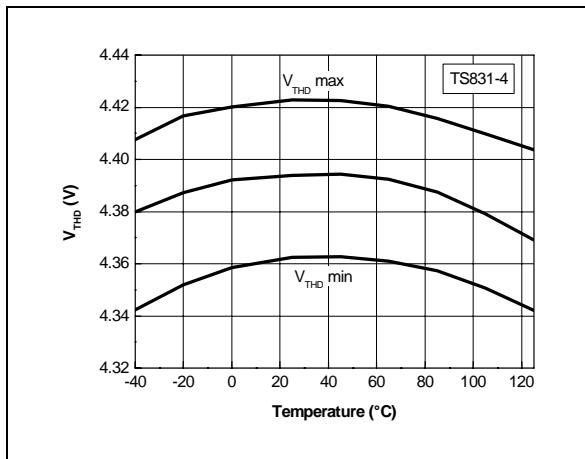


Output voltage versus Vcc**Reset output voltage versus Vcc****Output voltage versus Vcc****Reset output voltage versus Vcc****Output voltage versus Vcc****Reset output voltage versus Vcc**

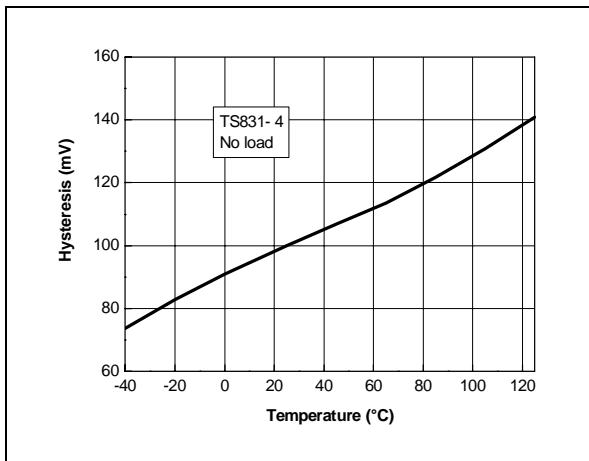
V_{THI} versus temperature



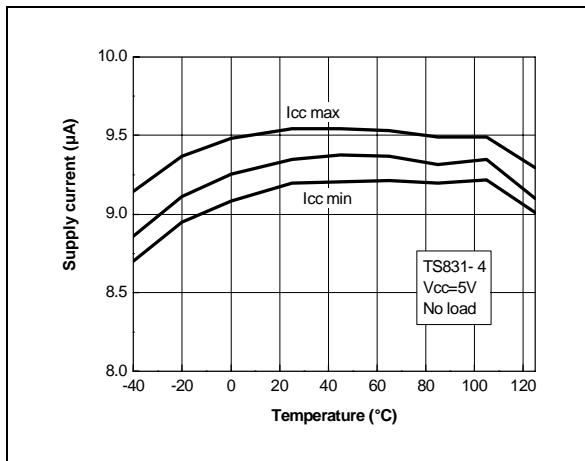
V_{THD} versus temperature



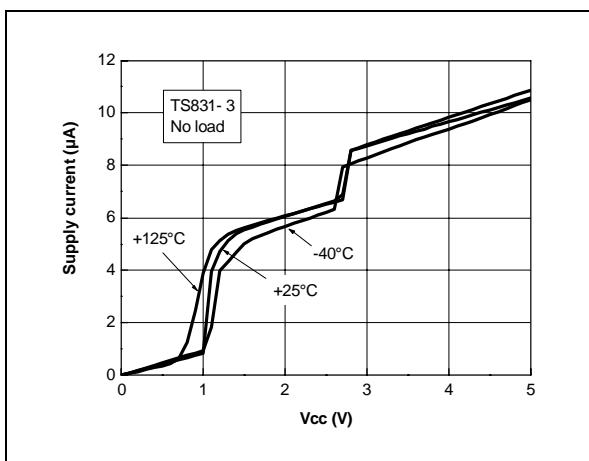
Hysteresis voltage versus temperature



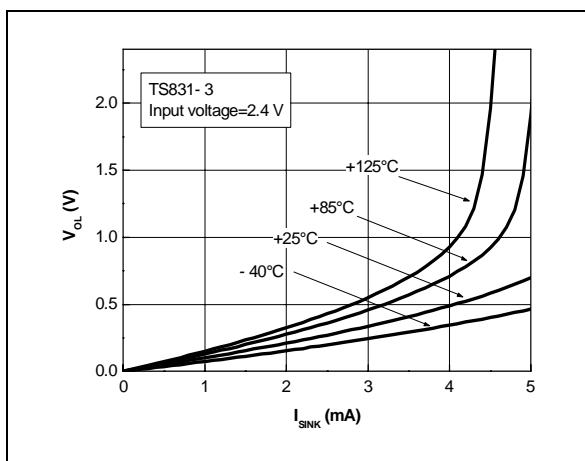
Supply current versus temperature

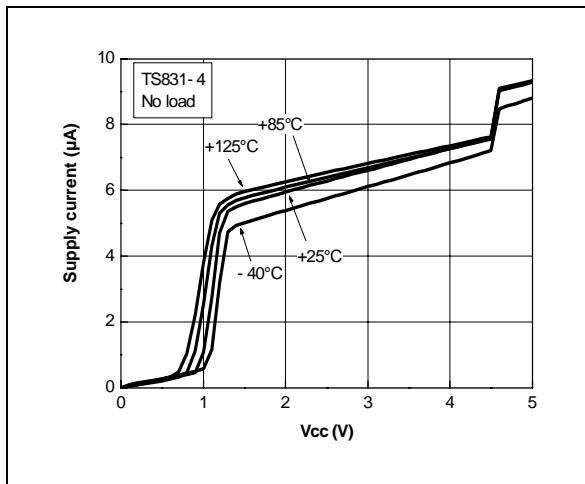
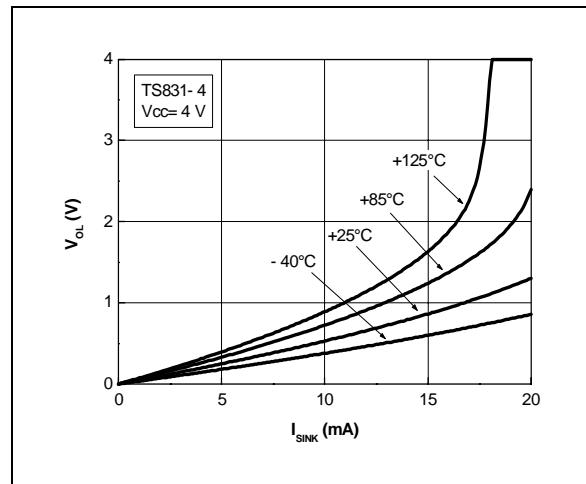
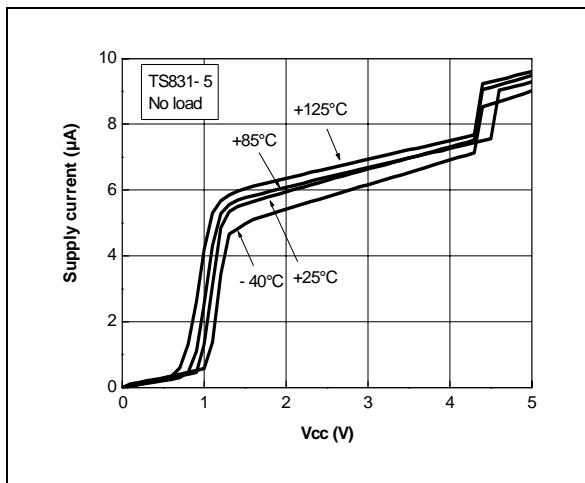
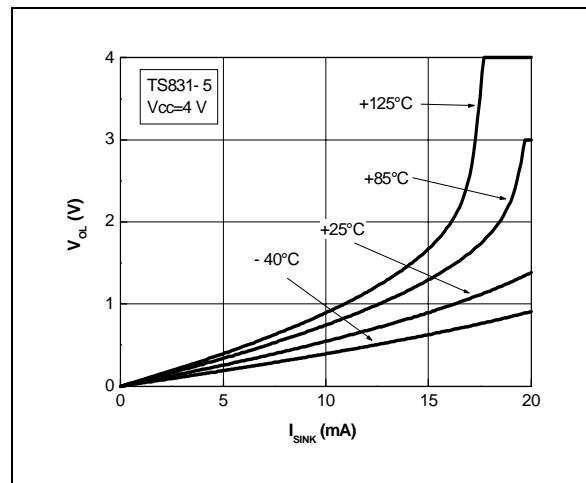
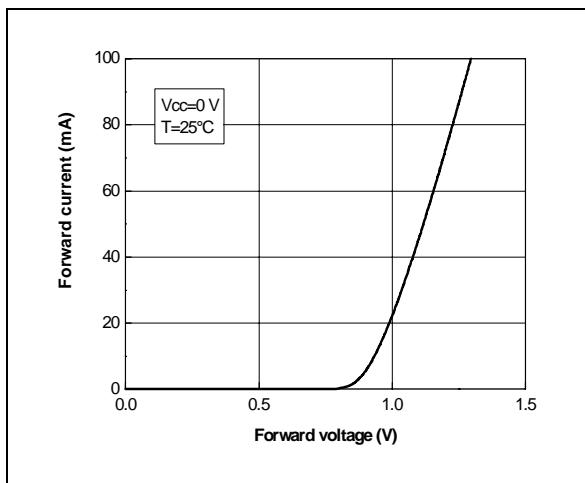
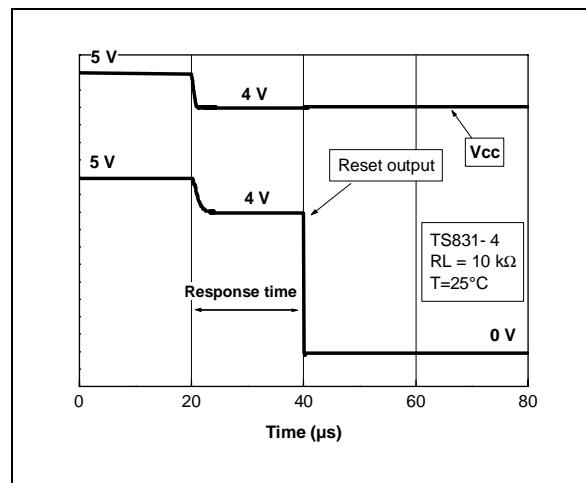


Supply current vs Vcc & temperature

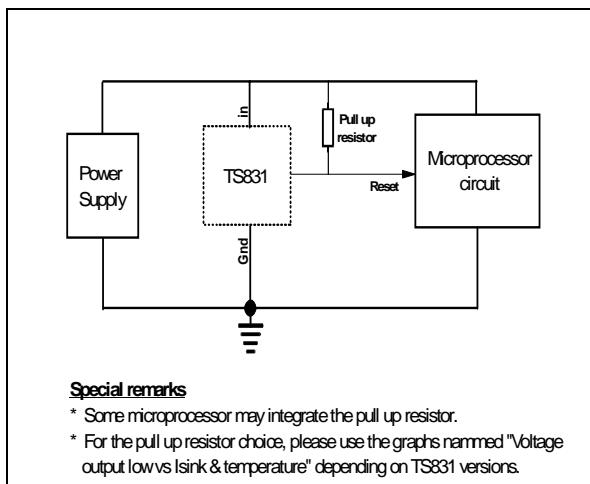


Voltage output low vs Isink & temperature

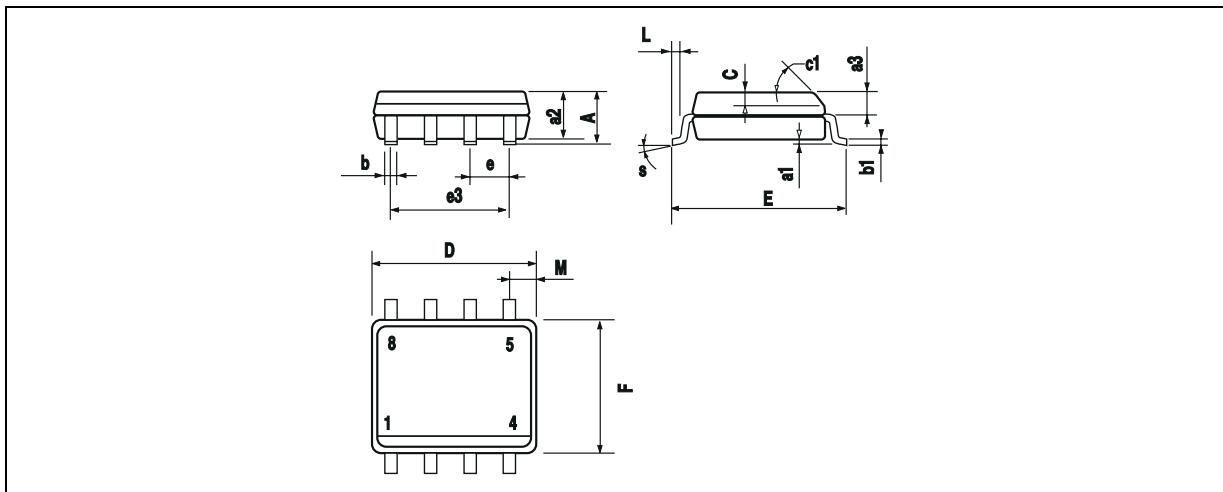


Supply current vs Vcc & temperature**Voltage output low vs Isink & temperature****Supply current vs Vcc & temperature****Voltage output low vs Isink & temperature****Clamp diode forward current versus voltage****Response time**

Basic configuration

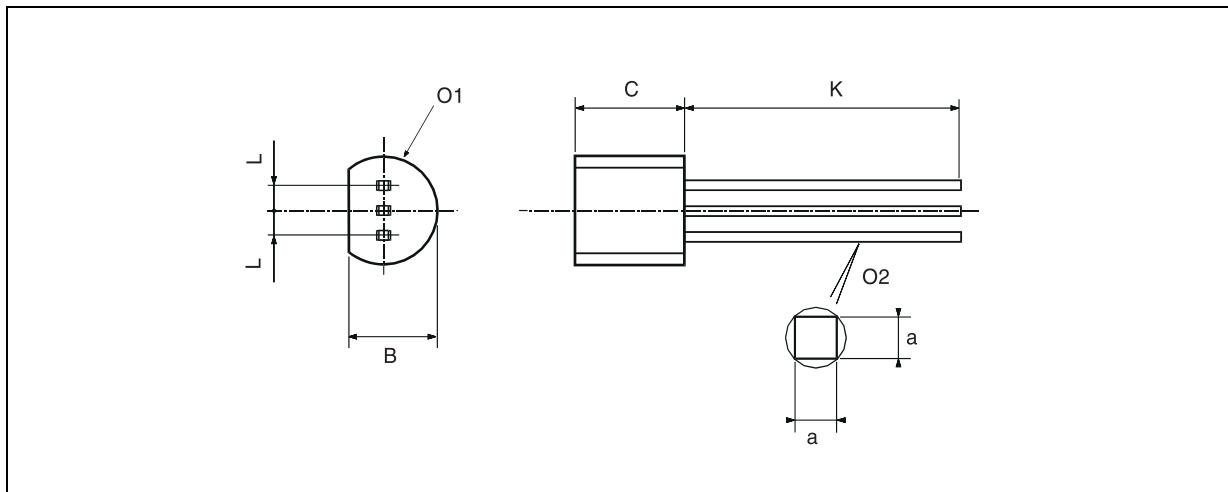


PACKAGE MECHANICAL DATA
8 PINS - PLASTIC MICROPACKAGE (SO)



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.)				

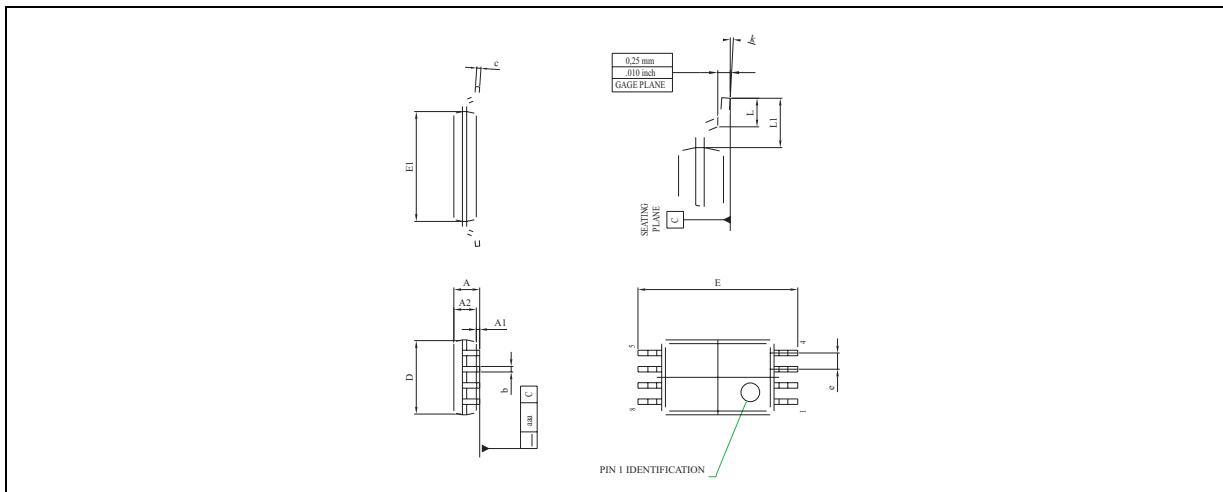
PACKAGE MECHANICAL DATA
3 PINS - PLASTIC PACKAGE TO92



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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