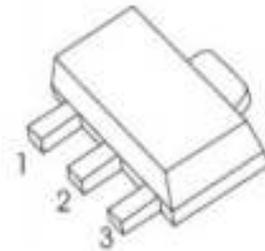


## Adjustable Accurate Reference Source

### DEVICE DESCRIPTION

The TL431B is a three-terminal adjustable shunt regulator offering excellent temperature stability. This device has a typical dynamic output impedance of  $0.2\Omega$ . The device can be used as a replacement for zener diodes in many applications.

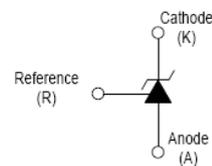


- 1.Reference
- 2.Anode
- 3.Cathode

### ■ Simplified outline(SOT-89)

### ■ FEATURES

- The output voltage can be adjusted to 36V
- Low dynamic output impedance, its typical value is  $0.2\Omega$
- Trapping current capability is 1 to 100mA
- Low output noise voltage
- Fast on -state response
- The effective temperature compensation in the working range of full temperature
- The typical value of the equivalent temperature factor in the whole temperature scope is  $50 \text{ ppm}/^\circ\text{C}$



### ■ APPLICATION

- Shunt Regulator
- High-Current Shunt Regulator
- Precision Current Limiter

### ■ ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

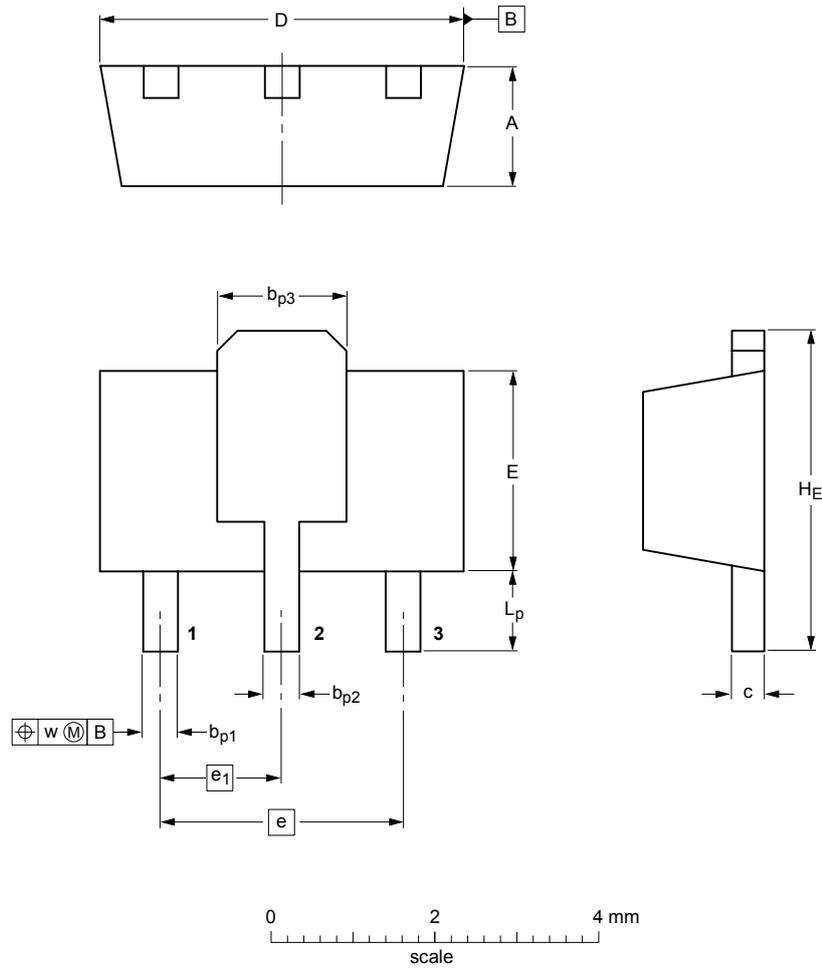
Parameter	Symbol	Value	Unit
Cathode Voltage	$V_{KA}$	36	V
Cathode Current Range (Continuous)	$I_{KA}$	-100~+150	mA
Reference Input Current Range	$I_{ref}$	0.05~+10	mA
Power Dissipation	$P_D$	500	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$
Operating Temperature	$T_{opr}$	-25~+85	$^\circ\text{C}$
Junction Temperature	$T_J$	150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65~+150	$^\circ\text{C}$

**■ ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25 °C unless otherwise specified)**

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Reference input voltage	V <sub>ref</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA	2.487	2.5	2.513	V
Deviation of reference Input voltage over temperature (note)	ΔV <sub>ref</sub> /ΔT	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA T <sub>MIN</sub> ≤T <sub>a</sub> ≤T <sub>MAX</sub>		4.5	17	mV
Ratio of change in reference Input voltage to the change in cathode voltage	ΔV <sub>ref</sub> /ΔV <sub>KA</sub>	I <sub>KA</sub> =10mA				
			ΔV <sub>KA</sub> =10V~V <sub>REF</sub>		-1.0	-2.7
Reference input current	I <sub>ref</sub>	I <sub>KA</sub> = 10mA, R <sub>1</sub> =10kΩ R <sub>2</sub> =∞		1.5	4	μA
Deviation of reference input current over full temperature range	ΔI <sub>ref</sub> /ΔT	I <sub>KA</sub> =10mA, R <sub>1</sub> =10kΩ R <sub>2</sub> =∞ T <sub>A</sub> =-25 to 85 °C		0.4	1.2	μA
Minimum cathode current for regulation	I <sub>KA(min)</sub>	V <sub>KA</sub> =V <sub>REF</sub>		0.45	1.0	mA
Off-state cathode current	I <sub>KA(OFF)</sub>	V <sub>KA</sub> =36V, V <sub>REF</sub> =0		0.05	1.0	μA
Dynamic impedance	Z <sub>KA</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =1 to 100mA f≤1.0kHz		0.15	0.5	Ω

 Note: T<sub>MIN</sub>=-25 °C, T<sub>MAX</sub>=+85 °C

■ SOT-89



**DIMENSIONS** (mm are the original dimensions)

UNIT	A	$b_{p1}$	$b_{p2}$	$b_{p3}$	c	D	E	e	$e_1$	$H_E$	$L_p$	w
mm	1.6	0.48	0.53	1.8	0.44	4.6	2.6	3.0	1.5	4.25	1.2	0.13
	1.4	0.35	0.40	1.4	0.23	4.4	2.4					