

## 1. Description

The KIA431 series ICs are three-terminal adjustable shunt regulators with guaranteed thermal stability over a full operation range. These ICs feature sharp turn-on characteristics, low temperature coefficient and low output impedance, which make them ideal substitutes for Zener diodes in applications such as switching power supply, charger and other adjustable regulators. The KIA431 precision reference is offered in three band gap tolerance: 0.5%, 1% and 1.5%.

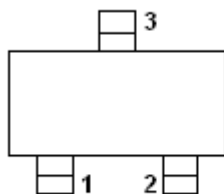
## 2. Features

- Adjustable output voltage from 2.5V to 36V
- Low dynamic output resistance: 0.2 ohm
- Sink current capacity from 1m A to 100m A
- Low output noise
- Typical equivalent full range temperature coefficient of 30ppm/° C

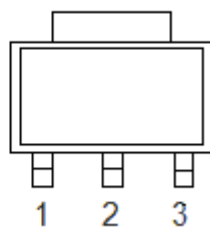
## 3. Applications

- PC motherboard
- Voltage monitor
- Voltage reference
- PWM down converter with reference
- Charge

## 4 Pinning information



SOT-23 Front View



SOT-89 Front View

Pin	Description SOT-23	Description SOT-89
1	Ref.	Ref.
2	Cathode	Anode
3	Anode	Cathode

## 5. Ordering information

Table2: Ordering information

Number	Voltage tolerance	Description SOT-23	Marking SOT-23	Description SOT-89	Marking SOT-89
1	0.5%	KIA431-A	431	KIA431-3A	3A
2	1%	KIA431-B		KIA431-3B	3B
3	1.5%			KIA431-CJ431	CJ431

## 6. Package information

SOT-23 : 3K/Reel 30K/Box 360K/CTN

SOT-89 : 1K/Reel 7K/Box 84K/CTN

## 7. Maximum ratings (Ta=25° )

Table3:Maximum ratings

Parameter	Symbol	Ratings	Units
Cathode voltage(Note 1)	$V_{KA}$	36	V
Continuous cathode current	$I_K$	-100-+150	mA
Reference input current range	$I_{REF}$	-0.05-+10	mA
Power dissipation	$P_D$	SOT-23 350	mW
		SOT-89 750	mW
Junction temperature	$T_J$	0-+150	°C
Storage temperature	$T_{STG}$	-65-+150	°C

Note1 : Voltage values are with respect to the anode terminal unless otherwise noted.

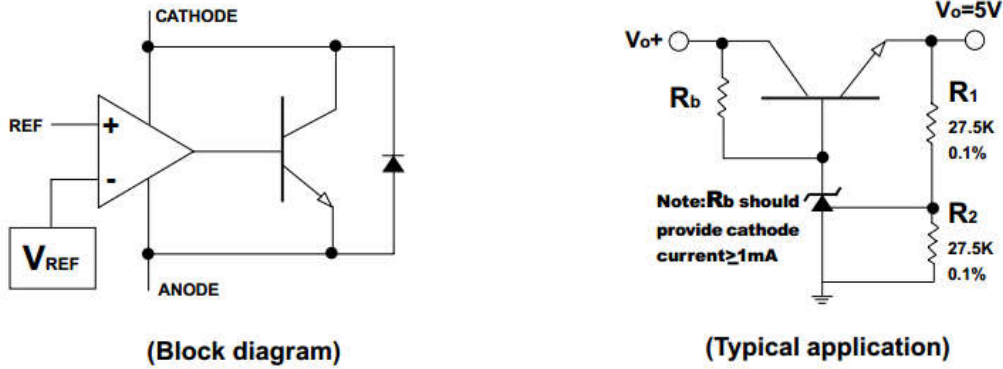
## 8. Recommended operating conditions

Table 4: Recommended operating conditions

Parameter	Symbol	Min	Max	Units
Operating free air temperature range	$T_A$	0	70	°C
Cathode current	$I_K$	1	100	mA
Cathode voltage	$V_{KA}$	0	36	V

### 9. Block diagram and typical application

Table 5: Block diagram and typical application



### 10. Electrical characteristics

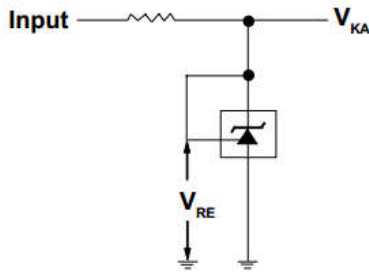
Table 6 : Electrical characteristics ( $T_A=25^\circ\text{C}$ , Unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Reference input voltage	$V_{REF}$	$I_K=10\text{mA}, V_{KA}=V_{REF}, \text{note 1}$	2.487	2.5	2.513	V
		$I_K=10\text{mA}, V_{KA}=V_{REF}, \text{note 2}$	2.475	2.5	2.525	V
		$I_K=10\text{mA}, V_{KA}=V_{REF}, \text{note 3}$	2.462	2.5	2.538	V
Reference drift	$\Delta V_{REF}$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ $I_K=10\text{mA}, V_{KA}=V_{REF}$	-	4	17	mV
Voltage ratio, ref to cathode	$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	$I_K=10\text{mA}, V_{KA}=2.5\text{V to }10\text{V}$	-	-1.4	-2.7	mV/V
		$I_K=10\text{mA}, V_{KA}=10\text{V to }36\text{V}$	-	-1.0	-2.0	V
Reference input current	$I_{REF}$	$I_K=10\text{mA}, V_{KA}=V_{REF}$	-	-	2.3	uA
		$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ $I_K=10\text{mA}, V_{KA}=V_{REF}$	-	2.0	4.0	
Minimum operating current	$I_{MIN}$	$V_{KA}=V_{REF}$	-	0.4	1.0	mA
Off-state cathode current	$I_{OFF}$	$V_{KA}=36\text{V}, V_{REF}=0\text{V}$	-	0.1	1.0	uA
Dynamic impedance	$Z_{KA}$	$V_{KA}=V_{REF}$ $I_{KA}=1\text{mA to }100\text{mA}, f \leq 1\text{kHz}$	-	0.2	0.5	Ohm

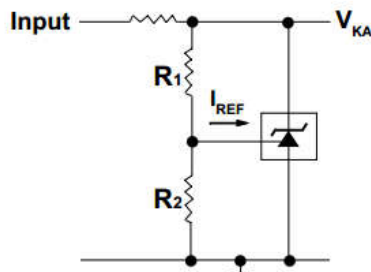
Note: 1. For KIA431-A/3A only, the output accuracy is 0.5%  
 2. For KIA431-B/3B only, the output accuracy is 1%  
 3. For KIA431-3C only, the output accuracy is 1.5%

**11. Parameter measurement information**

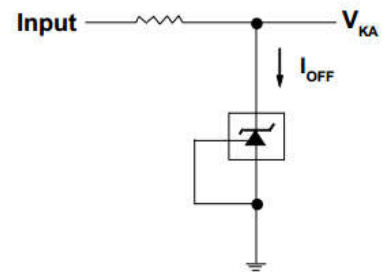
Table 7: Parameter measurement information



(Figure1. Test circuit for  $V_{KA}=V_{REF}$ )



(Figure2. Test circuit for  $V_{KA}>V_{REF}$ )



(Figure3. Test circuit for  $I_{OFF}$ )

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