

## Description

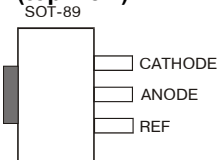
The MIK431 are three-terminal adjustable shunt regulators with specified thermal stability. The output voltage may be set to any value between  $V_{ref}$  (approximately 2.5V) and 36 V with two external resistors. These devices have a typical output impedance of  $0.2\Omega$ . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacements for zener diodes in many applications.

## Features

- Equivalent Full-Range Temperature Coefficient 30 ppm/°C
- Temperature Compensated for Operation Over Full Rated Operating Temperature Range
- Adjustable Output Voltage
- Fast Turn-On Response
- Sink Current Capability 1mA to 100 mA
- Low ( $0.2\Omega$  Typ) Dynamic Output Impedance
- Low Output Noise

## Package information

### Pin configuration (top view)



### Symbol



## Absolute maximum ratings

over operating free-air temperature range (unless otherwise noted)

Parameter	Maximum	Units
Cathode voltage (Note 1)	37	V
Continuous cathode current range	-100 to 150	mA
Reference input current range	-50µA to 10mA	
Operating free-air temperature range	0 to 70	°C
Lead temperature 1.6mm from case for 10 seconds	260	

Note 1: Voltage values are with respect to the anode terminal unless otherwise noted

## Recommended operating conditions

Parameter	Min	Max	Units
Cathode voltage, $V_{KA}$	$V_{ref}$	36	V
Cathode current, $I_K$ (for regulation )	1	100	mA

## Electrical characteristics

Electrical characteristics at 25 °C free-air temperature(unless otherwise noted)

Parameter	Symbol	Test Circuit	Test Conditions	Min	Typ	Max	Units
Reference input voltage	$V_{ref}$	1	$V_{KA}=V_{ref}$ , $I_K=10mA$	2474	2500	2526	mV
Deviation of reference input voltage over full temperature range	$V_{ref(dev)}$	1	$V_{KA}=V_{ref}$ , $I_K=10mA$ , $T_A=full\ range$		4	17	
Ratio of change in reference input voltage to the change in cathode voltage	$\frac{\Delta V_{ref}}{\Delta V_{KA}}$	2	$I_K=10mA$ $\Delta V_{KA}=10V\ to\ V_{ref}$ $\Delta V_{KA}=36V\ to\ 10V$	-2,7 -2	-1.0 -0.4		mV/V
Reference input current	$I_{ref}$	2	$I_K=10mA$ , $R1=10K\Omega$ , $R2=\infty$		0.7	4	
Deviation of reference input current over full temperature range	$I_{ref(dev)}$	2	$I_K=10mA$ , $R1=10K\Omega$ , $R2=\infty$ , $T_A=full\ range$		0.4	1.2	µA
Minimum cathode current for regulation	$I_{min}$	1	$V_{KA}=V_{ref}$		0.4	1.0	
Off-state cathode current	$I_{off}$	3	$V_{KA}=36V$ , $V_{ref}=0$		0.1	1	µA
Dynamic impedance	$ Z_{KA} $	1	$V_{KA}=V_{ref}$ , $I_K=1mA\ to\ 100mA$ , $f\leq 1KHz$		0.2	0.5	Ω

## Parameter measurement information

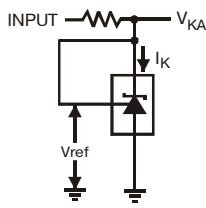


FIGURE 1. TEST CIRCUIT FOR  $V_{KA} \approx V_{ref}$

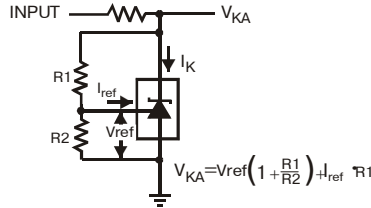


FIGURE 2. TEST CIRCUIT FOR  $V_{KA} > V_{ref}$

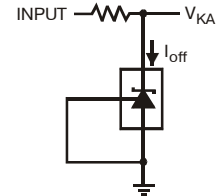


FIGURE 3. TEST CIRCUIT FOR  $I_{off}$

## Typical characteristics

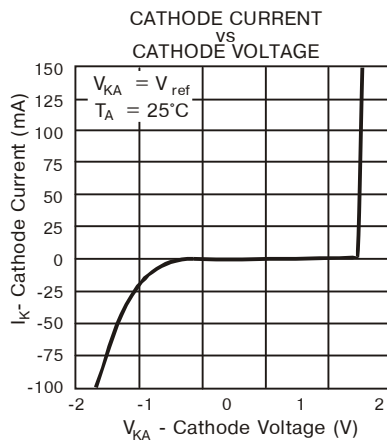


FIGURE 1

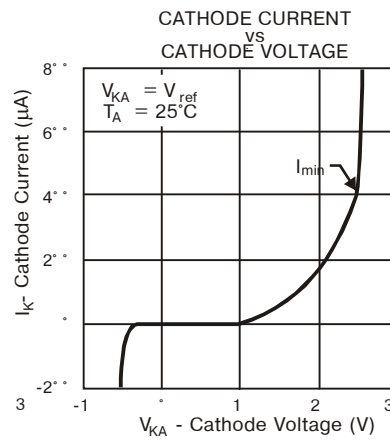


FIGURE 2

## Typical applications

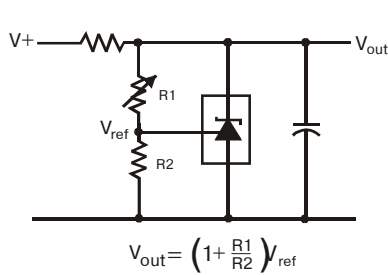


FIGURE 1. SHUNT REGULATOR

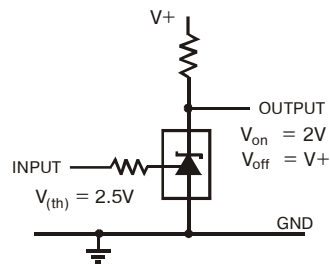
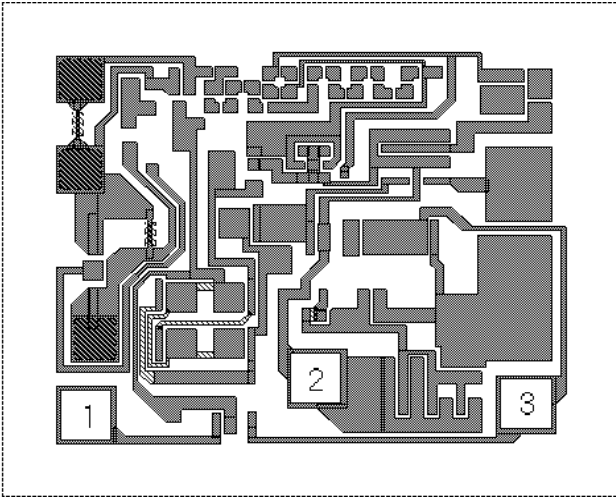


FIGURE 2. SINGLE-SUPPLY COMPARATOR WITH TEMPERATURE-COMPENSATED THRESHOLD

## Pad Location MIK431



Chip size: 1.03 x 0.85 mm

### Pad Location Coordinates

N	Pad Name	Coordinates ( $\mu\text{m}$ )	
		X	Y
1	Reference	159	158
2	Anode	524	203
3	Cathode	872	158