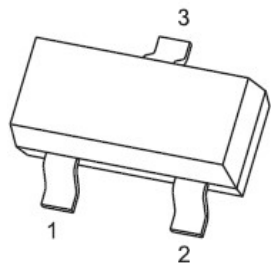


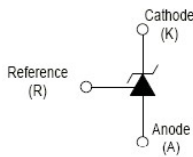
**SOT-23**

**SOT-23 Adjustable Accurate Reference Source**



- 1. REFERENCE
- 2. CATHODE
- 3. ANODE

**Equivalent Circuit**



**MARKING: 431**

**DEVICE DESCRIPTION**

The TL431 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.

**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

**Mechanical Data**

- 封装: SOT-23 封装 SOT-23 Small Outline Plastic Package.
- 环氧树脂 UL 易燃等级 Epoxy UL: 94V-0.
- 安装位置: 任意 Mounting Position: Any.

极限值和温度特性(TA = 25°C 除非另有规定)

**Maximum Ratings & Thermal Characteristics** (Ratings at 25°C ambient temperature unless otherwise specified.)

参数 Parameters	符号 Symbol	数值 Value	单位 Unit
Cathode Voltage	V <sub>KA</sub>	36	V
Cathode Current Range(Continuous)	I <sub>KA</sub>	-100~+150	mA
Reference Input Current Range	I <sub>ref</sub>	0.05~+10	mA
Power Dissipation	P <sub>D</sub>	300	mW
Junction Temperature	T <sub>j</sub>	150	°C
Operating Temperature	T <sub>opr</sub>	-25-+85	°C
Thermal Resistance From Junction to Ambient	R <sub>θJA</sub>	417	°C/W

电特性 (TA = 25°C 除非另有规定)

**Electrical Characteristics** (Ratings at 25°C ambient temperature unless otherwise specified).

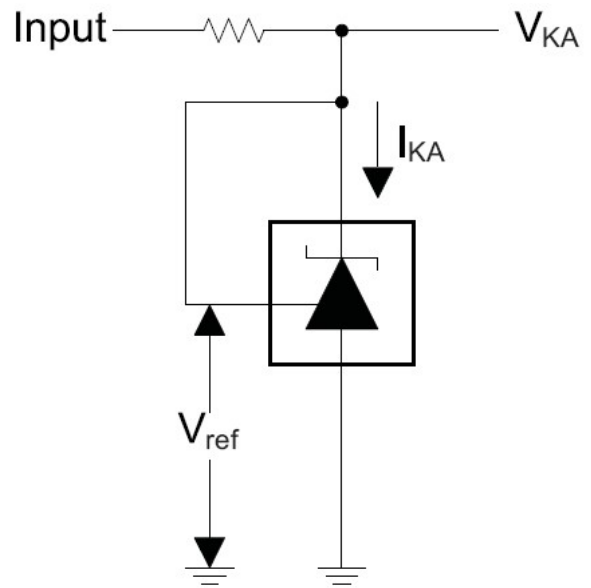
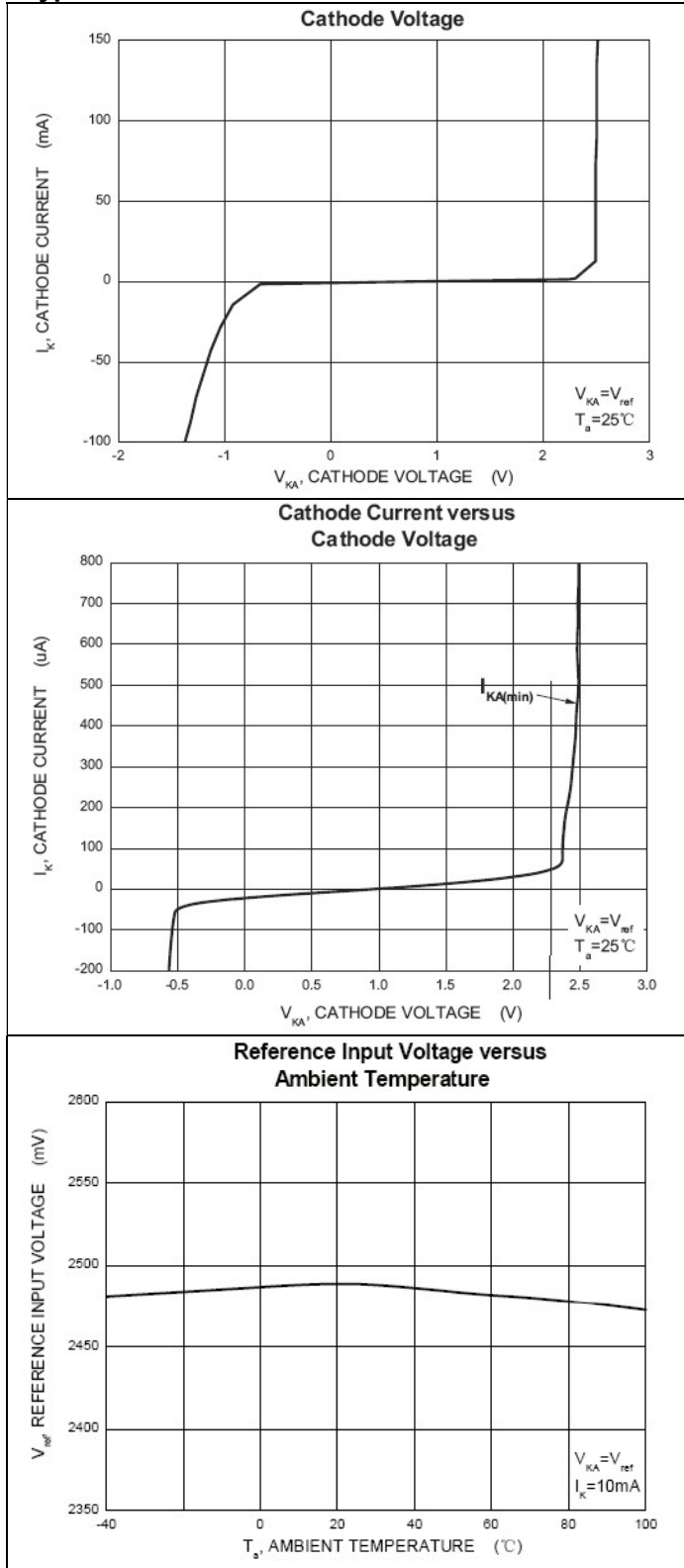
参数 Parameter	符号 Symbols	测试条件 Test Condition	界限 Limits			单位 Unit
			Min	Typ	Max	
Reference input Voltage	V <sub>ref</sub>	V <sub>KA</sub> = V <sub>REF</sub> V, I <sub>KA</sub> = 10mA	2.475	2.5	2.525	V
Deviation of reference input voltage over temperature(note)	$\Delta V_{ref}/\Delta T$	V <sub>KA</sub> = 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	$\Delta V_{ref}/\Delta V_{KA}$	I <sub>KA</sub> = 10mA		-1.0	-2.7	mV/v
				-0.5	-2.0	mV/v
Reference input current	I <sub>ref</sub>	I <sub>KA</sub> = 10mA, R <sub>1</sub> = 10KΩ, R <sub>2</sub> = ∞		1.5	4	uA
Deviation of reference input current over full temperature	$\Delta I_{ref}/\Delta T$	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	uA
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	uA
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.

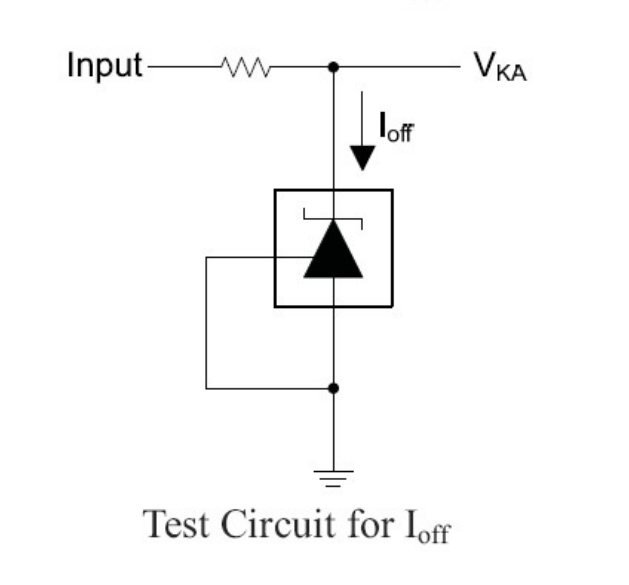
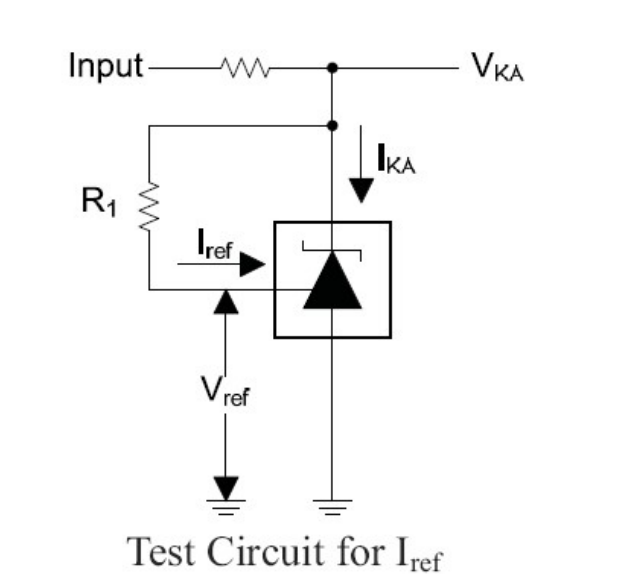
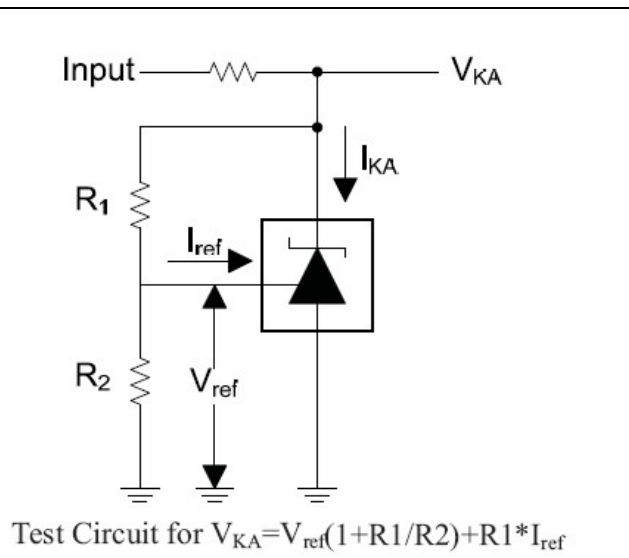
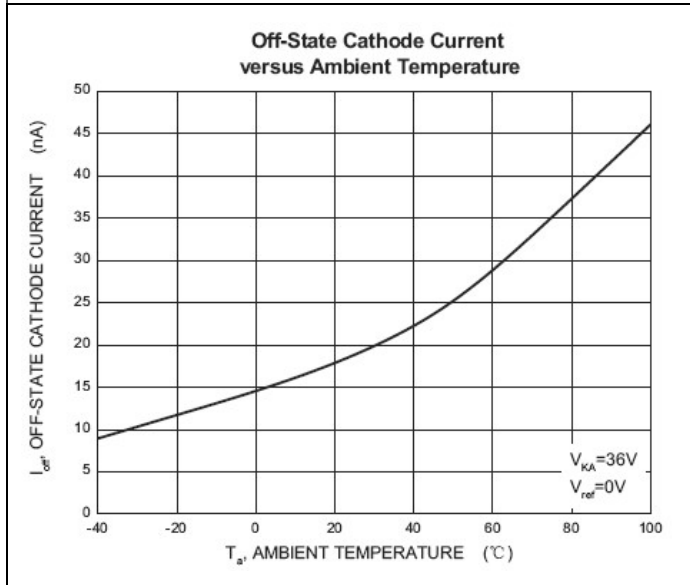
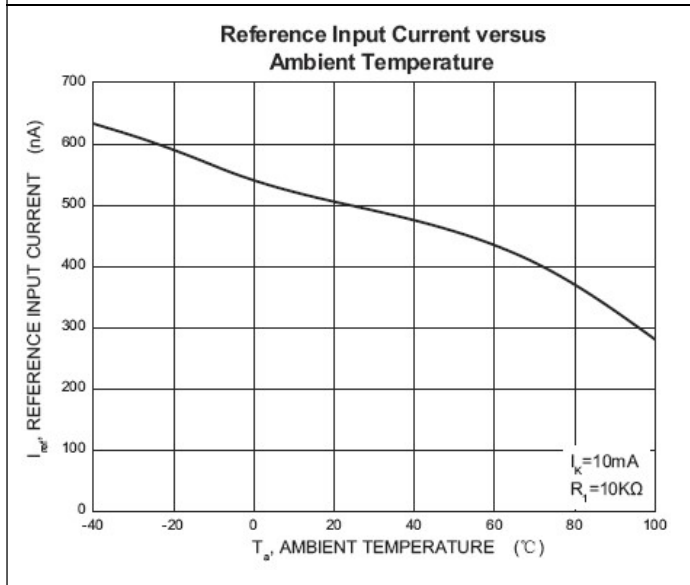
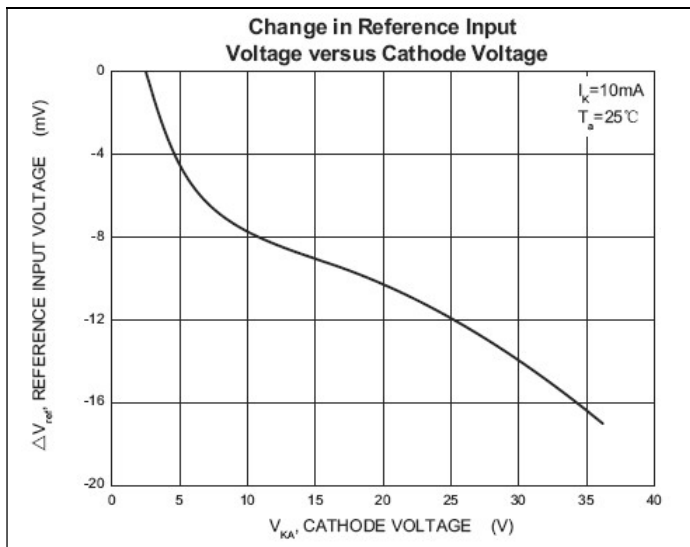
CLASSIFICATION of V<sub>ref</sub>

Rank	0.5%	1%
Rank	2.487-2.513	2.475-2.525

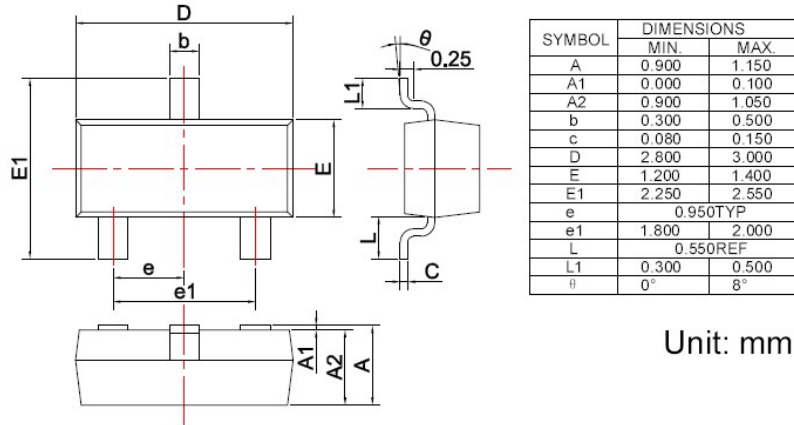
Typical characteristics



Test Circuit for  $V_{KA} = V_{ref}$

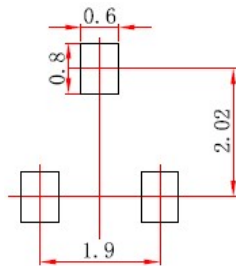


**SOT-23 PACKAGE OUTLINE** Plastic surface mounted package



焊盘设计参考 Precautions: PCB Design

Recommended land dimensions for SOT-23 diode. Electrode patterns for PCBs



- Note:
1. Controlling dimension: In millimeters.
  2. General tolerance: ±0.05mm.
  3. The pad layout is for reference purposes only.