

## 1. DESCRIPTION

The XB431-TL is a three terminal adjustable shunt regulator offering excellent temperature stability and output current handling capability up to 100mA. The output voltage may be set to any chosen voltage between 2.5 and 36 volts by selection of two external divider resistors. It can be used as a replacement for zener diodes in many applications requiring an improvement in zener performance. Xinluda' XB431-TL has the same electrical specifications as the industry standard '431 and initial tolerances is 0.5%.

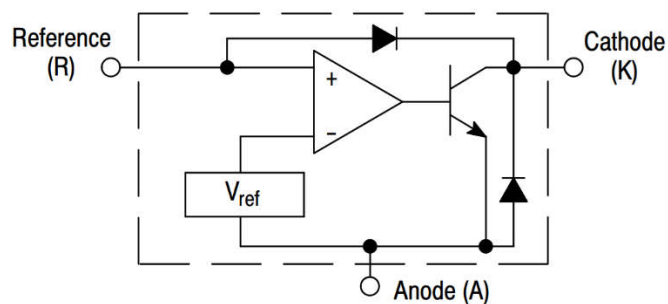
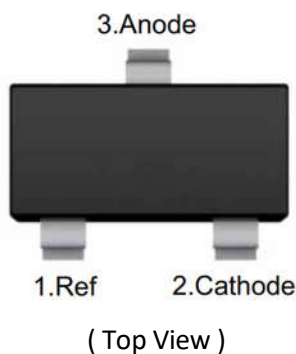
## 2. FEATURES

- Wide programmable precision output voltage from VREF to 36V
- Sink current capability from 1mA to 100mA
- Reference Voltage Tolerance at 25°C  
XB431-TL:  $2.495V \pm 0.5\%$
- Low output noise
- Low output impedance, its typical value is  $0.2\Omega$
- Operating Range of 0 to 70°C

## 3. Application

- Adjustable voltage and current references
- Voltage monitoring
- Improved zener
- Comparator with integrated reference

## 4. PIN CONFIGURATIONS AND BLOCK DIAGRAM



**Pin Functions**

PIN	NAME	TYPE	DESCRIPTION
1	Ref	I	REF Input Pin. Threshold Related to the voltage of anode Pin
2	Cathode	I/O	Cathode Pin. Voltage input and shunts current
3	Anode	O	Anode Pin. Connect to GND directly

**5. ABSOLUTE MAXIMUM RATINGS** (Operating temperature range applies unless otherwise specified)

Parameter	Symbol	Value	Unit
Cathode Voltage	$V_{KA}$	37	V
Cathode Current Range (Continuous)	$I_{KA}$	-100 - +150	mA
Reference Input Current Range	$I_{ref}$	0.05 - 10	mA
Power Dissipation	$P_D$	300	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	420	°C/W
Operating Ambient Temperature	$T_{opr}$	-20 ~ 80	°C
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-40~+150	°C

※ Note:

Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

**RECOMMENDED OPERATING CONDITIONS**

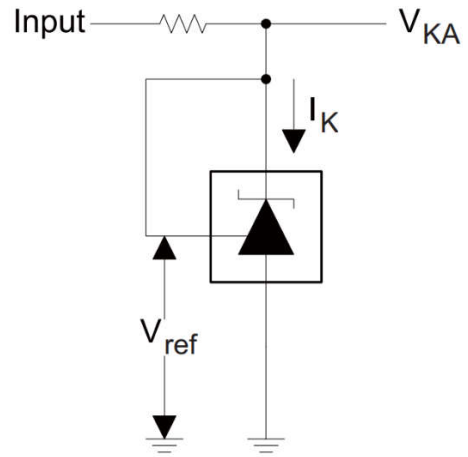
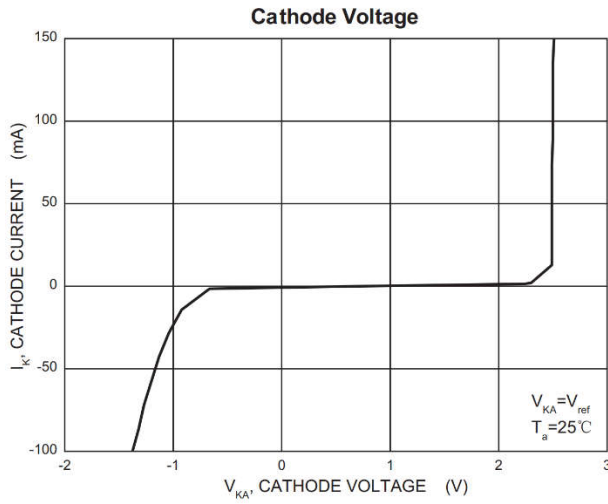
Parameter	Symbol	Value	Unit
Cathode Voltage	$V_{KA}$	36	V
Cathode Current Range (Continuous)	$I_{KA}$	1mA to 100mA	mA
Operating Ambient Temperature Range	$T_{opr}$	0 ~ 70	°C

**6. ELECTRICAL CHARACTERISTICS** ( $T_a=25\text{ °C}$  unless otherwise specified)

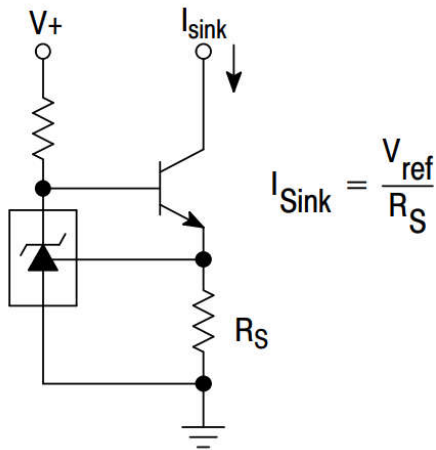
Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Reference input voltage	$V_{ref}$	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$	2.483	2.495	2.507	V
Deviation of reference input voltage over temperature (note)	$\Delta V_{ref} / \Delta T$	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$ $T_{MIN} \leq T_a \leq T_{MAX}$		4.5	17	mV
Ratio of change in reference input voltage to the change in cathode voltage	$\Delta V_{ref} / \Delta V_{KA}$	$I_{KA}=10\text{mA}$	$\Delta V_{KA}$ =10V~ $V_{REF}$	-1.1	-2.9	mV/V
			$\Delta V_{KA}$ =36V~10V	-0.6	-2.2	mV/V
Reference input current	$I_{ref}$	$I_{KA}=10\text{mA}, R_1=10\text{k}\Omega$ $R_2=\infty$		1.6	5	$\mu\text{A}$
Deviation of reference input current over full temperature range	$\Delta I_{ref} / \Delta T$	$I_{KA}=10\text{mA}, R_1=10\text{k}\Omega$ $R_2=\infty$ $T_A=0\text{ °C to }70\text{ °C}$		0.5	1.3	$\mu\text{A}$
Minimum cathode current for regulation	$I_{KA}(\text{min})$	$V_{KA}=V_{REF}$		0.45	1.0	mA
Off-state cathode current	$I_{KA}(\text{OFF})$	$V_{KA}=36\text{V}, V_{REF}=0$		0.05	1.1	$\mu\text{A}$
Dynamic impedance	$Z_{KA}$	$V_{KA}=V_{REF}, I_{KA}=1\text{ to }100\text{mA}$ $f \leq 1.0\text{kHz}$		0.2	0.5	$\Omega$

※ Note:  $T_{MIN} = 0\text{ °C}, T_{MAX} = 70\text{ °C}$

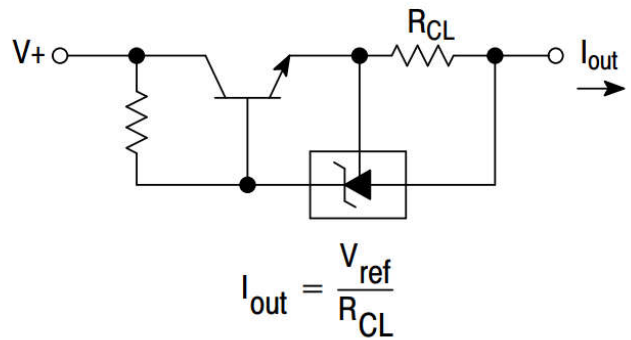
### 7. Typical Characteristics



### 8. Typical Application circuits

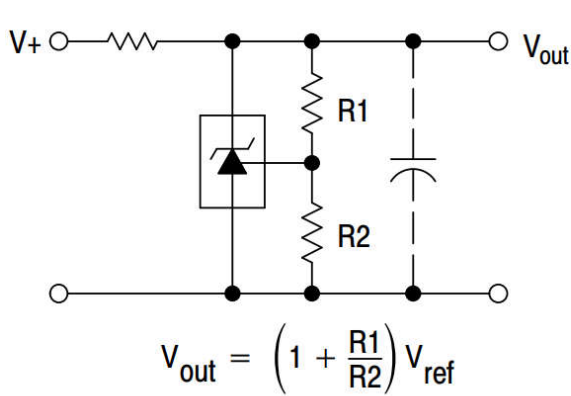


Circuit 1. Constant Current Sink

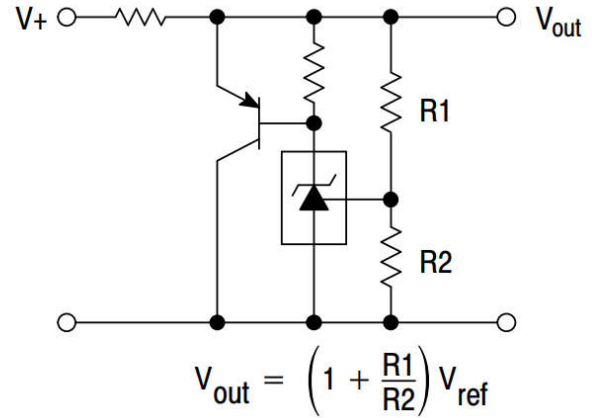


Circuit 2. Constant Current Source

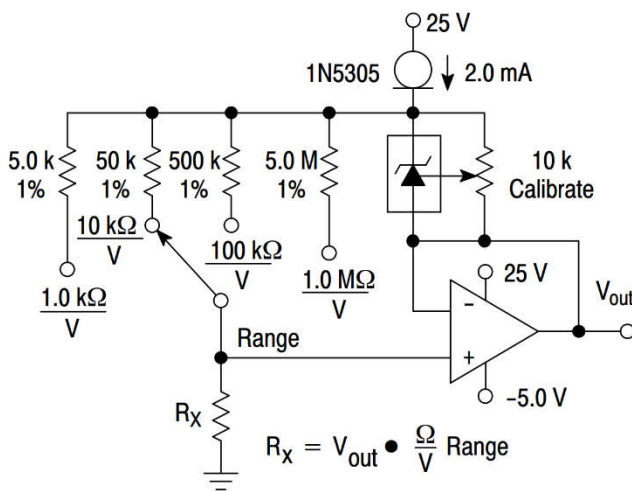
**Typical Application circuits ( continue )**



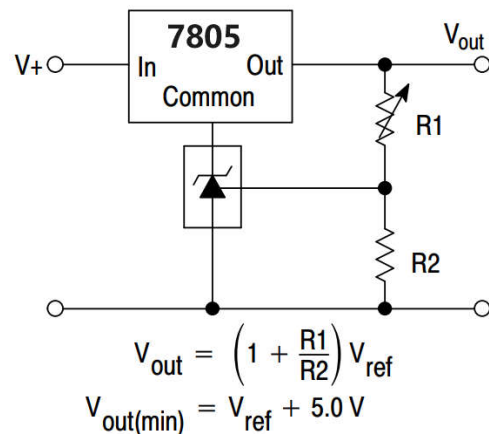
Circuit 3. General Shunt Regulator



Circuit 4. High Current Shunt Source



Circuit 5. Linear Ohmmeter



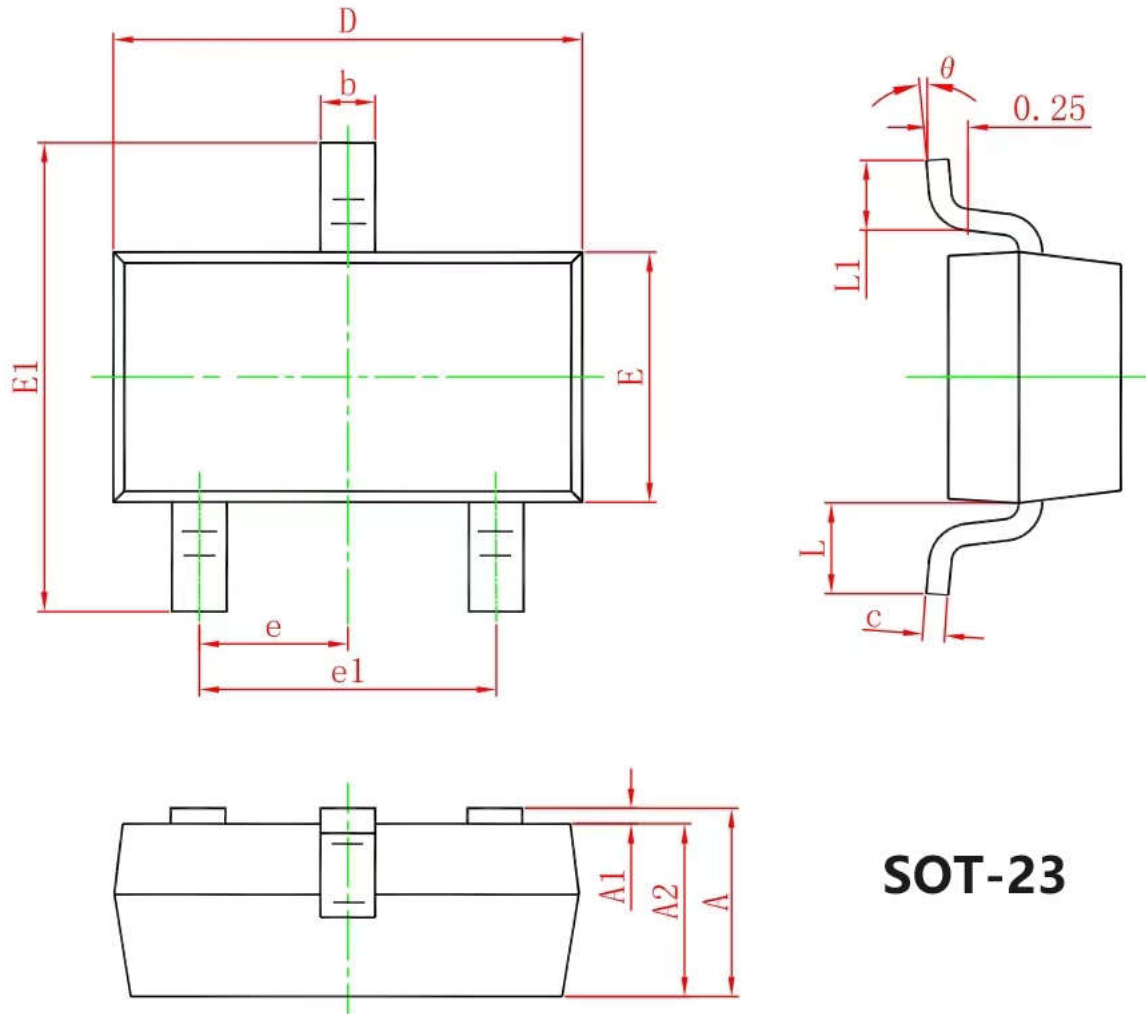
Circuit 6. Output Control for 7805 Regulator

**9. ORDERING INFORMATION**

**Ordering Information**

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XB431-TL	YAIS	SOT-23	3.00x1.40	0 to 70	MSL3	T&R	3000 pcs

**10. PACKAGE DIMENSIONAL**



**SOT-23**

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
$\theta$	0°	8°	0°	8°

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