ELM0431BA 2.5V Programable shunt regulator

■General description

ELM0431BA is three-terminal adjustable shunt regulator utilizing an accurate 2.5V band-gap reference. The output voltage can be set to any value between 2.5V (Vref) to 29V with two external resistors as shown in the typical application circuit. The device exhibit a wide operating current range of 0.4 to 100 mA with a typical dynamic impedance of 0.25Ω. The characteristics of these reference make it excellent replacements for zener diodes in many applications such as digital voltmeters, power supplies, and op amp circuitry. The 2.5V volt reference makes it convenient to obtain a stable reference from 5.0V logic supplies.

ELM0431BA shunt regulator is available in a SOT-23 package.

■Features

- Low cost solution
- Shunt capacity : 100mA
- Output voltage range(adj.) : Set up to 29V
- Output impedance : Typ.0.25Ω
- Trimmed band-gap design : 1%
- Package : SOT-23

■Application

- Linear regulator
- Precision voltage reference
- Switching power supplies
- Battery operating equipment
- Instrumentation

■Maximum absolute ratings

Parameter	Symbol	Limit	Unit
Cathode-Anode reverse breakdown voltage	Vka	30	V
Cathode –Anode current	Ika	100	mA
Reference input current	Iref	10	mA
Power dissipation	Pd	200	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-65 to +150	°C

■Selection guide

ELM0431BA-S

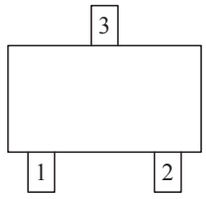
Symbol		
a	Package	B: SOT-23
b	Product version	A
c	Taping direction	S: Refer to PKG file

ELM0431 B A - S
↑ ↑ ↑
a b c

* Taping direction is one way.

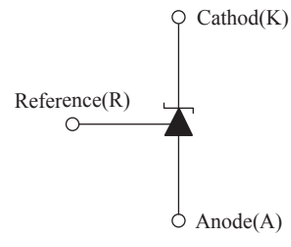
■Pin configuration

SOT-23(TOP VIEW)

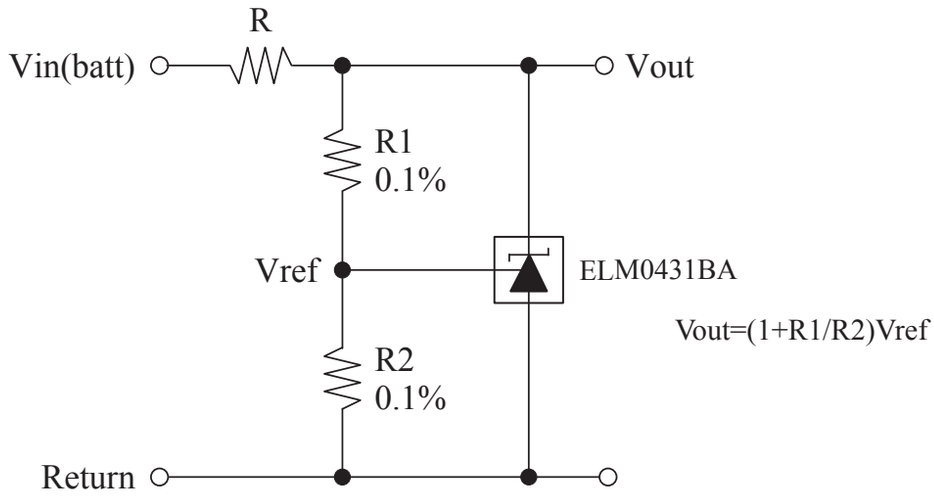


Pin No.	Pin name
1	REFERENCE
2	CATHODE
3	ANODE

■Circuit

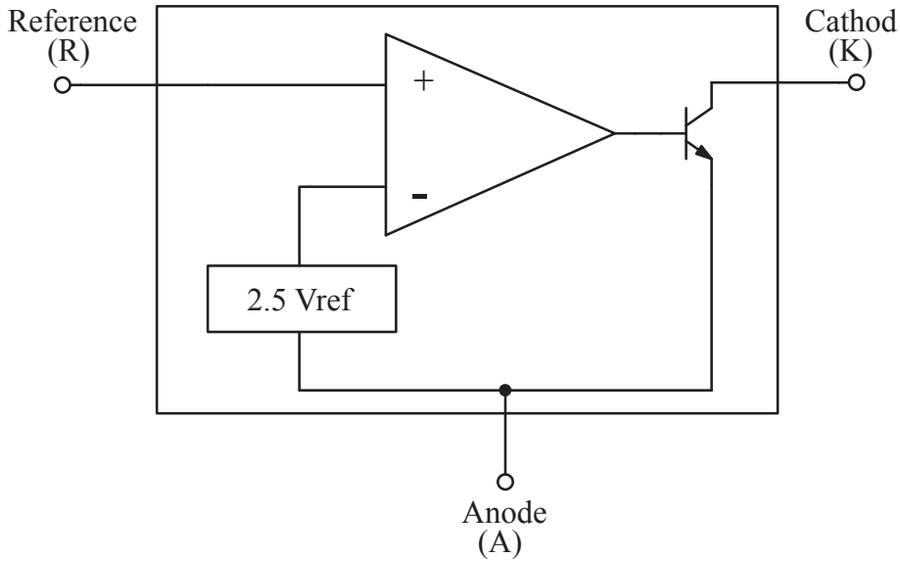


■Typical application



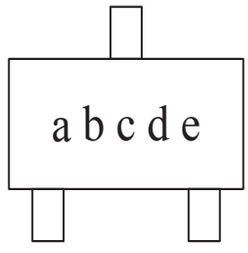
Shunt regulator

■Block diagram



■Marking

SOT-23



a to e : Assembly lot No. ——
A to Z (I, O, X excepted) and 0 to 9

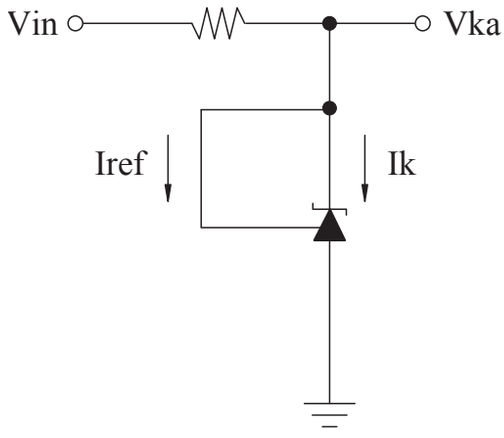
■Electrical characteristics

Vka=Vref, Ik=10mA, Top=25°C, unless otherwise stated

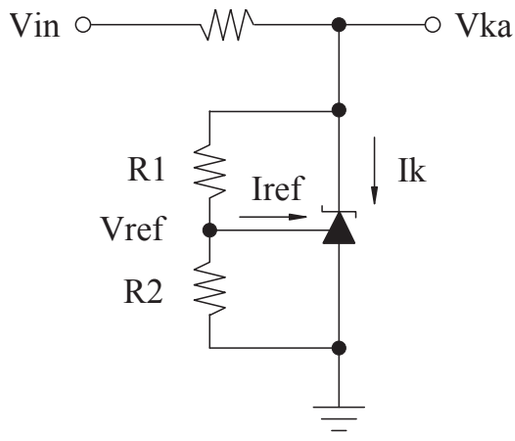
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Reference voltage	Vref		2.470	2.495	2.520	V	1
Reference voltage with temperature	ΔVref/ ΔTop			0.07	0.20	mV/°C	1
Ration of change in Vref to cathode voltage	Vref/ Vin	Vref to 10V	-2.7	-1.0		mV/V	2
		10V to 30V	-2.0	-0.4	0.3		
Reference input current	Iref			0.7	4.0	μA	2
Iref temperature deviation	ΔIref	Ta=-20 to 85°C		0.4	1.2	μA	2
Min. Ik for regulation	Ik(min)			0.4	1.0	mA	1
Stand-by current	Istandby	Vref=0V, Vka=30V		0.04	250	nA	3
Dynamic output impedance	Zout	f≤1kHz, Ik=1 to 100mA		0.25	0.50	Ω	1

Note : test circuit No.

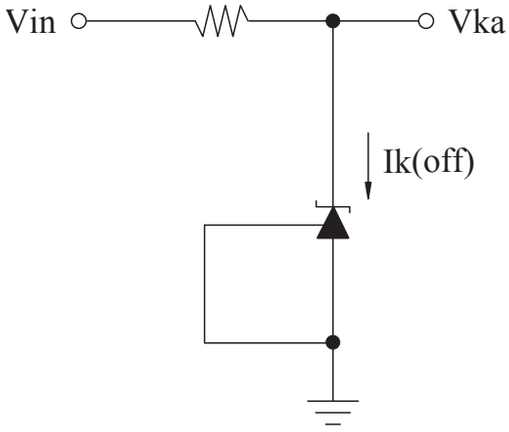
■Test circuits



Test circuit 1 : Vka=Vref



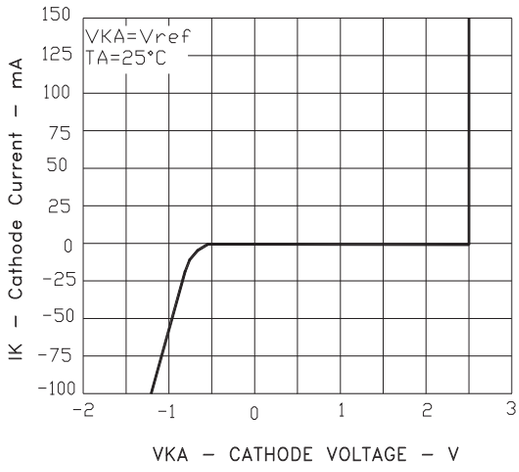
Test circuit 2 : Vka>Vref



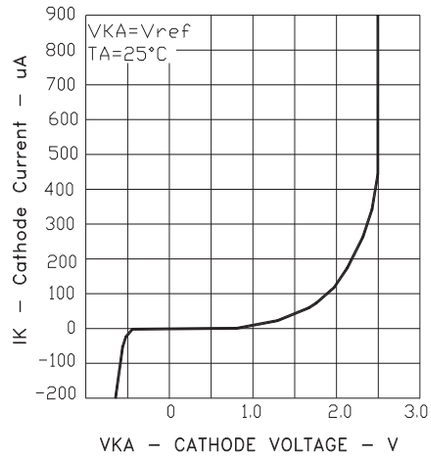
Test circuit 3 : Off state current

■Typical characteristics

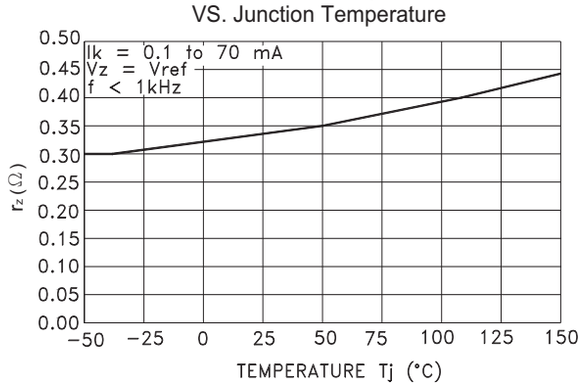
Cathode Current
VS. Cathode Voltage



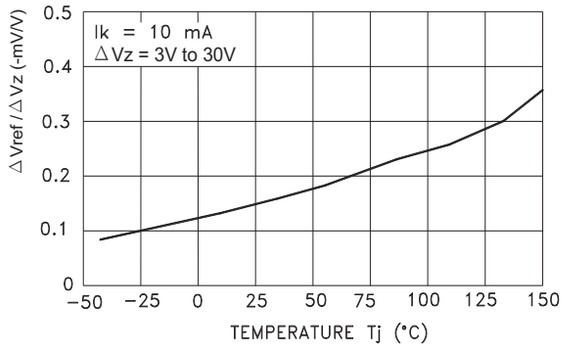
Cathode Current
VS. Cathode Voltage



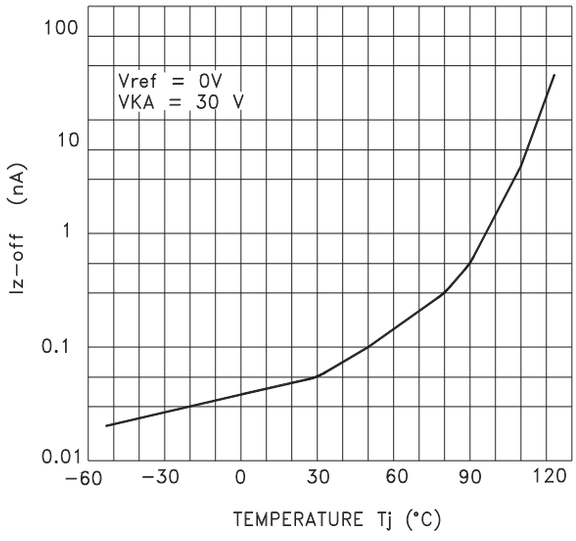
Reference Impedance
VS. Junction Temperature



Ratio of Delta Reference Voltage to Delta Cathode Voltage
VS. Junction Temperature



Off-State Cathode Current
VS. Junction Temperature



Reference Voltage
VS. Junction Temperature

