GS431

Adjustable Precision Shunt Regulators

Product Description

The GS431 is a three-terminal adjustable shunt regulator with specified thermal stability.

The output voltage may be set to any value between V_{REF} (approximately 2.5V) and 36V with two external resistors.

This device has a typical output impedance of 0.2Ω. Active output circuitry provides very sharp turn-on characteristics, making this device excellent replacement for Zener diodes in many applications.

GS431 is available in SOT-23 package.

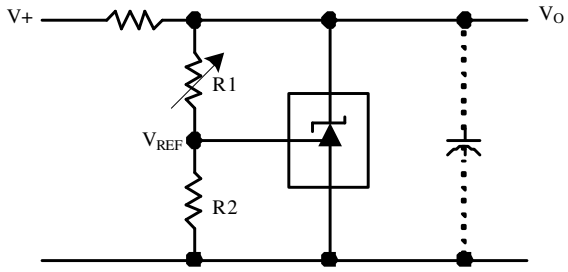
Features

- Equivalent Full Range Temperature Coefficient 30ppm/ºC
- Temperature-Compensated for Operation over Full Rated Operating Temperature Range.
- Sink Current Capability 1mA to 100mA
- Adjustable Output Voltage
- Low (0.2Ω Typ.) Dynamic Output Impedance
- Low Output Noise
- Fast Turn-on Response
- RoHS Compliant, 100%Pb & Halogen Free

Applications

- Battery Operated Computer
- Switching Power Supplies
- Adjustable Power Supplies
- Linear Regulators
- Instrumentation
- Computer Disk Drivers

Block Diagram & Symbol



$$V_O = (1+R1/R2)V_{REF}$$

Figure 1. Shunt Regulator

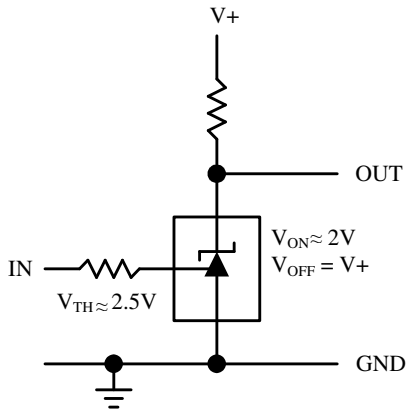
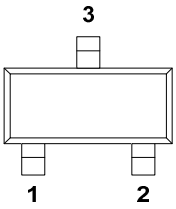
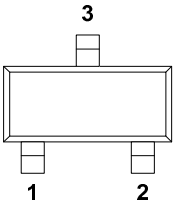
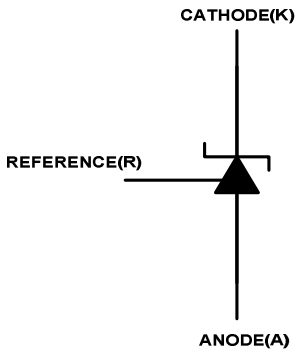


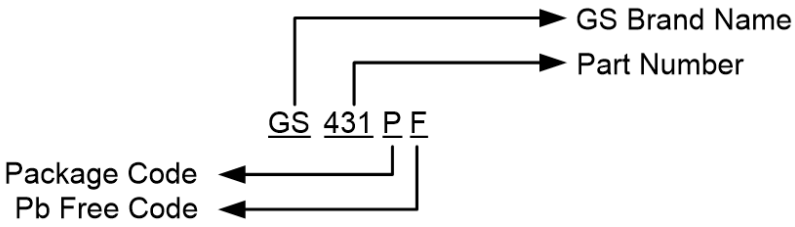
Figure 2. Single Supply Comparator with Temperature Compensated Threshold

Packages & Pin Assignments

GS431JZ (SOT-23)		GS431JW (SOT-23)	
			
1	REF	**1**	CATHODE
2	CATHODE	**2**	REF
3	ANODE	**3**	ANODE

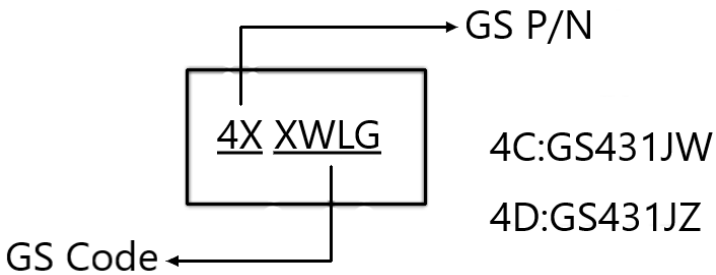


Ordering Information



Device	Package	Quantity
GS431JWF	SOT-23	3000PCS
GS431JZF	SOT-23	3000PCS

Marking Information



Absolute Maximum Ratings

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

Symbol	Parameter	Rating		Unit
V_{KA}	Cathode Voltage (**Note 1**)	36		V
I_K	Continuous Cathode Current Range	-10 to +150		mA
I_{REF}	Reference Current Range	-50μA to 10mA		mA
θ_{JA}	Thermal Resistance Junction To Ambient	SOT-23	330	ºC/W
P_D	Power Dissipation	SOT-23	0.23	W
T_{OPR}	Operating Temperature Range	-40 to 125		ºC
T_J	Junction Temperature	+150		ºC
T_{STG}	Storage Temperature Range	-65 to 150		ºC
T_{LEAD}	Lead Temperature Range(Soldering, 10sec)	260		ºC

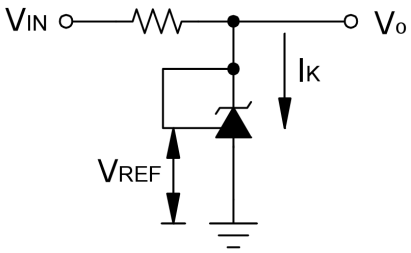
Note 1: Voltage values are with respect to the anode terminal unless otherwise noted.

Electrical Characteristics

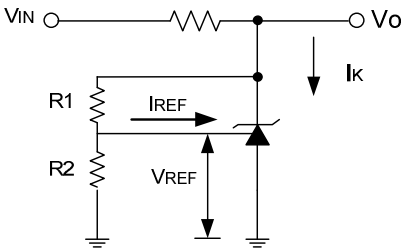
Electrical Characteristics at 25ºC free-air temperature (unless otherwise noted).

Symbol	Parameter	Conditions	GS431			Units
			Min	Typ	Max	
V_{REF}	Reference Voltage	$V_{KA}=V_{REF}$, I_K=10mA	2.487	2.500	2.513	V
V_{DEV}	Deviation of reference input voltage over full temperature range	$V_{KA}=V_{REF}$, I_K=10mA, T_A = Full range (Test circuit 1)		4.0	17	mV
$\frac{\triangle V_{REF}}{\triangle V_{KA}}$	Ratio of change in reference input voltage to the change in cathode voltage	I_K=10mA, $\triangle V_{KA}$=10V to V_{REF} $\triangle V_{KA}$=36V to 10V	-2.7 -2	-1.0 -0.4		mV/V
I_{REF}	Reference input current	I_K=10mA, R1=10KΩ, R2=∞ (Test circuit 2)		0.7	4.0	μA
I_{REF} (DEV)	Deviation of reference input current over full temperature range	I_K=10mA, R1=10KΩ, R2=∞, T_A = Full range (Test circuit 2)		0.4	1.2	μA
I_K (min)	Minimum cathode current for regulation	V_{KA} = V_{REF} (Test circuit 1)		0.4	1.0	mA
I_K (off)	Off-state cathode current	V_{KA}=36V, V_{REF}=0		0.1	1.0	μA
$\lvert Z_{KA} \rvert$	Dynamic impedance	f < 1KHz, V_{KA} = V_{REF} I_K =1mA to 100mA		0.2	0.5	Ω

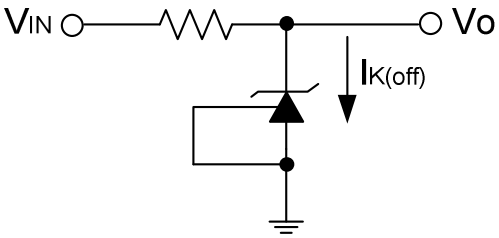
Test Circuits



Test Circuit 1.
$V_{KA}=V_{REF}$

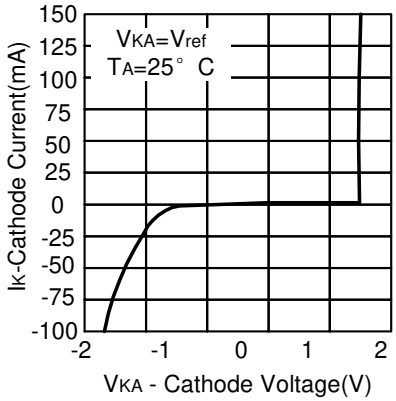


Test Circuit 2.
$V_{KA} > V_{REF}$

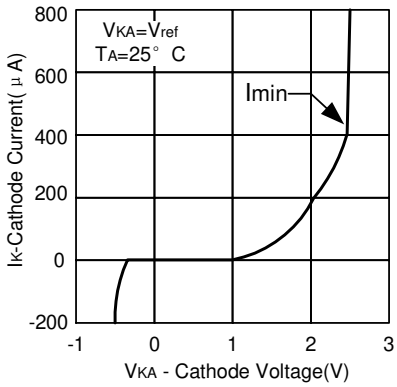


Test Circuit 3.
Off-State Current

Typical Performance Characteristics

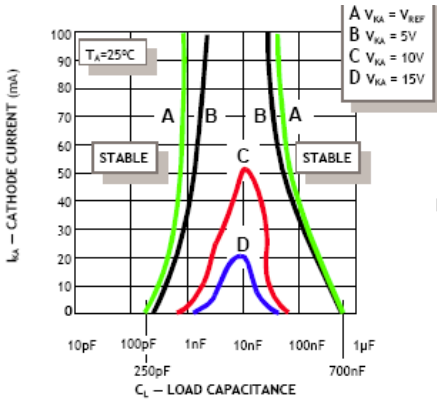


Cathode current vs. cathode voltage



Cathode current vs. cathode voltage

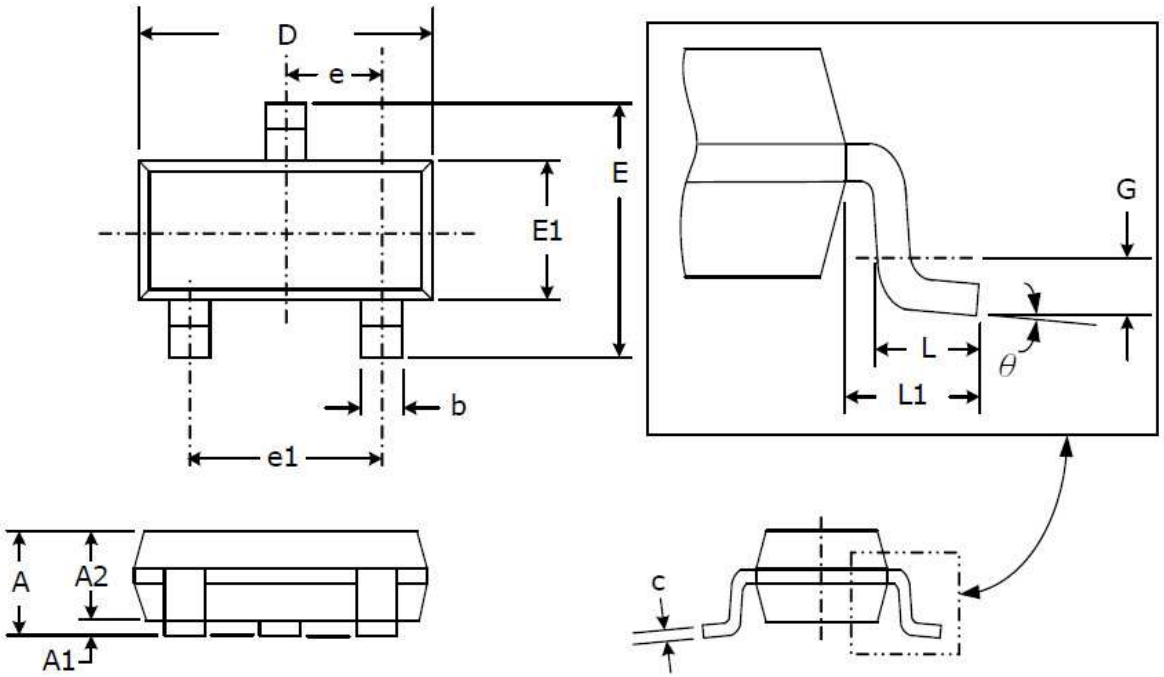
Stability Boundary Condition



***GS431 have not oscillation at Vka=15V and Vka=10V**

Package Dimension

SOT-23



Dimensions				
SYMBOL	Millimeters		Inches	
	MIN	MAX	MIN	MAX
A	0.75	1.17	0.030	0.046
A1	0.05	0.15	0.002	0.006
A2	0.70	1.02	0.028	0.040
b	0.30	0.50	0.012	0.020
c	0.08	0.20	0.003	0.008
D	2.80	3.04	0.110	0.120
E	2.10	2.64	0.083	0.104
E1	1.20	1.40	0.047	0.055
e	0.95 (TYP)		0.037 (TYP)	
e1	1.90 (TYP)		0.075 (TYP)	
L	0.40	0.60	0.016	0.024
L1	0.54 (TYP)		0.021 (TYP)	
G	0.25 (TYP)		0.010 (TYP)	
θ	0º	8º	0º	8º

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