ADJUSTABLE PRECISION SHUNT REGULATORS

General Description

The ET431 is a three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges.

The output voltage may be set to any value between Vref (approximately 2.5 volts) and 36 volts with two external resistors. The devices have a typical dynamic output impedance of 0.2 . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

The ET431 is characterized for operation from 0 ℃to +70℃

The ET431 precision reference is offered in three bandgap tolerance: 0.5% ,1%and 2%.

Features

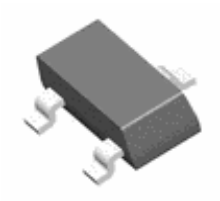
- Programmable Output Voltage to 36V
- Low Dynamic Output Impedance 0.2W
- Sink Current Capability of 0.1 mA to 100 mA
- Equivalent Full-Range TemperatureCoefficient of 50 ppm/℃
- Temperature Compensated for Operation over Full Rated
- Operating Temperature Range Low Output Noise
- Fast Turn on

Applications

- Charger
- Voltage Adapter
- Switching Power Supply
- Graphic Card
- Precision Voltage Reference

Package

TO-92

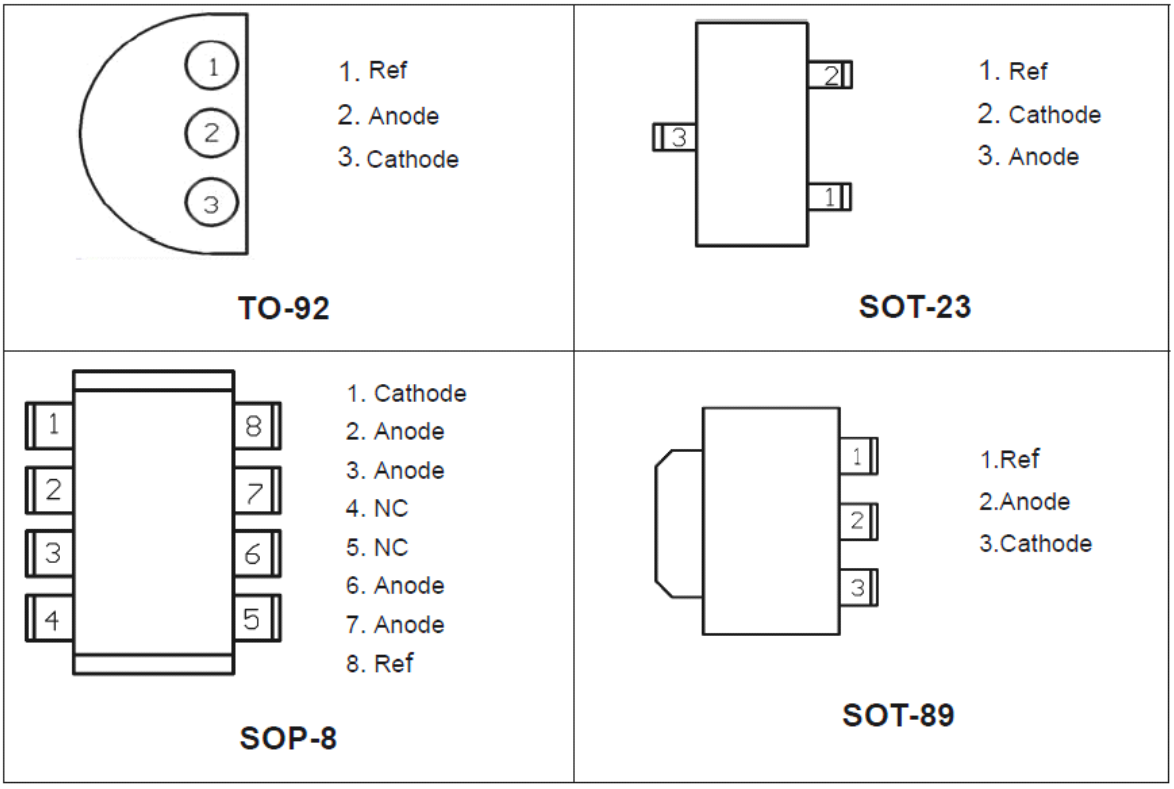


SOT-23

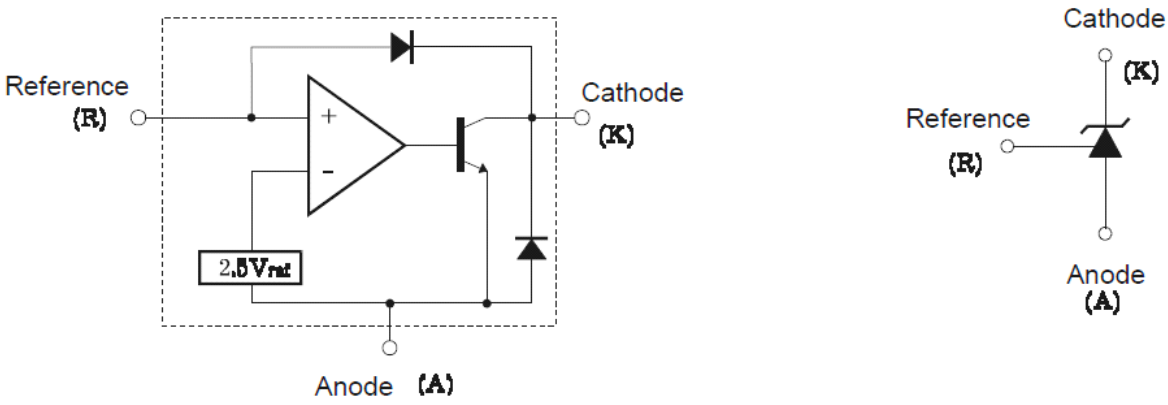
SOP-8

SOT-89

Pin Configuration



Functional Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Cathode Voltage	VKA	36	V
Cathode Current Range	IKA	150	mA
Reference Input Current	IREF	10	mA
Power Dissipation	PD	0.7(TO-92)	W
		0.2(SOT-23)	W
Junction Temperature	TJ	0 ~ 150	℃
Storage Temperature Range	TSTG	-65 ~ +150	℃

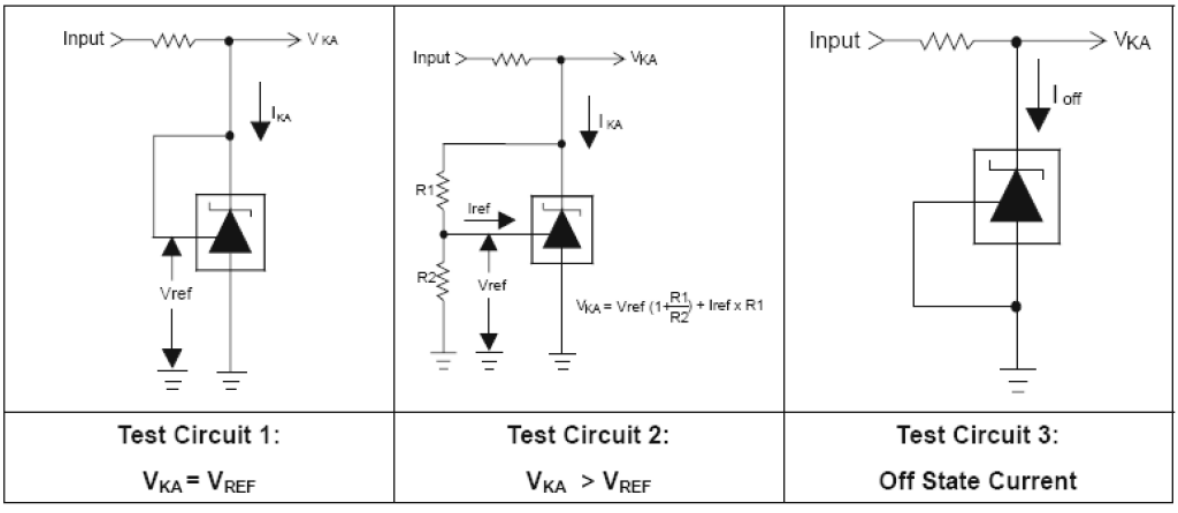
Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Cathode Voltage	VKA	Vref	36	V
Cathode Current	IKA	1.0	100	mA

Electrical Characteristics

Parameter		Symbol	Test Circuit	Test Conditions	Min	Typ	Max	Unit
Reference Voltage	0.5%	VREF	1	VKA=VREF,IKA=10mA	2483	2495	2507	mV
	1%				2470	2495	2520	
	2%				2445	2495	2545	
Deviation of reference voltage over full temperature range		VI(DEV)	1	VKA=VREF,IKA=10mA TA=0°C to 105°C	–	3	17	mV
Ratio of change in reference voltage to the change in cathode volage		$\frac{\phi VREF}{\phi VKA}$	2	IKA=10mA, ϕ VKA=10V- VREF	–	-1.4	-2.7	MV/V
Reference current		IREF	2	IKA=10mA, R1=10KΩ, R2=∞,	–	1.8	4	uA
Deviation of Reference current over full temperature range		II(DEV)	2	IKA=10mA, R1=10KΩ, R2=∞, TA=0°C to 105°C	--	0.4	1.2	uA
Minimum cathode current for regulation		IMIN	1	VKA=VREF	--	0.2	1	mA
Off-state cathode current		IOFF	3	VKA=36V, VREF=0	--	0.26	1	uA
Dynamic impedance		ZKA	1	IKA=1mA to 100mA, VKA=VREF, f ≤ 1KHz	--	0.22	0.5	Ω

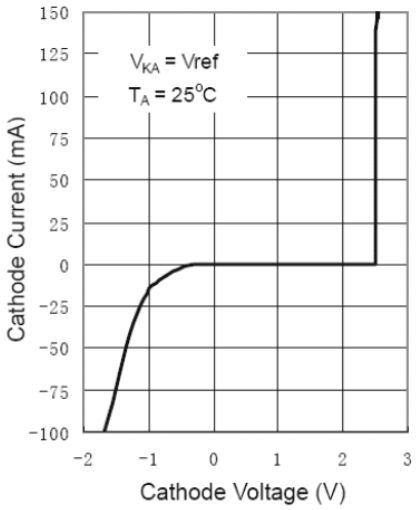
Test Circuit



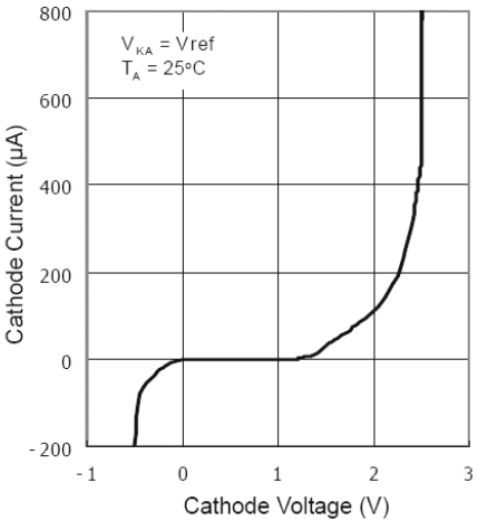
Test Circuit 1:	Test Circuit 2:	Test Circuit 3:
$V_{KA} = V_{REF}$	$V_{KA} > V_{REF}$	Off State Current

Typical Performance Characteristics

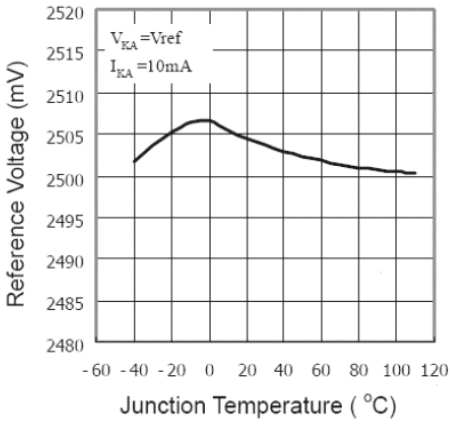
CATHODE CURRENT
Vs.
CATHODE VOLTAGE



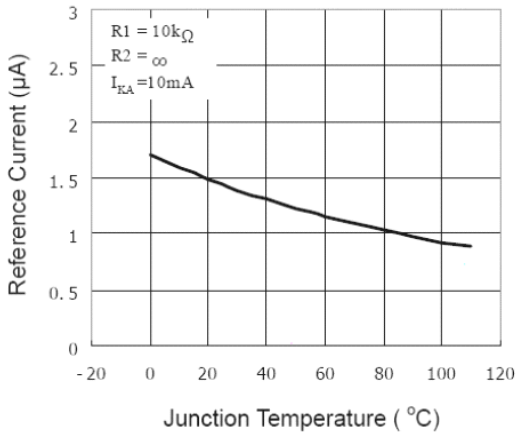
CATHODE CURRENT
Vs.
CATHODE VOLTAGE



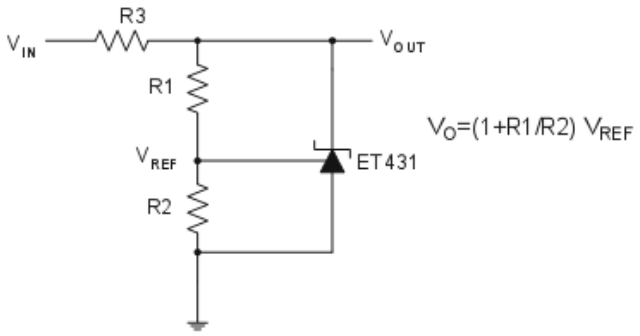
REFERENCE VOLTAGE
Vs.
JUNCTION TEMPERATURE



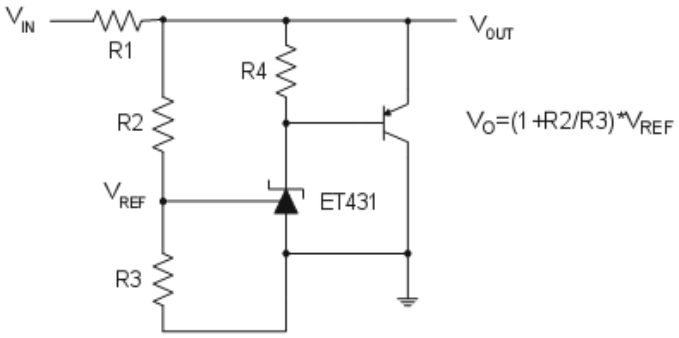
REFERENCE INPUT CURRENT
Vs.
JUNCTION TEMPERATURE



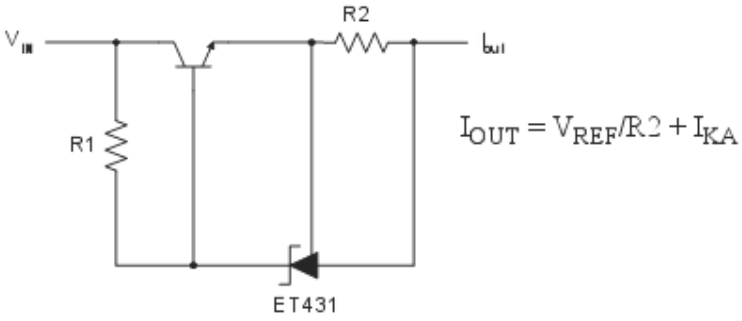
Typical Applications



Shunt Regulator



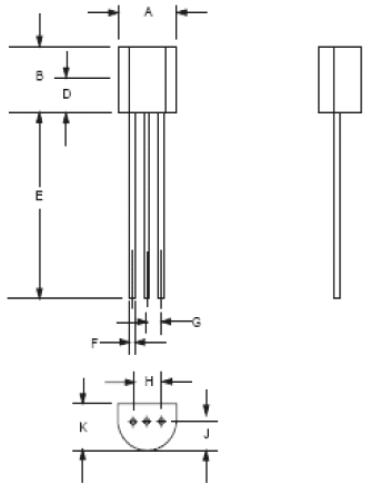
High Current Shunt Regulator



Current Source or Current Limit

Mechanical Dimensions

TO-92



DIMENSIONS				
DIM[N]	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.445	5.207
B	0.170	0.210	4.318	5.334
E	0.500	0.610	12.70	15.50
F	0.016	0.021	0.407	0.533
G	0.045	0.055	1.143	1.397
H	0.095	0.105	2.413	2.667
J	0.080	0.105	2.032	2.667
K	0.125	0.165	3.175	4.191

Ordering Information

Ordering Number	Package	Marking	Package Type
TL431	TO-92	ET TL431 YYY	Bulk
	SOT-23	431	Reel