ADJUSTABLE PRECISION ZENER SHUNT REGULATOR

TA 431

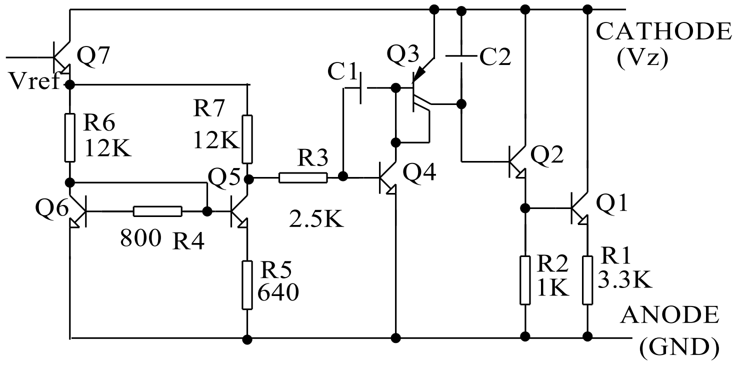
DESCRIPTION

The TA431 is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{REF} (approximately 2.5V) and 36V with two external resistors. This device has typical dynamic output impedance of 0.2Ω. Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

FEATURE

- Programmable output voltage to 36V
- Low dynamic output impedance 0.2Ωtypical
- Sink current capability of 1.0mA to 100mA
- Equivalent full-range temperature coefficient of 500ppm/□ typical
- Temperature compensated for operation over full rated operating temperature range
- Low output noise voltage
- Fast turn on response

EQUIVALENT CIRCUIT



ABSOLUTE MAXIMUM RATINGS

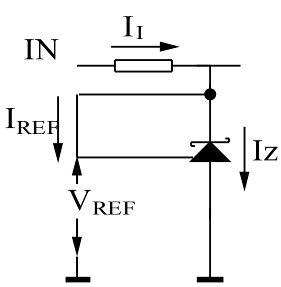
Operating temperature range applies unless otherwise specified.)

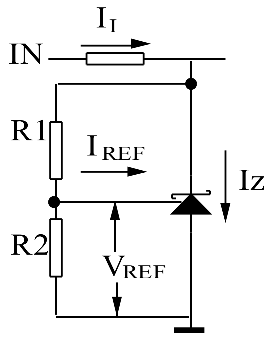
Characteristic	Symbol	Value	Unit
Cathode Voltage	Vka	37	V
Cathode Current Range (continuous)	Ika	-10~+150	mA
Reference Input Current Range	IREF	10	mA
Power Dissipation	PD	770	mW
Operating Temperature Range	Topr	0~+70	□
Store temperature Range	Tstg	-65~+150	□

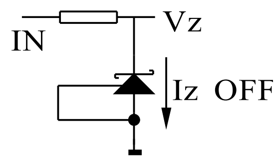
ELECTRICAL CHARACTERISTICS (Ta=25□ unless otherwise specified)

Parameter	Conditions		Symbol	Min	Typ	Max	Unit
Reference Voltage	Vz=VREF Ii=10mA	0.5%	VREF	2.485	2.5	2.51	V
		1.0%		2.470	2.495	2.52	
		2.0%		2.440	2.495	2.55	
Deviation of Reference Input Voltage Over Temperature	Vz=VREF, Ii=10mA		Vdev	-	8.0	17	mV
Ratio of the Change in Reference Voltage to the Change in Cathode Voltage	Iz=10mA	Vz=VREF~10V	ΔVREF/ ΔVz	-	-1.4	-2.7	mV/V
		Vz=10~36V		-	-1.0	-2.0	
Reference Input Current	R1=10kΩ,R2=∞ I1=10mA		IREF	-	2.0	4.0	μA
Deviation of Reference Input Current Over Temperature	R1=10kΩ,R2=∞I1=10mA		ΔIREF/ ΔT	-	0.4	1.2	μA
Minimum Cathode Current for Regulation	Vz=VREF		Iz(min)	-	0.4	1.0	mA
Off-State Current	Vz=36V,VREF=0V		Iz(off)	-	0.3	1.0	μA
Dynamic Output Impedance	Vz=VREF, Iz=1 to 100mA,f<1.0kHz		Rz	-	0.15	0.5	Ω

TEST CIRCUIT



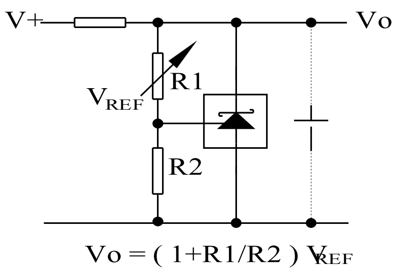


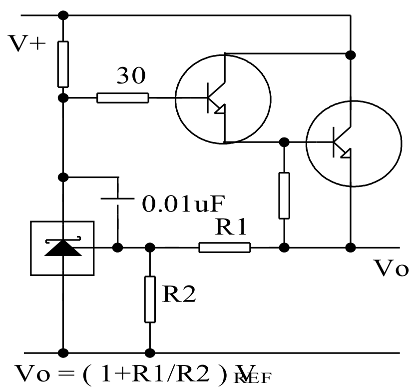


Note: $V_Z = V_{REF}(1+R1/R2)+I_{REF}*R1$

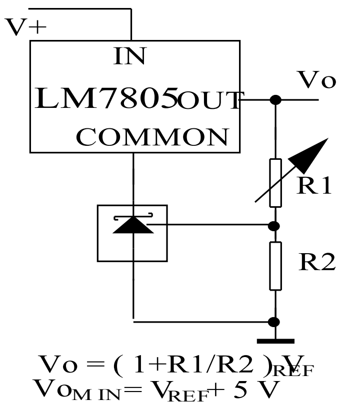
1.Test circuit for $V_Z=V_{REF}$ 2.Test circuit for $V_Z>V_{REF}$ 3.Test circuit for off-state current

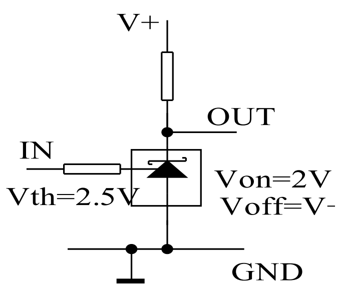
APPLICATION CIRCUIT





1. Shunt Regulator 2. Series Regulator



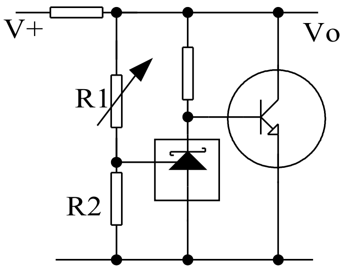


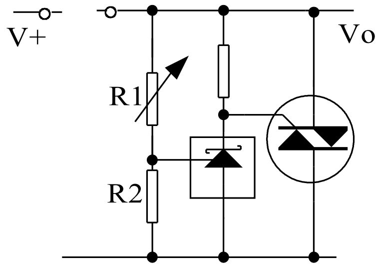
3.Output Control of a Three Terminal Fixed Regulator

4.Single Supply Comparator with Temperature Compensated Threshold

5.Higher Current Shunt Regulator

6.Crow Bar

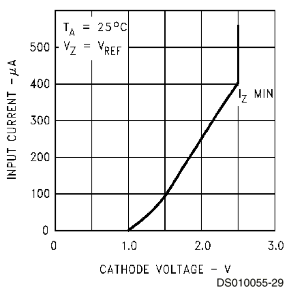




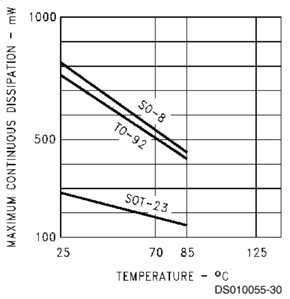
Vo=(1+R1/R2)*VREF Vlimit=(1+R1/R2)*VREF

CHARACTERISTIC CURVES

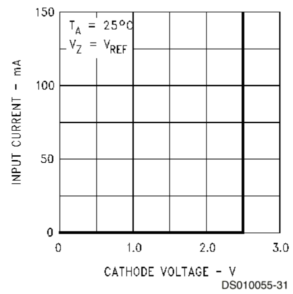
Input Current vs V_Z



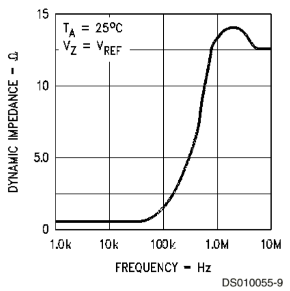
Thermal Information

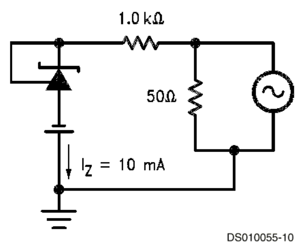


Input Current vs V_Z

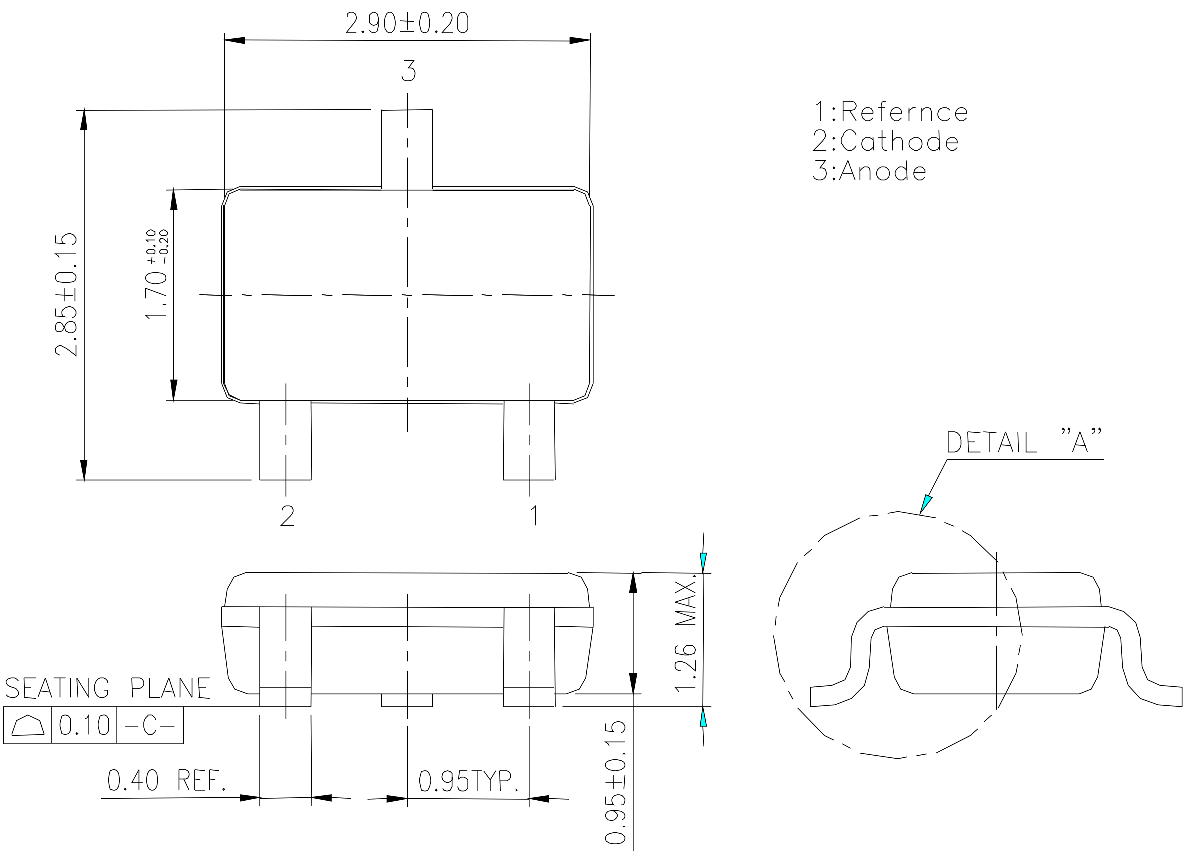


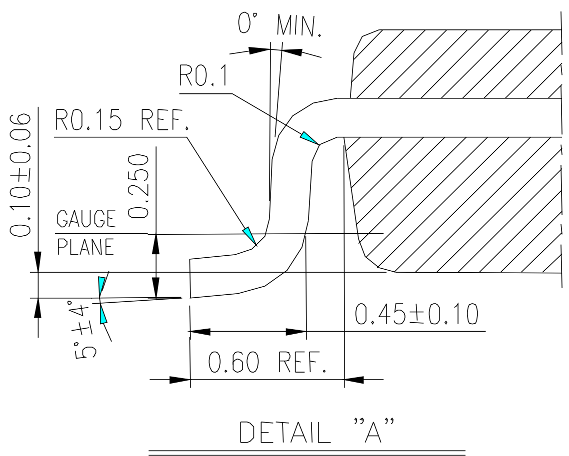
Dynamic Impedance vs Frequency





Outline Drawing


2.90±0.20
3
1:Refernce
2:Cathode
3:Anode
2.85±0.15
1.70 +0.10 -0.20
2
1
DETAIL "A"
SEATING PLANE
0.10
-C-
1.26 MAX.
0.40 REF.
0.95TYP.
0.95±0.15


0° MIN.
R0.1
R0.15 REF.
0.10±0.06
0.250
GAUGE
PLANE
5°±4°
0.45±0.10
0.60 REF.
DETAIL "A"