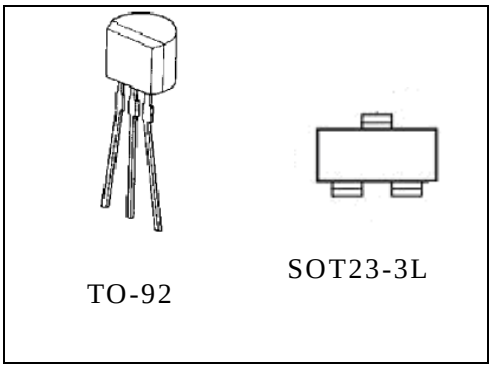
ADJUSTABLE PRECISION ZENER SHUNT REGULATOR BL431

DESCRIPTION

Outline Drawing

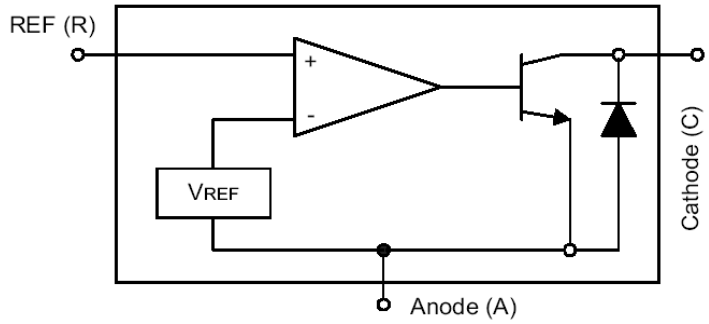


The BL431 is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{REF} (approximately 2.5V) and 36V with two external resistors. This device has typical dynamic output impedance of 0.2 Ω . Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

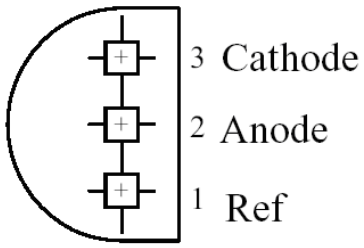
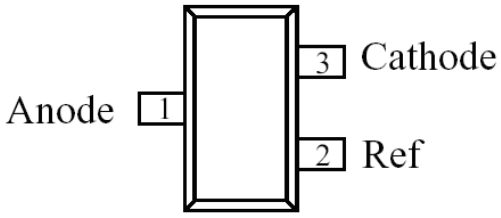
FEATURE

- Programmable output voltage to 36V
- Low dynamic output impedance 0.2 Ω typical
- Sink current capability of 1.0mA to 100mA
- Equivalent full-range temperature coefficient of 50ppm/℃ typical
- Temperature compensated for operation over full rated
- operating temperature range
- Low output noise voltage
- Fast turn on response

BLOCK DIAGRAM



PIN CONNECTION

Order Number	Pin Configuration (Top View)
BL431 (TO-92)	
BL431 (SOT23-3L)	

ABSOLUTE MAXIMUM RATINGS

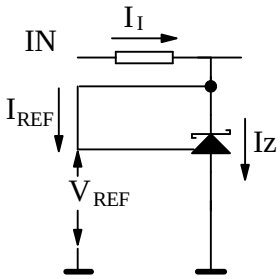
Operating temperature range applies unless otherwise specified.)

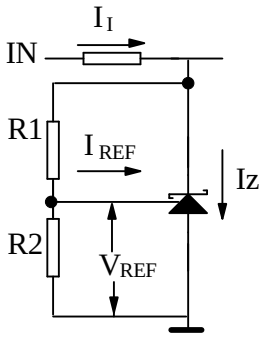
Characteristic	Symbol		Value	Unit
Cathode Voltage	Vka		37	V
Cathode Current Range (continuous)	Ika		-10~+150	mA
Reference Input Current Range	IREF		10	mA
Power Dissipation	PD	TO-92	770	mW
		SOT23-3	230	
Operating Temperature Range	Topr		0~+70	℃
Store temperature Range	Tstg		-65~+150	℃

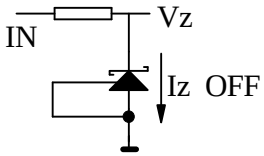
ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

Parameter	Conditions		Symbol	Min	Typ	Max	Unit
Reference Voltage	Vz=VREF Ii=10mA	0.5%	VREF	2.487	2.500	2.513	V
		1.0%		2.475	2.500	2.525	
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	Δ VREF/ Δ Vz	-	-1.0	-2.7	mV/V
		Vz=10~36V		-	-0.5	-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		∝ IREF	-	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)	-	0.05	1.0	μA
Dynamic Output Impedance	Vz=VREF, Iz=1 to 100mA,f<1.0kHz		Rz	-	-	0.50	Ω

TEST CIRCUIT



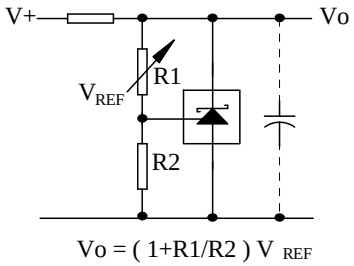




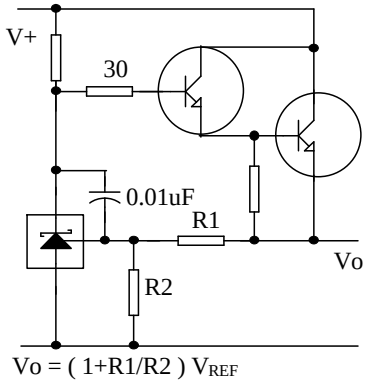
Note: Vz=VREF(1+R1/R2)+IREF*R1

1.Test circuit for Vz=VREF 2.Test circuit for Vz>VREF 3.Test circuit for off-state current

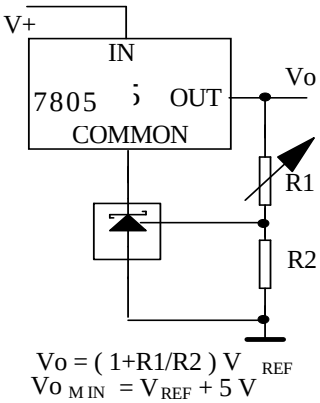
APPLICATION CIRCUIT



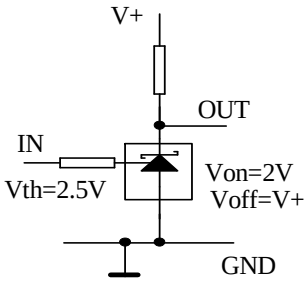
1. Shunt Regulator



2. Series Regulator

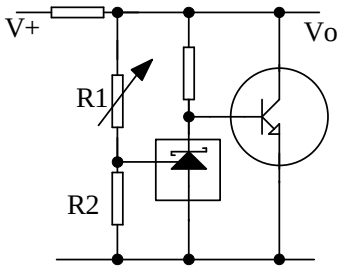


3.Output Control of a Three Terminal Fixed Regulator



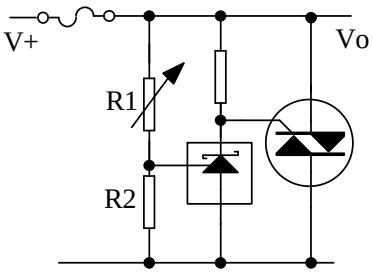
4.Single Supply Comparator with Temperature Compensated Threshold

5.Higher Current Shunt Regulator



Vo=(1+R1/R2)*V_{REF}

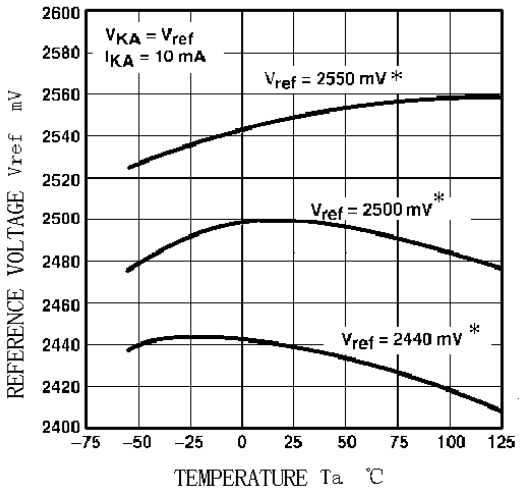
6.Crow Bar



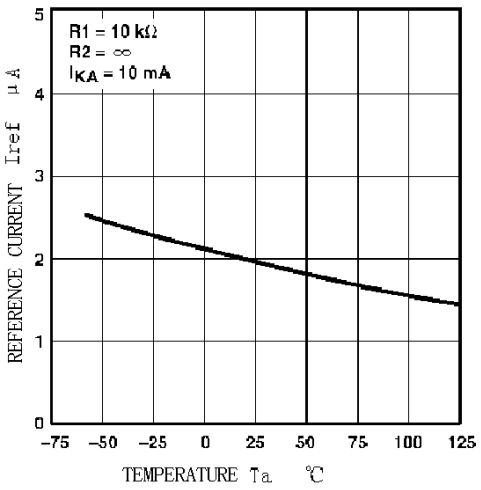
Vlimit=(1+R1/R2)*V_{REF}

CHARACTERISTIC CURVES

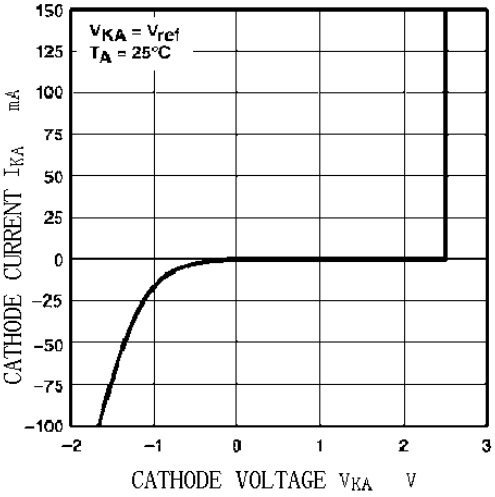
Vref – Ta



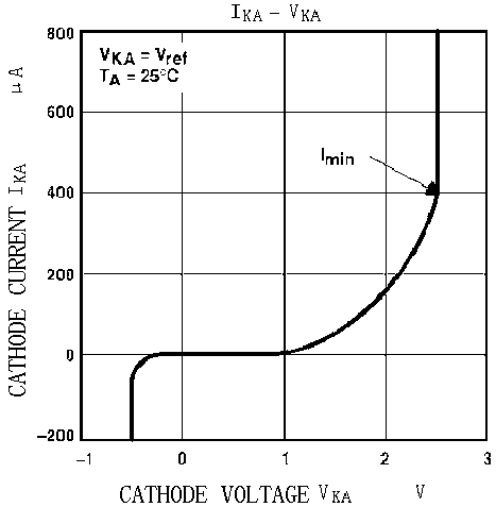
Iref – Ta



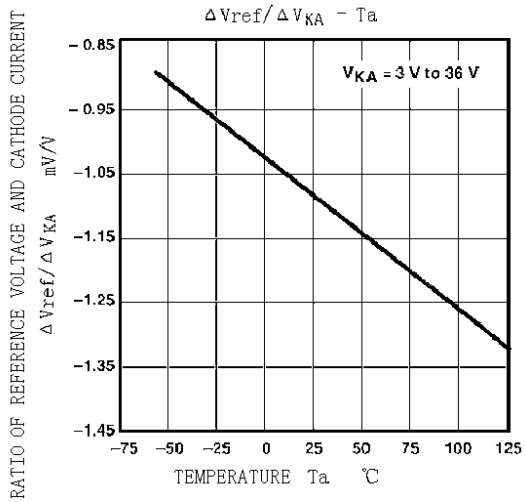
I_{KA} – V_{KA}



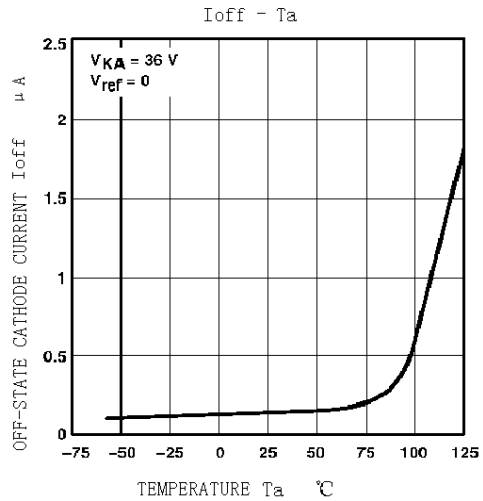
I_{KA} – V_{KA}

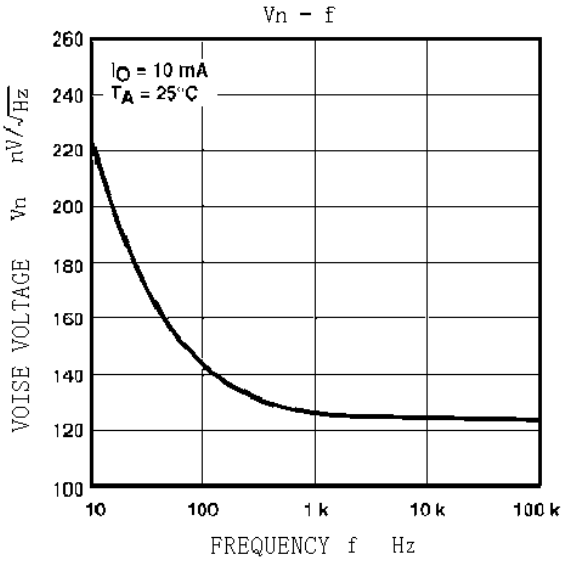


ΔVref/ΔV_{KA} – Ta

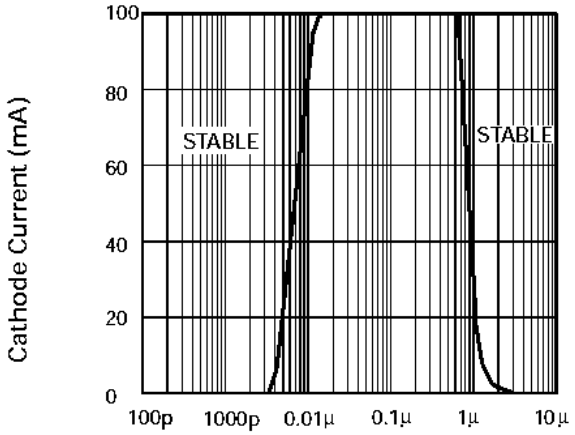


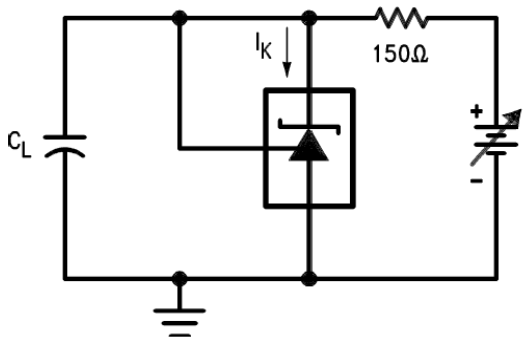
Ioff – Ta





STABILITY BOUNDARY CONDITIONS:

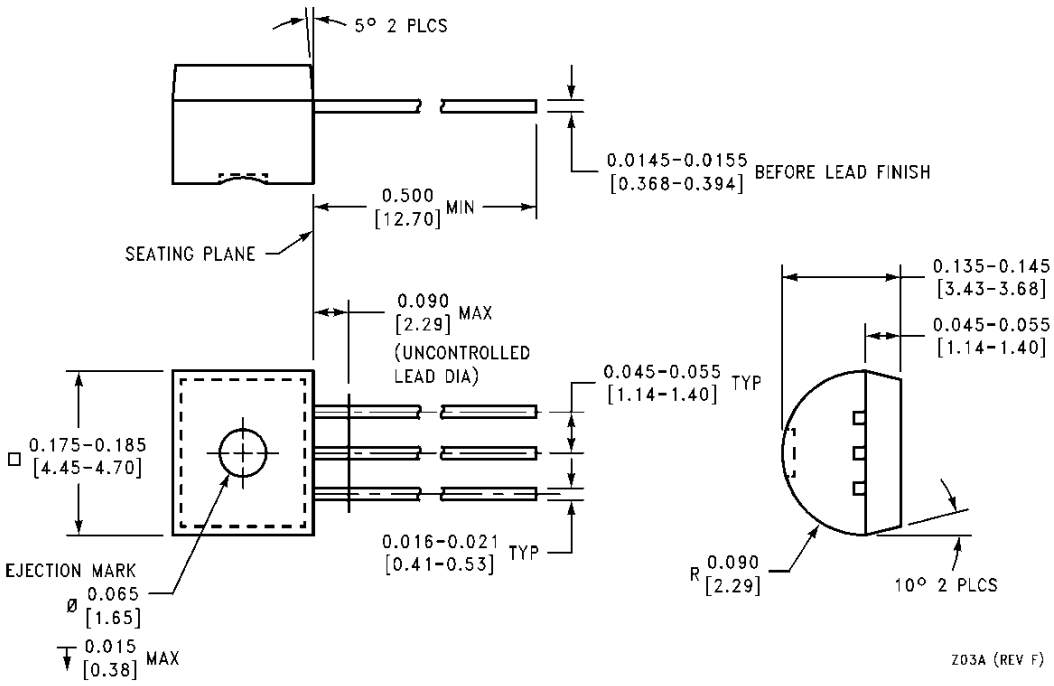




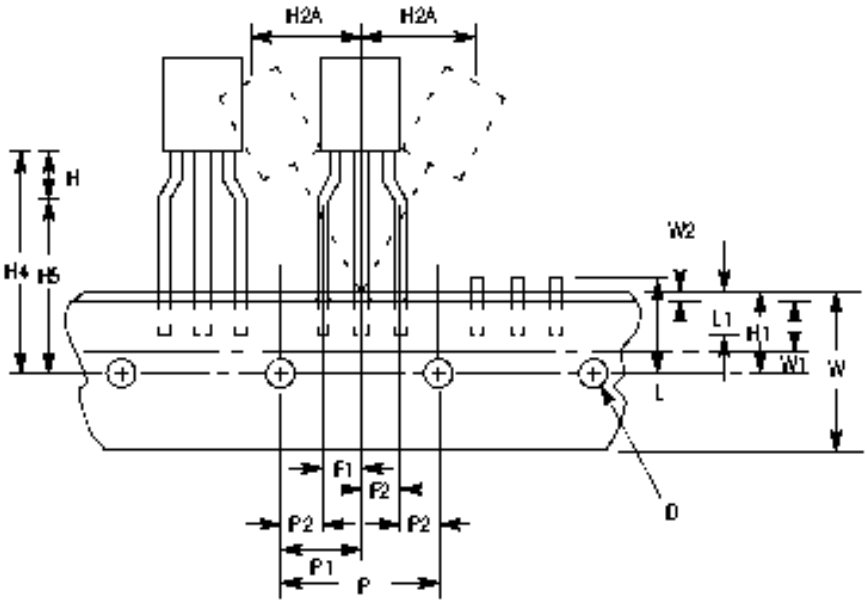
Test Circuit for Stability Boundary:

Appendix：

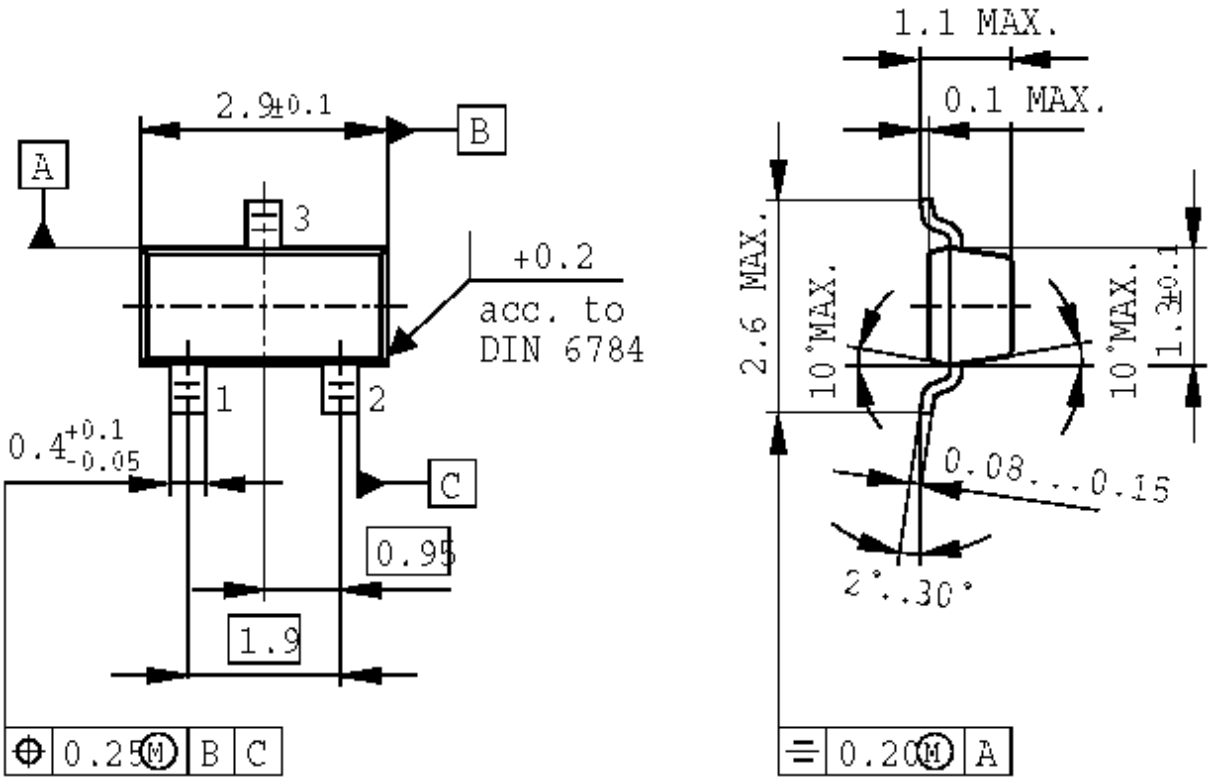
TO-92 Package Outline Dimension：



TO-92：



SOT-23-3 Package Outline Dimension:



Taping Diagram:

	(mm)
ΔA	0±1.0
ΔB	0+1.0
D	4.0±0.2
F1、F	2.5+0.4 -0.1
H	21.0max
H1	16±0.5
H2	9.0+0.5
P	12.7±0.3
P1	6.35±0.5
T	1.5max
W	18.0+1.0 -0.5
W1	6.0±0.5
W2	1.0max