



## DESCRIPTION

The A431L is a three-terminal Adjustable Shunt Voltage Reference. Output can be set to any value between VREF (1.24V) and 18V with two external resistors (see Figure 2).

The A431L operate from a lower voltage (1.24V) than the widely use A431, A431A and A432A shunt-regulator reference.

The A431L has a typical output impedance of 0.5  $\Omega$ . Active output circuitry provides a very sharp turn-on characteristic, making A431L excellent replacements for Zener diodes in many applications, including on-board regulation and adjustable power supplies.

The A431L is available in SOT-23 package.

## ORDERING INFORMATION

Package Type	Part Number	
SOT-23 SPQ: 3,000pcs/Reel	E3	A431LE3R-X
		A431LE3VR-X
Note	X: Output Voltage Tolerance: A, B or C A=0.5%, B=1%, C=1.5% R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products		

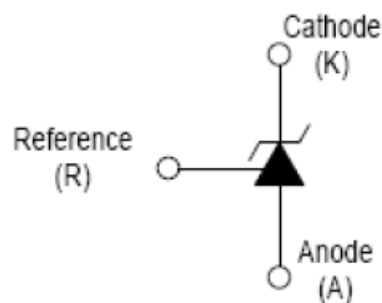
## FEATURES

- Low Voltage Operation: VREF=1.24V
- Adjustable Output Voltage: VREF to 18V
- Reference Voltage Tolerances
  - 0.5% for A431L-A
  - 1% for A431L-B
  - 1.5% for A431L-C
- Low dynamic output impedance: 0.5 $\Omega$
- Low output noise voltage
- Fast on-state response
- Sink current capability of 0.1mA to 100mA
- Available in SOT-23 package.

## APPLICATION

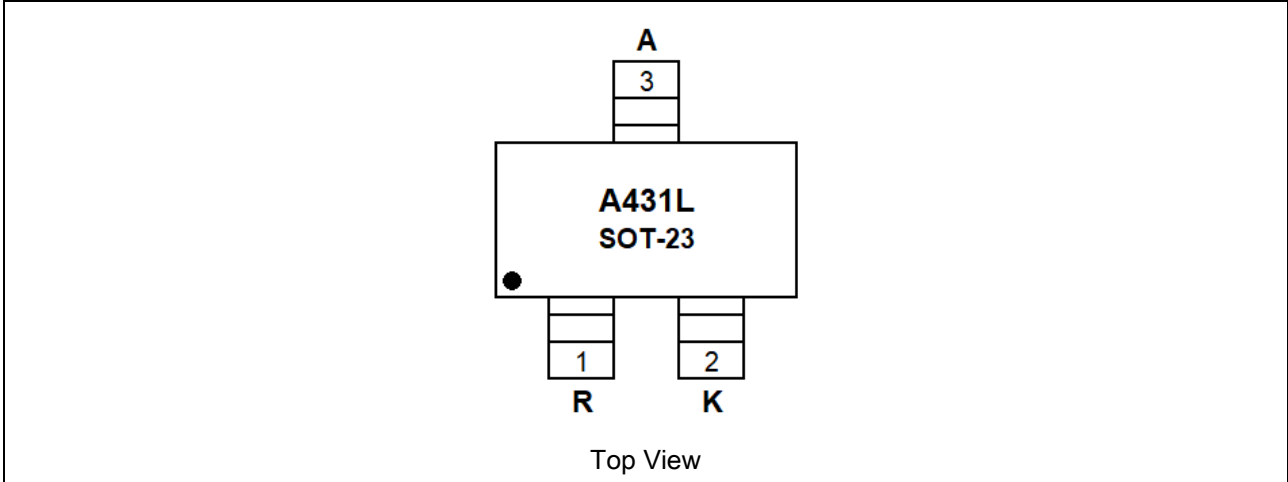
- Shunt Regulator
- High-Current Shunt Regulator
- Precision Current Limiter

## TYPICAL APPLICATION





**PIN DESCRIPTION**



Pin #	Symbol	Function
1	R	REFERENCE
2	K	CATHODE
3	A	ANODE



## ABSOLUTE MAXIMUM RATINGS

Operating temperature range applies unless otherwise specified

V <sub>KA</sub> , Cathode Voltage	18V
I <sub>KA</sub> , Cathode Current Range (Continuous)	100mA
I <sub>REF</sub> , Reference Input Current Range	6 $\mu$ A
P <sub>D</sub> , Power Dissipation	350mW
R <sub><math>\theta</math>JA</sub> , Thermal Resistance from Junction to Ambient	357°C/W
T <sub>OPR</sub> , Operating Temperature	0°C~+70°C
T <sub>J</sub> , Junction Temperature	150°C
T <sub>STG</sub> , Storage Temperature	-65°C~ +150°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



## ELECTRICAL CHARACTERISTICS

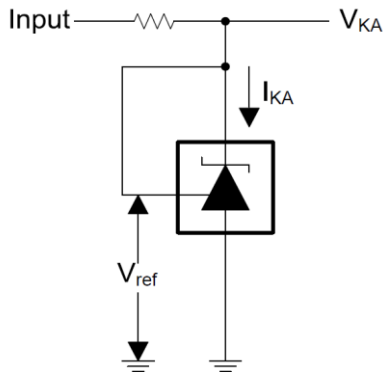
T<sub>A</sub>=25°C, unless otherwise specified

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit	
Reference Input Voltage(Fig 1)	V <sub>REF</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA	0.5%	1.2338	1.24	1.2464	V
			1%	1.2276	1.24	1.2524	V
			1.5%	1.2214	1.24	1.2586	V
Deviation of Reference Voltage Over Full Temperature Range(Fig 1)	Δ V <sub>REF(DEV)</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA 0°C≤T <sub>A</sub> ≤70°C	-	-	16	mV	
Ratio of Change in Reference Input Voltage to the change in Cathode Voltage (Fig 2)	ΔV <sub>REF</sub> / ΔV <sub>KA</sub>	I <sub>KA</sub> =10mA ΔV <sub>KA</sub> =1.25V~15V	-	-	2.4	mV/V	
Deviation of Reference Input Voltage Over Temperature Range(Fig 2)	ΔI <sub>REF</sub> / ΔT	I <sub>KA</sub> =10mA, R <sub>1</sub> =10kΩ, R <sub>2</sub> =∞, 0°C≤T <sub>A</sub> ≤70°C	-	-	0.6	μA	
Minimum Cathode Current for Regulation(Fig 1)	I <sub>KA(MIN)</sub>	V <sub>KA</sub> =V <sub>REF</sub>	-	-	0.1	mA	
Off-state Cathode Current(Fig 3)	I <sub>off</sub>	V <sub>KA</sub> =15V, V <sub>REF</sub> =0	-	-	0.5	μA	
Dynamic Impedance	Z <sub>KA</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =0.1~20mA, f≤1.0kHz	-	-	0.5	Ω	



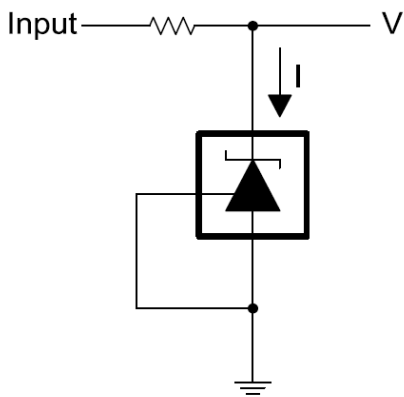
## TEST CIRCUIT

Figure 1. Test Circuit for  $V_{KA}=V_{ref}$



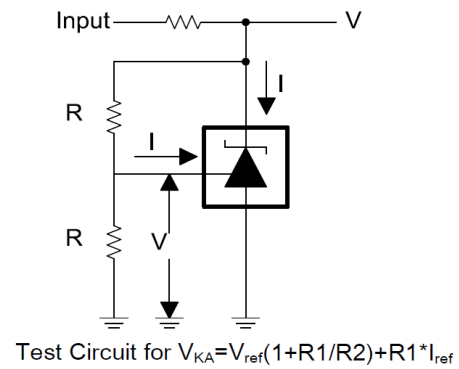
Test Circuit for  $V_{KA}=V_{ref}$

Figure 3. Test Circuit for  $I_{off}$



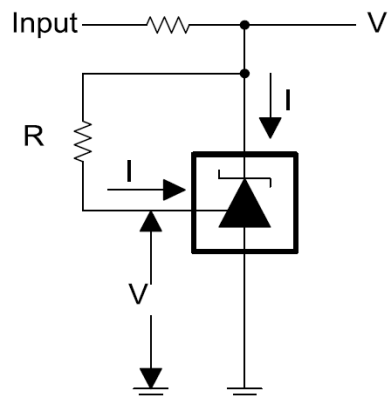
Test Circuit for  $I_{off}$

Figure 2. Test Circuit for  $V_{KA}=V_{ref}(1+R1/R2)+R1*I_{ref}$



Test Circuit for  $V_{KA}=V_{ref}(1+R1/R2)+R1*I_{ref}$

Figure 4. Test Circuit for  $I_{ref}$

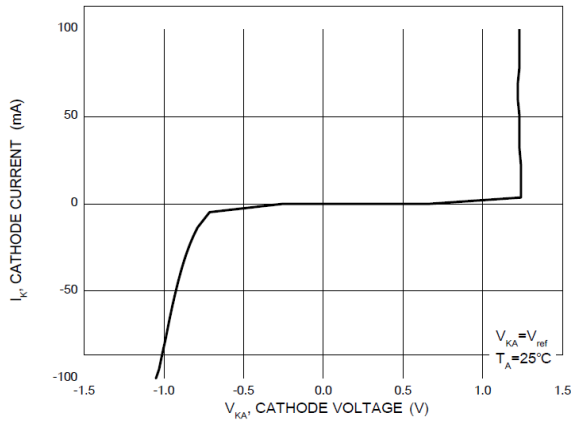


Test Circuit for  $I_{ref}$

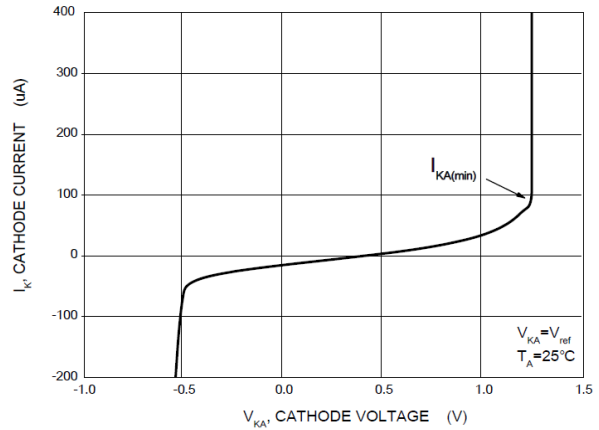


## TYPICAL PERFORMANCE CHARACTERISTICS

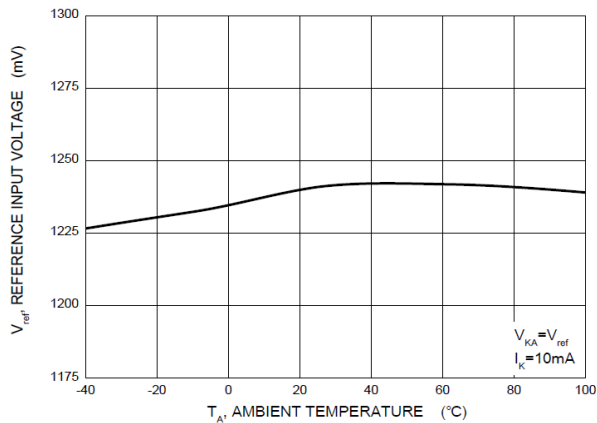
1. Cathode Current vs. Cathode Voltage



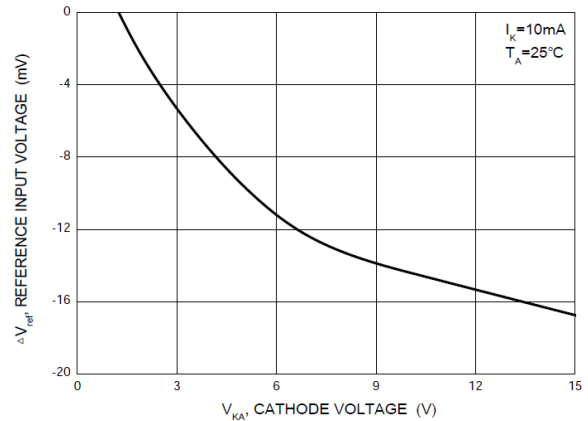
2. Cathode Current vs. Cathode Voltage



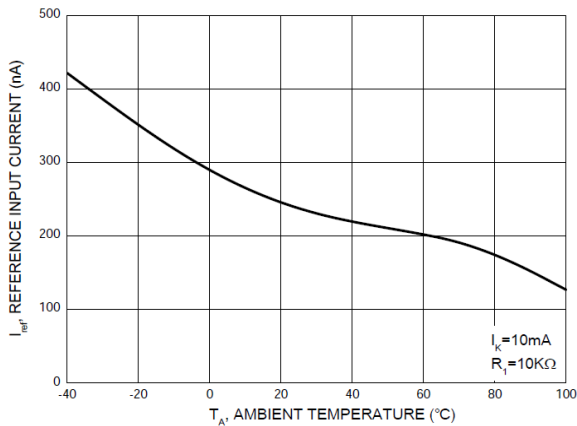
3. Reference Input Voltage vs. Ambient Temperature



4. Change in Reference Input Voltage vs. Cathode Voltage

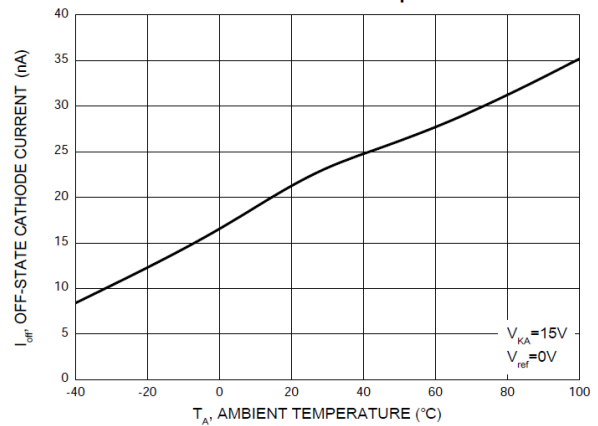


5. Reference Input Current vs. Ambient Temperature



6. Off-State Cathode Current

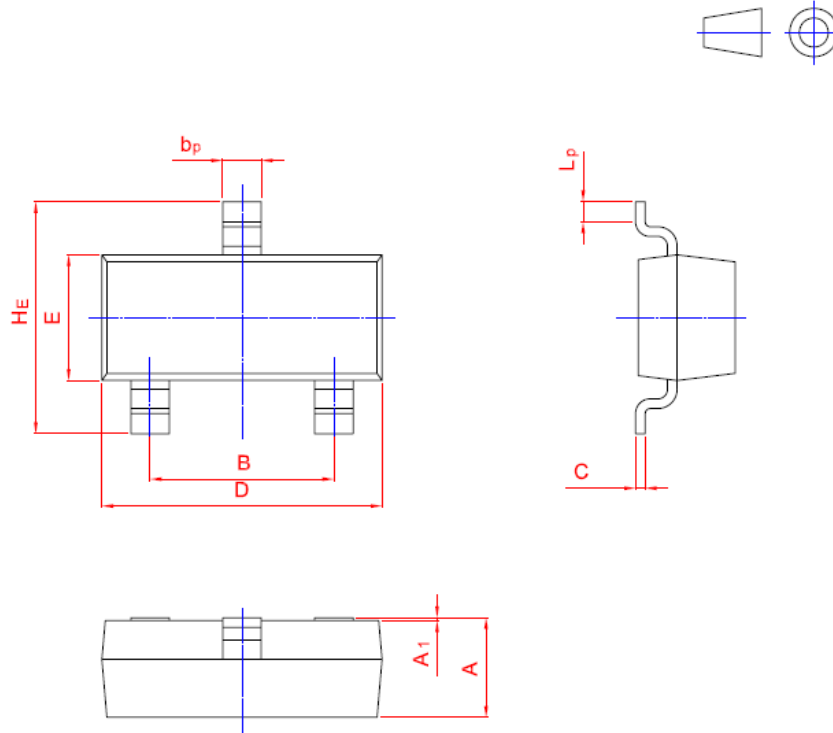
7. vs. Ambient Temperature





## PACKAGE INFORMATION

Dimension in SOT-23 Package (Unit: mm)  
Plastic surface mounted package; 3 leads



UNIT	A	B	bp	C	D	E	HE	A <sub>1</sub>	L <sub>p</sub>
mm	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50
	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20



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