

SSC431 Precision Programmable Reference

Description

The SSC431 are three-terminal adjustable shunt regulators with guaranteed thermal stability over a full operation range. It features sharp turn-on characteristics, low temperature coefficient and low output impedance, which make it ideal substitutes for Zener diodes in applications such as switching power supply, charger and other adjustable regulators.

The output voltage of SSC431 can be set to any value between Vref (2.5V) and the corresponding maximum cathode voltage (36V).

The SSC431 precision reference offers a voltage tolerance of 0.5%.

This IC are available in SOT-23 package.

4 Applications

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

4 Device Information



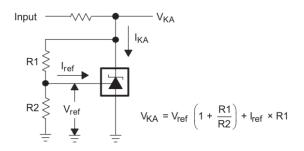
Top view

Marking (Y: year/W: week)

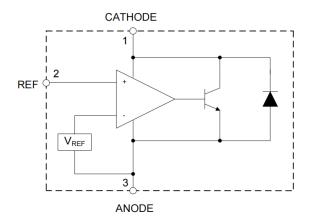
Features

- Adjustable output voltage: 2.5V to 36 V
- ➤ Wide Operating Range of -40°C to 125°C
- ➤ Low Equivalent Full-range Temperature Coefficient with 50PPM/°C Typical
- Low Output Noise
- Low Dynamic Output Resistance: 0.2Ω
 Typical
- ➤ Sink-current capability: 1 mA to 100 mA

Typical Application



♣ Functional Block Diagram

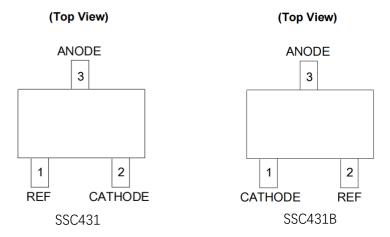




Ordering Information

Marking	Product	Package	Tape and Reel	Accuracy range
431 YW	SSC431	SOT23	3000 pcs	2500 1050
431B YW	SSC431B	SOT23B	3000 pcs	$2.500 \pm 0.5\%$

4 Pin Configuration



Pin configuration

SSC431	SSC431B	Symbol	Description		
1	2	REF	Threshold relative to common anode		
2	1	CATHODE	Shunt Current/Voltage input		
3	3	ANODE	Common pin, normally connected to ground		

Absolute Maximum Ratings⁽¹⁾

(Unless otherwise specified, all voltage are with respect to GND, TA=25°C)

Symbol	Parameter	Rating	Unit
V_{KA}	Cathode Voltage ⁽²⁾	40	V
I_{KA}	Cathode Current Range (Continuous)	-100 to 150	mA
I_{REF}	Reference Input Current Range	10	mA
P_D	Power Dissipation ⁽³⁾	370	mW
T_{J}	Junction Temperature	+150	° C
T_{opr}	Operating Temperature	-40 to +125	° C
T_{STG}	Storage Temperature Range	-65 to +150	° C

- (1). Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods my affect device reliability.
- (2) All voltage values are with respect to ANODE, unless otherwise noted.
- (3) Maximum power dissipation is a function of $T_{J(max)}$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_{J(max)} T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can affect reliability.

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Recommend Operating Conditions

(Ta=25°C, unless otherwise noted)

Symbol	Parameter	Min	Max	Unit
V_{KA}	Cathode Voltage	VREF	36	V
I _{KA}	Cathode Current	1.0	100	mA

Lectrical Characteristics

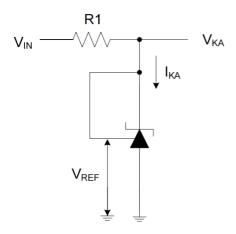
Over recommended operating conditions, $TA = 25^{\circ}C$ (unless otherwise noted)

Symbol	Parameter		Test Circuit	Condition	ns	Min	Тур	Max	Unit
V_{REF}	Reference Voltage	0.5%	4	V _{KA} =V _{RE}	$V_{KA}=V_{REF},I_{KA}=10mA$		2.500	2.512	V
ΔV_{REF}	Deviation of Reference Voltage Over Full Temperature Range		4	$V_{KA}=V_{REF}$, $I_{KA}=10$ mA TA=-40 to +125°C		_	8	17	mV
ΔV_{REF}	Ratio of Change in reference Voltage to the Change in Cathode Voltage		5	I _{KA} =10 mA	$\begin{array}{c} \triangle \ V_{KA} = 10V \\ \text{to } V_{REF} \end{array}$	_	-1.0	-2.7	mV/ V
ΔV_{KA}			3		\triangle V _{KA} =36V to 10V	_	-0.5	-2.0	
I_{REF}	Reference Cur	rent	5	$I_{KA}=10\text{mA}, R1=10\text{K},$ $R2=\infty$		_	2.0	4.0	μΑ
ΔI_{REF}	Deviation of Reference Current Over Full Temperature Range		5	$I_{KA}=10$ m/ $R2=\infty$, $T_{A}=-40$ to		-	0.4	1.2	μΑ
I _{KA} (Min)	Minimum Cathode Current for Regulation		4	$V_{KA} = V_R$	EF	_	0.4	1.0	mA
I _{KA} (Off)	Off-state Cath Current	ode	6	$V_{KA} = 36V$, $V_{REF} = 0$		_	0.05	1.0	μΑ
Z_{KA}	Dynamic Impo	edance	4	$\label{eq:VKA} \begin{split} V_{KA} = & V_{REF}, I_{KA} = 1 to 100 \\ mA, \\ f \leqslant & 1.0 \text{KHz} \end{split}$		_	0.2	0.5	Ω
θја	Thermal Resistance		_	SOT-23		_	337	_	°C /W

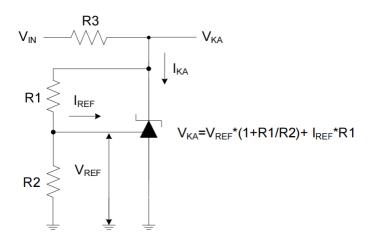
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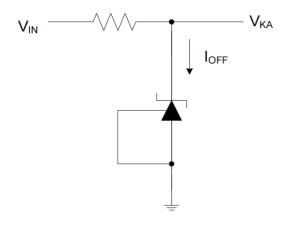
4 Typical Applications Circuit



Test Circuit 4 for V_{KA} = V_{REF}



Test Circuit 5 for V_{KA} > V_{REF}

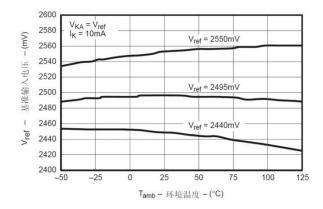


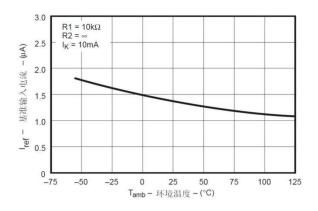
Test Circuit 6 for I_{OFF}

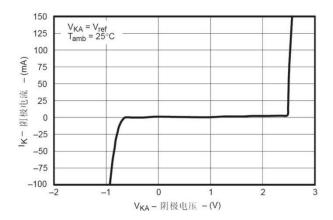
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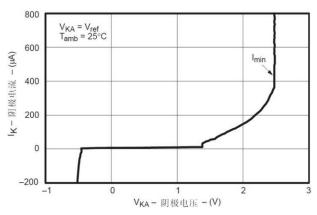


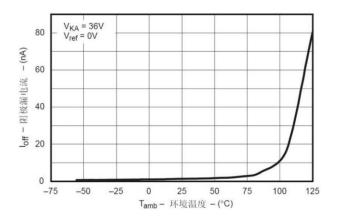
♣ Typical characteristic







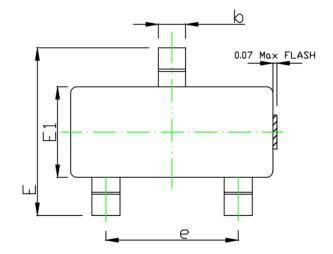


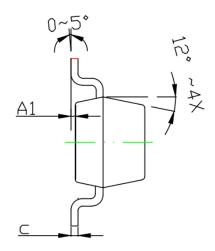


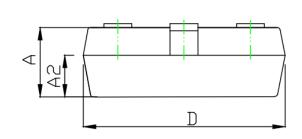
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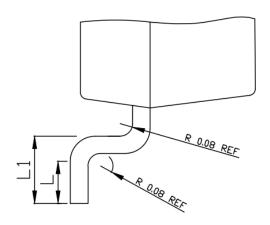


4 Package Outline





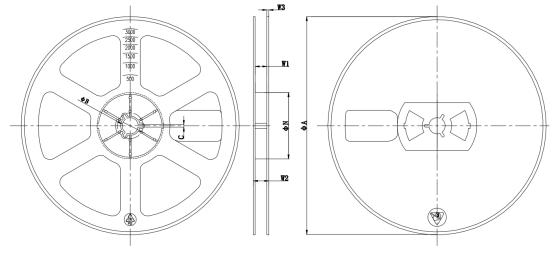




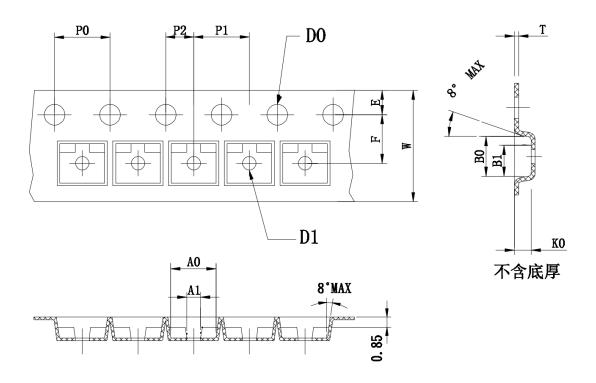
SYMBOL	MILLIMETER					
SIMDOL	MIN	NOM	MAX			
A	0.95	1.00	1.05			
A1	0.01	0.05	0.10			
b	b 0.35		0.45			
С	0.11 BSC					
D	2.80	2.90	3.00			
Е	2.30	2.40	2.50			
E1	1.20	1.30	1.40			
е	1.90 BSC					
L	0.20	_	_			
L1	0.30	0.40	0.50			
A2	0.60 REF					



4 Tape and Reel



фΑ	ΦN	ΦВ	С	W1	W2	W3
178±2	54±2	13.2±%3	2.2±0.3	9.5±1	13мх	1.4±0.4



Symbol	AO	A1	ВО	B1	KO	DO	D1	P0
Spec	3. 15±0. 10	1. 15±0. 10	2.80±0.10	2. 15±0. 10	1.30±0.10	1.55±0.10	1.10±0.10	4.00±0.10
Symbol	P1	W	E	P2	T	10*P0	F	
Spec	4.00±0.10	8.00±0.10	1.75±0.10	2.00±0.10	0.21±0.02	40.00±0.10	3.50±0.10	

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