

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 is offered in two voltage tolerance: 0.5% and 1.0%. This IC are available in SOT-23 package.

Applications

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

Device Information

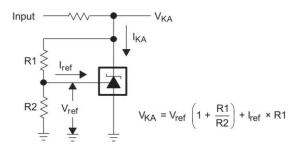


Top view
Marking (Y: year/W: week)

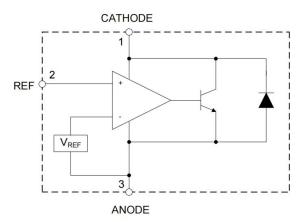
Features

- 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

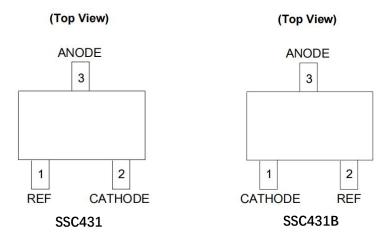




Ordering Information

Marking	Product	Package	Tape and Reel	Accuracy range		
431 YW	SSC431-F	SOT23	2000 pag			
431 1 1	SSC431-K	30123	3000 pcs	F: 2.500±1.0% K: 2.500±0.5%		
431B YW	SSC431B-F	SOT23	2000 pag			
43 ID Y VV	SSC431B-K	30123	3000 pcs			

Pin Configuration



Pin Configuration

SSC431	SSC431B	SSC431B Symbol Description			
1 2 REF		REF	Threshold relative to common anode		
2 1 CATHODE		CATHODE	Shunt Current/Voltage input		
3 3 ANODE		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
TJ	Junction Temperature	+150	°C
T _{opr}	Operating Temperature	-40 to +125	°C
T _{STG}	Storage Temperature Range	-65 to +150	Ĵ

- (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.

www.sscsemi.com 2 Rev.1.3



Recommend Operating Conditions

(Ta=25℃, unless otherwise noted)

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

Electrical Characteristics

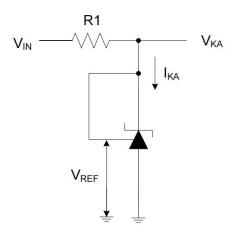
Over recommended operating conditions, TA = 25°C (unless otherwise noted)

Symbo I	Parameter		Test Circuit	Conditions		Min.	Тур.	Max.	Unit
	Reference 0.5%		4	\/ -\/ -10m \		2.487	2.500	2.512	V
V _{REF}	Voltage	1.0%	4	$V_{KA}=V_{REF},I_{KA}=10mA$		2.475	2.500	2.525	\ \ \
ΔV_{REF}	Deviation of Reference Voltage Over Full Temperature Range		4		_{:F,} I _{KA} =10mA) to +125°C	_	8	17	mV
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	Ratio of Change in reference Voltage to the Change in Cathode Voltage		5	I _{KA} =10m	ΔV_{KA} =10V to V_{REF}	_	-1.0	-2.7	mV/
			5	A	ΔV _{KA} =36V to 10V	_	-0.5	-2.0	V
I _{REF}	Reference Current		5		A, R1=10K, R2=∞	_	2.0	4.0	μA
ΔI_{REF}	Deviation of Reference Current Over Full Temperature Range		5	R	A, R1=10K, 2=∞, to +125°C	_	0.4	1.2	μA
I _{KA} (Min)	Minimum Cathode Current for Regulation		4	VKA	= V _{REF}	_	0.4	1.0	mA
I _{KA} (Off)	Off-state Cathode Current		6	V _{KA} = 36	SV , $V_{REF} = 0$	_	0.05	1.0	μA
ZĸA	Dynamic Impedance		4	to1	′ _{REF} , I _{KA} =1 00mA, 1.0KHz	_	0.2	0.5	Ω
θја	Thermal Resistance		_	S	OT-23	_	337		°C /W

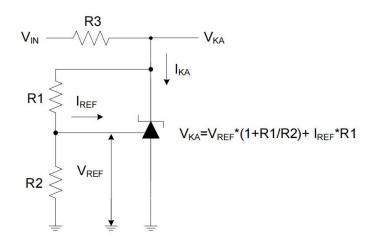
www.sscsemi.com 3 Rev.1.3



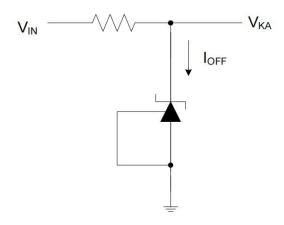
Typical Applications Circuit



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



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

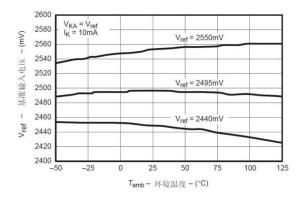


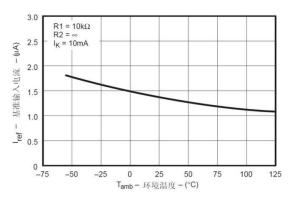
Test Circuit 6 for I_{OFF}

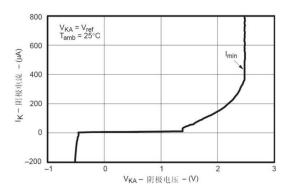
www.sscsemi.com 4 Rev.1.3

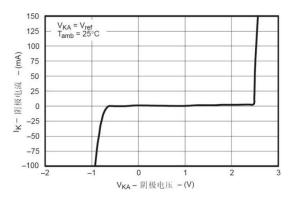


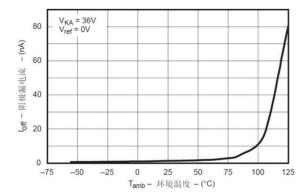
Typical characteristic

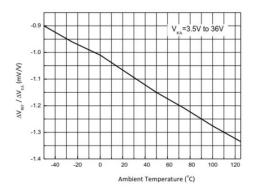






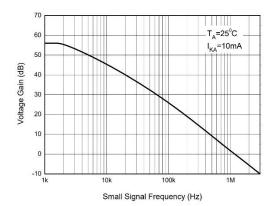


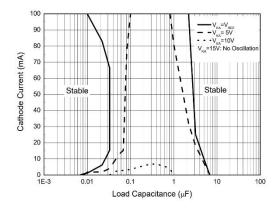




www.sscsemi.com 5 Rev.1.3



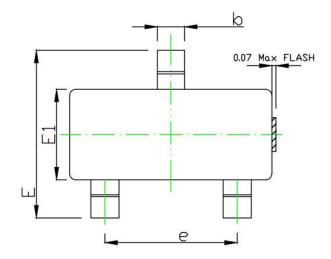


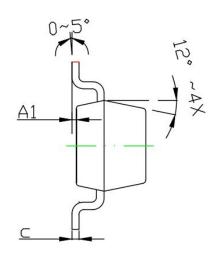


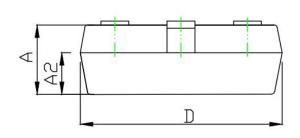
www.sscsemi.com 6 Rev.1.3

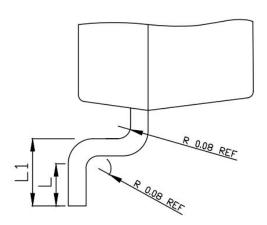


Package Outline







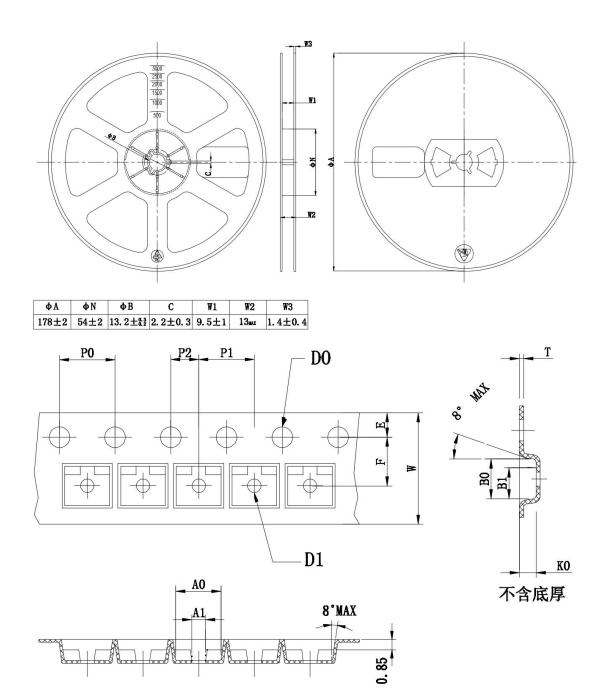


CAMDOL	MILLIMETER					
SYMBOL	MIN	NOM	MAX			
A	0.95	1.00	1.05			
A1	0.01	0.05	0.10			
b	0.35	0.40	0.45			
С	0.11 BSC					
D	2.80	2.90	3.00			
Е	2. 30	2. 40	2.50			
E1	1.20	1.30	1.40			
е	1.90 BSC					
L	0.20	_	_			
L1	0.30	0.40	0.50			
A2	0.60 REF					

Tape and Reel

www.sscsemi.com 7 Rev.1.3





Symbo1	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
Symbo1	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	

DISCLAIMER

www.sscsemi.com 8 Rev.1.3



SSCSEMI RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. SSCSEMI DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICIENCE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

THE GRAPHS PROVIDED IN THIS DOCUMENT ARE STATISTICAL SUMMARIES BASED ON A LIMITED NUMBER OF SAMPLES AND ARE PROVIDED FOR INFORMATIONAL PURPOSE ONLY. THE PERFORMANCE CHARACTERISTICS LISTED IN THEM ARE NOT TESTED OR GUARANTEED. IN SOME GRAPHS, THE DATA PRESENTED MAY BE OUTSIDE THE SPECIFIED OPERATING RANGE (E.G. OUTSIDE SPECIFIED POWER SUPPLY RANGE) AND THEREFORE OUTSIDE THE WARRANTED RANGE.

OUR PRODUCT SPECIFICATIONS ARE ONLY VALID IF OBTAINED THROUGH THE COMPANY'S OFFICIAL WEBSITE, CRM SYSTEM, OR OUR SALES PERSONNEL CHANNELS. IF CHANGES OR SPECIAL VERSIONS ARE INVOLVED, THEY MUST BE STAMPED WITH A QUALITY SEAL AND MARKED WITH A SPECIAL VERSION NUMBER TO BE VALID.

www.sscsemi.com 9 Rev.1.3