

广东协铖微电子科技有限公司

ADJUSTABLE PRECISION SHUNT REGULATORS 精密可调电压基准源

XC431

DESCRIPTION & FEATURES 概述及特点	
The XC431 series ICs are three-terminal adjustable shunt regulators with guaranteed thermal stability over a full operation range. These ICs feature sharp turn-on characteristics, low temperature coefficient and low output impedance, which make them ideal substitutes for Zener diodes in applications such as switching power supply, charger and other adjustable regulators. The XC431 precision reference is offered in three band gap tolerance: 0.5%, 1.0% and 1.5%.	XC431 系列三端可调精密稳压电路，具有低温度系数和低输出阻抗，这样精密可调的特性使其可替代许多应用场合下的稳压二极管。例如：开关电源、充电器及可调稳压器。XC431 参考电压有三种精度：0.5%，1.0%和1.5%。
- Adjustable output voltage from V_{REF} to 36V - Low dynamic output resistance: 200mΩ typical - Sink current capacity from 1mA to 100 mA - Low output noise - Typical equivalent full range temperature coefficient of 30ppm/°C	- 可调电压范围：2.5V~36V - 低动态输出阻抗：200mΩ（典型值） - 灌电流能力为 1.0~100mA - 低输出噪声 - 低温度系数：30ppm/°C（典型值）
Applications 应用	
- PC Motherboard - Voltage monitor - Voltage Reference - PWM down converter with reference - Charger	- 电脑主板 - 电压监控器 - 电压基准源 - 开关电源（参考电压） - 充电器

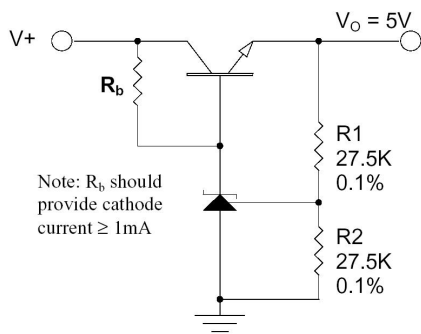
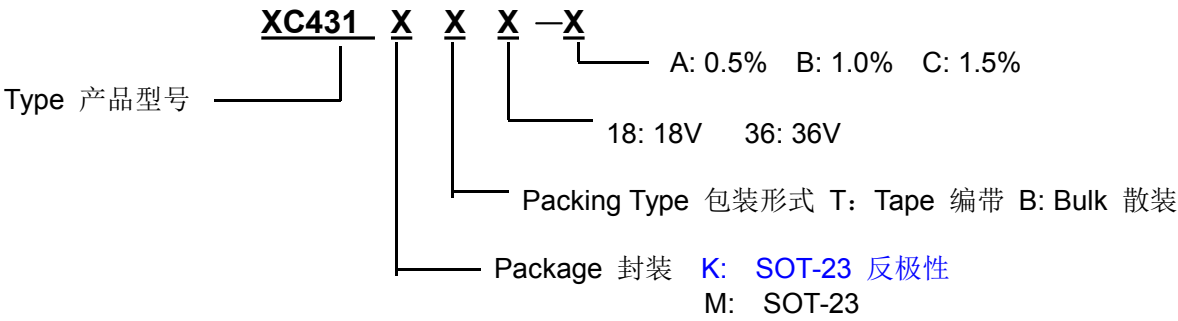
Ordering Information for 40V products 订购信息					
Package 封装类型	Temperature Range 温度范围	Voltage Tolerance 精度	Part Number 产品型号	Marking ID 打标	Packing Type 包装类型
SOT-23	-40℃ ~ 85℃	0.5%	XC431KT36-A	431	Tape
		1.0%	XC431KT36-B	431	Tape
		1.5%	XC431KT36-C	431	Tape
SOT-23		0.5%	XC431MT36-A	431	Tape
		1.0%	XC431MT36-B	431	Tape
		1.5%	XC431MT36-C	431	Tape
SOT-89		0.5%	XC431RT36-A	431	Tape
		1.0%	XC431RT36-B	431	Tape
		1.5%	XC431RT36-C	431	Tape

Note: 1. For XC431KTXX , 2. For XC431MTXX.

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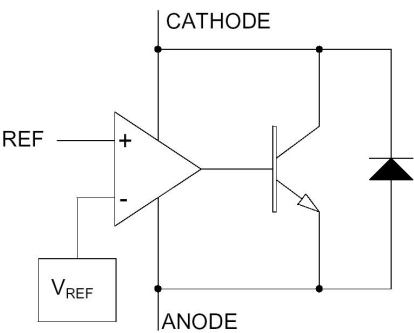
ADJUSTABLE PRECISION SHUNT REGULATORS 精密可调电压基准源

XC431



5V Precision Regulator

TYPICAL APPLICATION (典型应用)



BLOCK DIAGRAM (功能框图)

MAXIMUM RATINGS (T_a=25°C) 最大额定值 (Note 1)

Characteristic 特性参数	Symbol 符号	Rating 额定值		Unit 单位
		Min 最小	Max 最大	
Cathode Voltage (Note 2) 阴极电压	V _{KA}	-0.3	XC431 (40V) 40	V
Continuous Cathode Current 阴极连续电流	I _K	-100	150	mA
Reference Input Current Range 参考端输入电流	I _{REF}	-0.05	10	mA
Power Dissipation 耗散功率	P _D	SOT-23	370	mW
Junction Temperature 工作结温	T _J	0	150	°C
Thermal Impedance (Note 3) 热阻	θ _{JA}	SOT-23-3	330	°C / W

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Storage Temperature Range 储存温度	T_{STG}	-65	150	°C
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Note 1: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground.
 Currents are positive into, negative out of the specified terminal.

Note 2: Voltage values are with respect to the anode terminal unless otherwise noted.

Note 3: θ_{JA} : Thermal Resistance-Junction to Ambient, $D_F = 1/\theta_{JA}$
 Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
 The θ_{JA} numbers are guidelines for the thermal performance of the device/PC-board system.
 All of the above assume no ambient airflow.

RECOMMENDED OPERATING CONDITIONS 推荐使用条件	Symbol 符号	Min 最小	Max 最大	Unit 单位
Operating free air temperature range 使用温度范围	T_A	0	70	°C
Cathode current 阴极电流	I_K	1	100	mA
Cathode voltage 阴极电压	V_{KA}	0	XC431 (40V) 36 XC431 (20V) 18	V

ELECTRICAL CHARACTERISTICS 电特性

$T_A=25^\circ\text{C}$ unless otherwise noted 如无特殊说明, 温度为 25°C

Parameter 参数	Symbol 符号	Test Conditions 测试条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位
Reference Input Voltage 输入基准电压	V_{REF}	$I_K=10\text{mA}$, $V_{KA}=V_{REF}$, note 1	2.487	2.500	2.513	V
		$I_K=10\text{mA}$, $V_{KA}=V_{REF}$, note 2	2.475	2.500	2.525	
		$I_K=10\text{mA}$, $V_{KA}=V_{REF}$, note 3	2.462	2.500	2.538	
Reference Drift 参考电压变化率	ΔV_{REF}	$I_K=10\text{mA}$, $V_{KA}=V_{REF}$, $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$	—	4	17	mV
Voltage Ratio, Ref to Cathode 阴极电压对参考电压变化率	$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	$I_K=10\text{mA}$, $V_{KA}=2.5\text{V to }10\text{V}$	—	-1.4	-2.7	mV/V
		$I_K=10\text{mA}$, $V_{KA}=10\text{V to }36\text{V}$	—	-1.0	-2.0	
Reference Input Current 参考端出入电流	I_{REF}	$I_K=10\text{mA}$, $V_{KA}=V_{REF}$	—	—	2.3	μA
		$I_K=10\text{mA}$, $V_{KA}=V_{REF}$, $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$	—	2	4	
Minimum Operating Current 最小工作电流	I_{min}	$V_{KA}=V_{REF}$	—	0.4	1	mA
Off-State Cathode Current 关断阴极电流	I_{off}	$V_{KA}=36\text{V}$, $V_{REF}=0\text{V}$	—	0.1	1	μA
Dynamic Impedance 动态阻抗	$ Z_{KA} $	$V_{KA}=V_{REF}$, $I_K=1\text{mA to }100\text{mA}$, $f \leq 1\text{kHz}$	—	0.2	0.5	Ω

Note 1: For XC431A only. The output accuracy is 0.5%.

Note 2: For XC431B only. The output accuracy is 1.0%.

Note 3: For XC431C only. The output accuracy is 1.5%.

Note 4: $\Delta V_{REF}/\Delta V_{KA}$ Ratio of change in reference input voltage to the change in cathode voltage.

PARAMETER MEASUREMENT INFORMATION 参数测试图

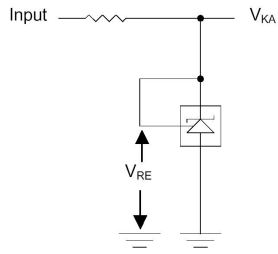


Figure 1. Test Circuit for $V_{KA} = V_{REF}$

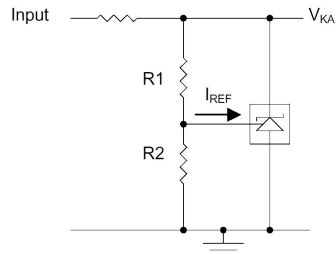


Figure 2. Test Circuit for $V_{KA} > V_{REF}$

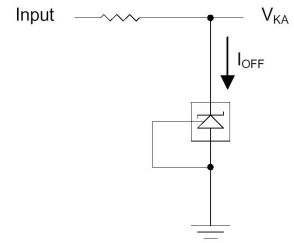


Figure 3. Test Circuit for I_{OFF}