

描述 / Descriptions

SOT-23 塑封封装精密可调基准电源。

Precision adjustable shunt regulator in a SOT-23 Plastic Package.

特征 / Features

精确参照电压 2.500V;允许电压误差为 0.4%,0.8%;阴极电流能力为 1.0mA ~ 100mA;快速导通;可调节输出电压为 $V_O=V_{ref} \sim 37V$;阴极工作电流低(典型值:400 μ A);动态输出阻抗低(典型值:0.15 Ω),符合 AEC-Q100 标准高可靠性要求,无卤产品。

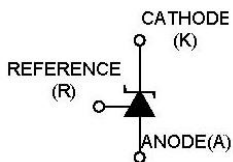
Precise reference voltage to 2.500V;guaranteed 0.4%,0.8% reference voltage Tolerance; sink current capability,1.0mA~100mA;quick turn-on; adjustable Output voltage, $V_O=V_{ref} \sim 37V$;low operational cathode current,400 μ A typical; 0.15 Ω typical output impedance,Qualified to AEC-Q100 Standards for High Reliability, HF Product.

用途 / Applications

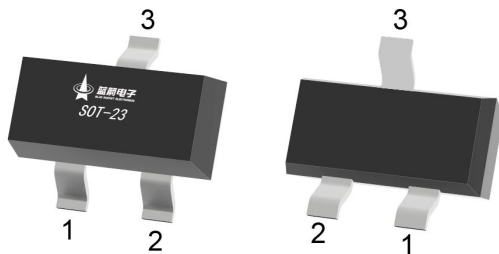
用于线性调整器,可调节电源和开关电源,满足汽车应用的严格要求。

Linear regulators, adjustable power supply, switching power supply, Meet the stringent requirements of automotive applications.

内部等效电路 / Equivalent Circuit



引脚排列 / Pinning



PIN 1 : R

PIN 2 : K

PIN 3 : A

印章代码 / Marking

Marking	Q431
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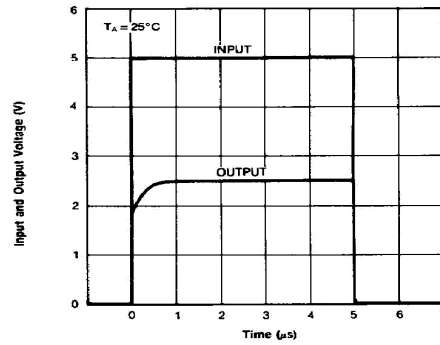
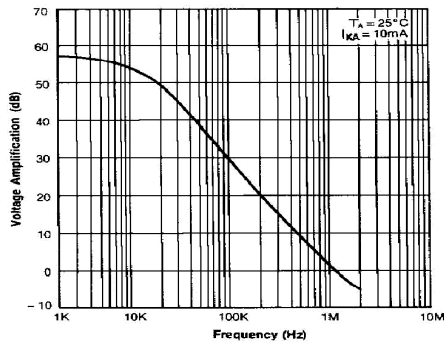
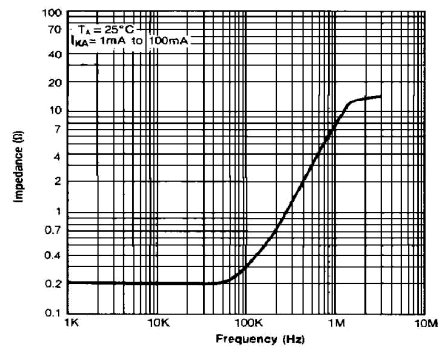
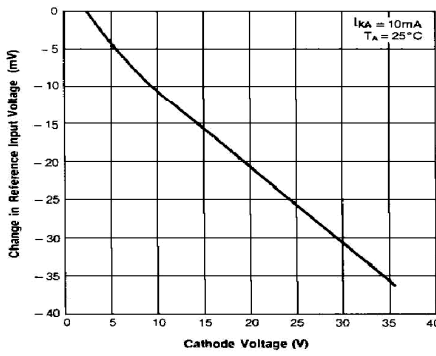
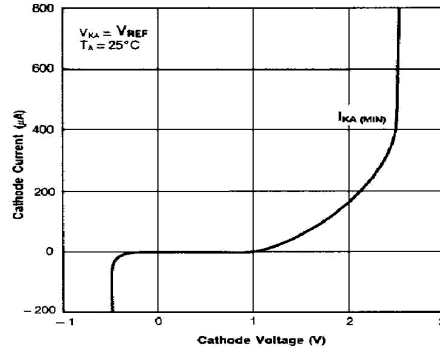
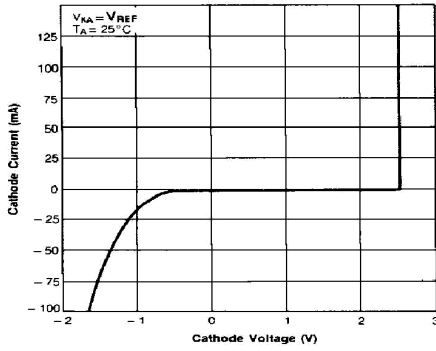
极限参数 / Absolute Maximum Ratings(Ta=25°C)

参数 Parameter	符号 Symbol	数值 Rating	单位 Unit
Cathode to Anode Voltage	V_{KA}	37	V
Cathode Current Range, Continuous	I_K	-100~+100	mA
Reference Input Current Range, Continuous	I_{REF}	0.05~+10	mA
Power Dissipation	P_D	370	mW
Operating Ambient Temperature	T_{amb}	-40~125	°C
Junction Temperature	T_j	160	°C
Storage Temperature Range	T_{stg}	-65~150	°C

电性能参数 / Electrical Characteristics(Ta=25°C)

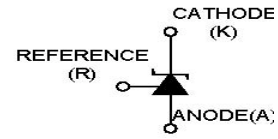
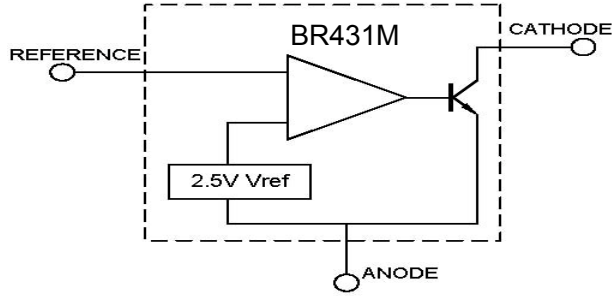
参数 Parameter	符号 Symbol	测试条件 Test Conditions	最小值 Min	典型值 Typ	最大值 Max	单位 Unit
Reference Input voltage	V_{REF}	$V_{KA}=V_{REF}$ $I_K=10mA(A=0.4\%)$	2.490	2.500	2.510	V
		$V_{KA}=V_{REF}$ $I_K=10mA(B=0.8\%)$	2.480	2.500	2.520	V
Deviation of Reference Input Voltage Over-Temperature	$\Delta V_{REF}/T$	$V_{KA}=V_{REF}$ $I_K=10mA$ $T_A=-25\sim 85^\circ C$		4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	$I_K=10mA$ $\Delta V_{KA}=10V$ to V_{REF}		-1	-2.7	mV/V
		$I_K=10mA$ $\Delta V_{KA}=36V$ to $10V$		-0.45	-2.0	mV/V
Reference Input current	I_{REF}	$I_K=10mA$ $R_1=10\Omega$ $R_2=open$		1.0	4.0	μA
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{REF}/T$	$I_K=10mA$ $R_1=10K\Omega$ $R_2=open$ $T_A=-40\sim 125^\circ C$		0.4	1.2	μA
Minimum Cathode Current for Regulation	$I_{K(min)}$	$V_{KA}=V_{REF}$		0.4	1	mA
Off-state cathode current	$I_{K(off)}$	$V_{KA}=36V$ $V_{REF}=0V$		0.05	1.0	μA
Dynamic impedance	$ Z_{KA} $	$V_{KA}=V_{REF}$ $I_K=1mA$ to $100mA$ $f\leq 1.0KHz$		0.15	0.5	Ω

电参数曲线图 / Electrical Characteristic Curve

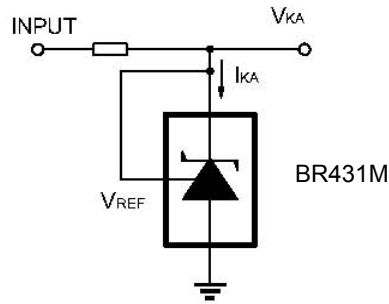


测试电路&典型应用图 Test circuits&Typical Application

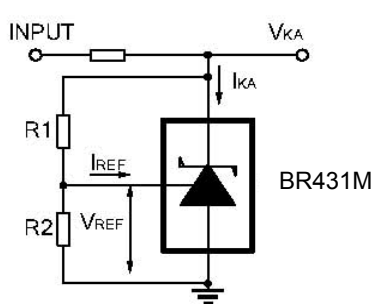
BLOCK DIAGRAM:



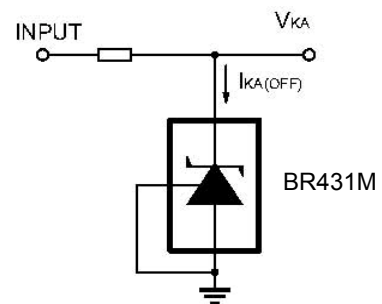
TEST CIRCUITS:



Test Circuit For $V_{KA} = V_{REF}$

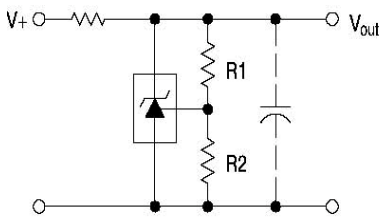


$V_{KA} = V_{REF} * (1 + R1/R2) + I_{REF} * R1$
Test Circuit for $V_{KA} \geq V_{REF}$



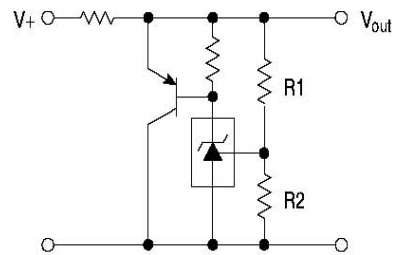
Test Circuit For $I_{KA(OFF)}$

TYPICAL APPLICATION:



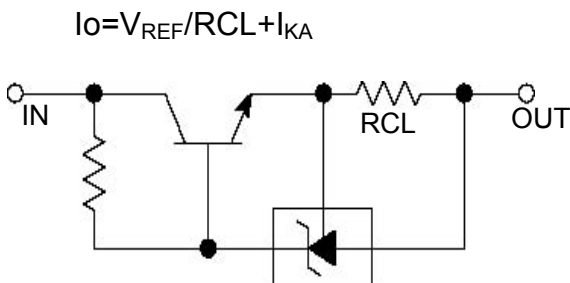
$$V_{out} = \left(1 + \frac{R1}{R2}\right) V_{ref}$$

Shutdown Regulator



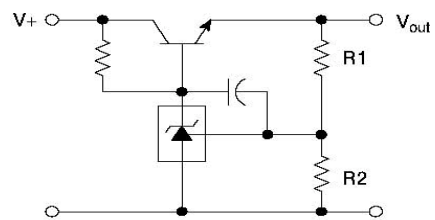
$$V_{out} = \left(1 + \frac{R1}{R2}\right) V_{ref}$$

Higher-current Shunt



$$I_o = V_{REF}/R_{CL} + I_{KA}$$

Constant Current Source BR431M



$$V_{out} = \left(1 + \frac{R1}{R2}\right) V_{ref}$$

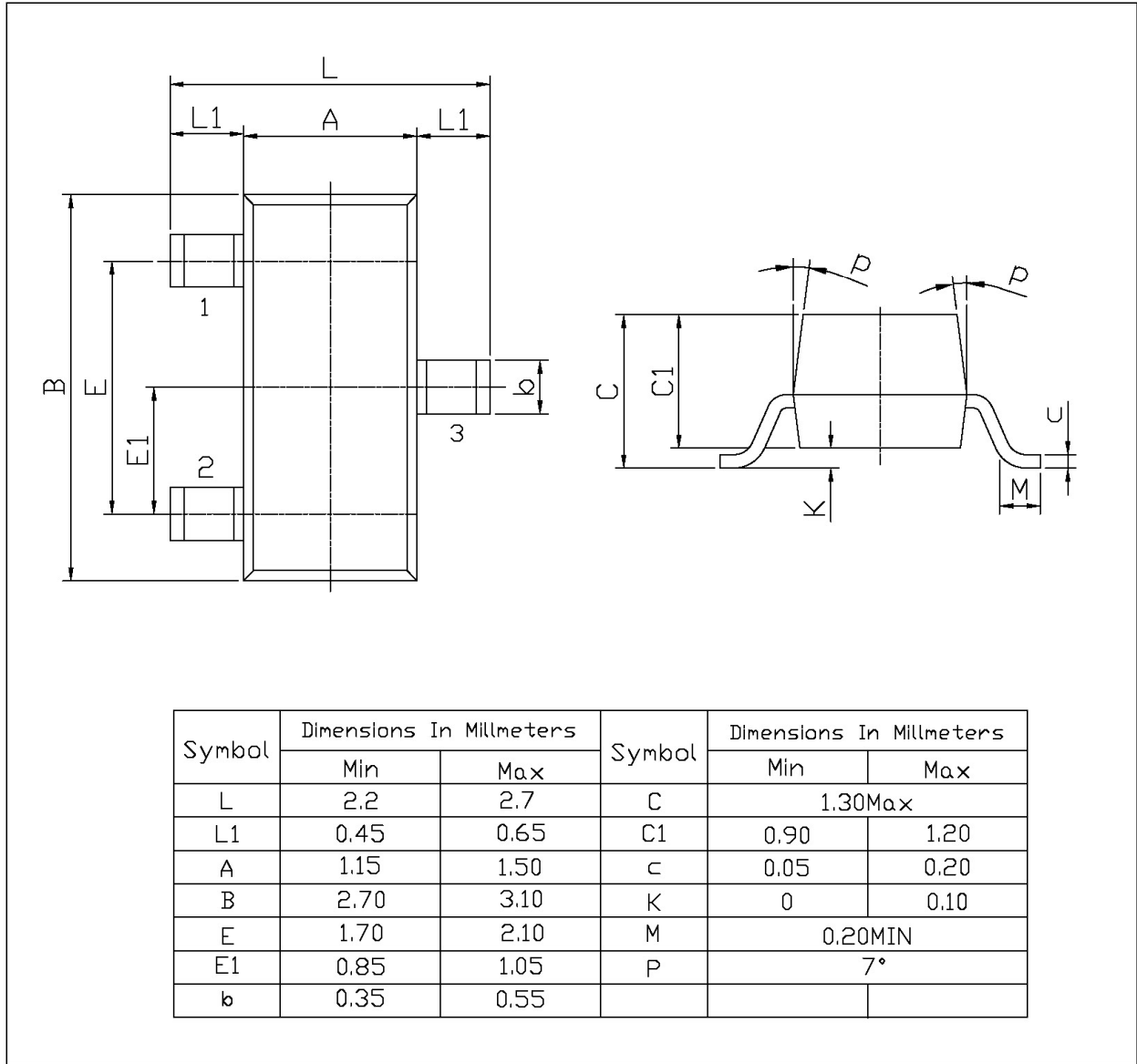
$$V_{out\ min} = V_{ref} + V_{be}$$

Series Pass Regulator

外形尺寸图 / Package Dimensions

SOT-23

单位: mm



印章说明 / Marking Instructions



说明：

Q： 为汽车无卤产品标识

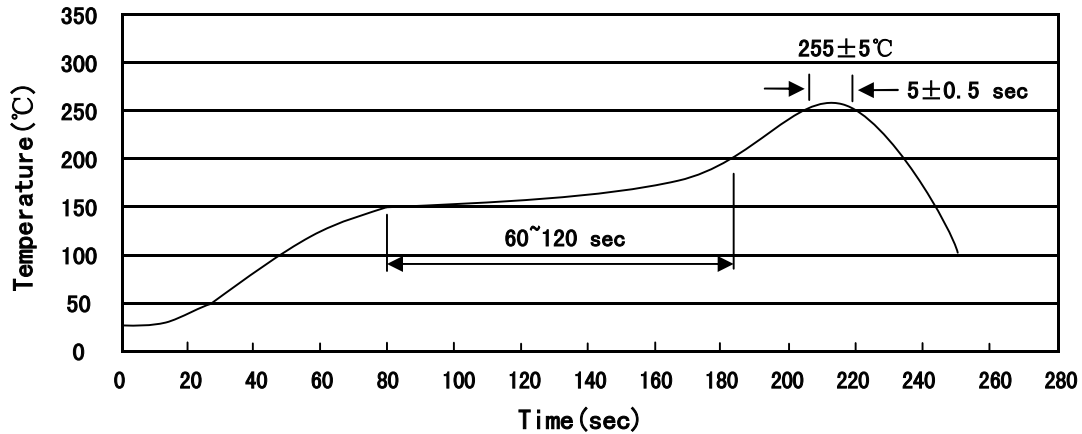
431： 为型号代码

Note:

Q: Automobile halogen-free product Code

431: Product Type

回流焊温度曲线图(无铅) / Temperature Profile for IR Reflow Soldering(Pb-Free)



说明：

- 1、预热温度 $150 \sim 200^\circ\text{C}$ ，时间 $60 \sim 120\text{sec}$;
- 2、峰值温度 $255 \pm 5^\circ\text{C}$ ，时间持续为 $5 \pm 0.5\text{sec}$;
- 3、焊接制程冷却速度为 $2 \sim 10^\circ\text{C}/\text{sec}$.

Note:

- 1.Preheating: $150 \sim 200^\circ\text{C}$, Time: $60 \sim 120\text{sec}$.
- 2.Peak Temp.: $255 \pm 5^\circ\text{C}$, Duration: $5 \pm 0.5\text{sec}$.
3. Cooling Speed: $2 \sim 10^\circ\text{C}/\text{sec}$.

耐焊接热试验条件 / Resistance to Soldering Heat Test Conditions

温度： $260 \pm 5^\circ\text{C}$

时间： 10 ± 1 sec.

Temp.: $260 \pm 5^\circ\text{C}$

Time: 10 ± 1 sec

包装规格 / Packaging SPEC.

卷盘包装 / REEL

Package Type 封装形式	Units 包装数量					Dimension 包装尺寸 (unit: mm^3)		
	Units/Reel 只/卷盘	Reels/Inner Box 卷盘/盒	Units/Inner Box 只/盒	Inner Boxes/Outer Box 盒/箱	Units/Outer Box 只/箱	Reel	Inner Box 盒	Outer Box 箱
SOT-23	3,000	10	30,000	6	180,000	7" × 8	180×120×180	390×385×205

使用说明 / Notices