

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。

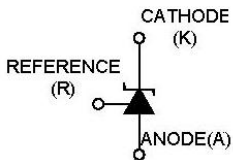
Precise reference voltage to 2.500V;guaranteed 0.4%,0.8% reference voltage Tolerance; sink current capability,1.0mA~100mA;quick turn-on; adjustable Output voltage, $V_O=V_{ref} \sim 37V$;low operational cathode current,400 μ A typical; 0.15 Ω typical output impedance, Qualified to AEC-Q100 Standards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



PIN1 : K

PIN 2 : R

PIN 3 : A

印章代码 / Marking

| | |
|---------|-------|
| Marking | Q431R |
|---------|-------|

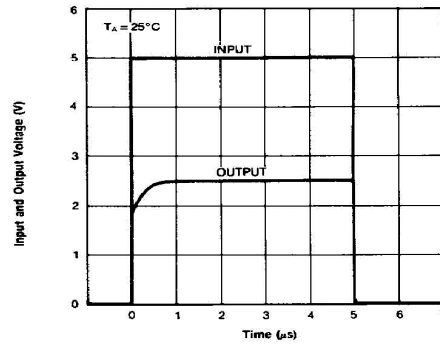
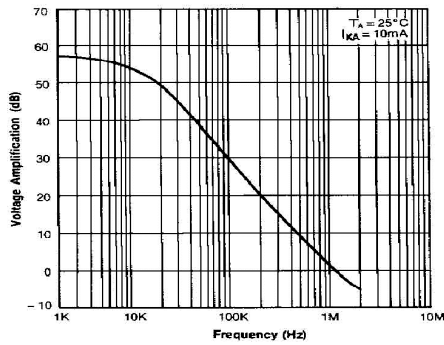
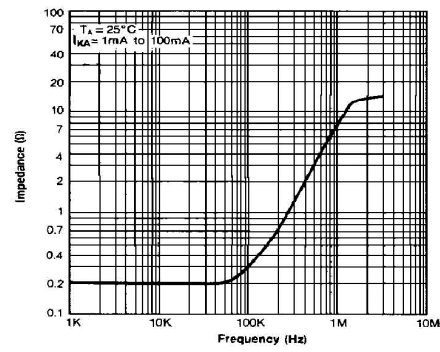
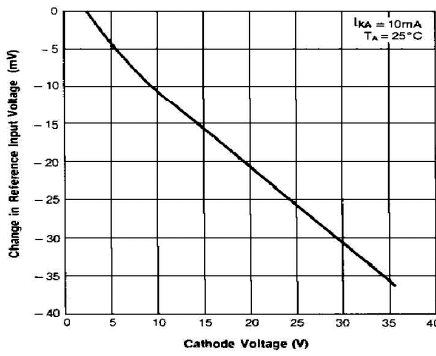
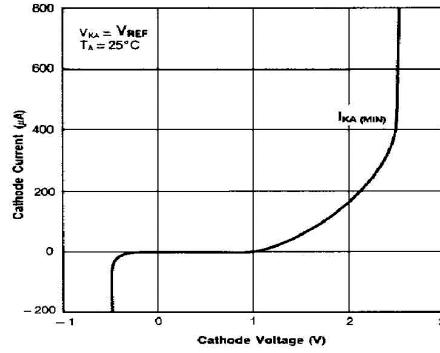
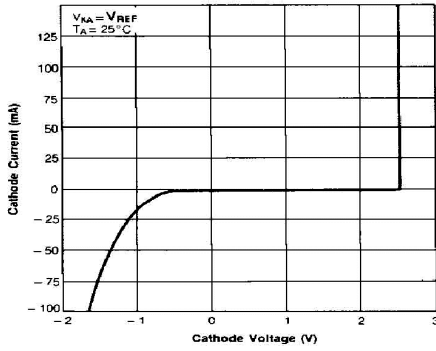
极限参数 / Absolute Maximum Ratings(Ta=25°C)

| 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)

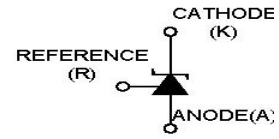
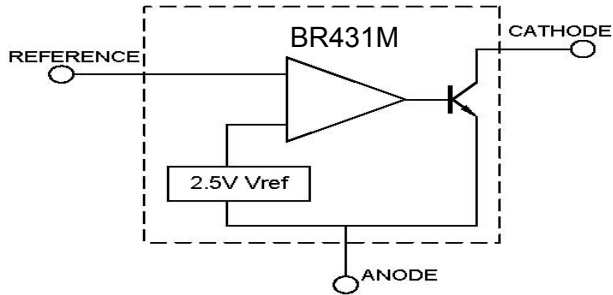
| 参数 Parameter | 符号 Symbol | 测试条件 Test Conditions | 最小值 Min | 典型值 Typ | 最大值 Max | 单位 Unit |
|---|-------------------------------------|--|------------|------------|------------|------------|
| Reference Input voltage | V _{REF} | V _{KA} =V _{REF} I _K =10mA(A=0.4%) | 2.490 | 2.500 | 2.510 | V |
| | | V _{KA} =V _{REF} I _K =10mA(B=0.8%) | 2.480 | 2.500 | 2.520 | V |
| Deviation of Reference Input Voltage Over-Temperature | ΔV _{REF} /T | V _{KA} =V _{REF} I _K =10mA T _A =-25~85°C | | 4.5 | 17 | mV |
| Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage | ΔV _{REF} /ΔV _{KA} | I _K =10mA ΔV _{KA} =10V to V _{REF} | | -1 | -2.7 | mV/V |
| | | I _K =10mA ΔV _{KA} =36V to 10V | | -0.45 | -2.0 | mV/V |
| Reference Input current | I _{REF} | I _K =10mA R ₁ =10Ω R ₂ =open | | 1.0 | 4.0 | μA |
| Deviation of Reference Input Current Over Full Temperature Range | ΔI _{REF} /T | I _K =10mA R ₁ =10KΩ, R ₂ =open T _A =-40~125°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≤1.0KHz | | 0.15 | 0.5 | Ω |

电参数曲线图 / Electrical Characteristic Curve

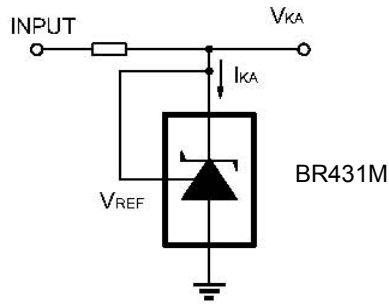


测试电路&典型应用图 Test circuits&Typical Application

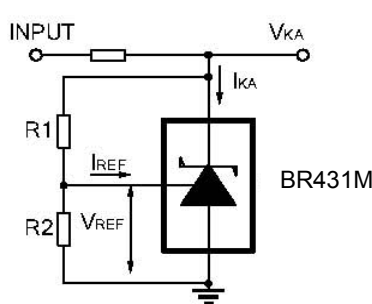
BLOCK DIAGRAM:



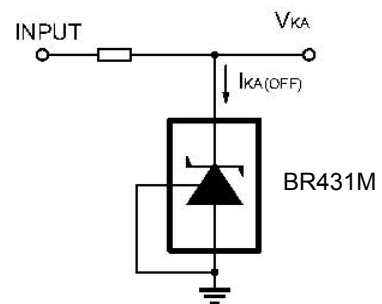
TEST CIRCUITS:



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

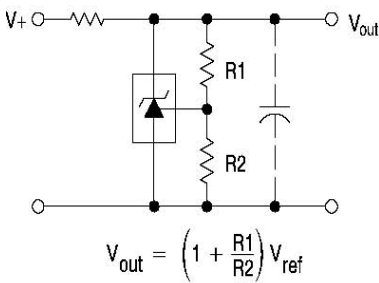


$V_{KA} = V_{REF} \times (1 + R1/R2) + I_{REF} \times R1$
Test Circuit for $V_{KA} \geq V_{REF}$

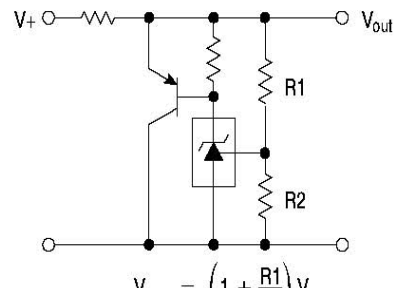


Test Circuit For $I_{KA(OFF)}$

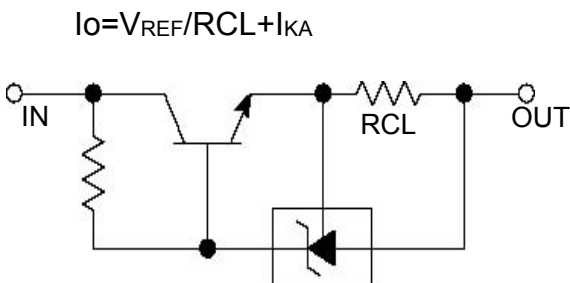
TYPICAL APPLICATION:



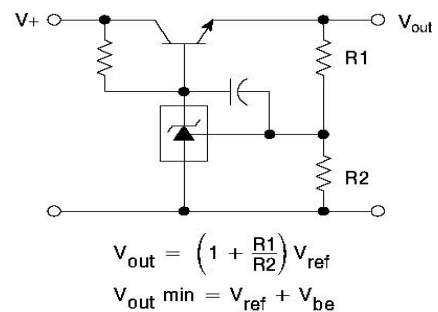
$V_{out} = \left(1 + \frac{R1}{R2}\right) V_{ref}$
Shutdown Regulator



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



$I_0 = V_{REF}/R_{CL} + I_{KA}$
Constant Current Source BR431M

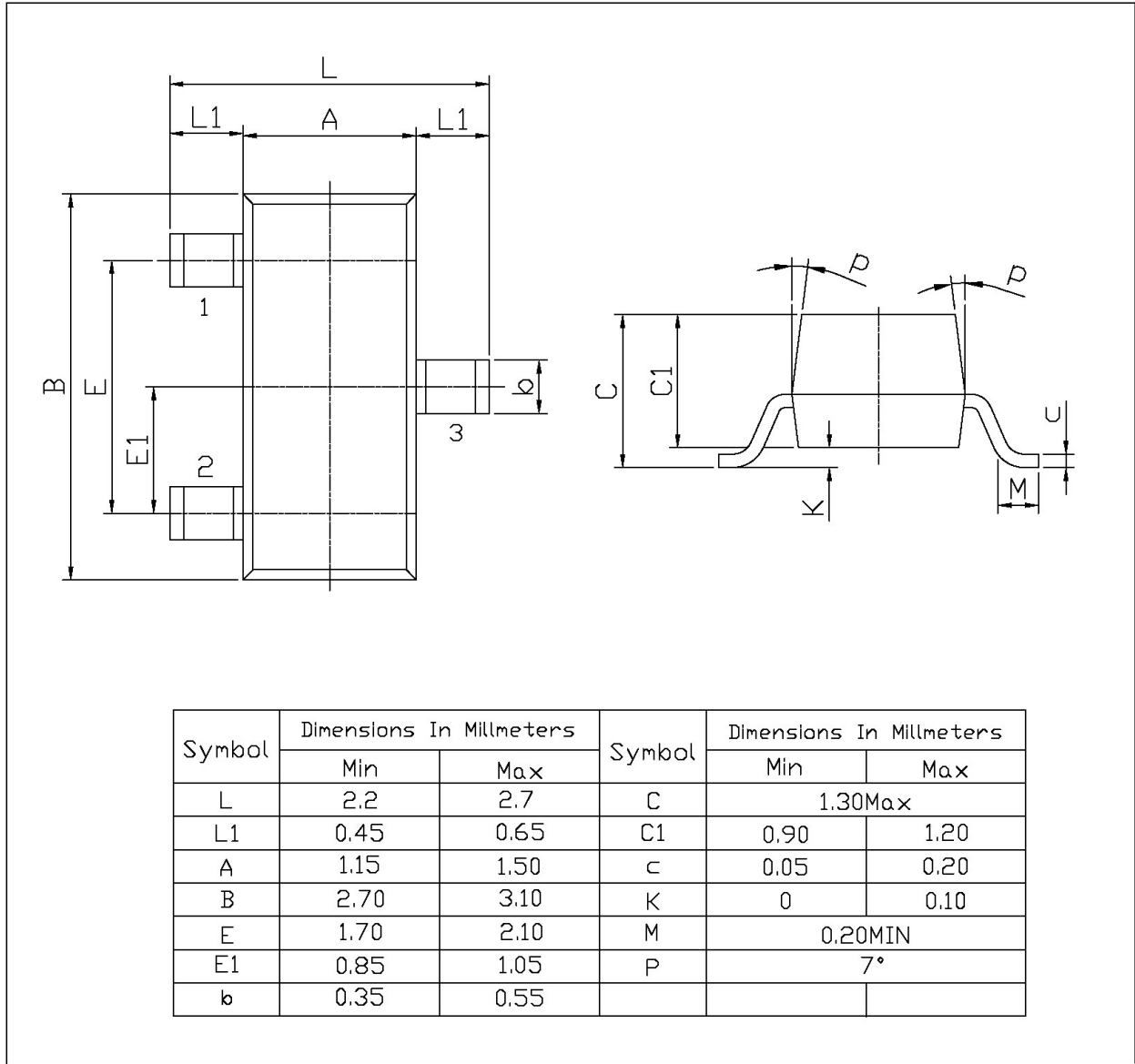


$V_{out} = \left(1 + \frac{R1}{R2}\right) V_{ref}$
 $V_{out\ min} = V_{ref} + V_{be}$
Series Pass Regulator

外形尺寸图 / Package Dimensions

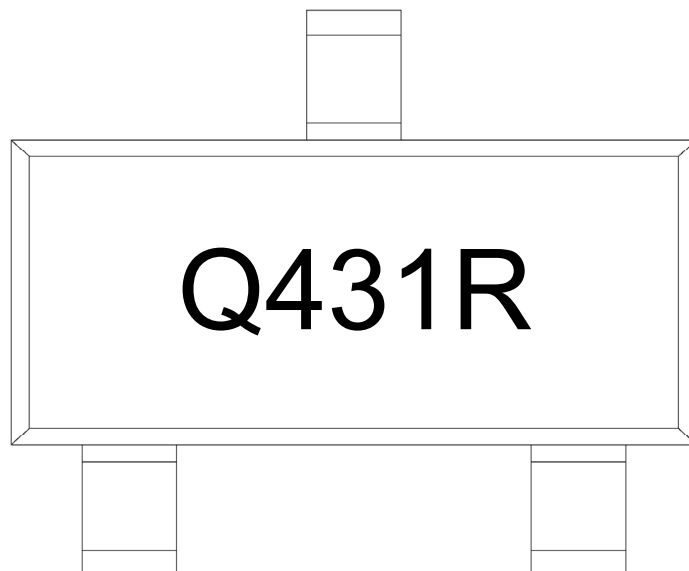
SOT-23

单位: mm



| Symbol | Dimensions In Millimeters | | Symbol | Dimensions In Millimeters | |
|--------|---------------------------|------|--------|---------------------------|------|
| | Min | Max | | Min | Max |
| L | 2.2 | 2.7 | C | 1.30Max | |
| L1 | 0.45 | 0.65 | C1 | 0.90 | 1.20 |
| A | 1.15 | 1.50 | c | 0.05 | 0.20 |
| B | 2.70 | 3.10 | K | 0 | 0.10 |
| E | 1.70 | 2.10 | M | 0.20MIN | |
| E1 | 0.85 | 1.05 | P | 7° | |
| b | 0.35 | 0.55 | | | |

印章说明 / Marking Instructions



说明：

Q： 为汽车无卤产品标识

431： 为型号代码

R： 表示与 BR431M 的 R 和 K 极相反排列

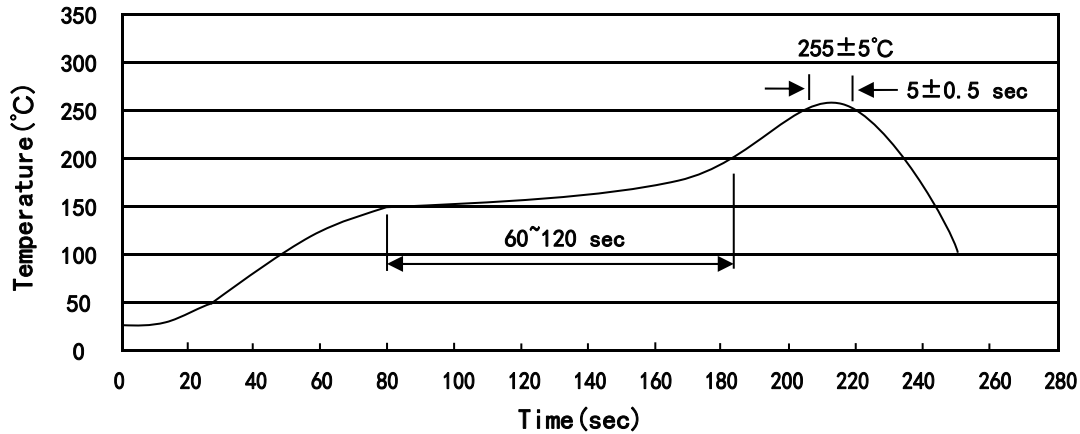
Note:

Q: Automobile halogen-free product Code

431: Product Type

R: It represents the opposite arrangement of R and K to BR431M

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 ~ 200°C，时间 60 ~ 120sec;
- 2、峰值温度 255±5°C，时间持续为 5±0.5sec;
- 3、焊接制程冷却速度为 2 ~ 10°C/sec.

Note:

- 1.Preheating:150~200°C, Time:60~120sec.
- 2.Peak Temp.:255±5°C, Duration:5±0.5sec.
3. Cooling Speed: 2~10°C/sec.

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

温度：260±5°C

时间：10±1 sec.

Temp.:260±5°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