

BRTL431MQ

Rev.A May.-2023

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 2.495V;允许电压误差为 0.5%,1%或 2%;阴极电流能力为 1.0mA ~ 100mA;快速导通;可调节输出电压为 $V_O=V_{ref} \sim 36V$;阴极工作电流低(典型值:50 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。

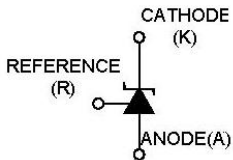
Precise reference voltage to 2.495V;guaranteed 0.5%,1% or 2% reference voltage Tolerance; sink current capability,1.0mA~100mA;quick turn-on; adjustable Output voltage, $V_O=V_{ref} \sim 36V$;low operational cathode current,50 μ A typical; 0.15 Ω typical output impedance, Qualified to AEC-Q100 Standards for High Reliability, HF Product.

途 / Applications

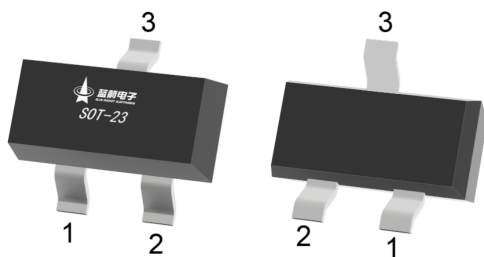
用于线性调整器,可调节电源和开关电源,满足汽车应用的严格要求。

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 : 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	150	°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=0.5%)	2.483	2.495	2.507	V
		V _{KA} =V _{REF} I _K =10mA(B=1%)	2.470	2.495	2.520	V
		V _{KA} =V _{REF} I _K =10mA(2%)	2.445	2.495	2.545	V
Deviation of Reference Input Voltage Over-Temperature	$\Delta V_{REF} / \Delta T$	V _{KA} =V _{REF} I _K =10mA T _A =-40~125°C		4.5	25	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		-0.5	-2.0	mV/V
Reference Input Current	I _{REF}	I _K =10mA R ₁ =10KΩ R ₂ =open		0.8	1.0	μA
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{REF} / \Delta T$	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}		0.05	0.08	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} f≤1.0KHz I _K =1mA to 100mA		0.15	0.5	Ω

电参数曲线图 / Electrical Characteristic Curve

Fig 1 Cathode Current Vs Cathode Voltage

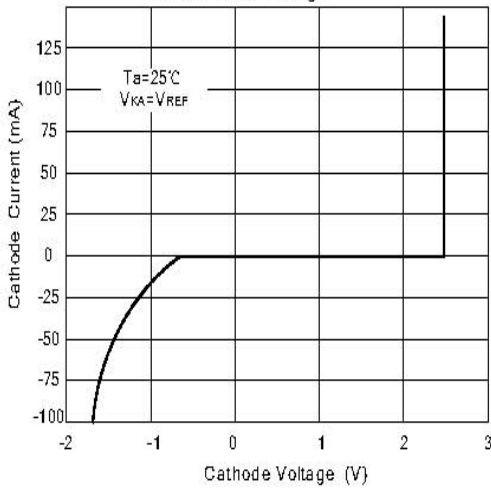


Fig 2 Cathode Current Vs Cathode Voltage

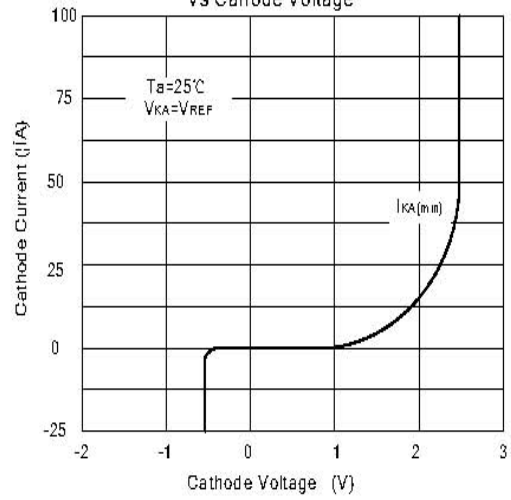


Fig 3 Change in Reference Input Voltage Vs Cathode voltage

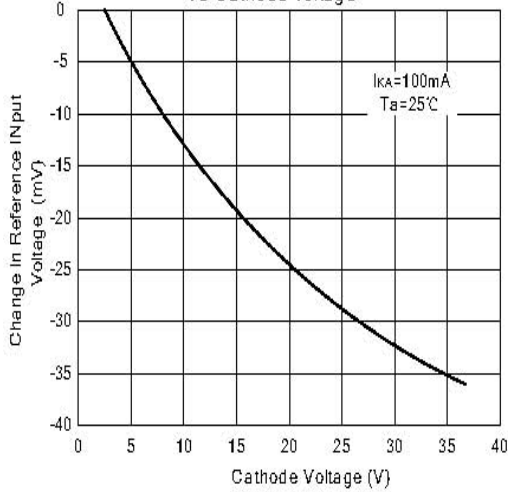


Fig 4 Pulse Response

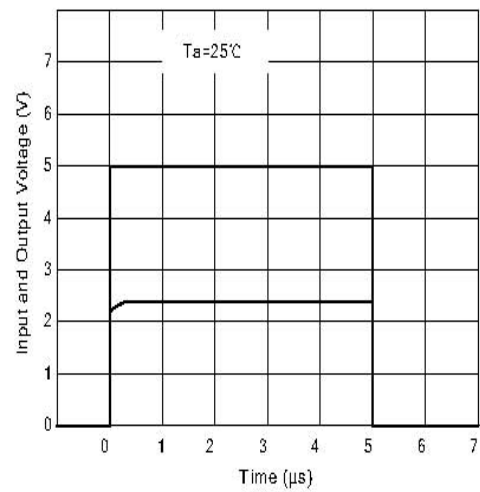


Fig 5 Dynamic Impedance Vs Frequency

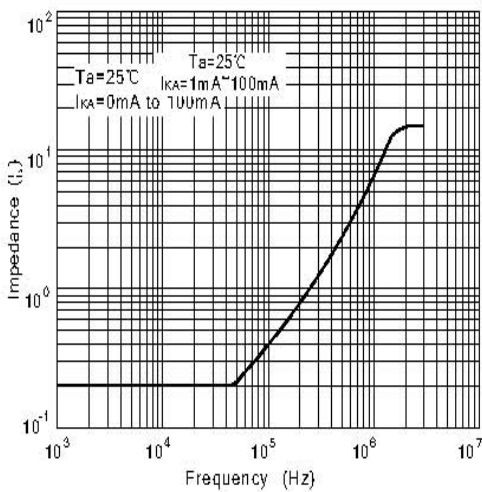
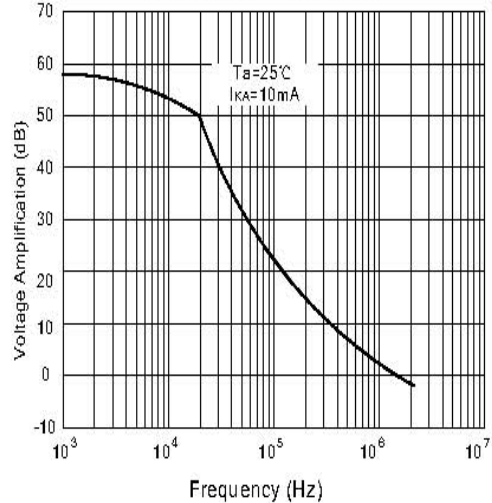


Fig 6 Small Signal Voltage Amplification Vs Frequency

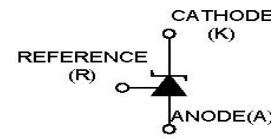
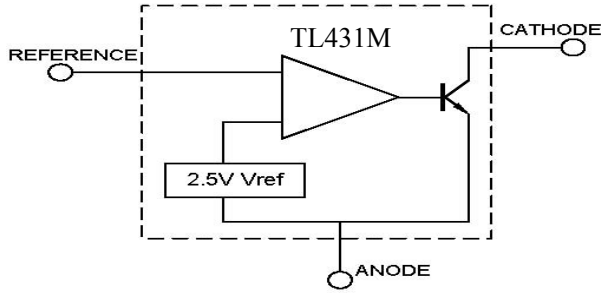


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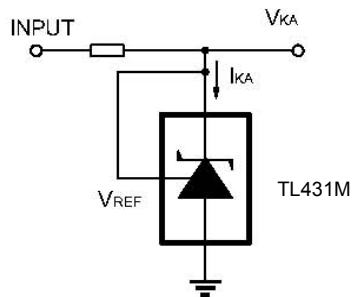
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测试电路图&典型应用图 Test circuits&Typical Application

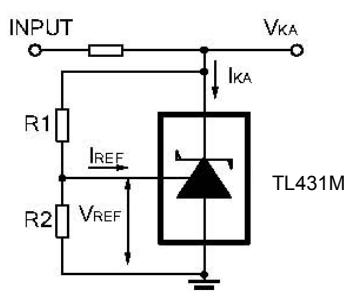
BLOCK DIAGRAM:



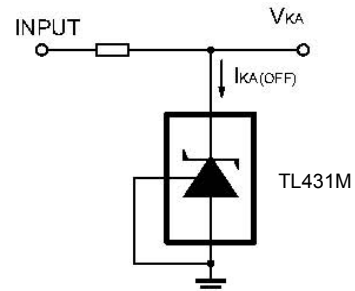
TEST CIRCUITS:



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

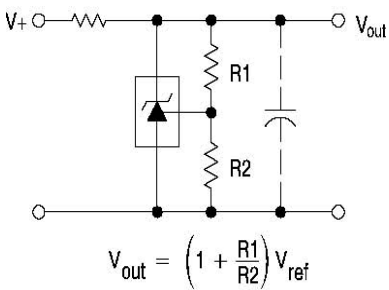


$V_{KA} = V_{REF} * (1 + R1/R2) + I_{REF} * R1$
Test Circuit for $V_{KA} \geq V_{REF}$

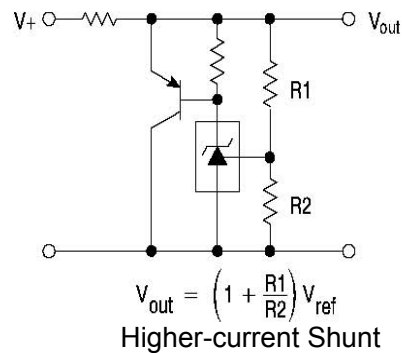


Test Circuit For $I_{KA(OFF)}$

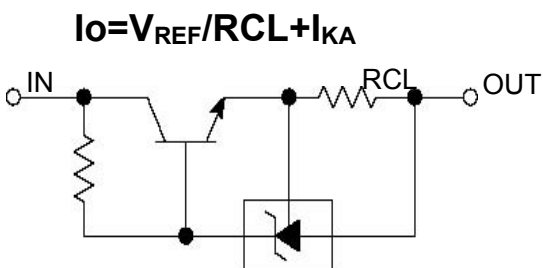
TYPICAL APPLICATION:



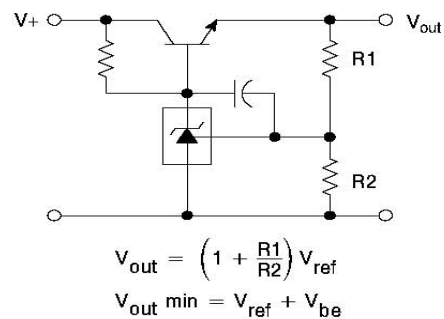
Shutdown Regulator



Higher-current Shunt



Constant Current Source TL431M

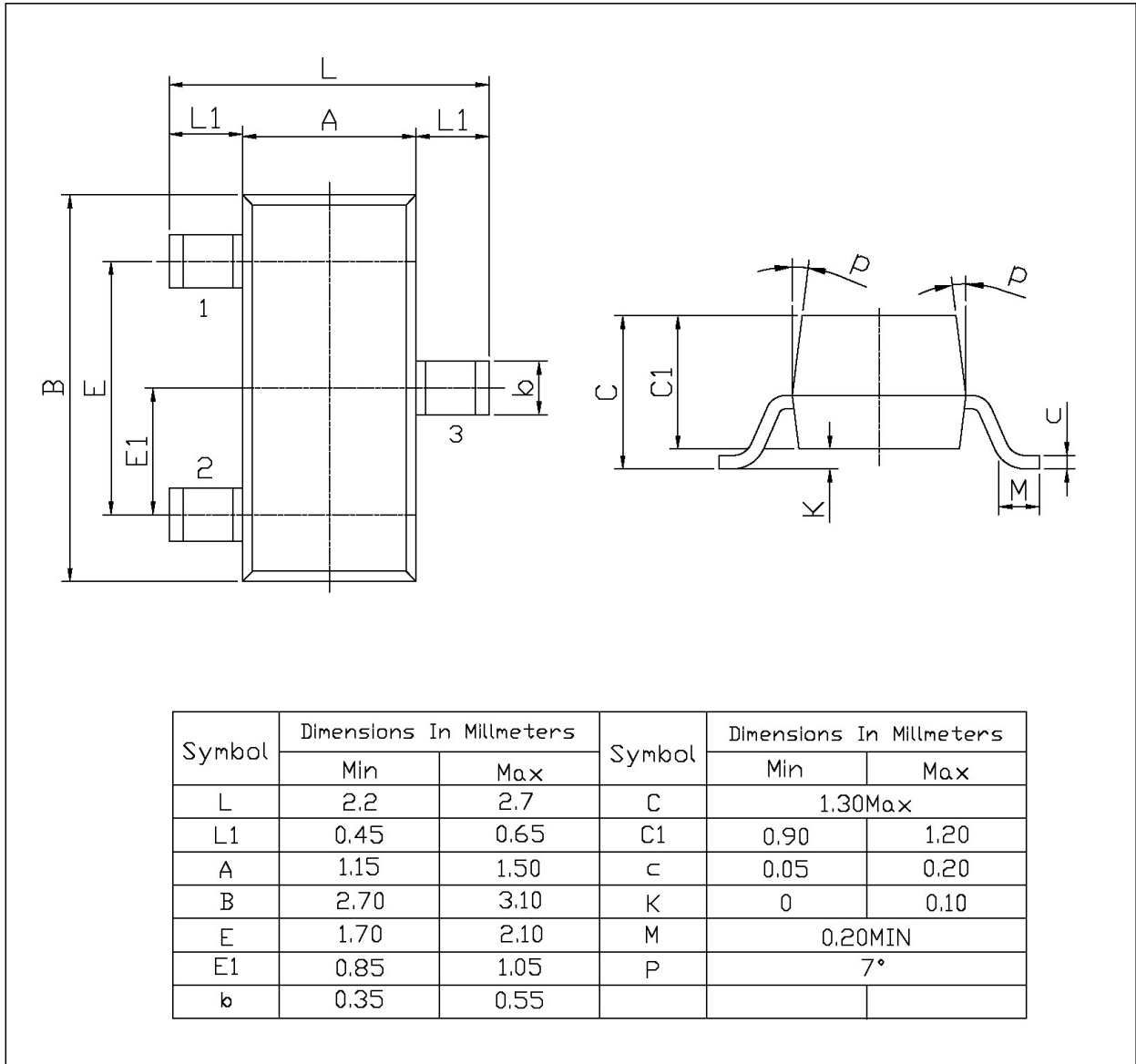


Series Pass Regulator

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

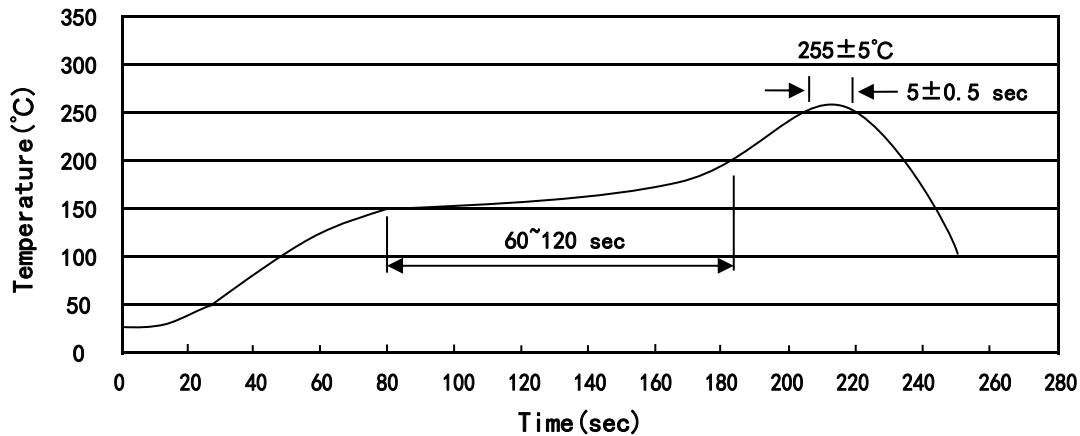
431： 为型号代码

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 150~200°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