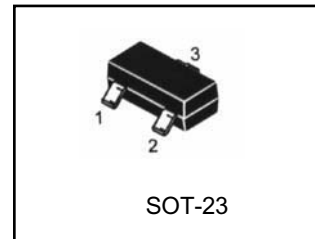


LTL431 LINEAR INTEGRATED CIRCUIT

PROGRAMMABLE PRECISION REFERENCE

DESCRIPTION

The LRC LTL431 is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{ref} (approximately 2.5V) and 36V with two external resistors. It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.



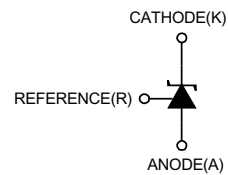
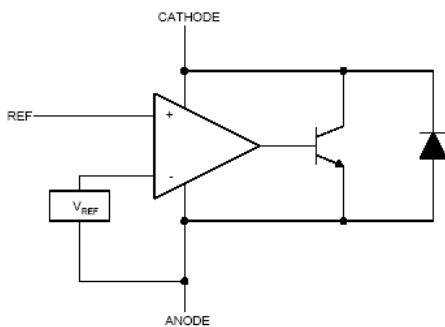
Pin 1: Cathode; 2: Ref; 3: Anode

FEATURES

- Programmable output Voltage to 36V.
- Low dynamic output impedance 0.2Ω .
- Sink current capability of 1 to 100mA.
- Equivalent full-range temperature coefficient of 50ppm / °C typical for operation over full rated operating temperature range.

Pb-Free package is available

BLOCK DIAGRAM



LTL431 LINEAR INTEGRATED CIRCUIT

ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

| PARAMETER | SYMBOL | VALUE | UNIT |
|-----------------------------------|------------------|--------------------|------|
| Cathode Voltage | V _{KA} | 36 | V |
| Cathode Current Range(Continuous) | I _{KA} | -100 ~ +150 | mA |
| Reference Input Current Range | I _{ref} | -0.05 ~ +10 | mA |
| Operating Junction Temperature | T _j | 150 | °C |
| Operating Ambient Temperature | T _{opr} | 0 ~ 70 / -40 ~ +85 | °C |
| Storage Temperature Temperature | T _{stg} | -65 ~ +150 | °C |

RECOMMENDED OPERATING CONDITIONS

| PARAMETER | SYMBOL | MIN | TYP | MAX | UNIT |
|-----------------|-----------------|------------------|-----|-----|------|
| Cathode Voltage | V _{KA} | V _{REF} | | 36 | V |
| Cathode Current | I _{KA} | 1 | | 100 | mA |

ELECTRICAL CHARACTERISTICS (T_a=25°C, unless otherwise specified)

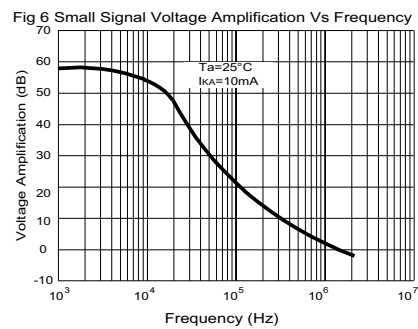
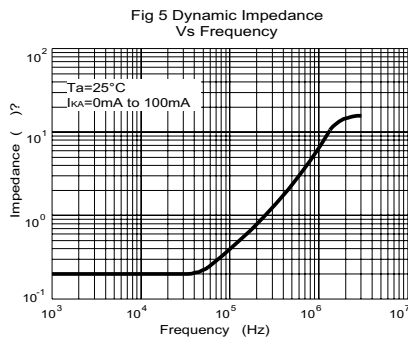
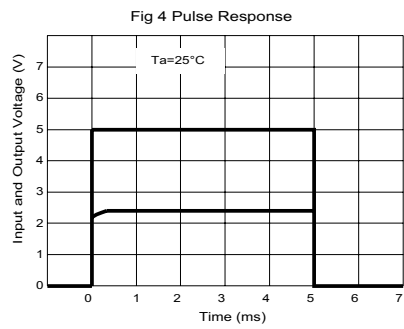
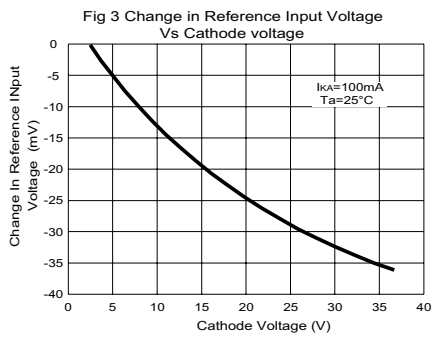
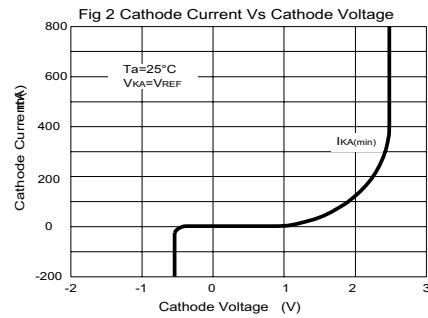
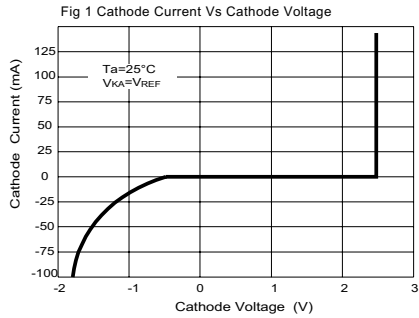
| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|--------------------------------------|---|-----|---------------|--------------|------|
| Reference Input Voltage * | V _{ref} | V _{KA} =V _{REF} , I _{KA} =10mA | | 2.50 2.495 | | V |
| Deviation of reference Input Voltage Over temperature(note 1) | ΔV _{ref} /ΔT | V _{KA} =V _{REF} , I _{KA} =10mA T _{MIN} ≤T _A ≤T _{MAX} | | 4.5 | 17 | mV |
| Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage | ΔV _{ref} / ΔV _{KA} | I _{KA} =10mA ΔV _{KA} =10V~V _{REF} ΔV _{KA} =36V~10V | | -1.0 -0.5 | -2.7 -2.0 | mV/V |
| Reference Input Current | I _{ref} | I _{KA} =10mA, R ₁ =10kΩ, R ₂ =∞ | | 1.5 | 4 | μA |
| Deviation of Reference Input Current Over Full Temperature Range | ΔI _{ref} /ΔT | I _{KA} =10mA, R ₁ =10kΩ, R ₂ =∞ T _A =full Temperature | | 0.4 | 1.2 | μA |
| Minimum Cathode Current for Regulation | I _{KA} (min) | V _{KA} =V _{REF} | | 0.45 | 1.0 | mA |
| Off-State Cathode Current | I _{KA} (OFF) | V _{KA} =36V, V _{REF} =0 | | 0.05 | 1.0 | μA |
| Dynamic Impedance | Z _{KA} | V _{KA} =V _{REF} , I _{KA} =1 to 100mA f≤1.0kHz | | 0.15 | 0.5 | Ω |

* CLASSIFICATION OF V_{ref} AND PACKAGE

| Type | RanK | Range(V) | Marking | Packa | T _{opr} |
|---------------|------|-------------|---------|--------|------------------|
| LTL431ALT1G | 0.5% | 2.487~2.512 | LA | SOT-23 | 0-70°C |
| LTL431BLT1G | 1% | 2.475~2.525 | LB | SOT-23 | 0-70°C |
| LTL431APLT1G | 0.5% | 2.482~2.507 | LA1 | SOT-23 | 0-70°C |
| LTL431BPLT1G | 1% | 2.470~2.520 | LB1 | SOT-23 | 0-70°C |
| LTL431ATLT1G | 0.5% | 2.487~2.512 | LA2 | SOT-23 | -40-85°C |
| LTL431BTLT1G | 1% | 2.475~2.525 | LB2 | SOT-23 | -40-85°C |
| LTL431APTLT1G | 0.5% | 2.482~2.507 | LA3 | SOT-23 | -40-85°C |
| LTL431BPTLT1G | 1% | 2.470~2.520 | LB3 | SOT-23 | -40-85°C |

LTL431 LINEAR INTEGRATED CIRCUIT

TYPICAL PERFORMANCE CHARACTERISTICS



LTL431 LINEAR INTEGRATED CIRCUIT

TEST CIRCUIT

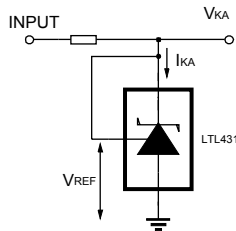


Fig 7 Test Circuit For $V_{KA}=V_{REF}$

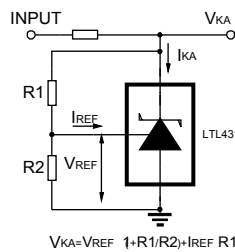


Fig 8 Test Circuit for $V_{KA} \geq V_{REF}$

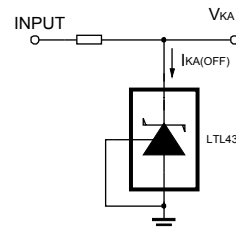


Fig 9 Test Circuit For $I_{KA(OFF)}$

APPLICATION CIRCUIT

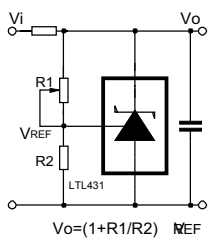


Fig 10 Shutdown Regulator

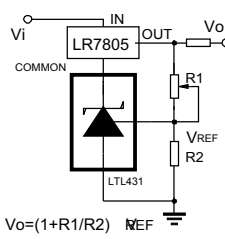


Fig 11 Output Control of a Three-Terminal Fixed Regulator

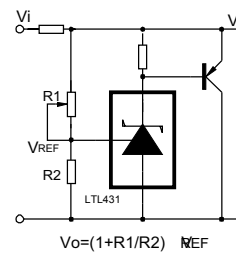


Fig 12 Higher-current Shunt Regulator

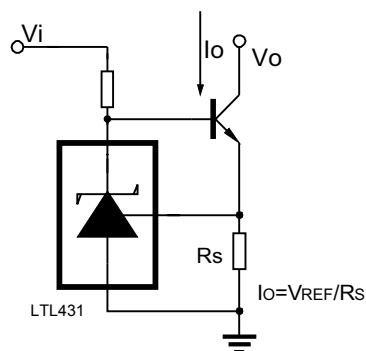


Fig 13 Constant-current Sink

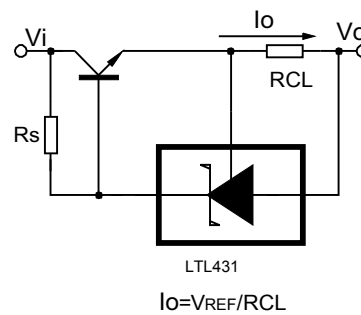
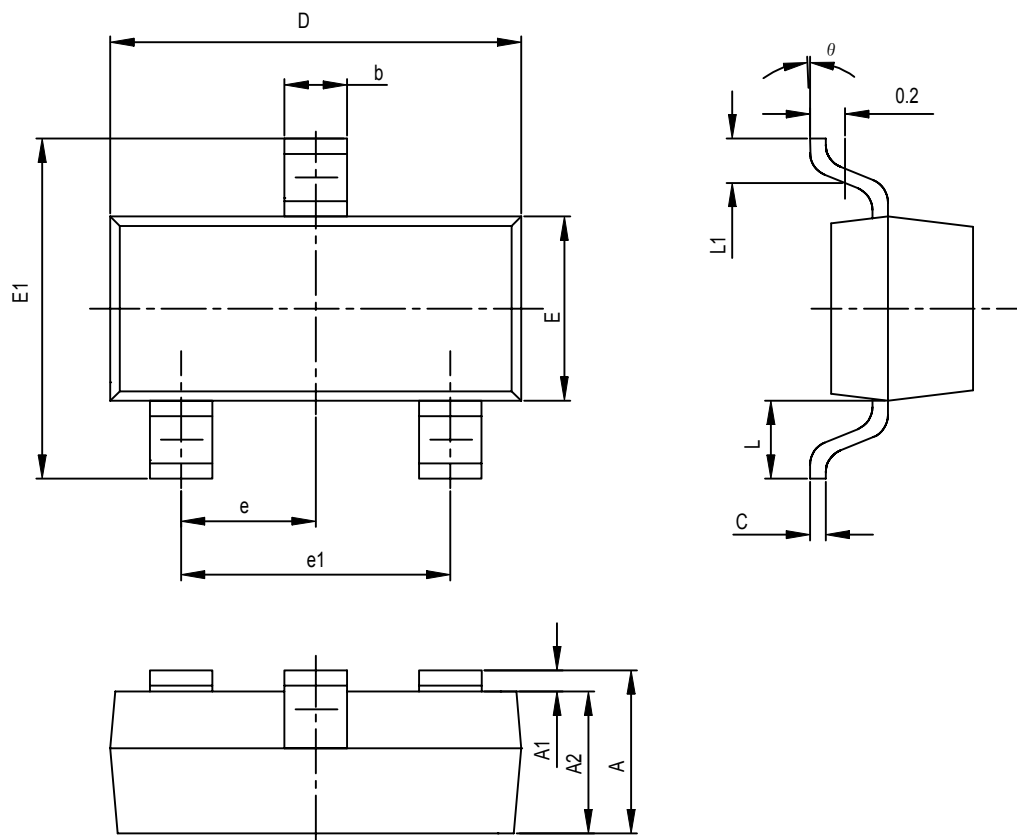


Fig 14 Current Limiting or Current Source

SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 0.900 | 1.100 | 0.035 | 0.043 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.000 | 0.035 | 0.039 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.100 | 0.110 | 0.118 |
| E | 1.200 | 1.610 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950TPY | | 0.037TPY | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550REF | | 0.022REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |