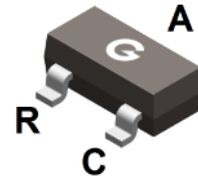
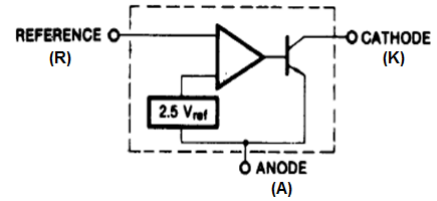


### Features

- Programmable output voltage to 36 volts
- Low dynamic output impedance 0.20 typical
- Sink current capability of 0.085 to 100mA
- Equivalent full-range temperature coefficient of 50ppm/°C typical
- Temperature compensated for operation over full rated operating temperature range
- Low output noise voltage
- Fast turn-on response
- Minimum Cathode Current for Regulation 50uA typ.
- RoHS compliant with Halogen-free

HF



SOT-23

### Mechanical Data

- Case: SOT-23
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

### Ordering Information

| Part Number | Package | Shipping Quantity      | Marking Code |
|-------------|---------|------------------------|--------------|
| BL431H      | SOT-23  | 3000 pcs / Tape & Reel | 431H         |
| BL431H-A    | SOT-23  | 3000 pcs / Tape & Reel | 431H         |
| BL431H-B    | SOT-23  | 3000 pcs / Tape & Reel | 431H         |

### Maximum Ratings (@ T<sub>A</sub> = 25°C unless otherwise specified)

| Parameter                                                                                      | Symbol             | Value       | Unit |
|------------------------------------------------------------------------------------------------|--------------------|-------------|------|
| Electrostatic discharge<br>Human-body model(HBM),per ANSI/ESDA/JEDEC JS-001 *1                 | V <sub>(ESD)</sub> | ±2000       | V    |
| Electrostatic discharge<br>Charged-device model(CDM), per JEDEC specification<br>JESD22C101 *2 |                    | ±1000       | V    |
| Cathode Voltage                                                                                | V <sub>KA</sub>    | 36          | V    |
| Cathode Current Range(Continuous)                                                              | I <sub>KA</sub>    | -100 ~ +150 | mA   |
| Reference Input Current Range                                                                  | I <sub>REF</sub>   | -0.05 ~ +10 | mA   |

Notes:

1. JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process. Manufacturing with less than 500-V HBM is possible with the necessary precautions.

2. JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process. Manufacturing with less than 250-V CDM is possible with the necessary precautions.

### Thermal Characteristics

| Parameter                          | Symbol          | Value      | Unit          |
|------------------------------------|-----------------|------------|---------------|
| Power Dissipation                  | $P_D$           | 350        | mW            |
| Thermal Resistance Junction-to-Air | $R_{\theta JA}$ | 350        | $^{\circ}C/W$ |
| Operating Temperature Range        | $T_{OPR}$       | -40 ~ +125 | $^{\circ}C$   |
| Junction Temperature               | $T_J$           | 150        | $^{\circ}C$   |
| Storage Temperature Range          | $T_{STG}$       | -65 ~ +150 | $^{\circ}C$   |

### Recommended Operating Condition

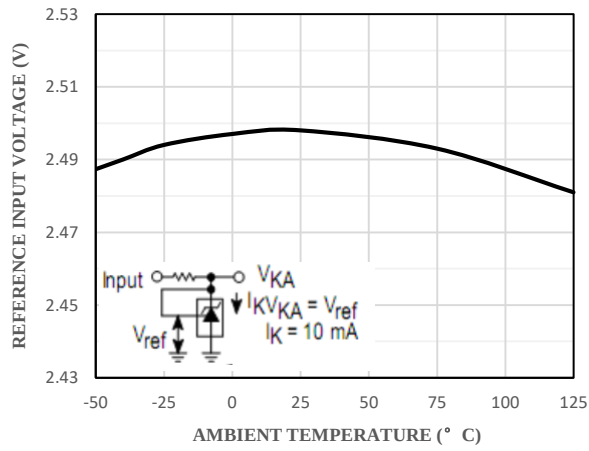
| Parameter       | Symbol   | Min.      | Typ. | Max. | Unit |
|-----------------|----------|-----------|------|------|------|
| Cathode Voltage | $V_{KA}$ | $V_{REF}$ | -    | 36   | V    |
| Cathode Current | $I_{KA}$ | 0.085     | -    | 100  | mA   |

### Electrical Characteristics (@ $T_A = 25^{\circ}C$ unless otherwise specified)

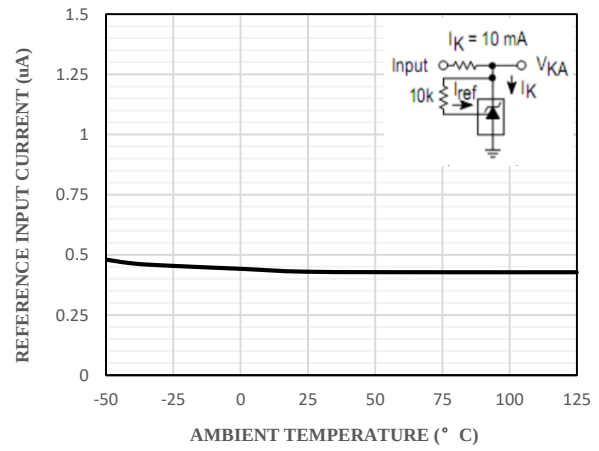
| Parameter                                                             | Symbol                         | Test Condition                                                                               | Min.                    | Typ.              | Max.                    | Unit     |
|-----------------------------------------------------------------------|--------------------------------|----------------------------------------------------------------------------------------------|-------------------------|-------------------|-------------------------|----------|
| Reference voltage                                                     | $V_{REF}$                      | $V_{KA} = V_{REF}$ , $I_{KA} = 10mA$<br>BL431H-A (0.5%)<br>BL431H (1%)<br>BL431H-B (2%)      | 2.488<br>2.475<br>2.450 | 2.5<br>2.5<br>2.5 | 2.512<br>2.525<br>2.550 | V        |
| Deviation of Reference Voltage Over Full Temperature Range            | $\Delta V_{REF}/\Delta T$      | $V_{KA} = V_{REF}$ , $I_{KA} = 10mA$ ,<br>$T_{MIN} \leq T_A \leq T_{MAX}$                    | -                       | 8                 | 17                      | mV       |
| Ratio of Change in Reference Voltage to the Change in Cathode Voltage | $\Delta V_{REF}/\Delta V_{KA}$ | $I_{KA} = 10mA$ , $\Delta V_{KA} = 10V - V_{REF}$                                            | -                       | -1.0              | -2.7                    | mV/V     |
|                                                                       |                                | $\Delta V_{KA} = 36V - 10V$                                                                  | -                       | -0.5              | -2.0                    | mV/V     |
| Reference Current                                                     | $I_{REF}$                      | $I_{KA} = 10mA$ ,<br>$R_1 = 10K\Omega$ , $R_2 = \infty$                                      | -                       | 0.4               | 4                       | $\mu A$  |
| Deviation of Reference Current Over Full Temperature Range            | $\Delta I_{REF}$               | $I_{KA} = 10mA$ ,<br>$R_1 = 10K\Omega$ , $R_2 = \infty$ ,<br>$T_{MIN} \leq T_A \leq T_{MAX}$ | -                       | 0.5               | 1.2                     | $\mu A$  |
| Minimum Cathode Current for Regulation                                | $I_{KA(MIN)}$                  | $V_{KA} = V_{REF}$                                                                           | -                       | 50                | 85                      | $\mu A$  |
| Off-state Cathode Current                                             | $I_{KA(OFF)}$                  | $V_{KA} = 36V$ , $V_{REF} = 0$                                                               | -                       | 0.05              | 1.0                     | $\mu A$  |
| Dynamic Impedance                                                     | $Z_{KA}$                       | $V_{KA} = V_{REF}$ , $f \leq 1KHz$<br>$I_{KA} = 1$ to $100mA$                                | -                       | 0.2               | 0.5                     | $\Omega$ |

•  $T_{MIN} = -40^{\circ}C$ ,  $T_{MAX} = +125^{\circ}C$

**TYPICAL CHARACTERISTICS** (@  $T_A = 25^\circ\text{C}$  unless otherwise specified)

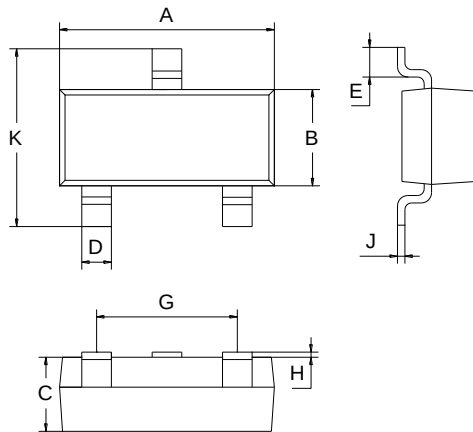


**Fig 1 Reference Input Voltage vs. Temperature**



**Fig 2 Reference Input Current vs. Temperature**

**Package Outline Dimensions** (Unit: mm)



| SOT-23    |      |      |
|-----------|------|------|
| Dimension | Min. | Max. |
| A         | 2.70 | 3.10 |
| B         | 1.10 | 1.50 |
| C         | 0.9  | 1.1  |
| D         | 0.3  | 0.5  |
| E         | 0.35 | 0.48 |
| G         | 1.80 | 2.00 |
| H         | 0.02 | 0.1  |
| J         | 0.05 | 0.15 |
| K         | 2.20 | 2.60 |

**Package Outline Dimensions** (Unit: mm)

**SOT-23**

