

### Features

- The output voltage can be adjusted to 36V.
- Low dynamic output impedance, its typical value is  $0.2\Omega$
- Trapping current capability is 1 to 100mA
- Low output noise voltage
- Fast on-state response
- The effective temperature compensation in the working range of full temperature
- The typical value of the equivalent temperature factor in the whole temperature scope is  $50 \text{ ppm}/^\circ\text{C}$

### Mechanical data

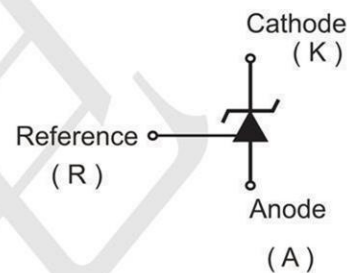
- Case: SOT-23, molded plastic.
- Terminals: solderable per MIL-STD-750, method 2026.

### Package and Pin Configuration

#### SOT-23



#### Circuit diagram



### Absolute Maximum Ratings

(operating temperature range applies unless otherwise specified)

| Parameter                                   | Symbol          | Value     | Unit                      |
|---|-----------------|-----------|---------------------------|
| Cathode voltage                             | $V_{KA}$        | 37        | V                         |
| Cathode current range (continuous)          | $I_{KA}$        | -100~+150 | mA                        |
| Reference input current range               | $I_{ref}$       | 0.05~+10  | mA                        |
| Power dissipation                           | $P_D$           | 300       | mW                        |
| Thermal resistance from junction to ambient | $R_{\theta JA}$ | 417       | $^\circ\text{C}/\text{W}$ |
| Operating junction temperature              | $T_J$           | 150       | $^\circ\text{C}$          |
| Operating ambient temperature range         | $T_{opr}$       | -40~+85   | $^\circ\text{C}$          |
| Storage temperature range                   | $T_{stg}$       | -65~+150  | $^\circ\text{C}$          |

## Encapsulate Adjustable Reference Source

### Electrical Characteristics (Ta=25°C unless otherwise specified)

| Parameter   | Symbol                           | Conditions  | Min.                                      | Typ. | Max.  | Unit          |
|---|----------------------------------|---|---|------|-------|---------------|
| Reference input voltage (Fig.1)   | $V_{ref}$                        | $V_{KA} = V_{REF}, I_{KA} = 10\text{mA}$  | 2.470                                     |      | 2.520 | V             |
| Deviation of reference input voltage over temperature (note) (Fig.1)                | $\Delta V_{ref} / \Delta T$      | $V_{KA} = V_{REF}, I_{KA} = 10\text{mA}$<br>$T_{min} \leq T_a \leq T_{max}$                         |   | 4.5  | 17    | mV            |
| Ratio of change in reference input voltage to the change in cathode voltage (Fig.2) | $\Delta V_{ref} / \Delta V_{KA}$ | $I_{KA} = 10\text{mA}$  | $\Delta V_{KA} = 10\text{V} - V_{REF}$    | -1.0 | -2.7  | mV/V          |
|   |                                  |   | $\Delta V_{KA} = 36\text{V} - 10\text{V}$ | -0.5 | -2.0  | mV/V          |
| Reference input current (Fig.2)   | $I_{ref}$                        | $I_{KA} = 10\text{mA}, R_1 = 10\text{k}\Omega$<br>$R_2 = \infty$                                    |   | 1.5  | 4     | $\mu\text{A}$ |
| Deviation of reference input current over full temperature range (Fig.2)            | $\Delta I_{ref} / \Delta T$      | $I_{KA} = 10\text{mA}, R_1 = 10\text{k}\Omega$<br>$R_2 = \infty$<br>$T_a = \text{full Temperature}$ |   | 0.4  | 1.2   | $\mu\text{A}$ |
| Minimum cathode current for regulation (Fig.1)                                      | $I_{KA(min)}$                    | $V_{KA} = V_{REF}$  |   | 0.45 | 1.0   | mA            |
| Off-state cathode current (Fig.3)   | $I_{KA(OFF)}$                    | $V_{KA} = 40\text{V}, V_{REF} = 0$  |   | 0.05 | 0.5   | $\mu\text{A}$ |
| Dynamic impedance   | $Z_{KA}$                         | $V_{KA} = V_{REF}, I_{KA} = 1\text{ to }100\text{mA}$<br>$f \leq 1.0\text{kHz}$                     |   | 0.15 | 0.5   | $\Omega$      |

Note:  $T_{MIN} = 0^\circ\text{C}, T_{MAX} = +70^\circ\text{C}$

### Classification of $V_{ref}$

| Rank  | 0.5%          | 1%          |
|-------|---------------|-------------|
| Range | 2.482 - 2.508 | 2.47 - 2.52 |

Fig.1 - Test Circuit for  $V_{KA} = V_{ref}$

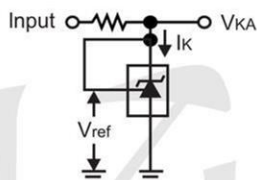
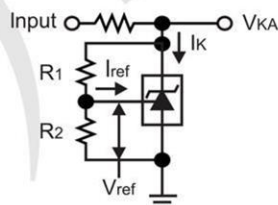
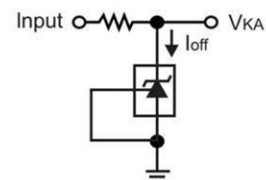


Fig.2 - Test Circuit for  $V_{KA} > V_{ref}$



$$V_{KA} = V_{ref} (1 + R_1/R_2) + I_{ref} \cdot R_1$$

Fig.3 - Test Circuit for  $I_{off}$





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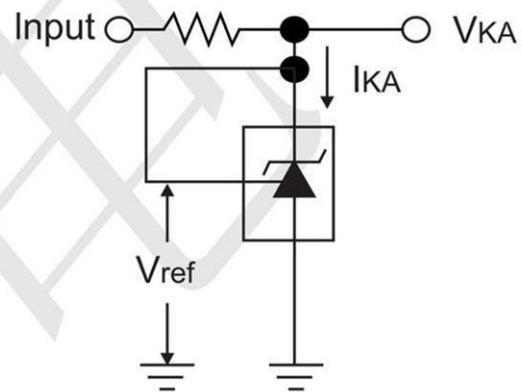
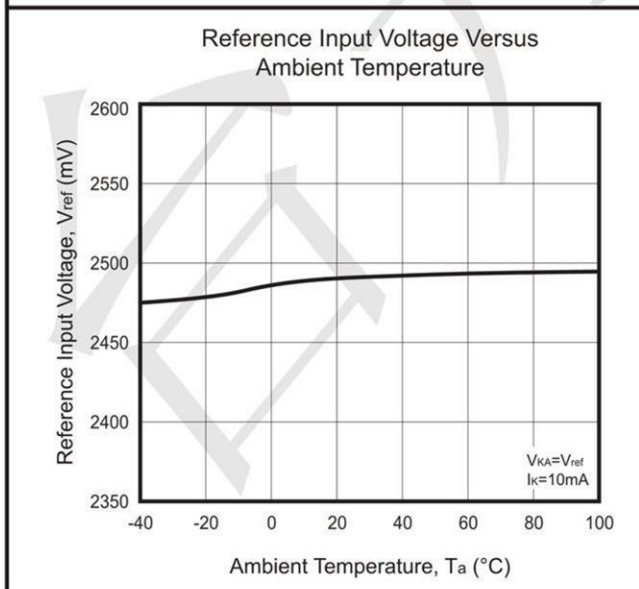
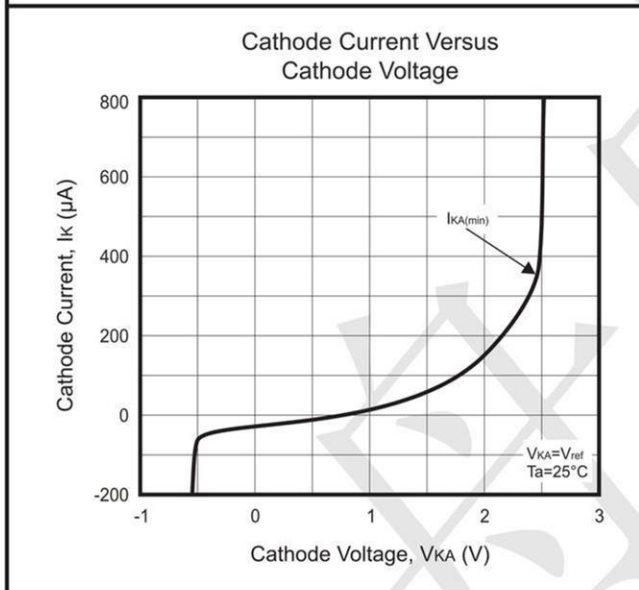
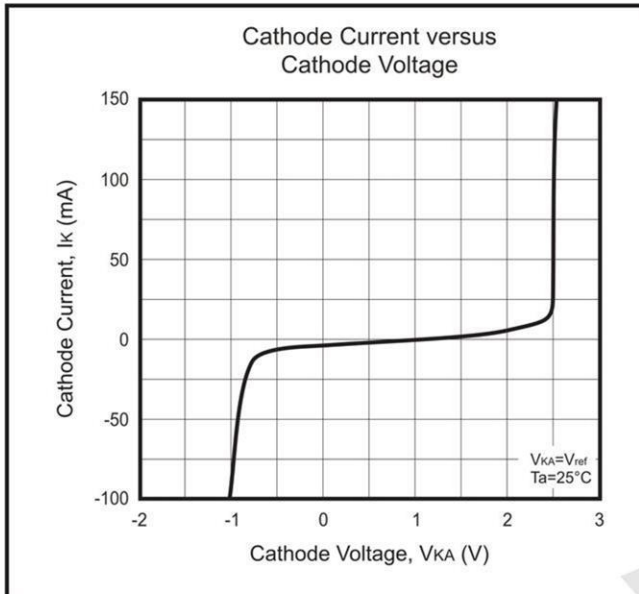
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TL431G

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[www.sot23.com.tw](http://www.sot23.com.tw)

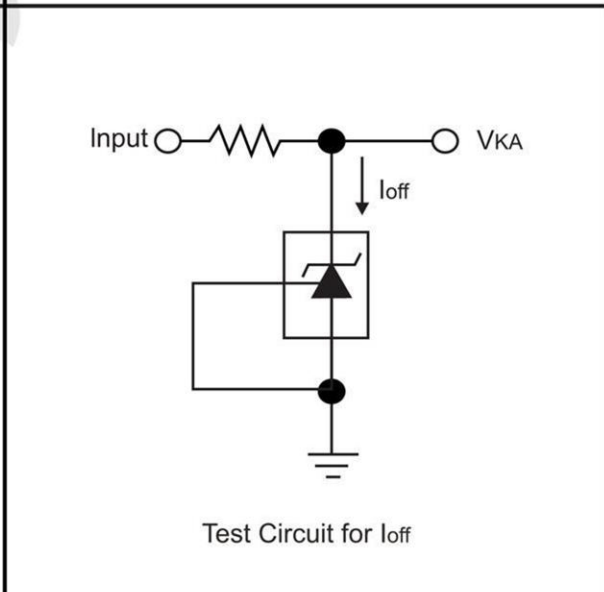
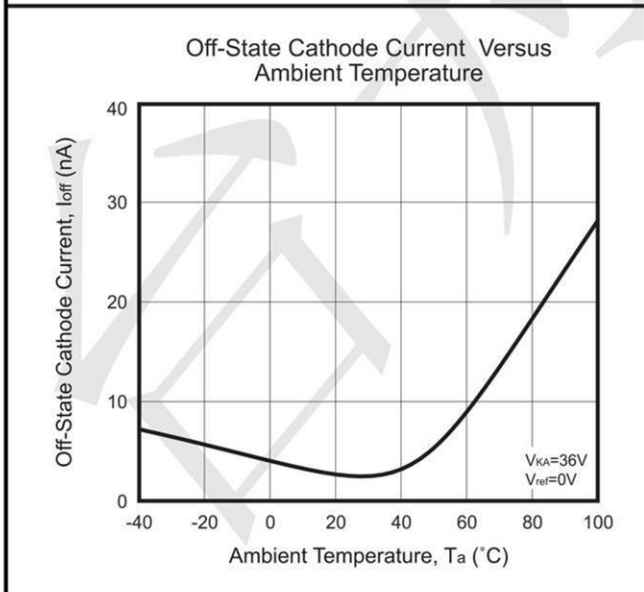
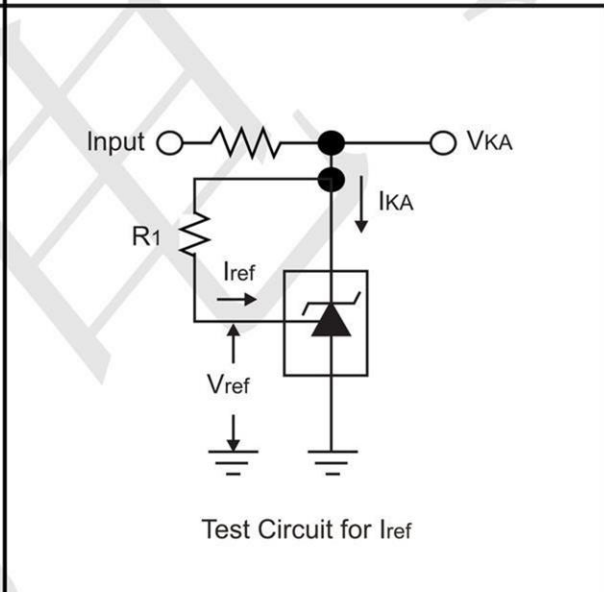
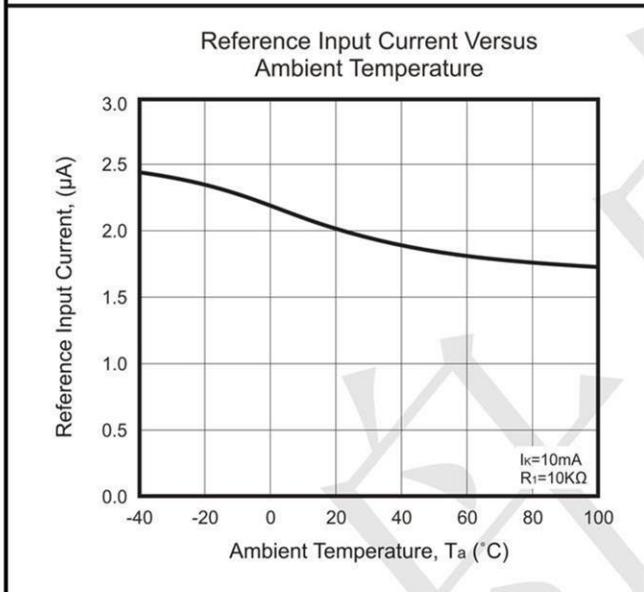
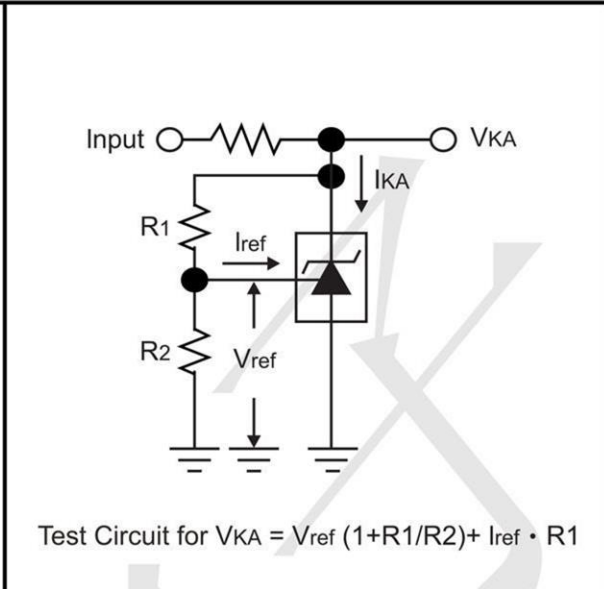
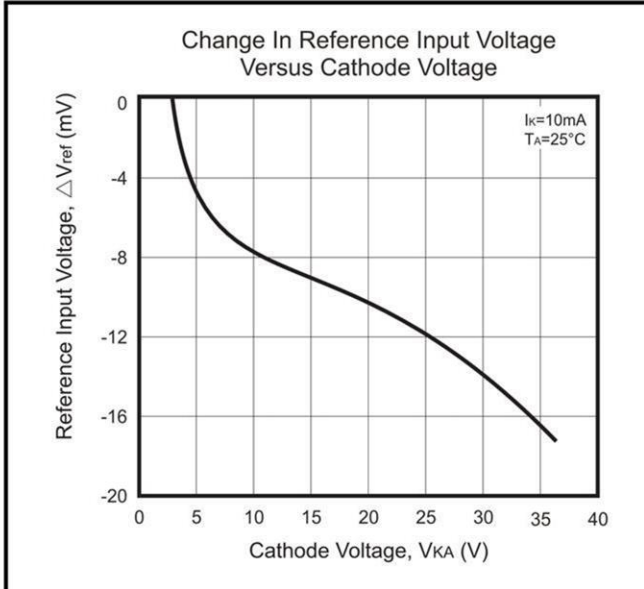
## Typical Electrical and Thermal Characteristics



Test Circuit for  $V_{KA} = V_{ref}$

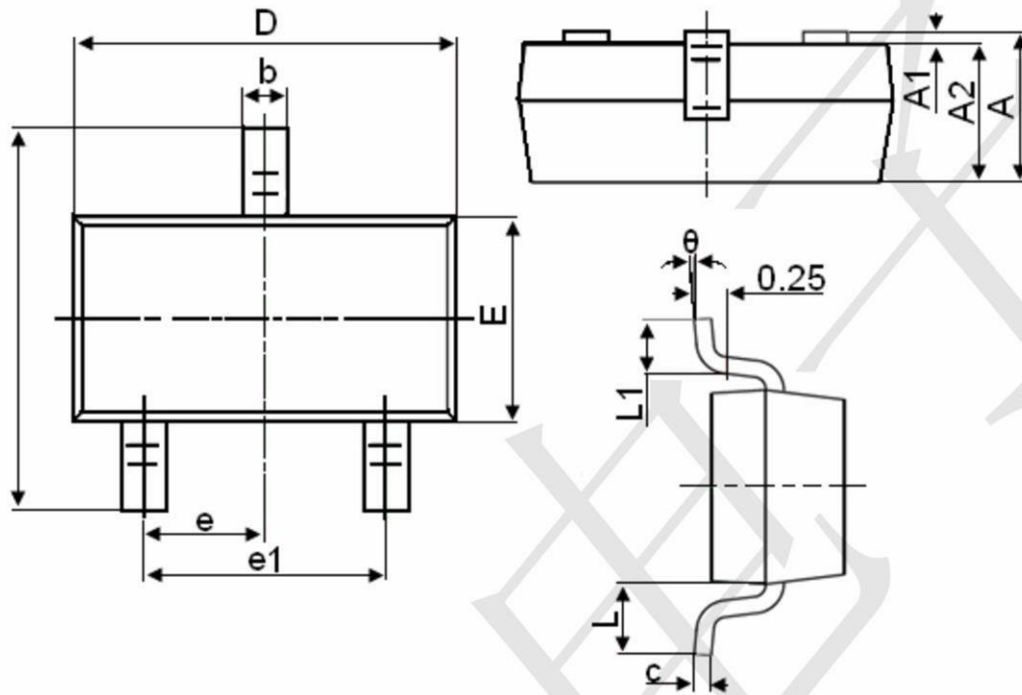


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SOT-23 Package Information



| Symbol | Dimensions in Millimeters |       |
|--------|---------------------------|-------|
|        | MIN.                      | MAX.  |
| A      | 0.900                     | 1.150 |
| A1     | 0.000                     | 0.100 |
| A2     | 0.900                     | 1.050 |
| b      | 0.300                     | 0.500 |
| c      | 0.080                     | 0.150 |
| D      | 2.800                     | 3.000 |
| E      | 1.200                     | 1.400 |
| E1     | 2.250                     | 2.550 |
| e      | 0.950TYP                  |       |
| e1     | 1.800                     | 2.000 |
| L      | 0.550REF                  |       |
| L1     | 0.300                     | 0.500 |
| θ      | 0°                        | 8°    |



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