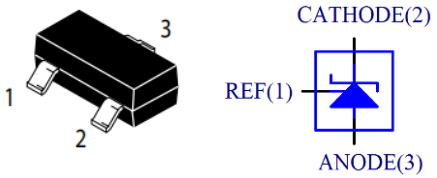
# NH432AT,BT

Three-terminal precision voltage regulator

| VOLTAGE: | 18 Volts | CURRENT: | 100 mA |
|---|---|---|---|

SOT-23 Marking and Polarity

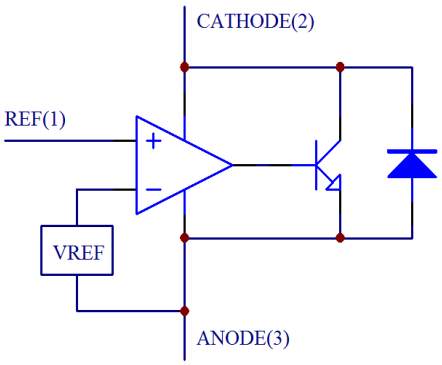



## FEATURES

- Programmable output Voltage to 18V.
- Sink current capability of 1 to 100mA.
- ESD:HBM 7000V

## DESCRIPTION

The NH431 series is a Three-terminal precision voltage regulator with a guaranteed thermal stability over applicable temperature ranges.The output voltage may be set to any value between Vref(app. 1.24V) and 18v with two external resistors.It provides very wide applications,including shunt regunator, series regulator,switching regulator,voltage reference and others.




## DEVICE MARKING

| Device | RanK | Marking |
|---|---|---|
| NH432AT | ±1% | RAS |
| NH432BT | ±0.5% | RBS |

## Absolute Maximum Ratings (Ratings at 25℃ ambient temperature unless otherwise specified.)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Cathode Voltage | $V_{KA}$ | 18 | V |
| Cathode Current(Continuous) | $I_{KA}$ | 100 | mAdc |
| Reference Input Current Range | $I_{REF}$ | 10 | mAdc |

## Recommended Operating Condutions

| Parameter | Symbol | NH432AT,BT | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Cathode Voltage | $V_{KA}$ | 1.24 | - | 18 | V |
| Cathode Current | $I_{KA}$ | 0.5 | - | 100 | mAdc |

## Thermal Characteristics

| Parameter | Symbol | NH432AT,BT | Unit |
|---|---|---|---|
| Thermal Resistance,Junction to Ambient | $R_{\theta JA}$ | 206 | °C/W |
| Operating Ambient Temperature | $T_{OPR}$ | -40 to +125 | °C |
| Junction Temperature | $T_j$ | 150 | |
| Storage Temperature | $T_{Stg}$ | -65 to +150 | |

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## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

| Characteristic | Test Condition | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Reference Input Voltage 0.50% | Vka=Vref,IKA=10mA | $V_{REF}$ | 1.234 | 1.24 | 1.246 | Vdc |
| Reference Input Voltage 1.00% | | | 1.228 | 1.24 | 1.252 | |
| Deviation of reference Input Voltage Over Temperature | Vka=Vref,IKA=10mA, -40°C≦Ta≦Tmax. | $\Delta V_{REF}$ | - | 8 | 25 | mV |
| Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage | IKA=10mA,△VKA=VREF~16V | $\Delta V_{REF}/\Delta V_{KA}$ | - | -0.5 | -1.5 | mV/V |
| Reference Input Current | IKA=10mA,R1=10KΩ,R2=∞ | $I_{REF}$ | - | 0.15 | 0.4 | uAdc |
| Deviation of reference Input Current Over Full Temperature Range | IKA=10mA,R1=10KΩ,R2=∞, TA=-20~85°C | $\Delta I_{REF}$ | - | 0.1 | 0.4 | uAdc |
| Min. Cathode Current for regulation | VKA=Vref | $I_{KA}$ (min.) | - | 55 | 80 | uA |
| Off-state Cathode Current | VKA=18V,Vref=0V | $I_{KA}$ (OFF) | | 0.04 | 0.5 | uA |
| Dynamic Impedance | VKA=Vref,IKA=1~100mA,f≦1KHz | $Z_{KA}$ | | 0.05 | 0.15 | Ω |

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## RATINGANDCHARACTERISTICCURVES

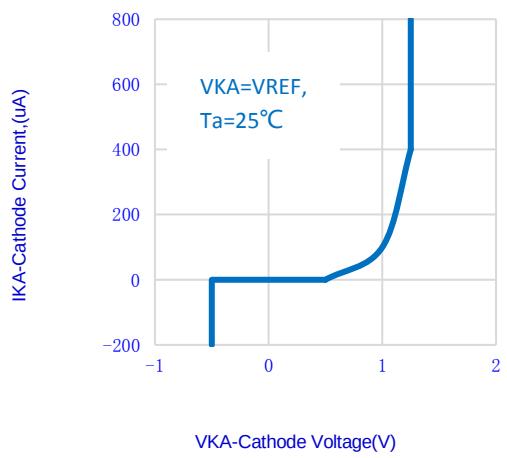



Fig.1-Cathode Current Vs Cathode Voltage

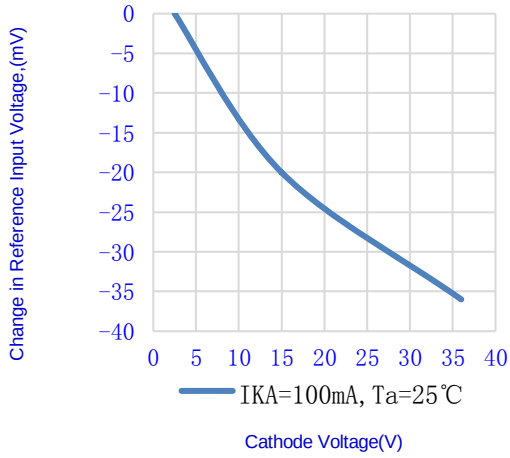



Fig.2-CHANGE IN REFERENCE INPUT VOLTAGE VS CATHODE VOLTAGE

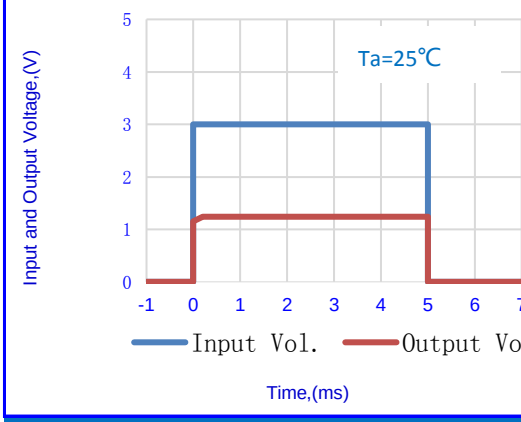



Fig.3- PULSE RESPONSE

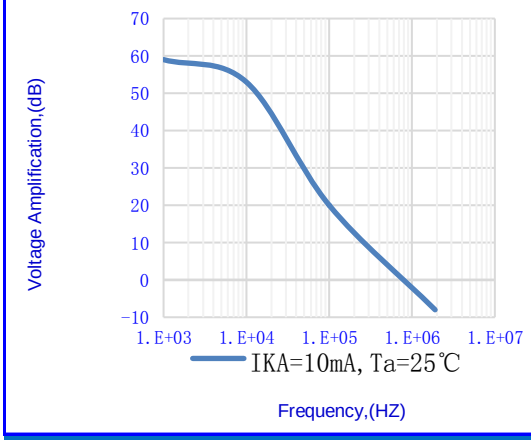



Fig.4- SMALL SIGNAL VOLTAGE AMPLIFICATION VS FREQUENCY

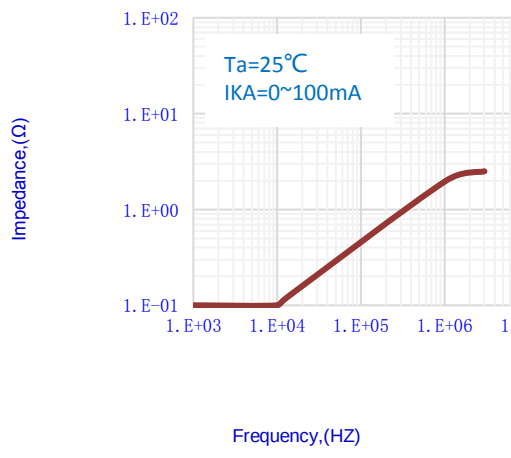
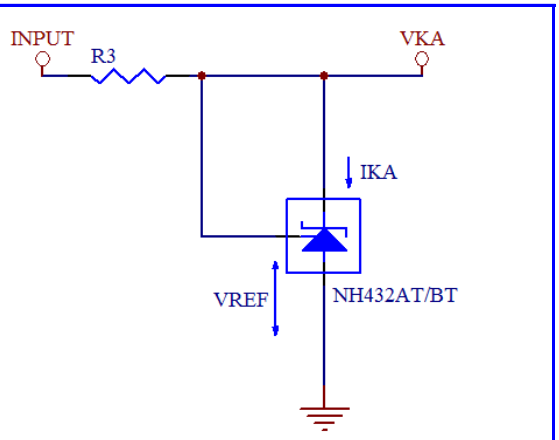



Fig.5--DYNAMIC IMPEDANCE VS FREQUENCY

# NH432AT,BT

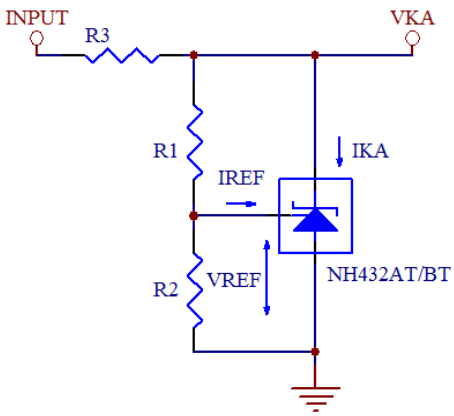
Three-terminal precision voltage regulator

## TEST CIRCUIT



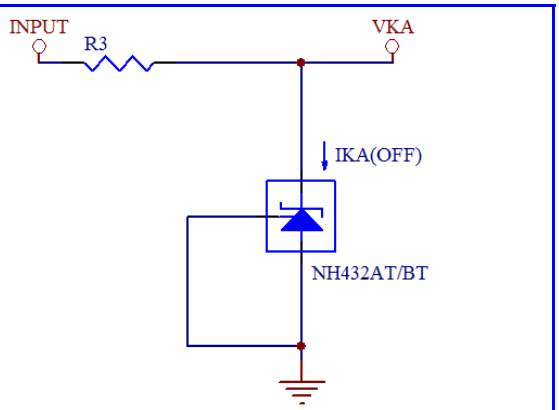

FOR VKA=VREF

Fig.7-TEST CIRCUIT



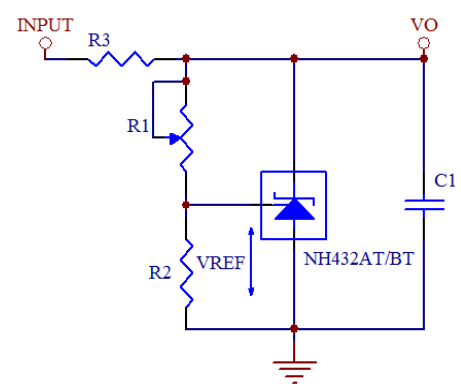

FOR VKA≥VREF,VKA=VREF(1+R1/R2)+IREF*R1

Fig.8-TEST CIRCUIT



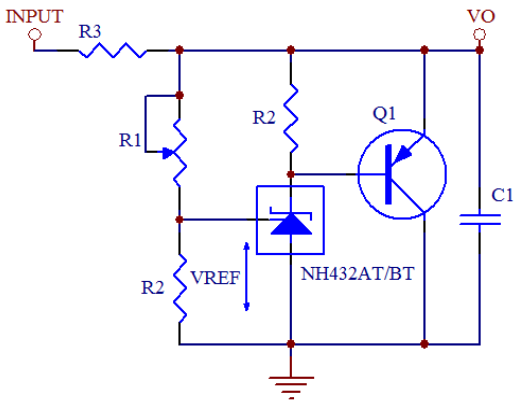

FOR IKA(OFF)

Fig.9-TEST CIRCUIT



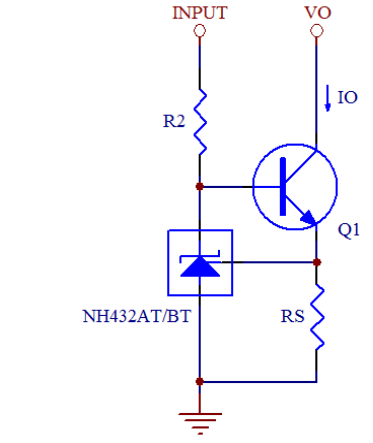

VO=VREF(1+R1/R2)

Fig.10- APPLICATION CIRCUIT,SHORTDOWM REGULATOR




VO=VREF(1+R1/R2)

Fig.11-APPLICATION CIRCUIT,HIGH-CURRENT SHORTDOWM REGULATOR




IO=VREF/RS

Fig.12-APPLICATION CIRCUIT,CONSTANT-CURRENT SINK

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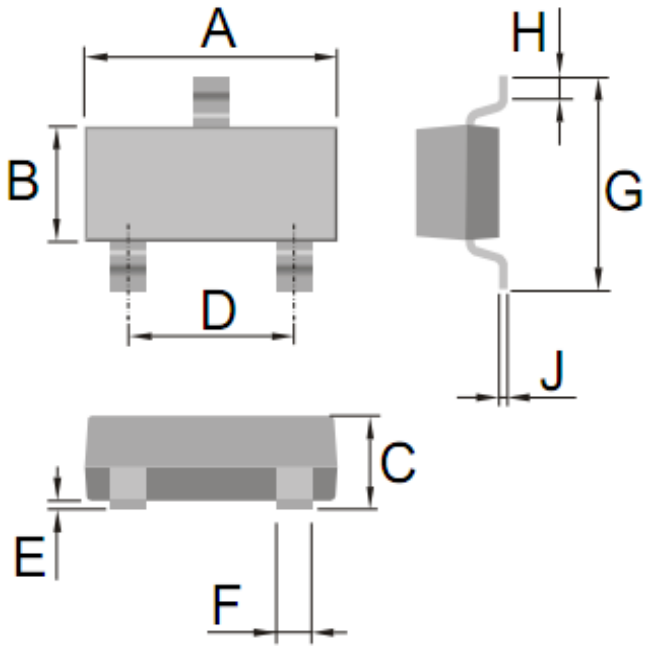
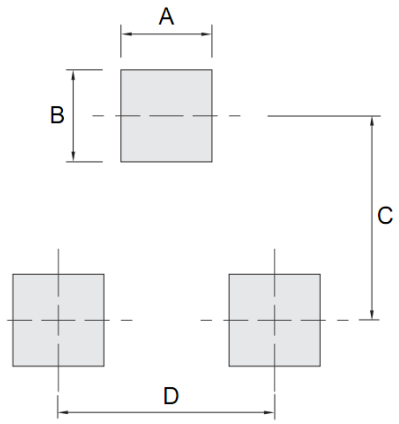
## OUTLINE DRAWINGS — SOT-23




**OUTLINE DIMENSIONS**

| Dim. | Milimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.800 | - | 3.020 | 0.1102 | - | 0.1189 |
| B | 1.200 | - | 1.400 | 0.0472 | - | 0.0551 |
| C | 0.890 | - | 1.110 | 0.0350 | - | 0.0437 |
| D | 1.780 | - | 2.040 | 0.0701 | - | 0.0803 |
| E | 0.000 | - | 0.100 | 0.0000 | - | 0.0039 |
| F | 0.300 | - | 0.500 | 0.0118 | - | 0.0197 |
| G | 2.100 | - | 2.640 | 0.0827 | - | 0.1039 |
| H | 0.300 | - | 0.600 | 0.0118 | - | 0.0236 |
| J | 0.100 | - | 0.200 | 0.0039 | - | 0.0079 |

## RECOMMEDNED LAYOUT DRAWINGS — SOT-23




**RECOMMEDNED MOUNTING PAD DIMENSIONS**

| Dim. | Milimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | - | 0.600 | - | - | 0.0236 | - |
| B | - | 0.800 | - | - | 0.0315 | - |
| C | - | 2.000 | - | - | 0.0787 | - |
| D | - | 1.900 | - | - | 0.0748 | - |

## PACKING INFORMATION — SOT-23

| Package Method | Reel Size (mm) | Quantity (pcs/reel) | Inner Box Size L×W×H(mm) | Quantity (pcs/Inner Box) | Carton Size L×W×H(mm) | Quantity (pcs/carton) |
|---|---|---|---|---|---|---|
| Tape Reel | Φ180 | 3000 | 201×190×70 | 15000 | 455×455×240 | 180000 |

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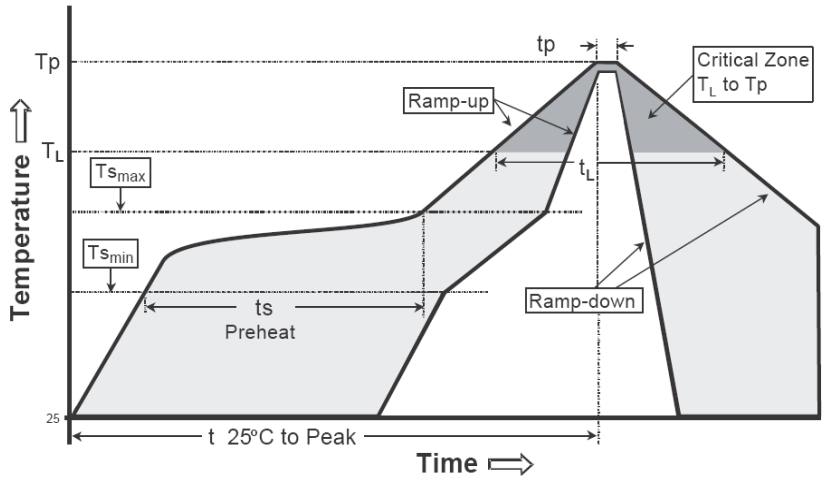
## Recommended wave soldering condition

| Product | Peak Temperature | Soldering Time |
|---|---|---|
| Pb-free devices | 260 +0/-5 °C | 5 +1/-1 seconds |

## Recommended temperature profile for IR reflow




| Profile feature | Sn-Pb eutectic Assembly | Pb-free Assembly |
|---|---|---|
| Average ramp-up rate (Tsmax to Tp) | 3°C/second max. | 3°C/second max. |
| Preheat<br>−Temperature Min(TS min)<br>−Temperature Max(TS max)<br>−Time(ts min to ts max) | <br>100°C<br>150°C<br>60-120 seconds | <br>150°C<br>200°C<br>60-180 seconds |
| Time maintained above:<br>−Temperature (TL)<br>− Time (tL) | <br>183°C<br>60-150 seconds | <br>217°C<br>60-150 seconds |
| Peak Temperature(TP) | 240 +0/-5 °C | 260 +0/-5 °C |
| Time within 5°C of actual peak temperature(tp) | 10-30 seconds | 20-40 seconds |
| Ramp down rate | 6°C/second max. | 6°C/second max. |
| Time 25 °C to peak temperature | 6 minutes max. | 8 minutes max. |

Note : All temperatures refer to topside of the package, measured on the package body surface.

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