



AME431B

Adjustable Precision Shunt Regulator

■ General Description

The AME431B series ICs are 3-terminal adjustable shunt regulator with guaranteed temperature stability over a full operation range. These ICs feature sharp turn-on characteristics, low temperature coefficient and low output impedance, which make them ideal substitutes for Zener diodes in applications such as switching power supply, charger and other adjustable regulators.

The reference is set to 1.24V for AME431Bxxxxx12 and 2.5V for AME431Bxxxxx25. The output voltage can be set to 1.24V to 16V for $V_{REF}=1.24V$ part type and 2.5 to 36V for $V_{REF}=2.5V$ part type with two external resistors.

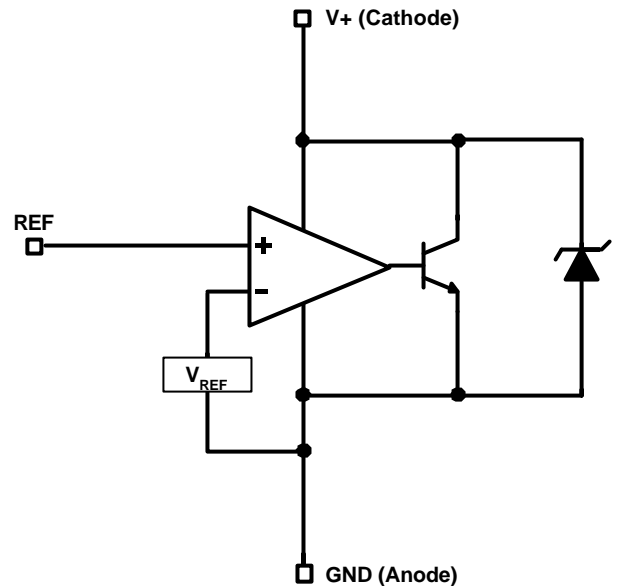
The AME431B precision reference is offered in two reference tolerance: 0.5% and 1.0%

The 5 main packages have low thermal impedance which allows operation over a wide range of $-40^{\circ}C$ to $+125^{\circ}C$.

■ Features

- Very accurate reference voltage : 0.15% typical
- High stability under capacitive load
- Low temperature deviation: 4.5mV typical
- Low equivalent full-range temperature coefficient with 20PPM/ $^{\circ}C$ typical
- Low dynamic output resistance: 0.2Ω typical
- Sink current capacity from 1mA to 100mA
- Low output noise
- Available in 5 packages: TO-92, SOT-23-3, SOT-89, SO-8 and SOT-25

■ Functional Block Diagram



■ Applications

- Adjustable power supplies
- Linear regulators
- Battery operated computer
- Portable electronics
- Instrumentation
- Switching power supply
- Mother board
- LCD monitor
- Note book computer

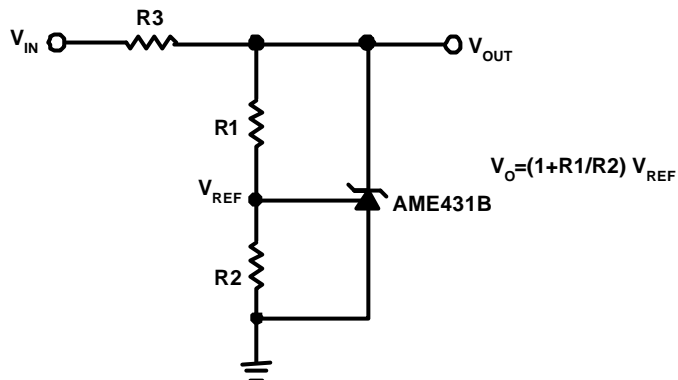


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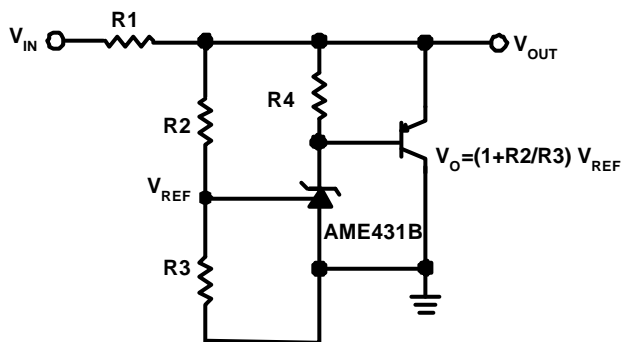
Adjustable Precision Shunt Regulator

■ **Typical Applications**

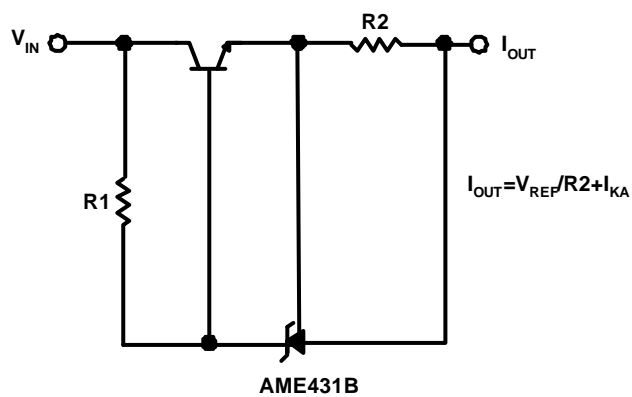
Shunt Regulator



High Current Shunt Regulator



Current Source or Current Limit



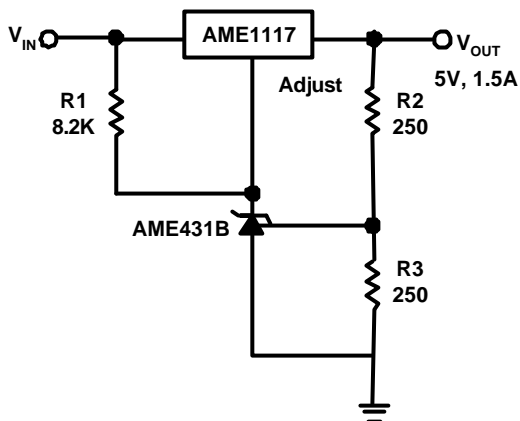


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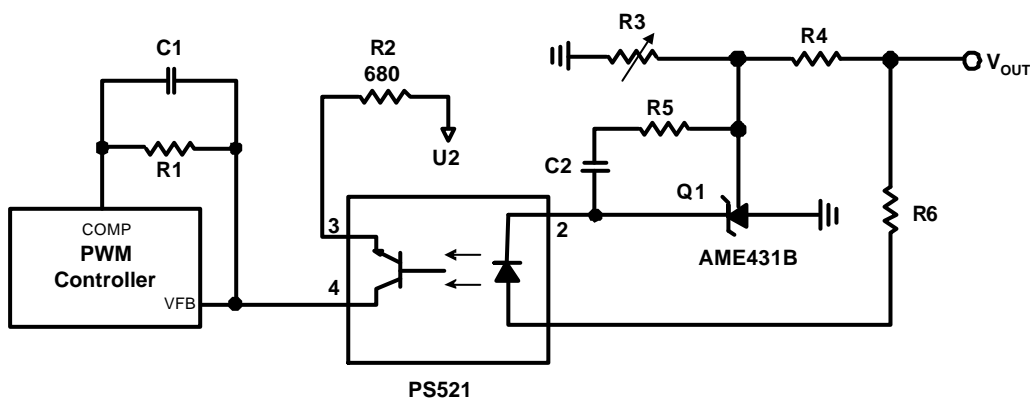
Adjustable Precision Shunt Regulator

■ Typical Applications (contd.)

Precision 5V 1.5A Regulator



Precision 5V 1.5A Regulator

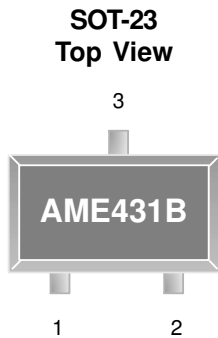




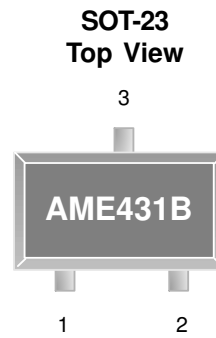
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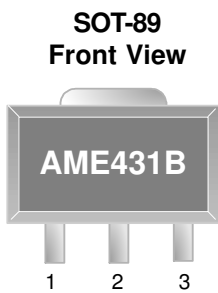
■ Pin Configuration



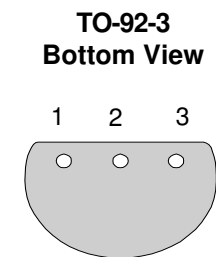
- AME431BAJETXXXX**
1. Cathode
 2. REF
 3. Anode



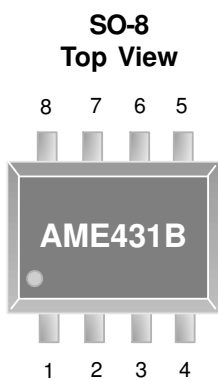
- AME431BBJETXXXX**
1. REF
 2. Cathode
 3. Anode



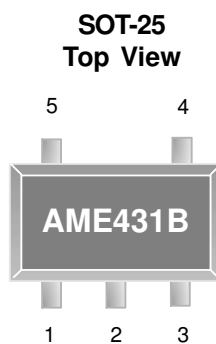
- AME431BAJFTXXXX**
1. REF
 2. Anode
 3. Cathode



- AME431BAJATXXXX**
1. REF
 2. Anode
 3. Cathode



- AME431BAJHAXXXX**
1. Cathode
 2. Anode
 3. Anode
 4. NC
 5. NC
 6. Anode
 7. Anode
 8. REF



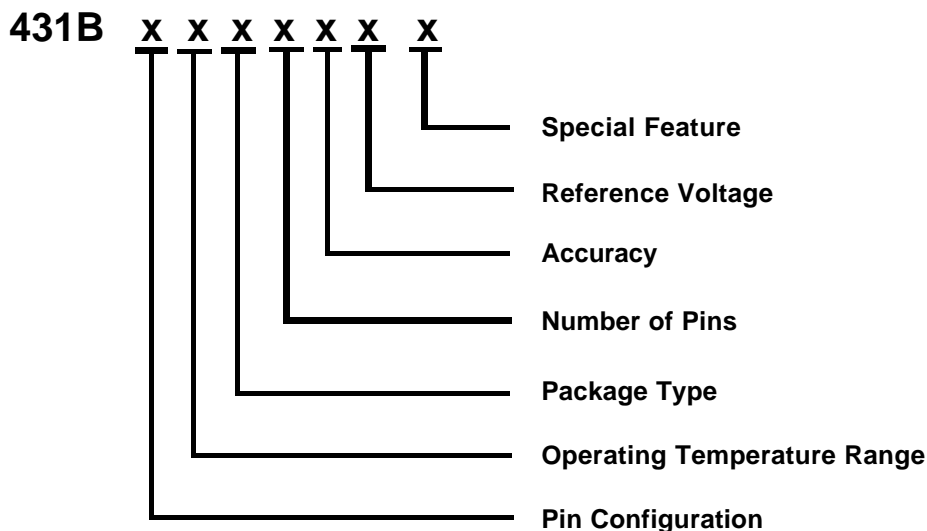
- AME431BAJEVXXXX**
1. NC
 2. NC
 3. Cathode
 4. REF
 5. Anode



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■ **Ordering Information**



| Pin Configuration | Operating Temperature Range | Package Type | Number of Pins | Accuracy | Reference Voltage | Special Feature |
|--|-----------------------------|---|----------------------|--------------------|-----------------------|--|
| A (SOT-23) 1. Cathode 2. REF 3. Anode | J: -40°C to 125°C | A: TO-92 E: SOT-2X F: SOT-89 H: SO-8 | A: 8 T: 3 V: 5 | A: 0.5% B: 1.0% | 12: 1.24V 25: 2.5V | L: Low profile Y: Lead free & Low profile Z: Lead free |
| B (SOT-23) 1. REF 2. Cathode 3. Anode | | | | | | |
| A (SOT-89) 1. REF 2. Anode 3. Cathode | | | | | | |
| A (TO-92-3) 1. REF 2. Anode 3. Cathode | | | | | | |
| A (SO-8) 1. Cathode 2. Anode 3. Anode 4. NC 5. NC 6. Anode 7. Anode 8. REF | | | | | | |
| A (SOT-25) 1. NC 2. NC 3. Cathode 4. REF 5. Anode | | | | | | |



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■ Ordering Information (contd.)

| Part Number | Marking* | Reference Voltage | Accuracy | Package | Temp. Range |
|-----------------|----------|-------------------|----------|---------|-------------------|
| AME431BAJETA12 | AZNww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETA12L | AZNww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETA12Y | AZNww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETA12Z | AZNww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB12 | AZOww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB12L | AZOww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB12Y | AZOww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB12Z | AZOww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA12 | AZPww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA12L | AZPww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA12Y | AZPww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA12Z | AZPww | 1.24V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETB12 | AZQww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETB12L | AZQww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETB12Y | AZQww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETB12Z | AZQww | 1.24V | 1.0% | SOT-23 | - 40°C to + 125°C |

* Package Options

| Part Number | Package | Lead Pitch |
|---------------|--------------|------------|
| AME431BXEAX | TO-92 Taping | 5.04mm |
| AME431BXEAX-1 | TO-92 Bulk | 2.54mm |

Note: yyww & ww represents the date code

* A line on top of the first letter represents lead free plating such as \bar{A} ZN

Please consult AME sales office or authorized Rep./Distributor for output voltage and package type availability.



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■ **Ordering Information (contd.)**

| Part Number | Marking* | Reference Voltage | Accuracy | Package | Temp. Range |
|-----------------|--------------------------------|-------------------|----------|---------|-------------------|
| AME431BAJATA12 | AME12 431B AJATA yyww | 1.24V | 0.5% | TO92-3 | - 40°C to + 125°C |
| AME431BAJATA12Z | AME12 431B AJATA yyww | 1.24V | 0.5% | TO92-3 | - 40°C to + 125°C |
| AME431BAJATB12 | AME12 431B AJATB yyww | 1.24V | 1.0% | TO92-3 | - 40°C to + 125°C |
| AME431BAJATB12Z | AME12 431B AJATB yyww | 1.24V | 1.0% | TO92-3 | - 40°C to + 125°C |
| AME431BAJETA25 | BAFww | 2.5V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETA25L | BAFww | 2.5V | 0.5% | TSOT-23 | - 40°C to + 125°C |
| AME431BAJETA25Z | BAFww | 2.5V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETA25Y | BAFww | 2.5V | 0.5% | TSOT-23 | - 40°C to + 125°C |
| AME431BBJETA25 | BAGww | 2.5V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA25L | BAGww | 2.5V | 0.5% | TSOT-23 | - 40°C to + 125°C |
| AME431BBJETA25Z | BAGww | 2.5V | 0.5% | SOT-23 | - 40°C to + 125°C |
| AME431BBJETA25Y | BAGww | 2.5V | 0.5% | TSOT-23 | - 40°C to + 125°C |
| AME431BAJETB25 | AZAww | 2.5V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB25L | AZAww | 2.5V | 1.0% | TSOT-23 | - 40°C to + 125°C |
| AME431BAJETB25Z | AZAww | 2.5V | 1.0% | SOT-23 | - 40°C to + 125°C |
| AME431BAJETB25Y | AZAww | 2.5V | 1.0% | TSOT-23 | - 40°C to + 125°C |
| AME431BBJETB25 | AZBww | 2.5V | 1.0% | SOT-23 | - 40°C to +125°C |
| AME431BBJETB25L | AZBww | 2.5V | 1.0% | TSOT-23 | - 40°C to +125°C |
| AME431BBJETB25Z | AZBww | 2.5V | 1.0% | SOT-23 | - 40°C to +125°C |
| AME431BBJETB25Y | AZBww | 2.5V | 1.0% | TSOT-23 | - 40°C to +125°C |



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■ **Ordering Information (contd.)**

| Part Number | Marking* | Reference Voltage | Accuracy | Package | Temp. Range |
|-----------------|--------------------------------|-------------------|----------|---------|------------------|
| AME431BAJATB25 | AME25 431B AJATB yyww | 2.5V | 1.0% | TO92-3 | - 40°C to +125°C |
| AME431BAJATB25Z | AME25 431B AJATB yyww | 2.5V | 1.0% | TO92-3 | - 40°C to +125°C |
| AME431BAJATA25 | AME25 431B AJATA yyww | 2.5V | 0.5% | TO92-3 | - 40°C to +125°C |
| AME431BAJATA25Z | AME25 431B AJATA yyww | 2.5V | 0.5% | TO92-3 | - 40°C to +125°C |
| AME431BAJEVA12 | BAWww | 1.24V | 0.5% | SOT-25 | - 40°C to +125°C |
| AME431BAJEVA12L | BAWww | 1.24V | 0.5% | TSOT-25 | - 40°C to +125°C |
| AME431BAJEVA12Z | BAWww | 1.24V | 0.5% | SOT-25 | - 40°C to +125°C |
| AME431BAJEVA12Y | BAWww | 1.24V | 0.5% | TSOT-25 | - 40°C to +125°C |
| AME431BAJEVB12 | BAVww | 1.24V | 1.0% | SOT-25 | - 40°C to +125°C |
| AME431BAJEVB12L | BAVww | 1.24V | 1.0% | TSOT-25 | - 40°C to +125°C |
| AME431BAJEVB12Z | BAVww | 1.24V | 1.0% | SOT-25 | - 40°C to +125°C |
| AME431BAJEVB12Y | BAVww | 1.24V | 1.0% | TSOT-25 | - 40°C to +125°C |



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■ **Absolute Maximum Ratings**

| Parameter | Maximum | | Unit |
|-----------------|----------------|-----|------|
| Cathode Current | AME431Bxxxxx12 | 100 | mA |
| | AME431Bxxxxx25 | 150 | |
| Cathode Voltage | AME431Bxxxxx12 | 18 | V |
| | AME431Bxxxxx25 | 40 | |

Caution: Stress above the listed absolute maximum rating may cause permanent damage to the device

■ **Recommended Operating Conditions**

| Parameter | Rating | | Unit |
|---------------------------|----------------|------------|------|
| Supply Current | 1 ~ 100 | | mA |
| Operation Voltage Range | AME431Bxxxxx12 | 1.24 to 16 | V |
| | AME431Bxxxxx25 | 2.50 to 36 | |
| Ambient Temperature Range | -40 to +125 | | °C |
| Junction Temperature | -40 to +125 | | °C |

■ **Thermal Information**

| Parameter | | Maximum | Unit |
|-----------------------------------|--------|---------|--------|
| Thermal Resistance | SOT-23 | 325 | °C / W |
| | SOT-25 | 325 | |
| | SOT-89 | 180 | |
| | TO-92 | 180 | |
| | SO-8 | 124 | |
| Maximum Junction Temperature | | 150 | °C |
| Maximum Lead Temperature (10 Sec) | | 300 | °C |



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■ Electrical Specifications (AME431Bxxxxx25)

TA = 25°C, I_{REF}=10mA unless otherwise specified

| Parameter | Test Circuit | Symbol | Test Condition | Min | Typ | Max | Units | |
|---|--------------|---------------------------------------|--|---|-------|--------|-------|------|
| Reference Voltage | 0.5% | 1 | V _{KA} = V _{REF} , I _{KA} =10mA | 2.4875 | 2.500 | 2.5125 | V | |
| | 1.0% | | | 2.475 | 2.500 | 2.525 | | |
| Deviation of Reference Voltage Over Temperature | 1 | ΔV _{REF} | V _{KA} = V _{REF} I _{KA} =10mA | 0°C ~ +70°C | - | 4.5 | 8 | mV |
| | | | | -40°C ~ +125°C | - | 4.5 | 10 | |
| Ratio of Change in Reference Voltage to the Change in Cathode Voltage | 2 | ΔV _{REF} ΔV _{KA} | I _{KA} =10mA | ΔV _{KA} = 10V to V _{REF} | - | -1.0 | -2.7 | mV/V |
| | | | | ΔV _{KA} = 36V to 10V | - | -0.5 | -2.0 | |
| Reference Current | 2 | I _{REF} | I _{KA} =10mA R1=10KΩ, R2=∞ | - | 0.7 | 4.0 | μA | |
| Deviation of Reference Current Over Full Temperature Range | 2 | ΔI _{REF} | R1=10KΩ, R2=∞ I _{KA} =10mA T _A = -40°C ~ +125°C | - | 0.4 | 1.2 | μA | |
| Minimum Cathode Current for Regulation | 1 | I _{KA} (MIN) | V _{KA} =V _{REF} | - | 0.4 | 1.0 | mA | |
| Off-State Cathode Current | 3 | I _{KA} (OFF) | V _{KA} =36V, V _{REF} =0V | - | 0.05 | 1.0 | μA | |
| Dynamic Impedance | 1 | Z _{KA} | V _{KA} = V _{REF} , I _{KA} =1 to 100mA F≤1KHz | - | 0.15 | 0.5 | Ω | |

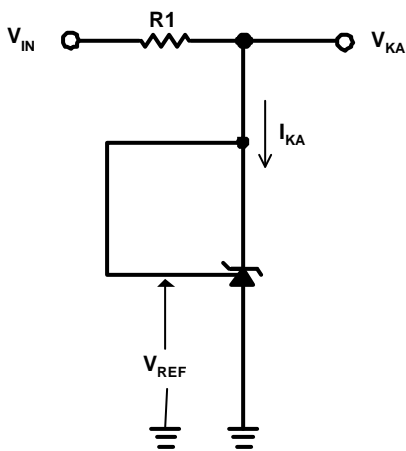


Figure1.
Test Circuit4 for V_{KA}=V_{REF}

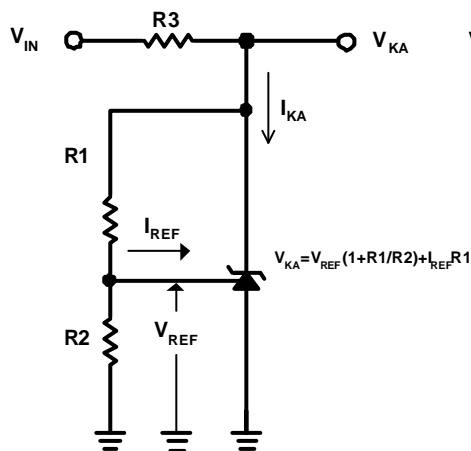


Figure2.
Test Circuit for V_{KA}>V_{REF}

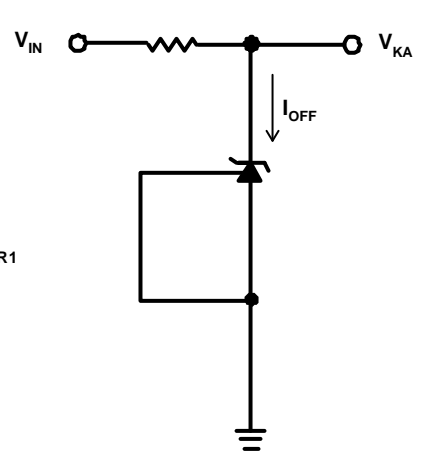


Figure3.
Test Circuit for I_{OFF}



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■ Electrical Specifications (AME431Bxxxxx12)

TA = 25°C, I_{REF}=10mA unless otherwise specified

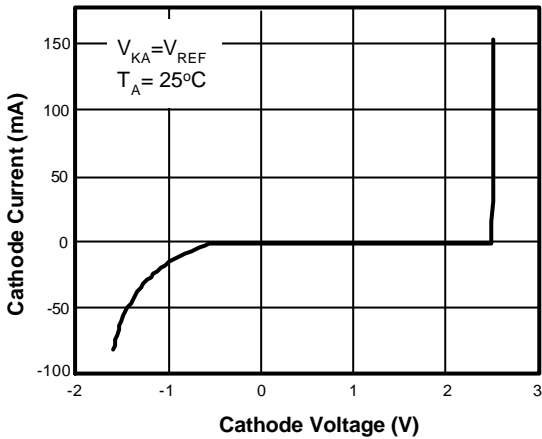
| Parameter | Test Circuit | Symbol | Test Condition | Min | Typ | Max | Units | |
|---|--------------|--|--|--|-------|-------|-------|------|
| Reference Voltage | 0.5% | V _{REF} | V _{KA} - V _{REF} , I _{KA} =10mA | 1.234 | 1.240 | 1.246 | V | |
| | 1.0% | | | 1.228 | 1.240 | 1.252 | | |
| Deviation of Reference Voltage Over Temperature | 1 | ΔV _{REF} | V _{KA} = V _{REF} I _{KA} =10mA | 0°C ~ +70°C | - | 2 | 10 | mV |
| | | | | -40°C ~ +85°C | - | 3 | 10 | |
| Ratio of Change in Reference Voltage to the Change in Cathode Voltage | 2 | $\frac{\Delta V_{REF}}{\Delta V_{KA}}$ | I _{KA} =10mA | ΔV _{KA} = 5V to V _{REF} | - | -0.5 | -1.5 | mV/V |
| | | | | ΔV _{KA} = 16V to 5V | - | -0.5 | -1.5 | |
| Reference Input Current | 2 | I _{REF} | I _{KA} =10mA R1=10KΩ, R2=∞ | - | 0.15 | 0.4 | μA | |
| Deviation of Reference Current Over Full Temperature Range | 2 | ΔI _{REF} | R1=10KΩ, R2=∞ I _{KA} =10mA T _A = -40°C ~ +85°C | - | 0.1 | 0.4 | μA | |
| Minimum Cathode Current for Regulation | 1 | I _{KA} (MIN) | V _{KA} =V _{REF} | - | 55 | 80 | μA | |
| Off-State Cathode Current | 3 | I _{KA} (OFF) | V _{KA} =18V, V _{REF} =0V | - | 0.04 | 0.1 | μA | |
| Dynamic Impedance | 1 | Z _{KA} | V _{KA} = V _{REF} , I _{KA} =1 to 100mA F≤1KHz | - | 0.05 | 0.15 | Ω | |



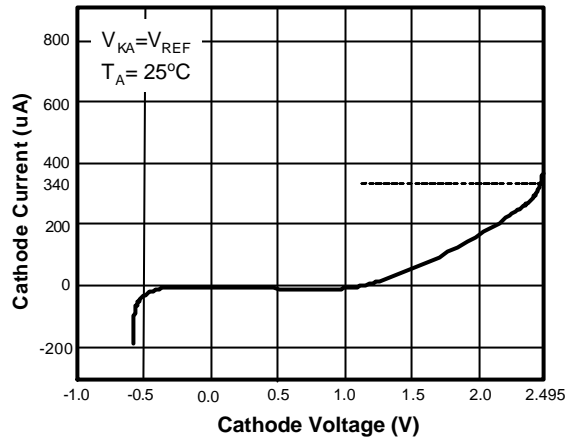
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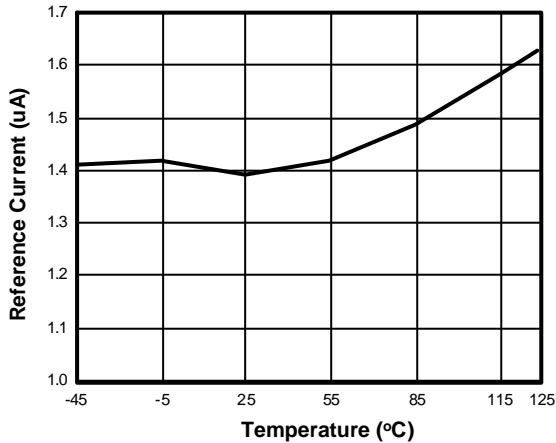
Cathode Current vs. Cathode Voltage



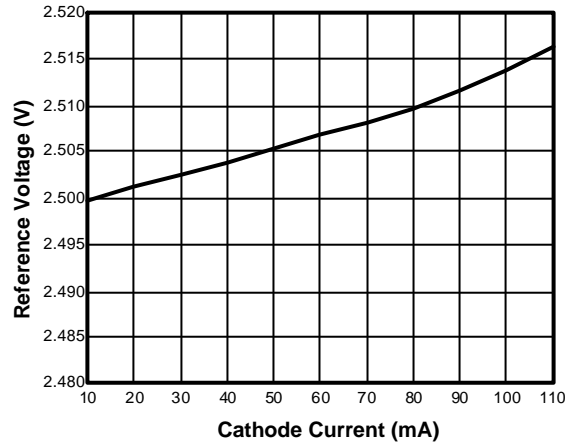
Current vs. Cathode Voltage



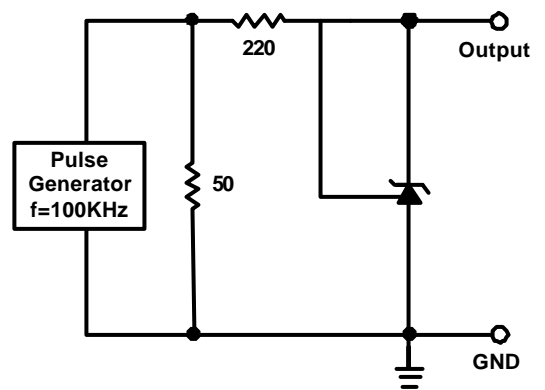
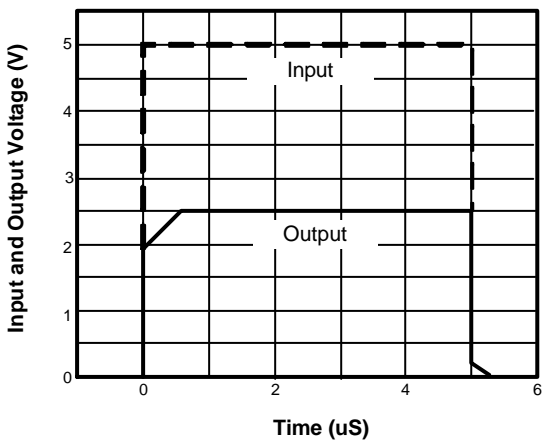
Reference Current vs. Temperature



Reference Voltage vs. Cathode Current



Small Signal Voltage Gain vs. Frequency

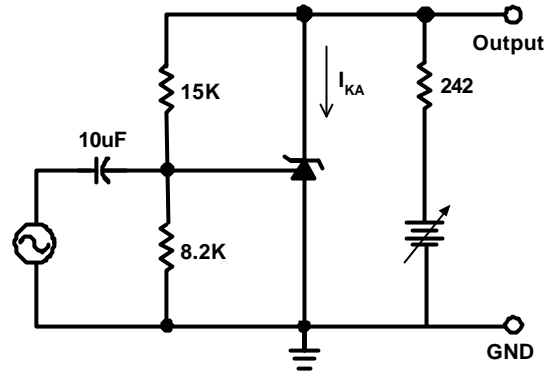
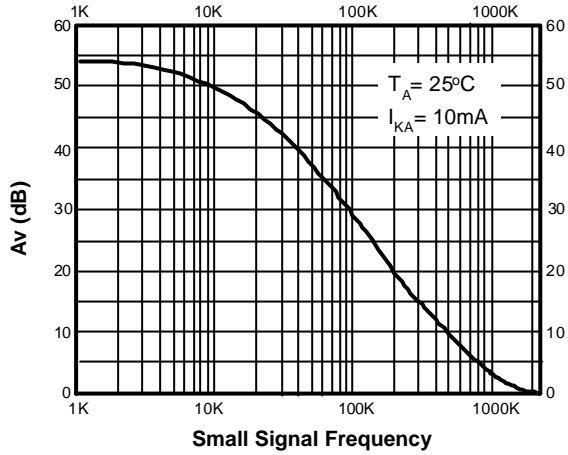




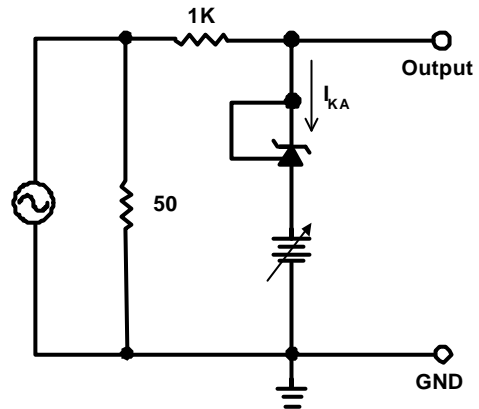
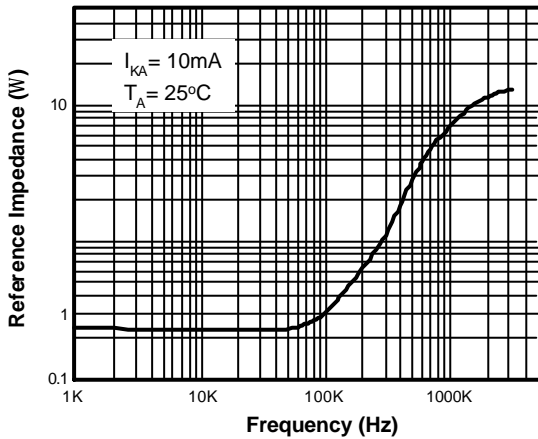
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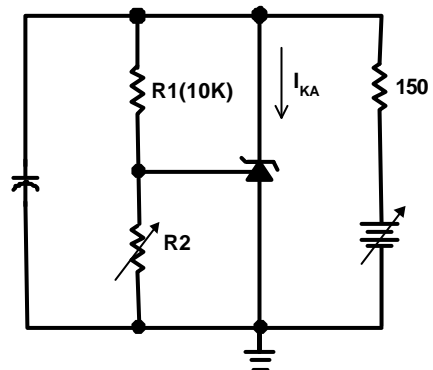
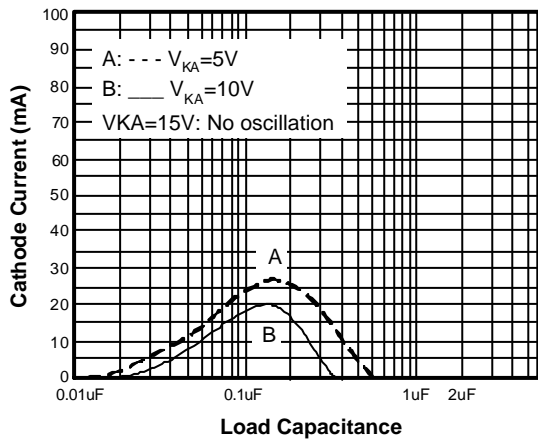
Small Signal Voltage Gain vs. Frequency



Reference Impedance vs. Frequency



Stability Boundary Conditions vs. Load Capacitance

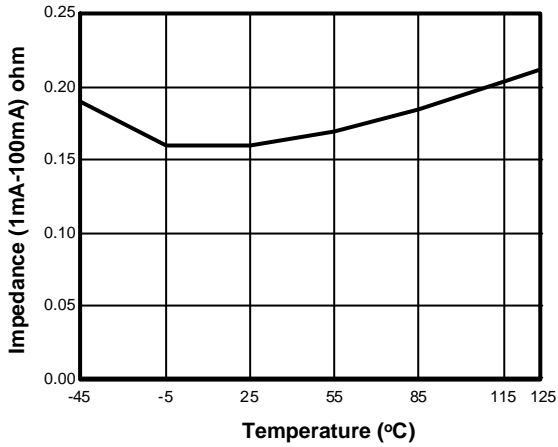




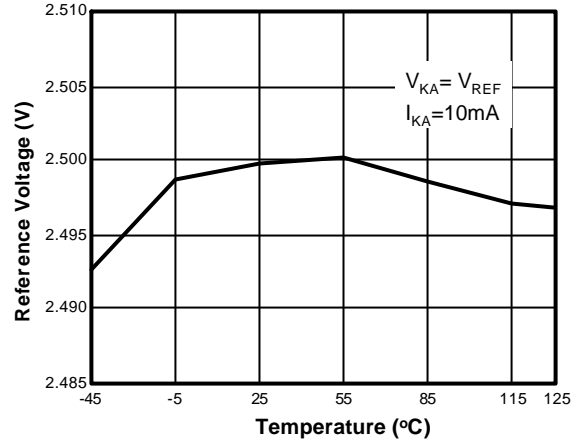
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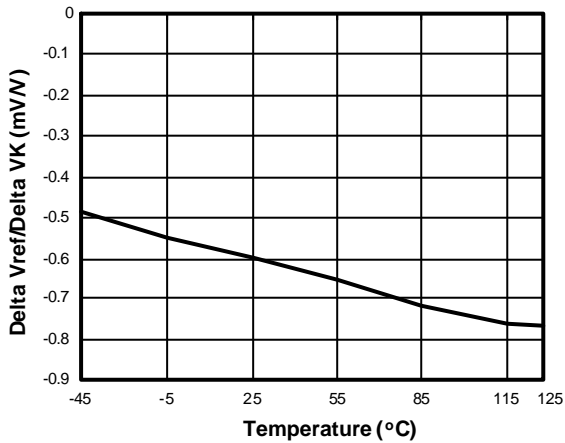
Impedance vs. Temperature



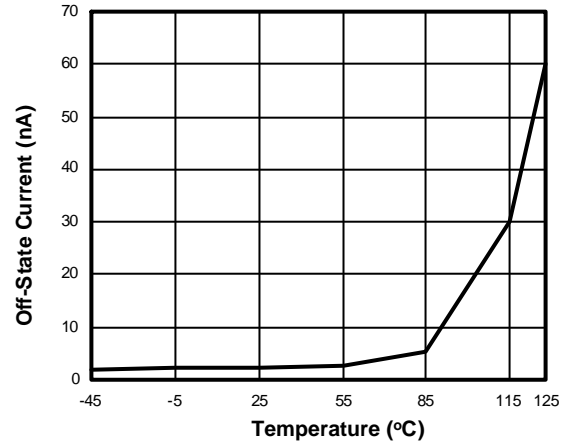
Reference Voltage vs. Temperature



Delta Reference Voltage vs. Temperature



Off-State Current vs. Temperature



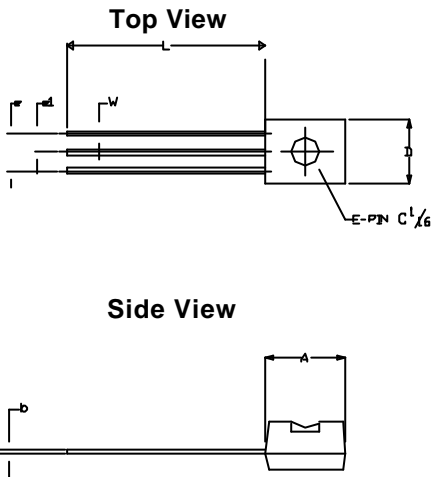


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Adjustable Precision Shunt Regulator

■ Package Dimension

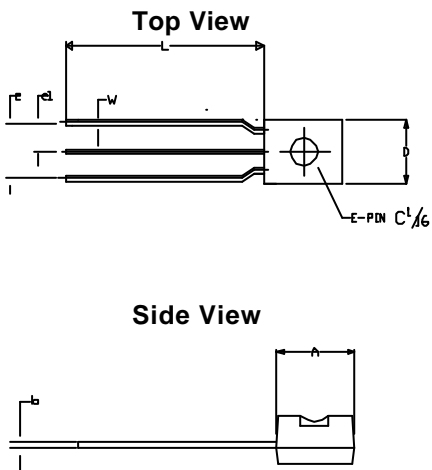
TO-92-3 (bulk pack)



| SYMBOLS | MILLIMETERS | | INCHES | |
|---------|-------------|-------|--------|--------|
| | MIN | MAX | MIN | MAX |
| A | 4.32 | 4.95 | 0.1701 | 0.1949 |
| b | 0.36 | 0.51 | 0.0142 | 0.0201 |
| E | 3.30 | 3.94 | 0.1299 | 0.1551 |
| e | 2.41 | 2.67 | 0.0949 | 0.1051 |
| e1 | 1.14 | 1.40 | 0.0449 | 0.0551 |
| L | 12.70 | 15.49 | 0.5000 | 0.6098 |
| R | 2.16 | 2.41 | 0.0850 | 0.0949 |
| W | 0.41 | 0.56 | 0.0161 | 0.0220 |
| D | 4.45 | 4.95 | 0.1752 | 0.1949 |

- Notes:
1. Package outline exclusive of any mold flashes dimension.
 2. Package outline exclusive of burr dimension.
 3. Lead pitch=2.54mm is bulk pack.
 4. Lead pitch=5.08mm is tape pack.

TO-92-3 (tape pack)



| SYMBOLS | MILLIMETERS | | INCHES | |
|---------|-------------|-------|--------|--------|
| | MIN | MAX | MIN | MAX |
| A | 4.32 | 4.95 | 0.1701 | 0.1949 |
| b | 0.36 | 0.51 | 0.0142 | 0.0201 |
| E | 3.30 | 3.94 | 0.1299 | 0.1551 |
| e | 4.98 | 5.08 | 0.1961 | 0.2000 |
| e1 | 2.49 | 2.54 | 0.0980 | 0.1000 |
| L | 12.70 | 15.49 | 0.5000 | 0.6098 |
| R | 2.16 | 2.41 | 0.0850 | 0.0949 |
| W | 0.41 | 0.56 | 0.0161 | 0.0220 |
| D | 4.45 | 4.95 | 0.1752 | 0.1949 |

- Notes:
1. Package outline exclusive of any mold flashes.
 2. Package outline exclusive of burr dimension.
 3. Lead pitch=2.54mm is bulk pack.
 4. Lead pitch=5.08mm is tape pack.

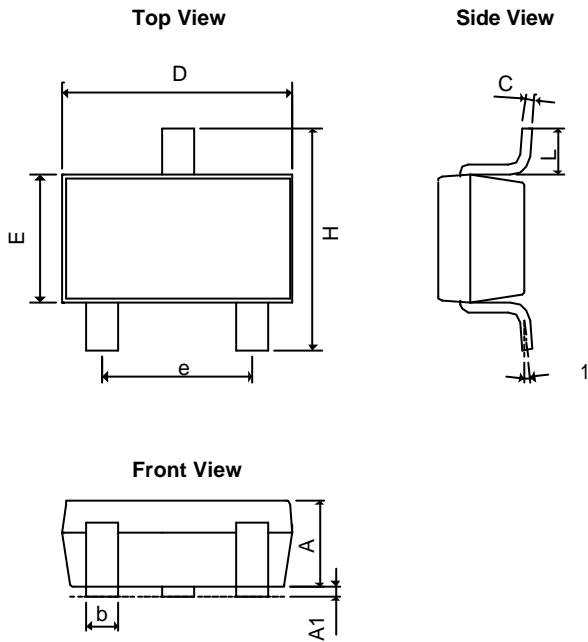


AME431B

Adjustable Precision Shunt Regulator

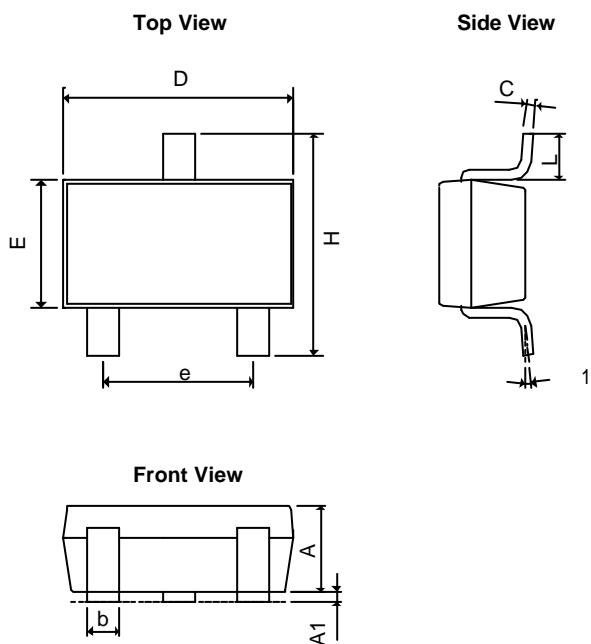
■ **Package Dimension**

SOT-23



| SYMBOLS | MILLIMETERS | | INCHES | |
|----------------------|-------------|------|------------|---------|
| | MIN | MAX | MIN | MAX |
| A | 1.00 | 1.40 | 0.0394 | 0.0551 |
| A₁ | 0.00 | 0.15 | 0.0000 | 0.0059 |
| b | 0.35 | 0.50 | 0.0138 | 0.0197 |
| C | 0.09 | 0.25 | 0.0035 | 0.0098 |
| D | 2.70 | 3.10 | 0.1063 | 0.1220 |
| E | 1.40 | 1.80 | 0.0551 | 0.0709 |
| e | 1.90 BSC | | 0.0748 BSC | |
| H | 2.40 | 3.00 | 0.09449 | 0.11811 |
| L | 0.35BSC | | 0.0138BSC | |
| ?1 | 0° | 10° | 0° | 10° |

TSOT-23



| SYMBOLS | MILLIMETERS | | INCHES | |
|------------------------|-------------|------|------------|---------|
| | MIN | MAX | MIN | MAX |
| A+A₁ | 0.80 | 1.30 | 0.0315 | 0.0512 |
| b | 0.35 | 0.50 | 0.0138 | 0.0197 |
| C | 0.08 | 0.25 | 0.0031 | 0.0098 |
| D | 2.70 | 3.10 | 0.1063 | 0.1220 |
| E | 1.20 | 1.80 | 0.0472 | 0.0709 |
| e | 1.90 BSC | | 0.0748 BSC | |
| H | 2.40 | 3.00 | 0.09449 | 0.11811 |
| L | 0.35BSC | | 0.0138BSC | |
| q1 | 0° | 10° | 0° | 10° |

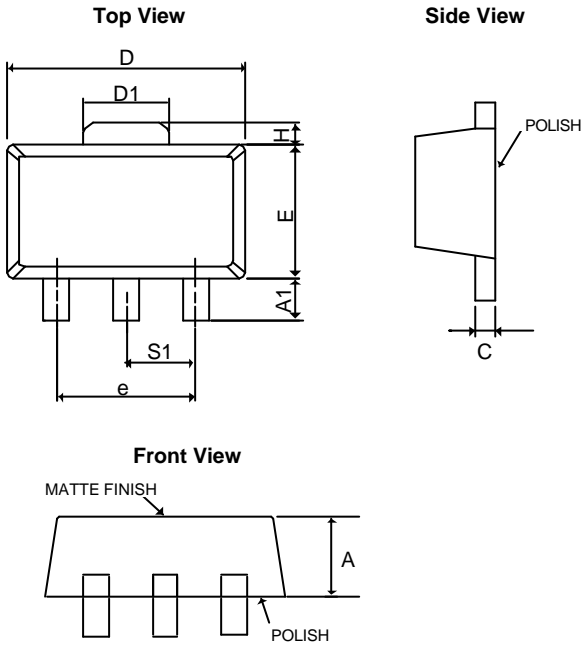


AME431B

Adjustable Precision Shunt Regulator

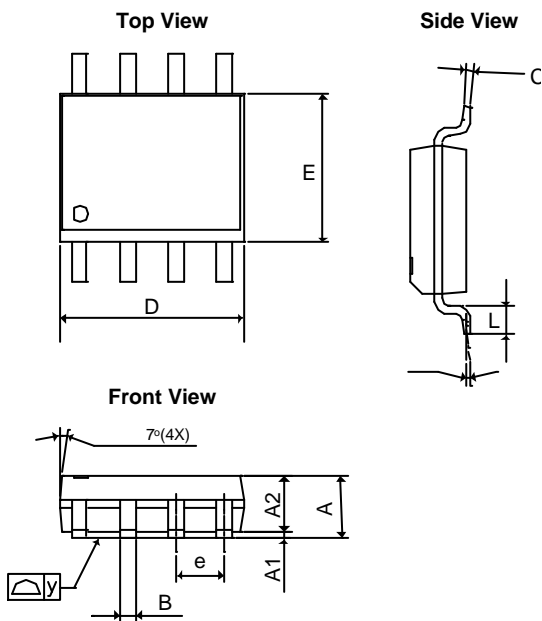
Package Dimension

SOT-89



| SYMBOLS | MILLIMETERS | | INCHES | |
|----------------------|-------------|------|-----------|---------|
| | MIN | MAX | MIN | MAX |
| A | 1.39 | 1.60 | 0.05472 | 0.06299 |
| A₁ | 0.8REF | | 0.0315REF | |
| C | 0.35 | 0.44 | 0.01378 | 0.01732 |
| D | 4.39 | 4.60 | 0.17283 | 0.1811 |
| D₁ | 1.35 | 1.83 | 0.05315 | 0.07205 |
| E | 2.28 | 3.60 | 0.08976 | 0.14173 |
| e | 3.00REF | | 0.1181REF | |
| H | 0.70REF | | 0.0276REF | |
| S1 | 1.50REF | | 0.0590REF | |

SO-8



| SYMBOLS | MILLIMETERS | | INCHES | |
|----------|-------------|-------|--------|--------|
| | MIN | MAX | MIN | MAX |
| A | 5.58 | 7.49 | 0.2197 | 0.2949 |
| C | 3.55 | 4.83 | 0.1398 | 0.1900 |
| D | 0.50 | 1.40 | 0.0197 | 0.0550 |
| E | 0.30 | 1.15 | 0.0118 | 0.0453 |
| G | 9.65 | 10.67 | 0.3799 | 0.4200 |
| I | 3.53 | 4.09 | 0.1390 | 0.1610 |
| K | 0.50 | 1.15 | 0.0197 | 0.0453 |
| M | 1.14 | 1.78 | 0.0449 | 0.0700 |
| N | 2.28 | 2.80 | 0.0898 | 0.1102 |
| O | 12.70 | 14.74 | 0.5000 | 0.5803 |
| P | 14.22 | 16.51 | 0.5600 | 0.6500 |

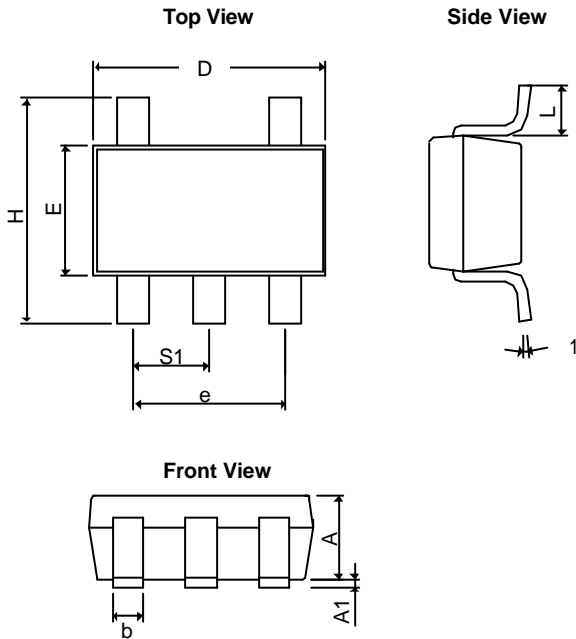


AME431B

Adjustable Precision Shunt Regulator

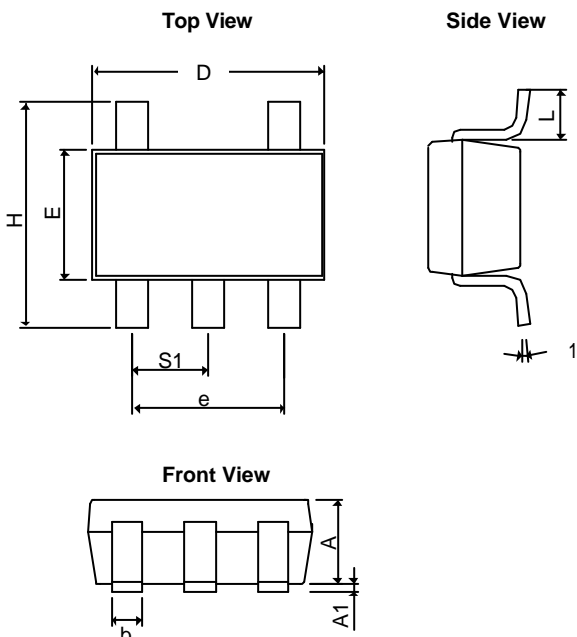
Package Dimension

SOT-25



| SYMBOLS | MILLIMETERS | | INCHES | |
|----------------------|-------------|------|-------------|---------|
| | MIN | MAX | MIN | MAX |
| A | 1.20REF | | 0.0472REF | |
| A₁ | 0.00 | 0.15 | 0.0000 | 0.0059 |
| b | 0.30 | 0.55 | 0.0118 | 0.0217 |
| D | 2.70 | 3.10 | 0.1063 | 0.1220 |
| E | 1.40 | 1.80 | 0.0551 | 0.0709 |
| e | 1.90 BSC | | 0.07480 BSC | |
| H | 2.60 | 3.00 | 0.10236 | 0.11811 |
| L | 0.37BSC | | 0.0146BSC | |
| q₁ | 0° | 10° | 0° | 10° |
| S₁ | 0.95BSC | | 0.0374BSC | |

TSOT-25



| SYMBOLS | MILLIMETERS | | INCHES | |
|------------------------|-------------|------|-------------|---------|
| | MIN | MAX | MIN | MAX |
| A+A₁ | 0.90 | 1.25 | 0.0354 | 0.0492 |
| b | 0.30 | 0.50 | 0.0118 | 0.0197 |
| D | 2.70 | 3.10 | 0.1063 | 0.1220 |
| E | 1.40 | 1.80 | 0.0551 | 0.0709 |
| e | 1.90 BSC | | 0.07480 BSC | |
| H | 2.40 | 3.00 | 0.09449 | 0.11811 |
| L | 0.35BSC | | 0.0138BSC | |
| q₁ | 0° | 10° | 0° | 10° |
| S₁ | 0.95BSC | | 0.0374BSC | |



www.ame.com.tw
E-Mail: sales@ame.com.tw

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Corporate Headquarter
AME, Inc.

2F, 302 Rui-Guang Road, Nei-Hu District
Taipei 114, Taiwan.
Tel: 886 2 2627-8687
Fax: 886 2 2659-2989

U.S.A.(Subsidiary)
Analog Microelectronics, Inc.

3100 De La Cruz Blvd., Suite 201
Santa Clara, CA. 95054-2046
Tel : (408) 988-2388
Fax: (408) 988-2489