

LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

General Description

The AZ432 series ICs are low voltage three-terminal adjustable regulators with guaranteed thermal 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, motherboard and other adjustable regulators.

The output voltage can be set to any value between 1.25V and 18V with two external resistors.

The AZ432 precision reference is offered in two voltage tolerance: 0.5% and 1.0%.

These ICs are available in 4 packages: TO-92 (bulk or ammo packing), SOT-23, SOT-23-5 and SOT-89.

Features

- Wide Programmable Precise Output Voltage from 1.25V to 18V
- High Stability under Capacitive Load
- Low Temperature Deviation: 3mV Typical
- Low Equivalent Full-Range Temperature Coefficient: 20PPM/°C Typical
- Low Dynamic Output Resistance: 0.05Ω Typical
- High Sink Current Capacity from 0.1mA to 100 mA
- Low Output Noise
- Wide Operating Range of -40 to 125°C

Applications

- Graphic Card
- PC Motherboard
- Voltage Adapter
- Switching Power Supply
- Charger

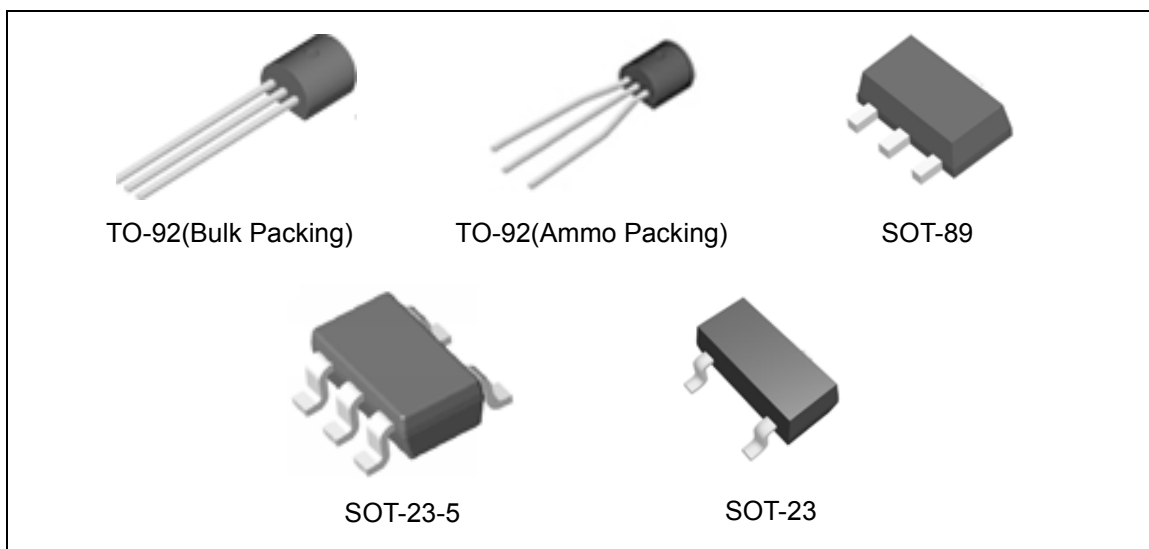
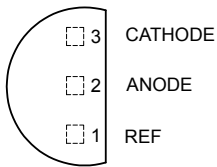


Figure 1. Package Types of AZ432

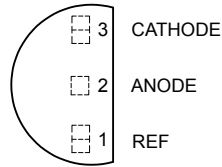
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Pin Configuration

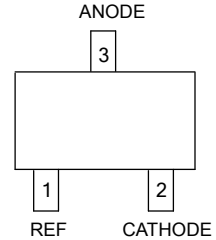
Z Package
(TO-92(Bulk Packing))



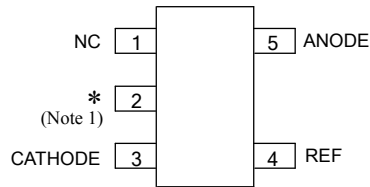
Z Package
(TO-92(Ammo Packing))



N Package
(SOT-23)



K Package
(SOT-23-5)



Note 1: * Pin 2 is attached to substrate and must be connected to ANODE or open

R Package
(SOT-89)

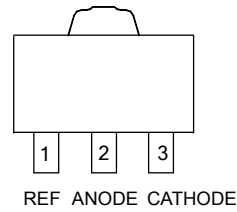


Figure 2. Pin Configuration of AZ432 (Top View)

Functional Block Diagram

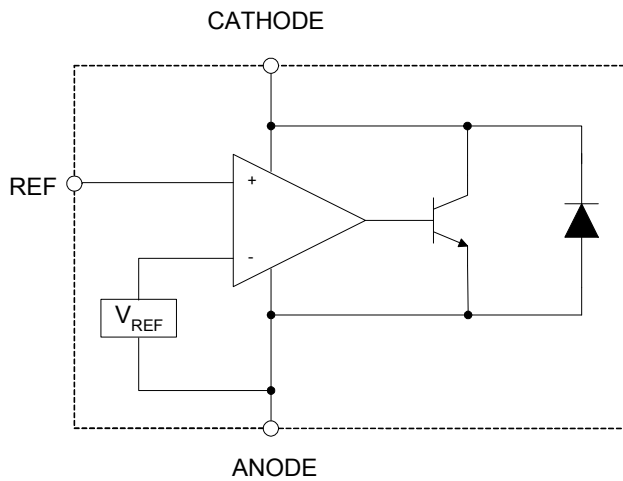
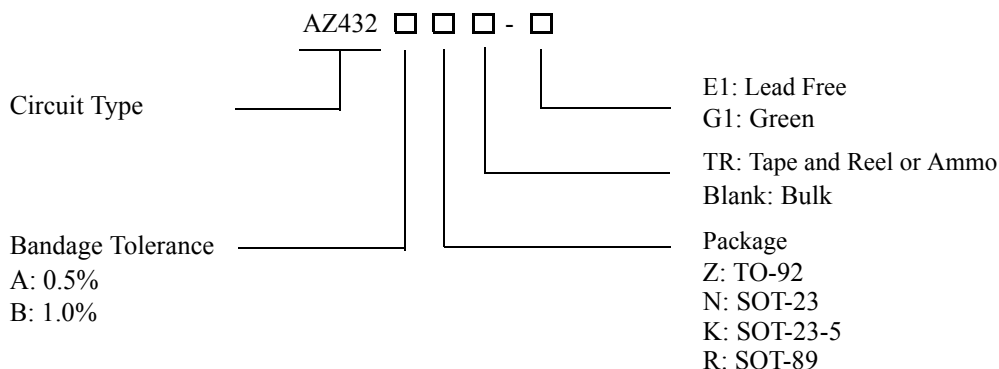


Figure 3. Functional Block Diagram of AZ432



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Ordering Information



| Package | Temperature Range | Voltage Tolerance | Part Number | | Marking ID | | Packing Type |
|----------|-------------------|-------------------|--------------|--------------|------------|------------|--------------|
| | | | Lead Free | Green | Lead Free | Green | |
| TO-92 | -40 to 125°C | 0.5% | AZ432AZ-E1 | AZ432AZ-G1 | AZ432AZ-E1 | AZ432AZ-G1 | Bulk |
| | | 0.5% | AZ432AZTR-E1 | AZ432AZTR-G1 | AZ432AZ-E1 | AZ432AZ-G1 | Ammo |
| | | 1.0% | AZ432BZ-E1 | AZ432BZ-G1 | AZ432BZ-E1 | AZ432BZ-G1 | Bulk |
| | | 1.0% | AZ432BZTR-E1 | AZ432BZTR-G1 | AZ432BZ-E1 | AZ432BZ-G1 | Ammo |
| SOT-23 | -40 to 125°C | 0.5% | AZ432ANTR-E1 | AZ432ANTR-G1 | EA8 | GA8 | Tape & Reel |
| | | 1.0% | AZ432BNTR-E1 | AZ432BNTR-G1 | EA9 | GA9 | Tape & Reel |
| SOT-23-5 | -40 to 125°C | 0.5% | AZ432AKTR-E1 | AZ432AKTR-G1 | E7A | G7A | Tape & Reel |
| | | 1.0% | AZ432BKTR-E1 | AZ432BKTR-G1 | E8A | G8A | Tape & Reel |
| SOT-89 | -40 to 125°C | 0.5% | AZ432ARTR-E1 | AZ432ARTR-G1 | E42A | G42A | Tape & Reel |
| | | 1.0% | AZ432BRTR-E1 | AZ432BRTR-G1 | E42B | G42B | Tape & Reel |

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant. Products with "G1" suffix are available in green packages.

**LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR****AZ432****Absolute Maximum Ratings (Note 2)**

| Parameter | Symbol | Value | | Unit |
|------------------------------------|-----------|--------------|-----|------|
| Cathode Voltage | V_{KA} | 20 | | V |
| Cathode Current Range (Continuous) | I_{KA} | -100 to 100 | | mA |
| Reference Input Current Range | I_{REF} | 10 | | mA |
| Power Dissipation | P_D | Z, R Package | 770 | mW |
| | | N, K Package | 370 | |
| Junction Temperature | T_J | 150 | | °C |
| Storage Temperature Range | T_{STG} | -65 to 150 | | °C |

Note 2: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operation Ratings

| Parameter | Symbol | Min | Max | Unit |
|-------------------------------------|----------|-----------|-----|------|
| Cathode Voltage | V_{KA} | V_{REF} | 18 | V |
| Cathode Current | I_{KA} | 0.1 | 100 | mA |
| Operating Ambient Temperature Range | | -40 | 125 | °C |



LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR AZ432

Electrical Characteristics

(Typical and limits apply for $T_A=25^{\circ}\text{C}$, unless otherwise noted.)

| Parameter | Test Circuit | Symbol | Conditions | Min | Typ | Max | Unit |
|---|--------------|--|---|------------------------------|--------|-------|----------------------|
| Reference Voltage | 0.5% | 4 | $V_{KA}=V_{REF}, I_{KA}=10\text{mA}$ | 1.244 | 1.250 | 1.256 | V |
| | 1.0% | | | 1.238 | 1.250 | 1.262 | |
| Deviation of Reference Voltage Over Full Temperature Range | 4 | ΔV_{REF} | $V_{KA}=V_{REF}, I_{KA}=10\text{mA}$ | 0 to 70°C | 2 | 10 | mV |
| | | | | -40 to 85°C | 3 | 10 | |
| | | | | -40 to 125°C | 4 | 15 | |
| Ratio of Change in V_{REF} to the Change in Cathode Voltage | 5 | $\frac{\Delta V_{REF}}{\Delta V_{KA}}$ | $I_{KA}=10\text{mA}, \Delta V_{KA}: V_{REF} \text{ to } 16\text{V}$ | | -0.5 | -1.5 | mV/V |
| Reference Input Current | 5 | I_{REF} | $I_{KA}=10\text{mA}, R1=10\text{K}\Omega, R2=\infty$ | | 0.15 | 0.4 | μA |
| Deviation of Reference Current Over Full Temperature Range | 5 | ΔI_{REF} | $I_{KA}=10\text{mA}, R1=10\text{K}\Omega, R2=\infty, T_A=-40 \text{ to } 125^{\circ}\text{C}$ | | 0.1 | 0.4 | μA |
| Minimum Cathode Current for Regulation | 4 | $I_{KA}(\text{MIN})$ | $V_{KA}=V_{REF}$ | | 55 | 80 | μA |
| Off-state Cathode Current | 6 | $I_{KA}(\text{OFF})$ | $V_{REF}=0, V_{KA}=18\text{V}$ | | 0.04 | 0.10 | μA |
| | | | $V_{KA}=6\text{V}, V_{REF}=0$ | | 0.01 | 0.05 | |
| Dynamic Impedance | 4 | Z_{KA} | $V_{KA}=V_{REF}, I_{KA}=1 \text{ to } 100\text{mA}, f \leq 1.0\text{kHz}$ | | 0.05 | 0.15 | Ω |
| Thermal Resistance (Junction to Case) | | θ_{JC} | SOT-23 | | 84.84 | | $^{\circ}\text{C/W}$ |
| | | | SOT-23-5 | | 84.84 | | |
| | | | TO-92 | | 140.80 | | |
| | | | SOT-89 | | 29.80 | | |

LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Electrical Characteristics (Continued)

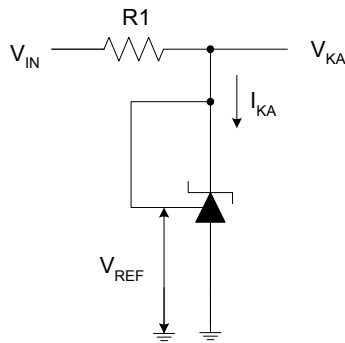


Figure 4. Test Circuit 4 for $V_{KA} = V_{REF}$

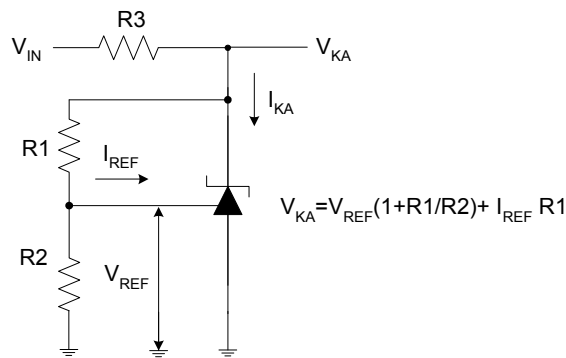


Figure 5. Test Circuit 5 for $V_{KA} > V_{REF}$

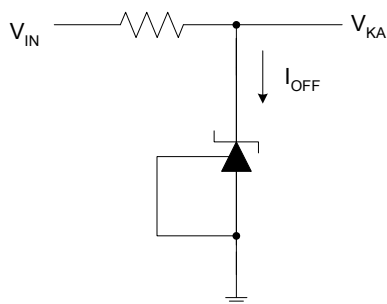


Figure 6. Test Circuit 6 for I_{OFF}



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Typical Performance Characteristics

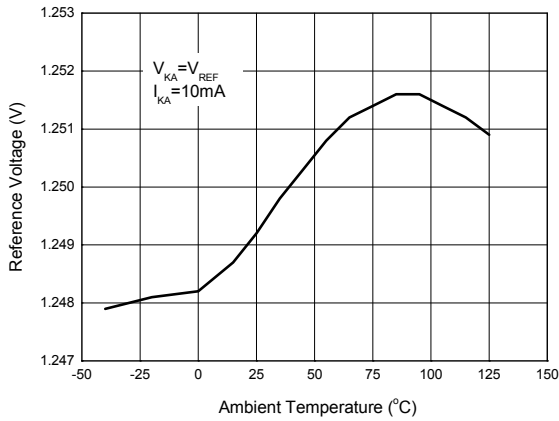


Figure 7. Reference Voltage vs. Ambient Temperature

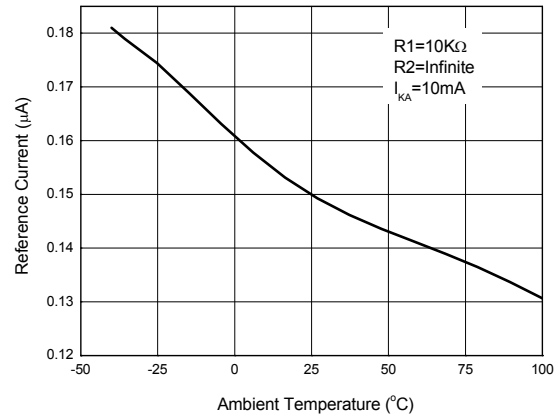


Figure 8. Reference Current vs. Ambient Temperature

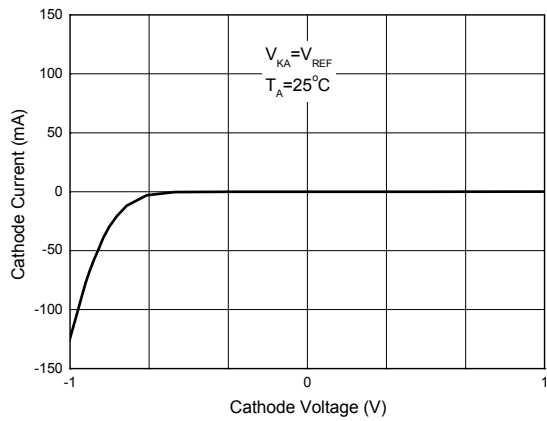


Figure 9. Cathode Current vs. Cathode Voltage

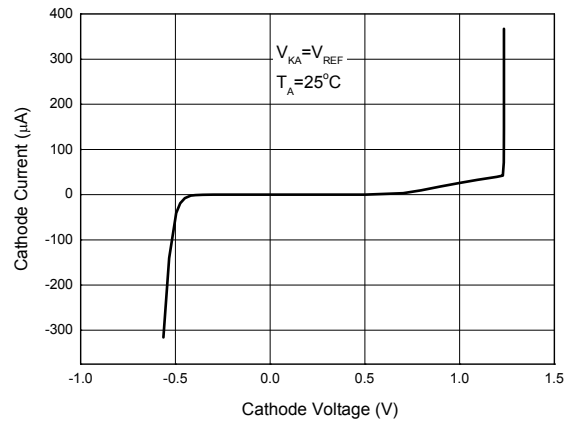


Figure 10. Cathode Current vs. Cathode Voltage

LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Typical Performance Characteristics (Continued)

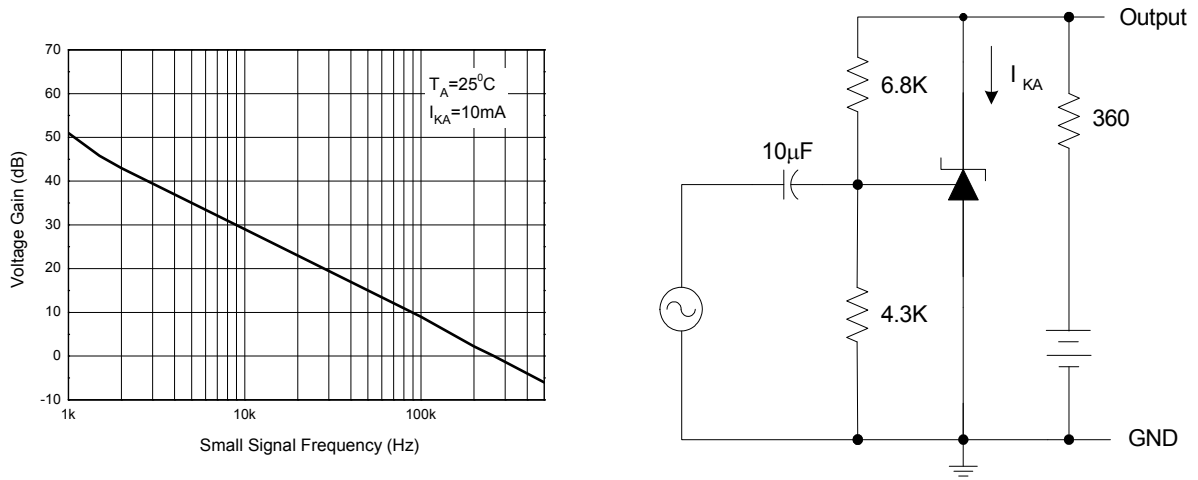


Figure 11. Small Signal Voltage Gain vs. Frequency

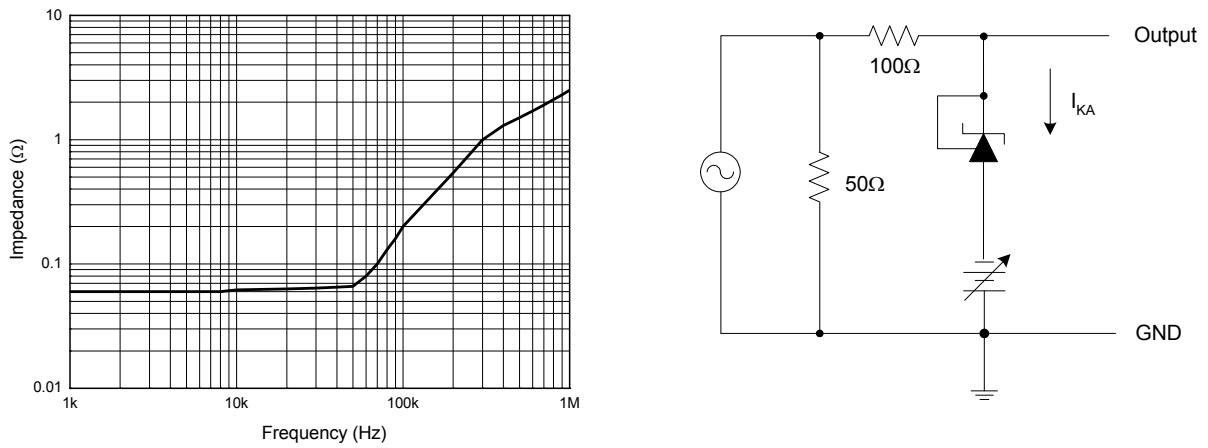


Figure 12. Dynamic Impedance vs. Frequency

LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Typical Performance Characteristics (Continued)

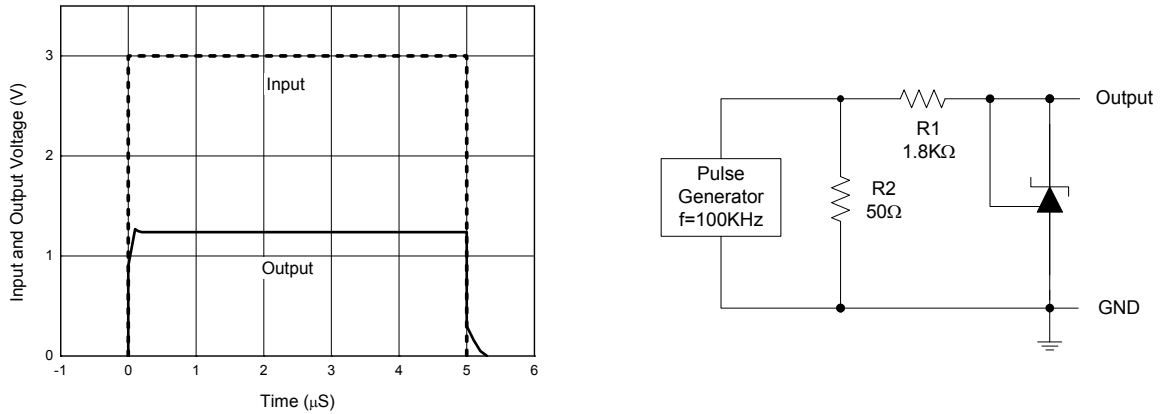


Figure 13. Pulse Response of Input and Output Voltage

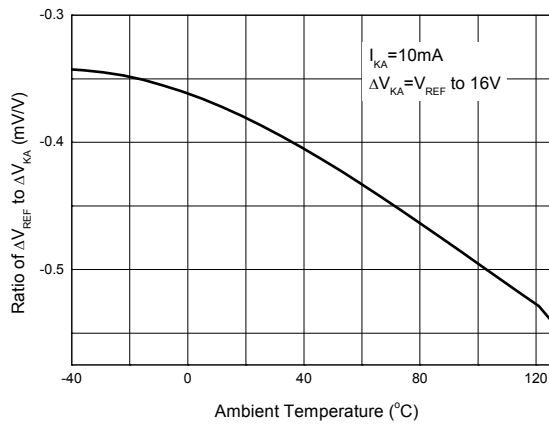
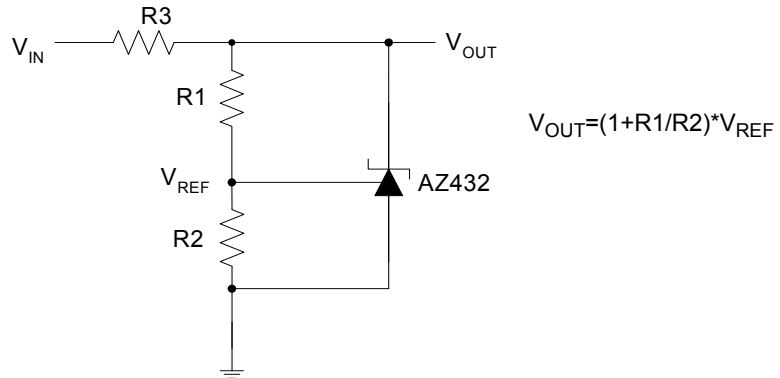


Figure 14. Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage vs. Ambient Temperature

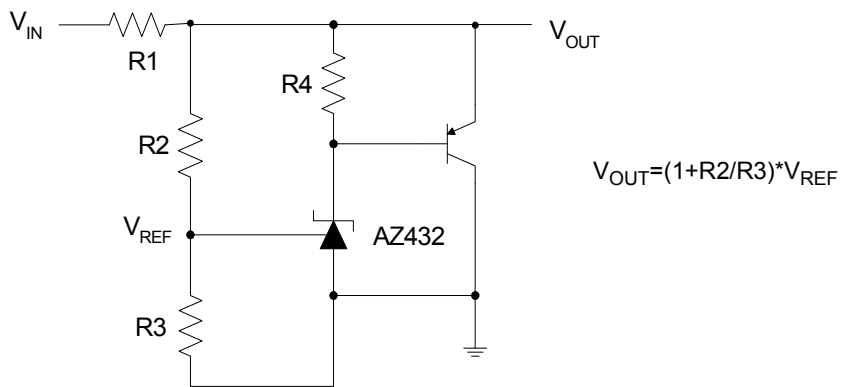
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Typical Applications



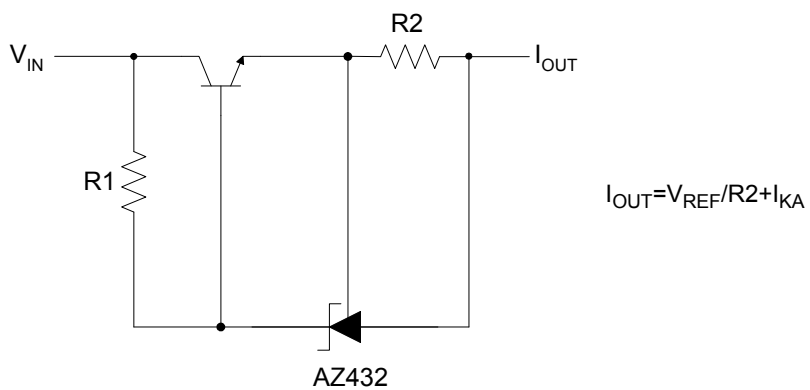
$$V_{OUT} = (1 + R1/R2) * V_{REF}$$

Figure 15. Shunt Regulator



$$V_{OUT} = (1 + R2/R3) * V_{REF}$$

Figure 16. High Current Shunt Regulator



$$I_{OUT} = V_{REF}/R2 + I_{KA}$$

Figure 17. Current Source or Current Limit

LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Typical Application (Continued)

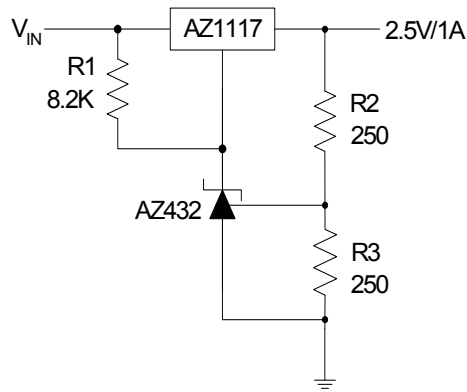


Figure18. Precision 2.5V/1A Regulator

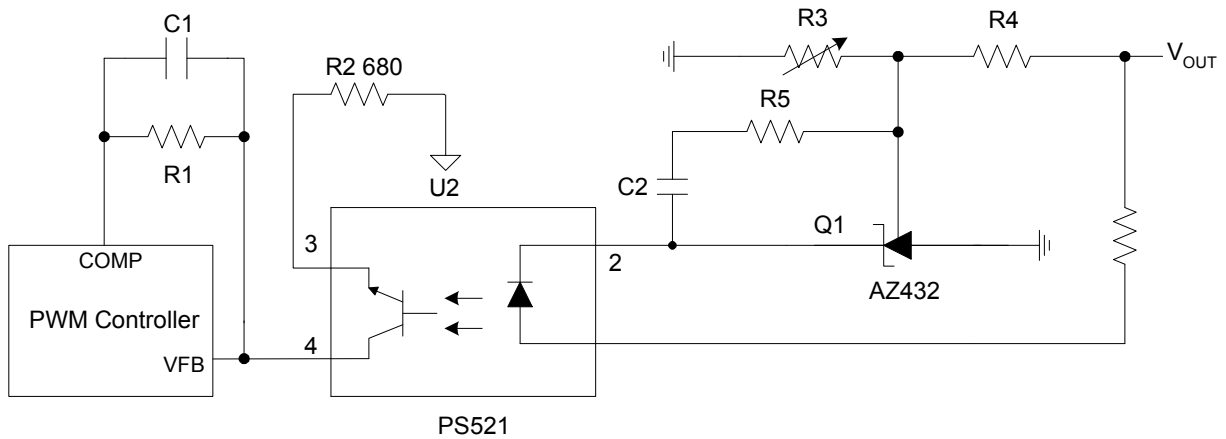


Figure 19. PWM Converter with Reference

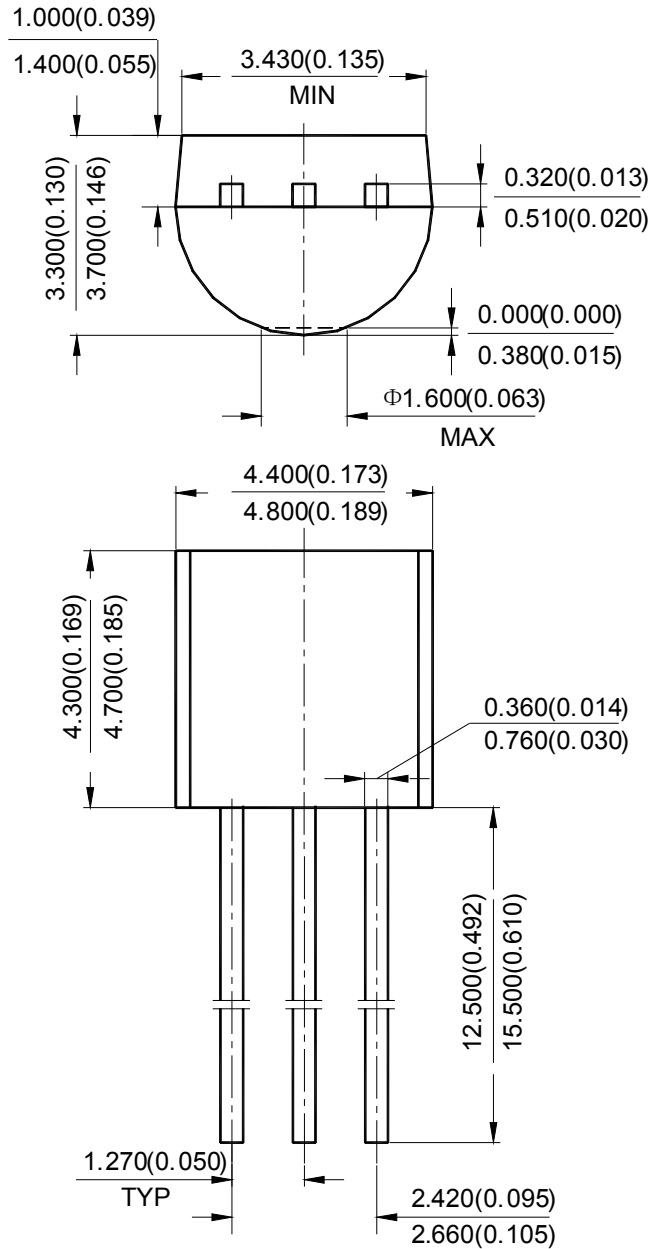


LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Mechanical Dimensions

TO-92(Bulk Packing)

Unit: mm(inch)



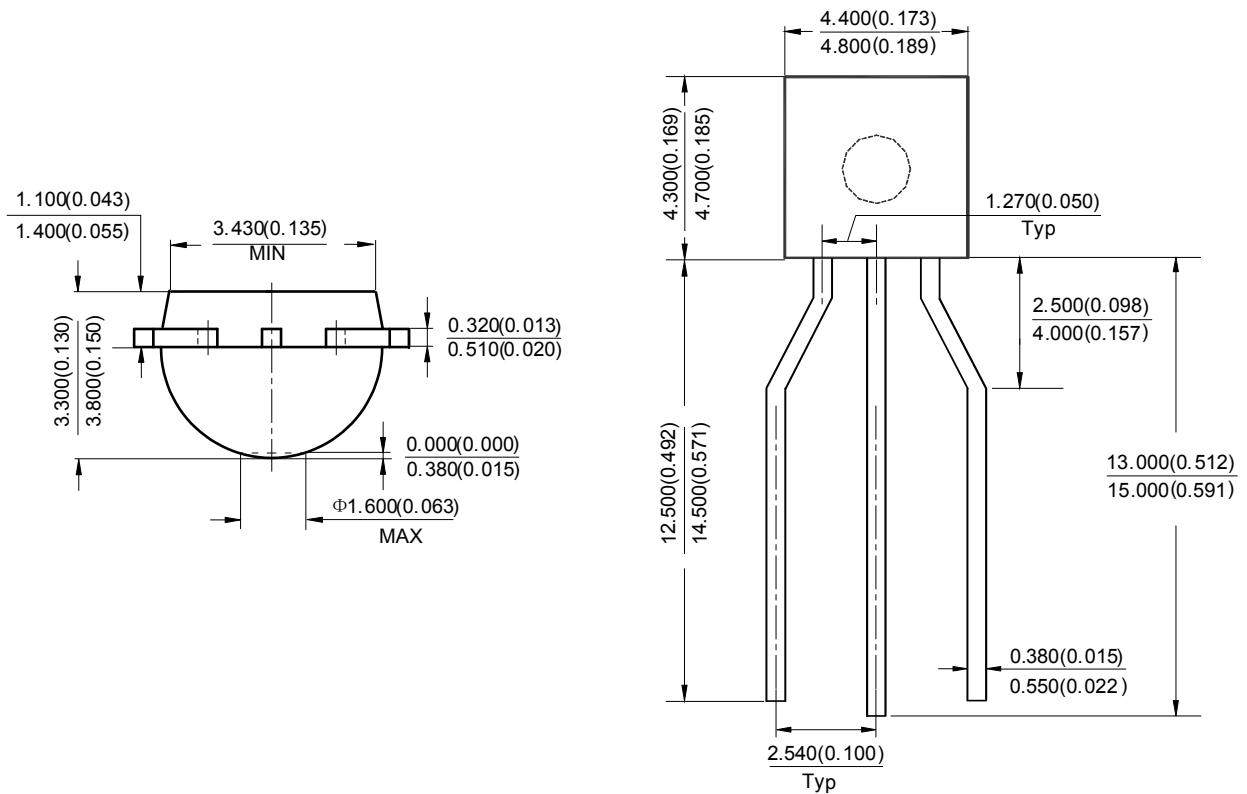


LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Mechanical Dimensions (Continued)

TO-92(Ammo Packing)

Unit: mm(inch)



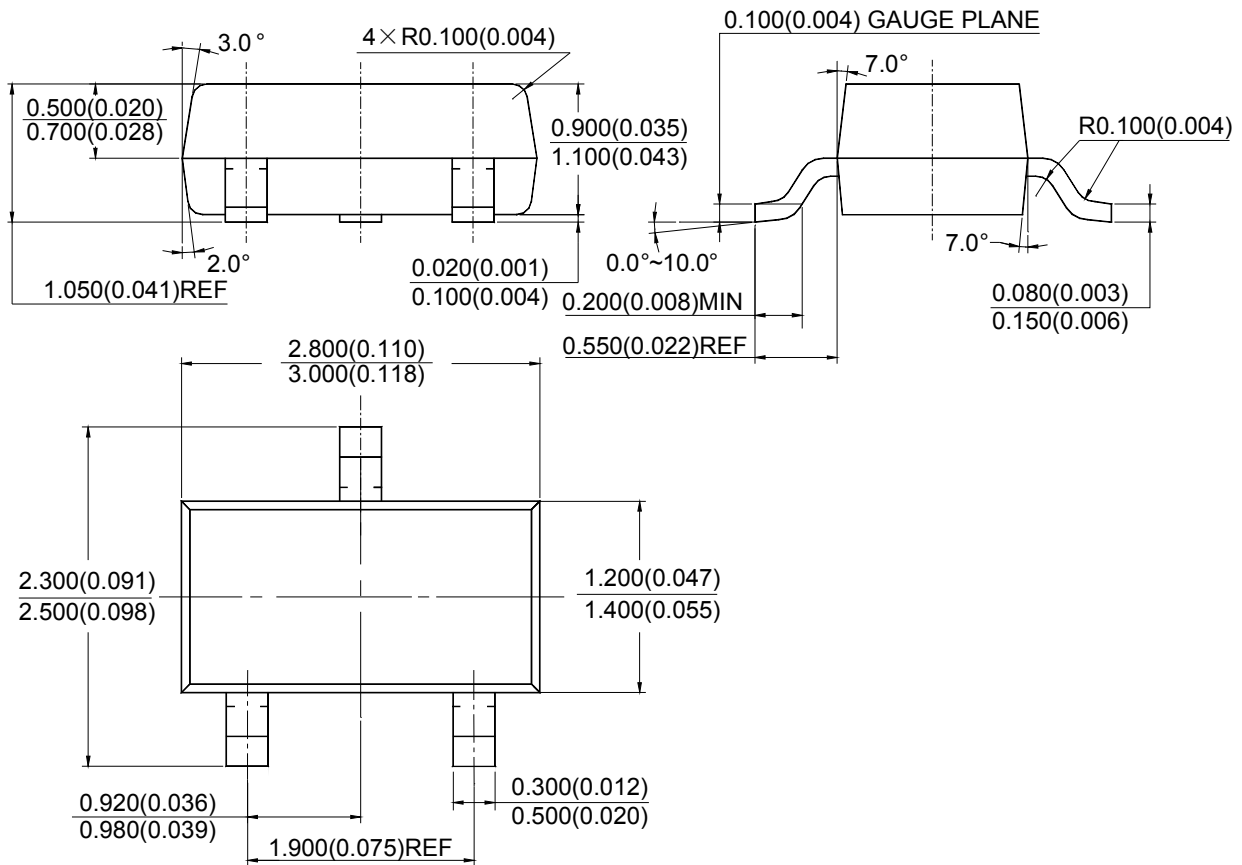


LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Mechanical Dimensions (Continued)

SOT-23

Unit: mm(inch)



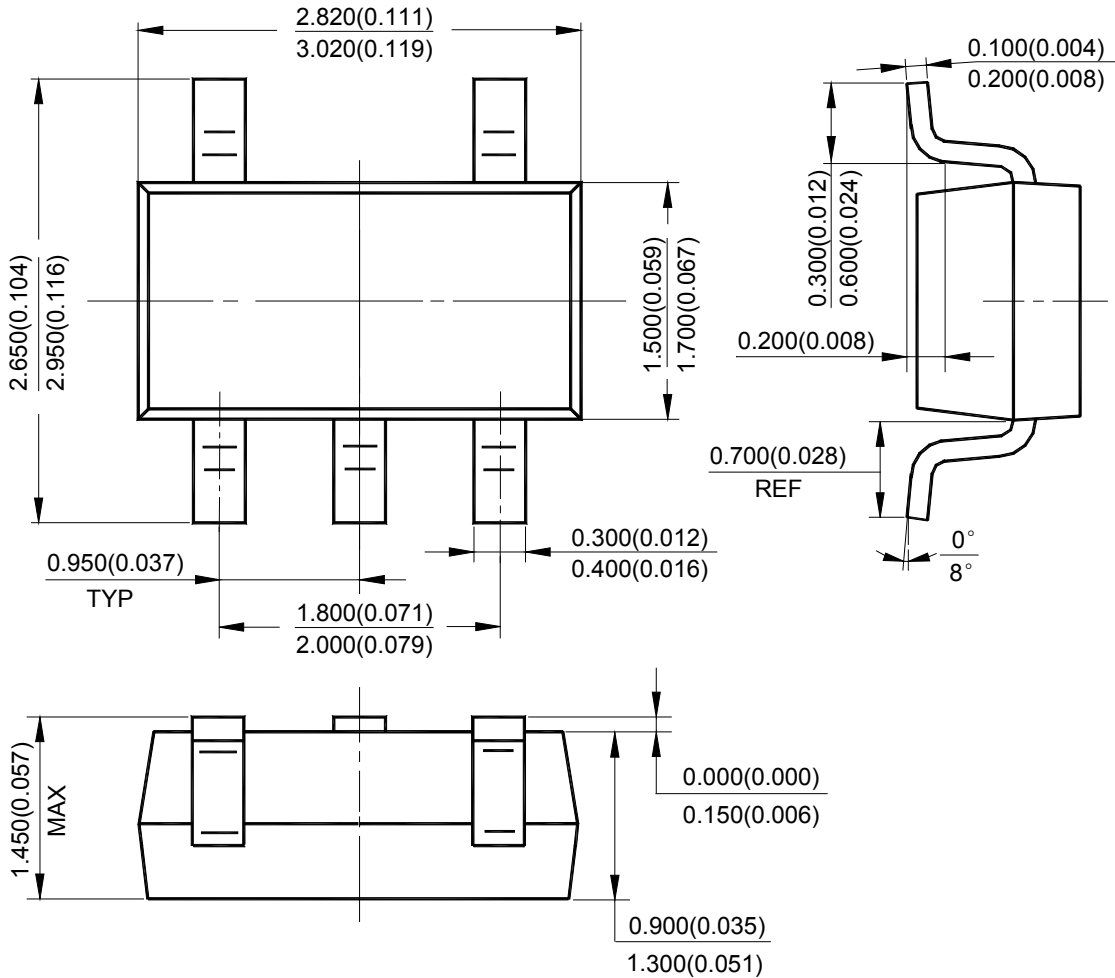


LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Mechanical Dimensions (Continued)

SOT-23-5

Unit: mm(inch)



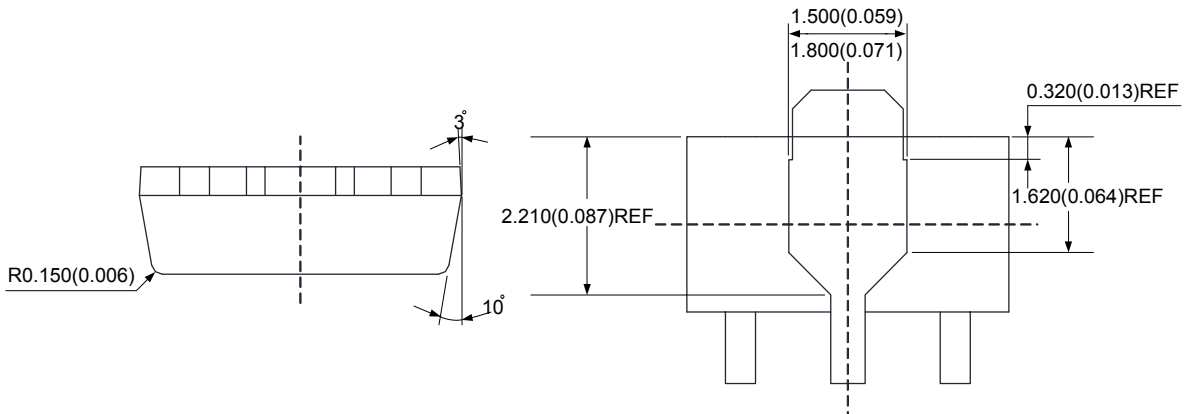
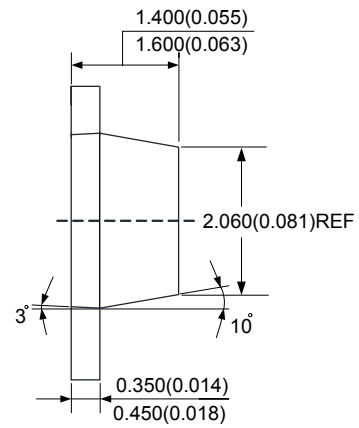
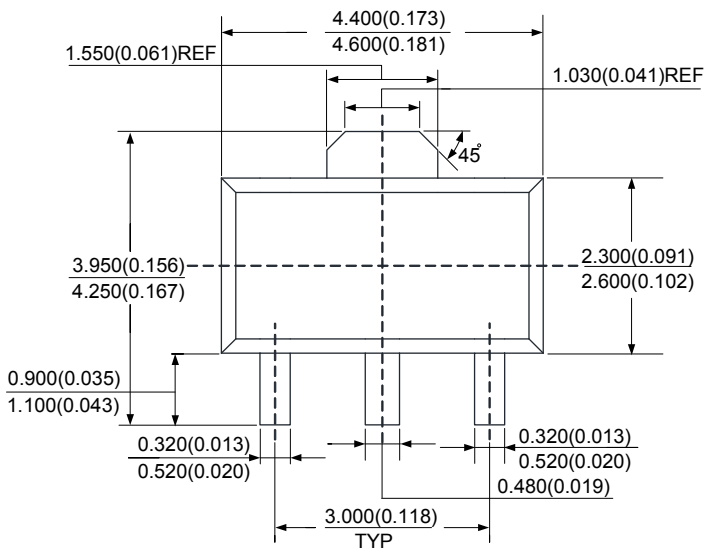


LOW VOLTAGE (1.25V) ADJUSTABLE PRECISION SHUNT REGULATOR **AZ432**

Mechanical Dimensions (Continued)

SOT-89

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

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MAIN SITE

- Headquarters

BCD Semiconductor Manufacturing Limited

No. 1600, Zi Xing Road, Shanghai Zizhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office

Unit A Room 1203, Skyworth Bldg., Gaoxin Ave. 1.S., Nanshan District, Shenzhen, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office

BCD Semiconductor (Taiwan) Company Limited

4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei, Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office

BCD Semiconductor Corp.

30920 Huntwood Ave. Hayward, CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

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- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
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- Комплексную поставку.
- Работу по проектам и поставку образцов.
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- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

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- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru