



Low Voltage(1.24V) Adjustable Precision  
Shunt Regulator TL432

**DESCRIPTION:**

The TL432 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 1.24V and 16V with two external resistors.

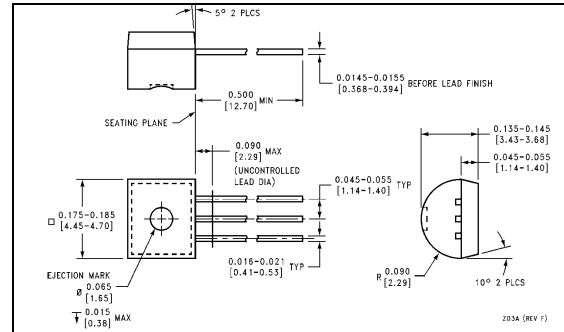
The TL432 precision reference is offered in two bandgap tolerance: 0.5%、1% and 2%.

These ICs are available in 3 packages:  
TO-92, SOT-23-3, SOT-23-5.

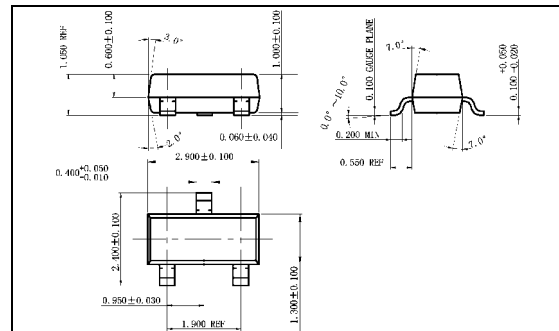
**FEATURE:**

- Wide Programmable Precise Output Voltage from 1.24V to 16V
- High Stability under Capacitive Load
- Low Temperature Deviation: 3mV Typical
- Low Dynamic Output Resistance: 0.2Ω Typical
- High Sink Current Capacity from 55 μ A to 20 mA
- Low Output Noise

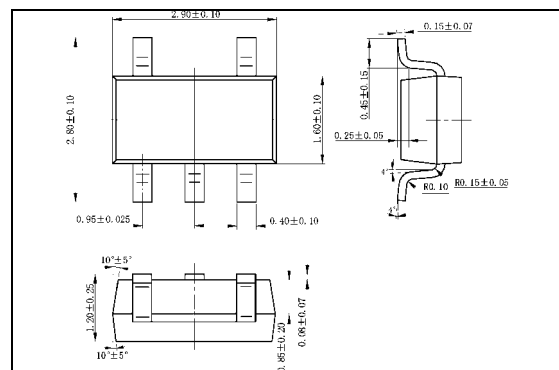
Outline Drawing



TO-92



SOT-23-3



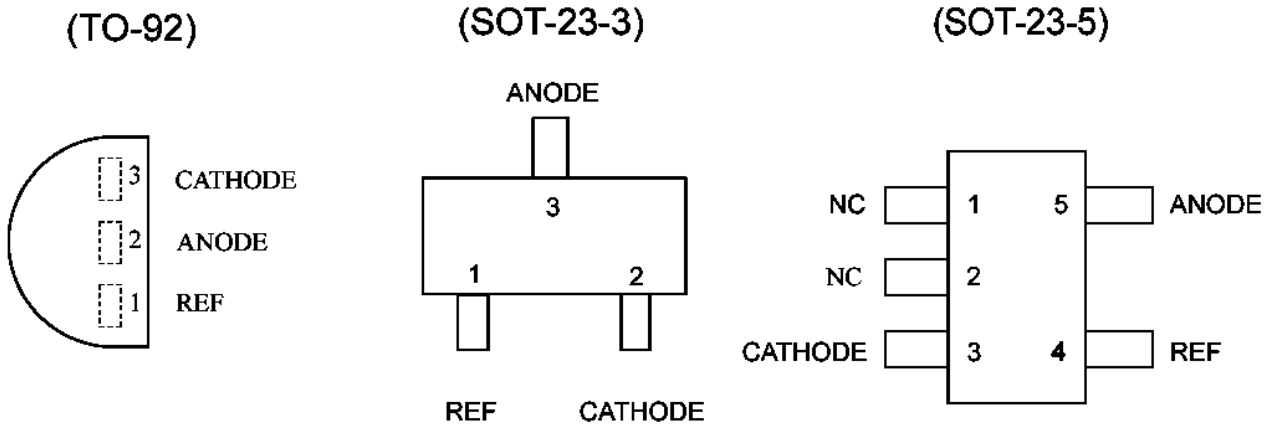
SOT-23-5

# TL432

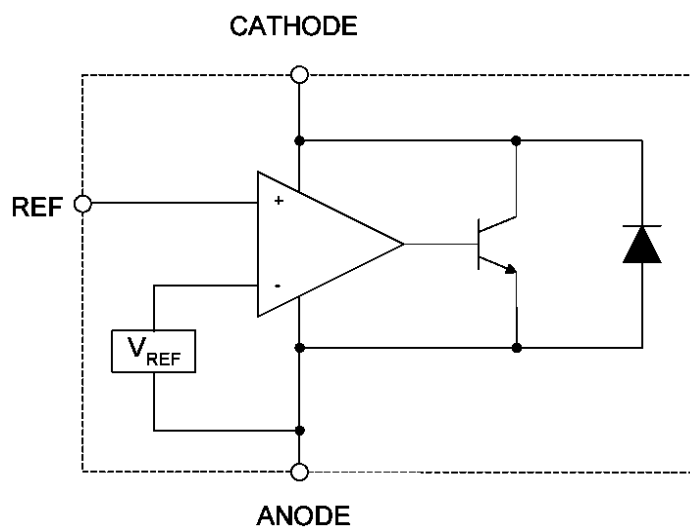
## APPLICATION:

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

## PIN CONFIGURATION:



## BLOCK DIAGRAM:



# TL432

## ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Characteristic	Symbol	Value		Unit
Cathode Voltage	V <sub>KA</sub>	18		V
Cathode Current Range(continuous)	I <sub>KA</sub>	-20~20		mA
Reference Input Current Range	I <sub>REF</sub>	10		mA
Power Dissipation	P <sub>D</sub>	TO-92 Package	770	mW
		SOT-23-3 Package	370	
		SOT-23-5 Package		
Storage Temperature	T <sub>stg</sub>	-65~+150		°C
Package Thermal Impedance	Q <sub>JA</sub>	TO-92	130	°C/W
		SOT-23-3	330	
		SOT-23-5	250	

**Note:** 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 OPERATING CONDITIONS (Ta=25°C)

Characteristic	Symbol	Min	Max	Unit
Cathode Voltage	V <sub>KA</sub>	V <sub>REF</sub>	16	V
Cathode Current	I <sub>KA</sub>	0.1	20	mA
Operating Ambient Temperature range		-30	85	°C

## ELECTRICAL CHARACTERISTICS (Unless otherwise specified: Ta=25°C)

Characteristics	Symbol	Test conditions	Min	Typ	Max	Unit
Reference Voltage (Fig.1)	V <sub>REF</sub>	V <sub>KA</sub> =V <sub>REF</sub> I <sub>KA</sub> =10mA	1.234	1.240	1.246	V
			1.228	1.240	1.252	
			1.215	1.240	1.265	
Deviation of reference voltage Over-Temperature(Fig.1)	V <sub>REF</sub>	V <sub>KA</sub> =V <sub>REF</sub> 0 ~ 70°C		2	10	mV
		I <sub>KA</sub> =10mA -30 ~ 85°C		3	20	
Ratio of Change in V <sub>REF</sub> to the Change in Cathode Voltage (Fig1)	V <sub>REF</sub> / V <sub>KA</sub>	I <sub>KA</sub> =10mA V <sub>KA</sub> =V <sub>REF</sub> -16V		-1.0	-2.7	MV/V
Reference input Current (Fig.2)	I <sub>REF</sub>	I <sub>KA</sub> =10mA R1=10KΩ,R2=		0.15	0.50	μA
Deviation of Reference Current Over Full Temperature Range (Fig.2)	I <sub>REF</sub>	I <sub>KA</sub> =10mA,R1=10KΩ R2= ,Ta=-30 ~ 85°C		0.1	0.50	μA
Minimum Cathode Current for Regulation (Fig.1)	I <sub>KA</sub> (MIN)	V <sub>KA</sub> = V <sub>REF</sub>		20	80	μA
Off-State Cathode Current (Fig.3)	I <sub>KA</sub> (OFF)	V <sub>REF</sub> =0, V <sub>KA</sub> =6V		0.01	0.05	μA
		V <sub>REF</sub> =0V, V <sub>KA</sub> =16V		0.04	0.15	
Dynamic Impedance (Fig.1)	Z <sub>KA</sub>	V <sub>KA</sub> = V <sub>REF</sub> , I <sub>KA</sub> =100μA ~ 20mA, f 1.0kHz		0.20	0.40	Ω

# TL432

## ELECTRICAL CHARACTERISTICS(CONTINUED):

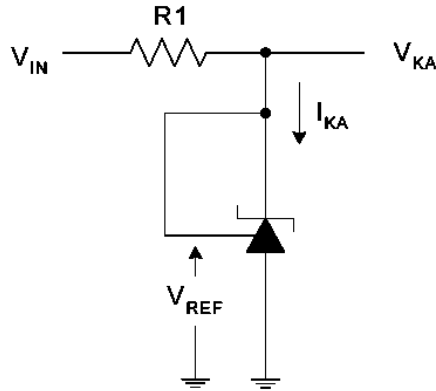


Figure 1  $V_{KA}=V_{REF}$

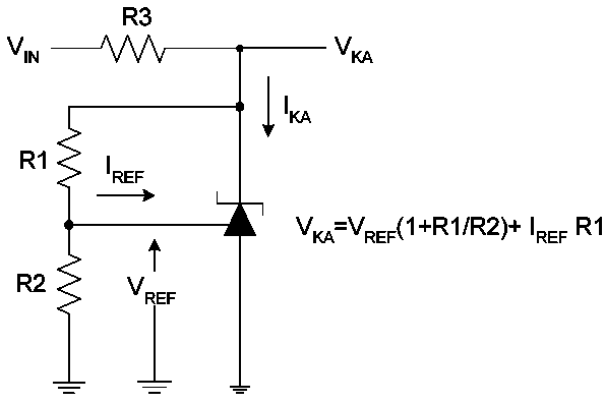


Figure 2  $V_{KA} > V_{REF}$

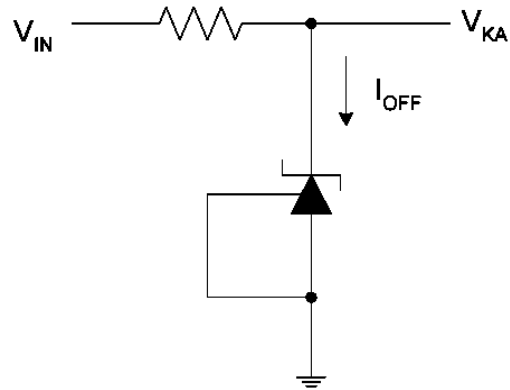
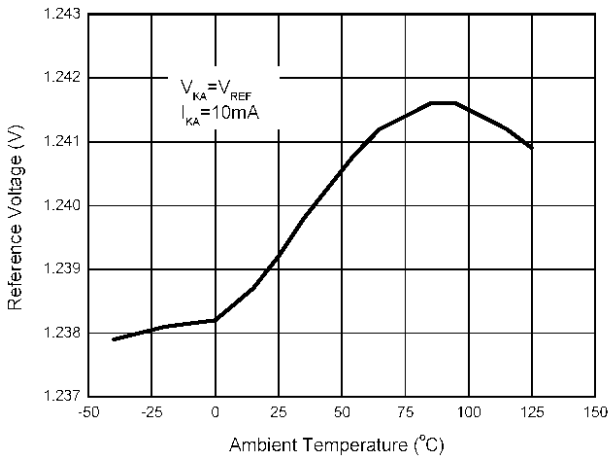
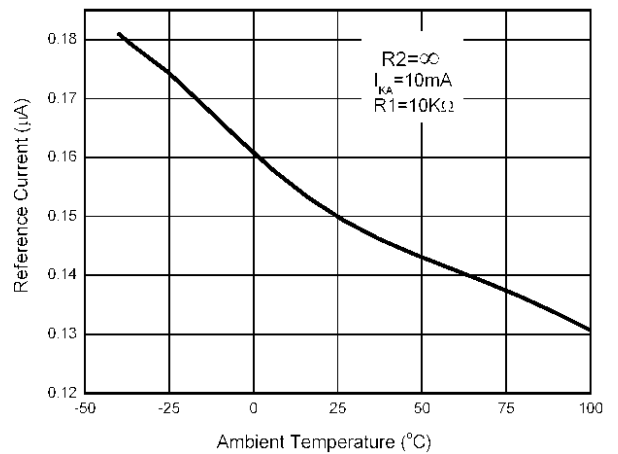


Figure 3  $I_{OFF}$

## TYPICAL CHARACTERISTICS:

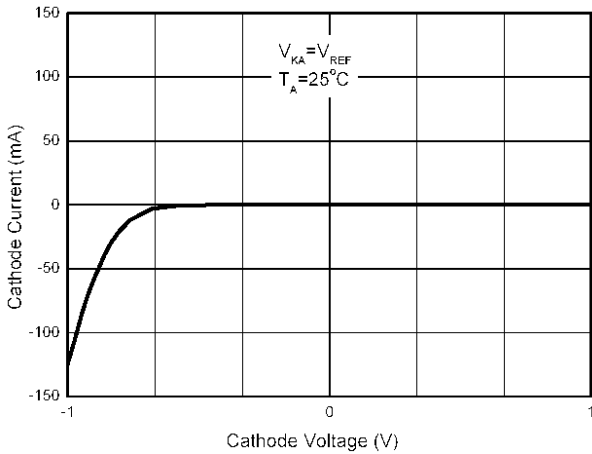


Reference Voltage vs. Ambient Temperature

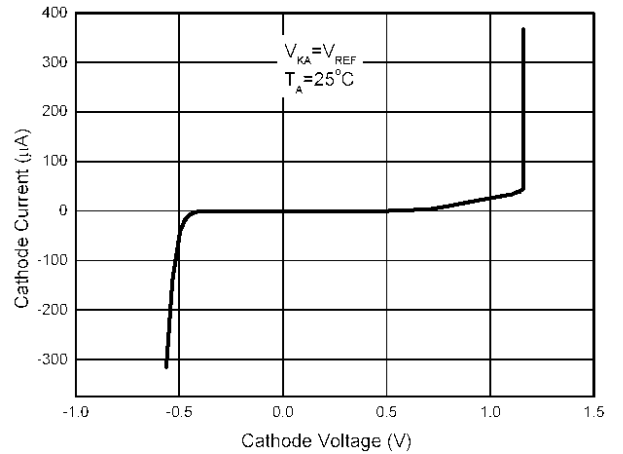


Reference Current vs. Ambient Temperature

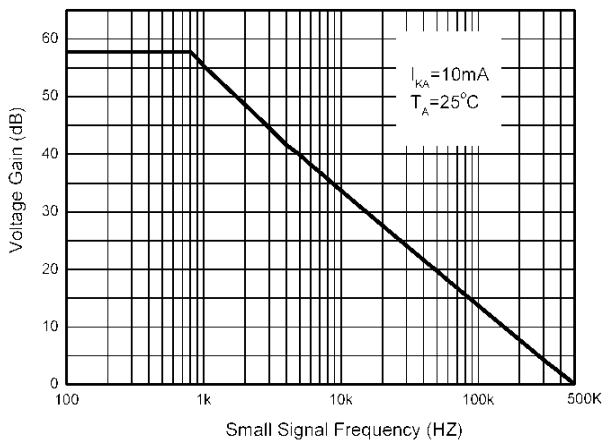
# TL432



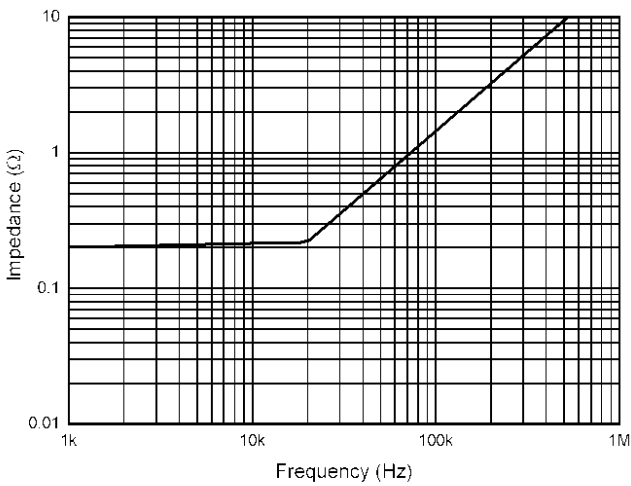
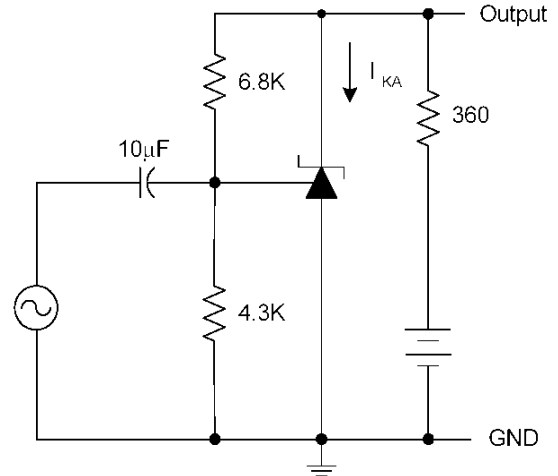
Cathode Current vs. Cathode Voltage



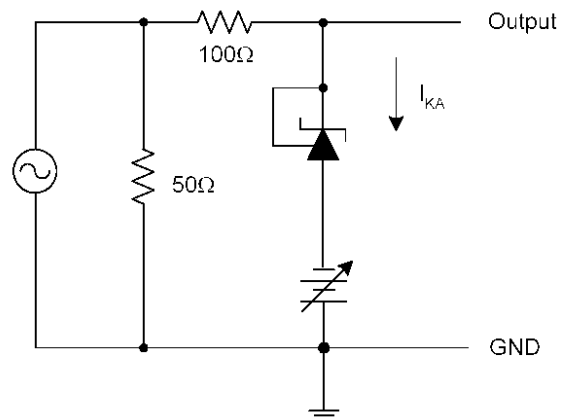
Current vs. cathode Voltage



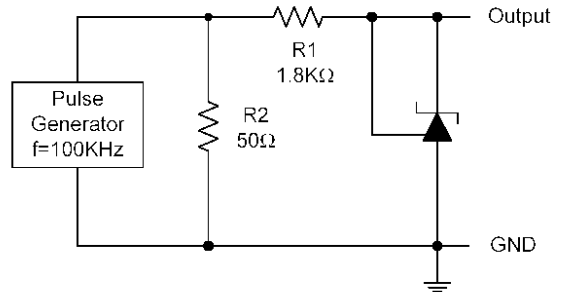
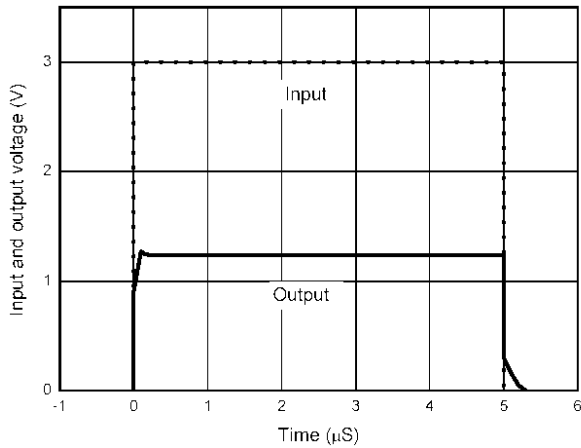
Small signal Voltage Gain vs. Frequency



Dynamic Impedance vs. Frequency

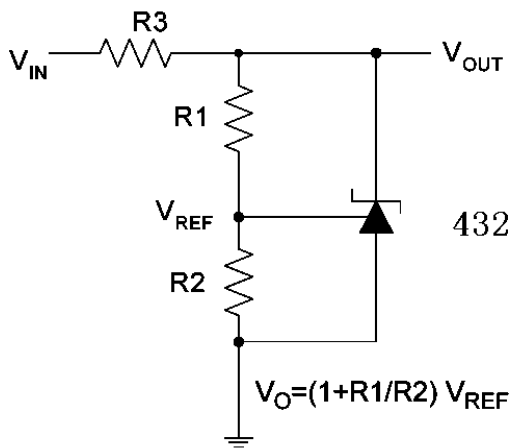


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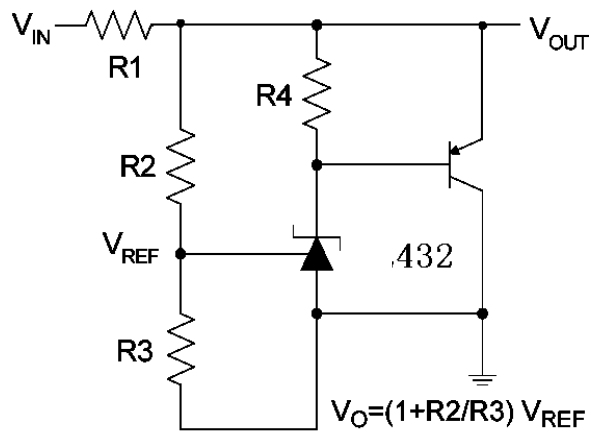


Pulse Response of Input and Output Voltage

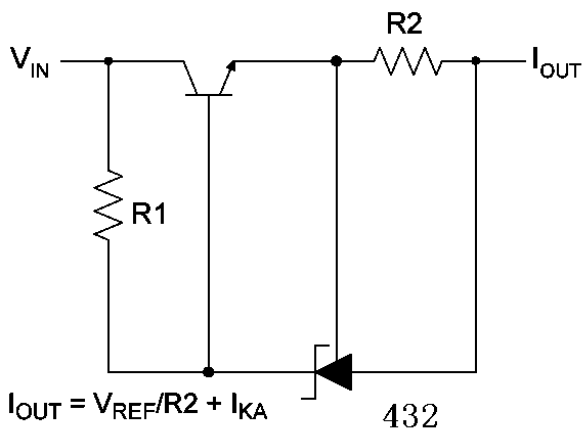
## APPLICATION CIRCUITS:



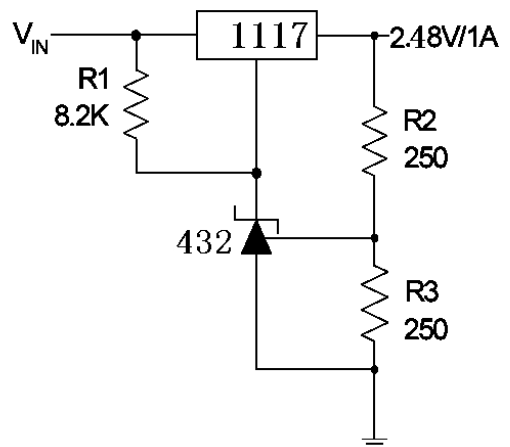
Shunt Regulator



High Current Shunt Regulator



Current Source or Current Limit



Precision 2.48V/1A Regulator