

## Description

The B432 is a three terminal adjustable shunt regulator with thermal stability of 50ppm/°C. The output voltage can be adjusted to any value from 1.25V ( $V_{REF}$ ) to 15V with two external resistors. The B432 is an ideal voltage reference in an isolated feedback circuit for 3.0V switch mode power supplies

The B432 shunt regulator is available with three voltage tolerances (0.5%, 1.0% and 2.0%) and three package options (SOT-23-3, TO-92, 8SOIC). This allows the designer the opportunity to select the optimum combination of cost and performance for their application.

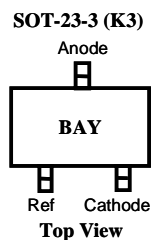
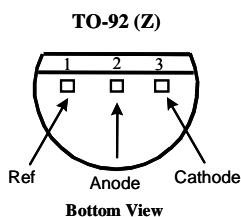
## Features

- **Low voltage operation (down to 1.25V)**
- **Wide operating current....1mA to 100mA**
- **Trimmed bandgap design  $\pm 0.5\%$**
- **Wide temperature range 0°C to +105°C**
- **Available in SOT-23-3, TO-92, 8SOIC**
- **Upgrade for TLV431A & Cross AS432**

## Applications

- **Switching Power Supplies**
- **Adjustable Power Supplies**
- **Linear Regulators**
- **Battery Powered Equipment**
- **Monitors, TV, VCR**
- **Instrumentation**

## Pin Connection



## Ordering Information

Package	Tolerance		
	0.5%	1%	2%
TO-92	B432AZ	B432BZ	B432CZ
SO-8	B432AM	B432BM	B432CM
SOT-23	B432AK3	B432BK3	B432CK3

**Absolute Maximum Rating**

Parameter	Symbol	Maximum	Units
Cathode Voltage	$V_Z$	18	V
Continuous Cathode Current	$I_Z$	100	mA
Power Dissipation at $T_A = 25^\circ\text{C}$ SOT-23-3 S0-8 TO-92	$P_D$	200 750 775	mW
Thermal Resistance SOT-23-3 S0-8 TO-92	$\theta_{JA}$	575 175 160	$^\circ\text{C}/\text{W}$
Operating Junction Temperature Range	$T_J$	-40 to +150	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65 to +150	$^\circ\text{C}$
Lead Temperature (Soldering) 10 seconds	$T_{LEAD}$	300	$^\circ\text{C}$
ESD Rating (Human Body Model)	$T_{ESD}$	2	kV

**Recommended Operating Conditions**

	Min	Max	Symbol
Cathode Voltage, $V_Z$	$V_{REF}$	15	V
Cathode Current, $I_Z$	1.0	100	mA

**Electrical Characteristics**

Unless specified:  $T_A = 25^\circ\text{C}$ . Values in bold apply over full operating ambient temperature.

Parameter	Symbol	Condition	B432 0.5%			Units
			Min	Typ	Max	
Reference Voltage	$V_{REF}$	$V_Z = V_{REF1}$ $I_Z = 10\text{mA}^{(1)}$	1.243	1.250	1.257	V
$V_{REF}$ Temp Deviation	$V_{DEV}$	$V_Z = V_{REF1}$ $I_Z = 10\text{mA}^{(1)}$		2	16	mV
Ratio of Change in $V_{REF}$ To Change in $V_Z$	$\frac{\Delta V_{REF}}{\Delta V_Z}$	$I_Z = 10\text{mA}, \Delta V_Z = 15\text{V to } V_{Ref}$		-1.5	-2.7	mV/V
Reference Input Current	$I_{REF}$	$R1 = 10\text{k}\Omega, R2 = \infty,$ $I_Z = 10\text{mA}^{(2)}$		3	6	$\mu\text{A}$
$I_{REF}$ Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty,$ $I_Z = 10\text{mA}^{(2)}$		0.3	0.6	$\mu\text{A}$
Off-State Cathode Current	$I_{Z(OFF)}$					nA
		$V_{REF} = 0\text{V}, V_Z = 15\text{V}^{(3)}$		0.05	500	
Min Operating Current	$I_{Z(MIN)}$	$V_Z = V_{REF}^{(1)}$		0.6	1	mA

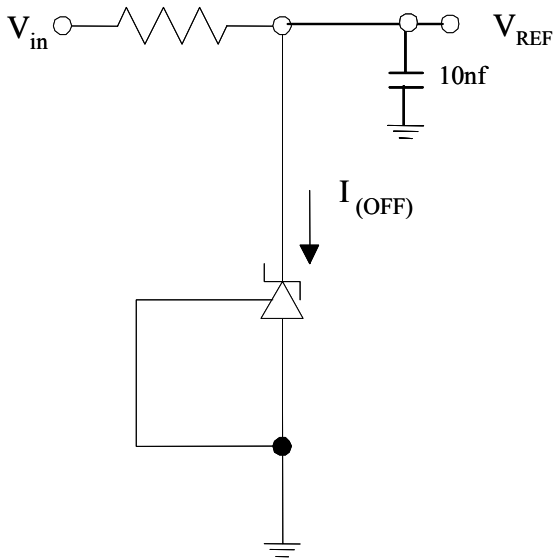
**Electrical Characteristics**

Unless specified:  $T_A = 25^\circ\text{C}$ . Values in bold apply over full operating ambient temperature.

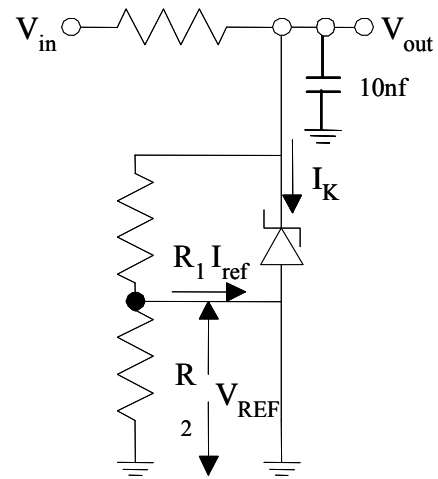
			<b>B432 1%</b>			
<b>Parameter</b>	<b>Symbol</b>	<b>Condition</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>
Reference Voltage	$V_{REF}$	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$	1.237	1.250	1.262	V
$V_{REF}$ Temp Deviation	$V_{DEV}$	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$		2	16	mV
Ratio of Change in $V_{REF}$ To Change in $V_Z$	$\frac{\Delta V_{REF}}{\Delta V_Z}$	$I_Z = 10\text{mA}, \Delta V_Z = 15\text{V to } V_{Ref}$		-1.5	-2.7	mV/V
Reference Input Current	$I_{REF}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		3	6	$\mu\text{A}$
$I_{REF}$ Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		0.3	0.6	$\mu\text{A}$
Off-State Cathode Current	$I_{Z(OFF)}$					nA
		$V_{REF} = 0\text{V}, V_Z = 15\text{V}^{(3)}$		0.05	500	
Min Operating Current	$I_{Z(MIN)}$	$V_Z = V_{REF}^{(1)}$		0.6	1	mA

Unless specified:  $T_A = 25^\circ\text{C}$ . Values in bold apply over full operating ambient temperature.

			<b>B432 2%</b>			
<b>Parameter</b>	<b>Symbol</b>	<b>Condition</b>	<b>Min</b>	<b>Typ</b>	<b>Max</b>	<b>Units</b>
Reference Voltage	$V_{REF}$	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$	1.225	1.250	1.275	V
$V_{REF}$ Temp Deviation	$V_{DEV}$	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$		2	16	mV
Ratio of Change in $V_{REF}$ To Change in $V_Z$	$\frac{\Delta V_{REF}}{\Delta V_Z}$	$I_Z = 10\text{mA}, \Delta V_Z = 15\text{V to } V_{Ref}$		-1.5	-2.7	mV/V
Reference Input Current	$I_{REF}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		3	6	$\mu\text{A}$
$I_{REF}$ Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		0.3	0.6	$\mu\text{A}$
Off-State Cathode Current	$I_{Z(OFF)}$					nA
		$V_{REF} = 0\text{V}, V_Z = 15\text{V}^{(3)}$		0.05	500	
Min Operating Current	$I_{Z(MIN)}$	$V_Z = V_{REF}^{(1)}$		0.6	1	mA

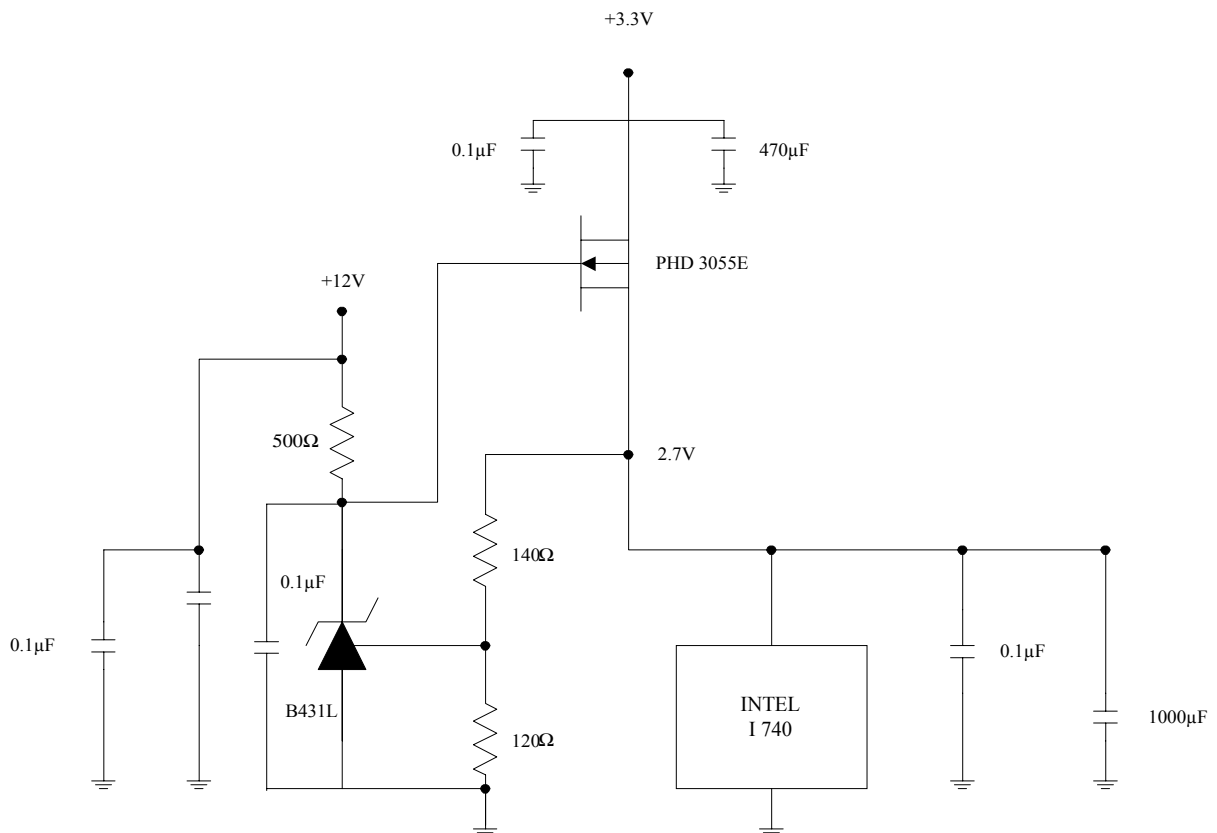


Test Circuit for  $I_{OFF}$



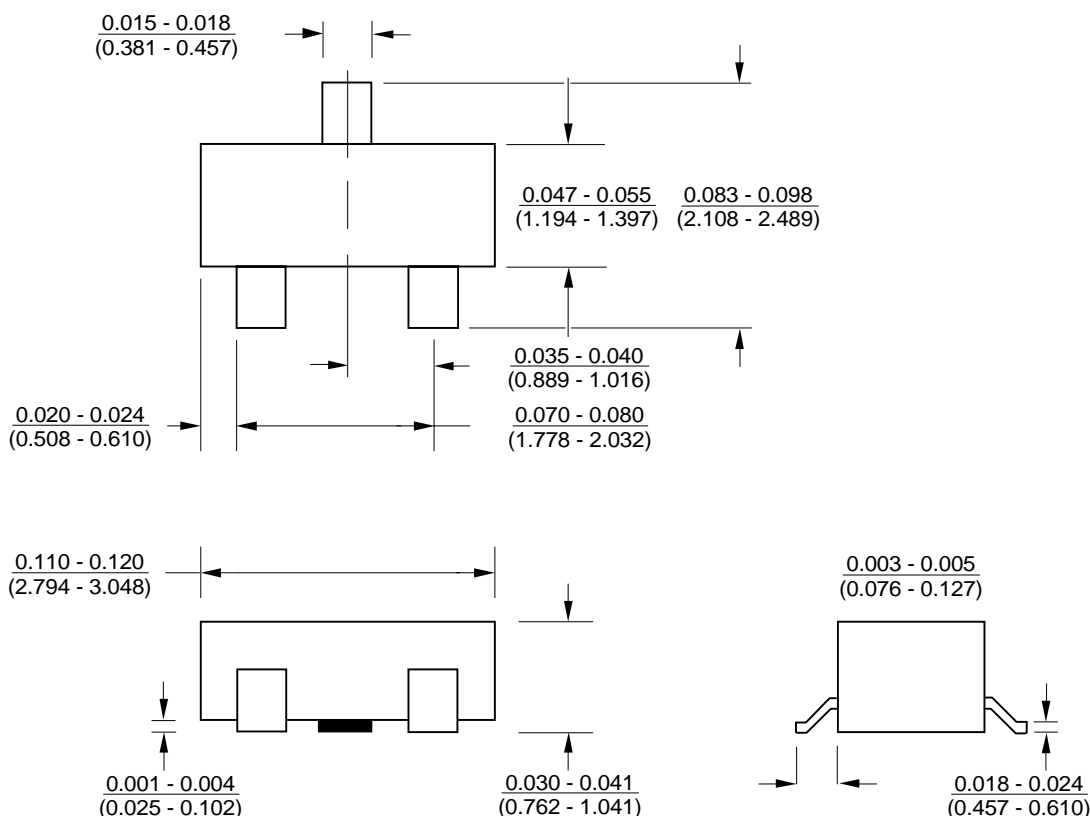
Test Circuit for  $V_{KA} > V_{REF}$

$$V_O = V_{KA} = V_{REF} \times (1 + R_1/R_2) - I_{REF} \times R_1$$



\*If the output voltage has noise, then please add a  $0.1\mu\text{F}$  in between drain and gate of power MOSFET to reduce the noise.

## SOT-23



**Advance Information-** These data sheets contain descriptions of products that are in development. The specifications are based on the engineering calculations, computer simulations and/ or initial prototype evaluation.

**Preliminary Information-** These data sheets contain minimum and maximum specifications that are based on the initial device characterizations. These limits are subject to change upon the completion of the full characterization over the specified temperature and supply voltage ranges.

The application circuit examples are only to explain the representative applications of the devices and are not intended to guarantee any circuit design or permit any industrial property right to other rights to execute. Bay Linear takes no responsibility for any problems related to any industrial property right resulting from the use of the contents shown in the data book. Typical parameters can and do vary in different applications. Customer's technical experts must validate all operating parameters including "Typical" for each customer application.

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