

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.

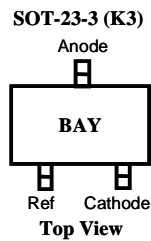
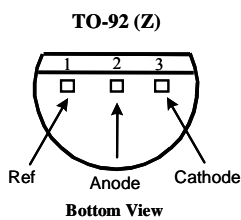
Features

- **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	θ_{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	μA
I_{REF} Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty,$ $I_Z = 10\text{mA}^{(2)}$		0.3	0.6	μA
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

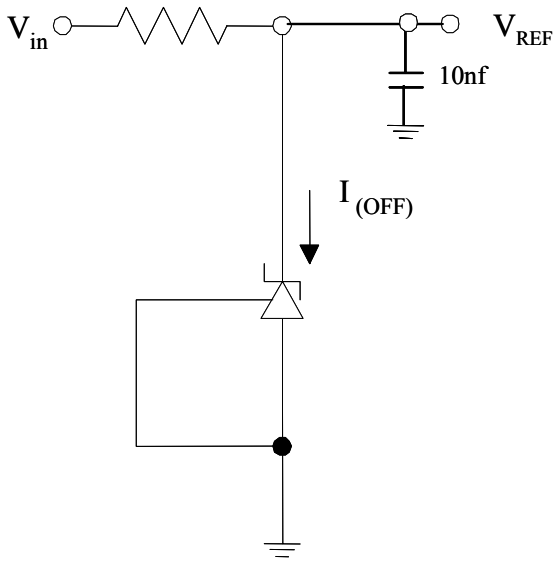
Electrical Characteristics

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

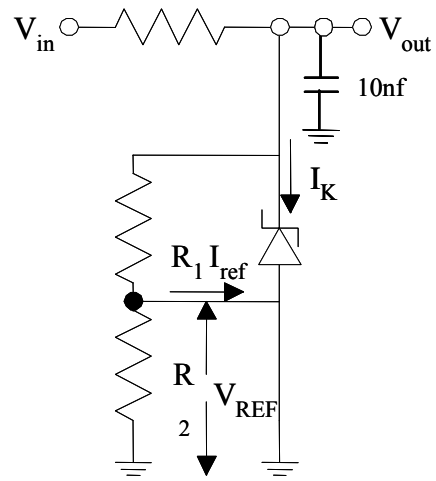
			B432 1%			
Parameter	Symbol	Condition	Min	Typ	Max	Units
Reference Voltage	V_{REF}	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$	1.237	1.250	1.262	V
V_{REF} Temp Deviation	V_{DEV}	$V_Z = V_{REF1} I_Z = 10\text{mA}^{(1)}$		2	16	mV
Ratio of Change in V_{REF} To Change in V_Z	$\frac{\Delta V_{REF}}{\Delta V_Z}$	$I_Z = 10\text{mA}, \Delta V_Z = 15\text{V to } V_{Ref}$		-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	μA
I_{REF} Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		0.3	0.6	μA
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.

			B432 2%			
Parameter	Symbol	Condition	Min	Typ	Max	Units
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	μA
I_{REF} Temperature Deviation	$I_{REF(DEV)}$	$R1 = 10\text{k}\Omega, R2 = \infty, I_Z = 10\text{mA}^{(2)}$		0.3	0.6	μA
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

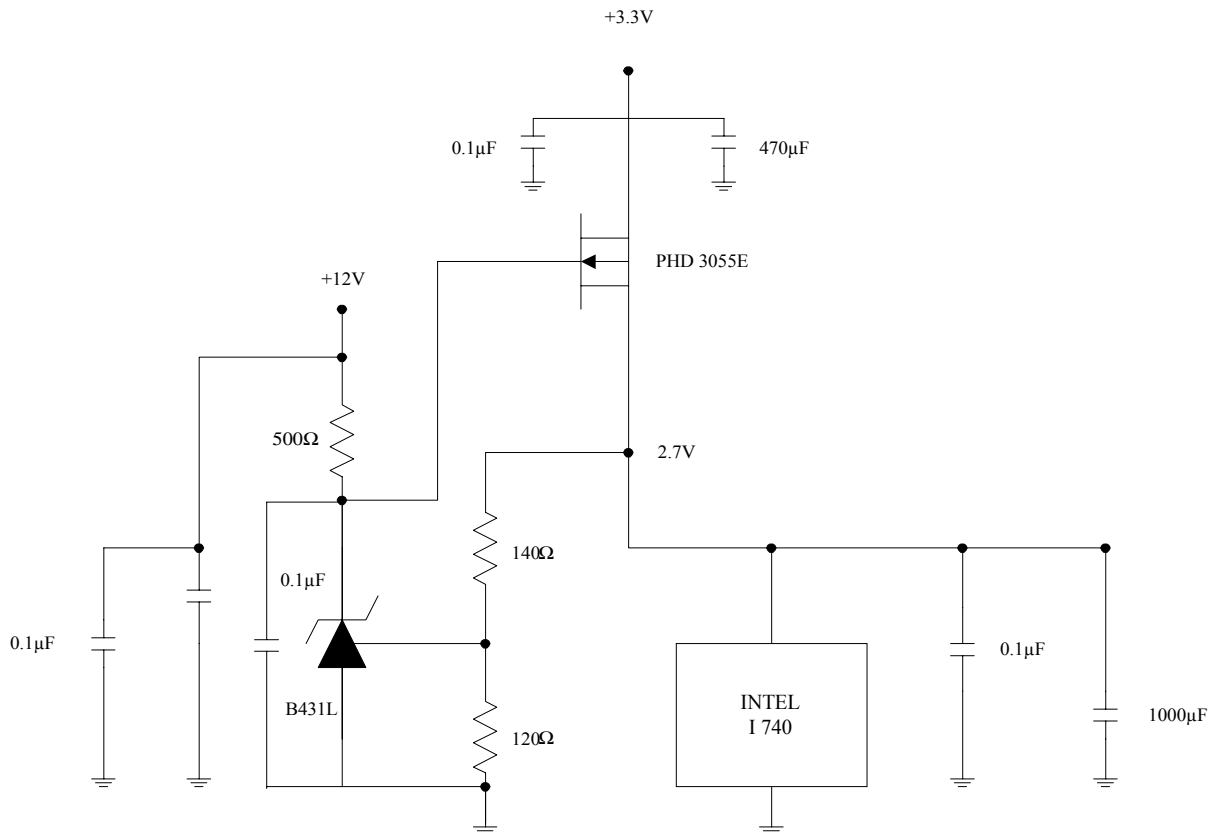


Test Circuit for I_{OFF}



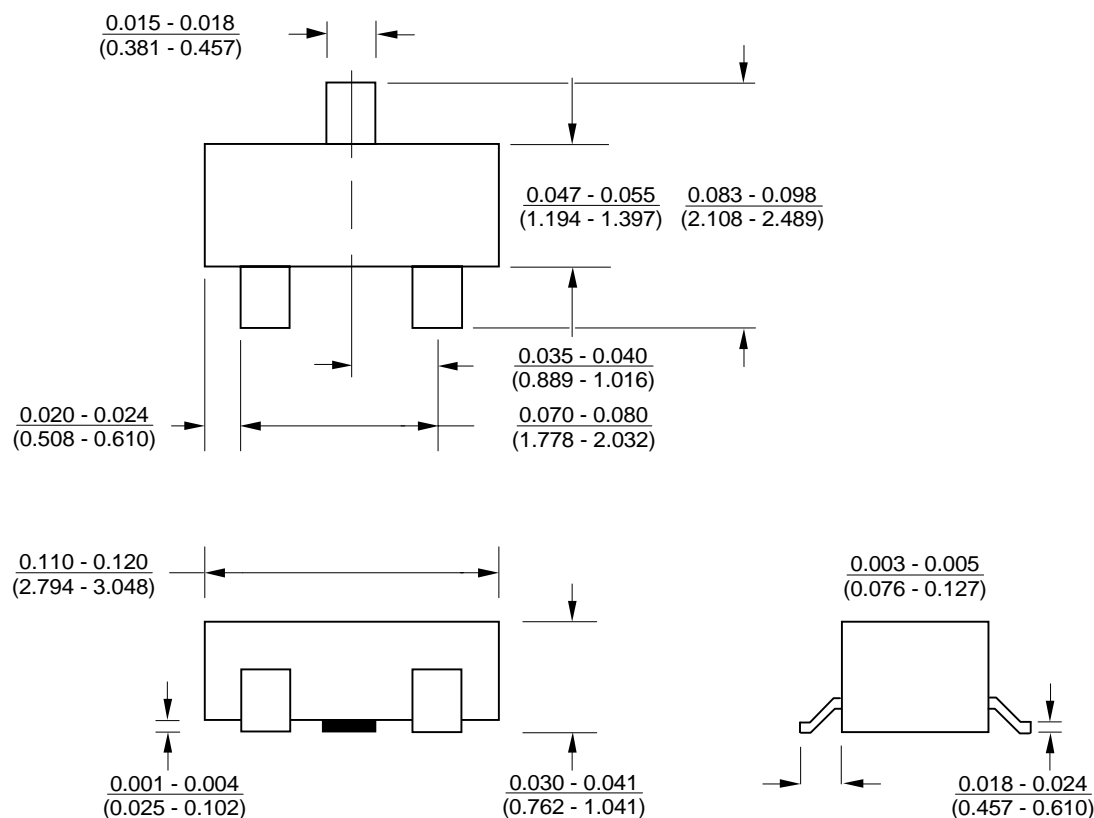
Test Circuit for $V_{KA} > V_{REF}$

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



*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.

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