# WSL432

## Adjustable Precision Shunt Regulator

## Features

- Precise Reference Voltage to 1.240V
- Guaranteed 1% and 1.5% Reference Voltage Tolerance
- Sink Current Capability, 0.1mA to 20mA
- Quick Turn-on
- Adjustable Output Voltage, Vo = $V_{ref}$ to 6V
- Low Operational Cathode Current, 42μA Typical
- 0.1Ω Typical Output Impedance
- TO-92 and SOT-23 Package

## Applications

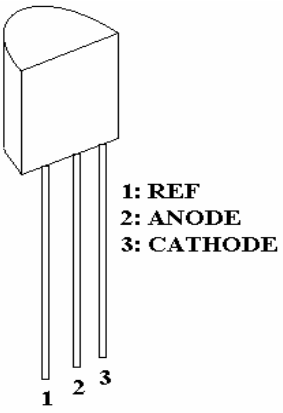
- Linear Regulators
- Adjustable Power Supply
- Switching Power Supply

## General Description

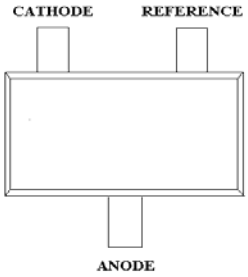
The WSL432 is a 3 terminal adjustable voltage reference with specified thermal stability over applicable commercial temperature ranges. Output voltage may be set to any value between Vref (1.24V) and 6V with two external resistors (see Figure 2).

When used with a photo-coupler, the WSL432 is an ideal voltage reference in isolated feedback circuits for 1.24V to 6V switching-mode power supplies.

This device has a typical output impedance of 0.1Ω. Active output circuitry provides a very sharp turn-on characteristic, making the WSL432 excellent replacements for zener diodes in many applications, including on-board regulation and adjustable power supplies.




**TO-92**



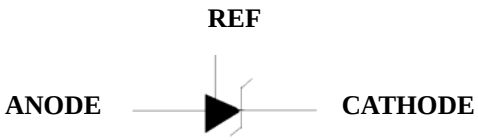

**SOT-23 (Top View)**

Winson reserves the right to make changes to improve reliability or manufacturability.

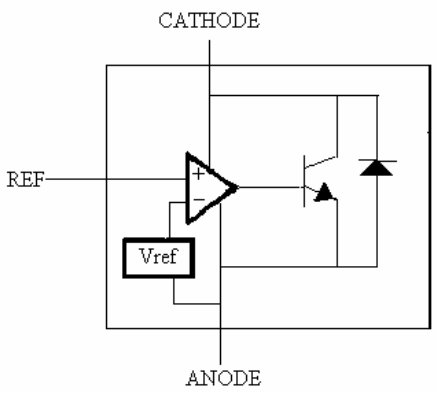
## Ordering Information

| | |
|---|---|
| WSL432-XP□N□<br>Elect. Grade<br>Package Code<br>N: No-Lead Product | Elect. Grade<br>3: 1% Reference Voltage Tolerance<br>5: 1.5% Reference Voltage Tolerance<br><br>Package Code<br>A: TO-92<br>C: SOT-23 |

## Symbol




## Functional Diagram

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## Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|---|---|---|---|
| $V_{KA}$ | Cathode voltage | 7 | V |
| $I_K$ | Continuous cathode current range | 30 | mA |
| Iref | Reference current range | 3 | mA |
| $T_A$ | Ambient temperature range | 0 to 85 | ˚C |
| $T_J$ | Junction temperature range | 0 to 125 | ˚C |
| $T_{STG}$ | Storage Temperature Range | -65 to 150 | ˚C |
| $T_{SO}$ | Lead temperature range, $T_s$ (Soldering, 10sec) | 260 | ˚C |

## Electrical Characteristics $T_A$= 25˚C (unless otherwise noted)

| Symbol | Parameter | Test Conditions | WSL432 | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Vref | $V_{KA}$=Vref, $I_K$=10mA. | WSL432 (1%) | 1.228 | 1.24 | 1.252 | V |
| | | WSL432 (1.5%) | 1.222 | 1.24 | 1.258 | V |
| ΔVref/T | Reference Voltage Drift over Temp. range | $T_A$=0 to 85°C*1 , $I_k$ =10mA. | | 4 | 20 | mV |
| ΔVref /Δ$V_{KA}$ | Voltage Ration (open loop gain) | $I_K$=10 mA, $V_{KA}$=Vref to 6V*2 | | 0.8 | 2.7 | mV/V |
| Iref | Reference Current | $I_K$=10mA, $R_1$=10KΩ, $R_2$=open*2 | | 0.15 | 0.5 | μA |
| $Iref_{(dev)}$ | Iref deviation | $I_K$=10mA, $R_1$=10KΩ, $R_2$=open*2 | | 0.1 | 0.4 | uA |
| ΔIref/T | Reference Current Drift | $I_K$=10 mA, $R_1$=10KΩ, $R_2$=open, TA=0 to 85°C*2 | | 0.4 | 1.2 | μA |
| $I_{K(min)}$ | Min. Cathode Current | $V_{KA}$=Vref*1 | | 42 | 80 | uA |
| $I_{K(off)}$ | Off-state Cathode Current | $V_{KA}$=6V, Vref=0V*3 | | 0.001 | 0.1 | μA |
| $Z_{KA}$ | Dynamic Impedance | $V_{KA}$=Vref, IK=0.1 mA to 20mA, f=1k Hz*1 | | 0.1 | 0.4 | Ω |

Notes: *1: use Figure 1

*2: use Figure 2

*3: use Figure 3

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## Test figures

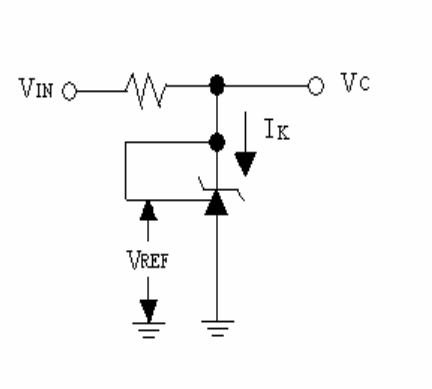


Figure 1. Test Circuit for $V_{KA}=V_{REF}$
$V_O=V_{KA}=V_{REF}$

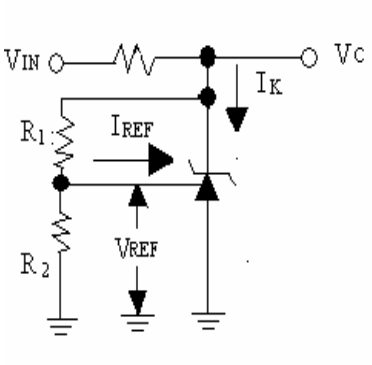


Figure 2. Test Circuit for $V_{KA}<V_{REF}$,
$V_O=V_{KA}=V_{REF}\times(1+R_1/R_2)+I_{REF}\times R_1$

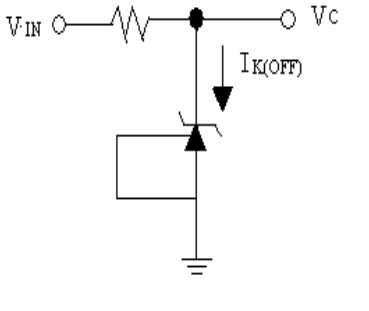


Figure 3. Test Circuit for $I_{k(off)}$

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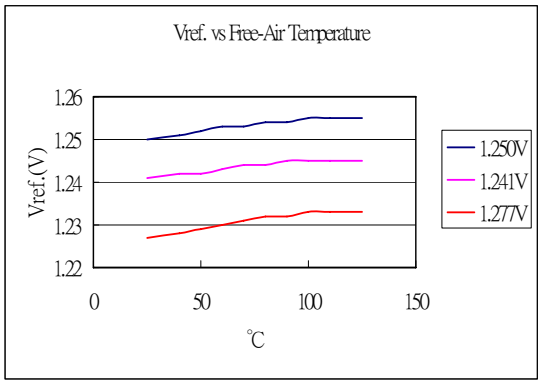
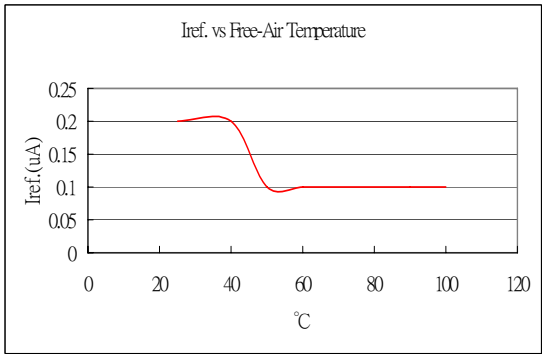
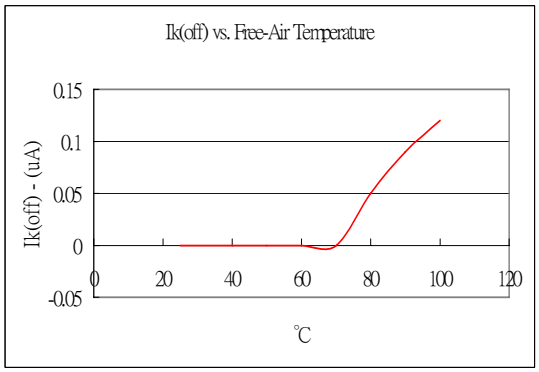
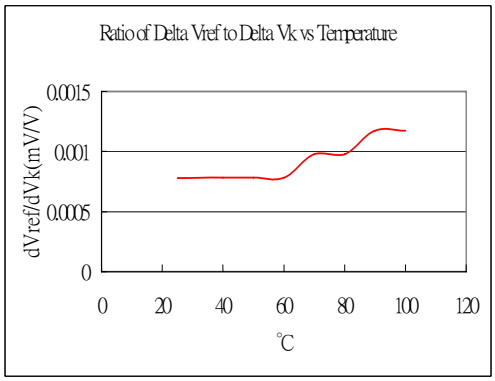
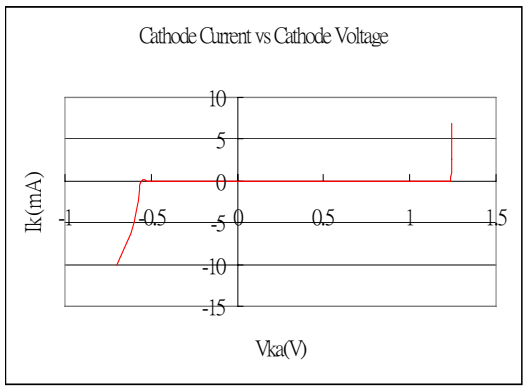
# TYPICAL CHARACTERISTICS

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## Application schematics

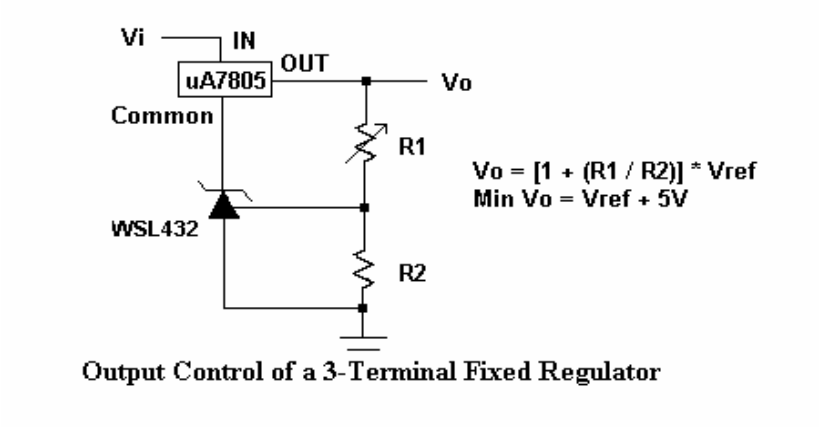


Figure 4.

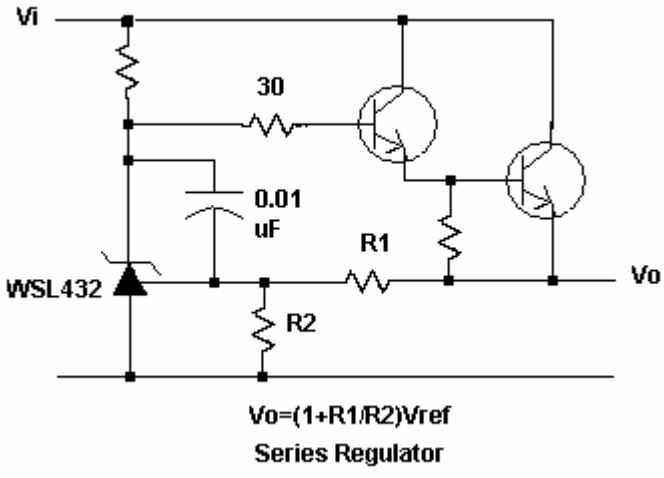


Figure 5.

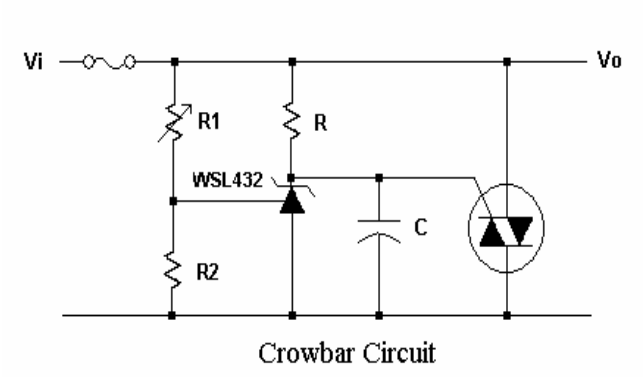


Figure 6.

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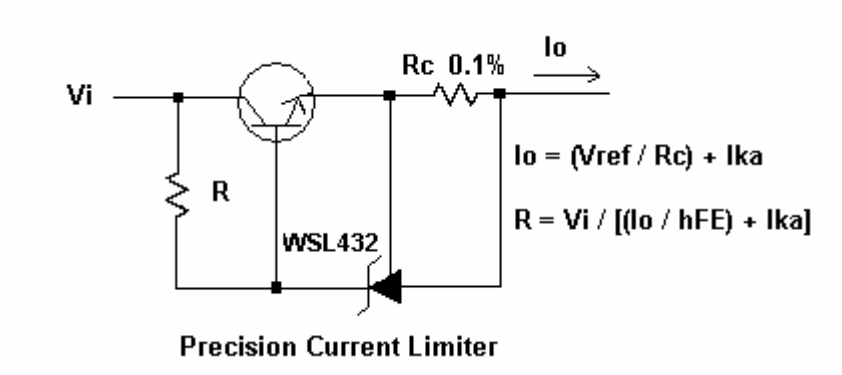


Figure 7.

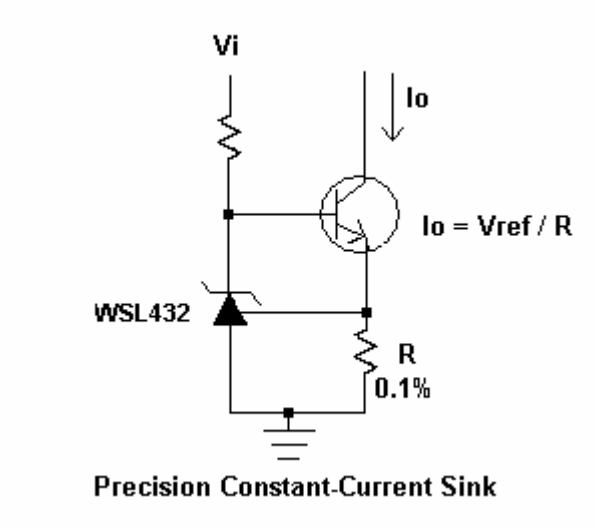


Figure 8.

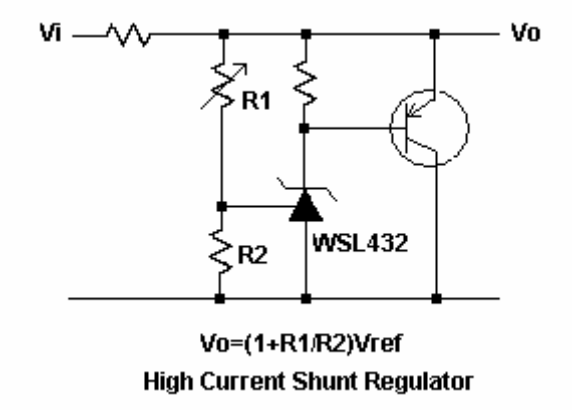


Figure 9.

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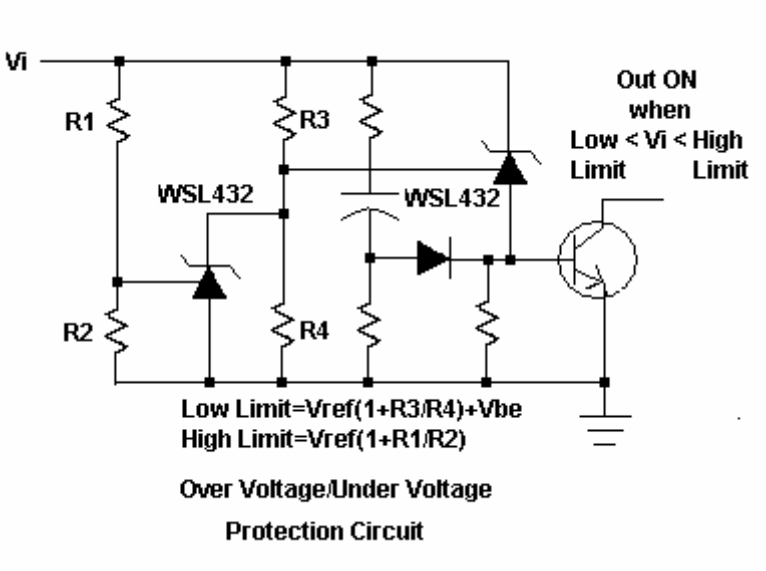


Figure 10.

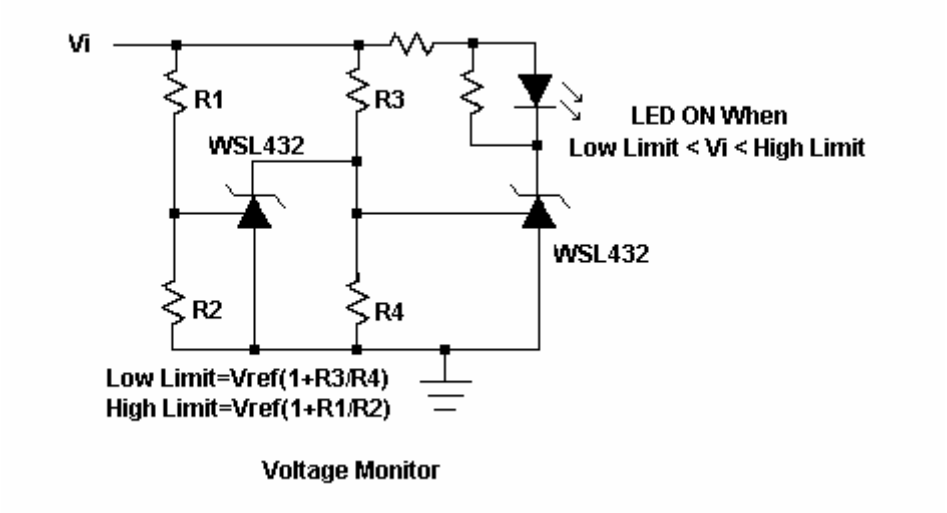


Figure 11.

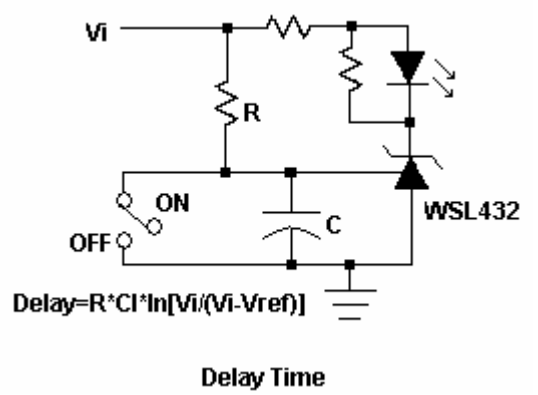


Figure 12.

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