

## 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,  $V_o = V_{ref}$  to 6V
- Low Operational Cathode Current, 42 $\mu$ A Typical
- 0.1 $\Omega$  Typical Output Impedance
- TO-92 and SOT-23 Package

This device has a typical output impedance of 0.1 $\Omega$ . 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.

### Applications

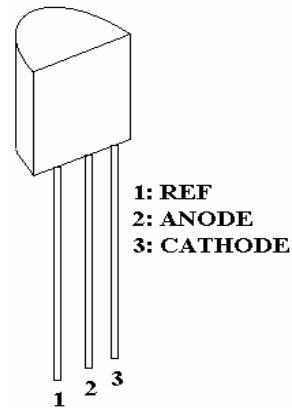
- Linear Regulators
- Adjustable Power Supply
- Switching Power Supply

### General Description

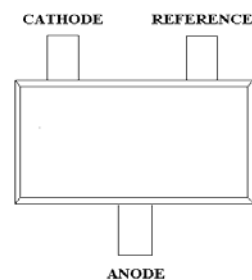
The WSL432 is a 3 terminal adjustable voltage reference with specified thermal stability over applicable commercial temperature ranges.

Output voltage may be set to any value between  $V_{ref}$  (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.



**TO-92**



**SOT-23 (Top View)**



**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
$V_{KA}$	Cathode voltage	7	V
$I_K$	Continuous cathode current range	30	mA
$I_{ref}$	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**      $T_A = 25^\circ\text{C}$  (unless otherwise noted)

Symbol	Parameter	Test Conditions	WSL432			Unit
			Min.	Typ.	Max.	
$V_{ref}$	$V_{KA}=V_{ref}, I_K=10\text{mA}$ .	WSL432 (1%)	1.228	1.24	1.252	V
		WSL432 (1.5%)	1.222	1.24	1.258	V
$\Delta V_{ref}/T$	Reference Voltage Drift over Temp. range	$T_A=0$ to $85^\circ\text{C}^{*1}$ , $I_K=10\text{mA}$ .		4	20	mV
$\Delta V_{ref} / \Delta V_{KA}$	Voltage Ration (open loop gain)	$I_K=10\text{ mA}$ , $V_{KA}=V_{ref}$ to $6\text{V}^{*2}$		0.8	2.7	mV/V
$I_{ref}$	Reference Current	$I_K=10\text{mA}$ , $R_1=10\text{K}\Omega$ , $R_2=\text{open}^{*2}$		0.15	0.5	$\mu\text{A}$
$I_{ref(\text{dev})}$	$I_{ref}$ deviation	$I_K=10\text{mA}$ , $R_1=10\text{K}\Omega$ , $R_2=\text{open}^{*2}$		0.1	0.4	$\mu\text{A}$
$\Delta I_{ref}/T$	Reference Current Drift	$I_K=10\text{ mA}$ , $R_1=10\text{K}\Omega$ , $R_2=\text{open}$ , $T_A=0$ to $85^\circ\text{C}^{*2}$		0.4	1.2	$\mu\text{A}$
$I_{K(\text{min})}$	Min. Cathode Current	$V_{KA}=V_{ref}^{*1}$		42	80	$\mu\text{A}$
$I_{K(\text{off})}$	Off-state Cathode Current	$V_{KA}=6\text{V}$ , $V_{ref}=0\text{V}^{*3}$		0.001	0.1	$\mu\text{A}$
$Z_{KA}$	Dynamic Impedance	$V_{KA}=V_{ref}$ , $I_K=0.1\text{ mA}$ to $20\text{mA}$ , $f=1\text{k Hz}^{*1}$		0.1	0.4	$\Omega$

Notes:    \*1: use Figure 1  
           \*2: use Figure 2  
           \*3: use Figure 3

**Test figures**

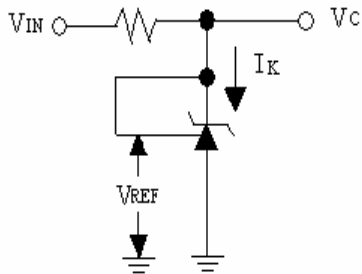


Figure 1. Test Circuit for  $V_{KA} = V_{REF}$   
 $V_O = V_{KA} = V_{REF}$

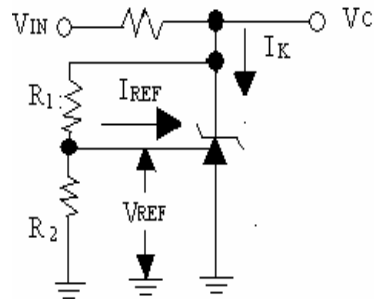


Figure 2. Test Circuit for  $V_{KA} < V_{REF}$ ,  
 $V_O = V_{KA} = V_{REF} \times (1 + R_1/R_2) + I_{REF} \times R_1$

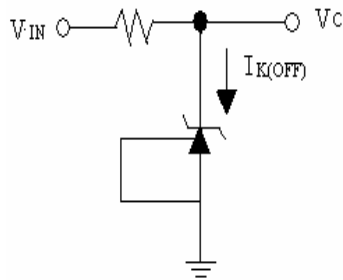
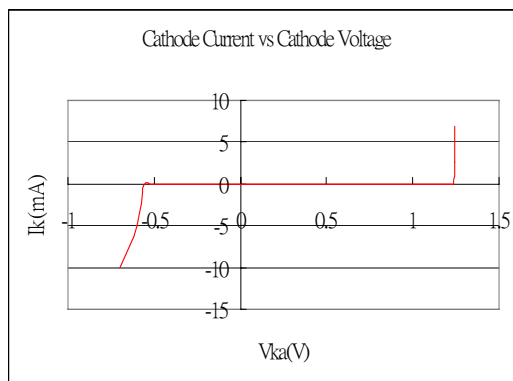
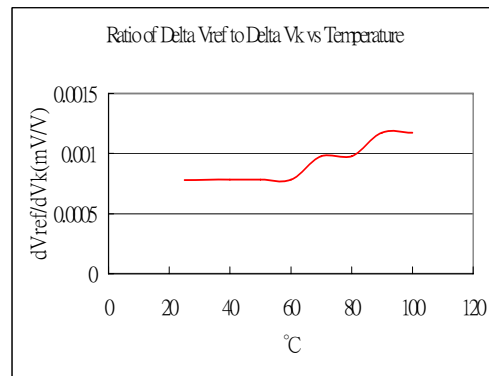
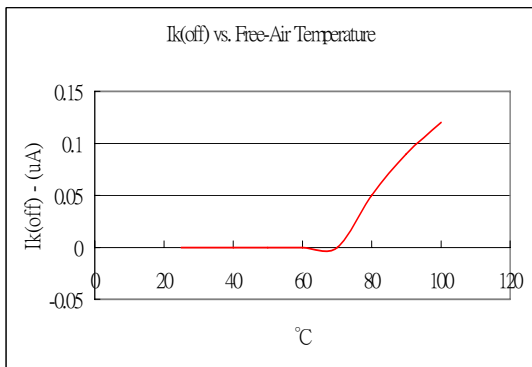
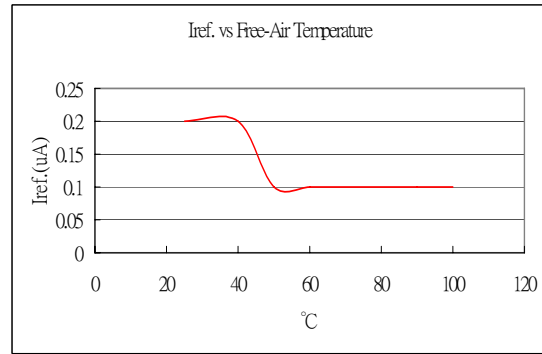
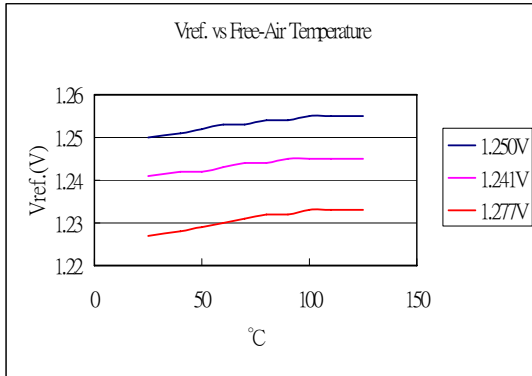


Figure 3. Test Circuit for  $I_{k(off)}$

TYPICAL CHARACTERISTICS



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

Application schematics

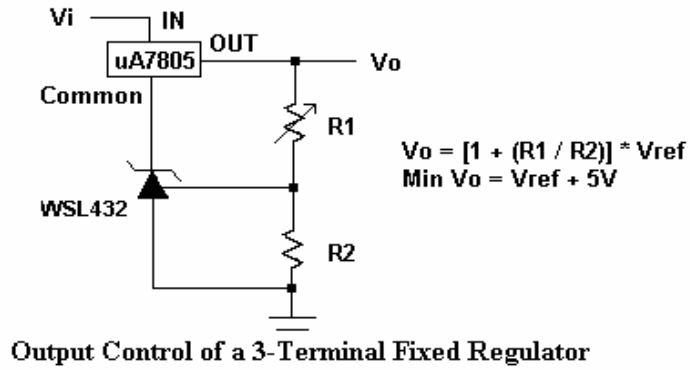


Figure 4.

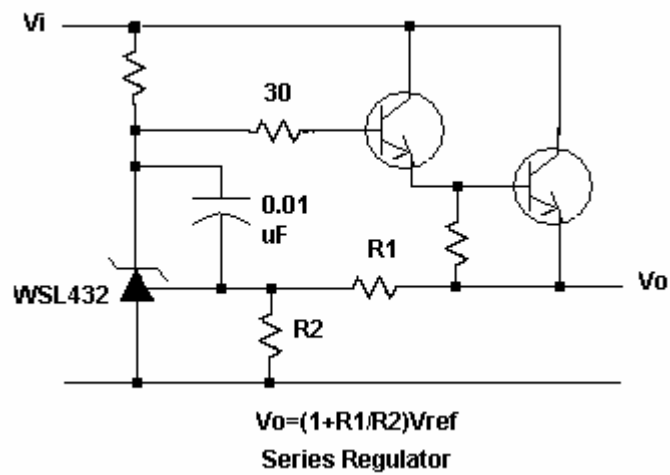


Figure 5.

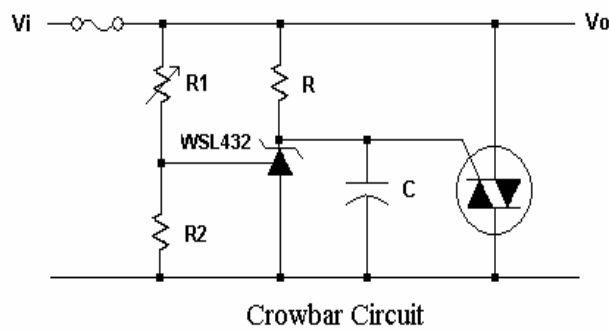


Figure 6.

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

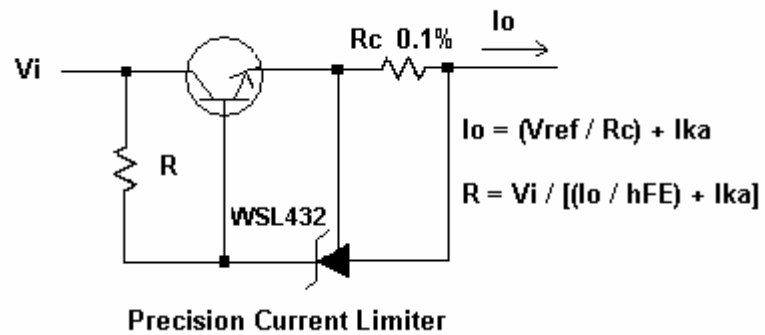


Figure 7.

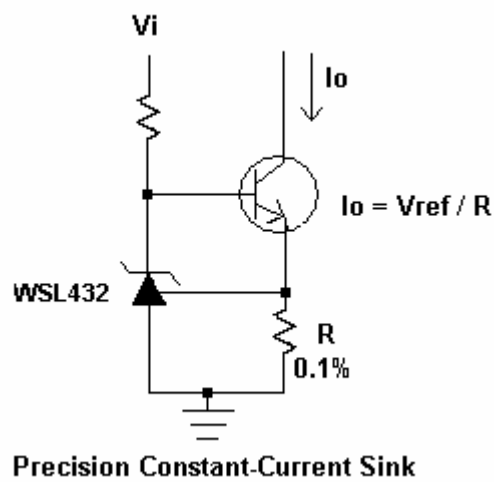


Figure 8.

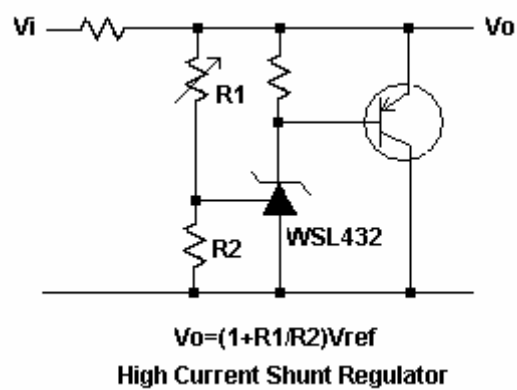


Figure 9.

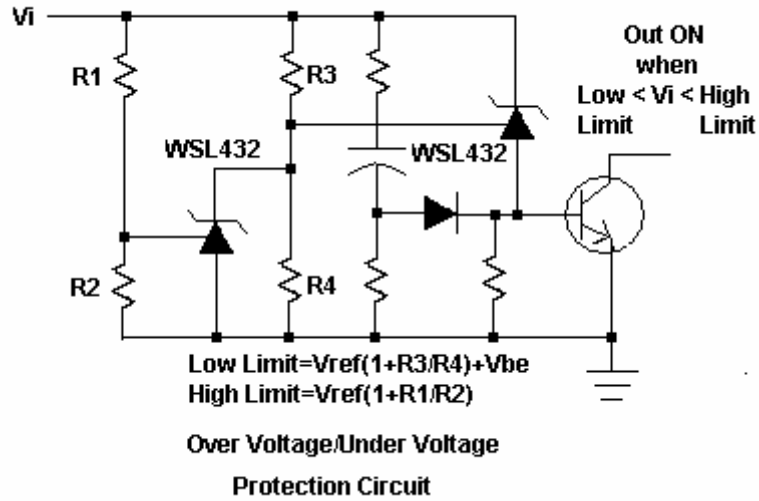


Figure 10.

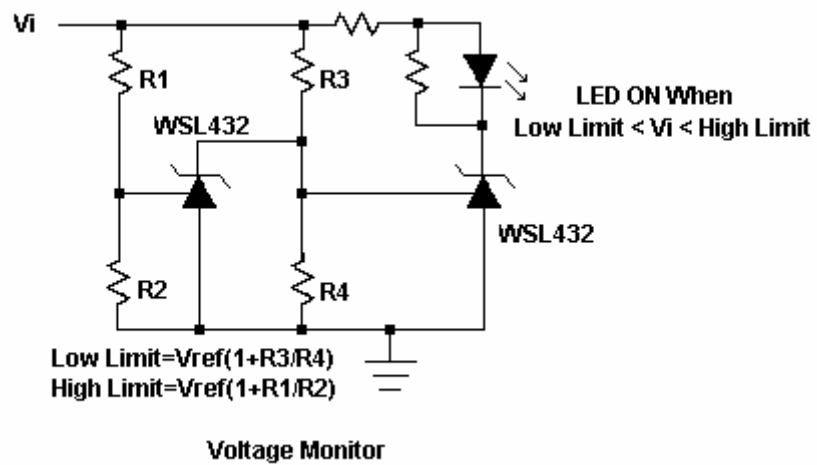


Figure 11.

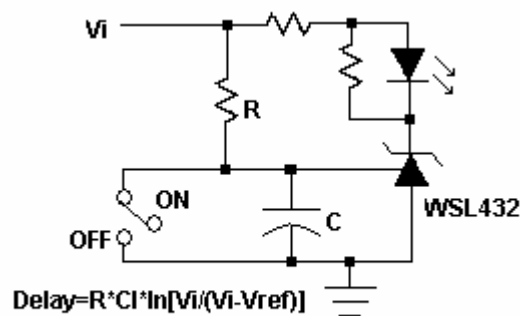


Figure 12.

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