

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 μ A Typical
- 0.1 Ω Typical Output Impedance
- TO-92 and SOT-23 Package

This device has a typical output impedance of 0.1 Ω . 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

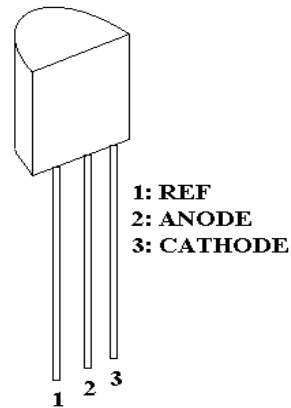
- Linear Regulators
- Adjustable Power Supply
- Switching Power Supply

General Description

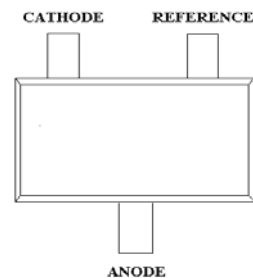
The WSL432 is a 3 terminal adjustable voltage reference with specified thermal stability over applicable commercial temperature ranges.

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.

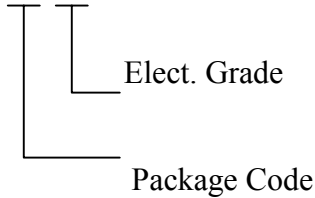


TO-92

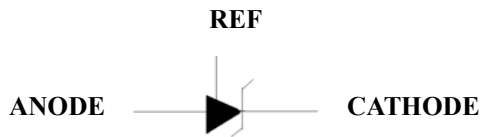


SOT-23 (Top View)

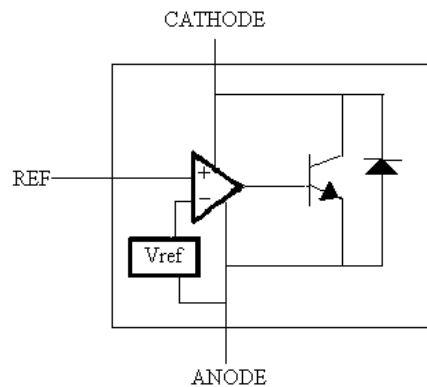
Ordering Information

<p>WSL432-XP <input type="checkbox"/> <input type="checkbox"/></p> 	<p>Elect. Grade 3: 1% Reference Voltage Tolerance 5: 1.5% Reference Voltage Tolerance</p> <p>Package Code A: TO-92 C: SOT-23</p>
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Symbol



Functional Diagram



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

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°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 6V^{*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	μA
$I_{ref(\text{dev})}$	I_{ref} deviation	$I_K=10\text{mA}$, $R_1=10\text{K}\Omega$, $R_2=\text{open}^{*2}$		0.1	0.4	μA
$\Delta I_{ref}/T$	Reference Current Drift	$I_K=10\text{ mA}$, $R_1=10\text{K}\Omega$, $R_2=\text{open}$, $T_A=0$ to 85°C^{*2}		0.4	1.2	μA
$I_{K(\text{min})}$	Min. Cathode Current	$V_{KA}=V_{ref}^{*1}$		42	80	μA
$I_{K(\text{off})}$	Off-state Cathode Current	$V_{KA}=6\text{V}$, $V_{ref}=0\text{V}^{*3}$		0.001	0.1	μA
Z_{KA}	Dynamic Impedance	$V_{KA}=V_{ref}$, $I_K=0.1\text{ mA}$ to 20mA , $f=1\text{k Hz}^{*1}$		0.1	0.4	Ω

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

Test figures

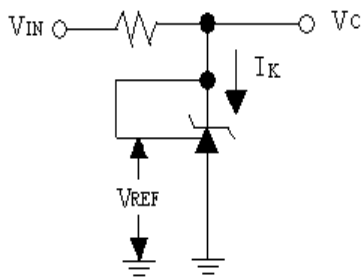


Figure 1. Test Circuit for $V_{KA} = V_{REF}$
 $V_O = V_{KA} = V_{REF}$

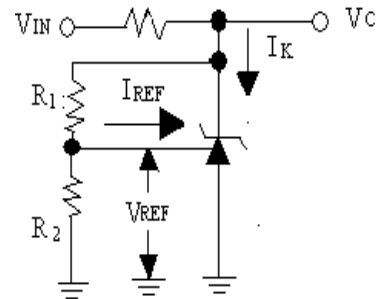


Figure 2. Test Circuit for $V_{KA} < V_{REF}$,
 $V_O = V_{KA} = V_{REF} \times (1 + R_1/R_2) + I_{REF} \times R_1$

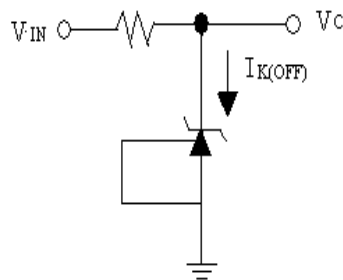
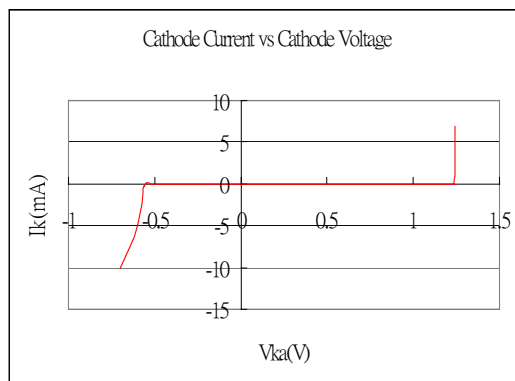
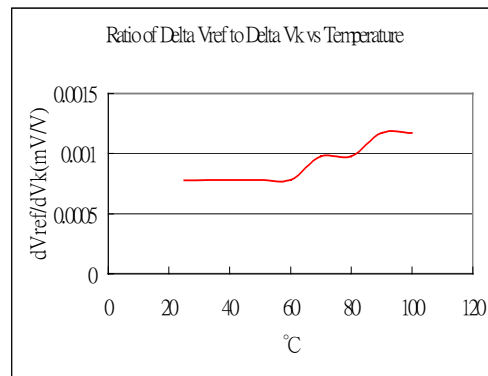
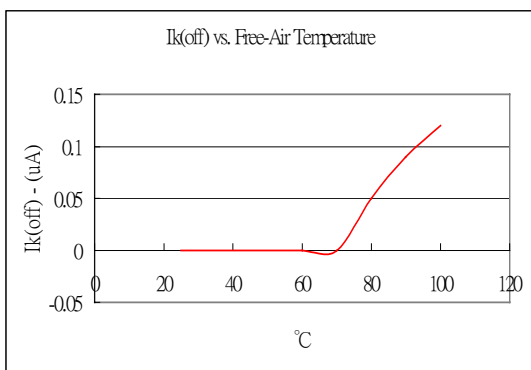
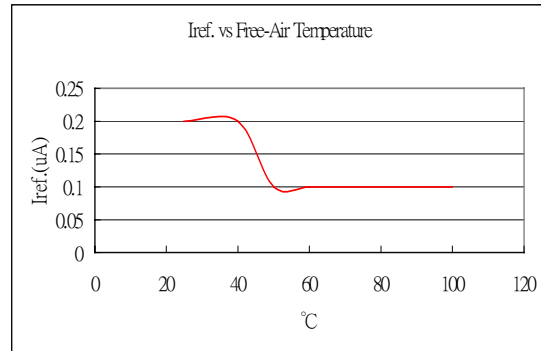
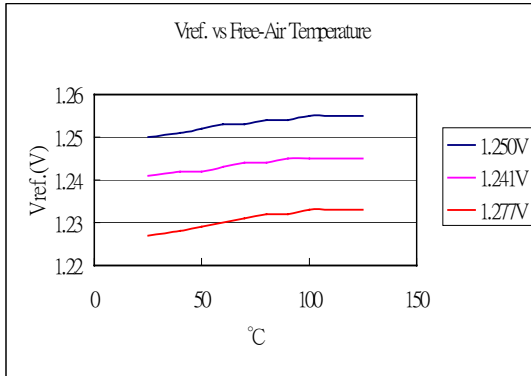


Figure 3. Test Circuit for $I_{K(OFF)}$

TYPICAL CHARACTERISTICS



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

Application schematics

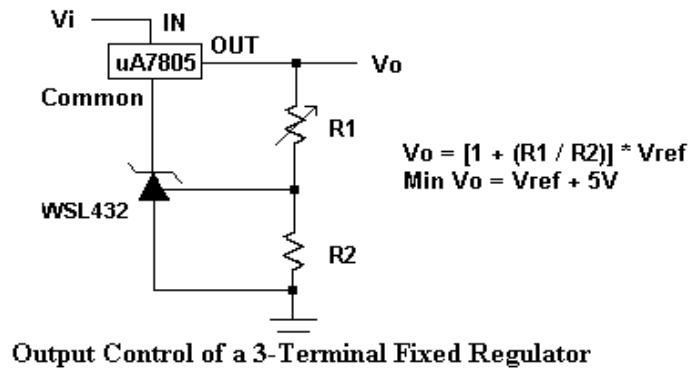


Figure 4.

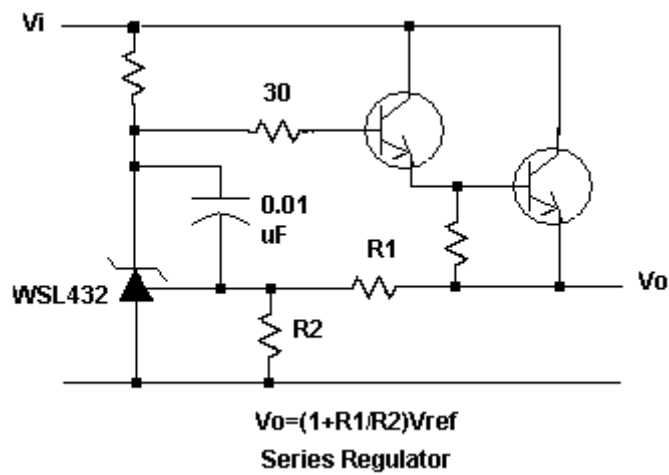


Figure 5.

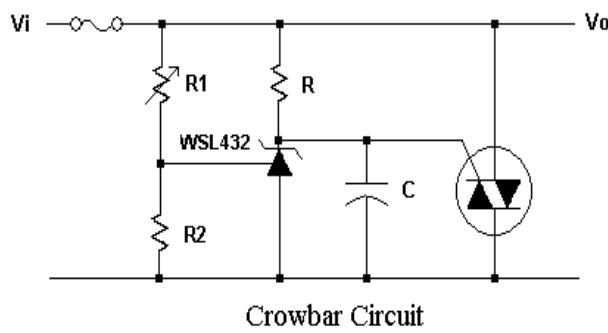
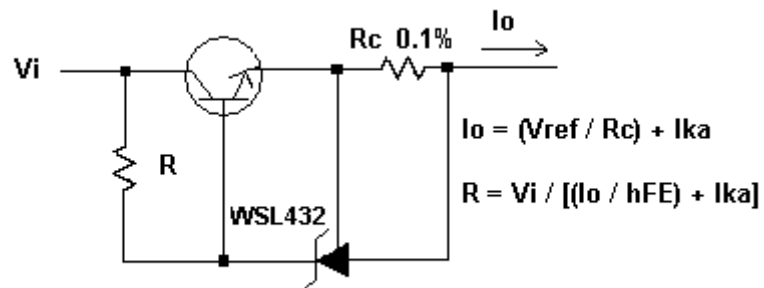


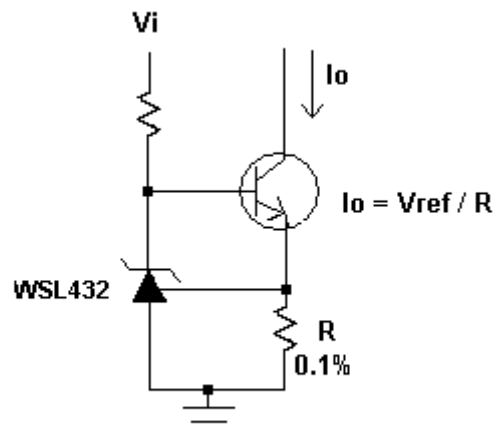
Figure 6.

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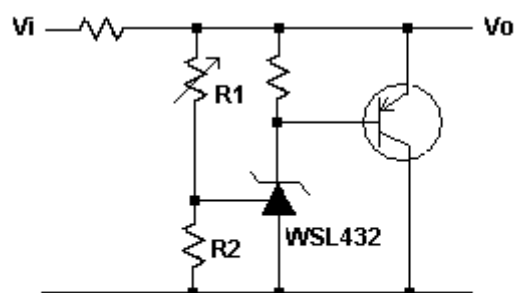
Precision Current Limiter

Figure 7.



Precision Constant-Current Sink

Figure 8.



$V_o = (1 + R_1/R_2)V_{ref}$

High Current Shunt Regulator

Figure 9.