Description

The SE432L is a low voltage three terminal adjustable shunt regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage can be set to any value between V_{REF} (approximately 1.24 V) to 8V with two external resistors. This device has a typical output impedance of 0.25Ω. Active output circuitry provides a very sharp turn on characteristic, making this device excellent replacement for Zener diodes in many applications.

The SE432L is characterized for operation from -40°C to 105°C, and two package options (SOT-23-3, TO-92) allow the designer the opportunity to select the proper package for their applications.

Features

- Low voltage operation (1.24V)
- Adjustable output voltage $V_0 = V_{REF}$ to 8V
- Wide operating current range 60μA to 100mA
- Low dynamic output impedance 0.30Ω (Typ.)
- Trimmed bandgap design up to ± 0.5%.
- ESD rating is 2.5KV(Per MIL-STD-883D)
- Available in Halogen-Free Packages.

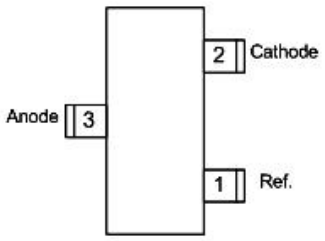
Application

- Linear Regulators
- Adjustable Supplies
- Switching Power Supplies
- Battery Operated Computers
- Instrumentation
- Computer Disk Drives

Pin Configuration

SOT-23-3,

(Top View)



Ordering Information

Part Number	Marking	Production Year Code	Production Week Code	Package	Remarks
SE432L-HF	S432Lw	Starting with S, a bar on top of S is for production year 2001, and underlined S is for year 2002. The next character is marked on top for 2003, and underlined for 2004. The naming pattern continues with consecutive characters for later years.	A-Z : 1-26 a-z : 27-52	SOT23-3	05 : 0.5%; 1 : 1%; 2 : 2% HF : Halogen Free

Absolute Maximum Rating

Parameter	Symbol	Maximum	Units
Cathode Voltage	V_{KA}	8	V
Continuous Cathode Current	I_{KA}	150	mA
Reference Current	I_{REF}	10	mA
Operating Junction Temperature Range	T_J	150	°C
Storage Temperature Range	T_{STG}	-45 to 150	°C
Thermal Resistance	θ_{JA}	230 (SOT-23-3)	°C/W
		220 (TO-92)	
Lead Temperature (Soldering) 10 seconds	T_{LEAD}	260	°C

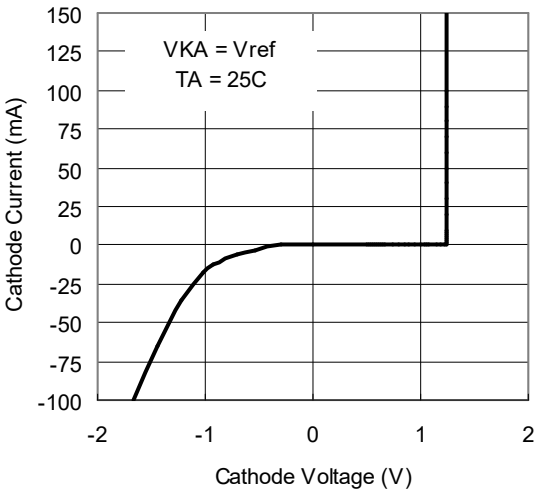
Electrical Characteristics

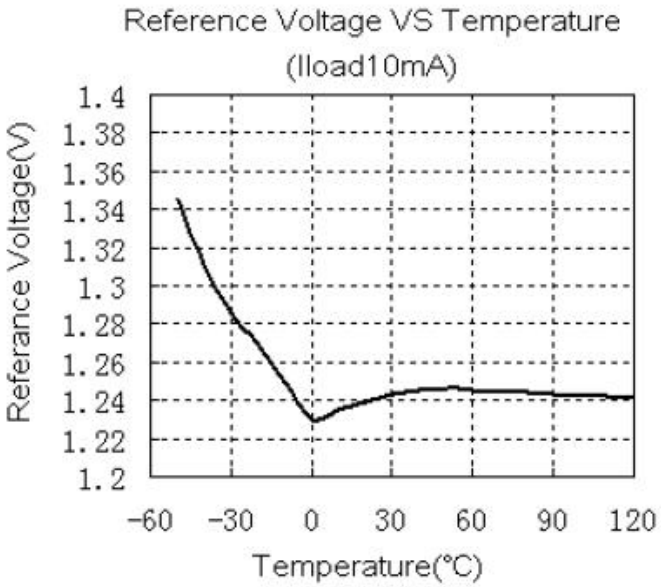
Parameter		Symbol	Test Conditions & Circuit	Min	Typ	Max	Unit
Reference Voltage	1.240V ± 0.5%	V_{REF}	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA	1234	1240	1246	mV
	1.240V ± 1.0%			1228	1240	1252	
	1.240V ± 1.5%			1221	1240	1259	
	1.240V ± 2.0%			1215	1240	1265	
Deviation of Reference Voltage over Full Temperature Range		$V_{I(DEV)}$	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA, T_A = 0°C - 105°C	--	68		mV
Ratio of Change in Reference Voltage to the Change in Cathode Voltage		$\Delta V_{REF}/\Delta VKA$	Test circuit #2 I_{KA} = 10mA, ΔV_{KA} = 8V to V_{REF}	--	-1.0	-2.7	mV/V
Reference Current		I_{REF}	Test circuit #2 I_{KA} = 10mA, R1=10kΩ, R2 = ∞	--	0.15	-	µA
Deviation of Reference Current over Full Temperature Range		$I_{I(DEV)}$	Test circuit #2 I_{KA} = 10mA, R1=10kΩ, R2 = ∞ T_A = 0°C - 105°C	--	0.10		µA
Minimum Cathode Current for Regulation		I_{MIN}	Test circuit #1 $V_{KA} = V_{REF}$	--	60	100	µA
Off-state Cathode Current		I_{OFF}	Test circuit #3 V_{KA} = 12V, V_{REF} = 0	--	0.04	0.8	µA
Dynamic Impedance		$\lvert Z_{KA} \rvert$	Test circuit #1 I_{KA} = 100µA - 80mA, $V_{KA} = V_{REF}$, f ≤ 1kHZ	--	0.30	1	Ω

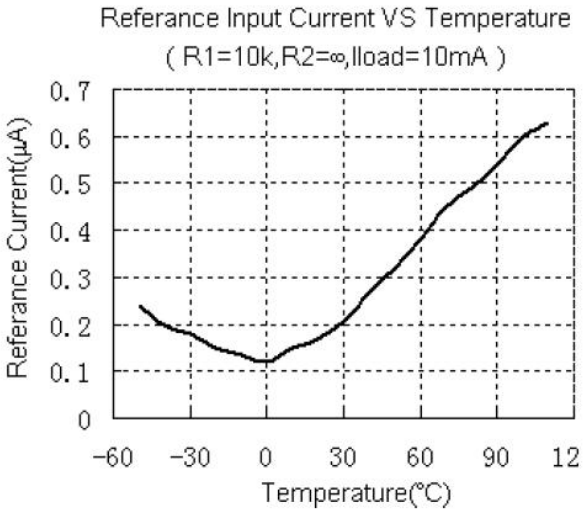
Note 1: Upon Customer Request.

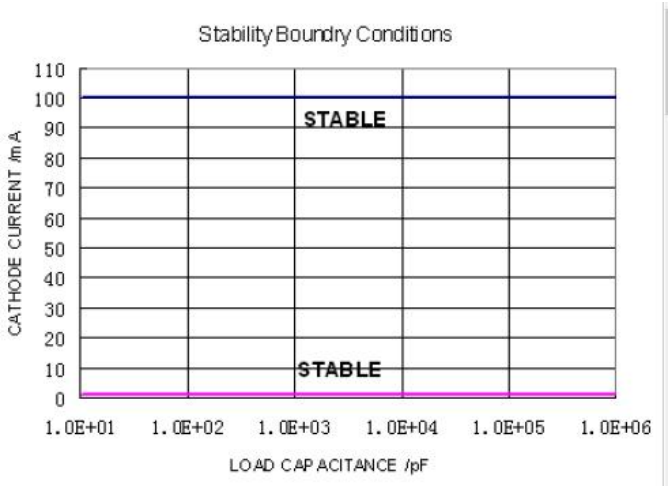
Typical Performance Characteristics

Cathode Current VS Cathode Voltage

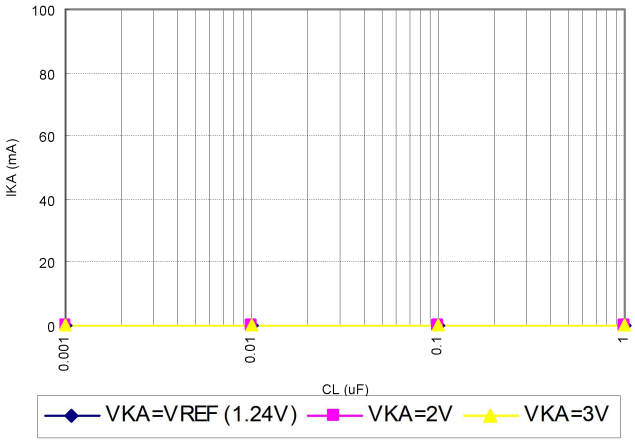


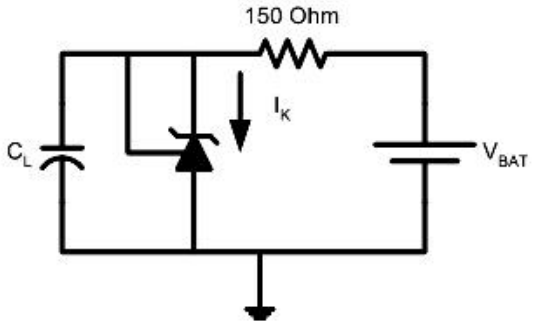




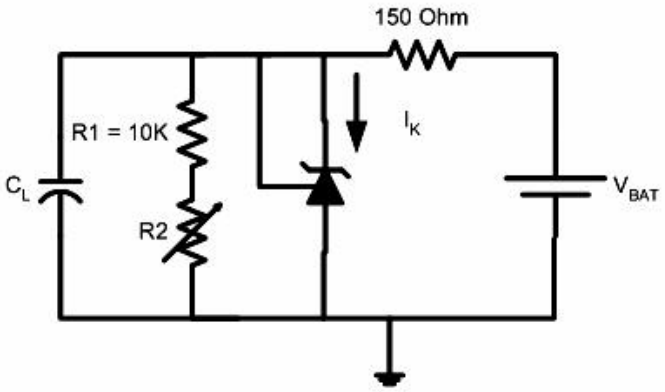


Stability Boundary Condition





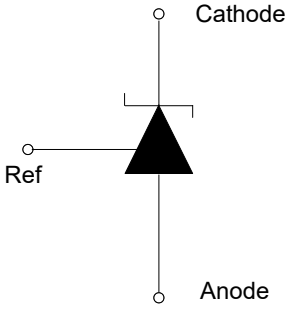
Test Circuit for $V_{KA} = V_{REF}$



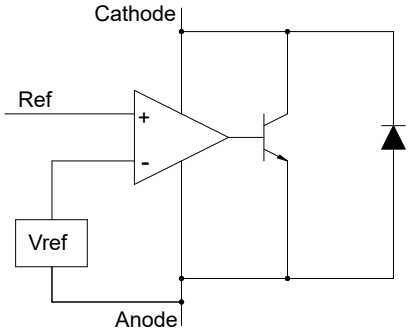
Test Circuit for V_{KA} = 2V, 3V

The areas under the curves represent conditions that may cause the device to oscillate. For V_{KA} = 2V and 3V curves, R2 and V_{BAT} were adjusted to establish the initial V_{KA} and I_K conditions with CL = 0. V_{BAT} and C_L then were adjusted to determine the ranges of stability. As the graph suggested, SE432L is unconditional stable with I_K from 0 to 100mA and with C_L from 0.001uF to 1uF.

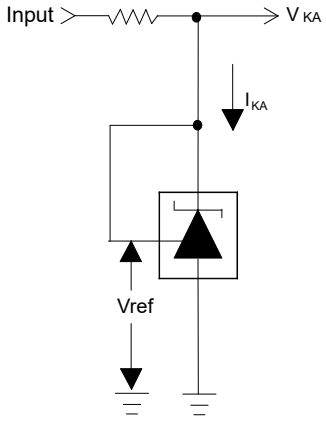
Symbol Diagram



Block Diagram

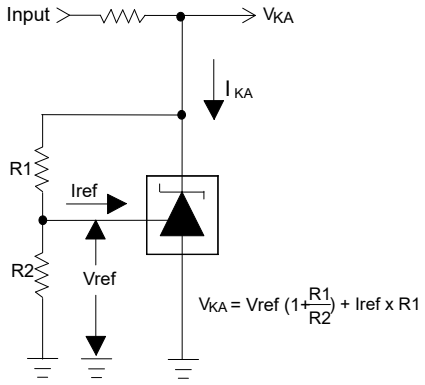


Test Circuits



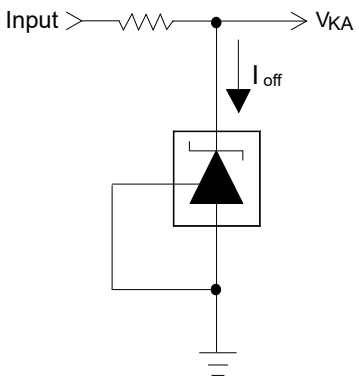
Test Circuit 1:

$V_{KA} = V_{REF}$



Test Circuit 2:

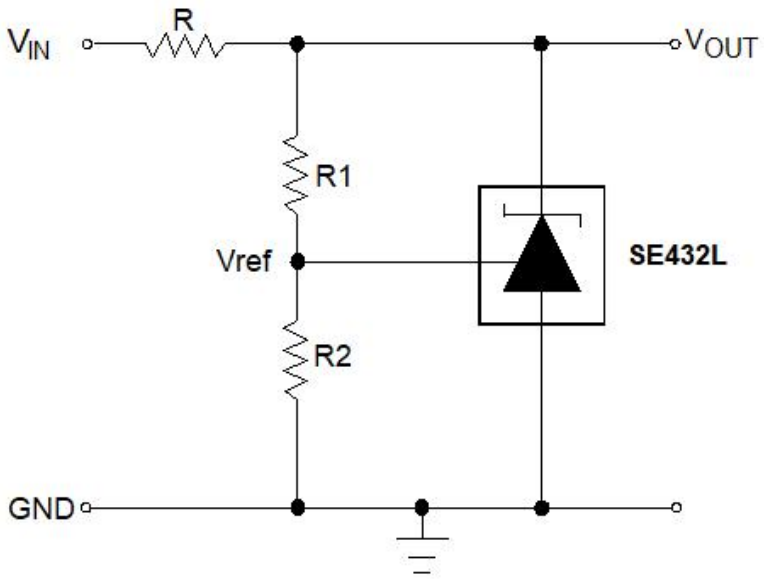
$V_{KA} > V_{REF}$



Test Circuit 3:

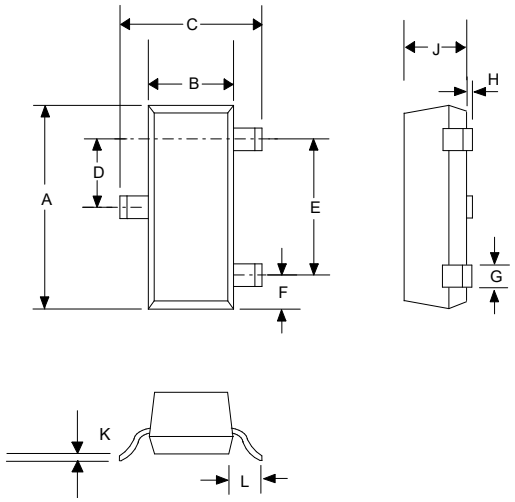
Off State Current

Application Circuit



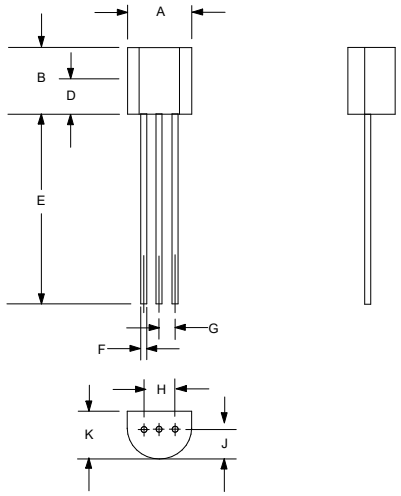
$$V_{OUT} = Vref\left(1+\frac{R1}{R2}\right)$$

OUTLINE DRAWING SOT-23-3



DIMENSIONS				
DIM[N]	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.110	0.120	2.80	3.04
B	0.047	0.055	1.20	1.40
C	0.083	0.104	2.10	2.64
D	0.035	0.040	0.89	1.03
E	0.070	0.080	1.78	2.05
F	0.018	0.024	0.45	0.60
G	0.015	0.020	0.37	0.51
H	0.0005	0.004	0.013	0.10
J	0.034	0.040	0.887	1.02
K	0.003	0.007	0.085	0.18
L	-	0.027	-	0.69

OUTLINE DRAWING TO-92



DIMENSIONS				
DIM[N]	INCHES		MM	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.445	5.207
B	0.170	0.210	4.318	5.334
E	0.500	0.610	12.70	15.50
F	0.016	0.021	0.407	0.533
G	0.045	0.055	1.143	1.397
H	0.095	0.105	2.413	2.667
J	0.080	0.105	2.032	2.667
K	0.125	0.165	3.175	4.191

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