Descriptions

The EC432L 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 VREF (approximately 1.24 V) to 8V with two external resistors. This device has a typical output impedance of 0.30Ω. Active output circuitry provides a very sharp turn on characteristic, making this device excellent replacement for Zener diodes in many applications.
The EC432L is characterized for operation from -40℃ to 105℃, and two package options (SOT-23 、SC59 and TO-92) allow the designer the opportunity to select the proper package for their applications.

Feature

- Low voltage operation (1.24V)
- Adjustable output voltage V0 =VREF to 8V
- Wide operating current range 60 A 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)
- 100% Lead (Pb)-Free.

Application

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

Ordering Information

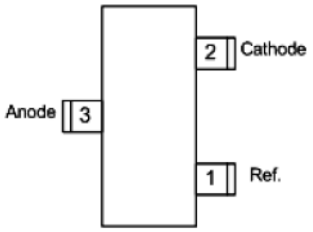
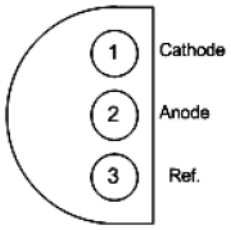
EC432L NN XXX X

R：Tape & Reel

SB1：SOT23
B1：SC59-3L
A6：TO-92-3L

Part Number	Package	Marking	Marking Information
EC432LNNSB1R	SOT23	S432L**x**	1. The last character is the batch number. 2. Lead-free package isindicated by a dot on top of the last character.
EC432LNNB1R	SC59-3L	S432L**x**	1. The last character is the batch number. 2. Lead-free package isindicated by a dot on top of the last character.
EC432LNNA6R	TO92-3L	SE432L **xxxx**	1. xxxx is the batch number. 2. Lead-free package is indicated by LF after xxxx

Pin Configuration

SOT-23-3 /SC59-3L (Top View)	**TO-92 (Top View)**
	

Absolute Maximum Ratings

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

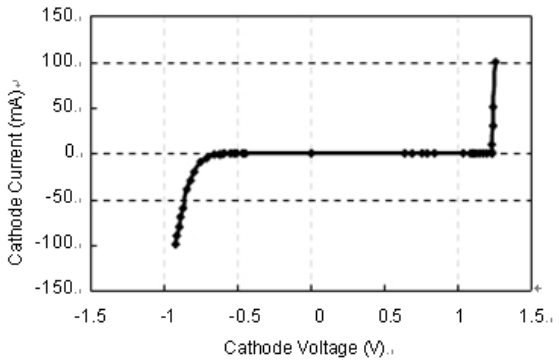
Electrical Characteristics

Parameter		Symbol	Test Conditions & Circuit	Min	Typ	Max	Unit
Reference Voltage	0.5%	V_{REF}	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA	1234	1240	1246	mV
	1.0%			1228	1240	1252	
	1.5%			1221	1240	1259	
	2.0%			1215	1240	1265	
	1.25V 1%(1)			1237	1250	1263	
Deviation of Reference Voltage over Full Temperature Range		$V_{I(DEV)}$	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA, T_A =-40℃ - 105℃	--	68		mV
Ratio of Change in Reference Voltage to the Change in Cathode Voltage		$\lvert \Delta V_{REF}/\Delta VKA \rvert$	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	2	μA
Deviation of Reference Current over Full Temperature Range		$I_{I(DEV)}$	Test circuit #2 I_{KA} = 10mA, R1=10kΩ, R2 =∞ T_A = 0℃ - 105℃	--	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} = 8V, 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

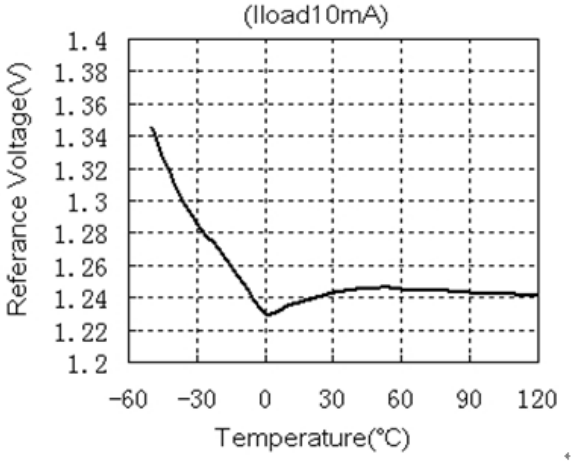
Note 1: Upon Customer Request.

Typical Performance Characteristics

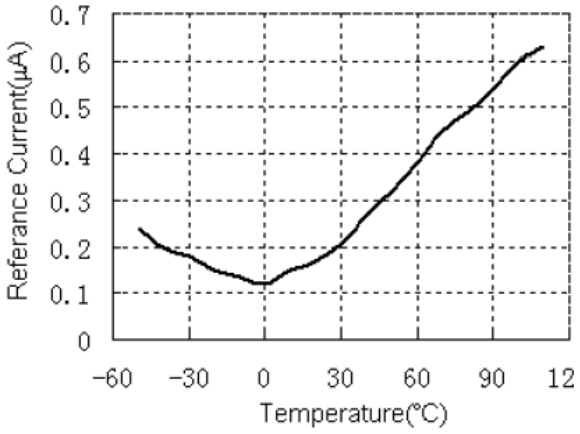
Cathode Current VS Cathode Voltage



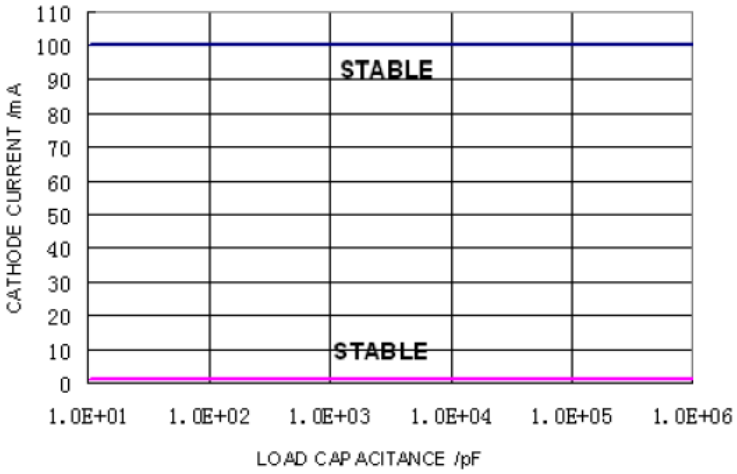
Reference Voltage VS Temperature
(Iload10mA)



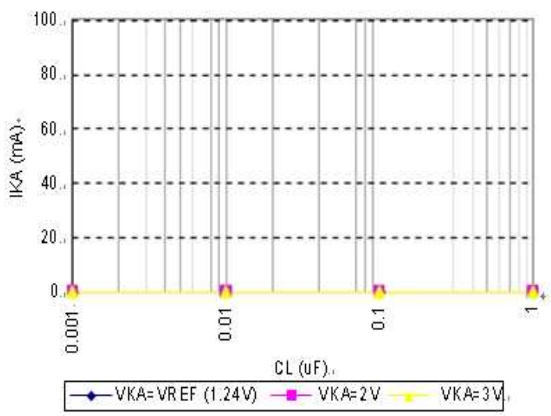
Referance Input Current VS Temperature
(R1=10k,R2=∞,Iload=10mA)

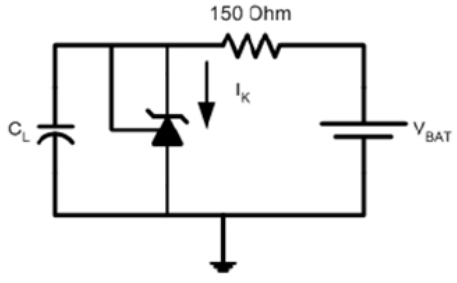


Stability Boundry Conditions

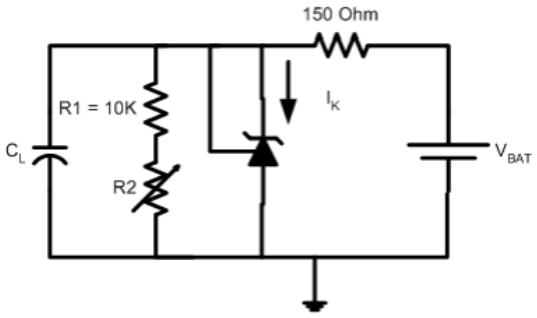


Stability Boundary Condition





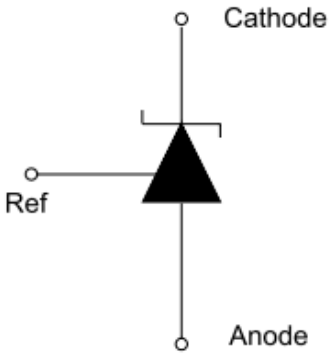
Test Circuit for $V_{KA} = V_{REF}$



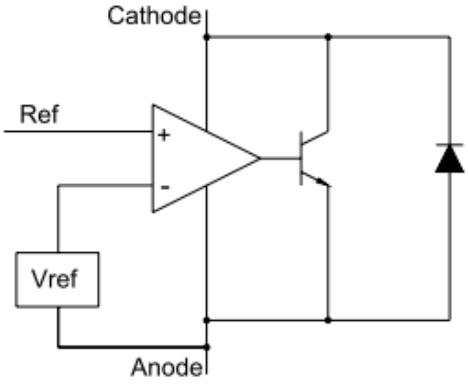
Test Circuit for V_{KA} = 2V, 3V

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, EC432L is unconditional stable with I_K from 0 to 100mA and with C_L from 0.001uF to 1uF.

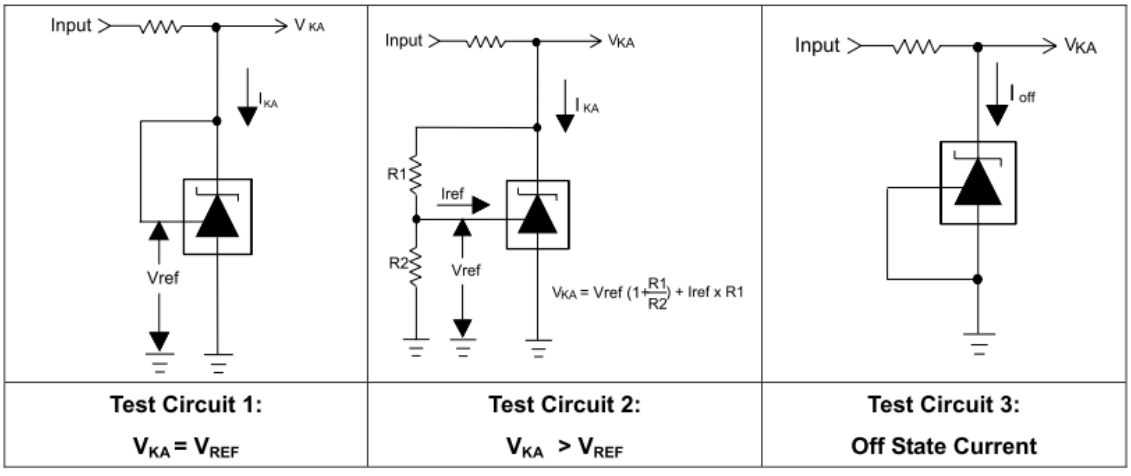
Symbol Diagram



Block Diagram

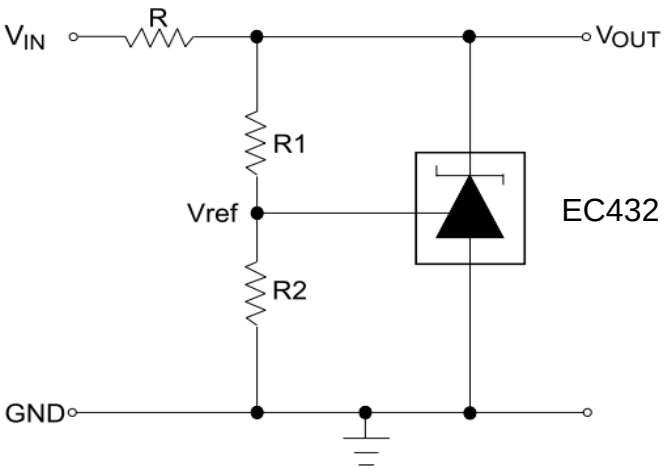


Test Circuits



Test Circuit 1:	Test Circuit 2:	Test Circuit 3:
$V_{KA} = V_{REF}$	$V_{KA} > V_{REF}$	Off State Current

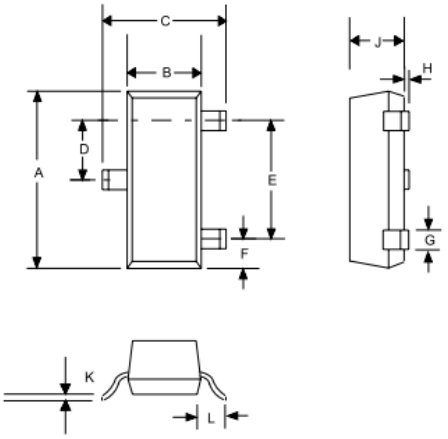
Application Circuit



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

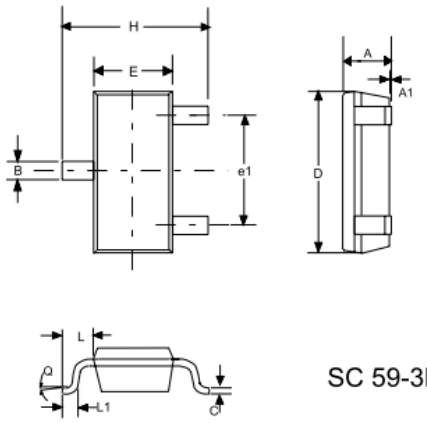
Outline Drawing

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

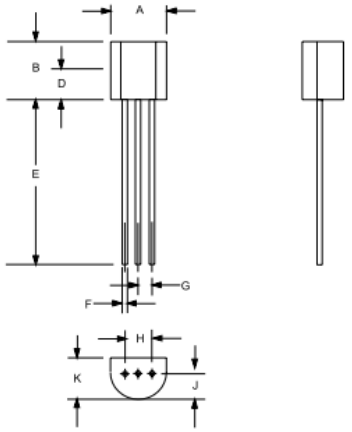
OUTLINE DRAWING SC59-3L



SC 59-3L

DIMENSIONS				
DIM^N	INCHE		MM	
	MIN	MAX	MIN	MAX
A	0.035	0.043	0.90	1.10
A1	0.0004	0.005	0.01	0.13
B	0.012	0.020	0.30	0.50
C	0.004	0.008	0.09	0.20
D	0.110	0.122	2.80	3.10
H	0.098	0.122	2.50	3.10
E	0.059	0.067	1.50	1.70
e	0.037REF		0.95REF	
e1	0.075REF		1.90REF	
L1	0.008	0.022	0.20	0.55
L	0.014	0.031	0.35	0.80
Q	0℃	10℃	0℃	10℃

OUTLINE DRAWING TO-92



DIMENSIONS				
DIM	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