Adjustable Precision Shunt Regulator

General Description

The CYT432 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 18V with two external resistors. This device has a typical output impedance of 0.20Ω. Active output circuitry provides a very sharp turn on characteristic, making this device excellent replacement for Zener diodes in many applications.

The CYT432 is characterized for operation from -40°C to 150°C, and two package options (SOT-23 and TO-92) allow the designer the opportunity to select the proper package for their applications.

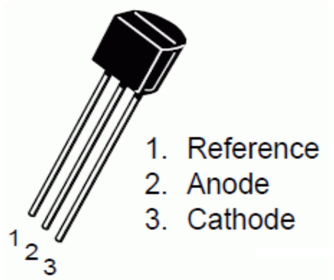
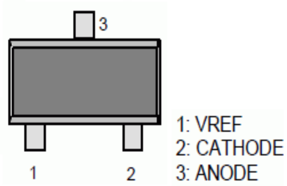
Features

- Low voltage operation (1.24V)
- Adjustable output voltage $V_0 = V_{REF}$ to 18V
- Wide operating current range 80μA to 100mA
- Low dynamic output impedance 0.20Ω (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

Pin Configuration

TO-92 (Top View)	SOT-23-3 (Top View)
	

Marking Information

Package	Marking	Production Batch Number	Lead-Free Package
SOT-23-3	CYT432	The last character is the batch number.	Lead-free package is indicated by a dot on top of the last character.
TO-92	CYT432 **XXXX**	XXXX is the batch number.	Lead-free package is indicated by LF after XXXX.

Absolute Maximum Rating

Parameter	Symbol	Maximum	Units
Cathode Voltage	V_{KA}	18	V
Continuous Cathode Current	I_{KA}	100	mA
Reference Current	I_{REF}	3	mA
Operating Junction Temperature Range	T_J	-40to150	°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

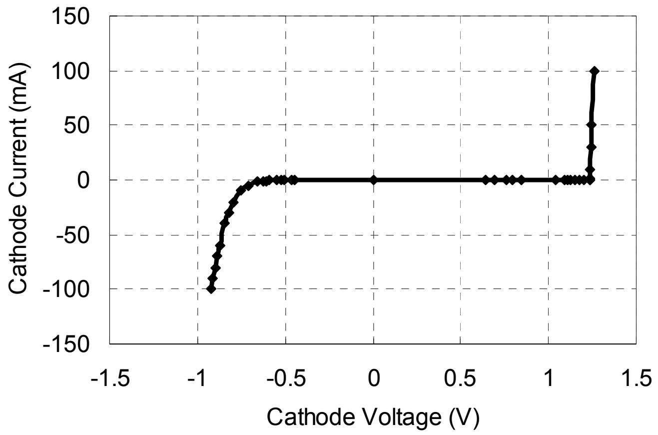
TA= 25°C (unless otherwise noted)

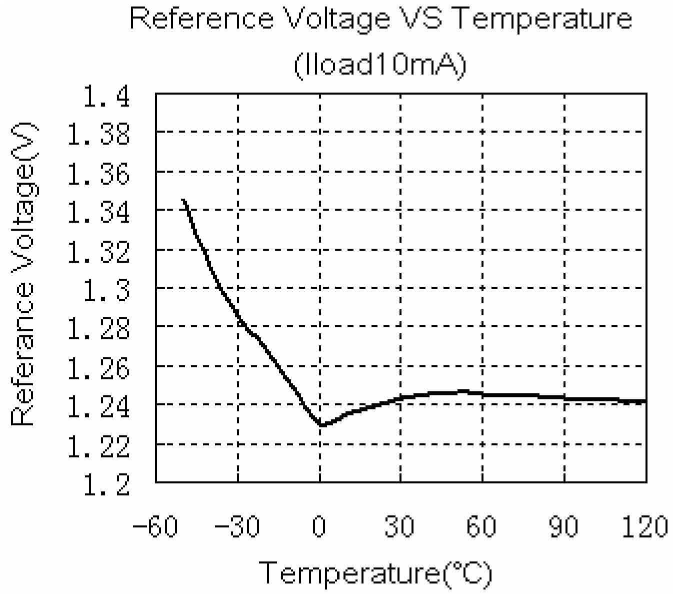
Parameter		Symbol	Test Conditions & Circuit	Min	Typ	Max	Unit
Reference Voltage	0.5%	V_{REF}	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA TA= 25°C	1234	1240	1246	mV
	1.0%			1228	1240	1252	
	1.5%			1221	1240	1259	
	2.0%			1215	1240	1265	
	1.25V 1%[1]			1237	1250	1263	
Deviation of Reference Voltage over Full Temperature Range		$V_{I(DEV)}$	Test circuit #1 $V_{KA} = V_{REF}$, I_{KA} = 10mA, T_A =-40°C - 105°C	--	10	25	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} = 18V to V_{REF}	--	-1.0	-2.7	mV/V
Reference Current		I_{REF}	Test circuit #2 I_{KA} = 10mA, R1=10kΩ, R2 = ∞	--	0.25	0.5	μA
Deviation of Reference Current over Full Temperature Range		$I_{I(DEV)}$	Test circuit #2 I_{KA} = 10mA, R1=10kΩ, R2 = ∞ T_A = -40°C - 105°C	--	0.05	0.3	μA
Minimum Cathode Current for Regulation		I_{MIN}	Test circuit #1 $V_{KA} = V_{REF}$	--	60	80	μA
Off-state Cathode Current		I_{OFF}	Test circuit #3 V_{KA} = 18V, V_{REF} = 0	--	0.04	0.5	μA
Dynamic Impedance		$\lvert Z_{KA} \rvert$	Test circuit #1 I_{KA} = 1000μA - 100mA, $V_{KA} = V_{REF}$, f ≤ 1kHZ	--	0.20	0.4	Ω

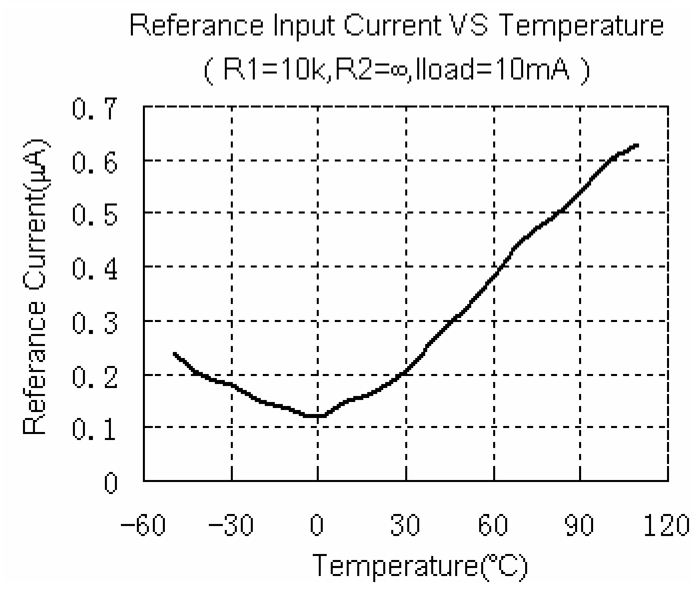
Note 1: Upon Customer Request.

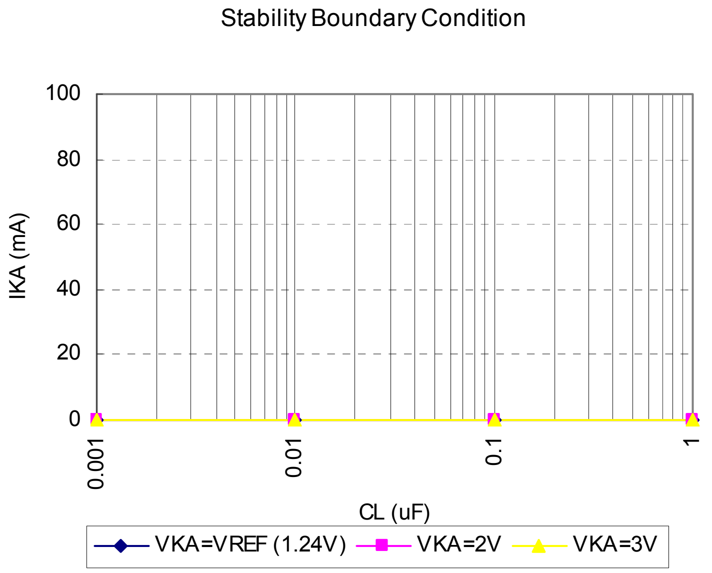
Typical Performance Characteristics

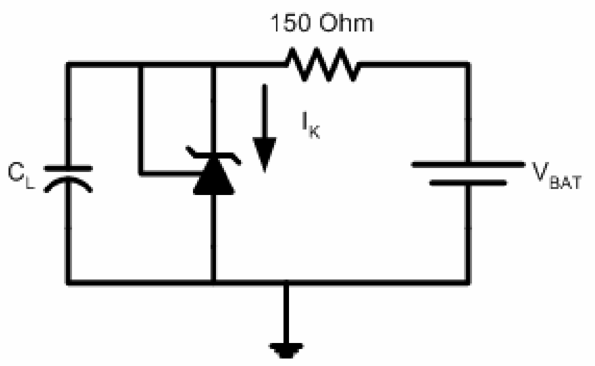
Cathode Current VS Cathode Voltage



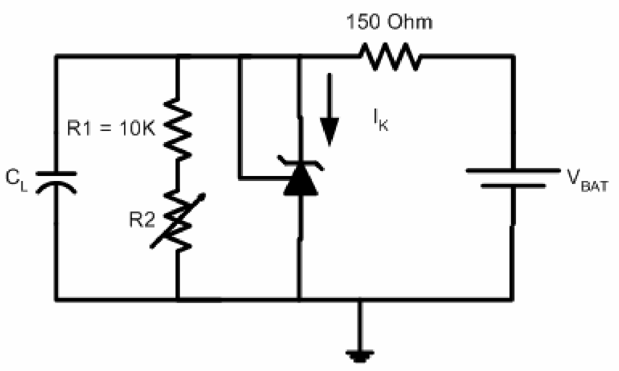








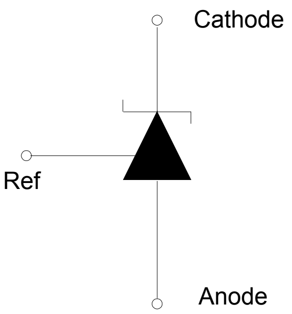
Test Circuit for $V_{KA} = V_{REF}$



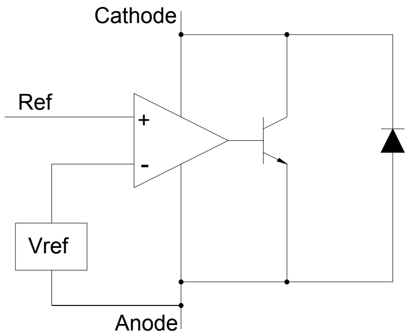
Test Circuit for V_{KA} = 2V, 3V

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, CYT432 is unconditional stable with I_K from 0 to 100mA and with C_L from 0.001uF to 1uF.

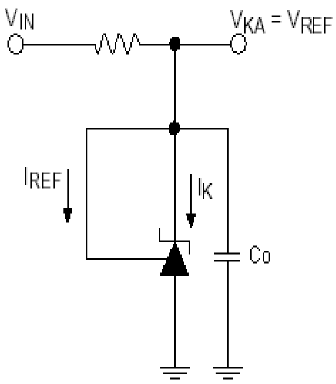
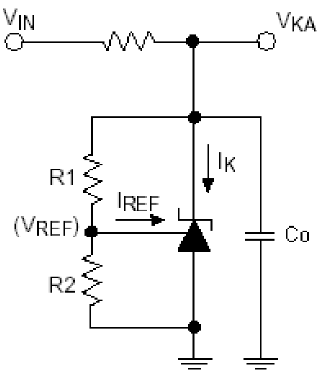
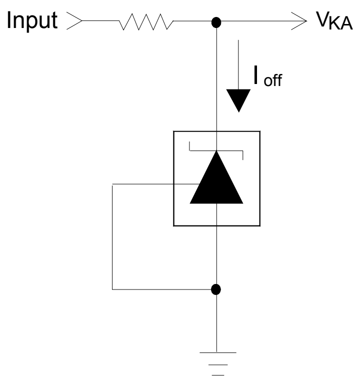
Symbol Diagram



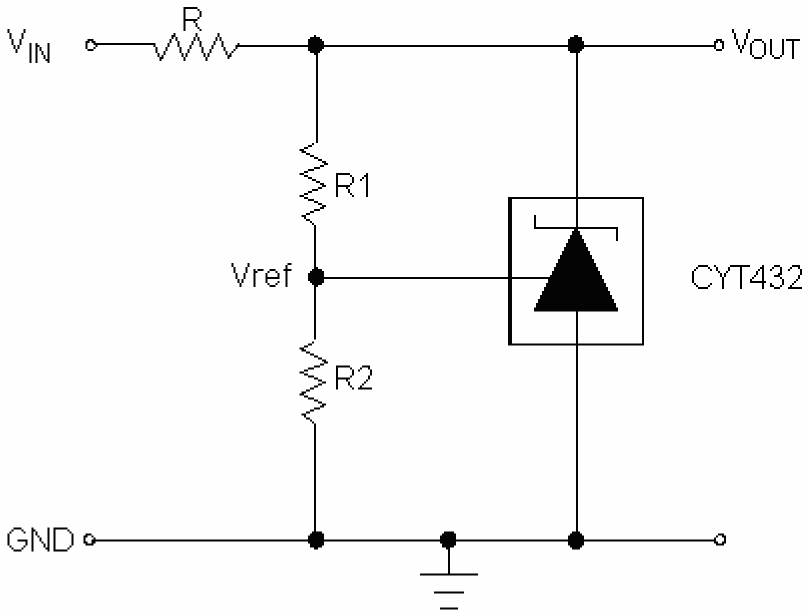
Block Diagram



Test Circuits

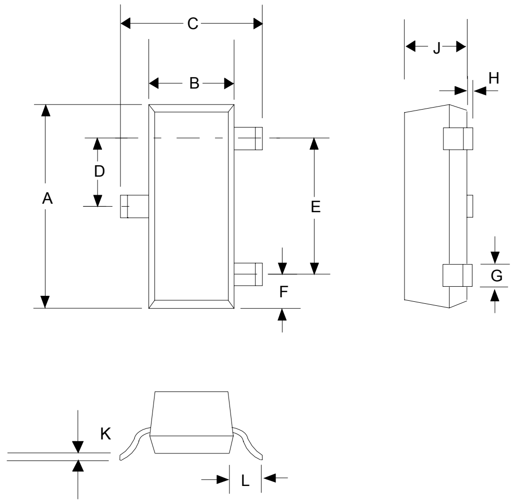
		
Test Circuit 1: Vo=Vka=Vref, Co=0.1μF	**Test Circuit 2:** Vka>Vref, Vo=Vka =Vref·(1+R1/R2)+Iref·R1, Co=0.1μF	**Test Circuit 3:** for Ik(off)

Application Circuit



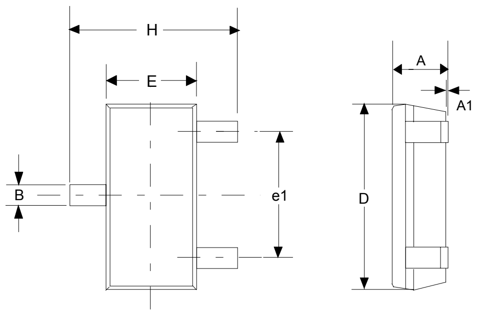
$$V_{OUT} = Vref\left(1+\frac{R1}{R2}\right)$$

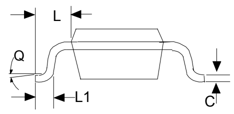
OUTLINE DRAWING SOT-23-3



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 SC59-3L

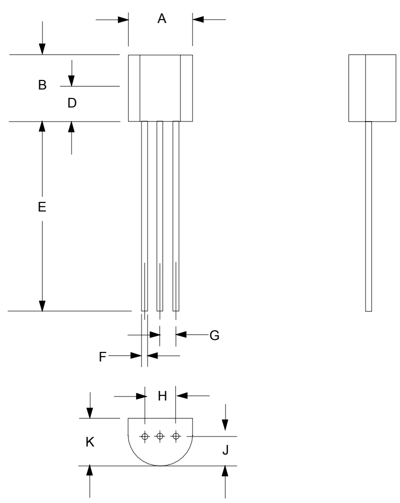




SC 59-3L

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°C	10°C	0°C	10°C

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

SHENZHEN CYT OPTO-ELECTRONIC TECHNOLOGY CO.,LTD.

IMPORTANT NOTICE

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