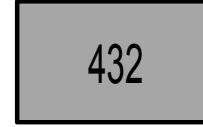


## Features

Wide Programmable Precise Output Voltage from 1.25V to 18V  
 High Stability under Capacitive Load  
 Low Temperature Deviation: 3mV Typical  
 Low Equivalent Full-Range Temperature Coefficient: 20PPM/°C Typical  
 Low Dynamic Output Resistance: 0.05Ω Typical  
 High Sink Current Capacity from 0.1mA to 100mA  
 Low Output Noise  
 Wide Operating Range of 0 to +70 °C

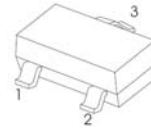


## Applications

Graphic Card  
 PC Motherboard  
 Voltage Adapter  
 Switching Power Supply  
 Charger

### SOT-23

1.REFERENCE  
 2.CATHODE  
 3. ANODE



## Absolute Maximum Ratings (Note 2)

Symbol	Parameter	Rating		Unit
$V_{KA}$	Cathode Voltage	20		V
$I_{KA}$	Cathode Current Range (Continuous)	-100 to 100		mA
$I_{REF}$	Reference Input Current Range	10		mA
$P_D$	Power Dissipation	Z, R Package	770	mW
		N, K Package	370	
$T_{STG}$	Storage Temperature Range	-65 to +150		°C

Note 2: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

## Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
$V_{KA}$	Cathode Voltage	$V_{REF}$	18	V
$I_{KA}$	Cathode Current	0.1	100	mA
—	Operating Ambient Temperature Range	0	+70	°C

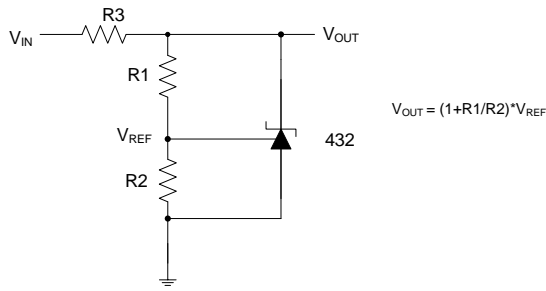
## CLASSIFICATION OF $V_{ref}$

Rank	0.5%	1.0%
Range	1.244~1.256	1.238~1.262

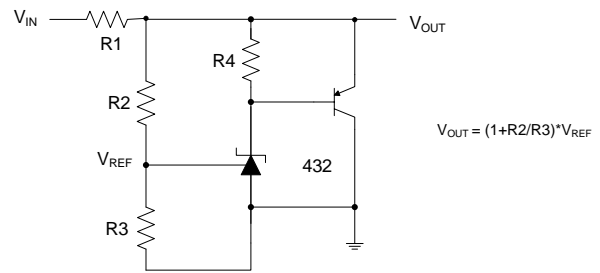
**ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C unless otherwise specified)**

Symbol	Parameter	Test Circuit	Conditions	Min	Typ	Max	Unit	
V <sub>REF</sub>	Reference Voltage	4	V <sub>KA</sub> = V <sub>REF</sub> , I <sub>KA</sub> = 10mA	0.5%	1.244	1.250	1.256	V
				1.0%	1.238	1.250	1.262	
ΔV <sub>REF</sub>	Deviation of Reference Voltage Over Full Temperature Range	4	V <sub>KA</sub> = V <sub>REF</sub> , I <sub>KA</sub> = 10mA	0 to +70°C	–	2	10	mV
				-40 to +85°C	–	3	10	
				-40 to +125°C	–	4	15	
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	Ratio of Change in V <sub>REF</sub> to the Change in Cathode Voltage	5	I <sub>KA</sub> = 10mA, ΔV <sub>KA</sub> : V <sub>REF</sub> to 16V	–	-0.5	-1.5	mV/V	
I <sub>REF</sub>	Reference Input Current	5	I <sub>KA</sub> = 10mA, R1 = 10KΩ, R2 = ∞	–	0.15	0.4	μA	
ΔI <sub>REF</sub>	Deviation of Reference Current Over Full Temperature Range	5	I <sub>KA</sub> = 10mA, R1 = 10KΩ, R2 = ∞, T <sub>A</sub> = -40 to +125°C	–	0.1	0.4	μA	
I <sub>KA</sub> (Min)	Minimum Cathode Current for Regulation	4	V <sub>KA</sub> = V <sub>REF</sub>	–	55	80	μA	
I <sub>KA</sub> (Off)	Off-state Cathode Current	6	V <sub>REF</sub> = 0, V <sub>KA</sub> = 18V	–	0.04	0.10	μA	
			V <sub>KA</sub> = 6V, V <sub>REF</sub> = 0	–	0.01	0.05		
Z <sub>KA</sub>	Dynamic Impedance	4	V <sub>KA</sub> = V <sub>REF</sub> , I <sub>KA</sub> = 1 to 100mA, f ≤ 1.0KHz	–	0.05	0.15	Ω	
θ <sub>JC</sub>	Thermal Resistance (Junction to Case)	–	SOT-23	–	84.84	–	°C/W	
			SOT-23-5	–	84.84	–		
			TO-92	–	140.80	–		
			SOT-89	–	29.80	–		

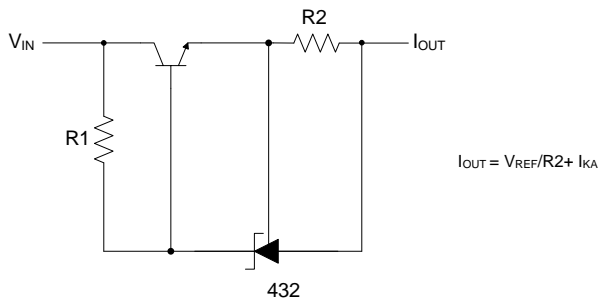
**Typical Application**



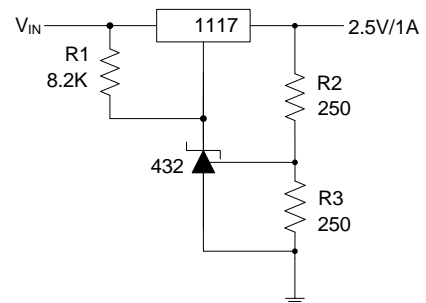
Shunt Regulator



High Current Shunt Regulator

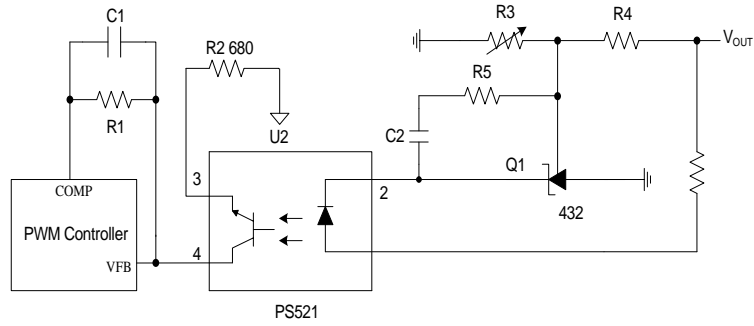


Current Source or Current Limit



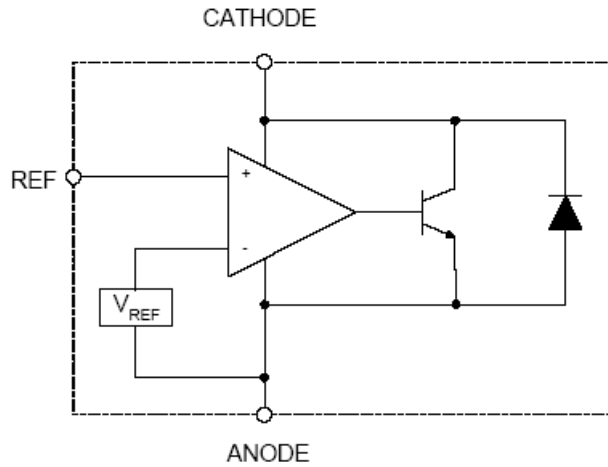
Precision 2.5V/1A Regulator

**Typical Application**

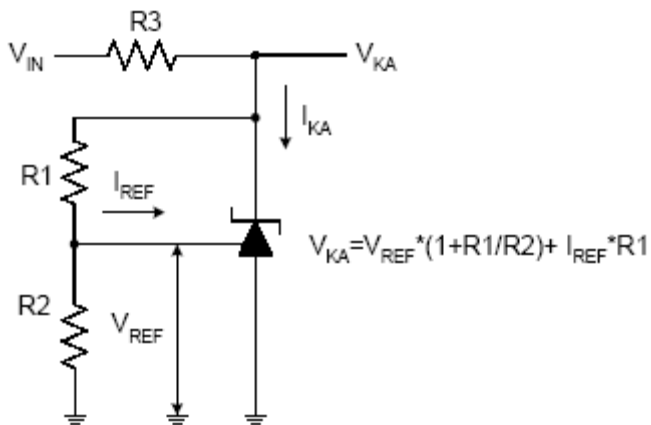


PWM Converter with Reference

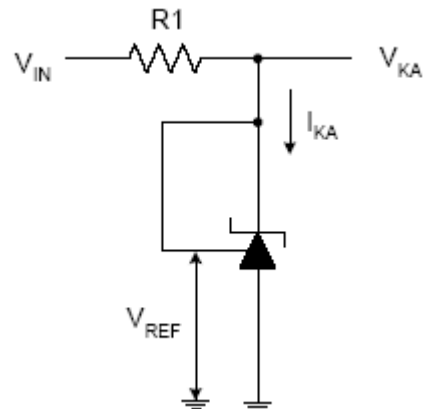
**Function Block Diagram**



**Test Circuit**



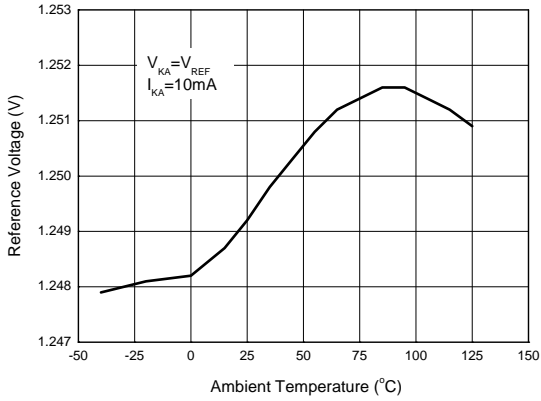
Test Circuit 5 for  $V_{KA} > V_{REF}$



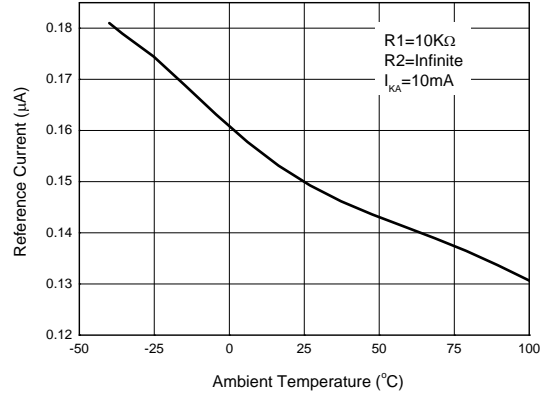
Test Circuit 4 for  $V_{KA} = V_{REF}$

RATING AND CHARACTERISTIC CURVES

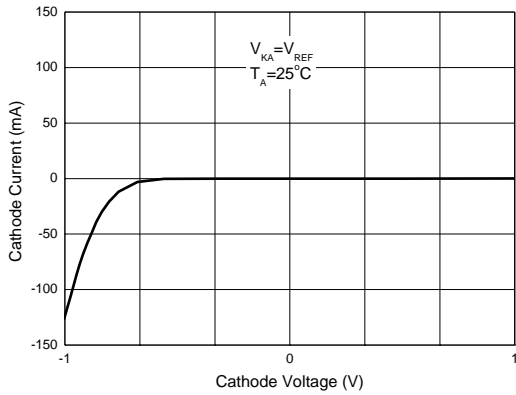
Reference Voltage vs. Ambient Temperature



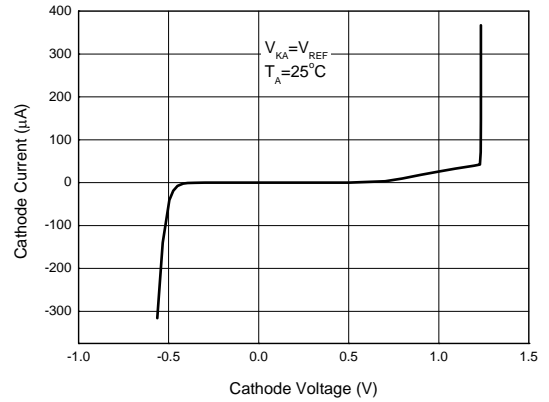
Reference Current vs. Ambient Temperature



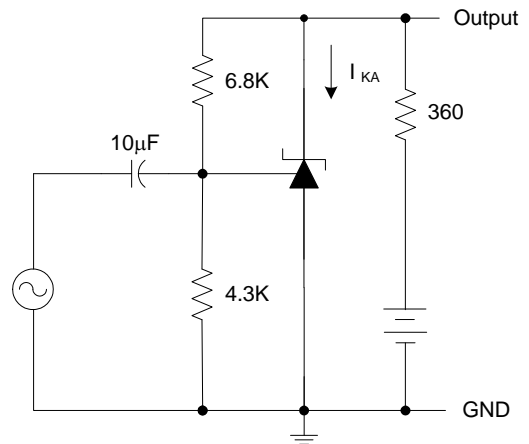
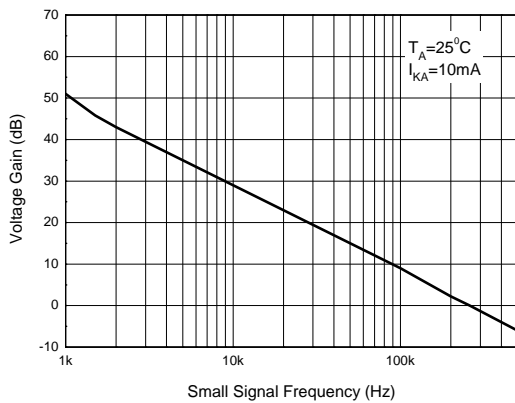
Cathode Current vs. Cathode Voltage



Cathode Current vs. Cathode Voltage

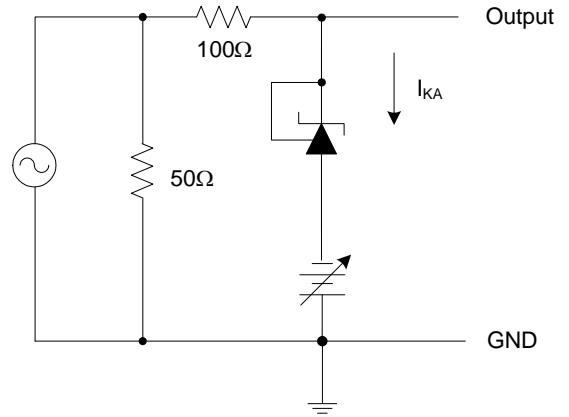
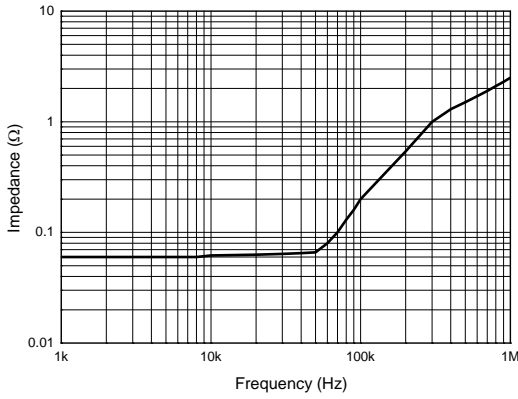


Small Signal Voltage Gain vs. Frequency

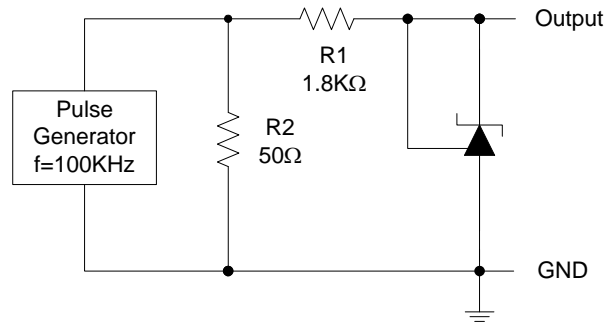
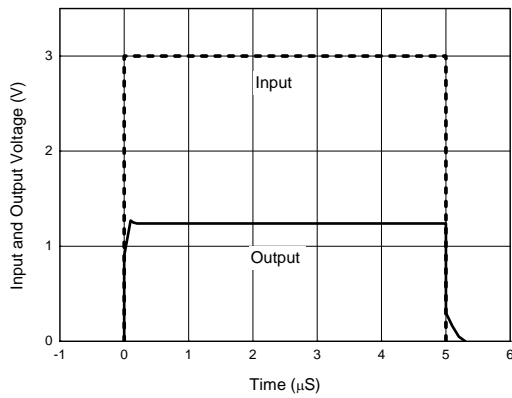


RATING AND CHARACTERISTIC CURVES

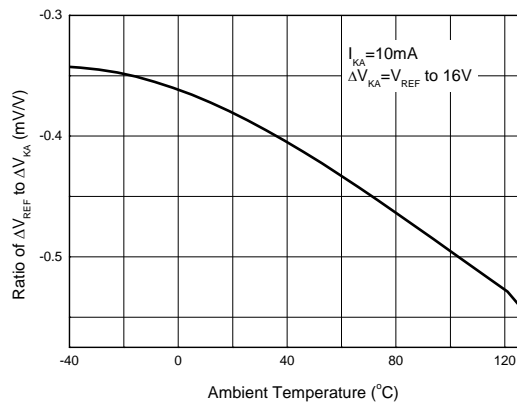
Dynamic Impedance vs. Frequency



Pulse Response of Input and Output Voltage

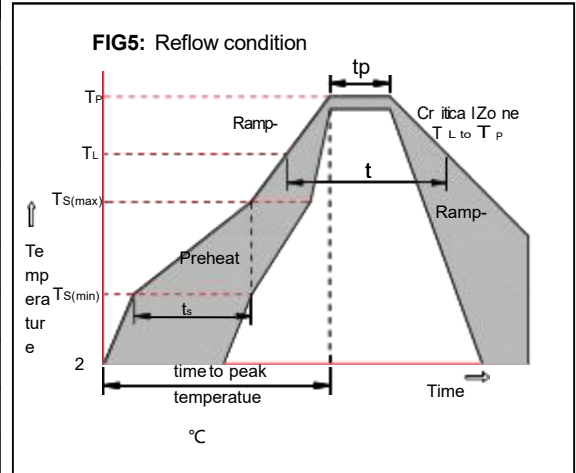


Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage vs. Ambient Temperature



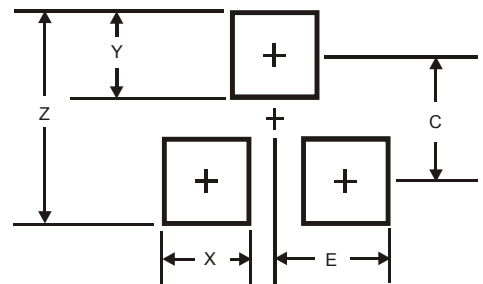
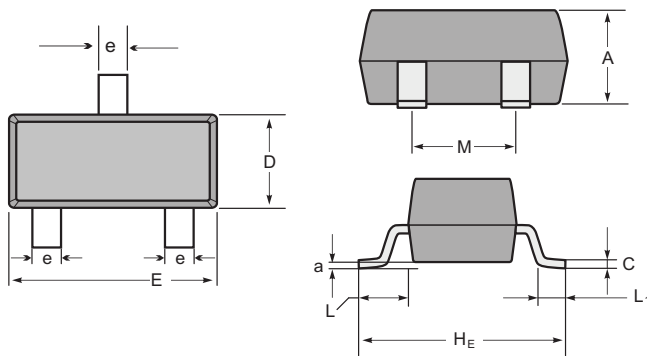
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ( $T_{s(min)}$ )	+150°C
	-Temperature Max( $T_{s(max)}$ )	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp ( $T_L$ ) to peak)		3°C/sec. Max
$T_{s(max)}$ to $T_L$ - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature( $T_L$ )(Liquid us)	+217°C
	-Temperature( $t_L$ )	60-150 secs.
Peak Temp ( $T_P$ )		+260(+0/-5)°C
Time within 5°C of actual Peak Temp ( $t_p$ )		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp ( $T_P$ )		8 min. Max
Do not exceed		+260°C



Package Dimensions & Suggested Pad Layout

SOT23

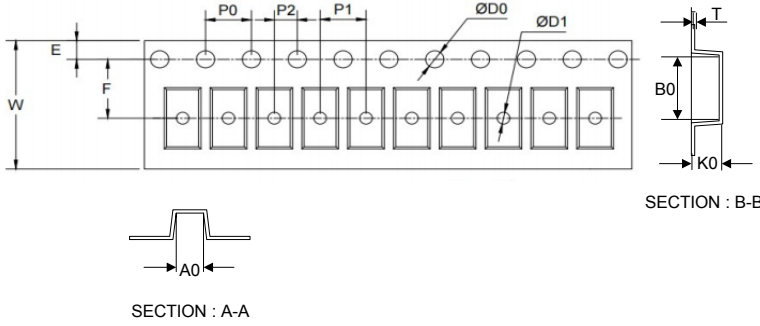
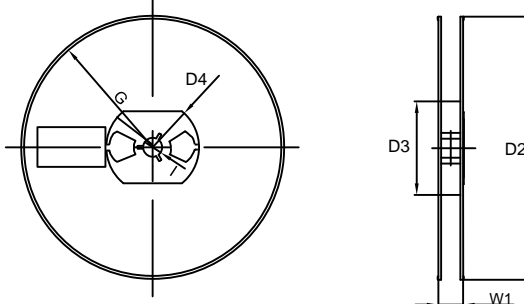


SOT-23 mechanical data

UNIT		A	C	D	E	$H_E$	e	M	L	$L_1$	a
mm	max	1.1	0.15	1.4	3.0	2.6	0.5	1.95	0.55 (ref)	0.36 (ref)	0.0
	min	0.9	0.08	1.2	2.8	2.2	0.3	1.7			0.15
mil	max	43	6	55	118	102	20	77	22 (ref)	14 (ref)	0.0
	min	35	3	47	110	87	12	67			6

Dimensions	SOT23
Z	2.9
X	0.8
Y	0.9
C	2.0
E	1.35

**Tape & reel specification**

Tape	Symbol	Dimension (mm)	
	P0	4.00±0.10	
	P1	4.00±0.10	
	P2	2.00±0.10	
	D0	1.55±0.10	
	D1	1.05±0.10	
	E	1.55±0.10	
	F	3.60±0.10	
	W	8.00±0.10	
	A0	3.80±0.20	
	B0	3.25±0.20	
	K0	1.45±0.10	
	T	0.25±0.05	
	<p>7" Reel</p> 	D2	178.0±3.0
		D3	55Min.
D4		R24.0±3.0	
G		R82.0±3.0	
I		13.0±2.0	
W1		11.0±3.0	
Quantity: 3000PCS			