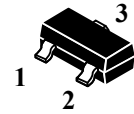


### PROGRAMMABLE PRECISION REFERENCE

**(Pb)** Lead(Pb)-Free

#### Features:

- \* Programmable output voltage to 36V.
- \* Low dynamic output impedance 0.2Ω.
- \* Sink current capability of 1 to 100mA.
- \* Equivalent full-range temperature coefficient of 50ppm/°C typical for operation over full rated operating temperature range.



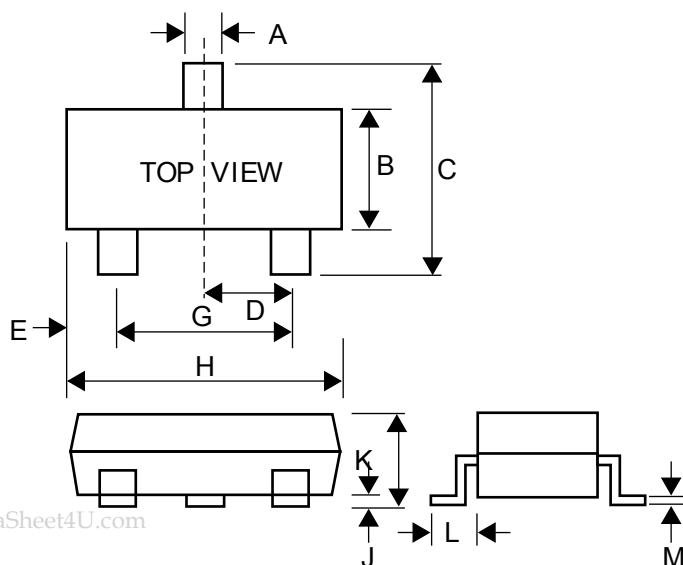
**SOT-23**

#### Description:

\* The WT431 is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between  $V_{ref}$  (approximately 2.5) and 36V with two external resistors. It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.

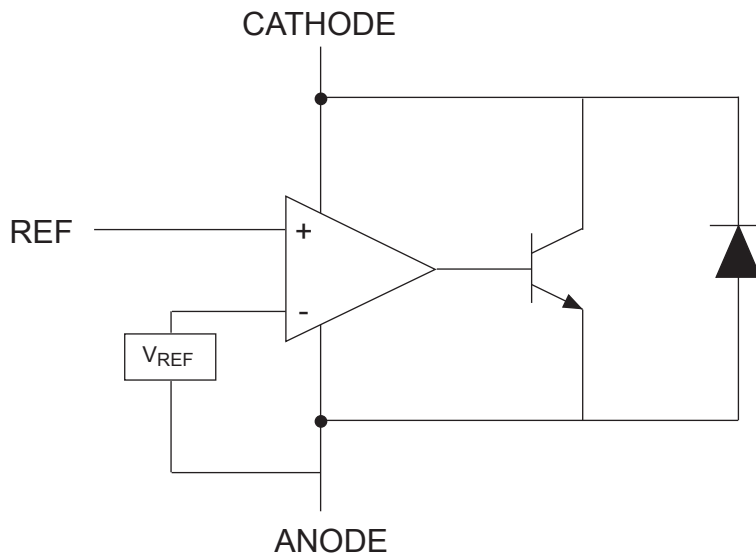
### SOT-23 Outline Dimensions

Unit:mm



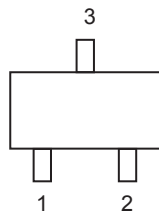
Dim	Min	Max
A	0.35	0.51
B	1.19	1.40
C	2.10	3.00
D	0.85	1.05
E	0.46	1.00
G	1.70	2.10
H	2.70	3.10
J	0.01	0.13
K	0.89	1.10
L	0.30	0.61
M	0.076	0.25

## BLOCK DIAGRAM



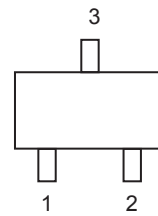
## PIN ASSIGNMENT

**WT431R**



P<sub>IN1</sub> = REF  
 P<sub>IN2</sub> = Cathode  
 P<sub>IN3</sub> = Anode

**WT431L**



P<sub>IN1</sub> = Cathode  
 P<sub>IN2</sub> = REF  
 P<sub>IN3</sub> = Anode

## Ordering information

Ordering Number	Rank	Shipping
WT431RA	0.5%	3000 Units / Tape & Reel
WT431RB	1%	3000 Units / Tape & Reel
WT431LA	0.5%	3000 Units / Tape & Reel
WT431LB	1%	3000 Units / Tape & Reel

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**ABSOLUTE MAXIMUM RATINGS(Operating temperature range applies unless otherwise specified)**

PARAMETER	SYMBOL	VALUE	UNIT
Cathode Voltage	$V_{KA}$	36	V
Cathode Current Range(Continuous)	$I_{KA}$	-100 ~ +150	mA
Reference Input Current Range	$I_{ref}$	-0.05 ~ +10	mA
Operating Junction Temperature	$T_j$	150	°C
Operating Ambient Temperature	$T_{opr}$	0~70	°C
Storage Temperature	$T_{stg}$	-65 ~ +150	°C

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	Min	Typ	Max	UNIT
Cathode Voltage	$V_{KA}$	$V_{REF}$	-	36	V
Cathode Current	$I_{KA}$	1	-	100	mA

**ELECTRICAL CHARACTERISTICS( $T_A=25^\circ\text{C}$  unless otherwise specified)**

PARAMETER	SYMBOL	TEST CONDITIONS	Min	Typ	Max	UNIT
Reference Input Voltage	$V_{ref}$	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$	-	2.50	-	V
Deviation of reference Input Voltage Over temperature	$\Delta V_{ref}/\Delta T$	$V_{KA}=V_{REF}, I_{KA}=10\text{mA}$ $T_{MIN}\leq T_A\leq T_{MAX}$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the change in Cathode Voltage	$\Delta V_{ref}/\Delta V_{KA}$	$I_{KA}=10\text{mA}$ $\Delta V_{KA}=10\text{V}\sim V_{REF}$ $\Delta V_{KA}=36\text{V}\sim 10\text{V}$	-	-1.0 -0.5	-2.7 -2.0	mV/V
Reference Input Current	$I_{ref}$	$I_{KA}=10\text{mA}, R1=10\text{k}\Omega, R2=\infty$	-	1.5	4	$\mu\text{A}$
Deviation of reference Input Current Over Full temperature range	$\Delta I_{ref}/\Delta T$	$I_{KA}=10\text{mA}, R1=10\text{k}\Omega, R2=\infty$ $T_A=\text{full temperature}$	-	0.4	1.2	$\mu\text{A}$
Minimum Cathode current for Regulation	$I_{KA(\text{min})}$	$V_{KA}=V_{REF}$	-	0.45	1.0	mA
Off-State Cathode current	$I_{KA(\text{OFF})}$	$V_{KA}=36\text{V}, V_{REF}=0$	-	0.05	1.0	$\mu\text{A}$
Dynamic Impedance	$Z_{KA}$	$V_{KA}=V_{REF}=0, I_{KA}=1$ to 100mA $f\leq 1.0\text{kHz}$	-	0.15	0.5	$\Omega$

**CLASSIFICATION OF  $V_{ref}$  AND MARKING**

PARAMETER	Rank	Range(V)	Marking
WT431RA	0.5%	2.487~2.512	RA
WT431RB	1%	2.475~2.525	RB
WT431LA	0.5%	2.487~2.512	LA
WT431LB	1%	2.475~2.525	LB

## TYPICAL PERFORMANCE CHARACTERISTICS

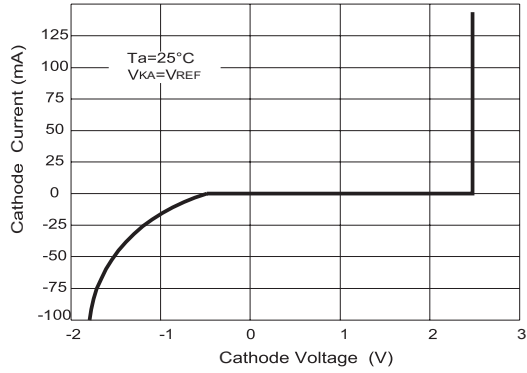


Fig 1 Cathode Current Vs Cathode Voltage

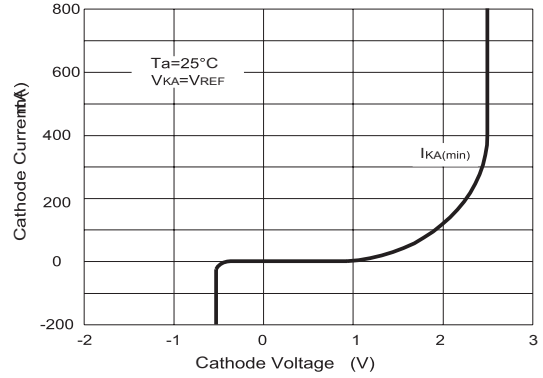


Fig 2 Cathode Current Vs Cathode Voltage

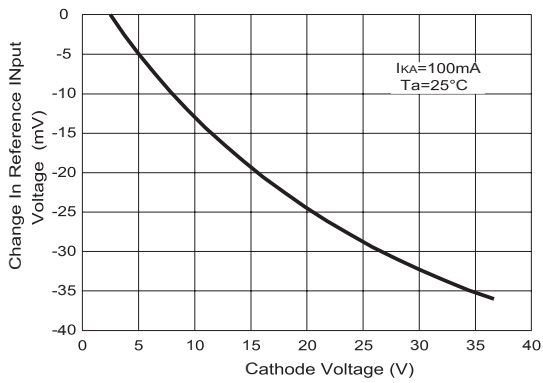


Fig 3 Change in Reference Input Voltage Vs Cathode voltage

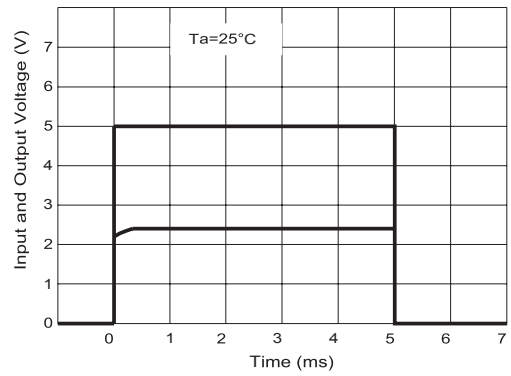


Fig 4 Pulse Response

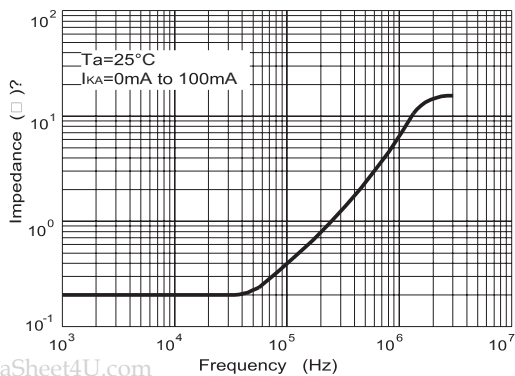


Fig 5 Dynamic Impedance Vs Frequency

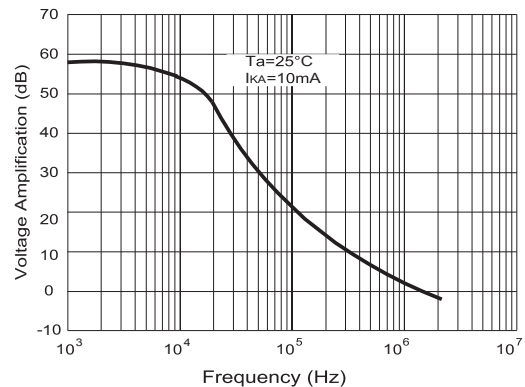


Fig 6 Small Signal Voltage Amplification Vs Frequency

## WT431 LINEAR INTEGRATED CIRCUIT

### TEST CIRCUIT

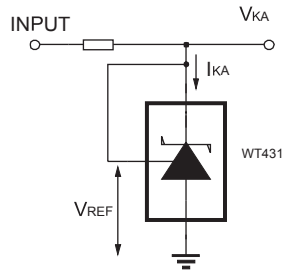


Fig 7 Test Circuit For  $V_{KA}=V_{REF}$

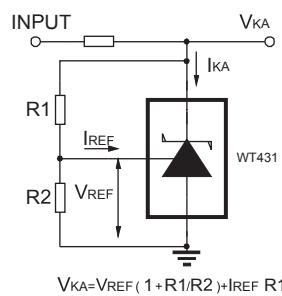


Fig 8 Test Circuit for  $V_{KA} \geq V_{REF}$

$$V_{KA} = V_{REF} (1 + R_1/R_2) + I_{REF} R_1$$

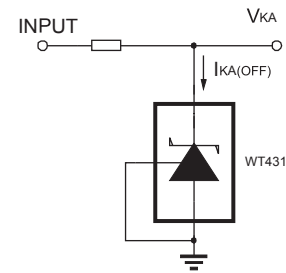


Fig 9 Test Circuit For  $I_{KA(OFF)}$

### APPLICATION CIRCUIT

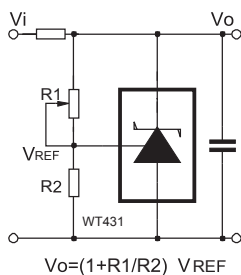


Fig 10 Shutdown Regulator

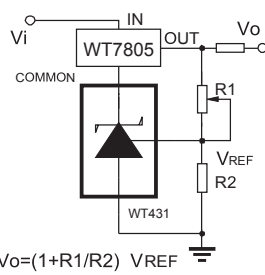


Fig 11 Output Control of a Three-Terminal Fixed Regulator

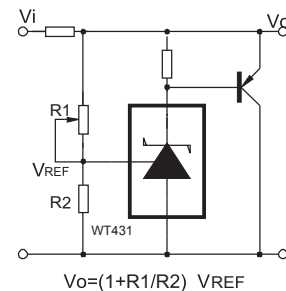


Fig 12 Higher-current Shunt Regulator

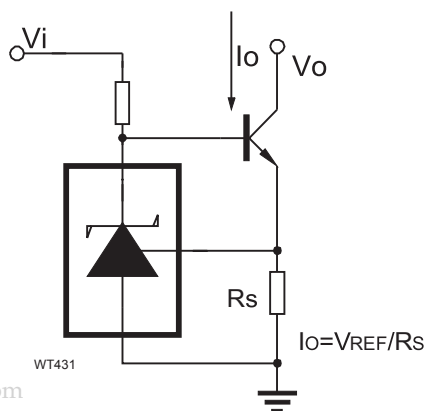


Fig 13 Constant-current Sink

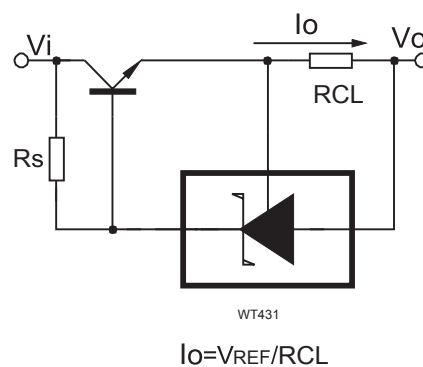


Fig 14 Current Limiting or Current Source