

Description

The TL431AT2M is a three-terminal adjustable shunt regulator with guaranteed thermal stability over a full operation range. It features sharp turn-on characteristics, low temperature coefficient and low output impedance, which make it ideal substitute for Zener diode in applications such as switching power supply, charger and other adjustable regulators.

The TL431AT2M precision reference is offered in two voltage tolerance: 0.5% .

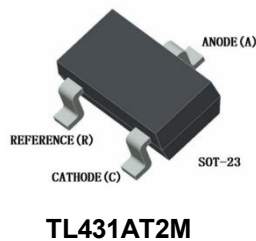
Features

- Programmable Precise Output Voltage from 2.5V to 36V
- High Stability under Capacitive Load
- Low Temperature Deviation: 5mV Typical
- Low Equivalent Full-range Temperature Coefficient
- With 40PPM/°C Typical
- Sink Current Capacity from 1mA to 100 mA
- Low Output Noise
- Wide Operating Range of -40 to 125°C

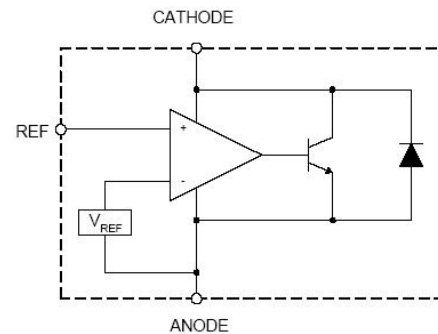
Applications

- Charger
- Voltage Adapter
- Switching Power Supply
- Graphic Card
- Precision Voltage Reference

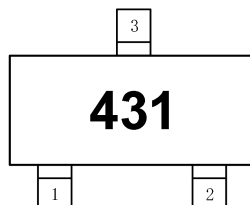
Pin Assignment



Simplified Block Diagram



Marking



Absolute Maximum Ratings(Note)

Symbol	Parameter	Rating	Unit
V_{KA}	Cathode Voltage	40	V
I_{KA}	Cathode Current Range (Continuous)	-100 to 150	mA
I_{REF}	Reference Input Current Range	10	mA
PD	Power Dissipation	370	mW
T_J	Junction Temperature	+150	°C
T_{STG}	Storage Temperature Range	-65 to +150	°C
ESD	ESD (Human Body Model)	2000	V

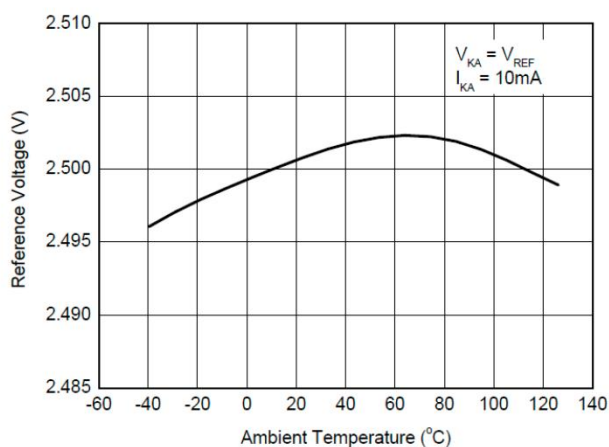
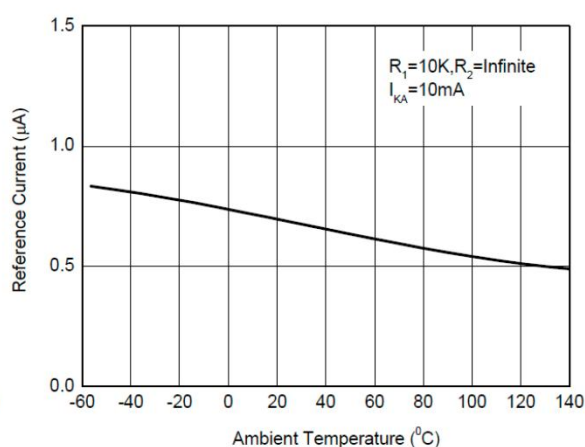
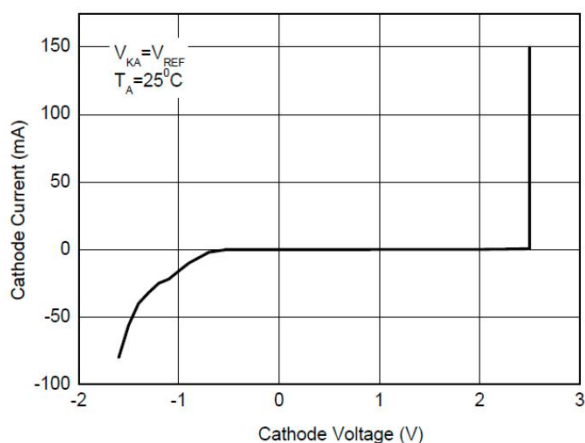
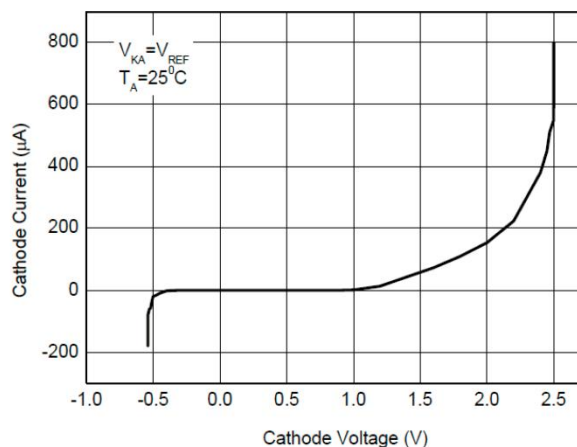
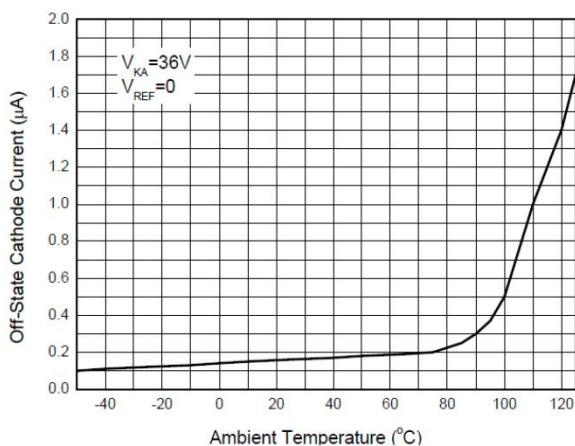
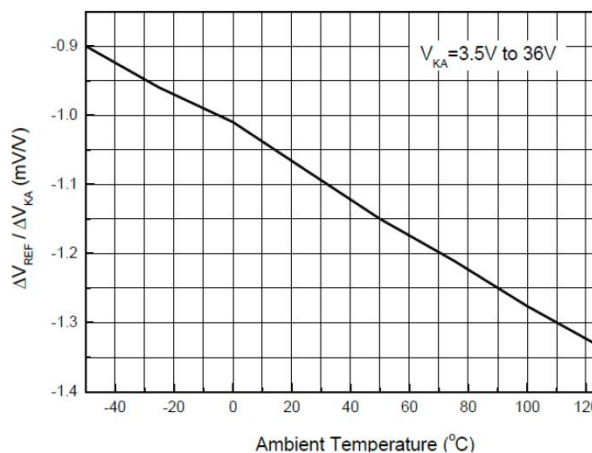
Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
VKA	Cathode Voltage	VREF	36	V
IKA	Cathode Current	1.0	100	mA
TA	Operating Ambient Temperature	-40	+125	°C

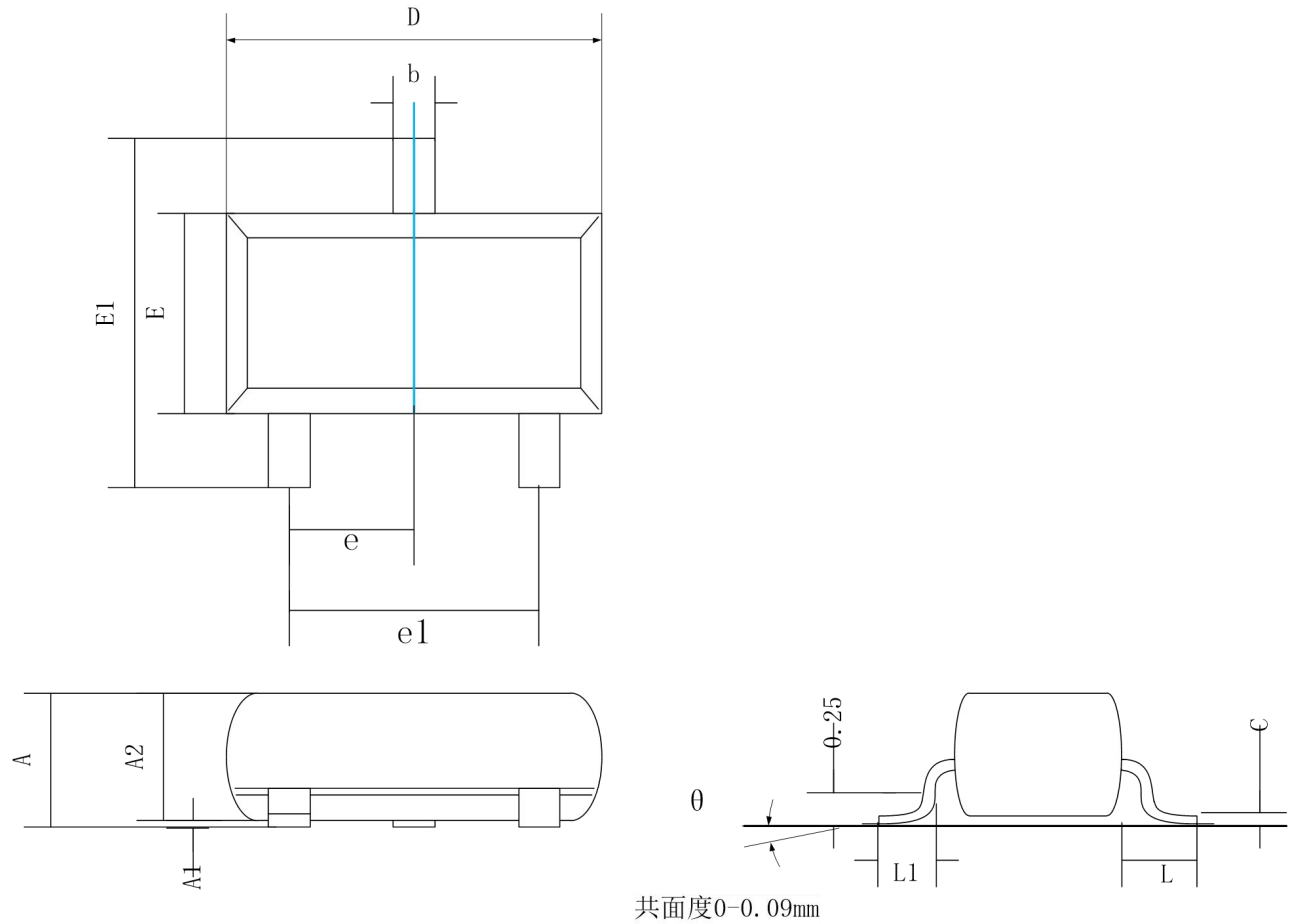
Electrical Characteristics($T_A=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter		Conditions		Min	Typ	Max	Unit
VREF	Reference	0.5%	VKA = VREF, IKA = 10mA		2.483	2.495	2.507	V
ΔVREF	Deviation of Reference Voltage Over Full Temperature Range		VKA = VREF, IKA = 10mA	0 to +70°C	—	5	20	mV
				-40 to +85°C	—	5	26	
				-40 to +125°C		5	40	
ΔVREF/ΔVKA	Ratio of Change in Reference Voltage to the Change in Cathode Voltage		IKA = 10mA	ΔVKA = 10V to VREF	—	-1.0	-2.7	mV/V
				ΔVKA = 36V to 10V	—	-0.5	-2.0	
IREF	Reference Current		IKA = 10mA, R1 = 10KΩ, R2 = ∞		—	0.7	4	μA
ΔIREF	Deviation of Reference Current Over Full Temperature Range		IKA = 10mA, R1 = 10KΩ, R2 = ∞, TA = -40 to +125°C		—	0.4	1.2	μA
IKA(Min)	Minimum Cathode Current for Regulation		VKA = VREF		—	0.4	1.0	mA
IKA(Off)	Off-state Cathode Current		VKA = 36V, VREF = 0		—	0.5	1.0	μA
ZKA	Dynamic Impedance		VKA = VREF, IKA = 1 to 100mA, f ≤ 1.0KHz		—	0.2	0.5	Ω
θJC	Thermal Resistance		SOT-23		—	135.9	—	°C/W

Typical Performance Characteristics($T_A=25^\circ\text{C}$, unless otherwise noted.)

Reference Voltage vs. Ambient Temperature

Reference Current vs. Ambient Temperature

Cathode Current vs. Cathode Voltage

Cathode Current vs. Cathode Voltage

Off-State Cathode Current vs. Ambient Temperature

Ratio of Delta Reference Voltage to the Ratio of Delta Cathode Voltage


SOT-23 Package Information



Symbol	Dimensions In Millimeters	
	Min.	Max.
A	0.90	1.15
A1	0.00	0.10
A2	0.90	1.05
b	0.30	0.50
c	0.08	0.15
D	2.80	3.00
E	1.20	1.40
E1	2.25	2.55
e	0.95 REF.	
e1	1.80	2.00
L	0.55 REF.	
L1	0.30	0.50
θ	0°	8°