

RoHS Compliant Product
A suffix of "-C" specifies halogen or lead -free

DESCRIPTION

The TL431A is a three-terminal adjustable shunt regulator offering excellent temperature stability. This device has a typical dynamic output impedance of 0.2Ω . The device can be used as a replacement for zener diodes in many applications.

FEATURES

- The Output Voltage can be Adjusted to 36V
- Low Dynamic Output Impedance, its Typical Value is 0.2Ω
- Trapping Current Capability is 1~100mA
- Low Output Noise Voltage
- Fast On-State Response
- The Effective Temperature Compensation in the Working Range of Full Temperature
- The Typical Value of the Equivalent Temperature Factor in the Whole Temperature Scope is 50 ppm/°C

APPLICATIONS

- Shunt Regulator
- High-Current Shunt Regulator
- Precision Current Limiter

MARKING

431

CLASSIFICATION OF V_{ref}

Rank	0.5%
Range	2.487-2.513

PACKAGE INFORMATION

Package	MPQ	Leader Size
SOT-23	3K	7 inch

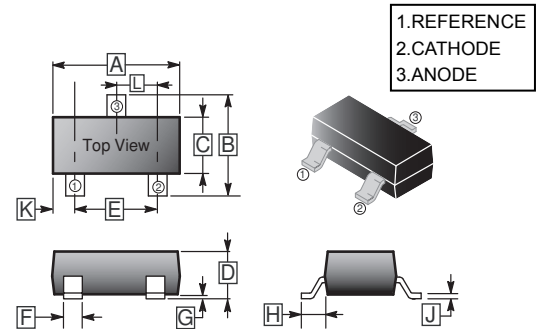
ORDER INFORMATION

Part Number	Type
TL431A	Lead (Pb)-free
TL431A-C	Lead (Pb)-free and Halogen-free

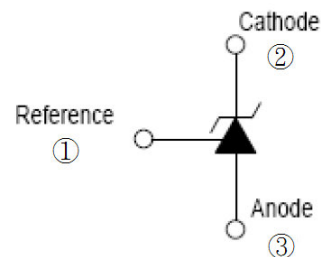
ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

Parameter	Symbol	Ratings	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
Power Dissipation	P_D	300	mW
Thermal Resistance from Junction-Ambient	$R_{\theta JA}$	417	°C/W
Operating temperature	T_{opr}	-25~85	°C
Operating Junction and Storage temperature	T_J, T_{STG}	150, -65~150	°C

SOT-23



REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	2.70	3.10	G	0	0.18
B	2.10	2.95	H	0.55 REF.	
C	1.20	1.7	J	0.08	0.20
D	0.89	1.3	K	0.6 REF.	
E	1.70	2.3	L	0.95 BSC.	
F	0.30	0.50			



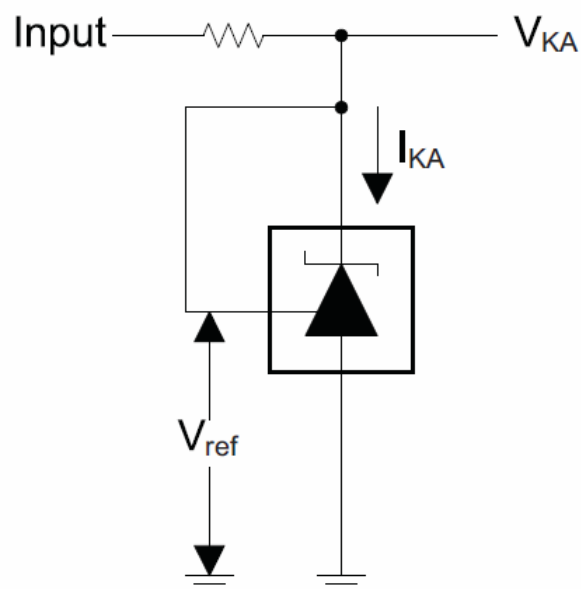
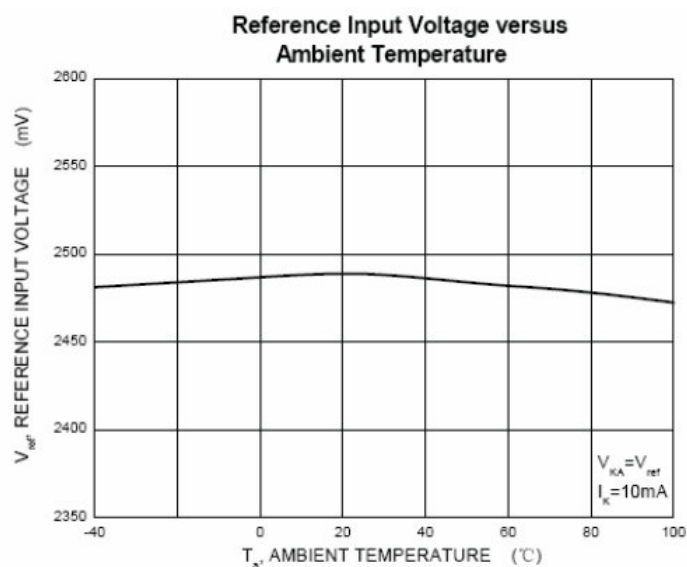
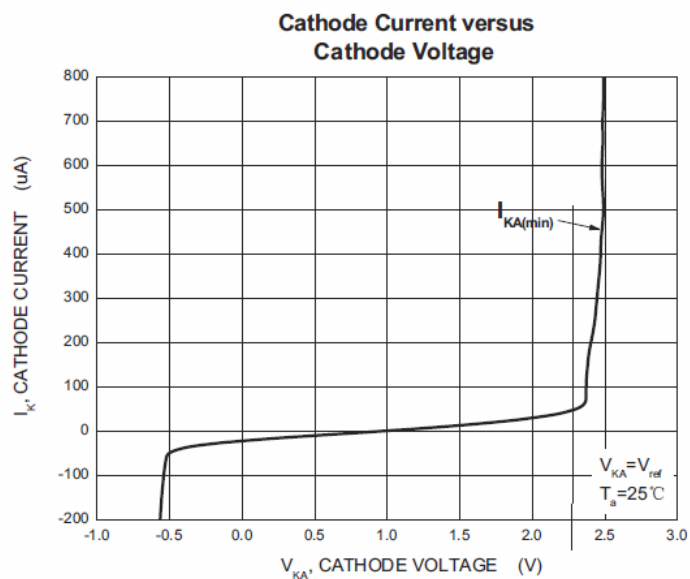
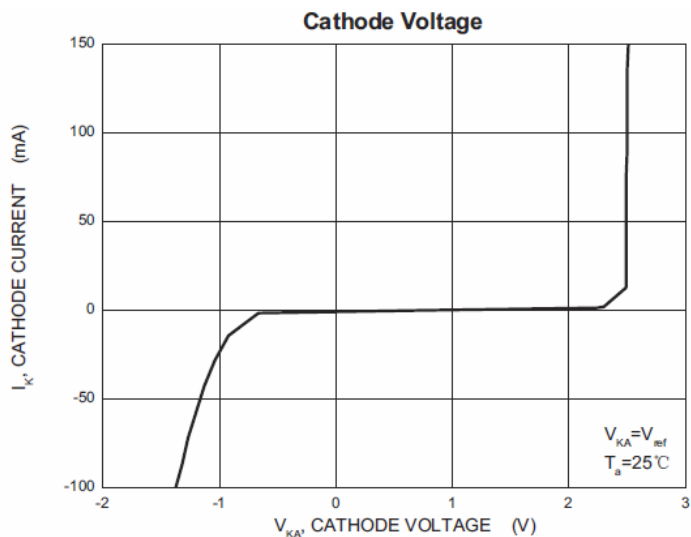
ELECTRICAL CHARACTERISTICS ($T_A=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Reference Input Voltage	V_{ref}	2.487	2.5	2.513	V	$V_{\text{KA}}=V_{\text{ref}}, I_{\text{KA}}=10\text{mA}$
Deviation of Reference Input Voltage Over Temperature ¹	$\Delta V_{\text{ref}} / \Delta T$	-	4.5	17	mV	$V_{\text{KA}}=V_{\text{ref}}, I_{\text{KA}}=10\text{mA}$ $T_{\text{Min}} \leq T_A \leq T_{\text{Max}}$
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{\text{ref}} / \Delta V_{\text{KA}}$	-	-1	-2.7	mV/V	$I_{\text{KA}}=10\text{mA}$ $\Delta V_{\text{KA}}=10\text{V} \sim V_{\text{ref}}$
		-	-0.5	-2		$\Delta V_{\text{KA}}=10\text{V} \sim 36\text{V}$
Reference Input Current	I_{ref}	-	1.5	4	μA	$I_{\text{KA}}=10\text{mA}, R_1=10\text{K}\Omega, R_2=\infty$
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{\text{ref}} / \Delta T$	-	0.4	1.2	μA	$I_{\text{KA}}=10\text{mA}, R_1=10\text{K}\Omega, R_2=\infty$ $T_A = -25 \sim 85^\circ\text{C}$
Minimum Cathode Current for Regulation	$I_{\text{KA(min)}}$	-	0.45	1	mA	$V_{\text{KA}}=V_{\text{ref}}$
Off-State Cathode Current	$I_{\text{KA(OFF)}}$	-	0.05	1	μA	$V_{\text{KA}}=36\text{V}, V_{\text{ref}}=0$
Dynamic Impedance	Z_{KA}	-	0.15	0.5	Ω	$V_{\text{KA}}=V_{\text{ref}}, I_{\text{KA}}=1 \sim 100\text{mA}$, $f \leq 1\text{KHz}$

Note:

1. $T_{\text{MIN}} = -25^\circ\text{C}$, $T_{\text{MAX}} = 85^\circ\text{C}$.

CHARACTERISTIC CURVE



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

CHARACTERISTIC CURVE

