

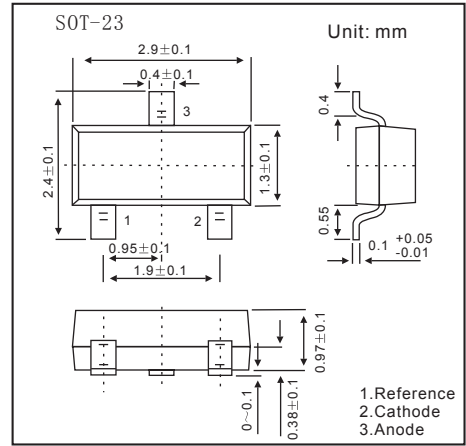
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TL431

■ Features

- The output voltage can be adjusted to 36V
- Low dynamic output impedance, its typical value is $0.2\ \Omega$
- Trapping current capability is 1 to 100mA
- The typical value of the equivalent temperature factor in the whole temperature scope is $50\ \text{ppm}/^\circ\text{C}$
- The effective temperature compensation in the working range of full temperature
- Low output noise voltage
- Fast on-state response



■ Absolute Maximum Ratings (Operating temperature range applies unless otherwise specified)

Parameter	Symbol	Rating	Unit
Cathode Voltage	V_{KA}	37	V
Cathode Current Range (Continuous)	I_{KA}	-100 ~ +150	mA
Reference Input Current Range	I_{REF}	0.05 ~ +10	mA
Power Dissipation	PD	350	mW
Operating Temperature	T_{OPR}	0 ~ 70	$^\circ\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^\circ\text{C}$

■ Electrical Characteristics ($T_a = 25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Testconditions	Min	Typ	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA} = V_{REF}$, $I_{KA} = 10\text{mA}$	2.45	2.5	2.55	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	$\Delta V_{REF}/\Delta V_{KA}$	$I_{KA} = 10\text{mA}$, $\Delta V_{KA} = 10\text{V} \sim V_{REF}$		-1.0	-2.7	mV/V
		$I_{KA} = 10\text{mA}$, $\Delta V_{KA} = 36\text{V} \sim 10\text{V}$		-0.5	-2.0	mV/V
Reference Input Current	I_{REF}	$I_{KA} = 10\text{mA}$, $R_1 = 10\text{K}\ \Omega$, $R_2 = \infty$		1.5	4	μA
Deviation of Reference Input Current Over Full Temperature Range	$\Delta I_{REF}/\Delta T$	$I_{KA} = 10\text{mA}$, $R_1 = 10\text{K}\ \Omega$, $R_2 = \infty$ $T_a = \text{Full Temperature}$		0.4	1.2	μA
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	μA
Dynamic Impedance	Z_{KA}	$V_{KA} = V_{REF}$, $I_{KA} = 1\text{ to }100\text{mA}$, $f \leq 1.0\text{KHz}$		0.15	0.5	Ω

* $T_{MIN} = 0^\circ\text{C}$, $T_{MAX} = +70^\circ\text{C}$

■ Classification Of V_{REF}

Rank	0.3%	0.5%	1%	2%
Range	2.493~2.508	2.487~2.512	2.475~2.525	2.450~2.550