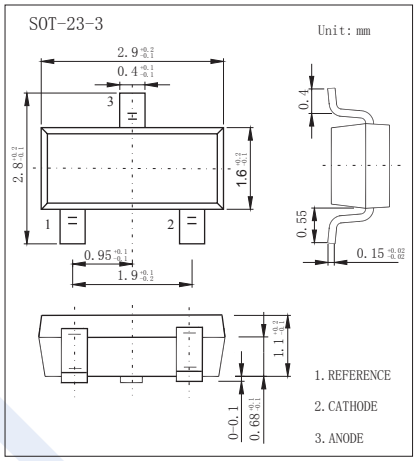
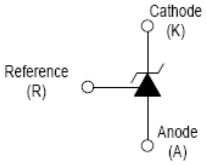
Adjustable Accurate Reference Source

TL431K (KL431K)



■ Features

- The output voltage can be adjusted to 36V
- Low dynamic output impedance, its typical value is 0.2Ω
- Trapping current capability is 1 to 100mA
- Low output noise voltage
- Fast on -state response



■ Absolute Maximum Ratings Ta = 25℃

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	
Maximum Power Dissipation	P_D	300	mW
Thermal Resistance from Juntion to Ambient	$R_{\theta JA}$	357	℃/W
Operating Junction Temperature	T_j	150	℃
Operating Junction Temperature Range	Topr	0 ~ 70	
Storage Temperature Range	T_{stg}	-65 ~ 150	

■ Electrical Characteristics Ta = 25℃（unless otherwise specified）

Parameter	Symbol	Test Conditions		Min	Typ	Max	Unit
Reference Input Voltage(Fig.1)	V_{ref}	$V_{KA}=V_{REF}, I_{KA}=10mA$		2.445	2.495	2.545	V
		RanK	0.5%	2.482		2.508	
			1%	2.47		2.52	
Deviation of Reference Input Voltage Over Temperature(Fig.1) Tmin=0℃ ,Tmax=+70℃	$\triangle V_{ref}/\triangle T$	$V_{KA}=V_{REF}, I_{KA}=10mA$ $T_{min}\leqslant T_a\leqslant T_{max}$			4.5	17	mV
Ratio Of Change in Reference Input Voltage to the Change in Cathode Voltage (Fig.2)	$\triangle V_{ref}/\triangle V_{KA}$	I_{KA}=10mA	$\triangle V_{KA}=V_{REF}$ ~ 10V		-1.0	-2.7	mV/V
			$\triangle V_{KA}$=10V ~ 36V		-0.5	-2.0	
Reference Input Current	I_{ref}	$I_{KA}=10mA, R_1=10\ k\Omega, R_2=\infty$			1.5	4	uA
Deviation Of Reference Input Current Over Full Temperature Range(Fig.2)	I_{ref} / △T	$I_{KA}=10mA, R_1=10\ k\Omega, R_2=\infty$ Ta=full Temperature			0.4	1.2	
Minmum Cathode Current for Regulation(Fig.1)	$I_{KA(min)}$	$V_{KA}=V_{REF}$			0.45	1.0	mA
Off-state Cathode Current(Fig.3)	$I_{KA(OFF)}$	V_{KA}=40V, V_{REF}=0			0.05	0.5	uA
Dynamic Impedance	Z_{KA}	$V_{KA}=V_{REF}$, I_{KA}=1to100mA ,f≤1.0KHz			0.15	0.5	Ω

■ Marking

Marking	431

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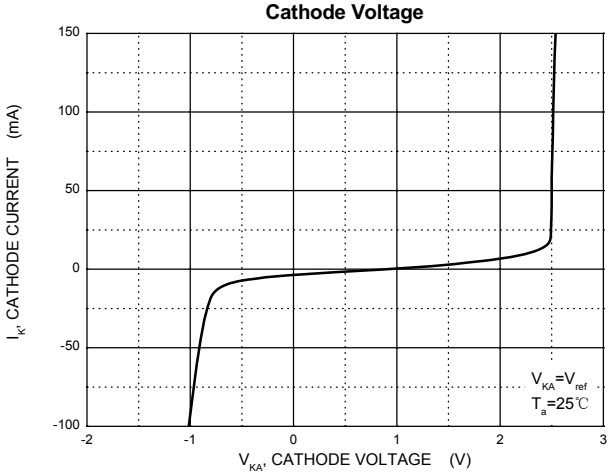
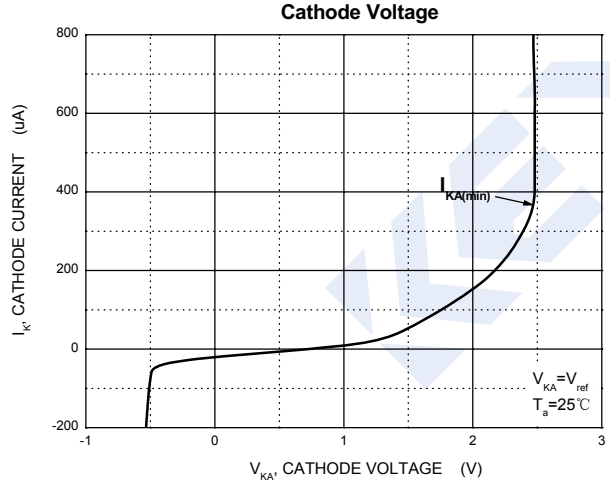
■ Typical Characterisitics

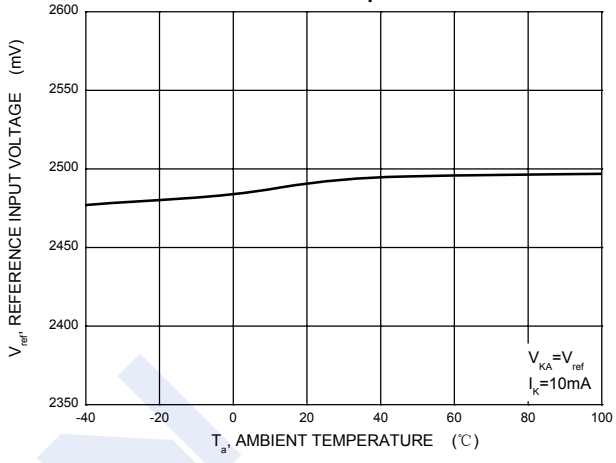
Cathode Current versus Cathode Voltage

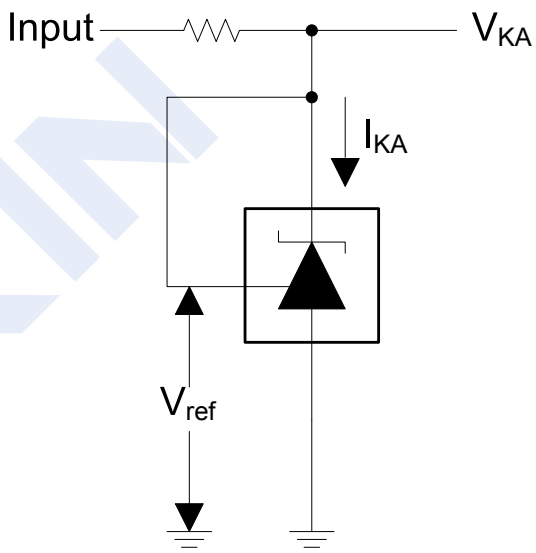


Cathode Current versus Cathode Voltage



Reference Input Voltage versus Ambient Temperature



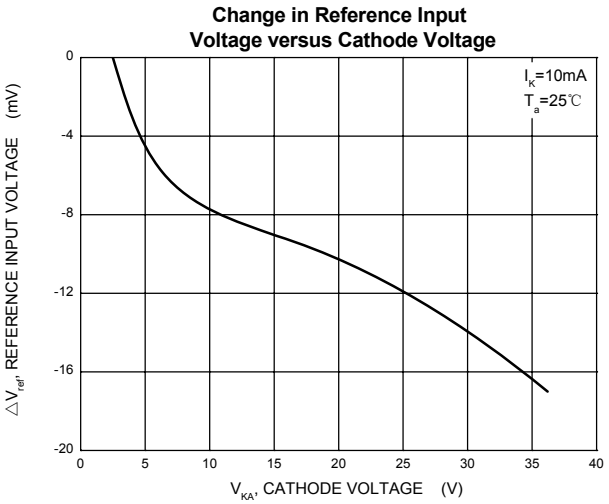


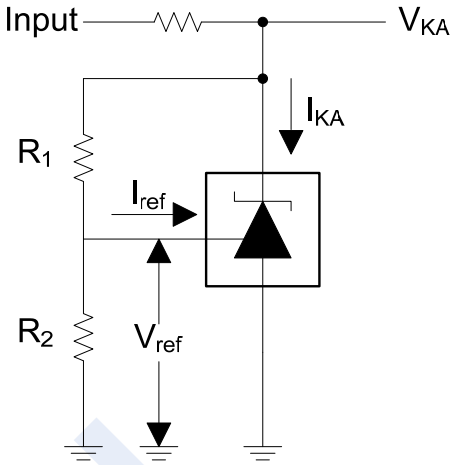
Test Circuit for $V_{KA}=V_{ref}$

Adjustable Accurate Reference Source

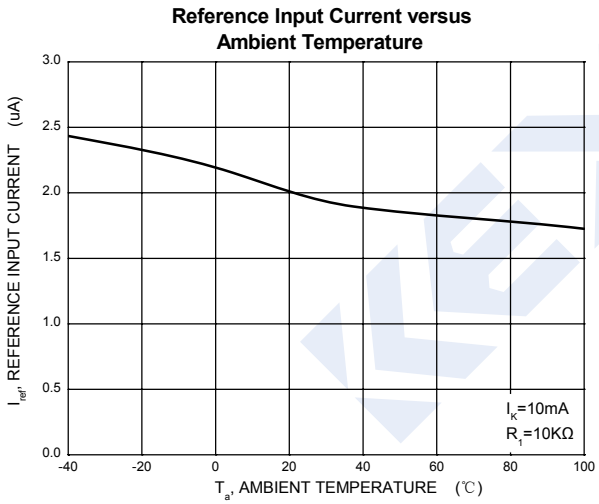
TL431K (KL431K)

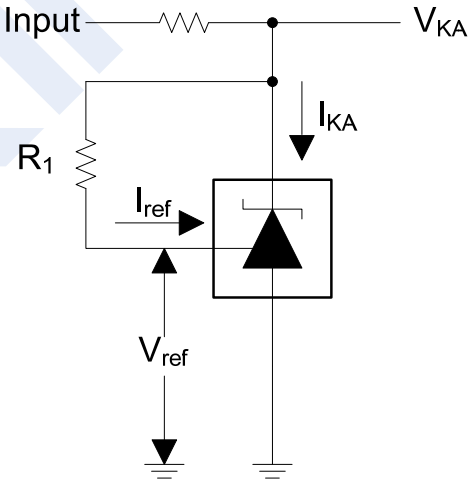
■ Typical Characterisitics



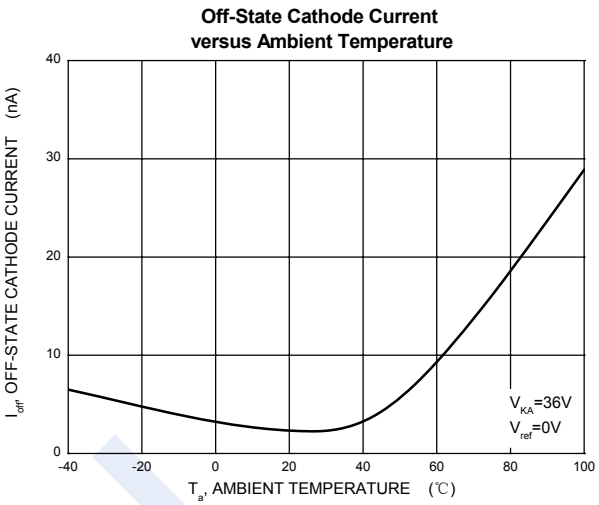


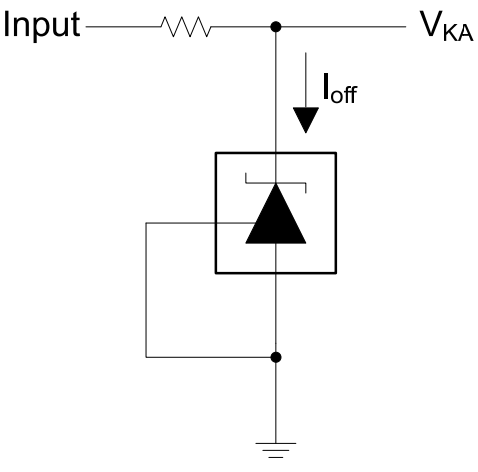
Test Circuit for $V_{KA}=V_{ref}(1+R1/R2)+R1*I_{ref}$





Test Circuit for I_{ref}





Test Circuit for I_{off}