



Micro Commercial Components

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TL431AU

Features

- Programmable Output Voltage 36V
- Sink Current Capability of 0.1mA to 100 mA
- Temperature Compensated for operation over full rated operating temperature range
- Low output noise voltage and Fast turn on response
- The Reference Input Voltage tolerance is 1%
- Marking Code: 431

Programmable Precision Regulator

Maximum Ratings

Parameter	Symbol	Value	Unit
Cathode Voltage	V_{KA}	37	V
Cathode Current Range	I_K	-100~150	mA
Reference Input Current Range	I_{REF}	0.05~10	mA
Power Dissipation at 25°C	P_D	0.2	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	300	°C/W
Junction Temperature	T_J	0~150	°C
Operating Temperature	T_g	0~70	°C
Storage Temperature Range	T_{STG}	-55~+150	°C

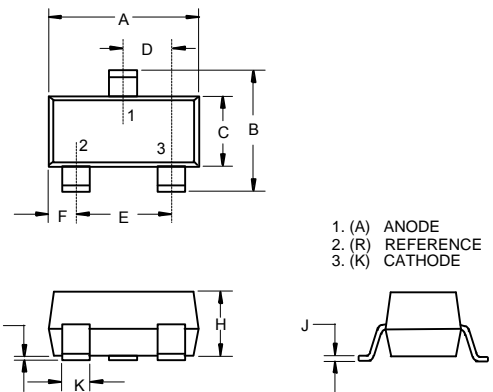
Recommended Operating Conditions

Parameter	Sym	Min	Max	Unit
Cathode Voltage	V_{KA}	V_{REF}	36	V
Cathode Current Range	I_K	1.0	100	mA

Electrical Characteristics @ 25°C Unless Otherwise Specified

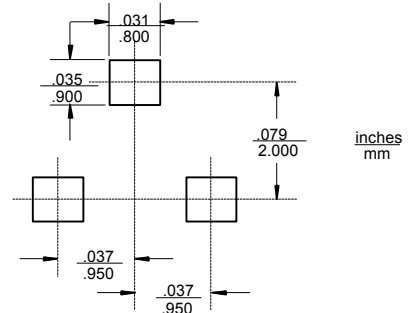
Parameter	Sym	Min	Typ	Max	Test conditions
Reference Input Voltage	V_{ref}	2.475V	2.500V	2.525V	
Deviation of reference input voltage	$V_{ref(dev)}$		3.0mV	17mV	$T_{min} \leq T_a \leq T_{max}$
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\frac{\Delta V_{ref}}{\Delta V_{KA}}$		-1.4	-2.7	$\Delta V_{KA}=10V \sim V_{ref}$
Reference Input Current	I_{ref}		1.8μA	4.0μA	$I_{KA}=10mA, R_1=10K\Omega, R_2=\infty$
Deviation of Reference Input Current Over Full Temperature Range	$\frac{\Delta I_{ref}}{\Delta T}$		0.4μA	1.2μA	$I_{KA}=10mA, R_1=10K\Omega, R_2=\infty, T_A=full\ Temperature$
Minimum Cathode Current for Regulation	$I_{KA(min)}$		0.5mA	1.0mA	
Off-State Cathode Current	$I_{KA(off)}$		0.26μA	1.0μA	$V_{KA}=36V, V_{REF}=0V$
Dynamic Impedance	Z_{KA}		0.22Ω	0.5Ω	$I_{KA}=10\ to\ 100mA, f \leq 1.0KHz$

SOT-23



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	.110	.120	2.80	3.04	
B	.083	.098	2.10	2.64	
C	.047	.055	1.20	1.40	
D	.035	.041	.89	1.03	
E	.070	.081	1.78	2.05	
F	.018	.024	.45	.60	
G	.0005	.0039	.013	.100	
H	.035	.044	.89	1.12	
J	.003	.007	.085	.180	
K	.015	.020	.37	.51	

Suggested Solder Pad Layout



TL431AU

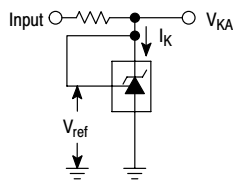


Figure 1. Test Circuit for $V_{KA} = V_{ref}$

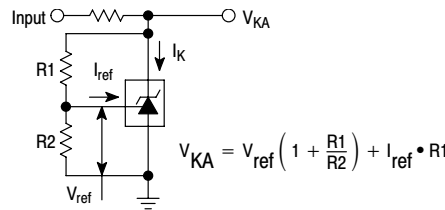


Figure 2. Test Circuit for $V_{KA} > V_{ref}$

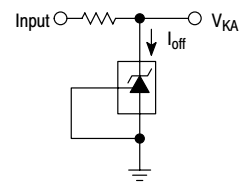


Figure 3. Test Circuit for I_{off}

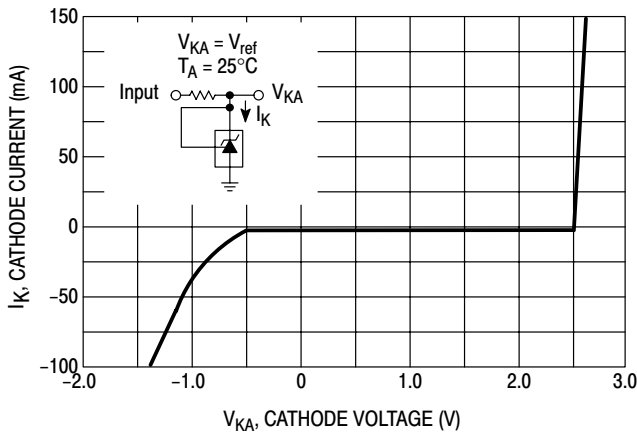


Figure 4. Cathode Current versus Cathode Voltage

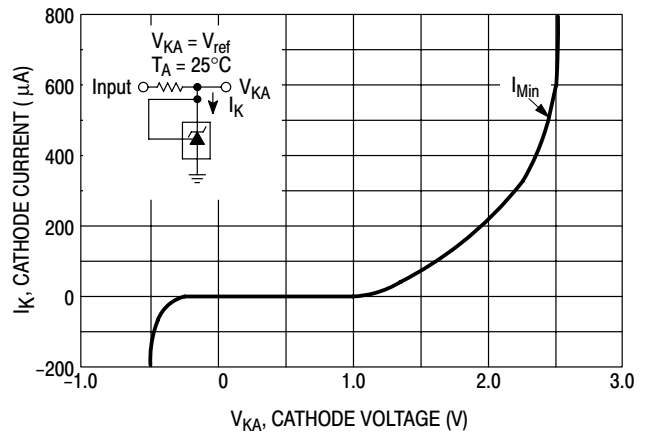


Figure 5. Cathode Current versus Cathode Voltage

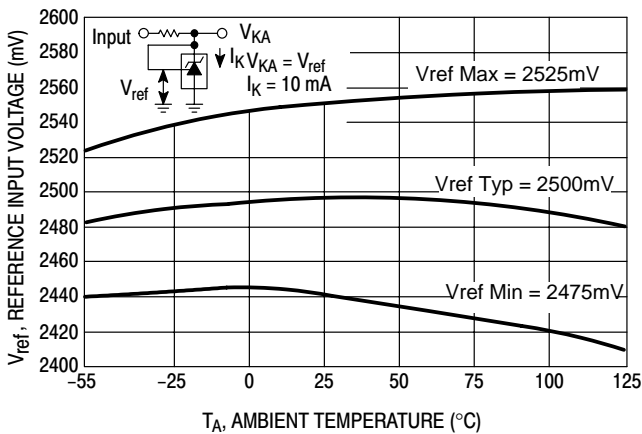


Figure 6. Reference Input Voltage versus Ambient Temperature

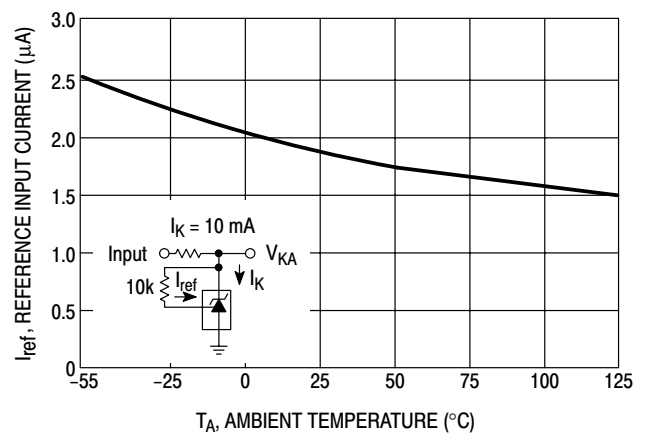


Figure 7. Reference Input Current versus Ambient Temperature

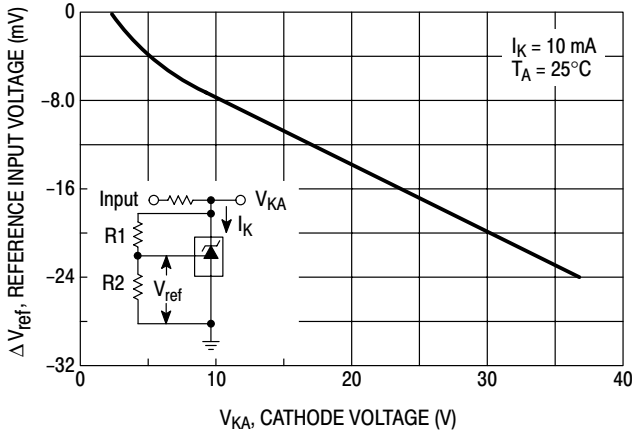


Figure 8. Change in Reference Input Voltage versus Cathode Voltage

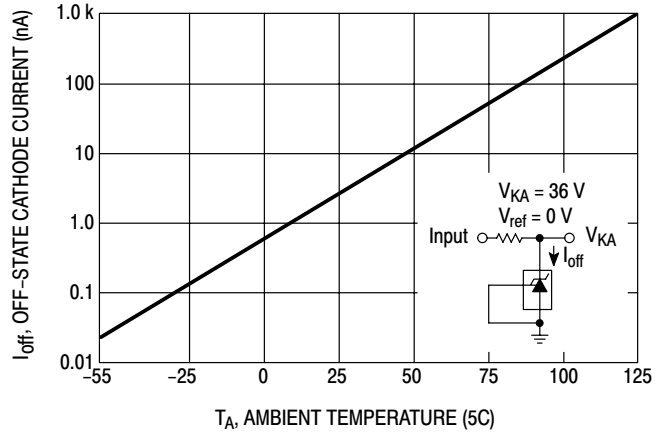


Figure 9. Off-State Cathode Current versus Ambient Temperature

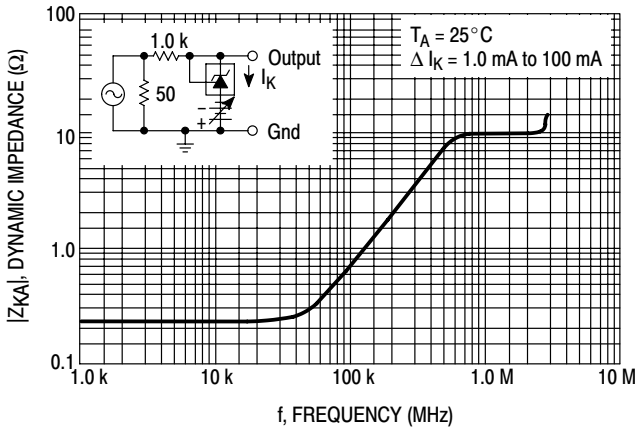


Figure 10. Dynamic Impedance versus Frequency

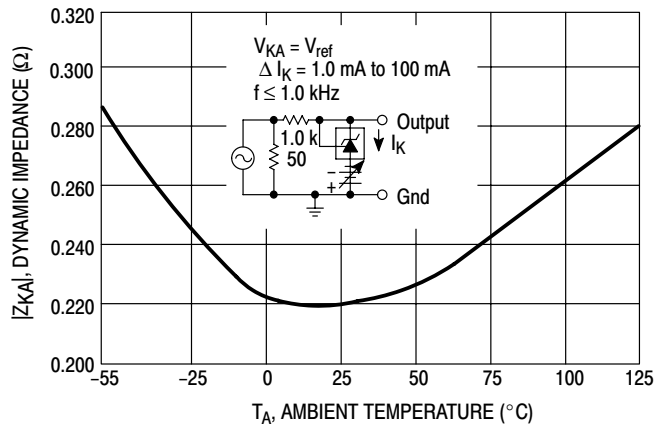


Figure 11. Dynamic Impedance versus Ambient Temperature

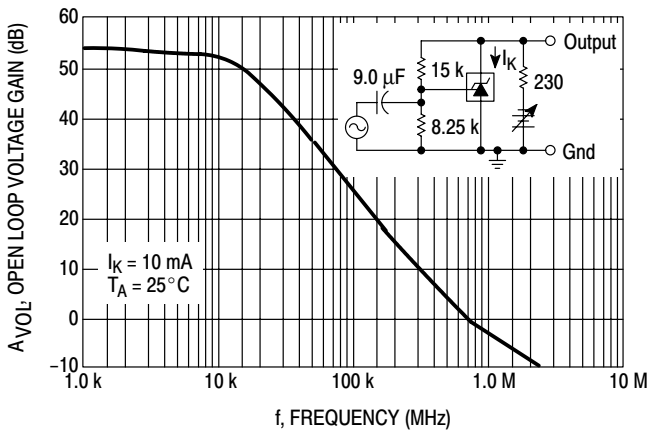


Figure 12. Open-Loop Voltage Gain versus Frequency

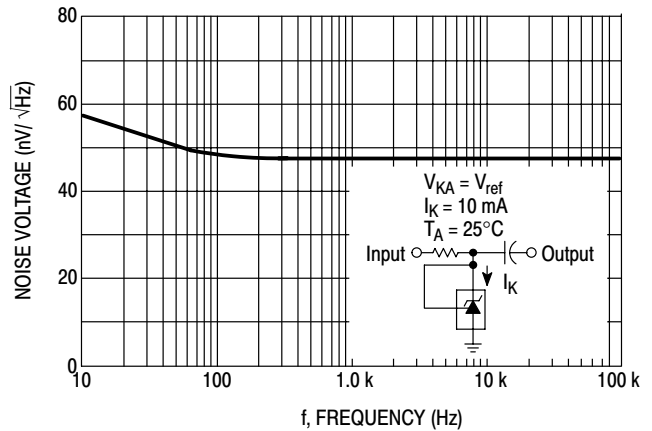


Figure 13. Spectral Noise Density