Micro Commercial Components
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TL431BU

Programmable Precision Regulator

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 0.5%
- Marking Code: 431

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℃	P_D	0.2	W
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	300	℃/W
Operating Temperature	T_{opr}	0---70	℃
Storage Temperature Range	T_{STG}	-55---+150	℃

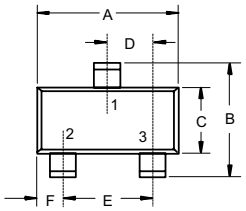
Recommended Operating Conditions

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

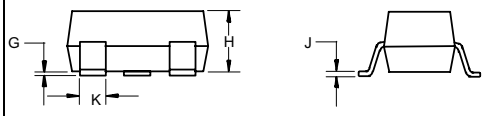
Electrical Characteristics @ 25°C Unless Otherwise Specified

Parameter	Sym	Min	Typ	Max	Test conditions
Reference Input Voltage	V_{ref}	2.487V	2.500V	2.512V	$V_{KA}=V_{REF}$, I_{KA}=10mA
Deviation of reference input voltage	$V_{ref(dev)}$		3.0mV	17mV	$V_{KA}=V_{REF}$, I_{KA}=10mA $T_{min} \leqq Ta \leqq T_{max}$
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\triangle V_{ref}/\triangle V_{KA}$		-1.4	-2.7	$\triangle V_{KA}$=10V～V_{ref}
			-1.0	-2.0	$\triangle V_{KA}$=36V～10V
Reference Input Current	I_{ref}		1.8μA	4.0μA	I_{KA}=10mA, R_1=10KΩ, R_2=∞
Deviation of Reference Input Current Over Full Temperature Range	$\triangle I_{ref}/\triangle T$		0.4μA	1.2μA	I_{KA}=10mA, R_1=10KΩ, R_2=∞ 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≦1.0KHz

SOT-23

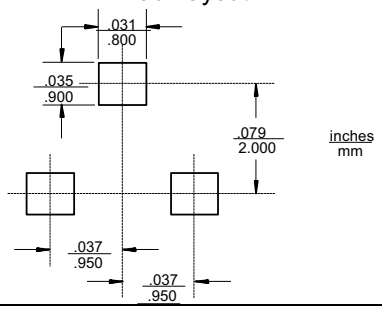


1. (A) ANODE
2. (R) REFERENCE
3. (K) CATHODE



DIMENSIONS					
	INCHES		MM		
DIM	MIN	MAX	MIN	MAX	NOTE
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



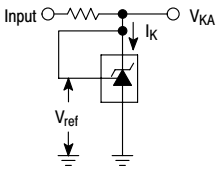


Figure 1. Test Circuit for $V_{KA} = V_{ref}$

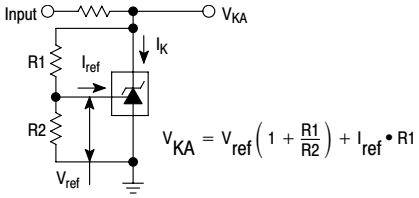


Figure 2. Test Circuit for $V_{KA} > V_{ref}$

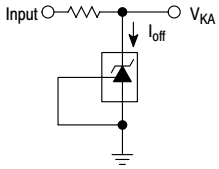


Figure 3. Test Circuit for I_{off}

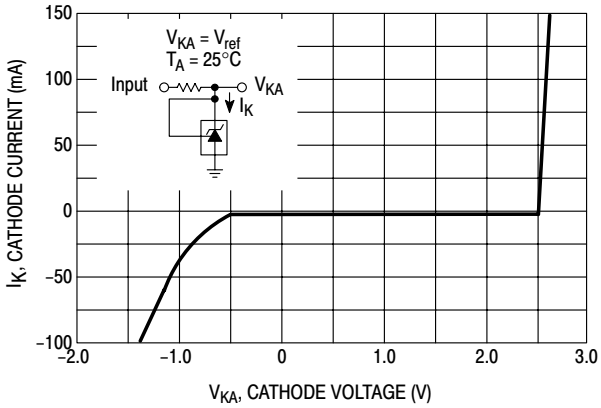


Figure 4. Cathode Current versus Cathode Voltage

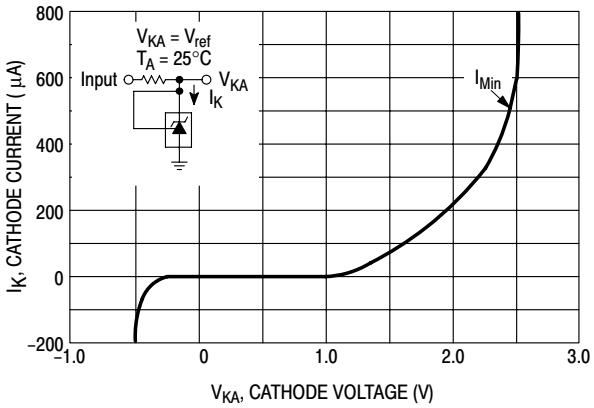


Figure 5. Cathode Current versus Cathode Voltage

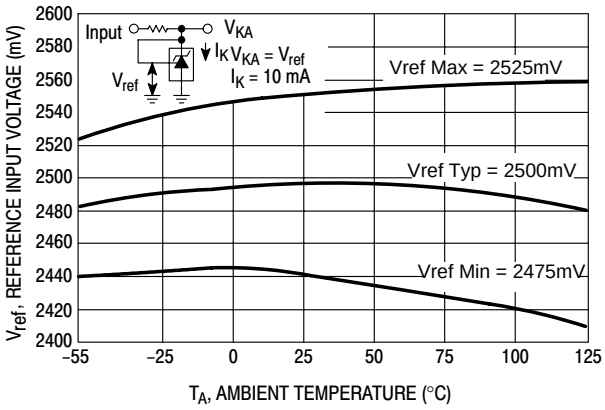


Figure 6. Reference Input Voltage versus Ambient Temperature

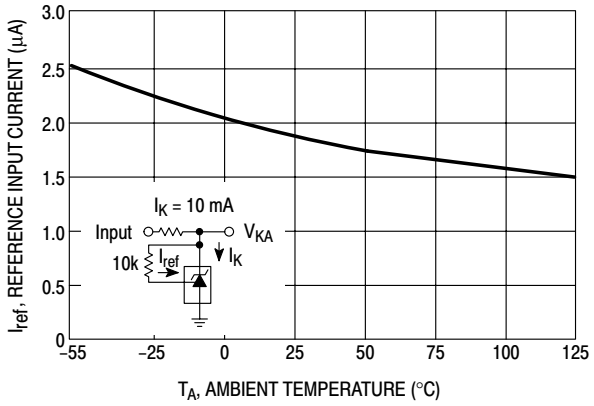


Figure 7. Reference Input Current versus Ambient Temperature

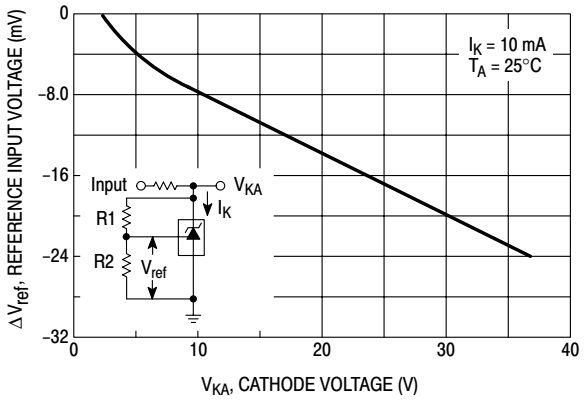


Figure 8. Change in Reference Input Voltage versus Cathode Voltage

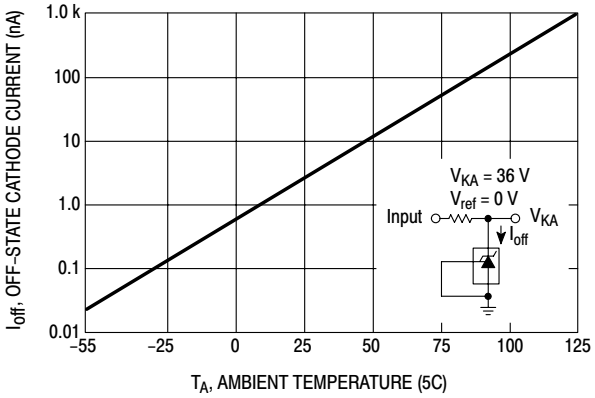


Figure 9. Off–State Cathode Current versus Ambient Temperature

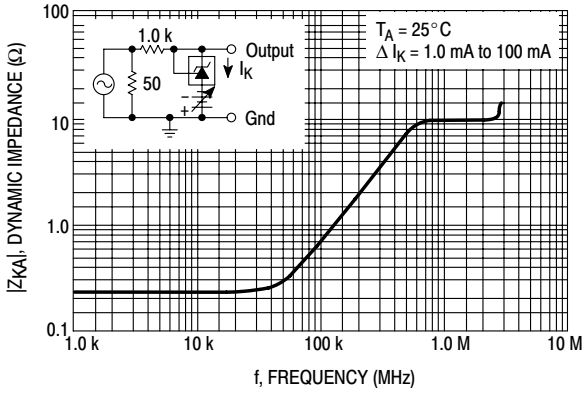


Figure 10. Dynamic Impedance versus Frequency

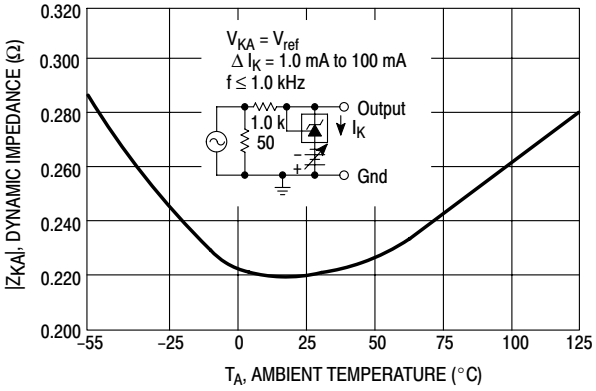


Figure 11. Dynamic Impedance versus Ambient Temperature

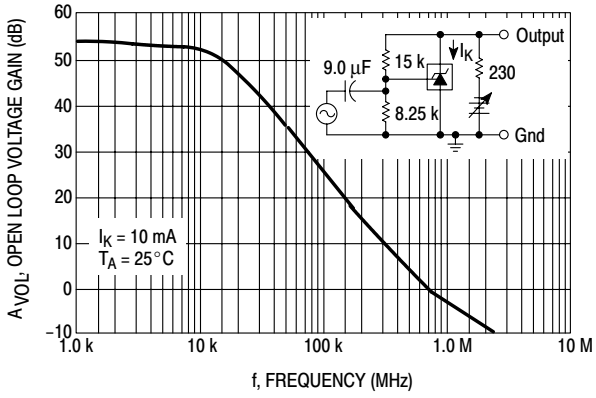


Figure 12. Open–Loop Voltage Gain versus Frequency

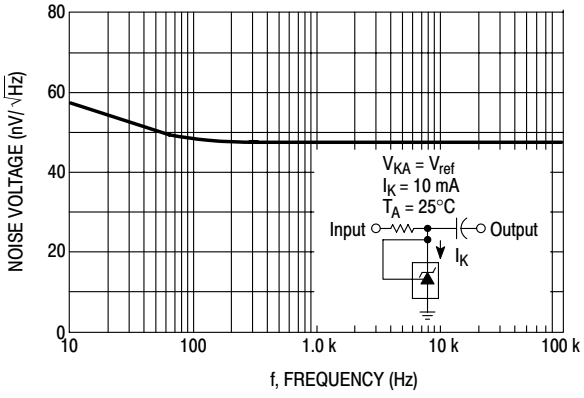


Figure 13. Spectral Noise Density