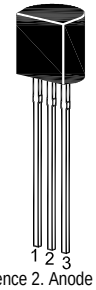
ST TL431/A

Programmable Precision Reference

Features:

- Programmable output Voltage to 36 V
- Low dynamic output impedance
- Sink current capability of 1 to 100 mA
- Low output noise voltage
- Fast turn on response



1. Reference 2. Anode 3. Cathode
TO-92 Plastic Package

Absolute Maximum Ratings (T_a = 25 °C, unless otherwise noted.)

Parameter	Symbol	Value	Unit
Cathode Voltage	V_{KA}	37	V
Cathode Current Range (Continuous)	I_{KA}	- 100 to + 150	mA
Reference Input Current Range	I_{REF}	- 0.05 to + 10	mA
Power Dissipation	P_D	770	mW
Operating Temperature Range	T_{opr}	- 25 to + 85	°C
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	- 65 to + 150	°C

Recmmended Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Cathode Voltage	V_{KA}	V_{REF}	36	V
Cathode Current	I_{KA}	1	100	mA

Characteristics at T_a = 25 °C

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reference Input Voltage at $V_{KA} = V_{REF}$, I_{KA} = 10 mA — TL431 TL431A	V_{REF}	2.44 2.48	2.495 2.495	2.55 2.51	V
Deviation of Reference Input Voltage Over Temperatue at $V_{KA} = V_{REF}$, I_{KA} = 10 mA, - 25°C ≤ T_a ≤ + 85 °C	$\Delta V_{REF}/\Delta T$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage at I_{KA} = 10 mA — ΔV_{KA} = 10 V to V_{REF} ΔV_{KA} = 36 V to 10 V	$\Delta V_{REF}/\Delta V_{KA}$	- -	-1.0 -0.5	-2.7 -2	mV/V
Reference Input Current at I_{KA} = 10 mA, R1 = 10 KΩ, R2 = ∞	I_{REF}	-	1.5	4	µA
Deviation of Reference Input Current Over Full Temperatue at I_{KA} = 10 mA, R1 = 10 KΩ, R2 = ∞, - 25°C ≤ T_a ≤ + 85 °C	$\Delta I_{REF}/\Delta T$	-	0.4	1.2	µA
Minimum Cathode Current for Regulation at $V_{KA} = V_{REF}$	$I_{KA(min)}$	-	0.45	1	mA
Off-Stage Cathode Current at V_{KA} = 36 V, V_{REF} = 0	$I_{KA(OFF)}$	-	0.05	1	µA
Dynamic Impedance at $V_{KA} = V_{REF}$, I_{KA} = 1 to 100 mA, f ≤ 1 KHz	Z_{KA}	-	0.15	0.5	Ω

Fig 1 Cathode Current Vs Cathode Voltage

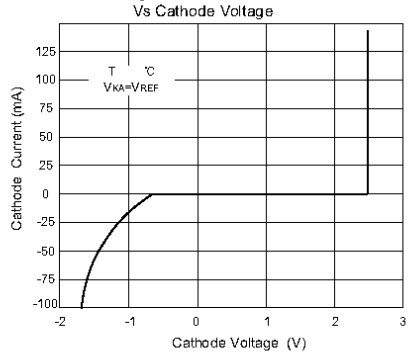


Fig 2 Cathode Current Vs Cahode Voltage

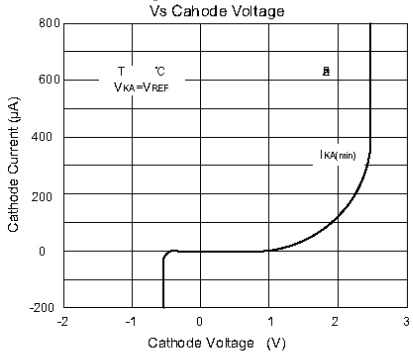


Fig 3 Change in Reference Input Voltage Vs Cathode voltage

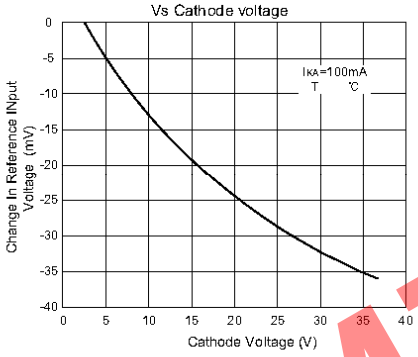


Fig 4 Pulse Response

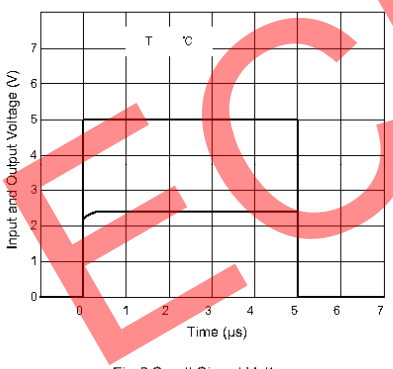


Fig 5 Dynamic Impedance Vs Frequency

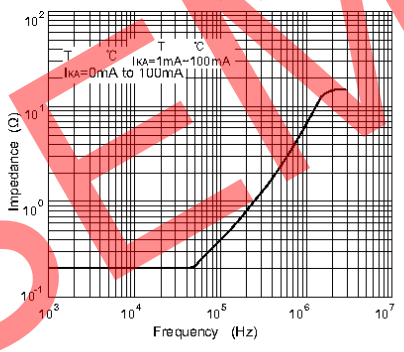


Fig 6 Small Signal Voltage Amplification Vs Frequency