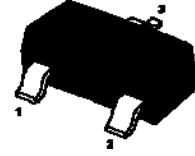


Programmable Precision Reference

TL431

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. Cathode 3. Anode
SOT-23 Plastic Package

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$, 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	350	mW
Operating Temperature Range	T_{opr}	- 25 to + 85	$^\circ\text{C}$
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	- 65 to + 150	$^\circ\text{C}$

Recommended Operating Conditions

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

Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reference Input Voltage at $V_{KA} = V_{REF}$, $I_{KA} = 10\text{ mA}$	V_{REF}	2.487	2.50	2.513	V
Reference Input Voltage at $V_{KA} = V_{REF}$, $I_{KA} = 10\text{ mA}$	V_{REF}	2.475	2.50	2.525	V
Reference Input Voltage at $V_{KA} = V_{REF}$, $I_{KA} = 10\text{ mA}$	V_{REF}	2.44	2.495	2.55	V
Deviation of Reference Input Voltage Over Temperature at $V_{KA} = V_{REF}$, $I_{KA} = 10\text{ mA}$, $-25^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	$\frac{\Delta V_{REF}}{\Delta T}$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage at $I_{KA} = 10\text{ mA}$	$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	-	-1.0	-2.7	mV/V
Reference Input Current at $I_{KA} = 10\text{ mA}$, $R_1 = 10\text{ K}\Omega$, $R_2 = \infty$	I_{REF}	-	1.5	4	μA
Deviation of Reference Input Current Over Full Temperature at $I_{KA} = 10\text{ mA}$, $R_1 = 10\text{ K}\Omega$, $R_2 = \infty$, $-25^\circ\text{C} \leq T_a \leq +85^\circ\text{C}$	$\frac{\Delta I_{REF}}{\Delta T}$	-	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 $V_{KA} = 36\text{ V}$, $V_{REF} = 0$	$I_{KA(OFF)}$	-	0.05	1	μA
Dynamic Impedance at $V_{KA} = V_{REF}$, $I_{KA} = 1\text{ to }100\text{ mA}$, $f \leq 1\text{ KHz}$	Z_{KA}	-	0.15	0.5	Ω

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Fig 1 Cathode Current Vs Cathode Voltage

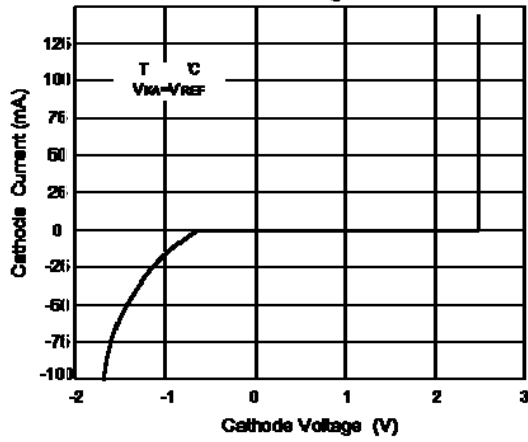


Fig 2 Cathode Current Vs Cathode Voltage

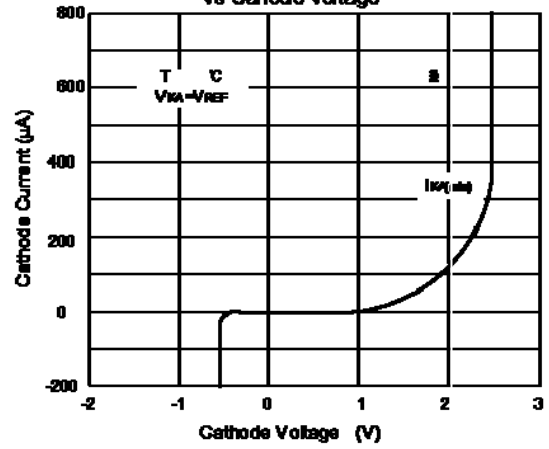


Fig 3 Change in Reference Input Voltage Vs Cathode voltage

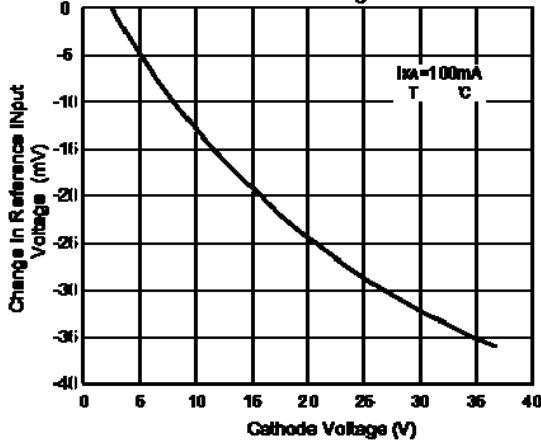


Fig 4 Pulse Response

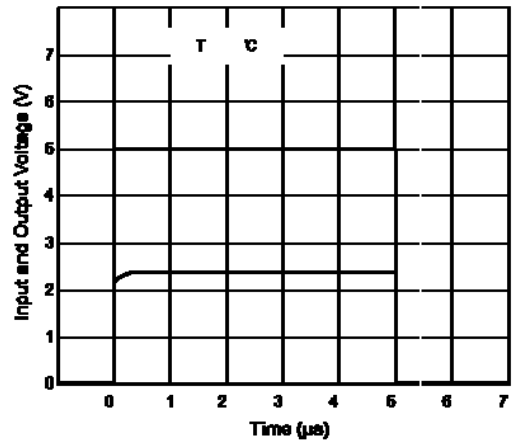


Fig 5 Dynamic Impedance Vs Frequency

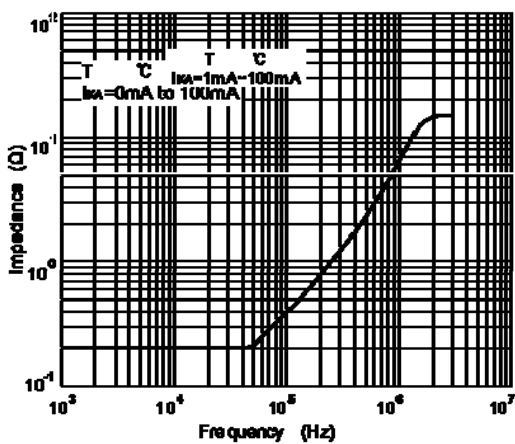
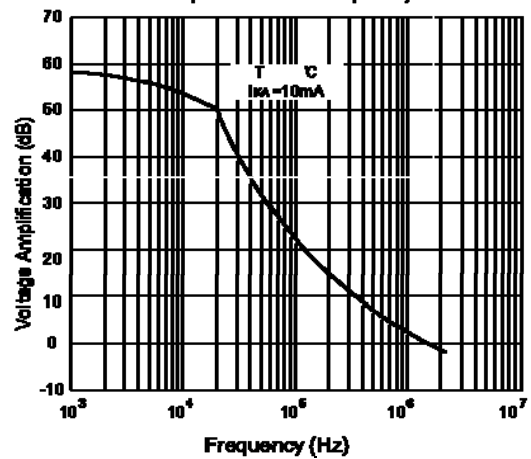


Fig 6 Small Signal Voltage Amplification Vs Frequency



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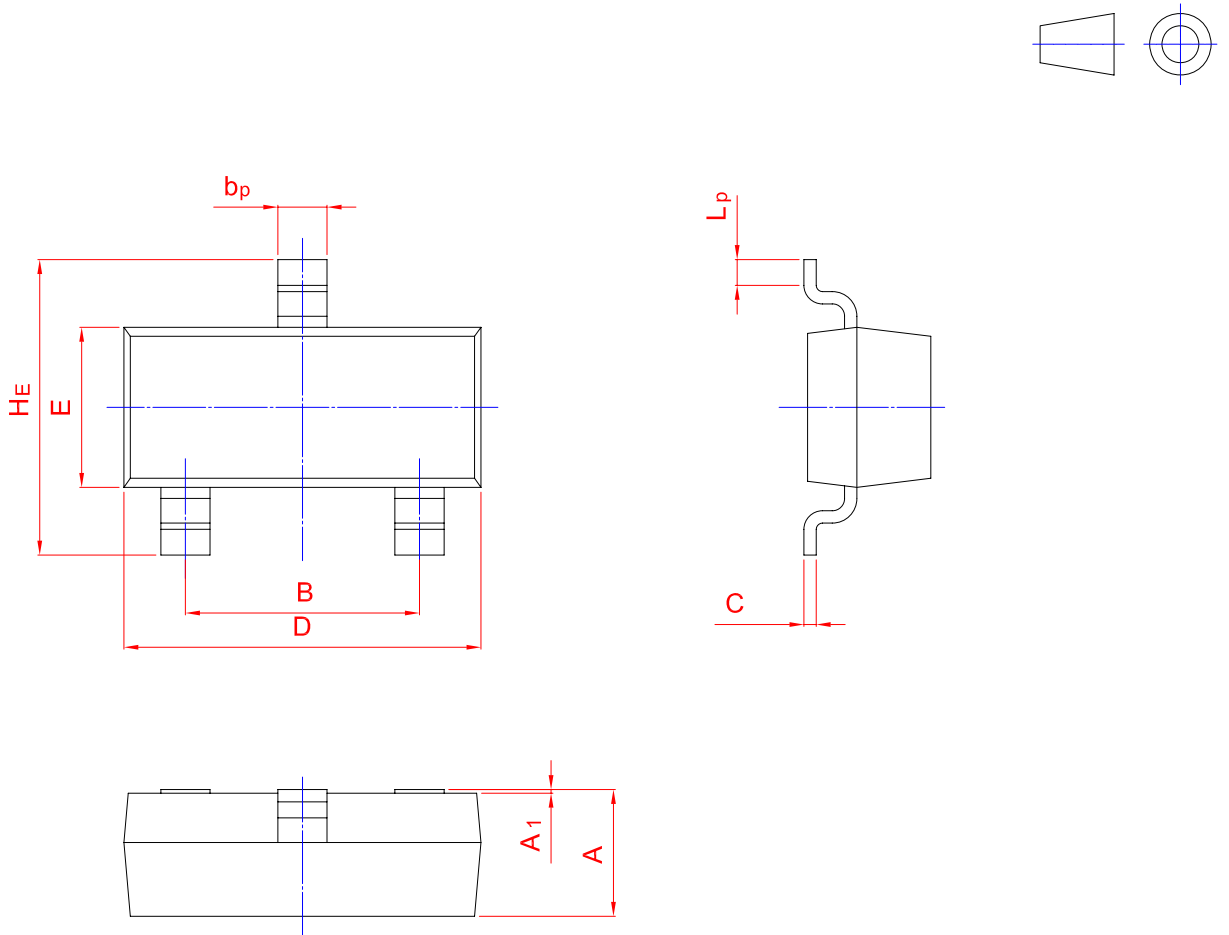
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PACKAGE OUTLINE

Plastic surface mounted package; 3 leads

SOT-23



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40	2.04	0.50	0.19	3.10	1.65	3.00	0.100	0.50
	0.95	1.78	0.35	0.08	2.70	1.20	2.20	0.013	0.20

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