



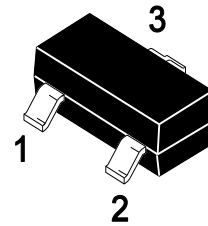
TL431/TL431A

Programmable Precision Reference

Features

- Programmable output voltage to 36V.
- Low dynamic output impedance.
- Sink current capability of 1.0 to 100mA.
- Low output noise voltage
- Fast turn on response

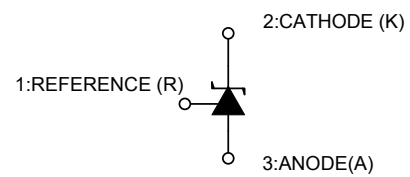
SOT-23



Marking: TL431: 431
TL431A: 431A

Application

- It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.



Absolute Maximum Ratings (Ta=25°C unless otherwise specified)

Symbol	Parameter	Rating	Units
V _{KA}	Cathode Voltage	37	V
I _{KA}	Cathode Current Range(Continuous)	-100 ~ +150	mA
I _{REF}	Reference Input Current Range	-0.05 ~ +10	mA
P _D	Power Dissipation	350	mW
T _J	Operating Junction	+150	°C
T _{OPR}	Operating Ambient	-25 ~ +85	°C
T _{STG}	Storage Temperature	-65 ~ +150	°C

Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Units
V _{KA}	Cathode Voltage	V _{REF}	-	36	V
I _{KA}	Cathode Current	1	-	100	mA

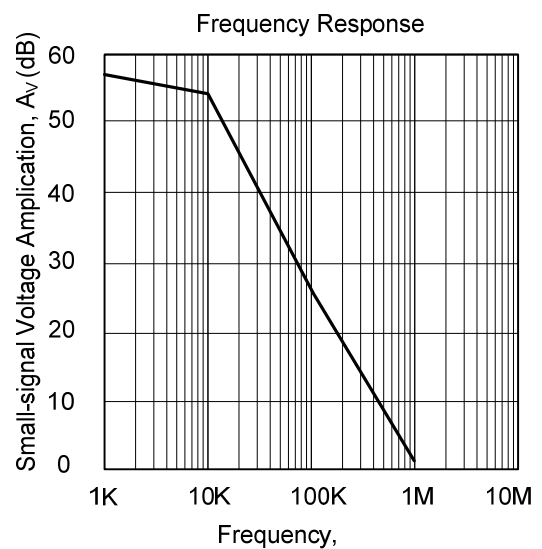
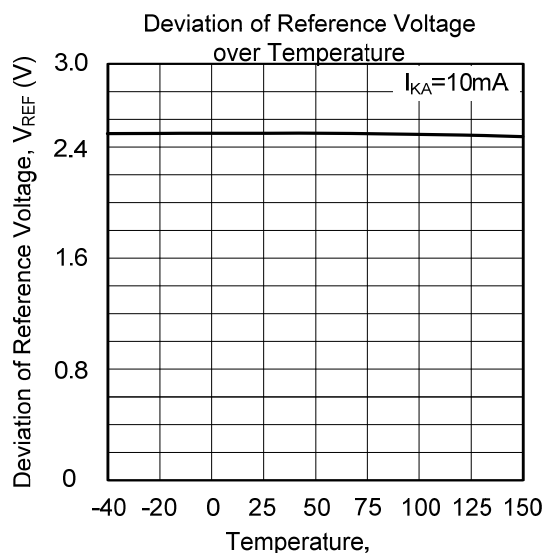
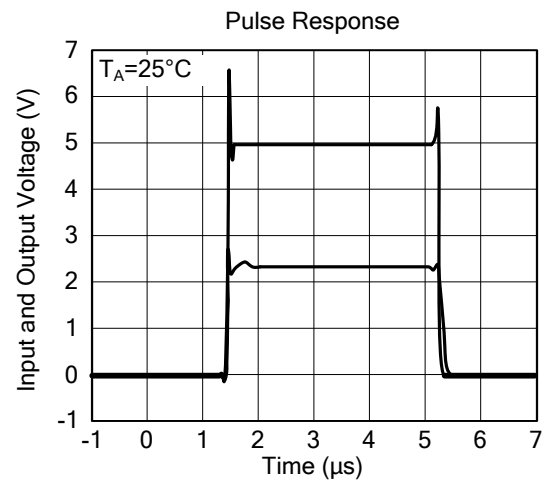
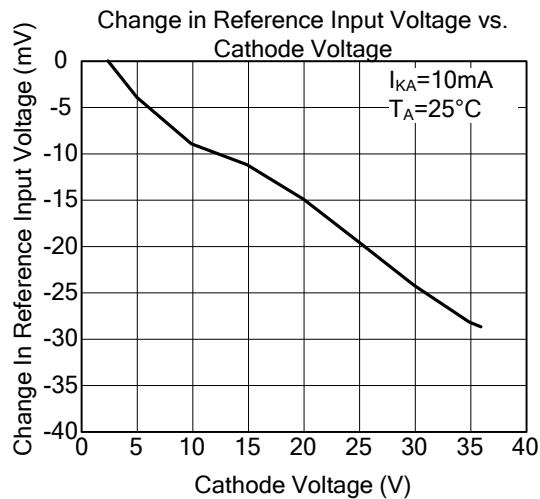
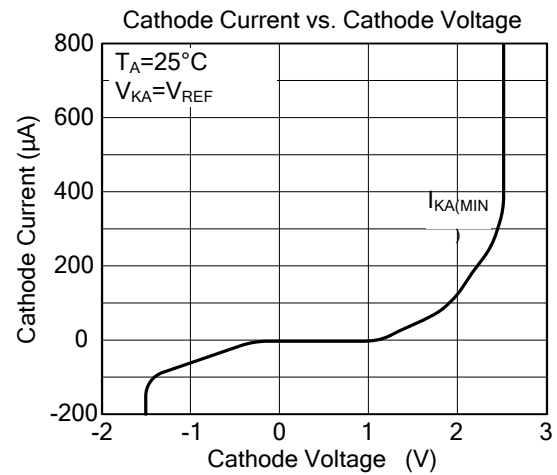
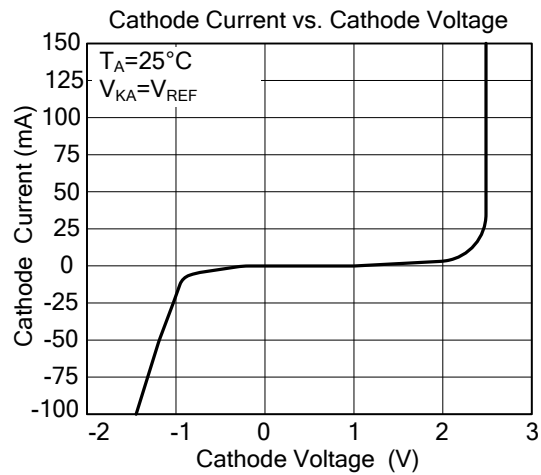


Electrical Characteristics (Ta=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_{REF}	Reference Input Voltage	$V_{KA}=V_{REF}, I_{KA}=10mA$	TL431	2.44	2.495	2.55	V
			TL431A	2.48	2.495	2.51	V
ΔV_{REF}	Deviation of Reference Input Voltage Over Temperature	$V_{KA}=V_{REF}, I_{KA}=10mA,$ $-25^{\circ}C \leq T_A \leq +85^{\circ}C$			4.5	17	mV
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$I_{KA}=10mA$	$\Delta V_{KA}=10V \sim V_{REF}$		-1.0	-2.7	mV/V
			$\Delta V_{KA}=36V \sim 10V$		-0.5	-2.0	mV/V
I_{REF}	Reference Input Current	$I_{KA}=10mA, R1=10k\Omega, R2=\infty$			1.5	4	μA
ΔI_{REF}	Deviation of Reference Input Current Over Full Temperature Range	$I_{KA}=10mA, R1=10k\Omega, R2=\infty,$ $-25^{\circ}C \leq T_A \leq +85^{\circ}C$			0.4	1.2	μA
$I_{KA(MIN)}$	Minimum Cathode Current for Regulation	$V_{KA}=V_{REF}$			0.45	1	mA
$I_{KA(OFF)}$	Off-State Cathode Current	$V_{KA}=36V, V_{REF}=0$			0.05	1.0	μA
Z_{KA}	Dynamic Impedance	$V_{KA}=V_{REF}, I_{KA}=1 \sim 100mA, f \leq 1.0kHz$			0.15	0.5	Ω



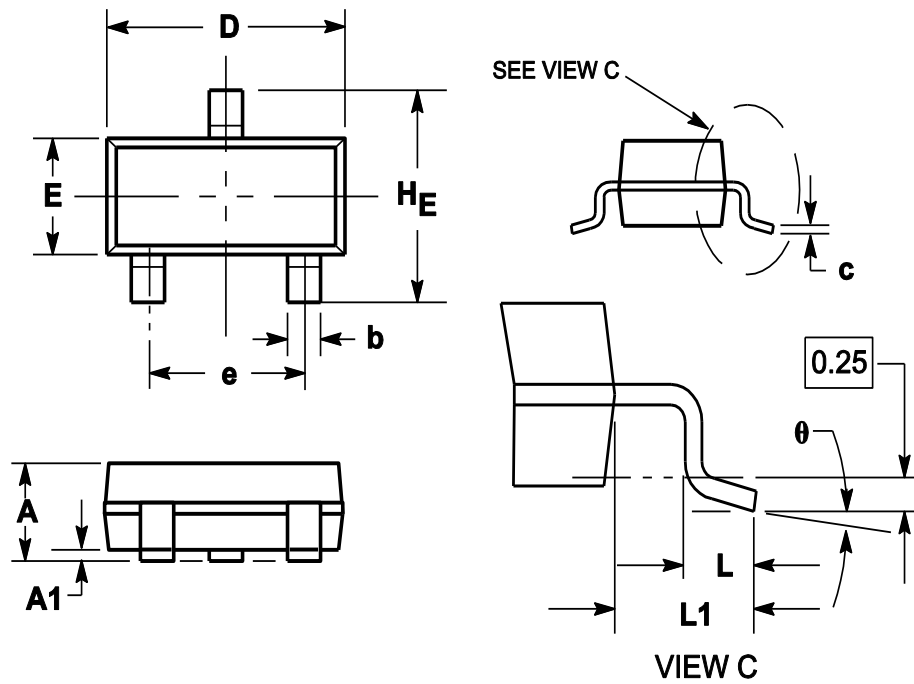
Typical Characteristic Curves



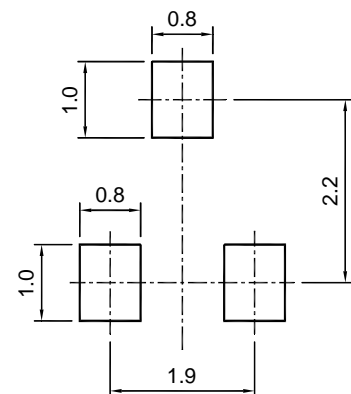


Package Outline

SOT-23



Symbol	Dimensions in millimeter		
	Min.	Typ.	Max.
A	0.900	1.025	1.150
A1	0.000	0.050	0.100
b	0.300	0.400	0.500
c	0.080	0.115	0.150
D	2.800	2.900	3.000
E	1.200	1.300	1.400
HE	2.250	2.400	2.550
e	1.800	1.900	2.000
L1	0.550REF		
L	0.300		0.500
θ	0°		8°



SOT-23 (TO-236)

Recommended soldering pad

Ordering Information

Device	Package	Shipping
TL431/TL431A	SOT-23	3000PCS/Reel&Tape