



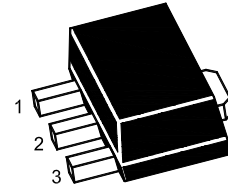
# TL431SQ/TL431ASQ

## 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-89



1: Reference  
2: Anode  
3: Cathode

**Marking:** TL431SQ: TL431  
TL431ASQ: TL431A

### 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 <sub>KA</sub>	Cathode Voltage	37	V
I <sub>KA</sub>	Cathode Current Range(Continuous)	-100 ~ +150	mA
I <sub>REF</sub>	Reference Input Current Range	-0.05 ~ +10	mA
P <sub>D</sub>	Power Dissipation	770	mW
T <sub>J</sub>	Operating Junction	+150	°C
T <sub>OPR</sub>	Operating Ambient	-40 ~ +85	°C
T <sub>STG</sub>	Storage Temperature	-65 ~ +150	°C

### Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Units
V <sub>KA</sub>	Cathode Voltage	V <sub>REF</sub>	-	36	V
I <sub>KA</sub>	Cathode Current	1	-	100	mA



# TL431SQ/TL431ASQ

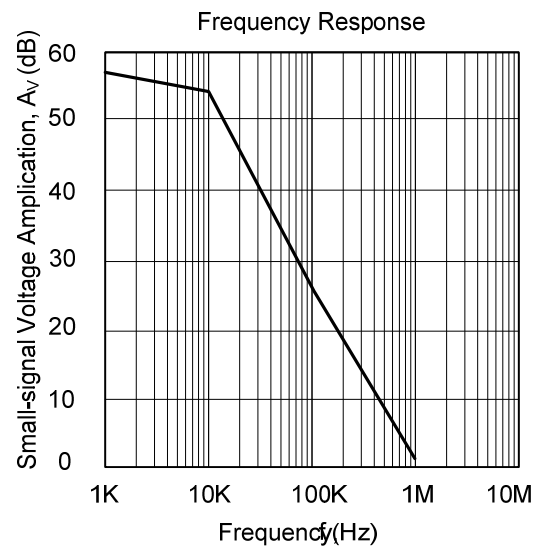
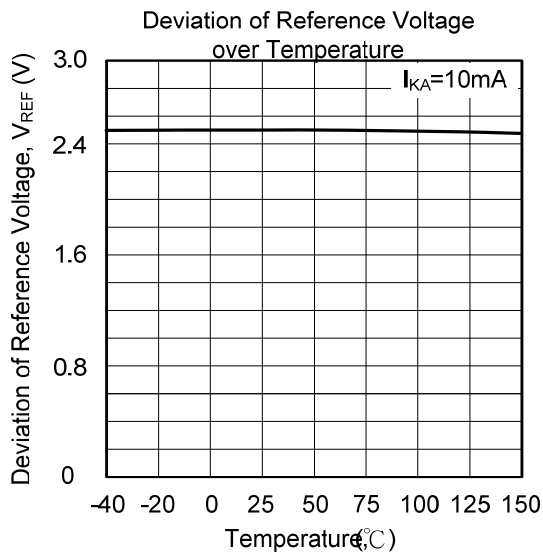
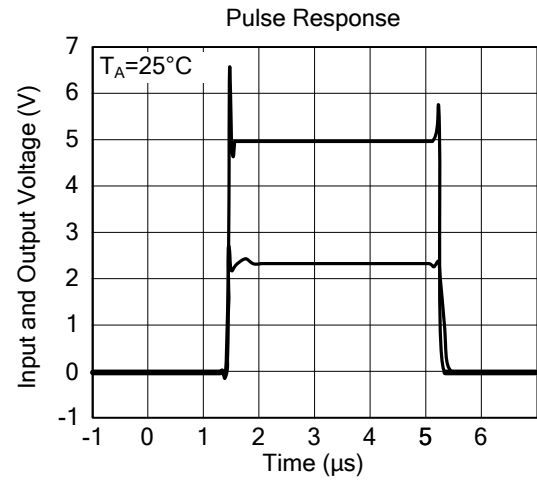
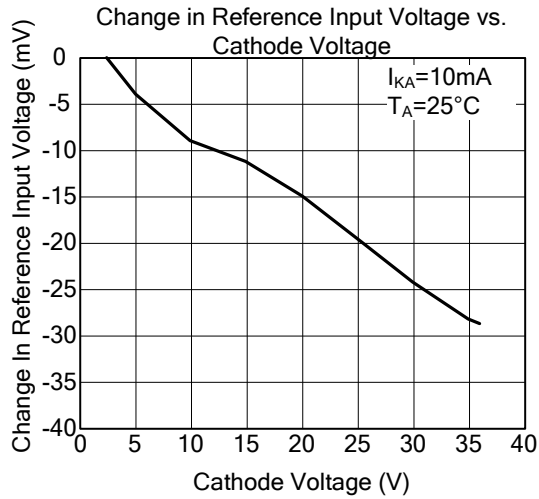
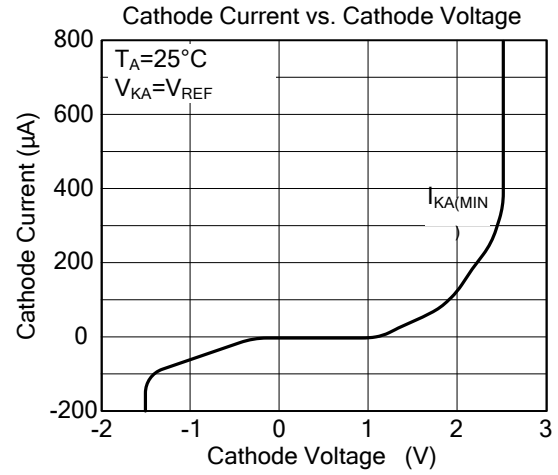
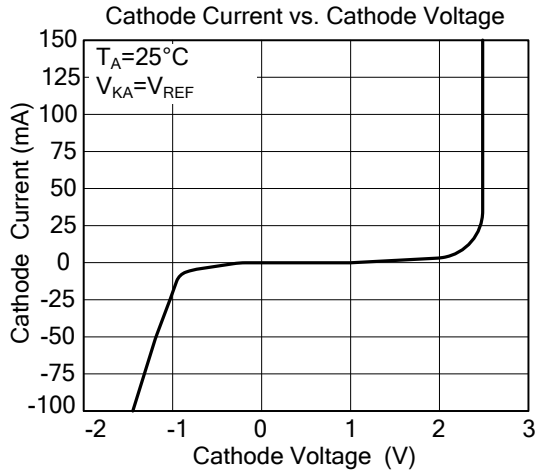
## Programmable Precision Reference

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

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$V_{REF}$	Reference Input Voltage	$V_{KA}=V_{REF}, I_{KA}=10mA$	TL431SQ	2.44	2.495	2.55	V
			TL431ASQ	2.48	2.495	2.51	V
$\Delta V_{REF}$	Deviation of Reference Input Voltage Over Temperature	$V_{KA}=V_{REF}, I_{KA}=10mA,$ $-40^{\circ}C \leq T_A \leq +85^{\circ}C$			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	$\mu A$
$\Delta I_{REF}$	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	$\mu A$
$I_{KA(MIN)}$	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	$\mu A$
$Z_{KA}$	Dynamic Impedance	$V_{KA}=V_{REF}, I_{KA}=1 \sim 100mA, f \leq 1.0kHz$			0.15	0.5	$\Omega$



### Typical Characteristic Curves

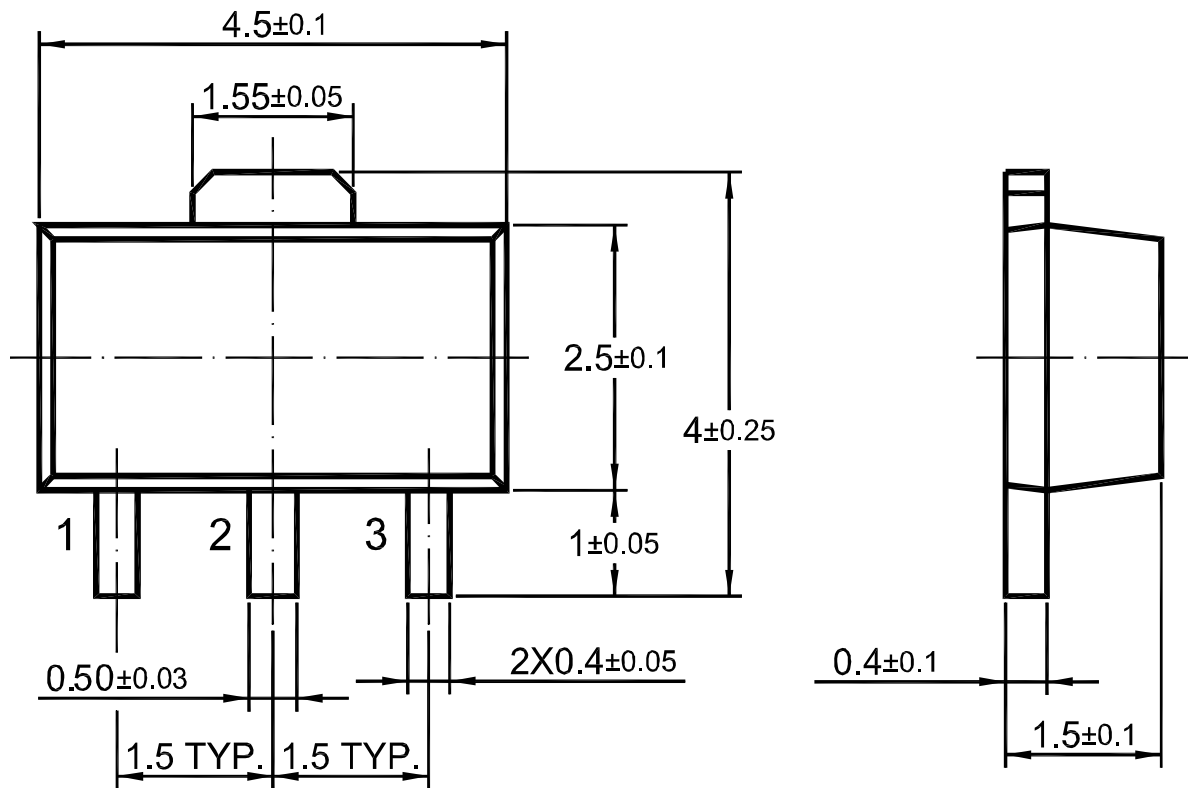




**Package Outline**

**SOT-89**

Dimensions in mm



**Ordering Information**

Device	Package	Shipping
TL431SQ/TL431ASQ	SOT-89	1000PCS/Reel&Tape