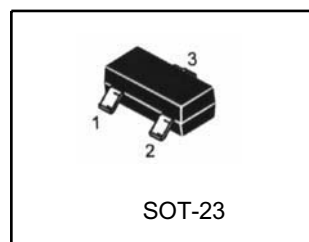


# LR431APHLT1G LINEAR INTEGRATED CIRCUIT

## PROGRAMMABLE PRECISION REFERENCE

### DESCRIPTION

The LRC LR431APHLT1G is a three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between  $V_{ref}$  (approximately 2.5V) and 36V with two external resistors. It provides very wide applications, including shunt regulator, series regulator, switching regulator, voltage reference and others.



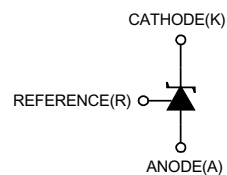
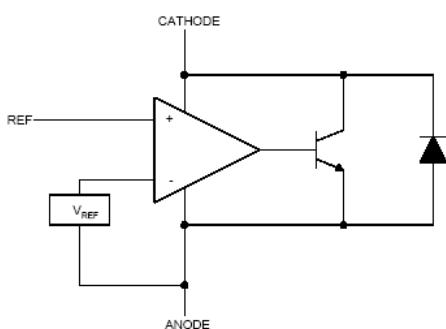
Pin 1: Ref; 2: Cathode; 3: Anode

### FEATURES

- Programmable output Voltage to 36V.
- Low dynamic output impedance 0.2  $\Omega$ .
- Sink current capability of 1 to 100mA.
- Equivalent full-range temperature coefficient of 50ppm /  $^{\circ}C$  typical for operation over full rated operating temperature range.

Pb-Free package is available

### BLOCK DIAGRAM



# LR431APHLT1G LINEAR INTEGRATED CIRCUIT

ABSOLUTE MAXIMUM RATINGS (Operating temperature range applies unless otherwise specified)

PARAMETER	SYMBOL	VALUE	UNIT
Cathode Voltage	V <sub>KA</sub>	37	V
Cathode Current Range(Continuous)	I <sub>KA</sub>	-100 ~ +150	mA
Reference Input Current Range	I <sub>ref</sub>	-0.05 ~ +10	mA
Operating Junction Temperature	T <sub>j</sub>	150	°C
Operating Ambient Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature Range	T <sub>stg</sub>	-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Cathode Voltage	V <sub>KA</sub>	V <sub>REF</sub>		36	V
Cathode Current	I <sub>KA</sub>	0.15		100	mA

ELECTRICAL CHARACTERISTICS (T<sub>a</sub>=25°C, unless otherwise specified)

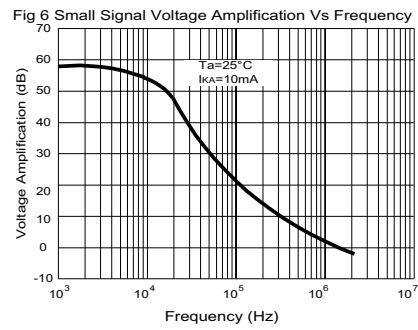
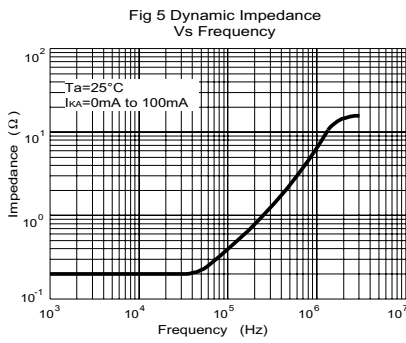
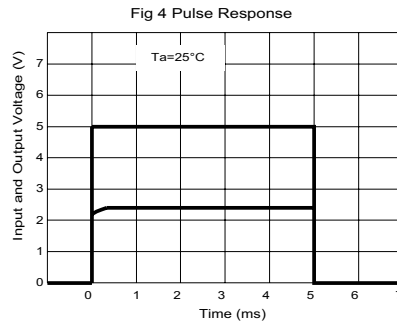
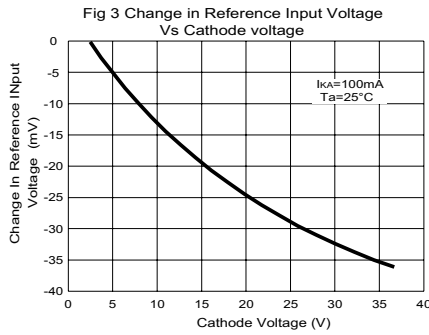
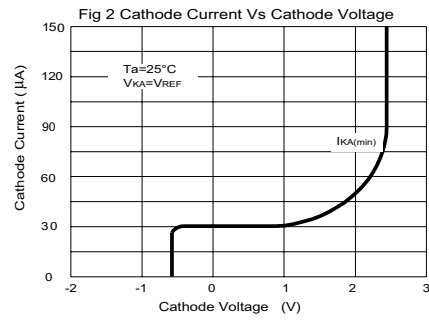
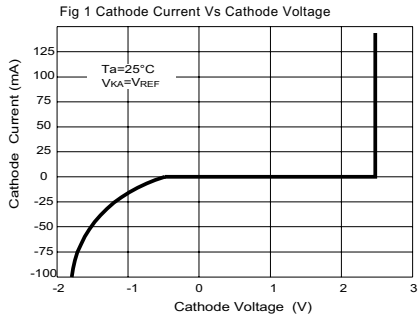
PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Reference Input Voltage *	V <sub>ref</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA	±0.5%	2.483	2.495	2.507	V
Deviation of reference Input Voltage Over Ambient Temperature Range	ΔV <sub>ref</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =10mA 0°C T <sub>a</sub> 70°C		4.5	17		mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	ΔV <sub>ref</sub> / ΔV <sub>KA</sub>	I <sub>KA</sub> =10mA ΔV <sub>KA</sub> =10V~V <sub>REF</sub> ΔV <sub>KA</sub> =36V~10V		-1.0 -0.5	-2.7 -2.0		mV/V
Reference Input Current	I <sub>ref</sub>	I <sub>KA</sub> =10mA, R1=10kΩ, R2=∞		1.5	4		μA
Deviation of Reference Input Current Over Ambient Temperature Range	ΔI <sub>ref</sub>	I <sub>KA</sub> =10mA, R1=10kΩ, R2=∞		0.4	1.2		μA
Minimum Cathode Current for Regulation	I <sub>KA</sub> (min)	V <sub>KA</sub> =V <sub>REF</sub>			0.15		mA
Off-State Cathode Current	I <sub>KA</sub> (OFF)	V <sub>KA</sub> =36V, V <sub>REF</sub> =0		0.05	1.0		μA
Dynamic Impedance	Z <sub>KA</sub>	V <sub>KA</sub> =V <sub>REF</sub> , I <sub>KA</sub> =1 to 100mA f≤1.0kHz		0.15	0.5		Ω

ORDERING INFORMATION

Device	Package	Marking	Shipping
LR431APHLT1G	SOT-23	RAH	3000/Tape & Reel

# LR431APHLT1G LINEAR INTEGRATED CIRCUIT

## TYPICAL PERFORMANCE CHARACTERISTICS



# LR431APHLT1G LINEAR INTEGRATED CIRCUIT

## TEST CIRCUIT

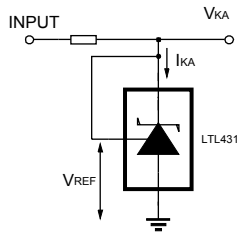


Fig 7 Test Circuit For  $V_{KA}=V_{REF}$

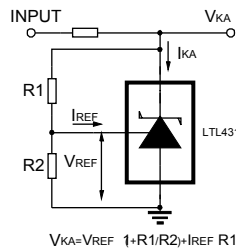


Fig 8 Test Circuit for  $V_{KA} \geq V_{REF}$

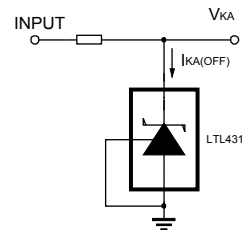


Fig 9 Test Circuit For  $I_{KA(OFF)}$

## APPLICATION CIRCUIT

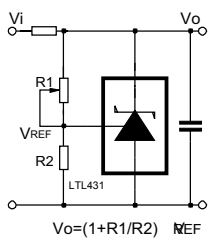


Fig 10 Shutdown Regulator

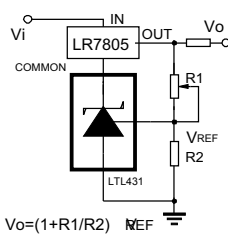


Fig 11 Output Control of a Three-Terminal Fixed Regulator

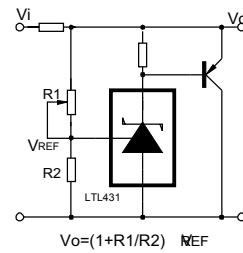


Fig 12 Higher-current Shunt Regulator

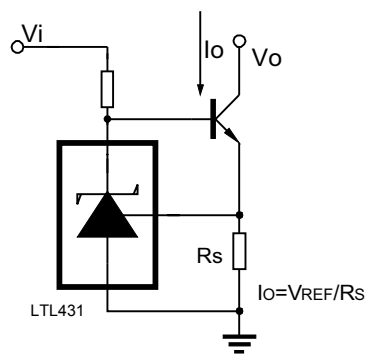


Fig 13 Constant-current Sink

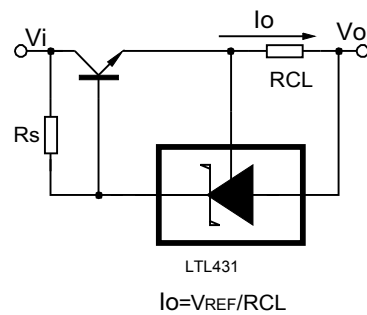
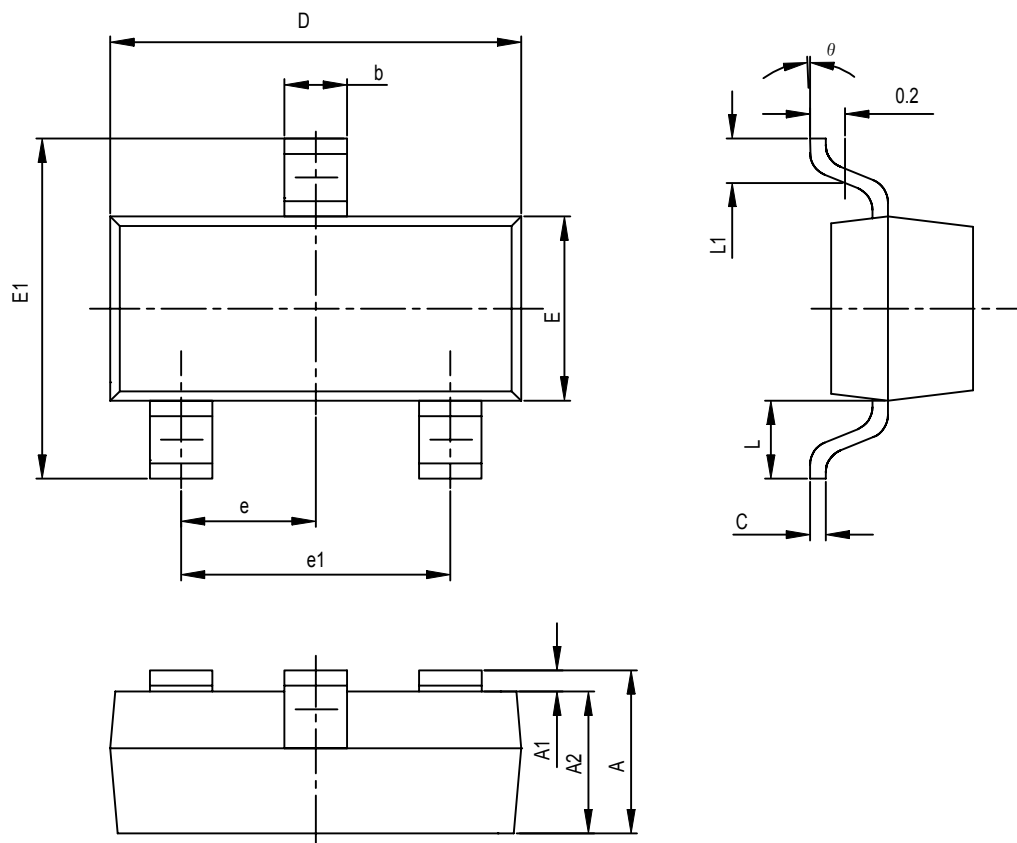


Fig 14 Current Limiting or Current Source

**SOT-23 PACKAGE OUTLINE DIMENSIONS**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.100	0.110	0.118
E	1.200	1.610	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950TPY		0.037TPY	
e1	1.800	2.000	0.071	0.079
L	0.550REF		0.022REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°