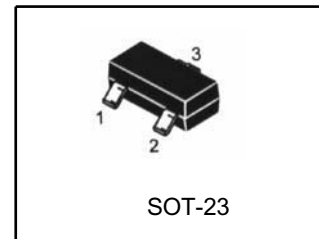


Programmable Precision Reference

LR431AKLT1G

DESCRIPTION

The LR431 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.

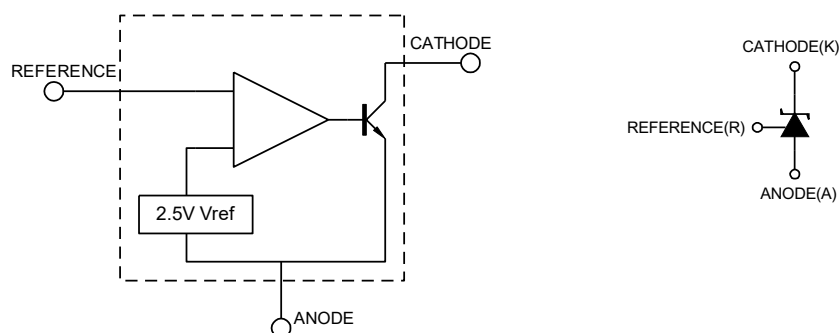


SOT-23 1: Ref; 2: Cathode; 3: Anode

FEATURES

- Low Dynamic output impedance 0.1 Ω (Typ)
- Adjustable output voltage
- Fast turn-on response
- Sink current capability of 0.1mA to 100mA
- Low output noise
- Industrial temperature range
- Excellent temperature coefficient 25ppm/ $^{\circ}$ C
- Electrostatic discharge voltage 2.5kV

BLOCK DIAGRAM



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

PARAMETER	SYMBOL	VALUE	UNIT
Cathode Voltage	V _{KA}	40	V
Cathode Current Range(Continuous)	I _{KA}	-100 ~ +150	mA
Reference Input Current Range	I _{ref}	-0.05 ~ +10	mA
Operating Junction Temperature	T _j	150	°C
Thermal Resistance	θ _{JA}	206	°C/W
Operating Ambient Temperature	T _{opr}	-40 ~ +125	°C
Storage Temperature	T _{stg}	-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Cathode Voltage	V _{KA}	V _{REF}		36	V
Cathode Current	I _{KA}	0.3		100	mA

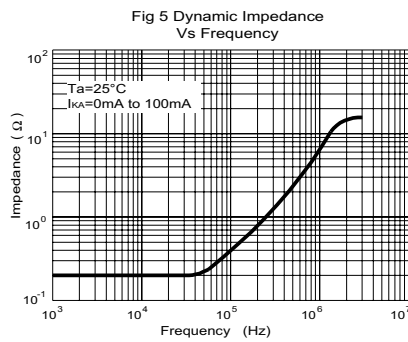
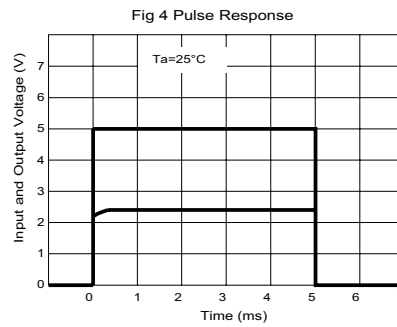
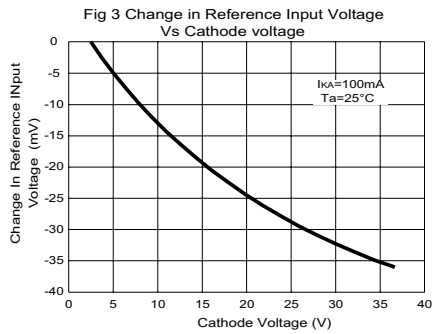
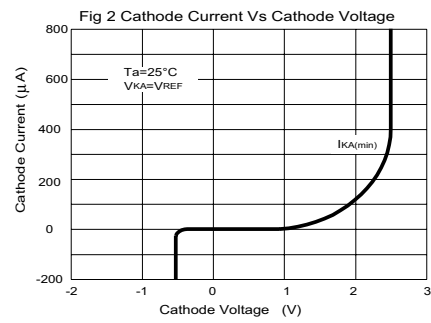
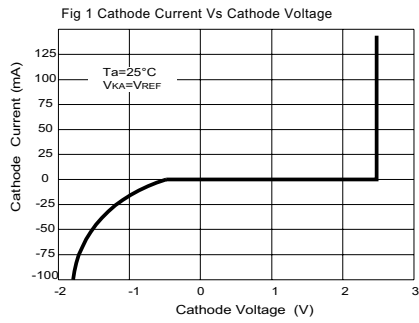
ELECTRICAL CHARACTERISTICS(T_a=25°C,unless otherwise specified)

Characteristic		Symbol	Test Conditions	Min	Typ	Max	Unit
Reference Input Voltage 1	0.5%	V _{ref}	V _{KA} =V _{REF} ,I _{KA} =10mA	2.488	2.50	2.512	V
	1%			2.475	2.50	2.525	
	2%			2.450	2.50	2.550	
Reference Input Voltage 2	0.5%	V _{ref}	V _{KA} =V _{REF} ,I _{KA} =10mA	2.483	2.495	2.507	V
	1%			2.470	2.495	2.520	
	2%			2.445	2.495	2.545	
Deviation of reference Input Voltage Over temperature		ΔV _{ref}	V _{KA} =V _{REF} ,I _{KA} =10mA T _{MIN} ≤T _A ≤T _{MAX}		8	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage		ΔV _{ref} /ΔV _{KA}	I _{KA} =10mA	ΔV _{KA} =10V~V _{REF}	-2.7	-1.0	mV/V
				ΔV _{KA} =36V~10V	-2	-0.4	
Reference Input Current		I _{ref}	I _{KA} =10mA,R ₁ =10kΩ,R ₂ =∞		0.5	1.2	μA
Deviation of Reference Input Current Over Full Temperature Range		ΔI _{ref} /ΔT	I _{KA} =10mA,R ₁ =10kΩ,R ₂ =∞, T _A =full Temperature		0.4	1.2	μA
Minimum cathode current for regulation		I _{KA} (min)	V _{KA} =V _{REF}		0.08	0.3	mA
Off-state cathode Current		I _{KA} (OFF)	V _{KA} =36V,V _{REF} =0		0.01	0.8	μA
Dynamic Impedance		Z _{KA}	V _{KA} =V _{REF} ,I _{KA} =0.2 to 100mA f≤1.0kHz		0.1	0.37	Ω

Note: The typical value of Reference Input Voltage 1 is 2.5V,The typical value of Reference Input Voltage 2 is 2.495V,

CLASSIFICATION OF V_{ref} AND PACKAGE

Type	RanK	Range(V)	Marking	Packa	T _{opr}
LR431AKLT1G	0.5%	2.488~2.512	AK	SOT-23	-40~+125 °C
LR431BKLT1G	1%	2.475~2.525	BK	SOT-23	-40~+125°C
LR431APKLT1G	0.5%	2.483~2.507	CK	SOT-23	-40~+125 °C
LR431BPkLT1G	1%	2.470~2.520	DK	SOT-23	-40~+125 °C

TYPICAL PERFORMANCE CHARACTERISTICS


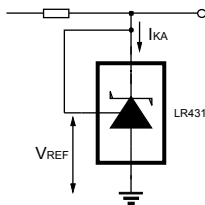
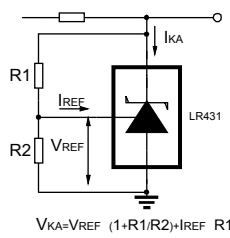
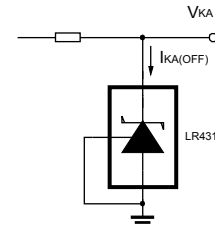
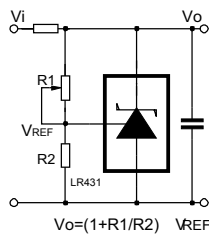
TEST CIRCUIT

 Fig6 Test Circuit For $V_{KA}=V_{REF}$

 Fig 7 Test Circuit for $V_{KA} \geq V_{REF}$

 Fig 8 Test Circuit For $I_{KA(OFF)}$
APPLICATION CIRCUIT


Fig 9 Shutdown Regulator

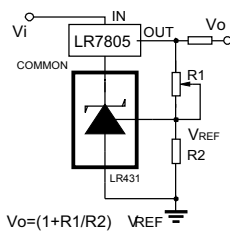


Fig 10 Output Control of a Three-Terminal Fixed Regulator

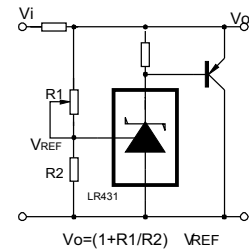


Fig 11 Higher-current Shunt Regulator

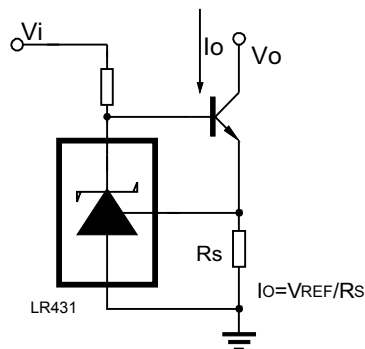


Fig 12 Constant-current Sink

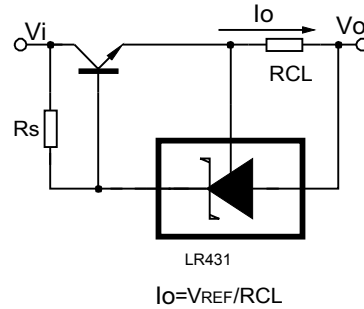
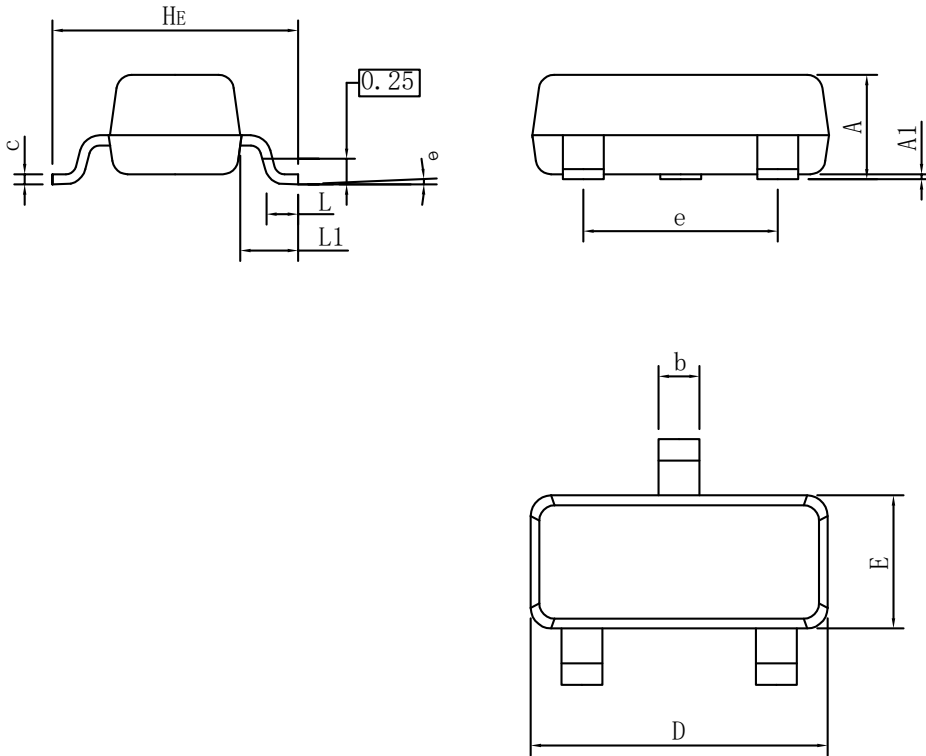


Fig 13 Current Limiting or Current Source

SOT-23 PACKAGE OUTLINE DIMENSIONS


SOT23E			
DIM	MIN	NOR	MAX
A	0.90	1.00	1.10
A1	0.01	0.06	0.10
b	0.30	0.40	0.50
c	0.10	0.17	0.20
D	2.80	2.90	3.00
E	1.20	1.30	1.40
e	1.80	1.90	2.00
L	0.20	0.40	0.60
L1	0.60REF		
HE	2.20	2.40	2.60
θ	0°	-	10°
All Dimensions in mm			

GENERAL NOTES

1. Top package surface finish Ra0.4±0.2um
2. Bottom package surface finish Ra0.7±0.2um
3. Side package surface finish Ra0.4±0.2um

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