Programmable Precision Reference

LTL431ATSLT1G

DESCRIPTION

The LTL431 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 Vref(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: Cathode; 2: Ref; 3: Anode

FEATURES

Programmable output Voltage to 36V.

Low dynamic output impedance 0.2Ω

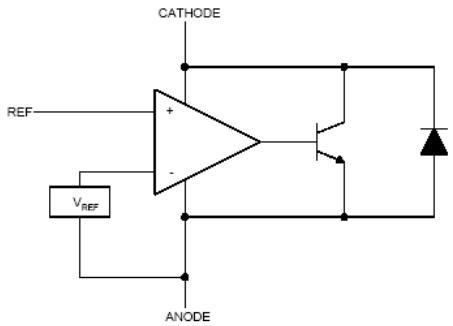
Sink current capability of 1 to 100mA.

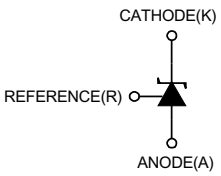
Equivalent full-range temperature coefficient of 50ppm/°C typical for operation over full rated operating temperature range.

ESD Enhanced; HBM 8000V

Pb-Free package is available

BLOCK DIAGRAM





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

PARAMETER	SYMBOL	VALUE	UNIT
Cathode Voltage	V_{KA}	36	V
Cathode Current Range(Continuous)	I_{KA}	-100 ~ +150	mA
Reference Input Current Range	Iref	-0.05 ~ +10	mA
Operating Junction Temperature	Tj	150	°C
Operating Ambient Temperature	Topr	-40 ~ +125	°C
Storage Temperature Temperature	Tstg	-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT
Cathode Voltage	V_{KA}	V_{REF}		36	V
Cathode Current	I_{KA}	0.5		100	mA

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

Characteristic		Symbol	Test conditions		MIN	TYP	MAX	UNIT
Reference Input Voltage 1	0.5%	Vref	$V_{KA}=V_{REF}, I_{KA}=10mA$		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%	Vref	$V_{KA}=V_{REF}, I_{KA}=10mA$		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}	$V_{KA}=V_{REF}, I_{KA}=10mA$ $T_{MIN} \le T_A \le T_{MAX}$			4.5	25	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage		$\Delta V_{ref}/\Delta V_{KA}$	$I_{KA}=10mA$	$\Delta V_{KA}=10V \sim V_{REF}$		-1.0	-2.7	mV/V
				$\Delta V_{KA}=36V \sim 10V$		-0.5	-2.0	
Reference Input Current		Iref	$I_{KA}=10mA, R1=10k\Omega, R2=\infty$			1	2	μA
Deviation of Reference Input Current Over Ful l Temperature Range		$\Delta Iref/\Delta T$	$I_{KA}=10mA, R1=10k\Omega, R2=\infty$, T_A= full Temperature			0.2	0.4	μA
Minimum cathode current for regulation		$I_{KA}(min)$	$V_{KA}=V_{REF}$			0.3	0.5	mA
Off-state cathode Current		$I_{KA}(OFF)$	$V_{KA}=36V, V_{REF}=0$			0.05	0.5	μA
Dynamic Impedance		Z_{KA}	$V_{KA}=V_{REF}, I_{KA}$=1 to 100mA f≤1.0kHz			0.15	0.5	Ω

* CLASSIFICATION OF V_{ref} AND PACKAGE

Type	RanK	Range(V)	Marking	Packa	Topr
LTL431ATSLT1G	0.5%	2.488~2.512	LAS	SOT-23	-40~+125 °C
LTL431BTSLT1G	1%	2.475~2.525	LBS	SOT-23	-40~+125 °C
LTL431APTSLT1G	0.5%	2.483~2.507	LCS	SOT-23	-40~+125 °C
LTL431BPTSLT1G	1%	2.470~2.520	LDS	SOT-23	-40~+125 °C

TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1 Cathode Current Vs Cathode Voltage

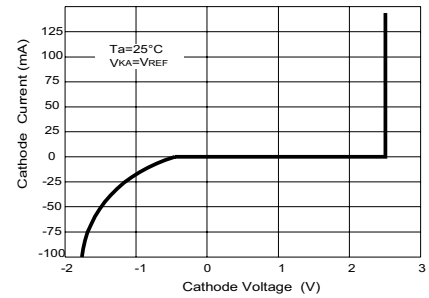


Fig 2 Cathode Current Vs Cathode Voltage

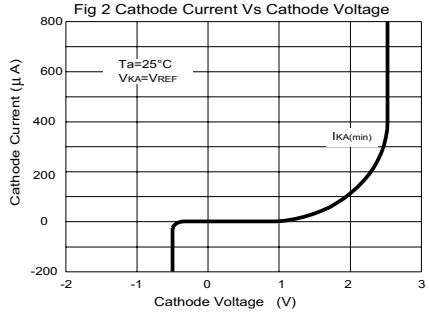


Fig 3 Change in Reference Input Voltage Vs Cathode voltage

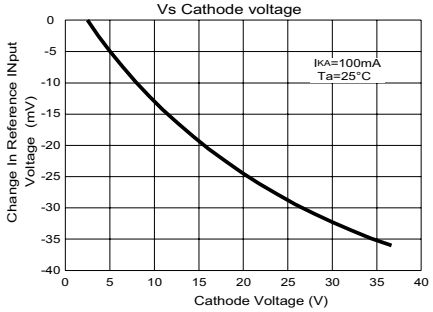


Fig 4 Pulse Response

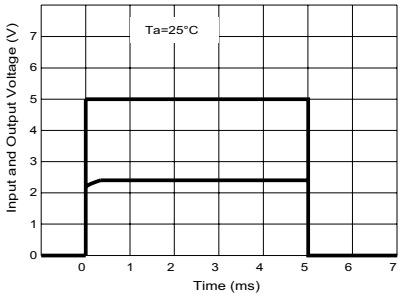


Fig 5 Dynamic Impedance Vs Frequency

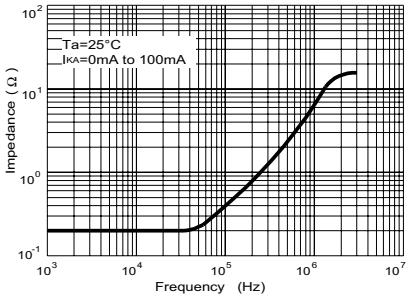
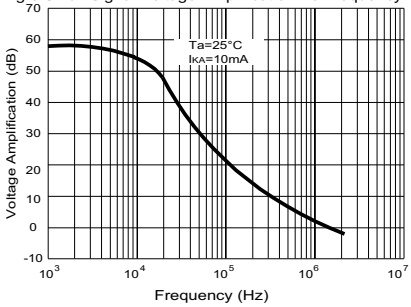


Fig 6 Small Signal Voltage Amplification Vs Frequency



TEST CIRCUIT

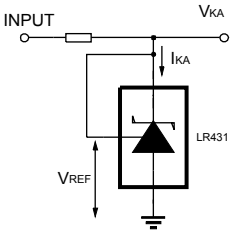


Fig 7 Test Circuit For VKA=VREF

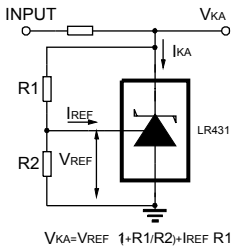


Fig 8 Test Circuit for VKA >= VREF

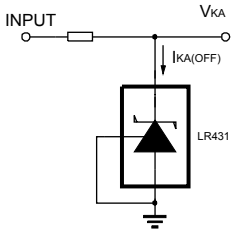


Fig 9 Test Circuit For IKA(OFF)

APPLICATION CIRCUIT

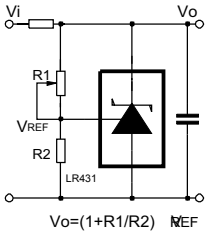


Fig 10 Shutdown Regulator

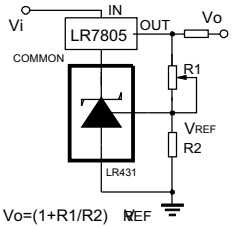


Fig 11 Output Control of a Three -Terminal Fixed Regulator

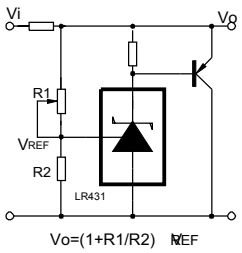


Fig 12 Higher-current Shunt Regulator

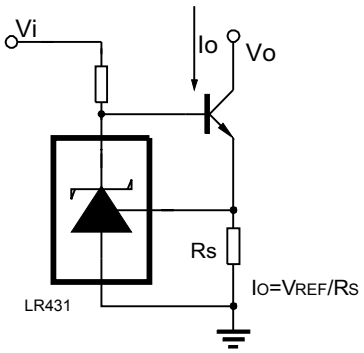


Fig 13 Constant-current Sink

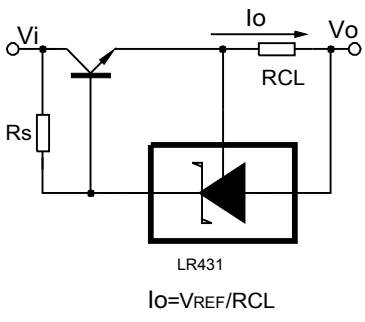
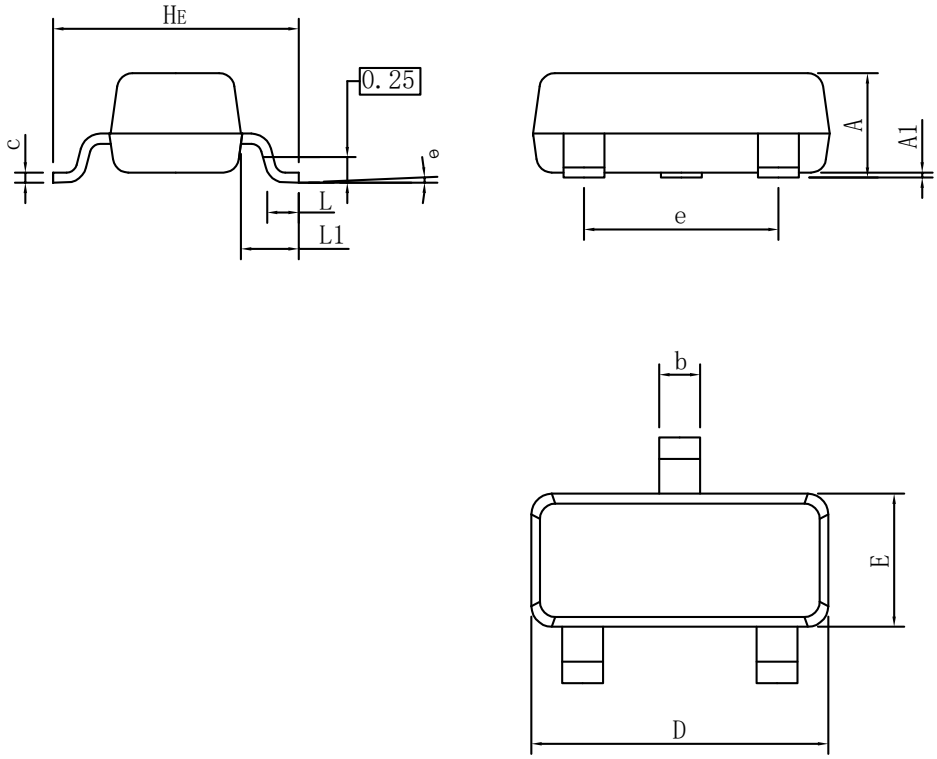


Fig 14 Current Limiting or Current Source

SOT-23 PACKAGE OUTLINE DIMENSIONS



SOT23			
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