DESCRIPTION

The TL431AIDBZR-CN device is three-terminal adjustable shunt regulators, with a guaranteed thermal stability over applicable temperature ranges.The output voltage can be set to any value between VREF (approximately 2.5V) and 36V with two external resistors. These devices have provided a very sharp turn-on characteristic, making these devices excellent replacement for Zener diodes in many applications.

The TL431AIDBZR-CN device is offered in two grades, with initial tolerances (at 25°C) of 0.5% and 1%, for A and B grade.

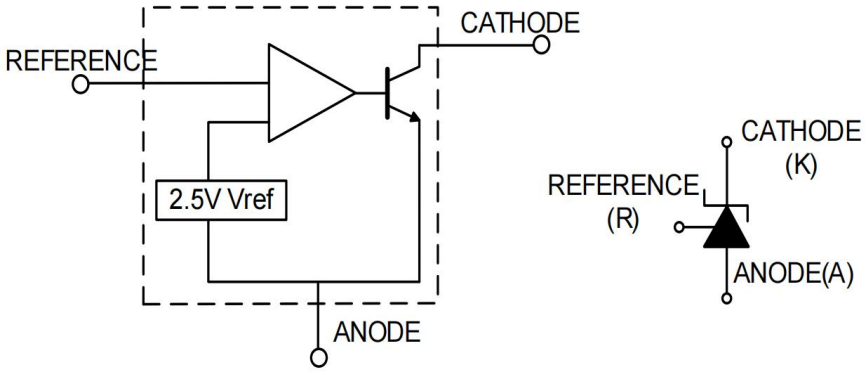
FEATURES

- Programmable Precise Output Voltage from 2.5V to 36V
- Low Dynamic Output Impedance 0.2 Ω
- High Stability under Capacitive Load
- Low Temperature Deviation
- Low Output Noise Voltage
- Sink Current Capability of 0.5mA to 100mA
- Operation Junction Temperature from -40°C to 125°C
- Lead-Free Packages: SOT23

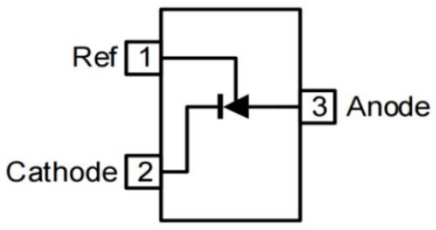
APPLICATIONS

- Voltage Adapter
- Charger
- Switching Power Supply
- Voltage Monitoring
- Adjustable Referencing
- Zener Replacement

Simplified Schematic



Pin Configuration

NUMBER	NAME	DESCRIPTION	Top View
1	Ref(R)	Threshold relative to common anode	
2	Cathode(K)	Shunt Current/ Voltage input	
3	Anode(A)	Common pin, normally connected to ground	

Absolute Maximum Ratings

Over operating free-air temperature range (unless otherwise noted)

SYMBAL	PARAMETER	MIN	MAX	UNIT
V_{KA}	Cathode Voltage	-0.3	37	V
I_{KA}	Cathode Current Range (Continuous)	-100	130	mA
I_{REF}	Reference Input Current Range	-0.05	10	mA
P_D	Power Dissipation		300	mW
T_J	Operating junction temperature	-40	+150	℃
T_S	Storage Temperature Range	-55	+150	℃

Note: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.

Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

SYMBAL	PARAMETER	MIN	TYP	MAX	UNIT
V_{KA}	Cathode Voltage	V_{REF}		36	V
I_{KA}	Cathode Current Range (Continuous)	0.5		100	mA
T_A	Junction Temperature	-40	+25	+125	℃

Electrical Characteristics

(At T_A=25℃, unless otherwise noted)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Reference Input Voltage	V_{REF}	$V_{KA}=V_{REF}, I_{KA}$=10mA	0.5%	2.488	2.50	2.512	V
			1%	2.475	2.50	2.525	V
Deviation of Reference Input Voltage Over temperature	ΔV_{REF}	$V_{KA}=V_{REF}$, I_{KA}=10mA, T_A=-40~+125℃		-	20	60	mV
Ratio of Change in Reference Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	I_{KA}=10mA, ΔV_{KA}=10V~V_{REF}		-	-1.2	-2	mV/V
		I_{KA}=10mA, ΔV_{KA}=36V~10V		-	-1.5	-2	
Reference Input Current	I_{REF}	I_{KA}=10mA, R1=10kΩ, R2=∞		-	1.5	3	uA
Deviation of Reference Input Current Over Full Temperature Range	ΔI_{REF}	I_{KA}=10mA, R1=10kΩ, R2=∞ T_A=-40~+125℃		-	2	5	uA
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}=0V		-	0.05	0.5	uA
Dynamic Impedance	Z_{KA}	$V_{KA}=V_{REF}$, I_{KA}=1mA~100mA, f≤1.0kHz		-	0.2	0.5	Ω

Test Circuit

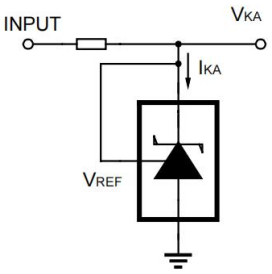


Figure 1. Test Circuit for $V_{KA}=V_{REF}$

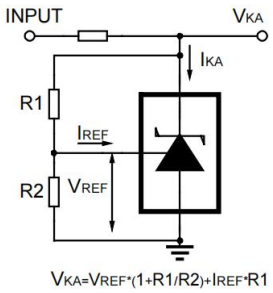


Figure 2. Test Circuit for $V_{KA} \geqslant V_{REF}$

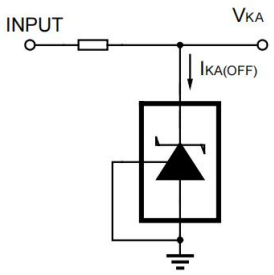


Figure 3. Test Circuit for $I_{KA(OFF)}$

Typical Application

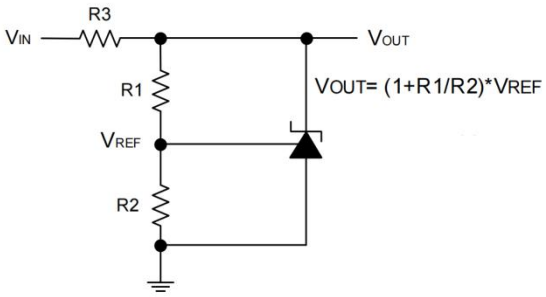


Figure 4. Shunt Regulator

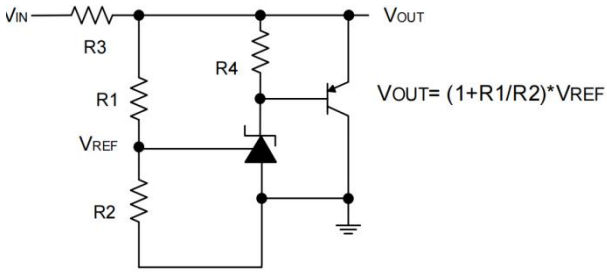


Figure 5. High Current Shunt Regulator

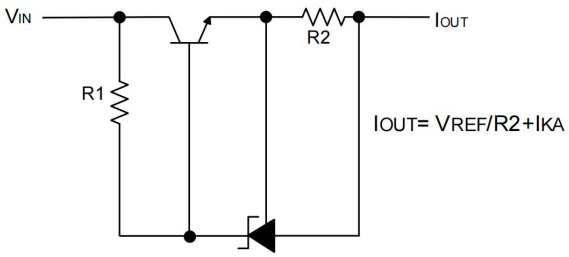
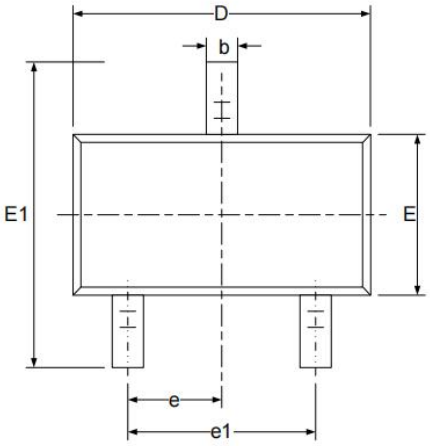
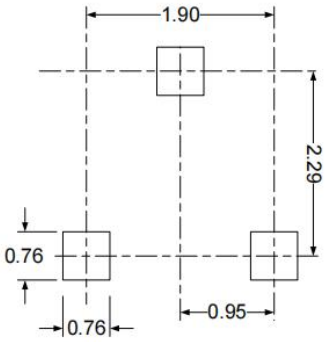


Figure 6. Current Source or Current Limit

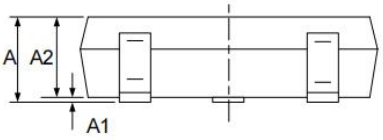
PACKAGE OUTLINE DIMENSIONS

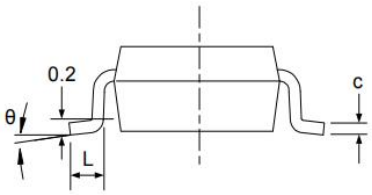
SOT23-3





RECOMMENDED LAND PATTERN (Unit: mm)





SYMBOL	MILLIMETER			SYMBOL	MILLIMETER		
	MIN	NOM	MAX		MIN	NOM	MAX
A	0.900	-	1.150	E	1.200	-	1.400
A1	0.000	-	0.100	E1	2.250	-	2.550
A2	0.900	-	1.050	e	0.950 BSC		
b	0.300	-	0.500	e1	1.800	-	2.000
c	0.080	-	0.150	L	0.300	-	0.500
D	2.800	-	3.000	θ	0°	-	8°

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