

## ● Introduce

REF-431 is a high precision voltage reference source which used TL431 from Texas Instruments. The TL431 is three-terminal adjustable shunt regulators, with specified thermal stability over applicable automotive, commercial, and military temperature ranges. The output voltage can be set to any value between Vref (approximately 2.5 V) and 36V. Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacements for Zener diodes in many applications, such as onboard regulation, adjustable power supplies, and switching power supplies.

## ● Features

- Sink-Current Capability . . . 1 mA to 100 mA
- 0.2-Ω Typical Output Impedance
- Low Output Noise
- Operation From -40°C to 125°C
- Adjustable Output Voltage . . . Vref to 36 V

## ● Parametric Description

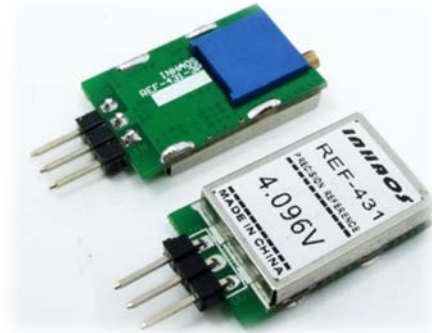
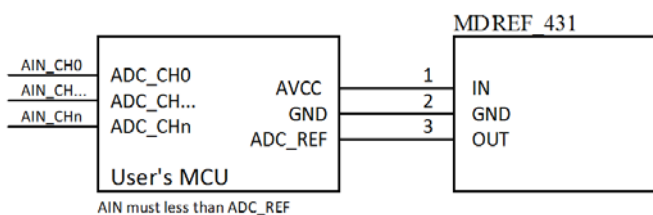
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Reference voltage (Temp = 25°C)	Vref	4.095	4.096	4.097	V
Reference input current	Iref		2	4	μA
Minimum cathode current for regulation	Imin		0.4	1	mA
Off-state cathode current	Ioff		0.1	1	μA

**Note: the board was pre\_adjust to a voltage which show on the label (such as 4.096v), you can adjustable to other voltage or ask us to adjust your target voltage before shipping.**

## ● Application

1. Power supplies
2. Switching power supplies
3. Precision Current Limiter
4. Voltage Monitor
5. Efficient 5-V Precision Regulator
6. High-Current Shunt Regulator
7. PWM Converter With Reference

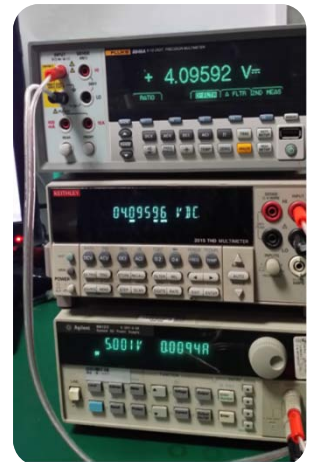
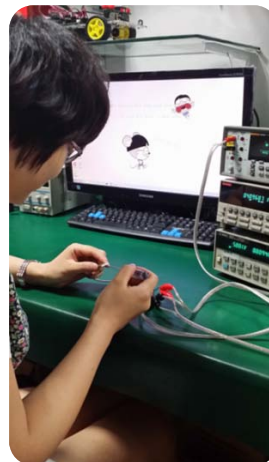
## ● Application Example



## ● Calibration

Below high precision voltage meter are used for calibration:

- 1, FLUKE 8846A 6.5 Digit Precision Multimeter  
[http://media.fluke.com/documents/9030234\\_ENG\\_A\\_W.PDF](http://media.fluke.com/documents/9030234_ENG_A_W.PDF)
- 2, KEITHLEY 2015 THD MULTIMETER



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