DONGGUAN NANJING ELECTRONICS LTD.,

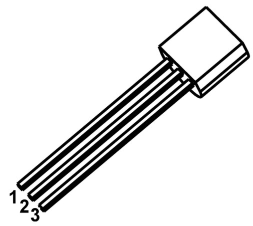
TO-92 Encapsulate Adjustable Reference Source

CJ431 Adjustable Accurate Reference Source

FEATURES

- The output voltage can be adjusted to 36V
- Low dynamic output impedance ,its typical value is 0.2Ω
- Trapping current capability is 1 to 100mA
- The typical value of the equivalent temperature factor in the whole temperature scope is 50 ppm/℃
- The effective temperature compensation in the working range of full temperature
- Low output noise voltage
- Fast on -state response

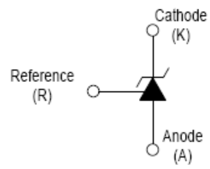
TO-92



1.REFERENCE

2.ANODE

3.CATHODE



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

Parameter	SYMBOL	VALUE	UNITS
Cathode Voltage	V_{KA}	37	V
Cathode Current Range (Continuous)	I_{KA}	-100-+150	mA
Reference Input Current Range	Iref	0.05-+10	mA
Power Dissipation	P_D	770	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	162	℃/W
Operating Ambient Temperature Range	T_A	0~+70	℃
Storage temperature Range	Tstg	-65~+150	℃
Operating Junction Temperature	T_j	150	℃

ELECTRICAL CHARACTERISTICS (Ta=25℃ unless otherwise specified)

Parameter	Symbol	Test conditions		MIN	TYP	MAX	UNIT
Reference Input Voltage (Fig.1)	V_{ref}	V_{KA}=V_{REF}, I_{KA}=10mA		2.450	2.5	2.550	V
Deviation of reference input Voltage Over temperature (note) (Fig.1)	$\triangle V_{ref}/\triangle T$	V_{KA} =V_{REF}, I_{KA} =10mA Tmin≤Ta≤Tmax			4.5	17	mV
Ratio Of Change in Reference Input Voltage to the change in Cathode Voltage (Fig.2)	$\triangle V_{ref}/\triangle V_{KA}$	I_{KA}=10mA	$\triangle V_{KA}$ =10V~V_{REF}		-1.0	-2.7	mV/V
			$\triangle V_{KA}$ =36V~10V		-0.5	-2.0	mV/V
Reference Input Current (Fig.2)	I_{ref}	I_{KA}= 10mA,R_1=10KΩ R_2=∞			1.5	4	μA
Deviation Of Reference Input Current Over Full Temperature Range (Fig.2)	$\triangle I_{ref}/\triangle T$	I_{KA}=10mA, R_1=10KΩ R_2=∞ T_A=full Temperature			0.4	1.2	μA
Minimum cathode current for regulation (Fig.1)	$I_{KA(min)}$	V_{KA}=V_{REF}			0.45	1.0	mA
Off-state cathode Current (Fig.3)	$I_{KA(OFF)}$	V_{KA}=36V ,V_{REF}=0			0.05	1.0	μA
Dynamic Impedance	Z_{KA}	V_{KA}=V_{REF}, I_{KA}=1 to 100mA f≤1.0KHz			0.15	0.5	Ω

Note:T_{MIN}=0℃ ,T_{MAX}=+70℃

CLASSIFICATION OF V_{ref}

Rank	0.5%	1%	2%
Range	2.487-2.513	2.475-2.525	2.450-2.550

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

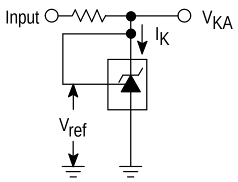
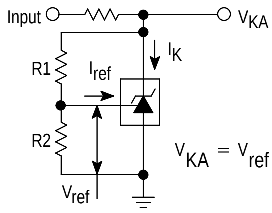
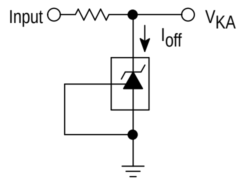


Figure 2. Test Circuit for $V_{KA} > V_{ref}$



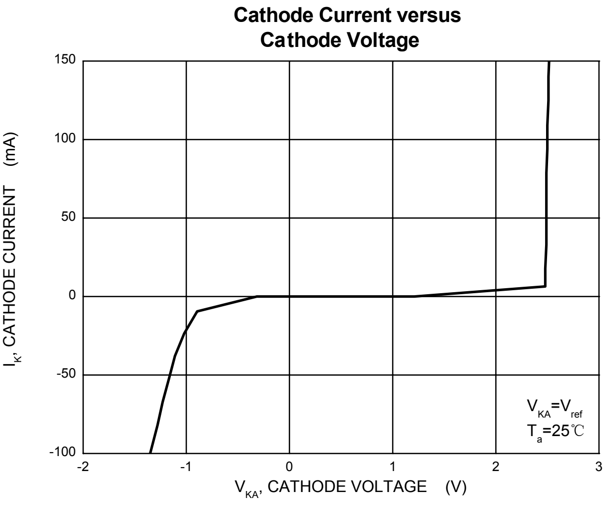
$$V_{KA} = V_{ref}\left(1 + \frac{R1}{R2}\right) + I_{ref} \cdot R1$$

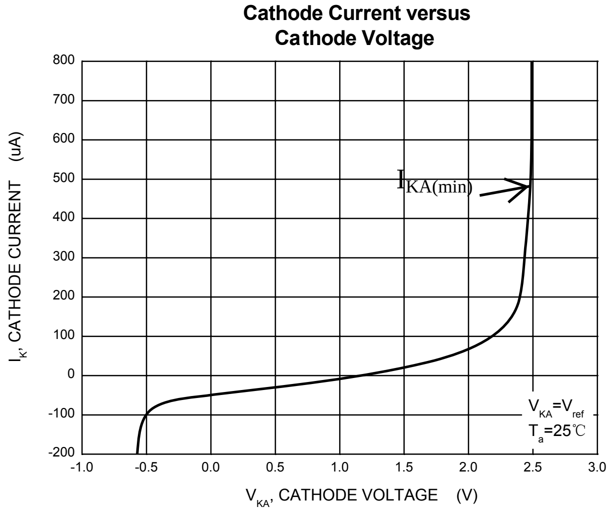
Figure 3. Test Circuit for I_{off}

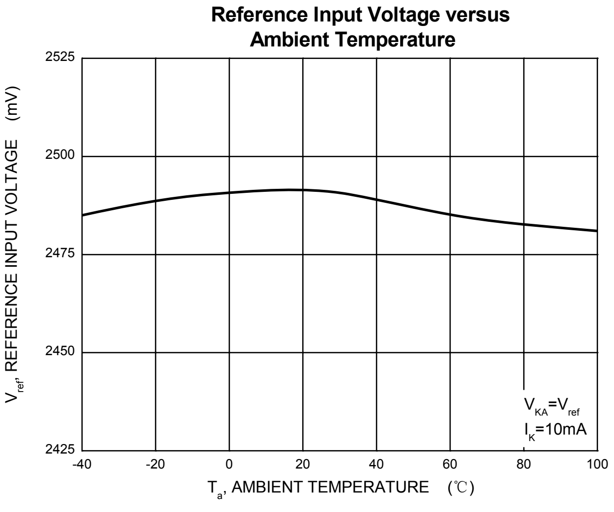


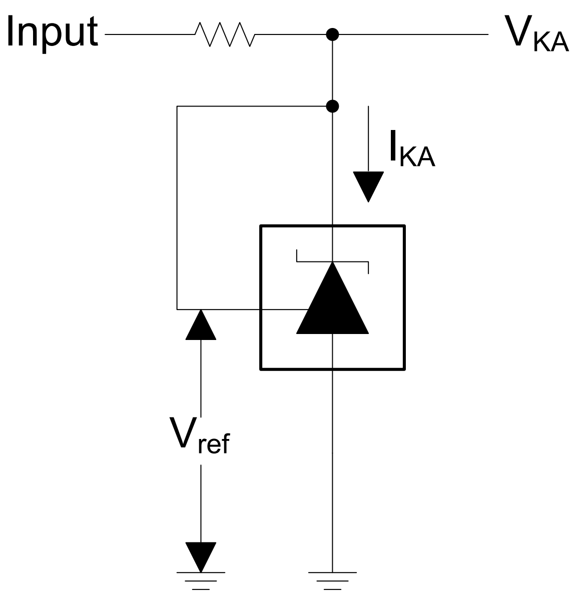
Typical Characteristics

CJ431

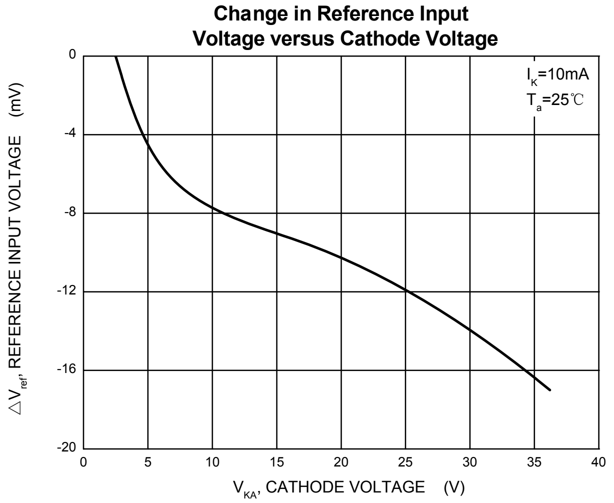


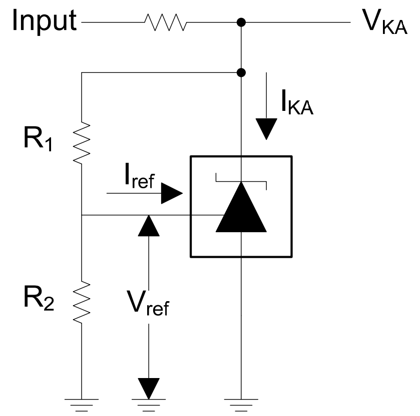




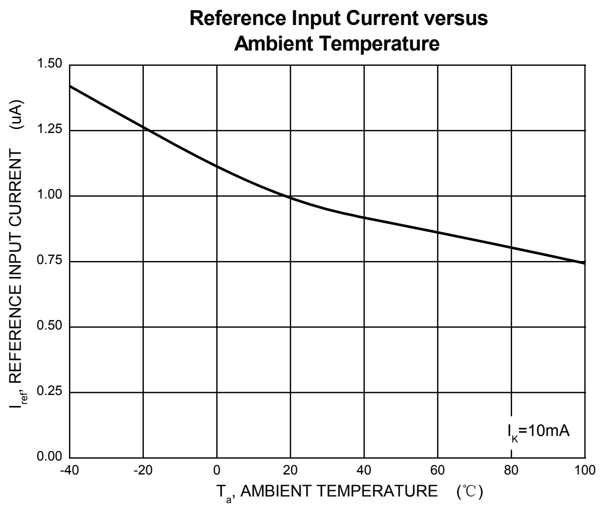


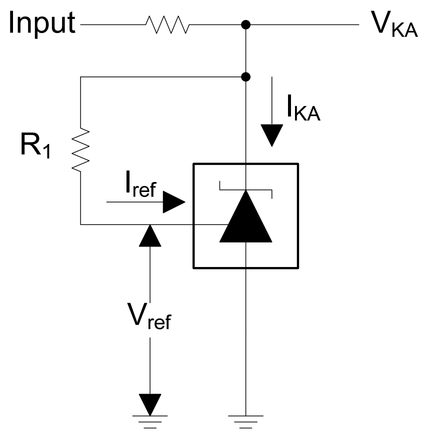
Test Circuit for $V_{KA}=V_{ref}$



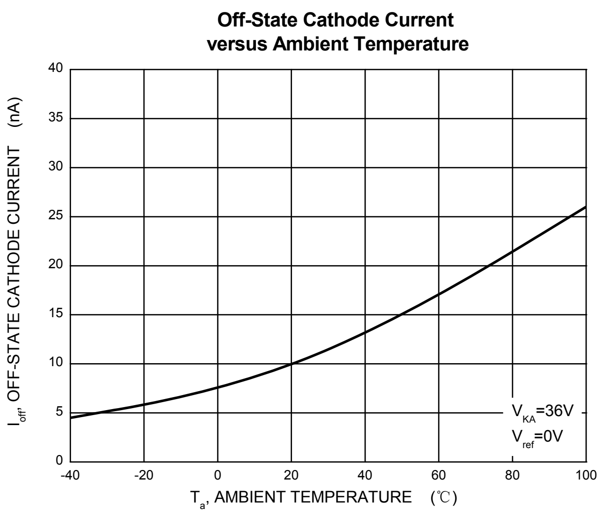


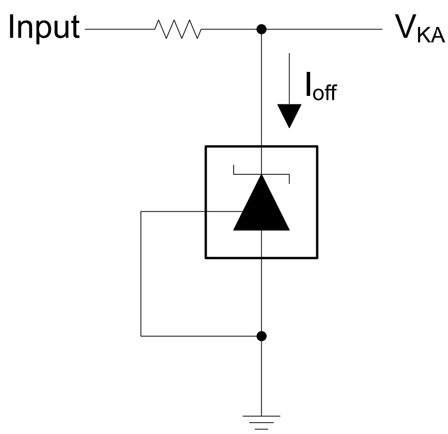
Test Circuit for $V_{KA}=V_{ref}(1+R1/R2)+R1*I_{ref}$





Test Circuit for I_{ref}

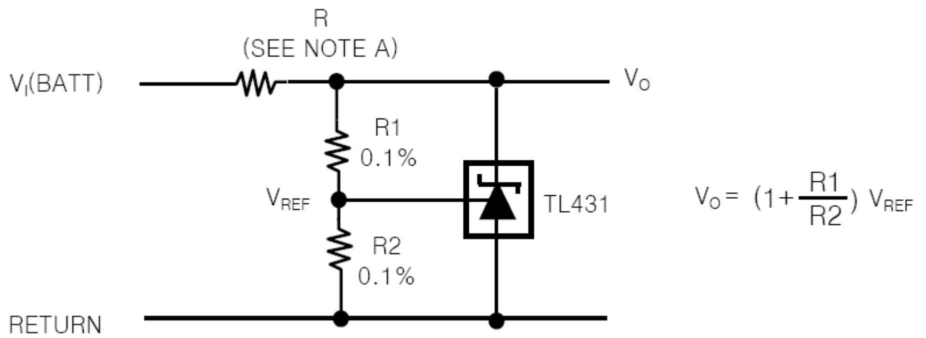




Test Circuit for I_{off}

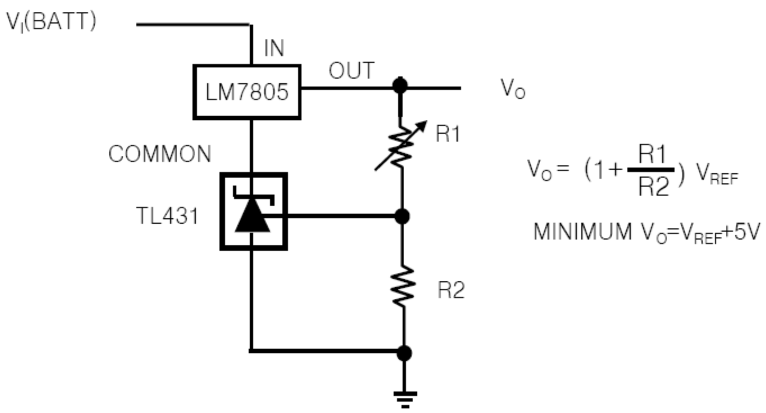
APPICATION INFORMATION

1. Shunt Regulator

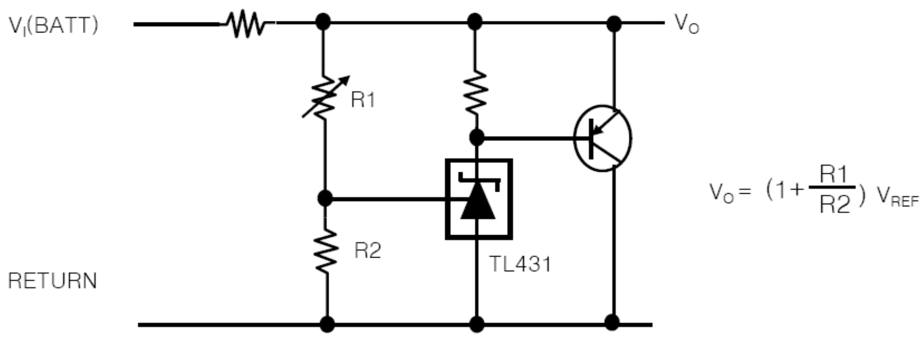


Note A : R Should provide cathode current 1mA to the TL431 at minimum $V_{I(BATT)}$

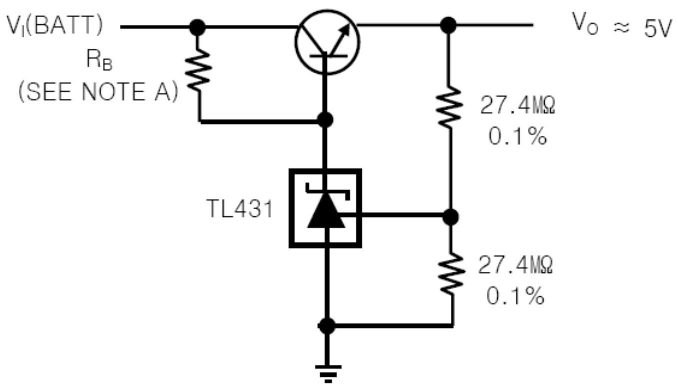
2. Output Control of a Three-Terminal Fixed Regulator



3. High-Current Shunt Regulator

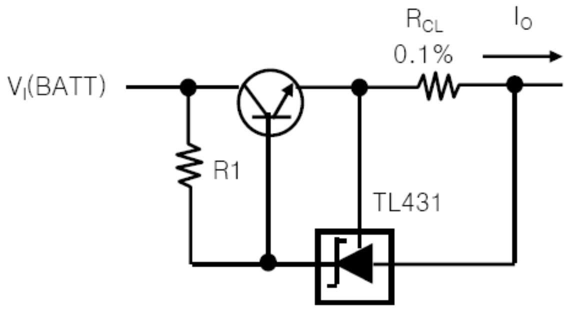


4. Efficient 5-V Precision Regulator



NOTE A : R_B Should provide cathode current≥1mA to the TL431.

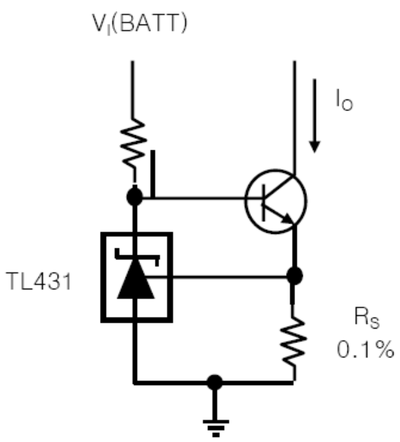
5. Precision Current Limiter



$$I_{OUT} = \frac{V_{REF}}{R_{CL}} + I_{KA}$$

$$R1 = \frac{V_{I(BATT)}}{\frac{I_O}{H_{FE}}} + I_{KA}$$

6. Precision Constant-Current Sink



$$I_O = \frac{V_{REF}}{R_S}$$