

Adjustable Precision Shunt Regulators

Description

The YJ431 is a three-terminal adjustable shunt regulator with guaranteed thermal stability over a full operation range. It features sharp turn-on characteristics, low temperature coefficient and low output impedance, which make it ideal substitute for Zener diode in applications such as switching power supply, charger and other adjustable regulators.

The output voltage of YJ431 can be set to any value between V_{REF} (2.5V) and the corresponding maximum cathode voltage (40V).

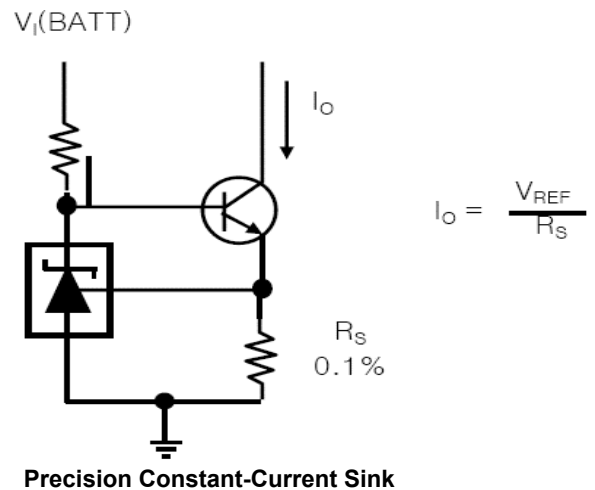
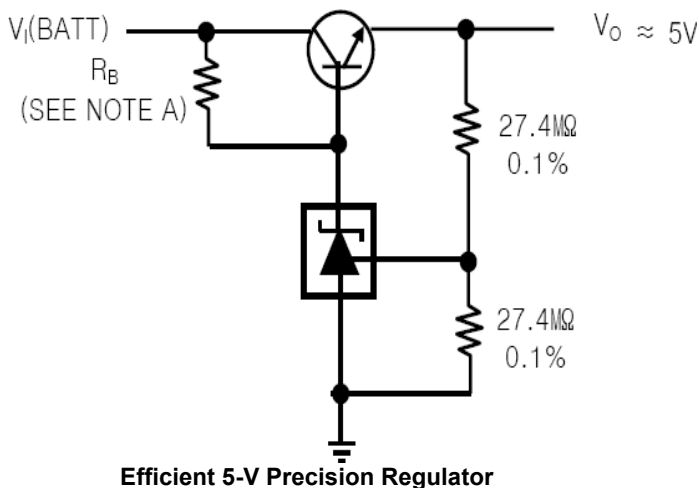
Features

- Reference Voltage Tolerance is $\pm 0.5\%$ and $\pm 1\%$.
- Programmable Precise Output Voltage to 40V.
- High Stability under Capacitive Load.
- Sink Current Capacity from 0.1mA to 100mA.
- Temperature Compensated for Operation over Full Rated.
- Operating Temperature Range.
- Low Output Noise Voltage.
- Fast turn on response.

Applications

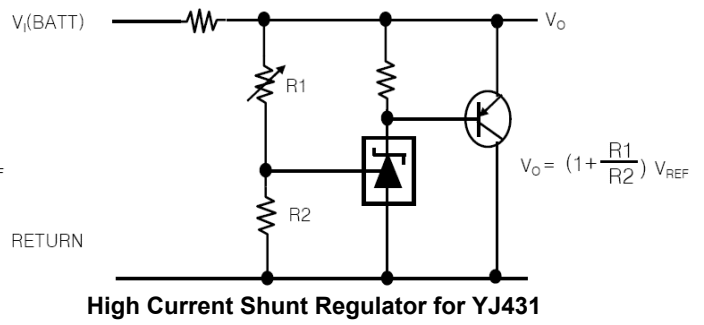
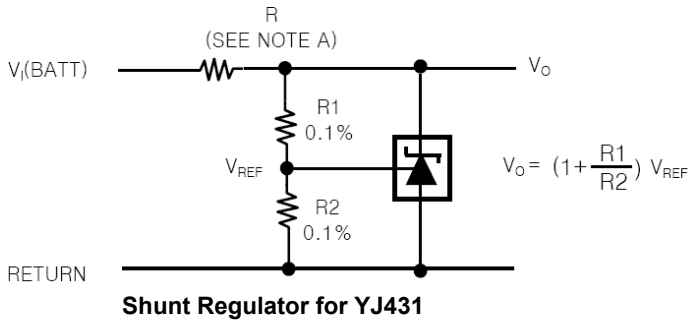
- Charger
- Voltage Adapter
- Switching Power Supply
- Graphic Card
- Precision Voltage Reference
- Adjustable Power Supply
- Switching Power Supply

Typical Application





YJ431 Series



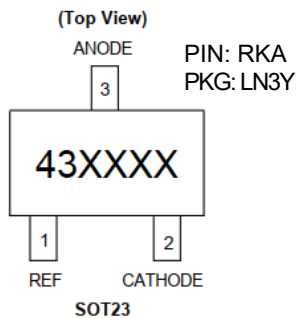
Package and Ordering Information

Model	Part Number	Package Description	Temperature Range	Voltage Tolerance	Ordering Number	Marking Information	Packing Option
YJ431	YJ431	SOT23	-40°C ~ 125°C	±0.5%	YJ431LN3Y	431XXX	Tape & Reel 3000
		SOT23	-40°C ~ 125°C		YJ431LNCY	4C1XXX	Tape & Reel 3000
	YJ431A	SOT23	-40°C ~ 125°C	±1%	YJ431ALN3Y	43AXXX	Tape & Reel 3000
		SOT23	-40°C ~ 125°C		YJ431ALNCY	4CAXXX	Tape & Reel 3000

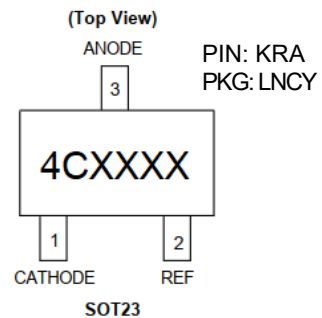
Notes:

1. XXX: Tracking No.

Pin Configuration and Top Mark

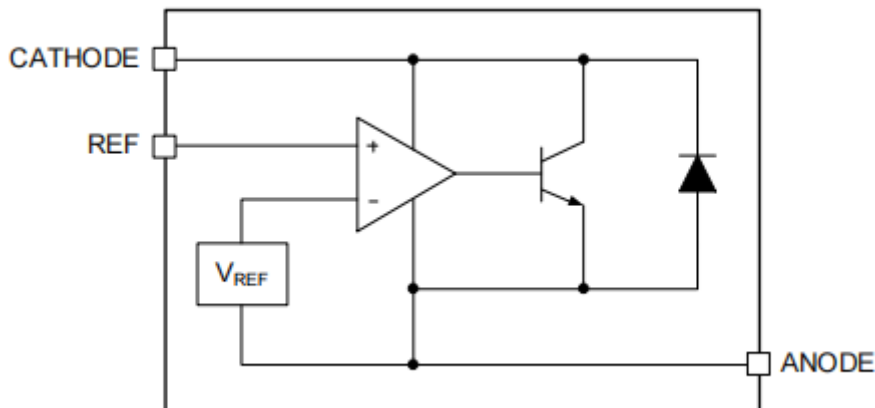


REF(R) CATHODE(K) ANODE (A)



CATHODE(K) REF(R) ANODE (A)

Functional Block Diagram





YJ431 Series

■ Absolute Maximum Ratings (Operating temperature range applies unless otherwise noted)

Parameter	Symbol	Ratings	Unit
Cathode Voltage	V_{KA}	40	V
Cathode Current Range (Continuous)	I_K	-100 to 150	mA
Reference Input Current Range	I_{REF}	-0.05 to +10	mA
Thermal Resistance from Junction to Ambient	SOT23 θ_{JA}	333	°C/W
Power Dissipation at 25°C	P_D	0.3	W
Junction Temperature Range	T_J	-40 to +150	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

Notes:

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.
2. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
3. This condition is only determined from design. It can't be 100% tested in mass production.

■ Recommended Operating Ratings

Parameter	Symbol	Ratings		Unit
		Min	Max	
Cathode Voltage	V_{KA}	V_{REF}	40	V
Cathode Current	I_K	0.5	100	mA

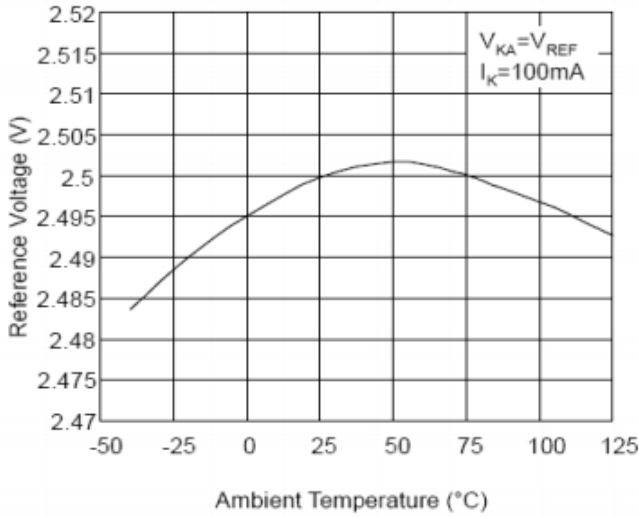
■ Electrical Characteristics ($T_A=25^\circ\text{C}$, $V_{KA}=V_{REF}$, $I_K=10\text{mA}$ unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units	
Reference Input Voltage	V_{REF}	$V_{KA}=V_{REF}$, $I_K=10\text{mA}$	$\pm 0.5\%$	2.483	2.495	2.507	V
			$\pm 1\%$	2.470	2.495	2.520	
Deviation of Reference Input Voltage Over Full Temperature Range	$V_{REF(dev)}$	$T_{min} \leq T_A \leq T_{max}$		3	17	mV	
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	$\Delta V_{KA}=10\text{V}-V_{REF}$		-0.5	-2.7	mV/V	
		$\Delta V_{KA}=36\text{V}-10\text{V}$		-0.4	-2.0		
Reference Input Current	I_{REF}	$R_1=10\text{K}\Omega$, $R_2=\infty$		1.8	4	μA	
Deviation of Reference Input Current Over Full Temperature Range	$I_{REF(dev)}$	$R_1=10\text{K}\Omega$, $R_2=\infty$		0.4	1.2	μA	
Minimum Cathode Current for Regulation	$I_{K(min)}$	-		0.25	0.5	mA	
Off-State Cathode Current	$I_{K(off)}$	$V_{KA}=40\text{V}$, $V_{REF}=0$		0.17	0.9	μA	
Dynamic Impedance	Z_{KA}	$I_K=1\text{mA}$ to 100mA , $f \leq 1.0\text{KHz}$		0.15	0.5	Ω	

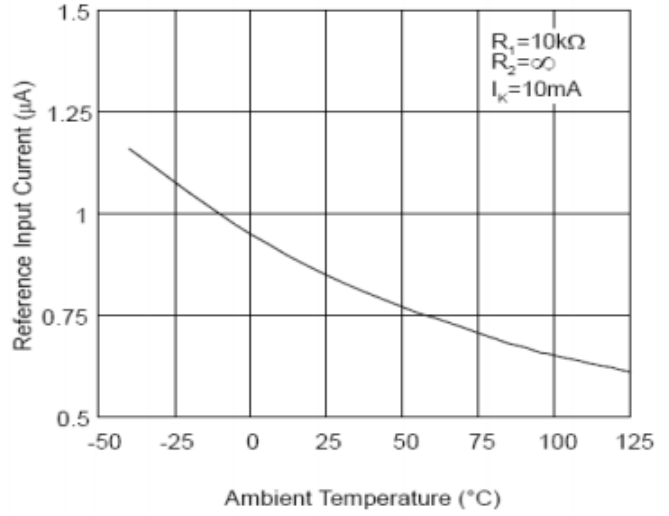


■ Typical Characteristics

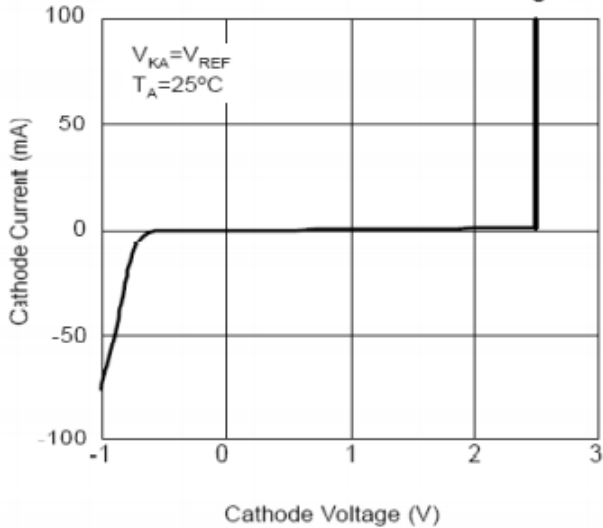
Reference Voltage vs. Ambient Temperature



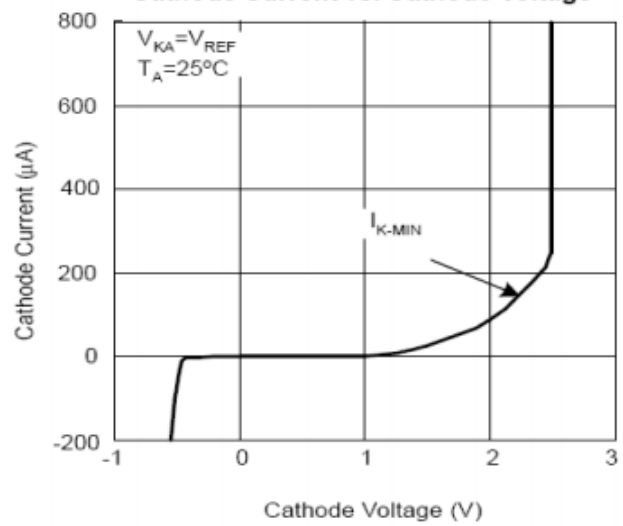
Reference Input Current vs. Ambient Temperature



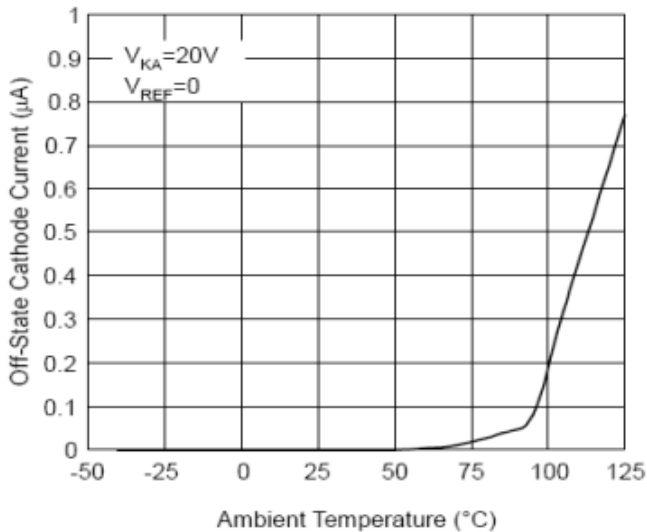
Cathode Current vs. Cathode Voltage



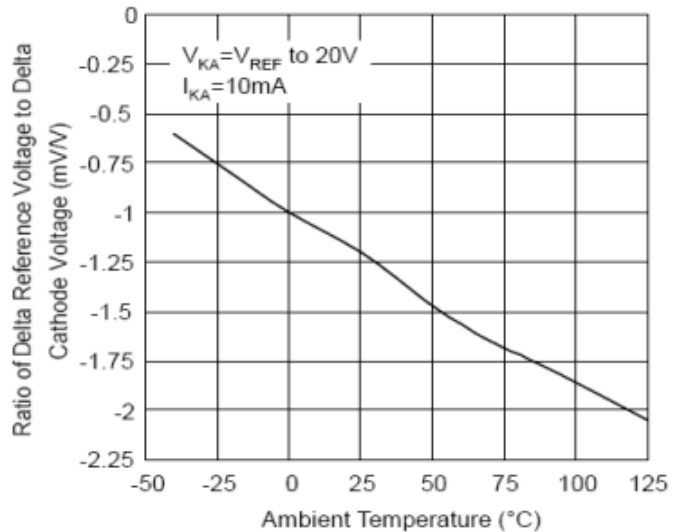
Cathode Current vs. Cathode Voltage



Off-State Cathode Current vs. Ambient Temperature



Ratio of Delta Reference Voltage to Delta Cathode Voltage vs. Ambient Temperature

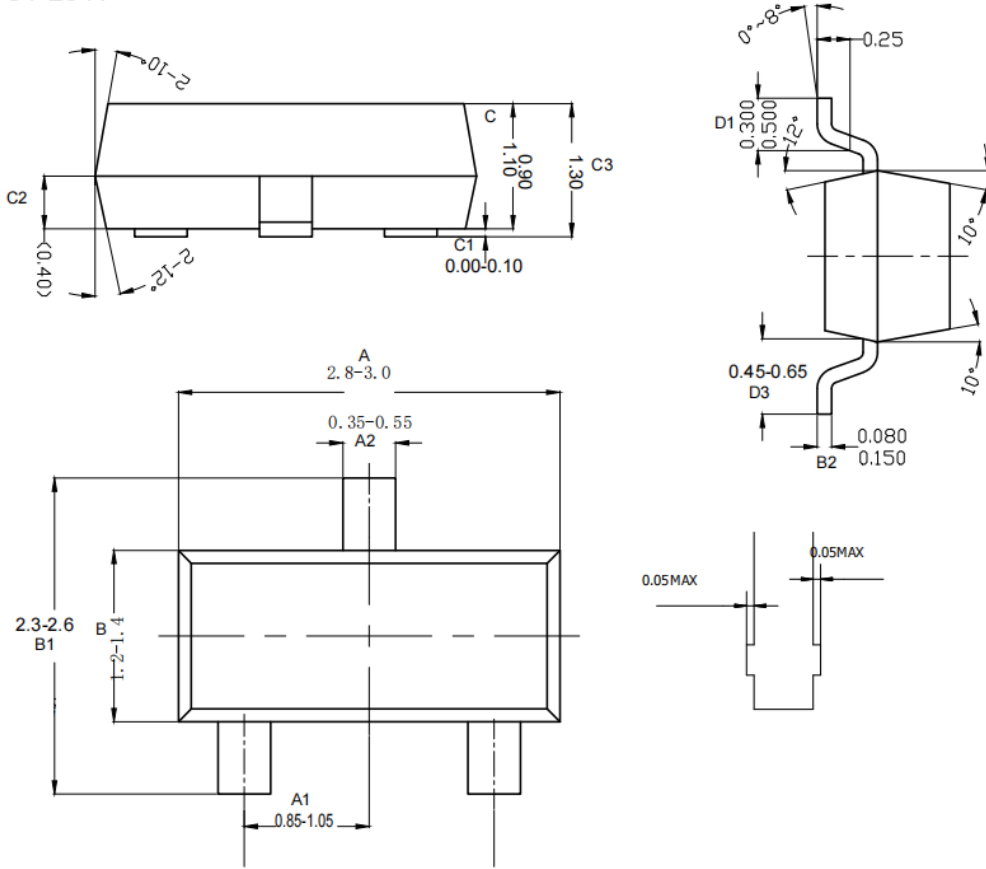




YJ431 Series

■ Package Outline Drawing

SOT-23-A



COMMON DIMENSIONS UNITS MEASURE=MILLIMETER			
SYMBOL	MIN	MID	MAX
A	2.80	2.90	3.0
A1	0.85	0.95	1.05
A2	0.35	0.45	0.55
B	1.20	1.3	1.4
B1	2.3	2.45	2.6
B2	0.08	0.115	0.15
C	0.90	1.0	1.10
C1	0.00	0.05	0.10
C2	0.35	0.4	0.45
C3	1.30MAX		
D1	0.3	0.4	0.5
D2	0.25TYP		
D3	0.45	0.55	0.65



YJ431 Series

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