

TO-92 Encapsulate Adjustable Reference Source

ALJTL431A Adjustable Accurate Reference Source

Features

- The output voltage can be adjusted to 40V
- Low dynamic output impedance, its typical value is 0.27Ω(Typ)
- Trapping current capability is 1 to 100mA
- Low output noise voltage
- Fast on -state response
- The effective temperature compensation in the working range of full temperature
- The typical value of the equivalent temperature factor in the whole temperature scope is 50 ppm/°C

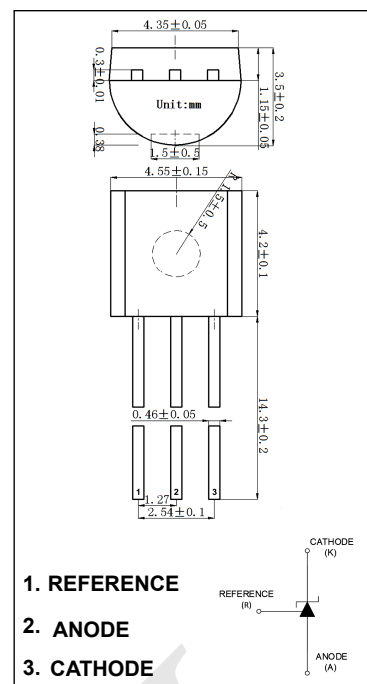
Applications

- Shunt Regulator
- High-Current Shunt Regulator
- Precision Current Limiter

Description

The ALJTL431A is a three-terminal adjustable shunt regulator offering excellent temperature stability. This device has a typical dynamic output impedance of 0.27Ω. The device can be used as a replacement for zener diodes in many applications.

Marking: ALJTL431A



Absolute Maximum Ratings (Operating temperature range applies unless otherwise specified)

Symbol	Parameter	Value	Unit
V _{KA}	Cathode Voltage	40	V
I _{KA}	Cathode Current Range (Continuous)	-100~+150	mA
I _{ref}	Reference Input Current Range	0.05~+10	mA
P _D	Power Dissipation	700	mW
R _{θJA}	Thermal Resistance from Junction to Ambient	128	°C/W
T _j	Operating Junction Temperature	0~+150	°C
T _{opr}	Operating Ambient Temperature Range	0~+70	°C
T _{stg}	Storage temperature Range	-65~+150	°C

Electrical Characteristics ($T_a=25^\circ\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V_{ref}	Reference input voltage (Fig.1)	$V_{\text{KA}}=V_{\text{REF}}, I_{\text{KA}}=10\text{mA}$	2.445	2.495	2.545	V
$\Delta V_{\text{ref}} / \Delta T$	Deviation of reference input voltage over temperature (note) (Fig.1)	$V_{\text{KA}}=V_{\text{REF}}, I_{\text{KA}}=10\text{mA}$ $T_{\text{min}} \leq T_a \leq T_{\text{max}}$		3.0	17	mV
$\Delta V_{\text{ref}} / \Delta V_{\text{KA}}$	Ratio of change in reference input voltage to the change in cathode voltage (Fig.2)	$I_{\text{KA}}=10\text{mA}$ $\Delta V_{\text{KA}} = 10\text{V} \sim V_{\text{REF}}$	-0.4		-2.7	mV/V
		$\Delta V_{\text{KA}} = 36\text{V} \sim 10\text{V}$	-0.4		-2.0	mV/V
I_{ref}	Reference input current (Fig.2)	$I_{\text{KA}}=10\text{mA}, R_1=10\text{k}\Omega$ $R_2=\infty$		1.8	4	μA
$\Delta I_{\text{ref}} / \Delta T$	Deviation Of reference input current over full temperature range (Fig.2)	$I_{\text{KA}}=10\text{mA}, R_1=10\text{k}\Omega$ $R_2=\infty$ $T_a=\text{full Temperature}$		0.4	1.2	μA
$I_{\text{KA}(\text{min})}$	Minimum cathode current for regulation (Fig.1)	$V_{\text{KA}}=V_{\text{REF}}$		0.25	0.5	mA
$I_{\text{KA}(\text{OFF})}$	Off-state cathode Current (Fig.3)	$V_{\text{KA}}=40\text{V}, V_{\text{REF}}=0$		0.17	0.9	μA
Z_{KA}	Dynamic impedance	$V_{\text{KA}}=V_{\text{REF}}, f \leq 1.0\text{kHz}$ $I_{\text{KA}}=1 \text{ to } 100\text{mA}$		0.27	0.5	Ω

note: $T_{\text{MIN}}=0^\circ\text{C}$, $T_{\text{MAX}}=+70^\circ\text{C}$

Classification of V_{ref}

Rank	± 0.5	± 1.0	± 2.0
Range	2.483-2.507	2.470-2.520	2.445-2.545

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

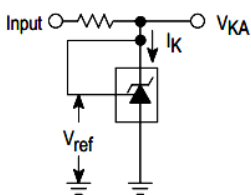


Figure 2. Test Circuit for $V_{\text{KA}} > V_{\text{ref}}$

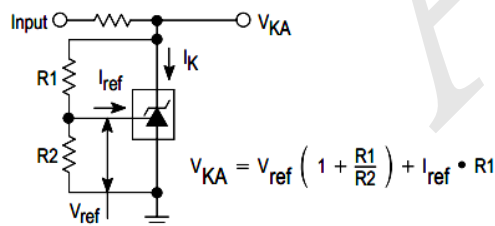
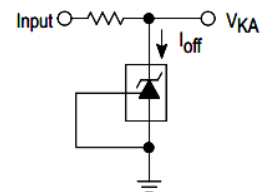
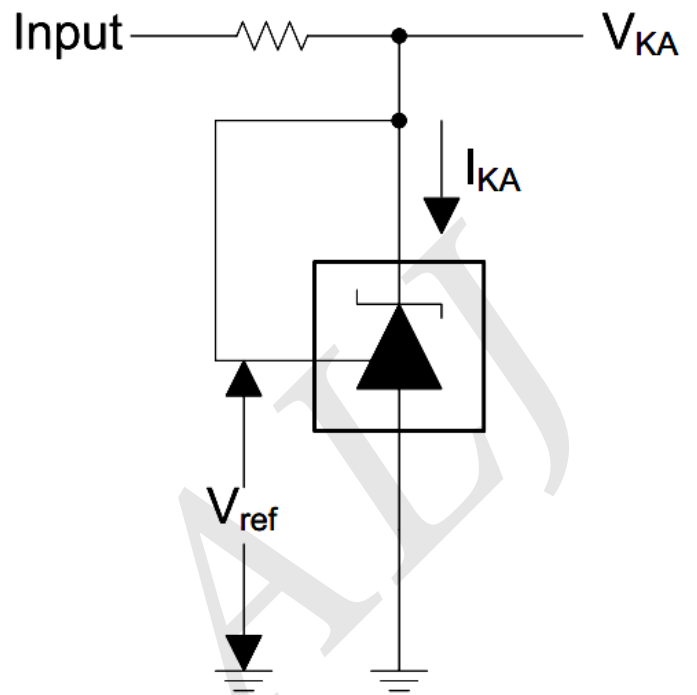
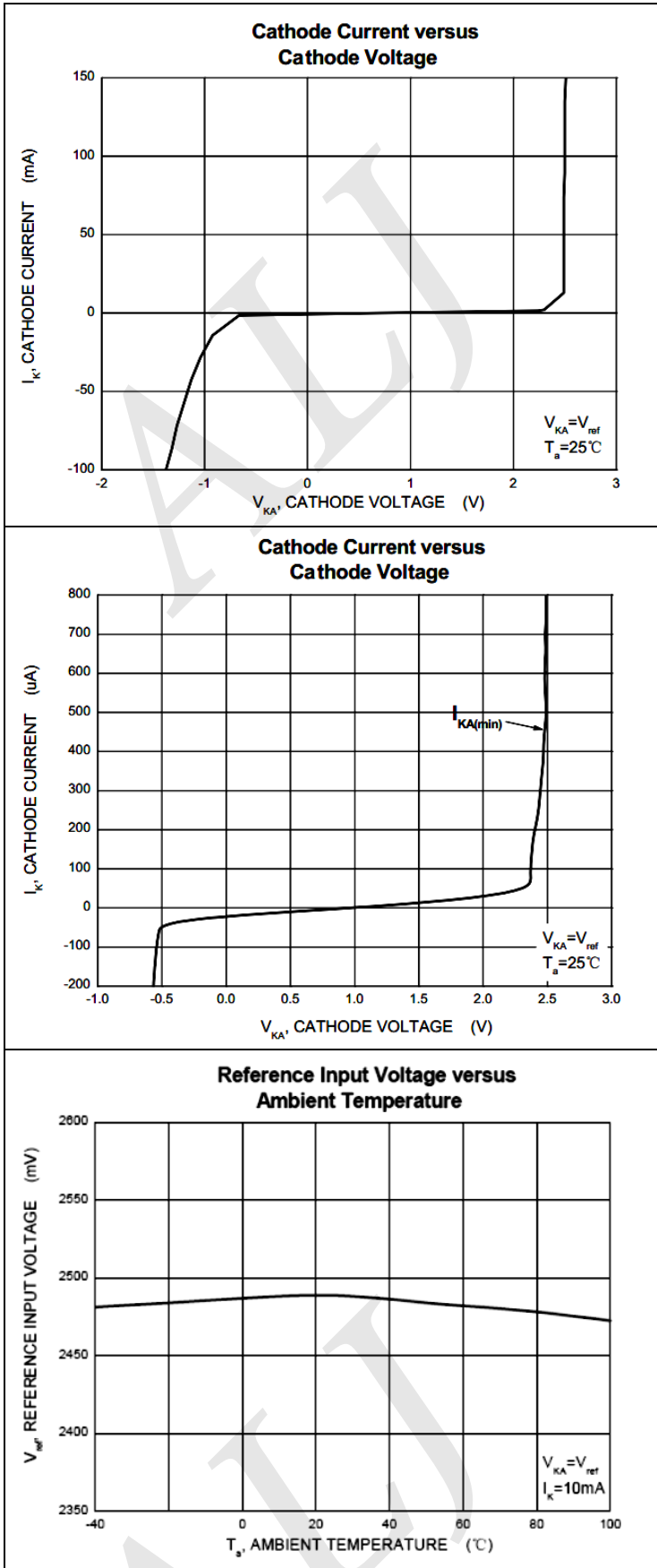


Figure 3. Test Circuit for I_{off}



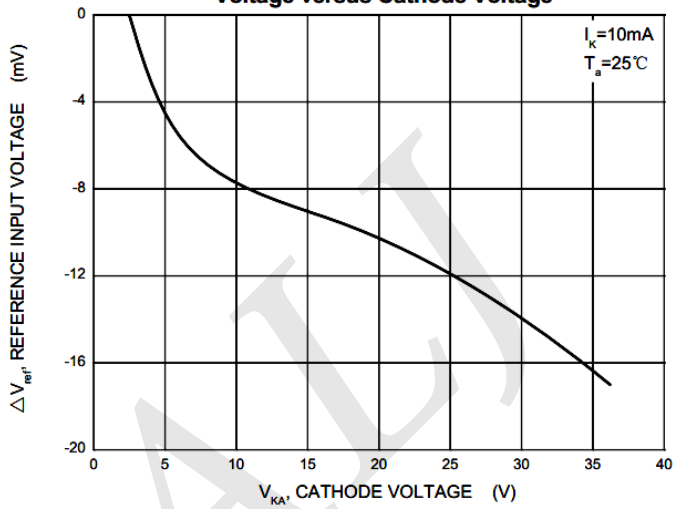
Typical Electrical Characteristics



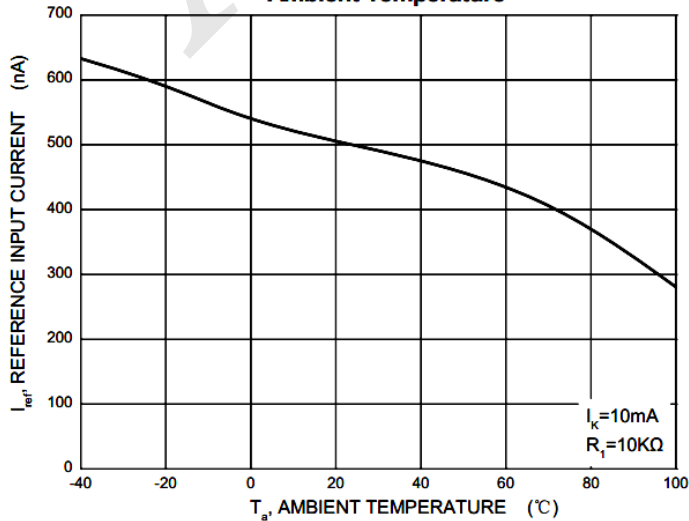
Test Circuit for $V_{KA} = V_{ref}$

Typical Electrical Characteristics (continued)

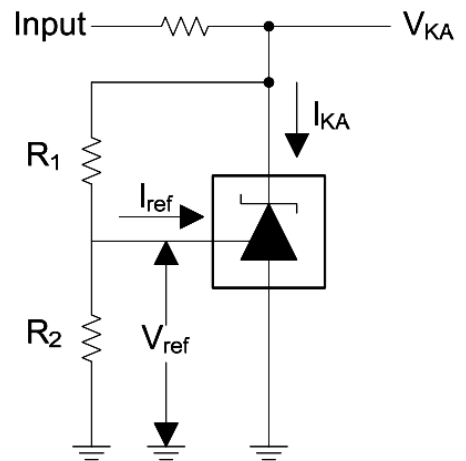
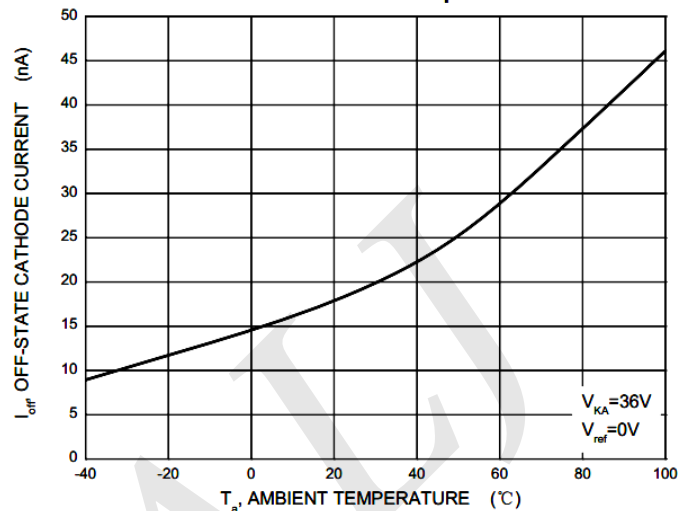
Change in Reference Input Voltage versus Cathode Voltage



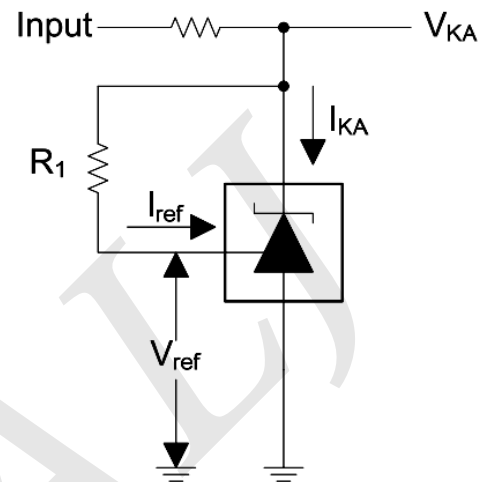
Reference Input Current versus Ambient Temperature



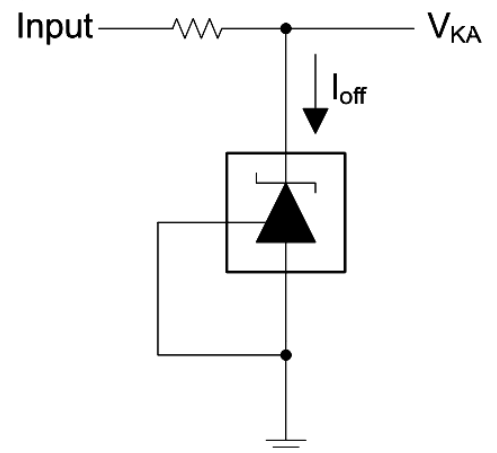
Off-State Cathode Current versus Ambient Temperature



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



Test Circuit for I_{ref}



Test Circuit for I_{off}