

CJ431B Adjustable Accurate Reference Source

DEVICE DESCRIPTION

The CJ431B is a three-terminal adjustable shunt regulators with a specified thermal stability. The output voltage may be set to any value between Vref (approx. 2.5V) and 36V with two external resistors. The active output circuitry provides a very sharp turn on characteristic making these devices an excellent replacement for zener diodes in many applications.

FEATURES

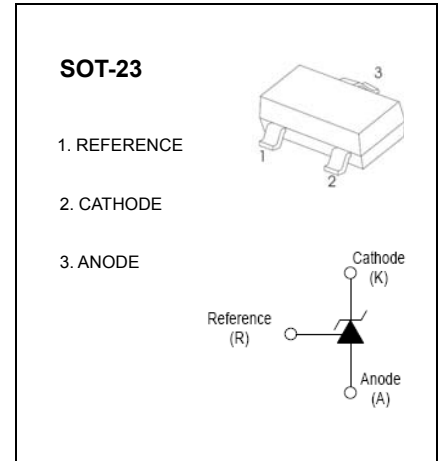
- On-wafer Vref trimming $\pm 0.3\%$
- 95% chips after packaging have Vrefaccuracy $\pm 0.5\%$
- Low Dynamic output impedance 0.1Ω (Typ)
- Adjustable output voltage
- Fast turn-on response
- Sink current capability of 0.1mA to 100mA
- Low output noise
- Industrial temperature range
- Improved temperature compensation
- Excellent temperature coefficient 25ppm/°C
- Electrostatic discharge voltage 2.5kV

APPLICATION

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

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

Parameter	Symbol	Value	Unit
Cathode Voltage	V_{KA}	40	V
Cathode Current Range (Continuous)	I_{KA}	-100~+150	mA
Reference Input Current Range	I_{ref}	0.05~+10	mA
Power Dissipation	P_D	300	mW
Thermal Resistance from Junction to Ambient	$R_{\theta JA}$	417	°C/W
Lead Temperature (1.6mm aside from the case, 10 seconds)	T_{Lead}	260	°C
Operating Ambient Temperature Range	T_j	-40~+125	°C
Storage temperature Range	T_{stg}	-65~+150	°C
ESD (HBM)	V_{ESD}	2.5	kV



ELECTRICAL CHARACTERISTICS (T_a=25°C 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	2.483	2.495	2.508	V
Deviation of reference input voltage over temperature (note) (Fig.1)	ΔV _{ref} /ΔT	V _{KA} =V _{REF} , I _{KA} =10mA T _{MIN} ≤T _a ≤T _{MAX}		8	17	mV
Ratio of change in reference input voltage to the change in cathode voltage (Fig.2)	ΔV _{ref} /ΔV _{KA}	I _{KA} =10mA	ΔV _{KA} =10V~V _{REF}	-1.0	-2.7	mV/V
			ΔV _{KA} =36V~10V	-0.4	-2.0	mV/V
Reference input current (Fig.2)	I _{ref}	I _{KA} =10mA, R ₁ =10kΩ R ₂ =∞		0.5	1.2	μA
Deviation Of reference input current over full temperature range (Fig.2)	ΔI _{ref} /ΔT	I _{KA} =10mA, R ₁ =10kΩ R ₂ =∞ T _A = full range		0.4	1.2	μA
Minimum cathode current for regulation (Fig.1)	I _{KA(min)}	V _{KA} =V _{REF}		0.08	0.3	mA
Off-state cathode Current (Fig.3)	I _{KA(OFF)}	V _{KA} =36V, V _{REF} =0		0.01	0.8	μA
Dynamic impedance	Z _{KA}	V _{KA} =V _{REF} , I _{KA} =0.2 to 100mA f≤1.0kHz		0.1	0.37	Ω

Note: T_{MIN}=-25°C, T_{MAX}=+125°C

CLASSIFICATION cZV_{ref}

Rank	*** 0.5%
Range	2.483-2.508

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

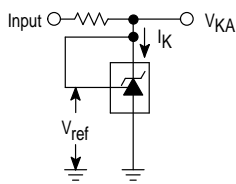


Figure 2. Test Circuit for V_{KA} > V_{ref}

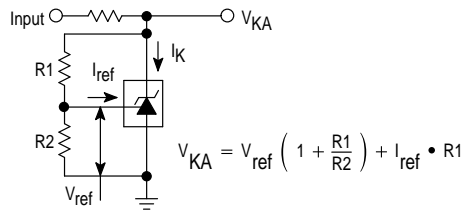
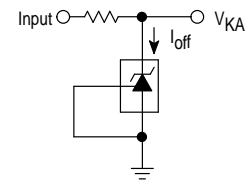
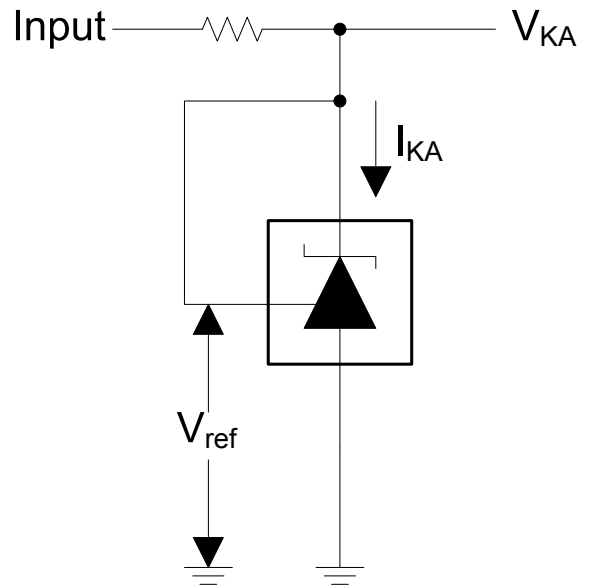
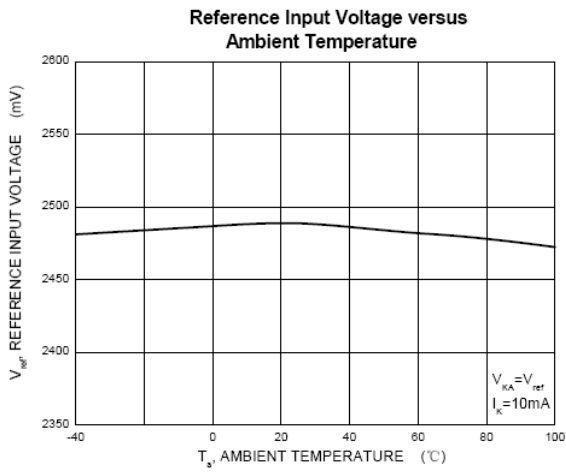
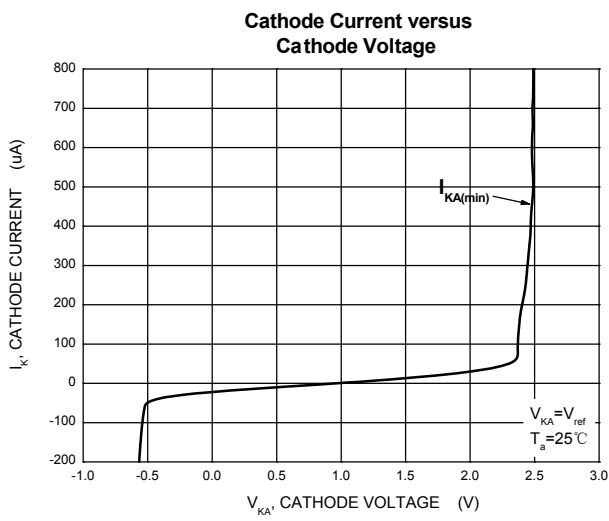
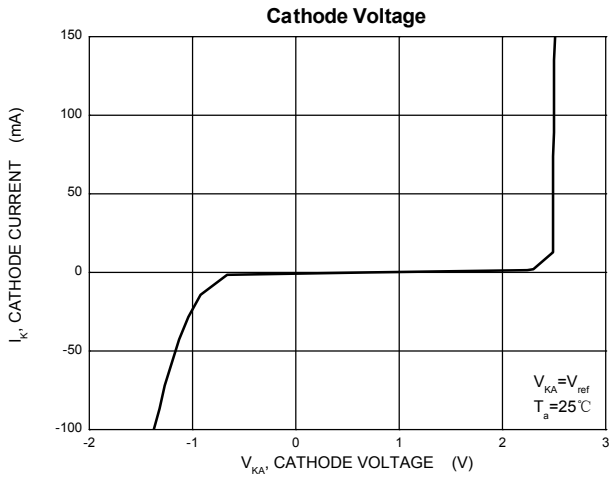


Figure 3. Test Circuit for I_{off}



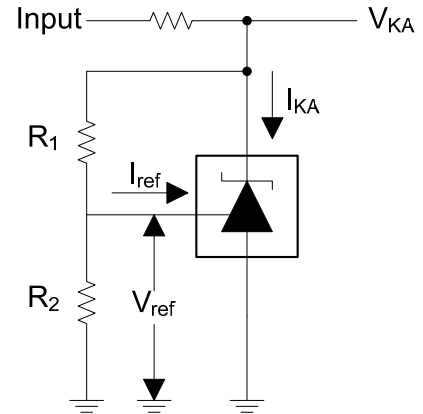
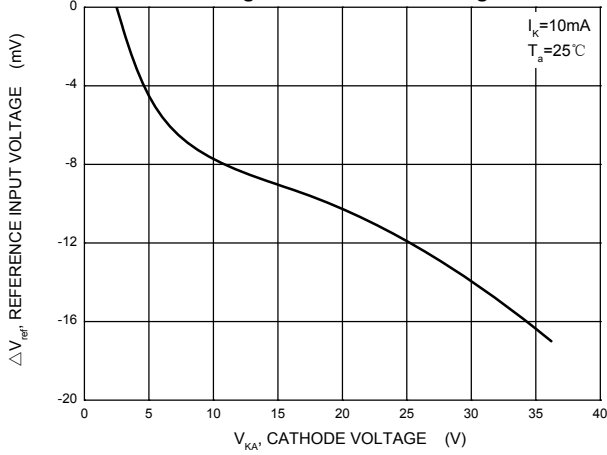
Typical Characteristics



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

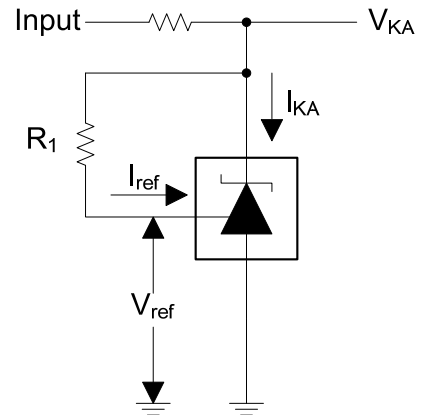
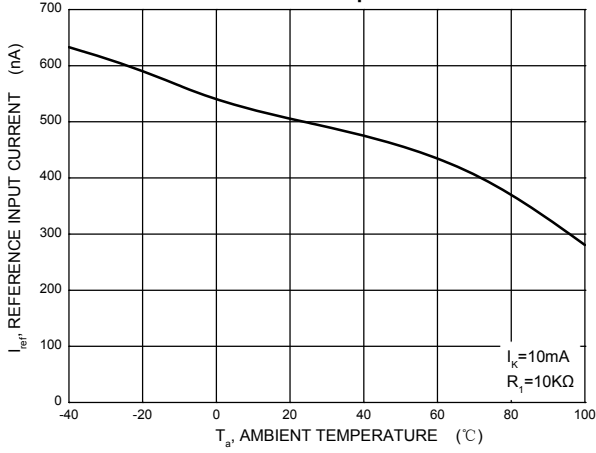
Typical Characteristics

Change in Reference Input Voltage versus Cathode Voltage



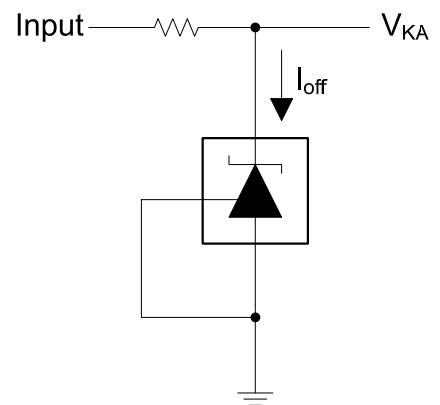
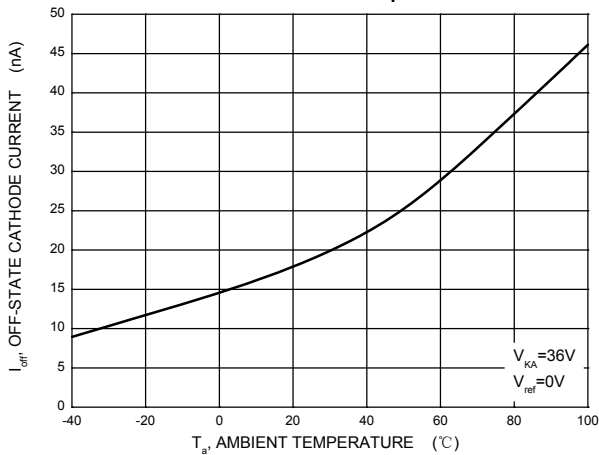
Test Circuit for $V_{KA} = V_{ref}(1 + R1/R2) + R1 * I_{ref}$

Reference Input Current versus Ambient Temperature



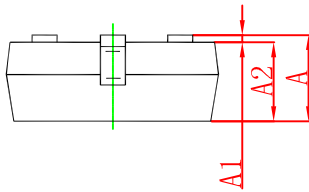
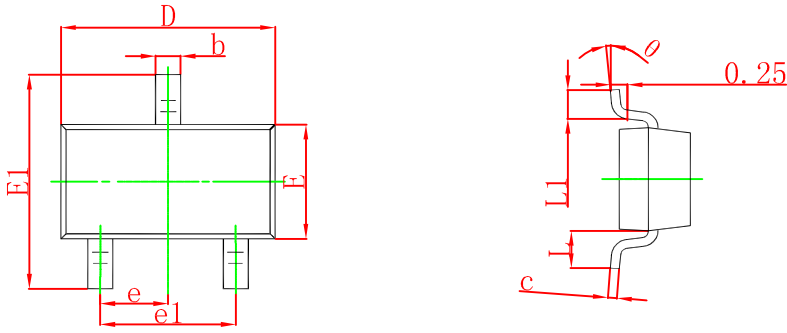
Test Circuit for I_{ref}

Off-State Cathode Current versus Ambient Temperature



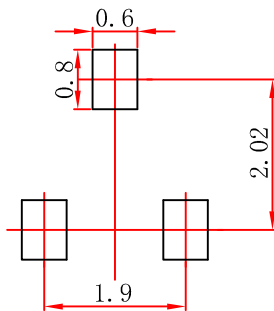
Test Circuit for I_{off}

SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout

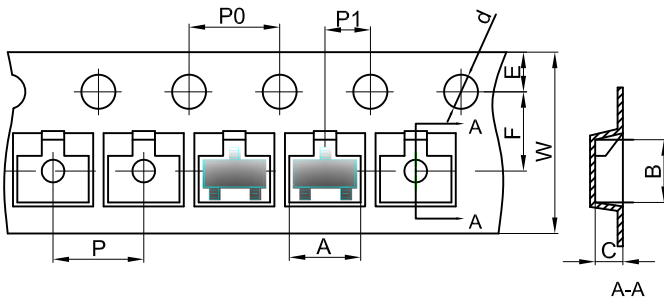


Note:

1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.

SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape



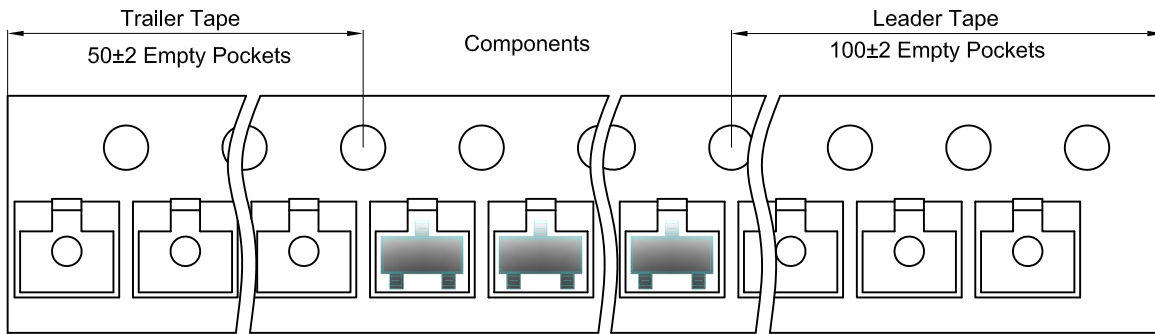
Packaging Description:

SOT-23 parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 3,000 units per 7" or 17.8cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

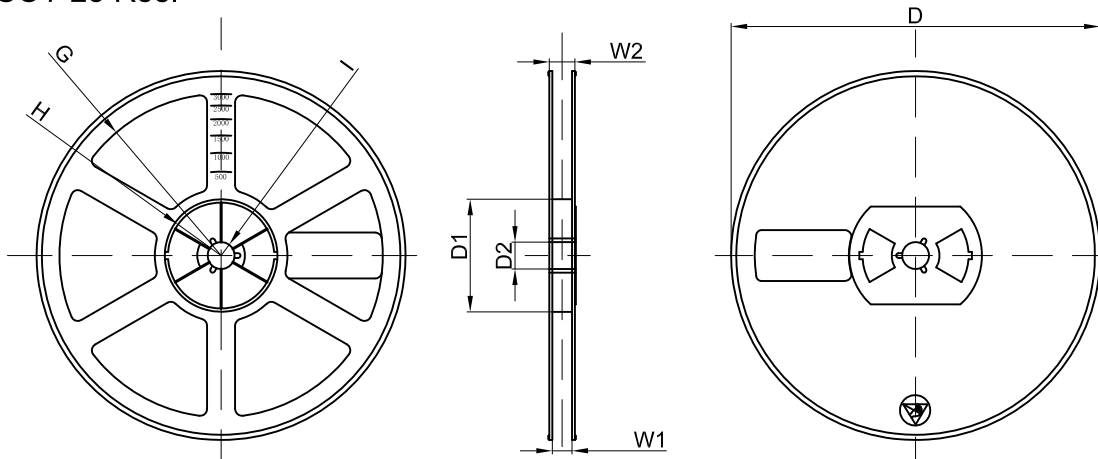
Dimensions are in millimeter

Pkg type	A	B	C	d	E	F	P0	P	P1	W
SOT-23	3.15	2.77	1.22	Ø1.50	1.75	3.50	4.00	4.00	2.00	8.00

SOT-23 Tape Leader and Trailer



SOT-23 Reel



Dimensions are in millimeter

Reel Option	D	D1	D2	G	H	I	W1	W2
7"Dia	Ø178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30

REEL	Reel Size	Box	Box Size(mm)	Carton	Carton Size(mm)	G.W.(kg)
3000 pcs	7 inch	45,000 pcs	203×203×195	180,000 pcs	438×438×220	

DISCLAIMER

IMPORTANT NOTICE, PLEASE READ CAREFULLY

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