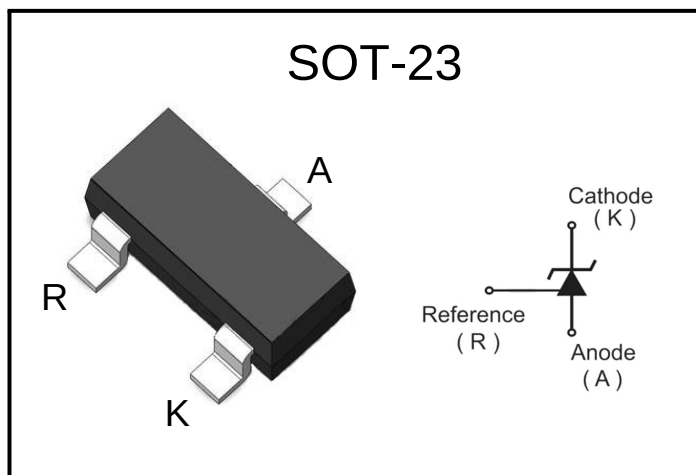


Features

- Programmable output Voltage to 36V
- Low dynamic output impedance 0.1Ω
- Sink current capability of 0.3 to 100mA
- Equivalent full-range temperature coefficient of 25ppm/°C typical
- Temperature compensated for operation over full rated operating temperature range
- Low output noise voltage
- Fast turn on response

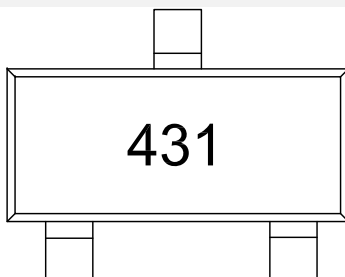
Package



Description

The BX431A is three-terminal adjustable regulator with a guaranteed thermal stability over applicable temperature ranges. The output Voltage may be set to any value between V_{ref} (approximately 2.495V) and 36V with two external resistors. These devices have provides a very sharp turn-on characteristic , making these devices excellent replacement for zener diodes in many applications.

Marking



Ordering information

Order code	Package	Base qty	Delivery mode
BX431A	SOT-23	3k	Tape and reel

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

Symbol	Characteristics	Value	Units
V_{KA}	Cathode Voltage	40	V
I_K	Cathode Current Range(Continuous)	-100 to 150	mA
I_{ref}	Reference Input Current Range	-0.05 to 10	
T_{opr}	Operating Junction temperature	-40 to 125	°C
T_{stg}	Storage temperature Temperature	-65 to 150	



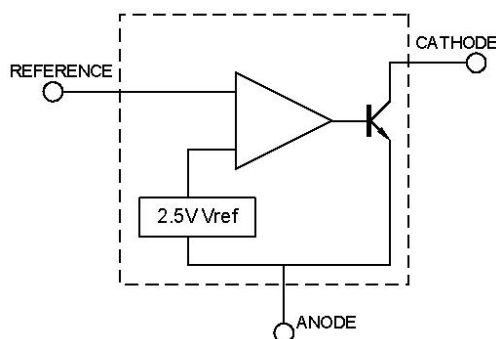
Recommended Operating Conditions

Characteristics	Symbol	Min.	Max.	Units
V_{KA}	Cathode Voltage	V_{REF}	36	V
I_K	Cathode Current	0.3	100	mA

Electrical Characteristics ($T_A=25^{\circ}\text{C}$ free-air temperature, unless otherwise noted)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Reference Input Voltage	V_{ref}	$V_{KA} = V_{ref}, I_{KA} = 10\text{mA}$	2.488	2.495	2.502	V
			2.483	2.495	2.507	
			2.470	2.495	2.520	
Deviation of reference Input Voltage Over temperature	ΔV_{ref}	$V_{KA} = V_{REF}, I_{KA} = 10\text{mA}, T_{MIN} \leq T_A \leq T_{MAX}$	—	8	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{ref} / \Delta V_{KA}$	$I_{KA} = 10\text{mA}, \Delta V_{KA} = 10\text{V} \sim V_{REF}$	—	-1.0	-2.7	mV/V
		$I_{KA} = 10\text{mA}, \Delta V_{KA} = 36\text{V} \sim 10\text{V}$	—	-0.4	-2	
Reference Input Current	I_{ref}	$I_{KA} = 10\text{mA}, R1 = 10\text{k}\Omega, R2 = \infty$	—	0.5	1.2	μA
Deviation of the REF input current over full temperature range	$\Delta I_{ref} / \Delta T$	$I_{KA} = 10\text{mA}, R1 = 10\text{k}\Omega, R2 = \infty, T_A = \text{full Temperature}$	—	0.4	1.2	μA
Minimum cathode current for regulation	$I_{KA(min)}$	$V_{KA} = V_{REF}$	—	250	500	μA
Off-state cathode current	$I_{KA(OFF)}$	$V_{KA} = 36\text{V}, V_{ref} = 0\text{V}$	—	0.17	0.9	μA
Dynamic impedance	Z_{KA}	$V_{KA} = V_{REF}, f \leq 1\text{KHZ}, I_{KA} = 0.2\text{mA to } 100\text{mA}$	—	0.1	0.37	Ω

Block Diagram



Test Circuits

Fig 1: Test Circuit for $V_{KA}=V_{ref}$

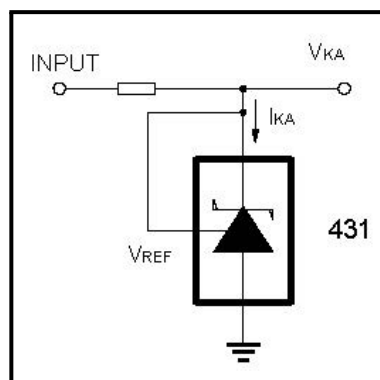


Fig 2: Test Circuit for $V_{KA}>V_{REF}$

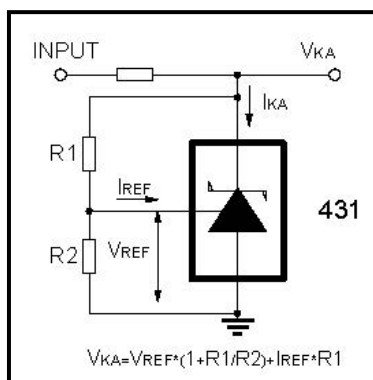
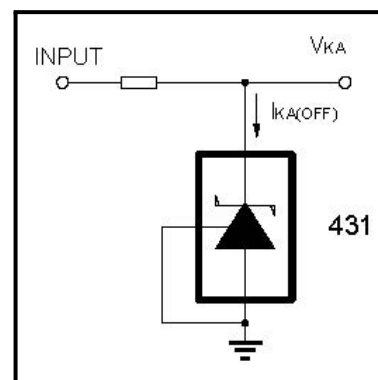


Fig 3: Test Circuit for $I_{KA(off)}$



Typical Characteristics

Fig 4: Shutdown Regulator

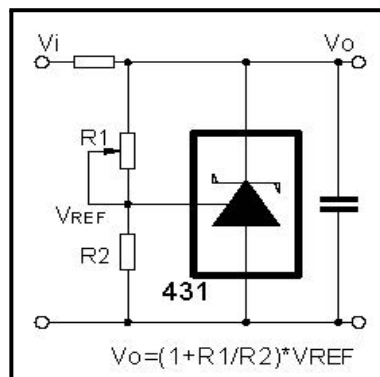


Fig 5: Output Control of a Three-Terminal Fixed Regulator

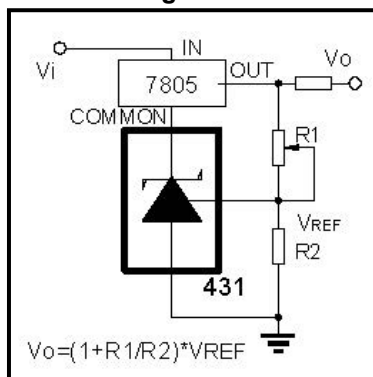


Fig 6: Higher-current Shunt Regulator

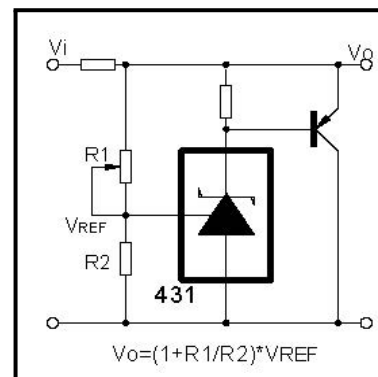


Fig 7: Constant-current Sink

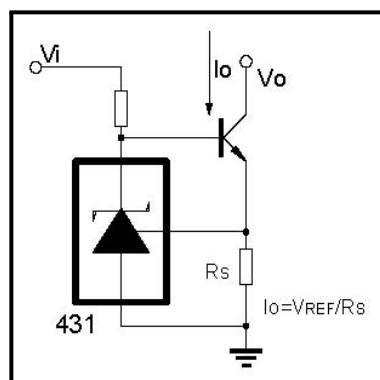
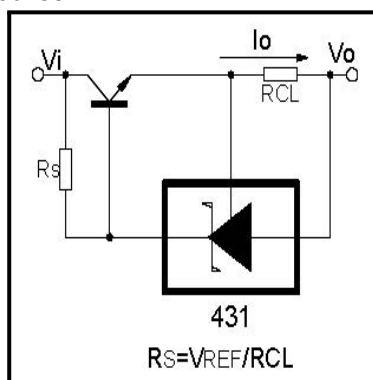


Fig 8: Current Limiting or Current Source



Typical Performance Characteristics

Fig 7: Cathode Current Vs Cathode Voltage

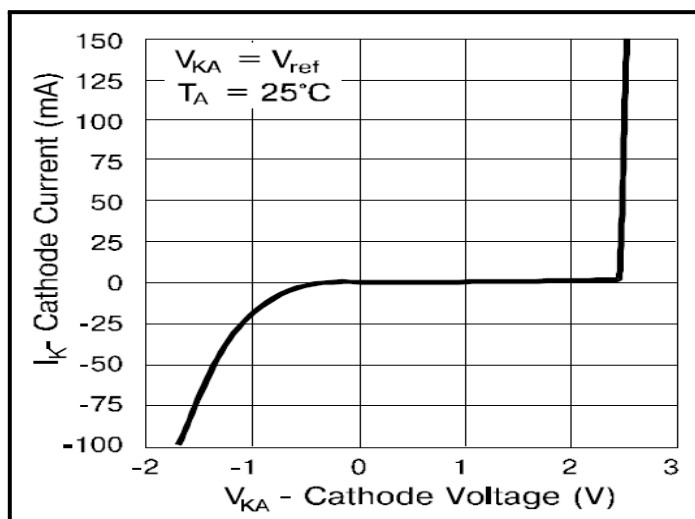
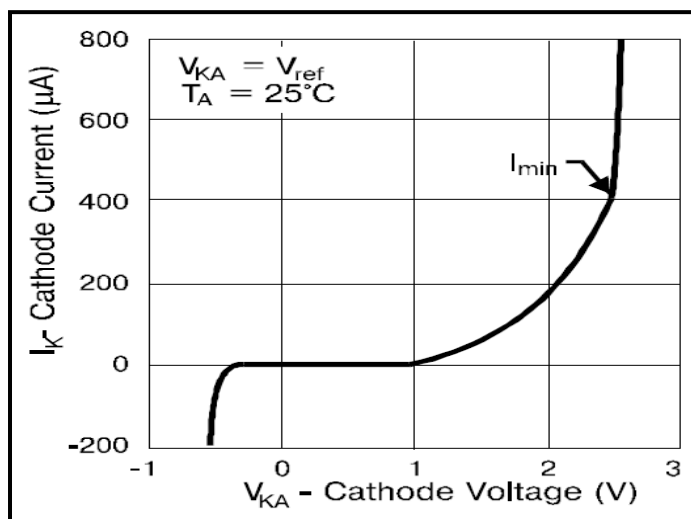
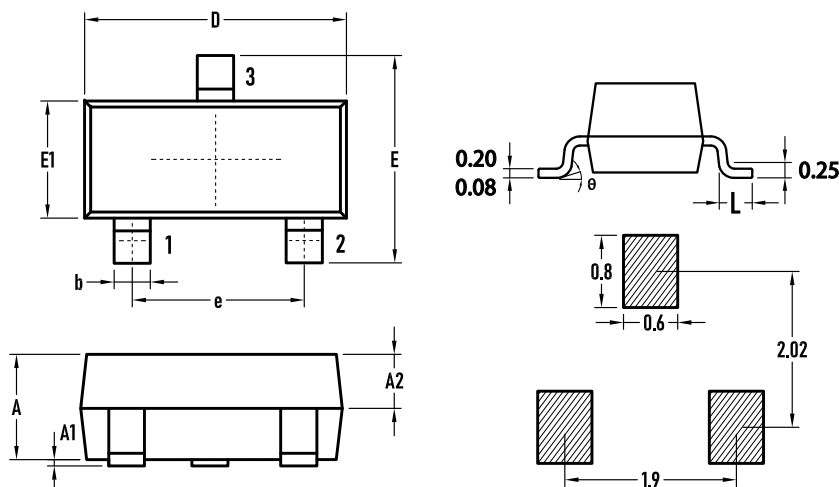


Fig 8: Cathode Current Vs Cathode Voltage

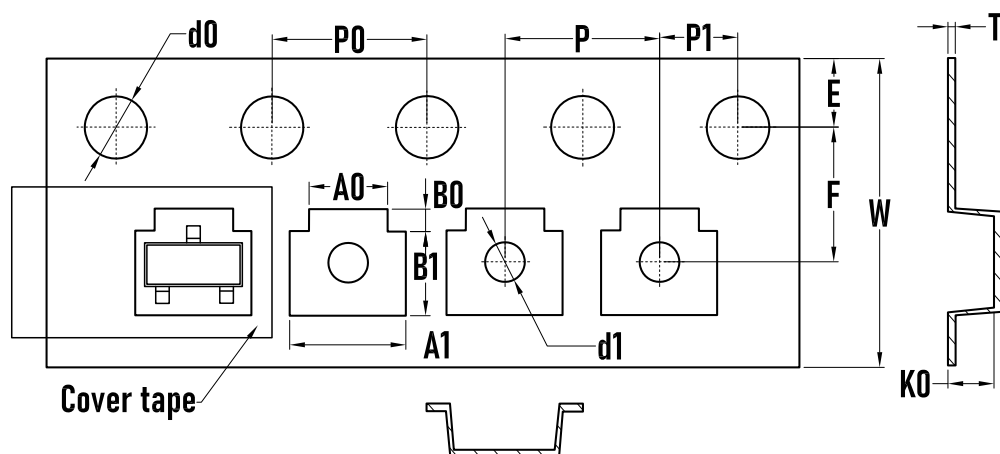


Outline Drawing - SOT-23



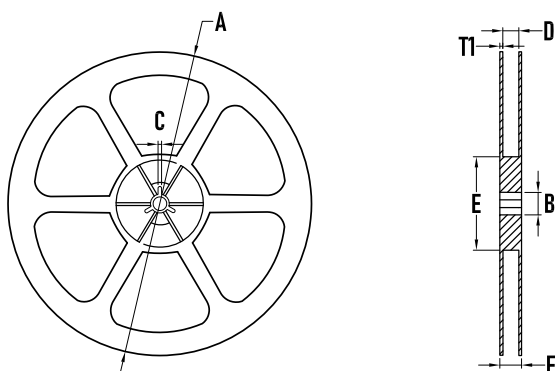
SYMBOL	MILLIMETER		
	MIN.	Typ	MAX
A	0.95	1.00	—
A1	0.02	0.06	0.10
A2	—	0.60	—
D	2.85	2.90	2.95
b	0.37	0.40	0.43
E	2.35	2.40	2.45
E1	1.25	1.30	1.35
e	1.85	1.90	1.95
L	0.35	0.40	0.48
θ	0	—	6°

Packaging Tape - SOT-23



SYMBOL	MILLIMETER
A0	2.10±0.10
A1	3.10±0.10
B0	0.65±0.10
B1	2.75±0.10
d0	1.55±0.10
d1	1.00±0.05
E	1.75±0.10
F	3.50±0.10
K0	1.10±0.10
P	4.00±0.10
P0	4.00±0.10
P1	2.00±0.10
W	8.00±0.30
T	0.20 ±0.05

Packaging Reel



SYMBOL	MILLIMETER
A	177.8±0.2
B	3.1
C	13.50
D	9.6±0.3
E	75±0.2
F	12.3±0.3
T1	1.0±0.2
Quantity	3000PCS

