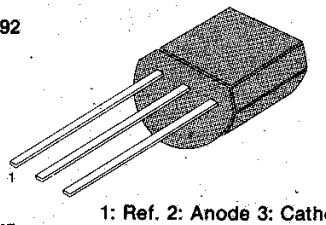
PROGRAMMABLE PRECISION REFERENCES

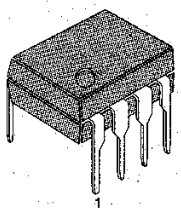
The KA431 is a three-terminal adjustable regulator series with guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{ref} (approximately 2.5 volts) and 36 volts with two external resistors. These devices have a typical dynamic output impedance of 0.2Ω. Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacement for zener diodes in many applications.

TO-92



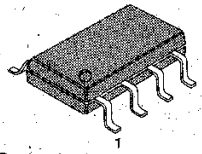
1: Ref. 2: Anode 3: Cathode

8 DIP



1: Cathode 6: Anode 8: Ref. 2, 3, 4, 7: N.C.

8 SOP

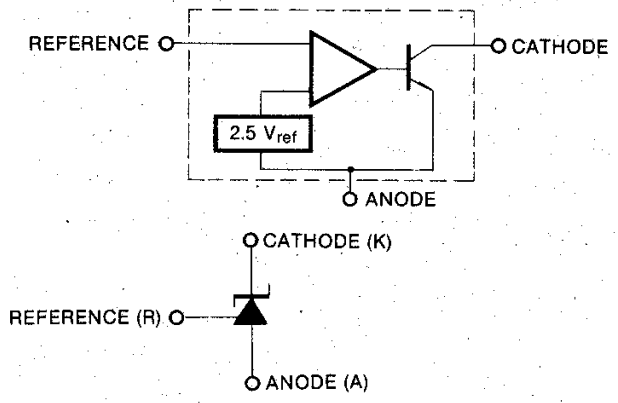


1: Cathode 2, 3, 6, 7: Anode 8: Ref. 4, 5: N.C.

FEATURES

- **Programmable output voltage to 36 volts**
- **Low dynamic output impedance 0.2Ω typical**
- **Sink current capability of 1.0 to 100mA**
- **Equivalent full-range temperature coefficient of 50ppm/°C typical**
- **Temperature compensated for operation over full rated operating temperature range**
- **Low output noise voltage**

BLOCK DIAGRAM

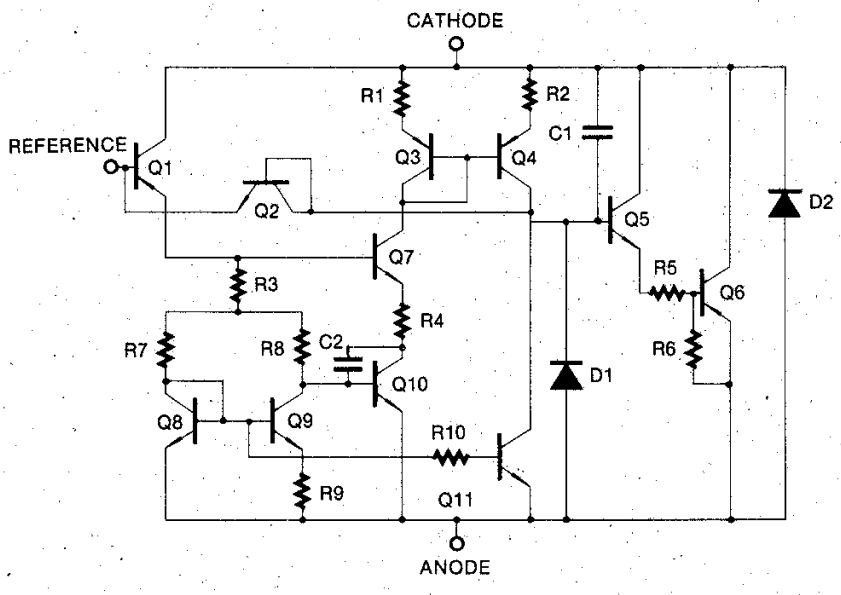


ORDERING INFORMATION

Device	Operating Temperature	Package
KA431CZ	0 ~ +70°C	TO-92
**KA431CN	0 ~ +70°C	8 DIP
KA431CD	0 ~ +70°C	8 SOP
**KA431IZ	−40 ~ +85°C	TO-92
**KA431IN	−40 ~ +85°C	8 DIP

** Under Development.

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Cathode Voltage	V_{KA}	37	V
Cathode Current Range (Continuous)	I_K	−100 ~ +150	mA
Reference Input Current Range	I_{ref}	0.05 ~ +10	mA
Power Dissipation	P_D		
D, Z Suffix Package		770	mW
N Suffix Package		1000	mW
Operating Temperature	T_{opr}		
KA431CZ, KA431CN, KA431CD		0 ~ +70	°C
KA431IZ, KA431IN		−40 ~ +85	°C
Operating Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	−65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS

Characteristic	Symbol	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}	V_{ref}		36	V
Cathode Current	I_K	1.0		100	mA

ELECTRICAL CHARACTERISTICS (Ta = 25°C, unless otherwise specified)

Characteristic	Symbol	Test Conditions		Min	Typ	Max	Unit	*T/C
Reference Input Voltage	V_{ref}	$V_{KA} = V_{ref}$, I_K = 10mA	Ta = 25°C	2.440	2.495	2.550	V	1
			Ta = 0°C to 70°C	2.423		2.567		
Deviation of Reference Input Voltage Over Temperature 1	$V_{ref(dev)}$	$V_{KA} = V_{ref}$, I_K = 10mA, Ta = 0°C to 70°C			8	17	mV	1
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\frac{V_{ref}}{V_{KA}}$	I_K = 10mA	$V_{KA} = V_{ref}$ to 10V		−1.4	−2.7	mV/V	2
			V_{KA} = 10V to 36V		−1.0	−2.0		
Reference Input Current	I_{ref}	I_K = 10mA, R1 = 10KΩ, R2 = ∞	Ta = 25°C		1.8	4.0	μA	2
			Ta = 0°C to 70°C			5.2		
Reference Input Current Deviation Over Temperature Range	I_{ref}	I_K = 10mA, R1 = 10KΩ, R2 = ∞, Ta = 0°C to 70°C			0.4	1.2	μA	2
Minimum Cathode Current for Regulation	I_{Kmin}	$V_{KA} = V_{ref}$			0.5	1.0	mA	1
Off-State Cathode Current	I_{Koff}	V_{KA} = 36V, V_{ref} = 0V			2.6	1000	nA	3
Dynamic Impedance 2	Z_{KA}	$V_{KA} = V_{ref}$, I_K = 1.0 to 100mA, f ≤ 1.0KHz			0.22	0.5	Ω	1

* Test Circuit