

DESCRIPTION

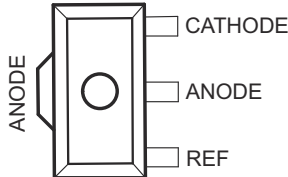
The AZ431Ax-ATRE1 is a three-terminal adjustable regulator series with a guaranteed thermal stability over applicable temperature ranges. The output voltage may be set to any value between V_{ref} (approximately 2.5 volts) and 40 volts with two external resistors. These devices have a typical dynamic 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.

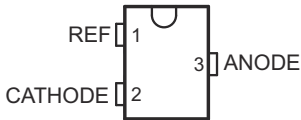
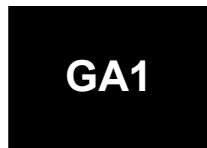
FEATURES

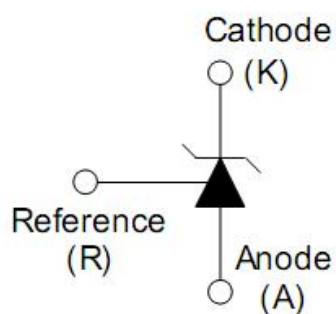
- Programmable Output Voltage to 36V
- Low Dynamic Output Impedance 0.27Ω (Typ)
- Sink Current Capability of 0.1mA to 100mA
- Equivalent Full-Range Temperature Coefficient of 50 ppm/°C
- Temperature Compensated for Operation over Full Rated Operating Temperature Range
- Low Output Noise Voltage
- Fast Turn on Respons
- TO-92, SOT-89-3 or SOT-23 packages

Reference News

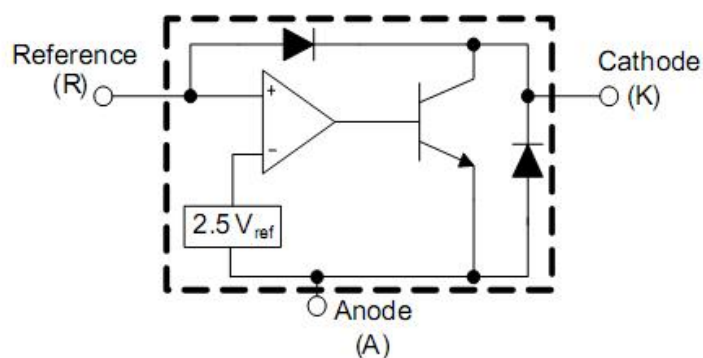
PIN CONFIGURATION	MARKING
	

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Symbol



Representative Block diagram

ORDER INFORMATION

P/N	PKG	QTY
AZ431AZ-ATRE1	TO-92	1000
AZ431AN-ATRE1	SOT-23	3000
AZ431AR-ATRE1	SOT89-3	1000

ABSOLUTE MAXIMUM RATINGS

(Operating temperature range applies unless otherwise specified)

Characteristic	Symbol	Value	Unit
Cathode Voltage	V_{KA}	36	V
Cathode Current Range (Continuous)	I_K	-100 ~ 150	mA
Reference Input Current Range	I_{REF}	-0.05 ~ +10	mA
Power Dissipation at 25°C: TO-92 Package ($R_{\theta JA} = 178^{\circ}\text{C/W}$) SOT-23 Package ($R_{\theta JA} = 625^{\circ}\text{C/W}$)	P_D	0.7 0.2	W W
Junction Temperature Range	T_J	-40 ~ 150	°C
Storage Temperature Range	T_{stg}	-65 ~ +150	°C

RECOMMENDED OPERATING CONDITIONS

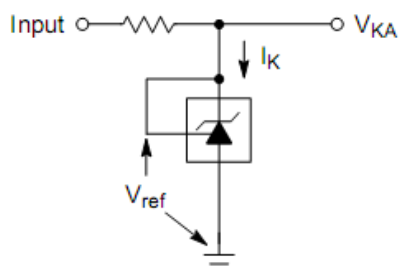
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Cathode Voltage	V_{KA}		V_{REF}		36	V
Cathode Current	I_K		0.5		100	mA

ELECTRICAL CHARACTERISTICS

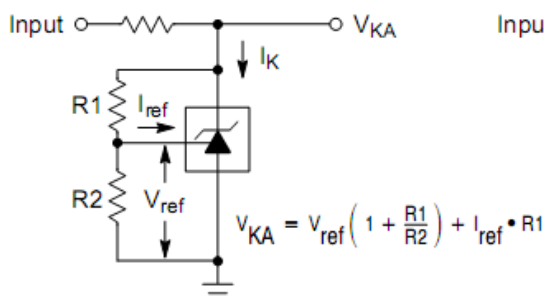
($T_a = 25^\circ\text{C}$, $V_{KA} = V_{REF}$, $I_K = 10\text{mA}$ unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA} = V_{REF}$, $I_K = 10\text{mA}$	2.483	2.495	2.507	V
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	$\Delta V_{REF}/\Delta V_{KA}$	$\Delta V_{KA} = 10\text{V} - V_{REF}$ $\Delta V_{KA} = 36\text{V} - 10\text{V}$	-0.4 -0.4	0.0 0.0	2.7 2.0	mV/V
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}	$I_K = 1\text{mA}$ 100mA , $f \leq 1.0\text{KHz}$		0.27	0.5	Ω

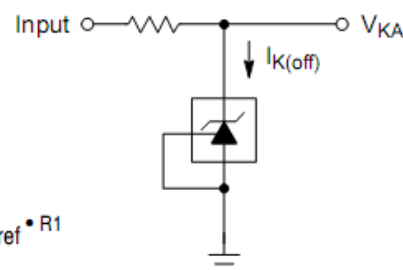
TEST CIRCUITS



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

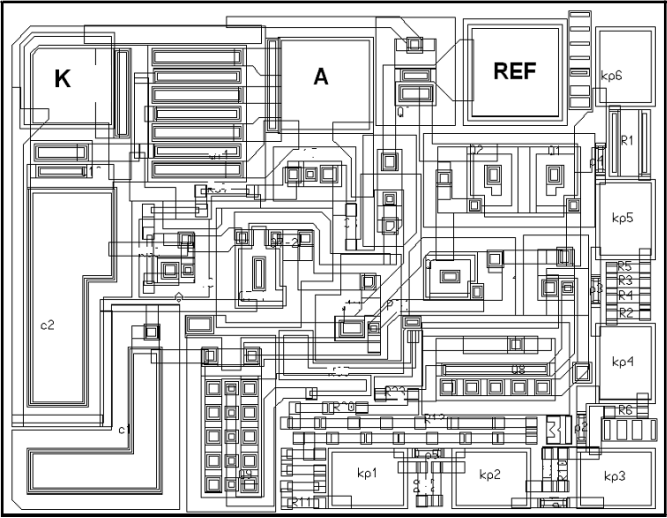


Test Circuit
for $V_{KA} > V_{ref}$



Test Circuit
for $I_{K(off)}$

PAD LAYOUT



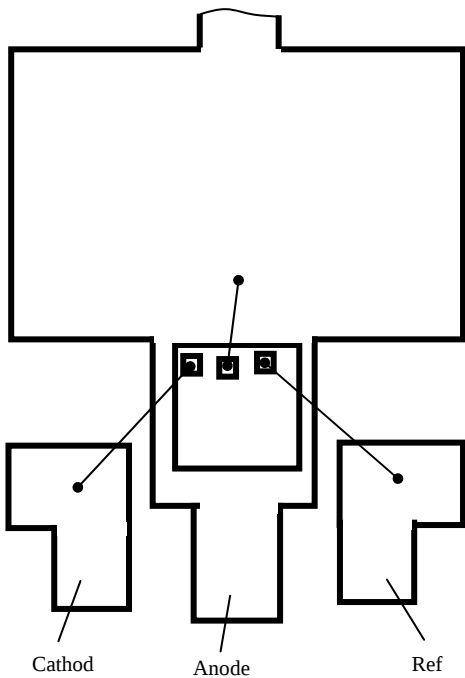
PHISICAL CHARACTERISTICS:

Wafer Diameter.....100 ± 0.5mm
 Wafer Thickness..... 260 ±20 μm
 Die size.....0.76 x 0.60 mm²
 Scribe Width.....60 μm
 Pad Size86 x 86 μm
 Passivation.....PECVD
 Backside metallizationwithout metallization

PAD LOCATION

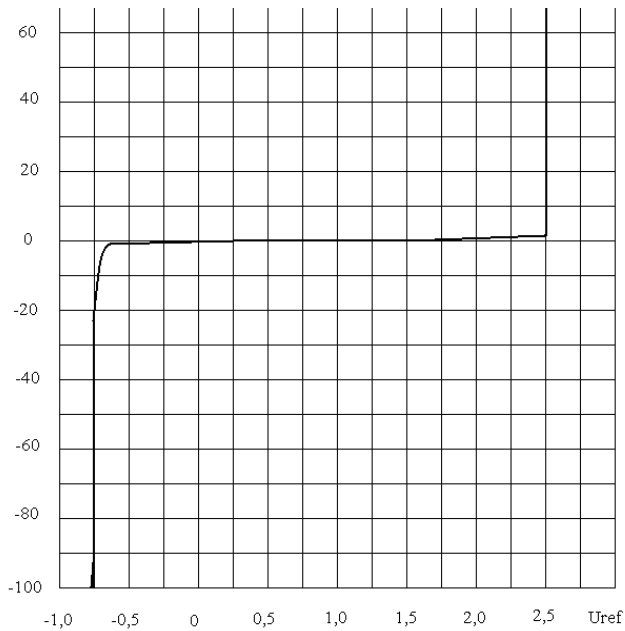
Pad Name	Description	X	Y
K	Cathode	56	445
A	Anode	328	440
R	Reference	528	453

BONDING DIAGRAM

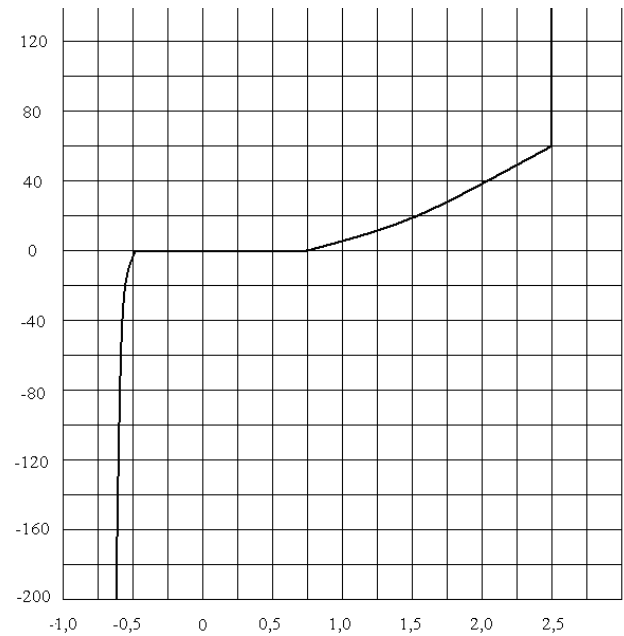


TYPICAL PERFORMANCE CHARACTERISTICS

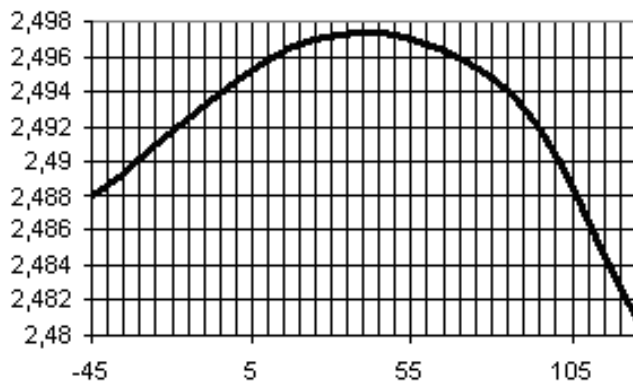
**Cathode Current I_k (mA)
vs. Cathode Voltage U_k (V)**



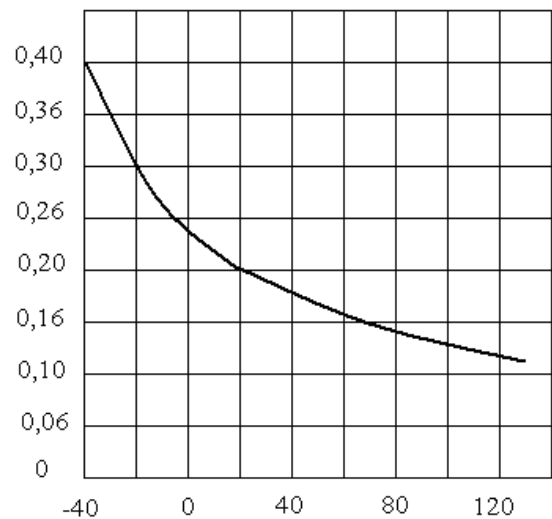
**Cathode Current I_k (uA)
vs. Cathode Voltage U_k (V)**



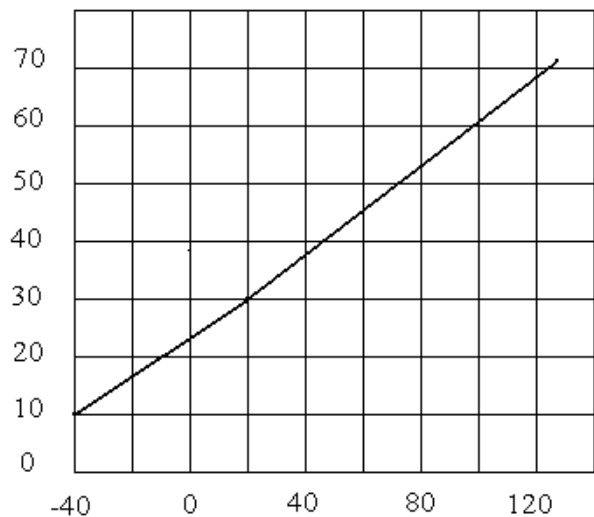
**Reference Voltage U_{ref} (V)
vs. Junction Temperature T_j (°C)
 $I_k=10\text{mA}$**



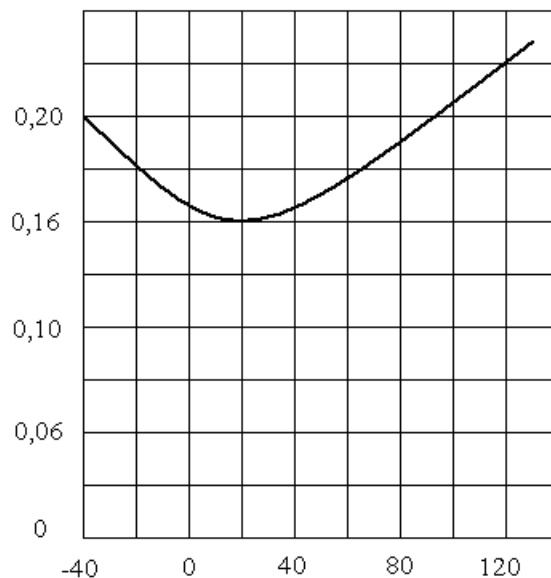
**Reference Input Current I_{ref} (uA)
vs. Junction Temperature T_j (°C)
 $I_k=10\text{mA}$**



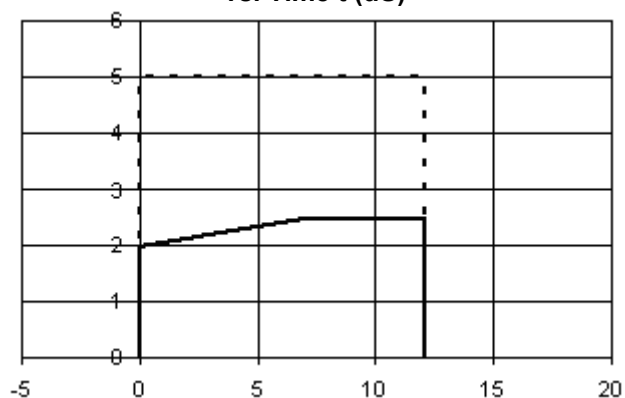
**Off-State Cathode Current I_{koff} (uA)
vs. Junction Temperature T_j (°C)
 $U_{ka}=36V$**

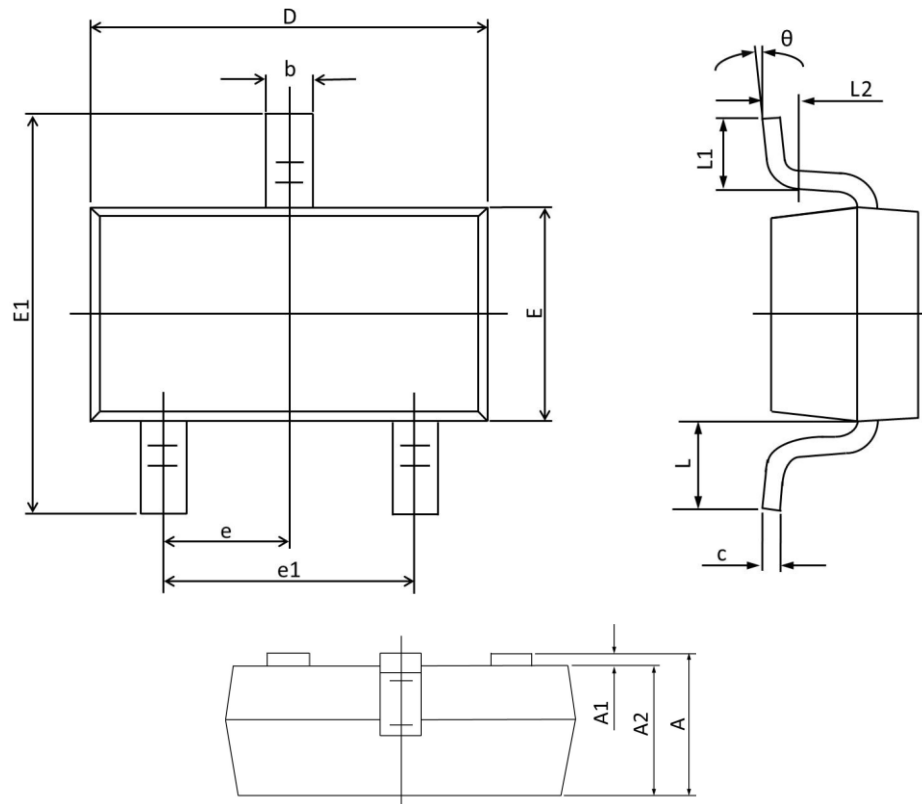


**Dynamic Impedance Z_{ka} (Ohm)
vs. Junction Temperature T_j (°C)
 $I_k = 1 \div 100$ mA**



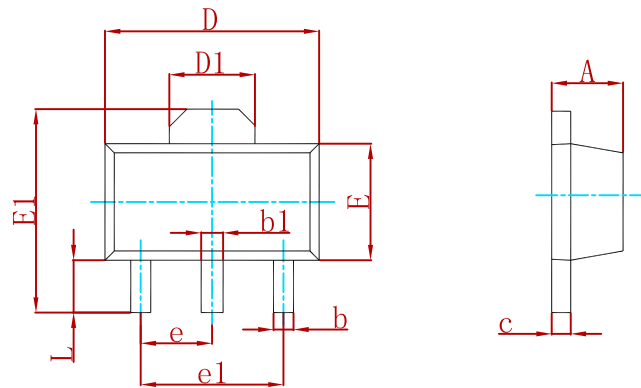
**Pulse Response Input and Output Voltage (V)
vs. Time t (uS)**



SOT-23 PACKAGE INFORMATION


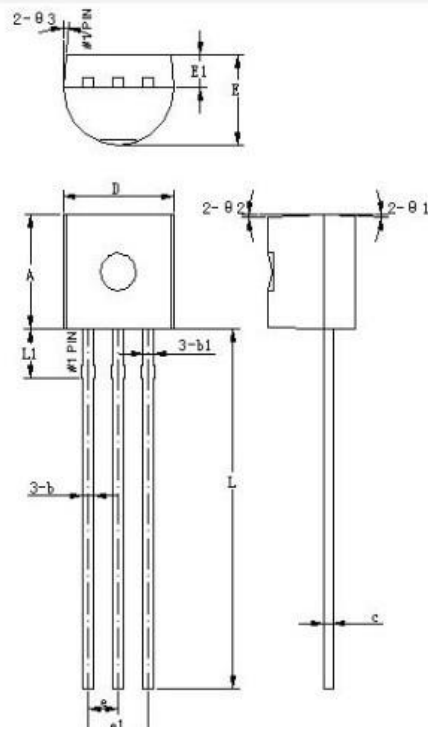
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Max	Min	Max	Min
A	1.150	0.900	0.045	0.035
A1	0.100	0.000	0.004	0.000
A2	1.050	0.900	0.041	0.035
b	0.500	0.300	0.020	0.012
c	0.150	0.080	0.006	0.003
D	3.000	2.800	0.118	0.110
E	1.400	1.200	0.055	0.047
E1	2.550	2.250	0.100	0.089
e	0.95 TYP.		0.037 TYP.	
e1	2.000	1.800	0.079	0.071
L	0.55 REF.		0.022 REF.	
L1	0.500	0.300	0.020	0.012
L2	0.25 TYP.		0.01 TYP.	
θ	8°	0°	8°	0°

SOT-89 PACKAGE MECHANICAL DATA



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF.		0.061 REF.	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP.		0.118 TYP.	
L	0.900	1.200	0.035	0.047

TO-92 PACKAGE MECHANICAL DATA



符号	机械尺寸/mm		
	最小值	典型值	最大值
A	4.5	4.6	4.7
b	0.38	0.46	0.56
b1		0.46	
c	0.36	0.38	0.51
D	4.5	4.6	4.7
E	3.45	3.6	3.75
E1	1.2	1.3	1.4
e		1.27	
e1		2.54	
L	13.5	14.5	15.3
L1		1.96	
θ 1		2°	
θ 2		2°	
θ 3		5°	