DESCRIPTION

The A431A and A432A devices are three-terminal adjustable shunt regulators, with specified thermal stability over applicable automotive, commercial, and military temperature ranges.
The output voltage can be set to any value between Vref (approximately 2.5V) and 36V, with two external resistors. These devices have a typical output impedance of 0.15 Ω. Active output circuitry provides a very sharp turn-on characteristic, making these devices excellent replacements for Zener diodes in many applications, such as onboard regulation, adjustable power supplies, and switching power supplies.

The A432A device has exactly the same functionality and electrical specifications as the A431A device, but has different pinouts. Both the A431A and A432A devices are offered in two grades, with initial tolerances (at 25°C) of 0.5% for A, and 1%, for the B. In addition, low output drift versus temperature ensures good stability over the entire temperature range. The A431A and A432A devices are characterized for operation from–40°C to 125°C.

The A431A and A432A are available in SOT-23 package.

ORDERING INFORMATION

Package Type	Part Number	
SOT-23 SPQ: 3,000pcs/Reel	E3	A431AE3R-X
		A431AE3VR-X
		A432AE3R-X
		A432AE3VR-X
Note	X: Output Voltage Tolerance: A or B, A=0.5%, B=1% R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products		

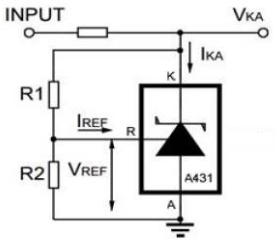
FEATURES

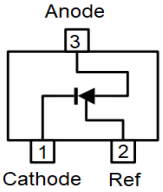
- Reference Voltage Tolerance at 25°C
  -0.5% (A Grade)
  -1% (B Grade)
- Adjustable Output Voltage: Vref to 36V
- Operation From -40°C to 125°C
- Low Output Noise
- 0.15Ω Typical Output Impedance
- Sink current capability of 0.5 to 100mA
- Available in SOT-23 package.

APPLICATIONS

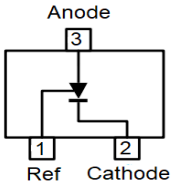
- Adjustable Voltage and Current Referencing
- Secondary Side Regulation in Flyback SMPS
- Zener Replacement
- Voltage Monitoring
- Comparator with Integrated Reference

TYPICAL APPLICATION



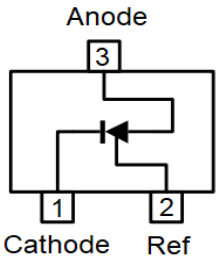


A431A



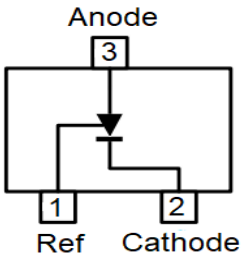
A432A

PIN DESCRIPTION



A431A, SOT-23

Top View



A432A, SOT-23

Top View

Pin #		Symbol	Function
A431A	A432A		
1	2	Cathode	Shunt Current/Voltage input
2	1	Ref	Threshold relative common anodes
3	3	Anode	Common pin, normally connected to ground

ABSOLUTE MAXIMUM RATINGS

T_A = 25℃, unless otherwise noted.

V_{KA}, Cathode Voltage	SOT-23	-0.3V~37V
I_{KA}, Cathode Current Range (Continuous)		-100mA~+150mA
I_{REF}, Reference Input Current Range		-0.05mA~+10mA
P_D, Power Dissipation	SOT-23	350mW
T_{OPR}, Operating Junction Temperature Range		-40℃~+125℃
T_J, Junction Temperature		150℃
T_{STG}, Storage Temperature Range		-55℃~ +150℃
$V_{(ESD)}$, Electrostatic Discharge	Human-body model (HBM)	±4000V
	Charge device model (MM)	±200V

Stress beyond above listed “Absolute Maximum Ratings” may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
Cathode Voltage	V_{KA}		V_{REF}	-	36	V
Cathode Current	I_{KA}		0.5	-	100	mA
Operating Ambient Temperature Range	T_A		-40	-	+125	℃

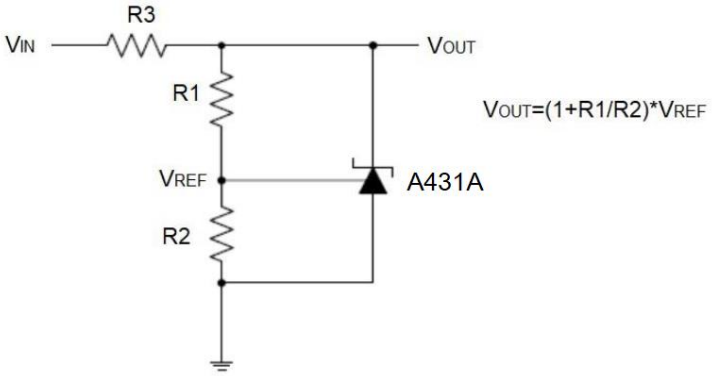
ELECTRICAL CHARACTERISTICS

Over recommended operating conditions, typical values are at T_A = +25°C, unless otherwise noted.

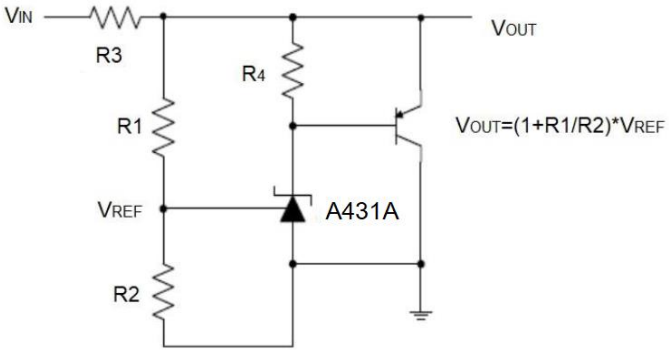
Parameter	Symbol	Conditions		Min	Typ.	Max	Unit
Reference Input Voltage	V_{REF}	$V_{KA}=V_{REF}$, I_{KA}=10mA	0.5%	2.487	2.5	2.513	V
			1%	2.475	2.5	2.525	
Deviation of Reference Input Voltage Over Temperature	$\Delta V_{REF}/\Delta T$	$V_{KA}=V_{REF}$, I_{KA}=10mA $T_{min} \le T_A \le T_{max}$		-	4.5	23	mV
Ratio of Change in Reference Input Voltage to the change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	I_{KA}=10mA	ΔV_{KA}=10V~V_{REF}	-	-1.0	-2.7	mV/V
			ΔV_{KA}=36V~ 10V	-	-0.5	-2.0	mV/V
Reference Input Current	I_{REF}	I_{KA}=10mA, R_1=10kΩ R_2=∞		-	1.5	4	μA
Deviation of Reference Input Current Over Full Temperature	$\Delta I_{REF}/\Delta T$	I_{KA}=10mA, R_1=10kΩ R_2=∞ -40℃ ≤ T_A ≤ +125℃		-	0.2	0.4	μA
Minimum Cathode Current for Regulation	$I_{KA(MIN)}$	$V_{KA}=V_{REF}$		-	0.3	0.5	mA
Off-State Cathode Current	$I_{KA(OFF)}$	V_{KA}=36V, V_{REF}=0V		-	0.05	0.5	μA
Dynamic Impedance	$\lvert Z_{KA} \rvert$	$V_{KA}=V_{REF}$, I_{KA}=1 to 100mA, f≤1kHz		-	0.15	0.5	Ω

TYPICAL APPLICATIONS CIRCUIT

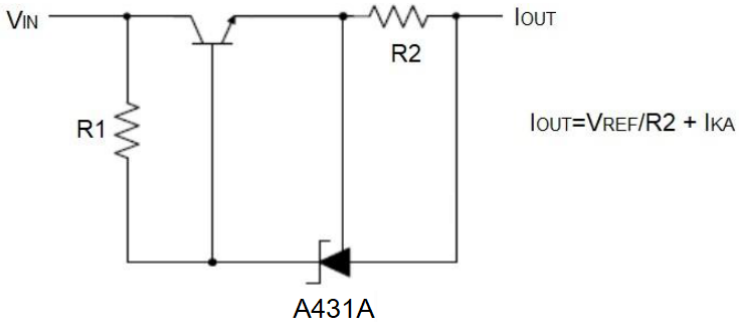
1. Shunt Regulator



2. High Current Shunt Regulator

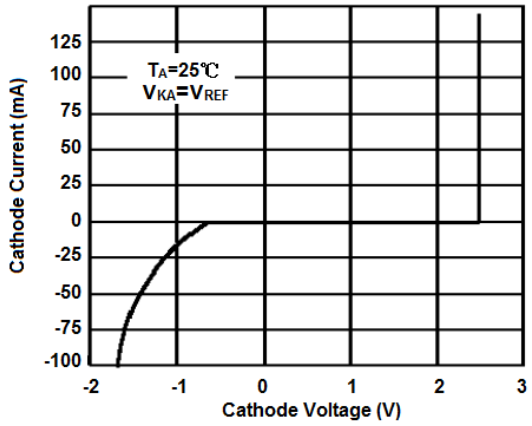


3. Current Source or Current Limit

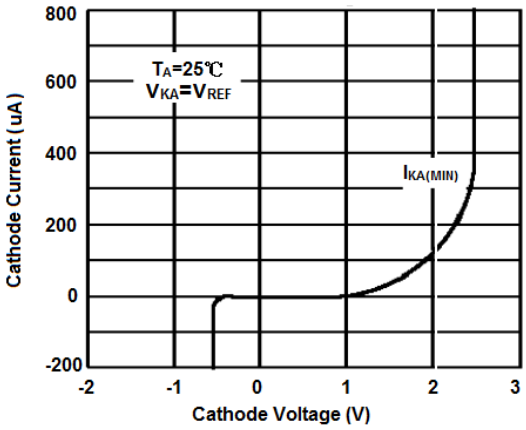


TYPICAL PERFORMANCE CHARACTERISTICS

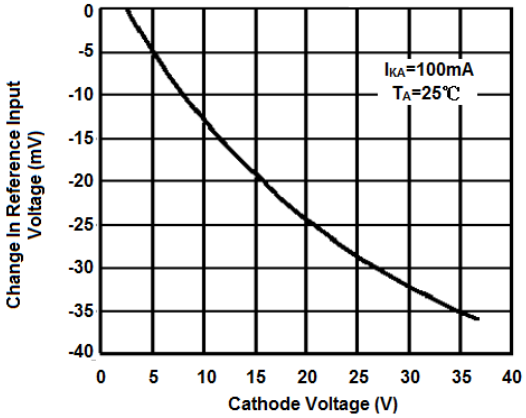
1. Cathode Current (mA) vs. Cathode Voltage



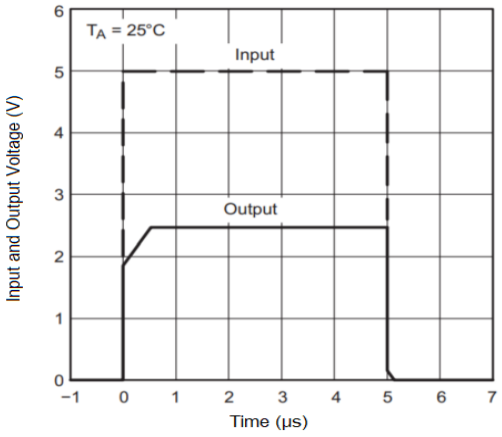
2. Cathode Current (uA) vs. Cathode Voltage



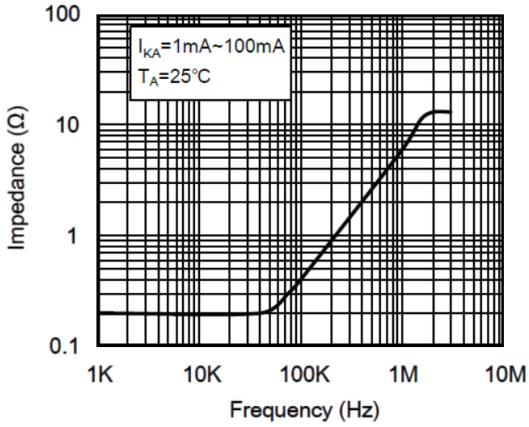
3. Change in Reference Input Voltage vs. Cathode Voltage



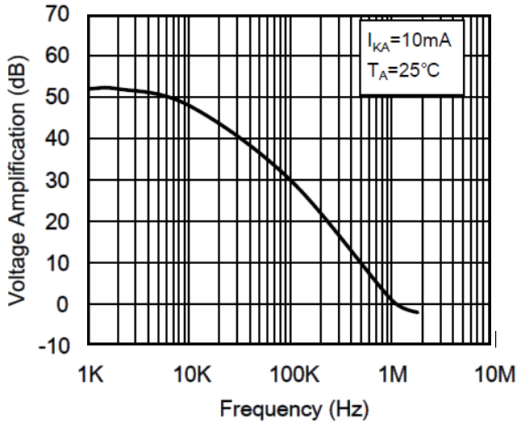
4. Pulse Response



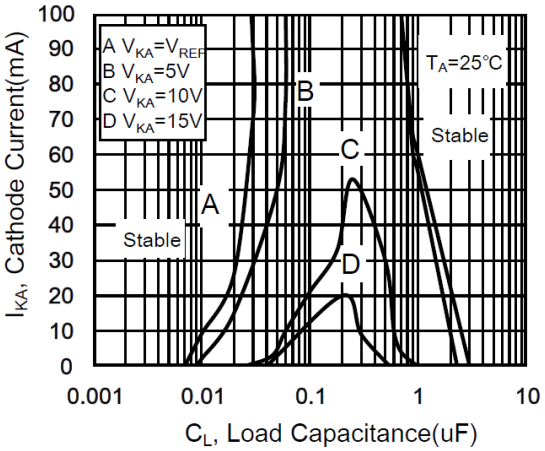
5. Dynamic Impedance vs. Frequency



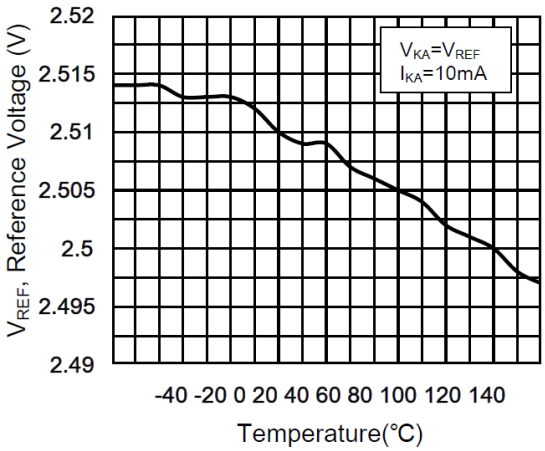
6. Small-Signal Voltage Amplification vs. Frequency



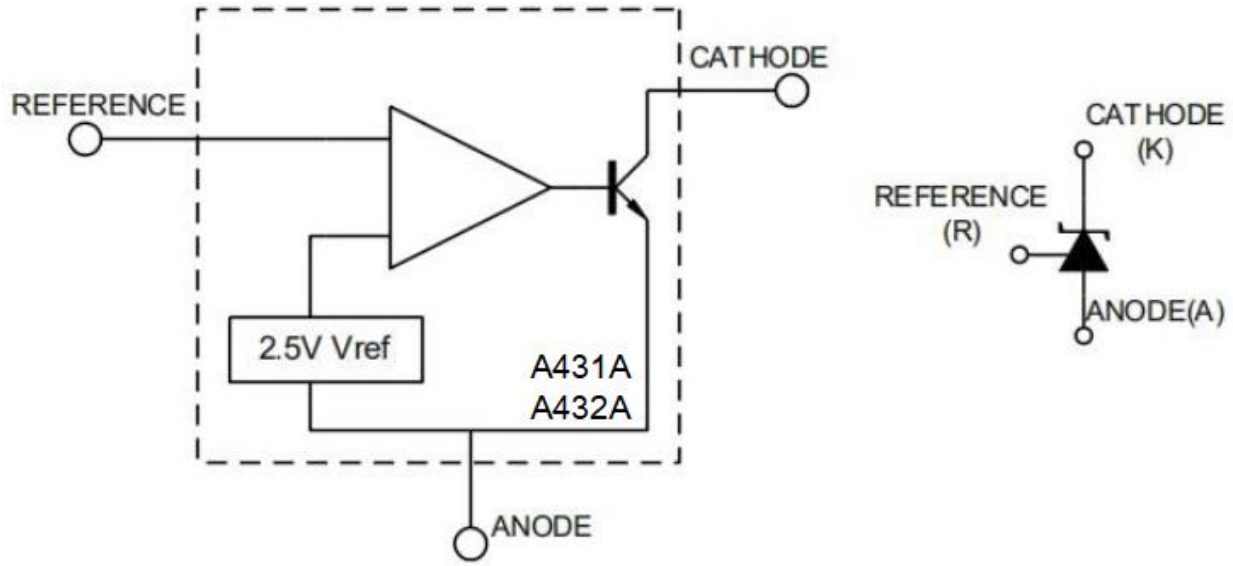
7. Cathode Current Vs Load Capacitance



8. Reference Voltage vs. Ambient Temperature

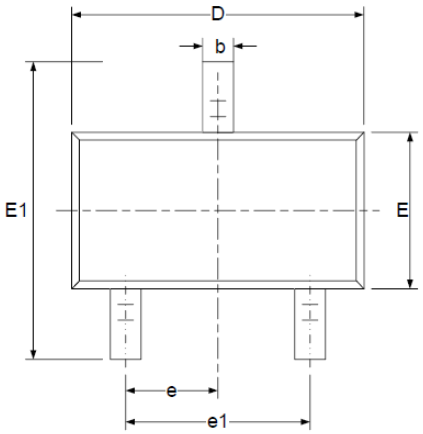


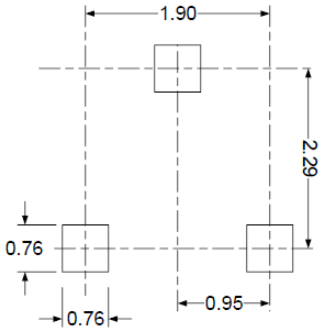
BLOCK DIAGRAM



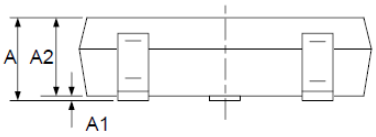
PACKAGE INFORMATION

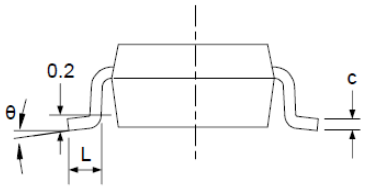
Dimension in SOT-23 Package (Unit: mm)





RECOMMENDED LAND PATTERN (Unit: mm)





Symbol	Millimeters		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	0.105	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 BSC		0.037 BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

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