

## DESCRIPTION

The JD431/JD431SWD are three-terminal adjustable shunt regulators with specified thermal stability. The output voltage may be set to any value between  $V_{ref}$  and 36V with two external resistors. Active output circuitry provides a very sharp turnon characteristic, making these devices excellent replacements for zener diodes in many applications.

## Features

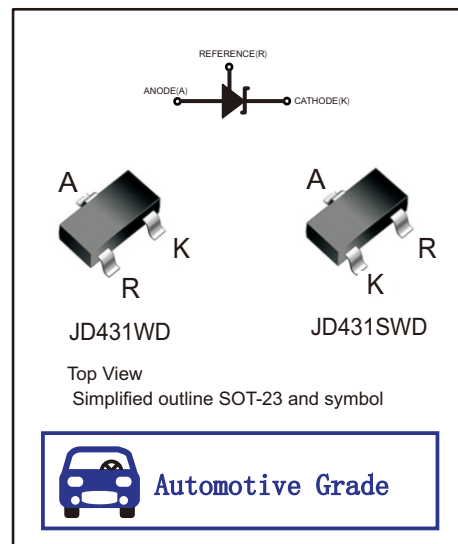
- The output voltage can be adjusted 2.5V to 36V
- The JD431/JD431SWD precision reference is offered in two voltage tolerance: 0.5% and 1.0%.
- Fast turn-on response
- Sink current capability 1mA to 100mA
- Low output noise
- Industrial temperature range
- Qualified to AEC-Q101 Standards for High Reliability

## Application

- Shunt regulator
- High-current shunt regulator
- Precision current limiter

## PINNING

PIN	DESCRIPTION
A	ANODE
K	CATHODE
R	REFERENCE



## Absolute Maximum Ratings (Note 1)

Symbol	Parameter		Rating	Unit
$V_{KA}$	Cathode Voltage		36	V
$I_{KA}$	Cathode Current Range (Continuous)		-100 to 150	mA
$I_{REF}$	Reference Input Current Range		0.05~10	mA
$P_D$	Power Dissipation		Z, R Package: 770	mW
			N Package: 300	
$\theta_{JA}$	Thermal Resistance (Junction to Ambient)	SOT-23	380	°C/W
$T_J$	Junction Temperature		+150	°C
$T_{STG}$	Storage Temperature Range		-65 to +150	°C
ESD	ESD (Human Body Model)		2000	V

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.



## Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
$V_{KA}$	Cathode Voltage	$V_{REF}$	36	V
$I_{KA}$	Cathode Current	1.0	100	mA
$T_A$	Operating Ambient Temperature Range	-25	+85	°C

## Electrical Characteristics (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit			
$V_{REF}$	Reference Voltage	$V_{KA} = V_{REF}, I_{KA} = 10\text{mA}$		2.488	2.500	2.512	V		
								0.5%	JD431AWD
									JD431SAWD
								1%	JD431BWD
				2.475	2.500	2.525			
$\Delta V_{REF}$	Deviation of Reference Voltage Over Full Temperature Range	$V_{KA} = V_{REF}, I_{KA} = 10\text{mA}$ $T_{min} \leq T_A \leq T_{max}$	—	4.5	17	mV			
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$	Ratio of Change in Reference Voltage to the Change in Cathode Voltage	$I_{KA} = 10\text{mA}$							
$I_{REF}$	Reference Current	$I_{KA} = 10\text{mA}, R_1 = 10\text{k}\Omega,$ $R_2 = \infty$	—	1.5	4	$\mu\text{A}$			
$\Delta I_{REF}$	Deviation of Reference Current Over Full Temperature Range	$I_{KA} = 10\text{mA}, R_1 = 10\text{k}\Omega$ $R_2 = \infty, T_A = \text{full Temperature}$	—	0.4	1.2	$\mu\text{A}$			
$I_{KA}$ (Min)	Minimum Cathode Current for Regulation	$V_{KA} = V_{REF}$	—	0.45	1.0	mA			
$I_{KA}$ (Off)	Off-state Cathode Current	$V_{KA} = 36\text{V}, V_{REF} = 0$	—	0.05	1.0	$\mu\text{A}$			
$Z_{KA}$	Dynamic Impedance	$V_{KA} = V_{REF}, I_{KA} = 1 \text{ to } 100\text{mA},$ $f \leq 1.0\text{kHz}$	—	0.15	0.5	$\Omega$			



FIGURE 1. TEST CIRCUIT FOR  $V_{KA} = V_{REF}$

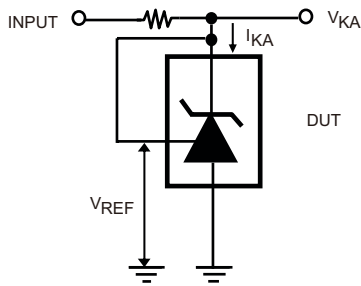


FIGURE 2. TEST CIRCUIT FOR  $V_{KA} \geq V_{REF}$

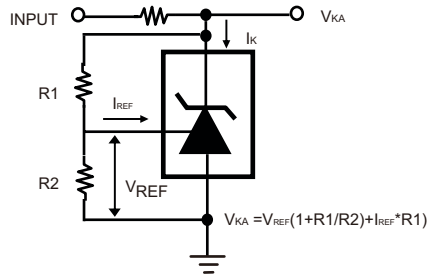


FIGURE 3. TEST CIRCUIT FOR  $I_{KA}$  (OFF)

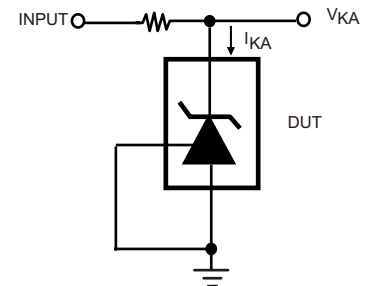


FIGURE 4. TEST CIRCUIT FOR PULSE RESPONSE

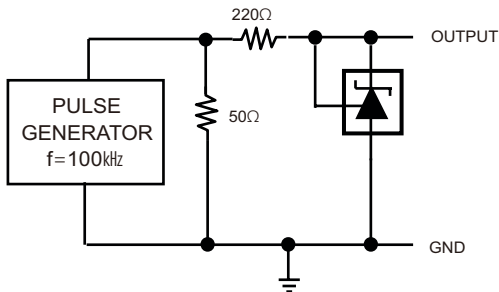
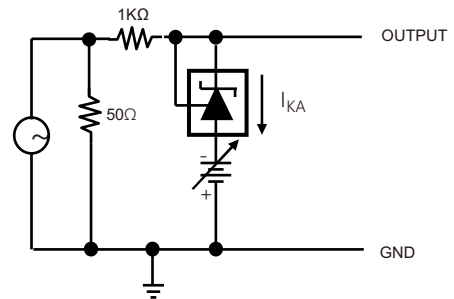


FIGURE 5. TEST CIRCUIT REFERENCE IMPEDANCE





### Typical Characteristics

Fig.1 CATHODE CURRENT VS CATHODE VOLTAGE

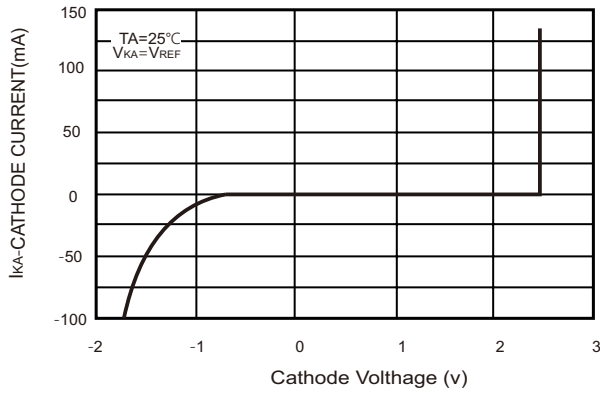


Fig.2 CATHODE CURRENT VS CATHODE VOLTAGE

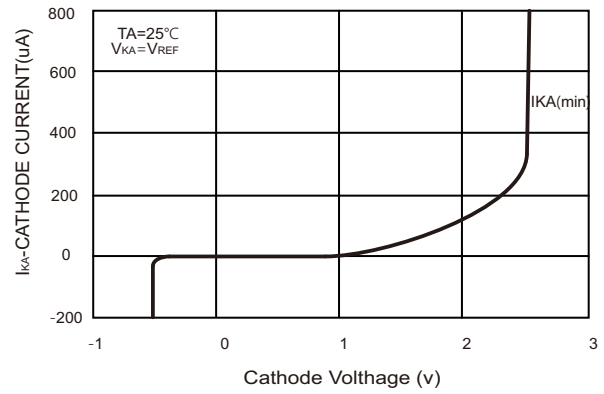


Fig.3 CHANGE IN REFERENCE INPUT VOLTAGE VS CATHODE VOLTAGE

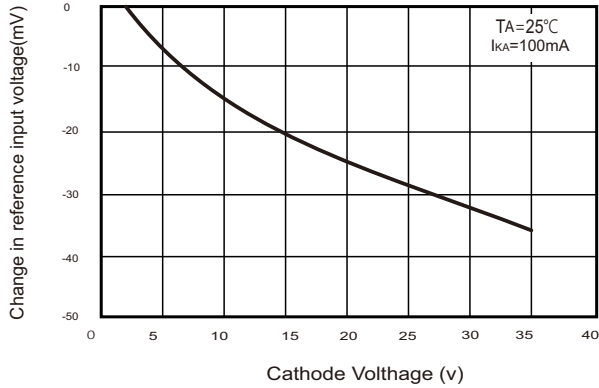


Fig.4 PULSE RESPONSE

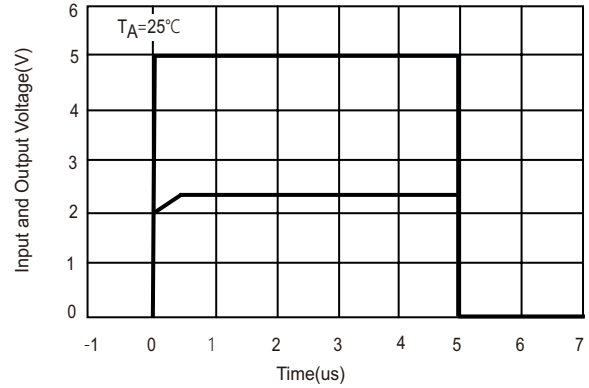


Fig.5 IMPEDANCE VS FREQUENCY

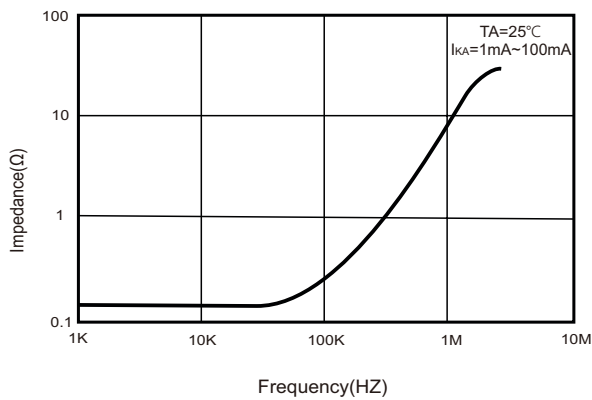
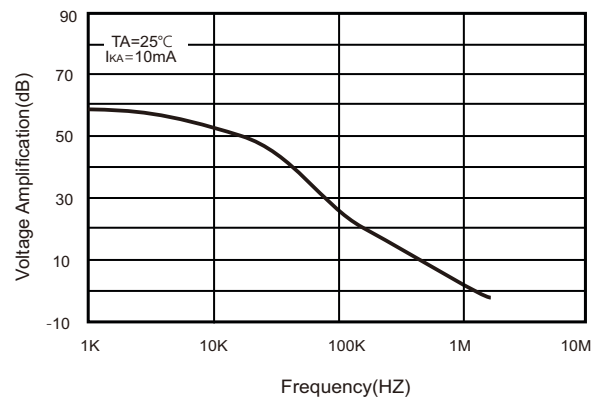
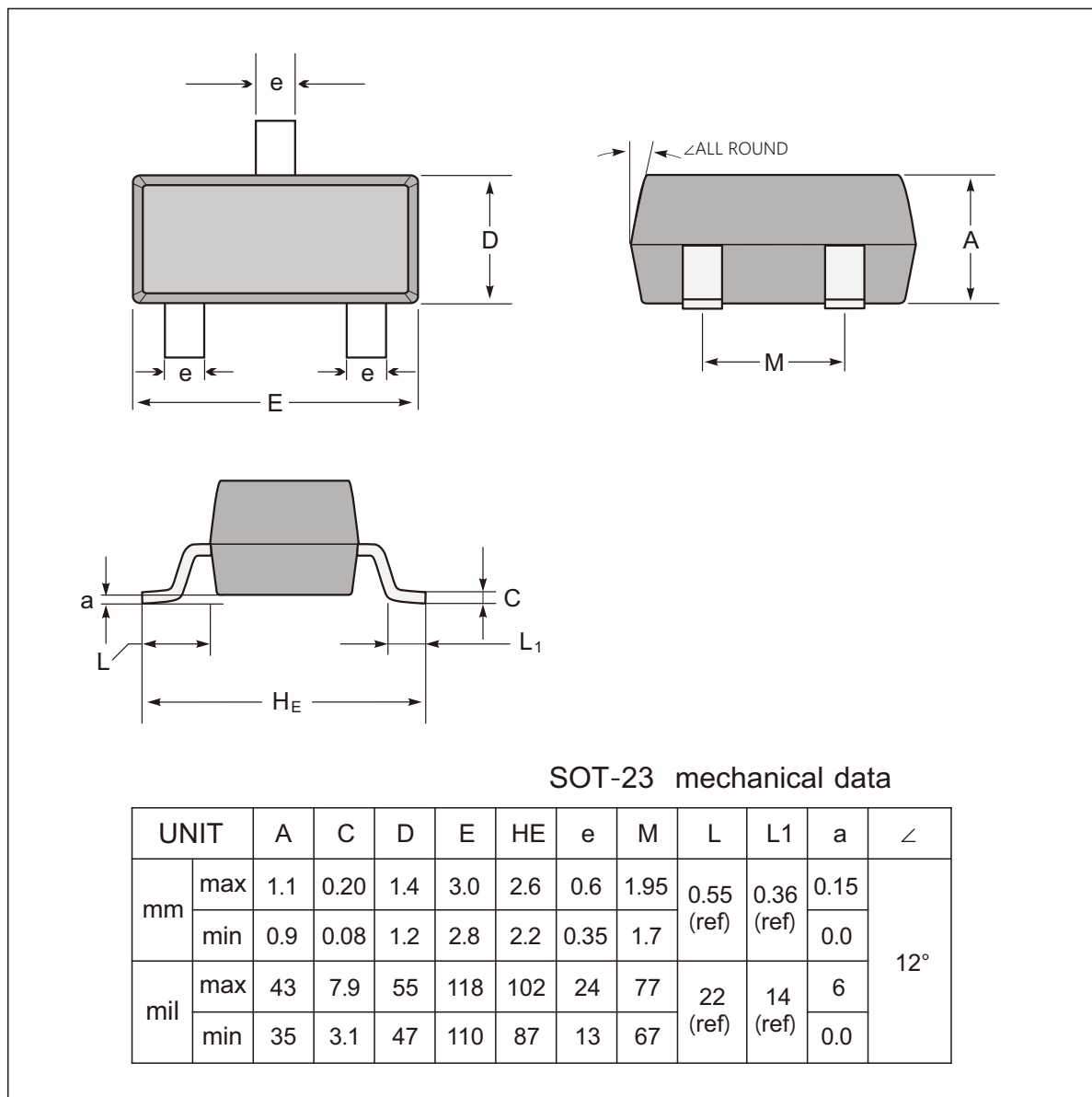


Fig.6 SMALL SIGNAL VOLTAGE AMPLIFICATION VS FREQUENCY

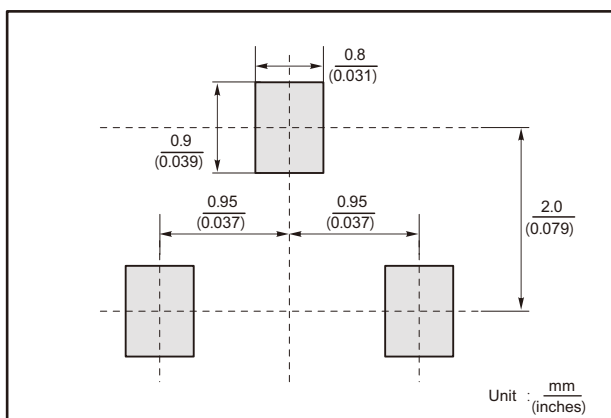




### SOT-23 Package Outline Dimensions



#### The recommended mounting pad size



#### Marking

NumType er	Marking code
JD431AWD	J431A
JD431BWD	J431B
JD431SAWD	431JA
JD431SBWD	431JB



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