

# PROGRAMMABLE PRECISION SHUNT REGULATOR TJ431/A/C

## FEATURES

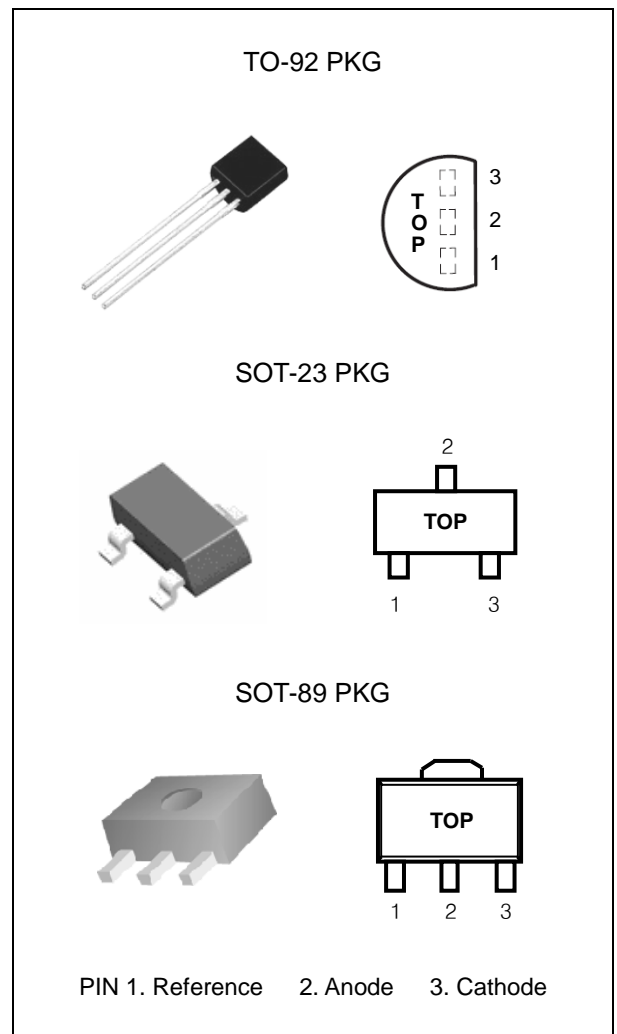
- Programmable Output Voltage to 28V
- Guaranteed 0.5% Reference Voltage Tolerance
- Cathode Current Range(Continuous) 100 mA
- Temperature Compensated For Operation Over Full Rate Operating Temperature Range
- Low Output Noise Voltage
- Fast Turn-on Response
- TO-92, SOT-89 or SOT-23 3L Package

## APPLICATION

- Shunt Regulator
- Precision High-Current Series Regulator
- High-Current Shunt Regulator
- Crowbar Circuit
- PWM Converter With Reference
- Voltage Monitor
- Precision Current Limiter

## DESCRIPTION

The TJ431 is a three-terminal adjustable shunt regulator with specified thermal stability over applicable temperature  $V_{REF}$  (Approx. 2.5V) and 28V with two external resistors. This device has a typical dynamic output impedance of 0.25Ω. Active output circuitry provides a very sharp turn-on characteristic, making this device excellent replacement for zener diodes in many applications. The TJ431 is characterized for operation from -40°C to +125°C.



## ORDERING INFORMATION

Device	Package
TJ431	TO-92(Bulk)
TJ431TA	TO-92(Taping)
TJ431SF	SOT-23 3L
TJ431F	SOT-89 3L

\* Refer to the page 2 for detailed ordering Information,

## Absolute Maximum Ratings

(Operating temperature range applies unless otherwise specified)

CHARACTERISTIC	SYMBOL	MIN.	MAX.	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
Junction Temperature Range	$T_J$	-40	150	°C
Operating Temperature Range	$T_{OPR}$	-40	125	°C
Storage Temperature Range	$T_{STG}$	-65	150	°C

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## RECOMMENDED OPERATING CONDITIONS

CHARACTERISTIC	SYMBOL	MIN.	MAX.	UNIT
Cathode Voltage	$V_{KA}$	$V_{REF}$	28	V
Cathode Current	$I_K$	1.0	100	mA

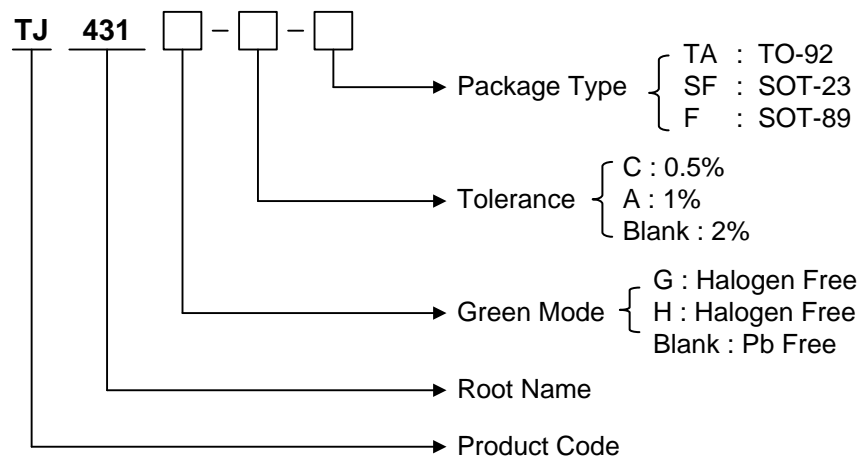
## Ordering Information

$V_{REF}$	Package	Tolerance	Order No.	Package Marking	Supplied As
2.495V	TO-92	0.5%	TJ431C	-	Bulk
			TJ431GC	-	
			TJ431CTA	-	Tape
			TJ431GCTA	-	
		1%	TJ431A	-	Bulk
			TJ431GA	-	
			TJ431ATA	-	Tape
			TJ431GATA	-	
		2%	TJ431	-	Bulk
			TJ431G	-	
			TJ431TA	-	Tape
			TJ431GTA	-	
	SOT-23	0.5%	TJ431CSF	-	Reel
			TJ431GCSF	-	
		1%	TJ431ASF	-	Reel
			TJ431GASF	-	
		2%	TJ431SF	-	Reel
			TJ431GSF	-	
	SOT-89	0.5%	TJ431CF	-	Reel
		1%	TJ431AF	-	Reel
2%		TJ431F	-	Reel	

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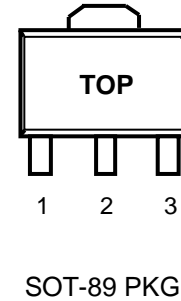
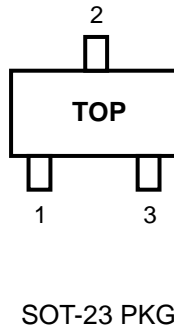
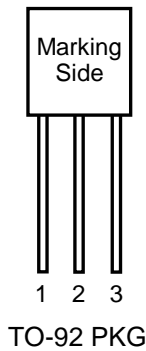
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## Ordering Information (continued)



# PROGRAMMABLE PRECISION SHUNT REGULATOR TJ431/A/C

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin No.	TO-92 / SOT-23 / SOT-89	
	Name	Function
1	Reference	Reference Voltage
2	Anode	Ground
3	Cathode	Input Supply Voltage

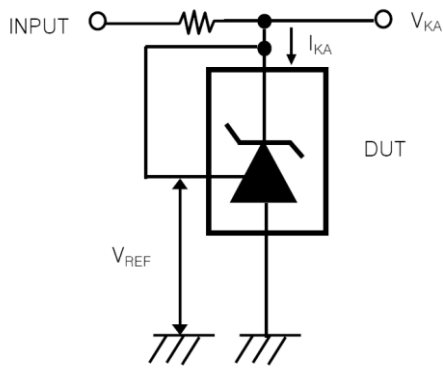
## TJ431 ELECTRICAL CHARACTERISTICS

( $T_A=25^\circ\text{C}$ , unless otherwise specified)

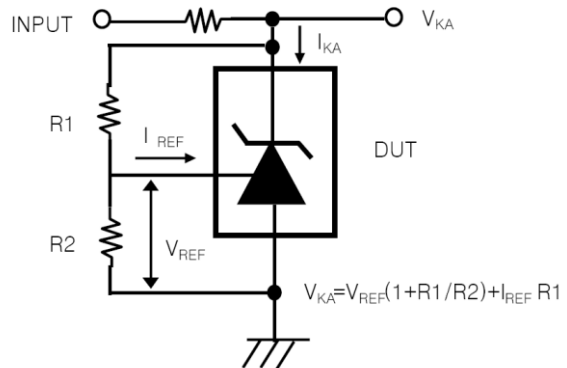
CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
Reference Input Voltage	$V_{REF}$	$V_{KA}=V_{REF}$ , $I_K=10\text{mA}$	TJ431C	2.483	2.495	2.507	V
			TJ431A	2.470	2.495	2.520	
			TJ431	2.440	2.495	2.550	
Deviation of Reference Input Voltage	$\Delta V_{REF}/\Delta T$	$V_{KA}=V_{REF}$ , $I_K=10\text{mA}$ $T_A=\text{Full Range}$		24		mV	
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage	$\Delta V_{REF}/\Delta V_{KA}$	$I_K=10\text{mA}$	$\Delta V_{KA}=10\text{V to }V_{REF}$	-2.7	-1.0		mV/V
			$\Delta V_{KA}=28\text{V to }10\text{V}$	-2	-0.4		
Reference Input Current	$I_{REF}$	$I_{KA}=10\text{mA}$ , $R_1=10\text{k}\Omega$ , $R_2=\infty$		0.5	1.2	$\mu\text{A}$	
Deviation of Reference Input Current	$\Delta I_{REF}/\Delta T$	$I_K=10\text{mA}$ , $R_1=10\text{k}\Omega$ , $R_2=\infty$ $T_A=\text{Full Range}$		0.4	1.2	$\mu\text{A}$	
Minimum Cathode Current for Regulation	$I_{K(MIN)}$	$V_{KA}=V_{REF}$		0.4	1.0	mA	
Off-State Cathode Current	$I_{K(OFF)}$	$V_{KA}=28\text{V}$ , $V_{REF}=0$		0.1	1.0	$\mu\text{A}$	
Dynamic Impedance	$Z_{KA}$	$V_{KA}=V_{REF}$ , $I_K=1\text{mA}\sim 100\text{mA}$ $f \leq 1\text{kHz}$		0.25	0.50	$\Omega$	

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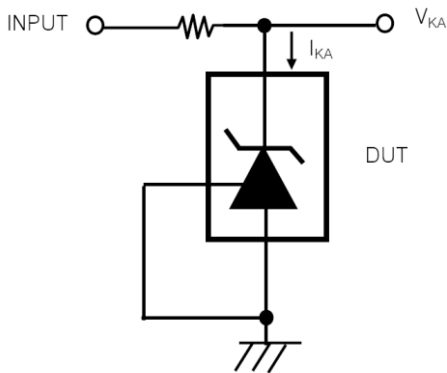
## TEST CIRCUITS



< Fig 1. Test circuit for  $V_{KA} = V_{REF}$  >



< Fig 2. Test circuit for  $V_{KA} \geq V_{REF}$  >



< Fig 3. Test circuit for  $I_{KA(OFF)}$  >