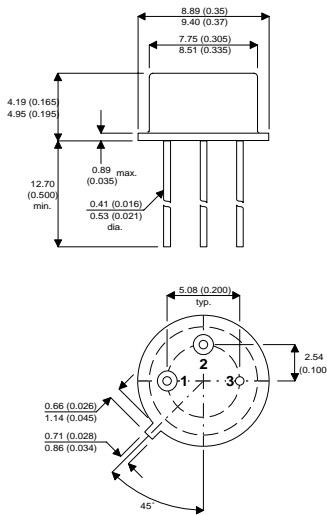


MECHANICAL DATA

Dimensions in mm (inches)



TO39 PACKAGE

PIN 1 = REF PIN 2 = CATHODE PIN 3 = ANODE

FEATURES

- VOLTAGE REFERENCE TOLERANCE $\pm 1\%$
- PROGRAMMABLE OUTPUT VOLTAGE TO 36V
- EQUIVALENT FULL RANGE TEMPERATURE COEFFICIENT OF 30ppm/ $^{\circ}\text{C}$ TYPICAL
- TEMPERATURE COMPENSATED FOR OPERATION OVER FULL RATED OPERATING TEMPERATURE RANGE
- SINK CURRENT CAPABILITY 1 TO 100 mA
- FAST TURN-ON RESPONSE
- LOW DYNAMIC OUTPUT IMPEDANCE (0.2 Ω typical)
- LOW OUTPUT NOISE VOLTAGE

DESCRIPTION

The IP431A circuit is a monolithic three terminal programmable shunt regulator diode. This voltage reference operates as a low temperature coefficient zener which is programmable between Vref (2.5V) and 36 volts using two external resistors. The device has a wide operating current range of 1mA to 100mA and a typical dynamic impedance of 0.2 Ω . Active output circuitry provides a very sharp turn-on characteristic making these devices excellent replacements for Zener Diodes in many applications. Being a shunt regulator it can be used as either a positive or negative voltage reference.

ABSOLUTE MAXIMUM RATINGS ($T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise stated)

V_{KA}	Cathode To Anode Voltage	37V
I_K	Cathode Current Range	- 100 to +150mA
I_{REF}	Reference Input Current Range	- 0.05 to +10mA
P_D	Power Dissipation @ $T_A = 25^{\circ}\text{C}$ Derate Above 25 $^{\circ}\text{C}$	TO39 Package 1.5W 15mW/ $^{\circ}\text{C}$
T_J	Maximum Operating Junction Temperature	150 $^{\circ}\text{C}$
T_A	Operating Ambient Temperature Range	- 55 to +125 $^{\circ}\text{C}$
T_{STG}	Storage Temperature Range	- 65 to 150 $^{\circ}\text{C}$

THERMAL CONDITIONS

$R_{\theta JA}$	Thermal resistance, junction to Ambient,	160°C/W
$R_{\theta JC}$	Thermal resistance, junction to Case	20°C/W

RECOMMENDED OPERATING CONDITIONS

V_{KA}	Cathode To Anode Voltage	V_{REF} to 36V
I_K	Cathode Current Range	1.0 to 100mA

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise stated)

Parameter	Test Conditions	Min.	Typ.	Max.	Units	
V_{REF} Reference Input Voltage	$V_{KA} = V_{REF}$	2.47	2.495	2.52	V	
	$I_K = 10\text{mA}$ $T_A = -55$ to $+125^\circ\text{C}^*$	2.426		2.564		
ΔV_{REF} Reference Input Voltage Over Temperature Range ¹	$V_{KA} = V_{REF}$ $I_K = 10\text{mA}$ $T_A = -55$ to $+125^\circ\text{C}^*$		15	44	mV	
$\frac{\Delta V_{REF}}{\Delta V_{KA}}$ Ratio of Reference Voltage Change to Change in Cathode to Anode Voltage	$I_K = 10\text{mA}$	$\Delta V_{KA} = 10\text{V}$ to V_{REF}		-1.5	-2.7	mV/V
		$\Delta V_{KA} = 36\text{V}$ to 10V		-0.7	-2	
I_{REF} Reference Input Current	$R1 = 10\text{k}\Omega$ $R2 = \infty$		1	4	μA	
	$I_K = 10\text{mA}$ $T_A = -55$ to $+125^\circ\text{C}^*$			7		
ΔI_{REF} Reference Input Current Deviation Over Temperature Range	$R1 = 10\text{k}\Omega$ $R2 = \infty$ $I_K = 10\text{mA}$ $T_A = -55$ to $+125^\circ\text{C}^*$		1	3	μA	
I_{MIN} Minimum Cathode Current For Regulation	$V_{KA} = V_{REF}$		0.5	1	mA	
I_{OFF} Off-State Cathode Current	$V_{KA} = 36\text{V}$ $V_{REF} = 0$		3	1000	nA	
$ Z_{ka} $ Dynamic Impedance ²	$V_{KA} = V_{REF}$ $f \leq 1\text{kHz}$ $\Delta I_K = 1\text{mA}$ to 100mA		0.2	0.5	Ω	