

## LOW POWER, BANDGAP VOLTAGE REFERENCES

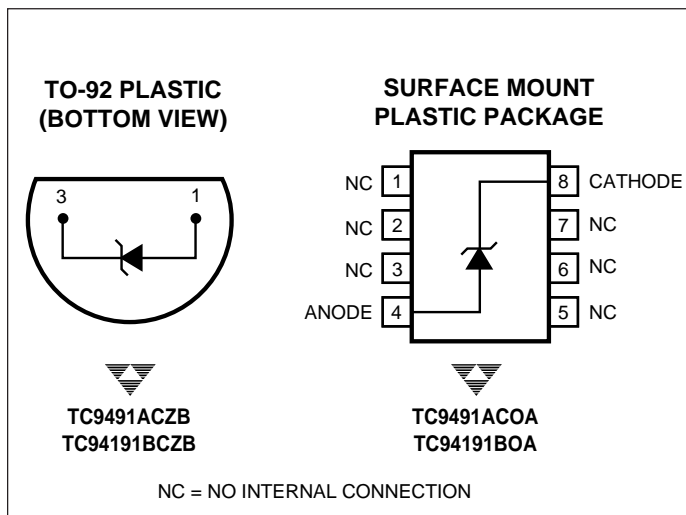
### FEATURES

- Temperature Coefficient ..... 50ppm/°C
- Wide Operating Current Range ..... 15µA to 20mA
- Dynamic Impedance ..... 0.6Ω
- Output Tolerance ..... 1% or 2%
- Output Voltage Option ..... 1.220V
- TO-92 Plastic Package
- 8-Pin Plastic Small Outline (SO) Package

### APPLICATIONS

- ADC and DAC Reference
- Current Source Generation
- Threshold Detectors
- Power Supplies
- Multi-meters

### PIN CONFIGURATIONS



### GENERAL DESCRIPTION

The TC9491 (1.220V output) bipolar, two-terminal, bandgap voltage references offer precision performance without premium price. These devices do not require thin-film resistors, greatly lowering manufacturing complexity and cost.

A 50ppm/°C output temperature coefficient and a 15µA to 20mA operating current range make these devices attractive for multimeter, data acquisition converter, and telecommunication voltage references.

### ORDERING INFORMATION

Part No.	Package Range	Temperature	Tempco.
TC9491ACOA	8-Pin SOIC	0°C to +70°C	50 ppm°C
TC9491BCOA	8-Pin SOIC	0°C to +70°C	100 ppm°C
TC9491ACZM	TO-92	0°C to +70°C	50 ppm°C
TC9491BCZM	TO-92	0°C to +70°C	100 ppm°C

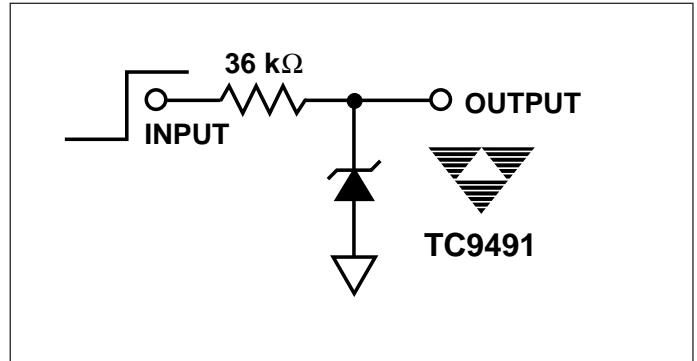
## TC9491A TC9491B

### ABSOLUTE MAXIMUM RATINGS\*

Forward Current .....	+10mA
Reverse Current .....	+30mA
Storage Temperature Range .....	- 65°C to +150°C
Operating Temperature Range	
TO-92 Package .....	0°C to +70°C
COA Surface Mount Package .....	0°C to +70°C
Lead Temperature (Soldering, 10 sec)	
TO-92 Package .....	+300°C
COA Surface Mount Package .....	+300°C
Power Dissipation	
Limited by Forward/Reverse Current	

\*Functional operation above the absolute maximum stress ratings is not implied.

### RESPONSE TIME TEST CIRCUIT



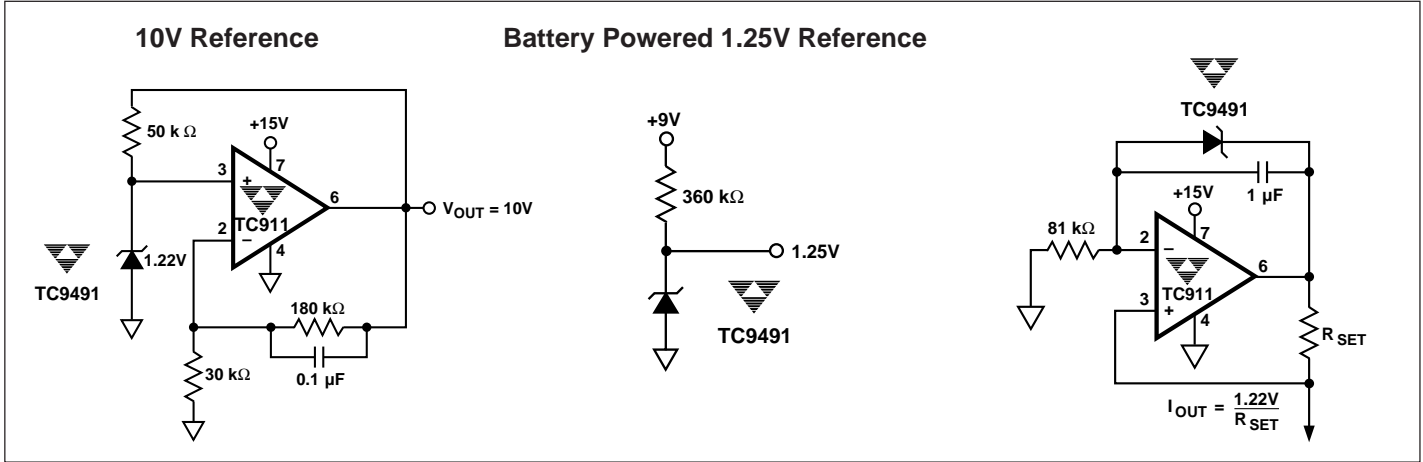
### ELECTRICAL CHARACTERISTICS: $T_A = +25^\circ\text{C}$ , unless otherwise specified.

Symbol	Parameter	Test Conditions	TC9491A			TC9491B			Unit
			Min	Typ	Max	Min	Typ	Max	
$V_{(BR)R}$	Reverse Breakdown Voltage $T_A = 0^\circ\text{C to } +70^\circ\text{C}$	$I_R \leq 20\text{mA}$	1.200 1.180	1.22 —	1.250 1.290	1.200 1.219	1.220 —	1.250 1.260	V
$I_{RMIN}$	Minimum Operating Current $T_A = +25^\circ\text{C}$ $T_A = 0^\circ\text{C to } +70^\circ\text{C}$		— —	8.0 —	15 20	— —	8.0 —	15 20	$\mu\text{A}$
$\Delta V_{(BR)R}$	Reverse Breakdown Voltage Change with Current $I_{Rmin} = I_R = 1.0\text{mA}$ , $T_A = +25^\circ\text{C}$ $T_A = 0^\circ\text{C to } +70^\circ\text{C}$ $1.0\text{mA} = I_R = 20\text{mA}$ , $T_A = +25^\circ\text{C}$ $T_A = 0^\circ\text{C to } +70^\circ\text{C}$		— — — —	— — — —	1.0 1.5 10 20	— — — —	— — — —	1.0 1.5 20 25	mV
Z	Reverse Dynamic Impedance	$I_R = 100\mu\text{A}$	—	0.6	—	—	0.6	—	$\Omega$
$\Delta V_{(BR)}/\Delta T$	Average Temperature Coefficient	$10\mu\text{A} = I_R = 20\text{mA}$	—	—	50	—	—	100	ppm/ $^\circ\text{C}$
S	Long Term Stability	$I_R = 100\mu\text{A}$ , $T_A = +25^\circ\text{C} \pm 0.1^\circ\text{C}$	—	20	—	—	20	—	ppm/kHR

# LOW POWER, BANDGAP VOLTAGE REFERENCES

TC9491A  
TC9491B

## TYPICAL APPLICATIONS



3

## TYPICAL CHARACTERISTICS

