

## LOW POWER, BANDGAP VOLTAGE REFERENCES

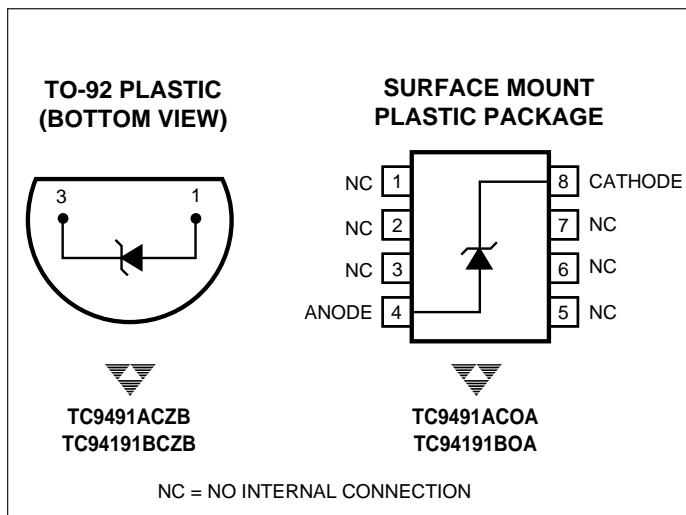
### FEATURES

- 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 |

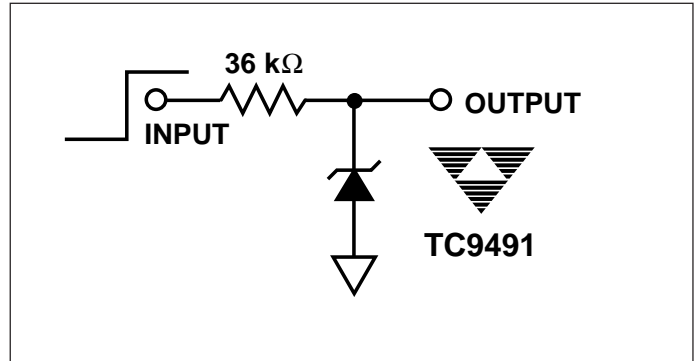
## TC9491A TC9491B

### 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



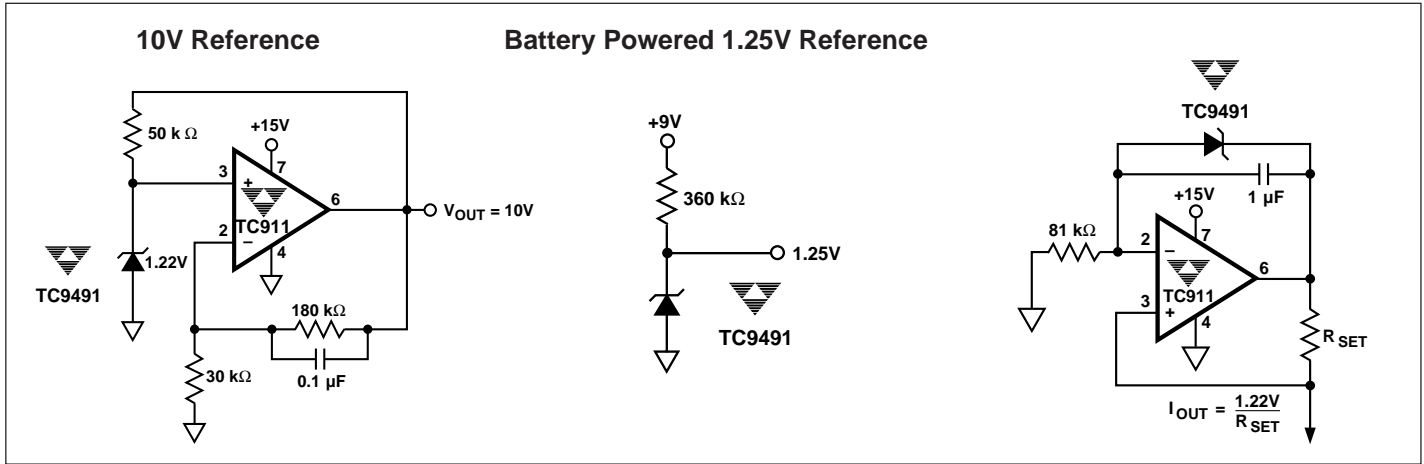
### ELECTRICAL CHARACTERISTICS: $T_A = +25^\circ\text{C}$ , unless otherwise specified.

| Symbol                     | Parameter   | Test Conditions   | TC9491A          |                  |                        | TC9491B          |                  |                        | Unit                  |
|----------------------------|---|---|------------------|------------------|------------------------|------------------|------------------|------------------------|-----------------------|
|                            |   |   | Min              | Typ              | Max                    | Min              | Typ              | Max                    |                       |
| $V_{(BR)R}$                | Reverse Breakdown Voltage<br>$T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$   | $I_R \leq 20\text{mA}$  | 1.200<br>1.180   | 1.22<br>—        | 1.250<br>1.290         | 1.200<br>1.219   | 1.220<br>—       | 1.250<br>1.260         | V                     |
| $I_{RMIN}$                 | Minimum Operating Current<br>$T_A = +25^\circ\text{C}$<br>$T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$  |   | —<br>—           | 8.0<br>—         | 15<br>20               | —<br>—           | 8.0<br>—         | 15<br>20               | $\mu\text{A}$         |
| $\Delta V_{(BR)R}$         | Reverse Breakdown Voltage<br>Change with Current<br>$I_{Rmin} = I_R = 1.0\text{mA}$ , $T_A = +25^\circ\text{C}$<br>$T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$<br>$1.0\text{mA} = I_R = 20\text{mA}$ , $T_A = +25^\circ\text{C}$<br>$T_A = 0^\circ\text{C}$ to $+70^\circ\text{C}$ |   | —<br>—<br>—<br>— | —<br>—<br>—<br>— | 1.0<br>1.5<br>10<br>20 | —<br>—<br>—<br>— | —<br>—<br>—<br>— | 1.0<br>1.5<br>20<br>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   | $I_R = 100\mu\text{A}$ ,<br>$T_A = +25^\circ\text{C} \pm 0.1^\circ\text{C}$ | —                | 20               | —                      | —                | 20               | —                      | ppm/kHR               |

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TC9491A  
TC9491B

## TYPICAL APPLICATIONS



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## TYPICAL CHARACTERISTICS

