

LOW POWER, BANDGAP VOLTAGE REFERENCES

FEATURES

- Temperature Coefficient 50ppm/°C
- Wide Operating Current Range
 - TC04 15µA to 20mA
 - TC05 20µA to 20mA
- Dynamic Impedance 1Ω
- Output Tolerance Typ. 2%
- Output Voltage Option
 - TC04 1.25V
 - TC05 2.5V
- TO-92 Plastic Package
- 8-Pin Plastic Narrow Body SOIC Package

APPLICATIONS

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

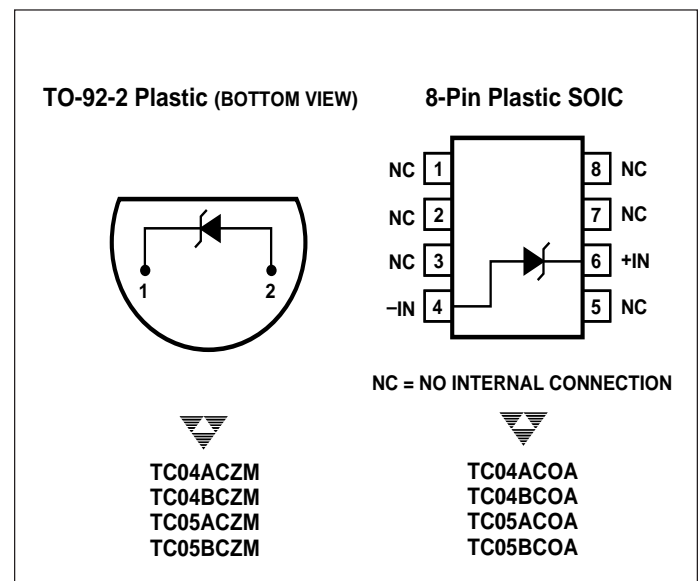
GENERAL DESCRIPTION

The TC04 (1.25V output) and TC05 (2.5V 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 15µA to 20mA operating current range make these devices attractive for multimeter, data acquisition converter, and telecommunication voltage references.

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PIN CONFIGURATIONS



ORDERING INFORMATION

| Part No. | Package | Temperature Range | Voltage | Max. Temperature Coefficient |
|----------|------------|-------------------|---------|------------------------------|
| TC04ACOA | 8-Pin SOIC | 0°C to +70°C | 1.25V | 50ppm/°C |
| TC04ACZM | TO-92-2 | 0°C to +70°C | 1.25V | 50ppm/°C |
| TC04BCOA | 8-Pin SOIC | 0°C to +70°C | 1.25V | 100ppm/°C |
| TC04BCZM | TO-92-2 | 0°C to +70°C | 1.25V | 100ppm/°C |
| TC05ACOA | 8-Pin SOIC | 0°C to +70°C | 2.5V | 50ppm/°C |
| TC05ACZM | TO-92-2 | 0°C to +70°C | 2.5V | 50ppm/°C |
| TC05BCOA | 8-Pin SOIC | 0°C to +70°C | 2.5V | 100ppm/°C |
| TC05BCZM | TO-92-2 | 0°C to +70°C | 2.5V | 100ppm/°C |

**TC04A
TC04B
TC05A
TC05B**

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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 |
| Surface Mount Package | 0°C to +70°C |

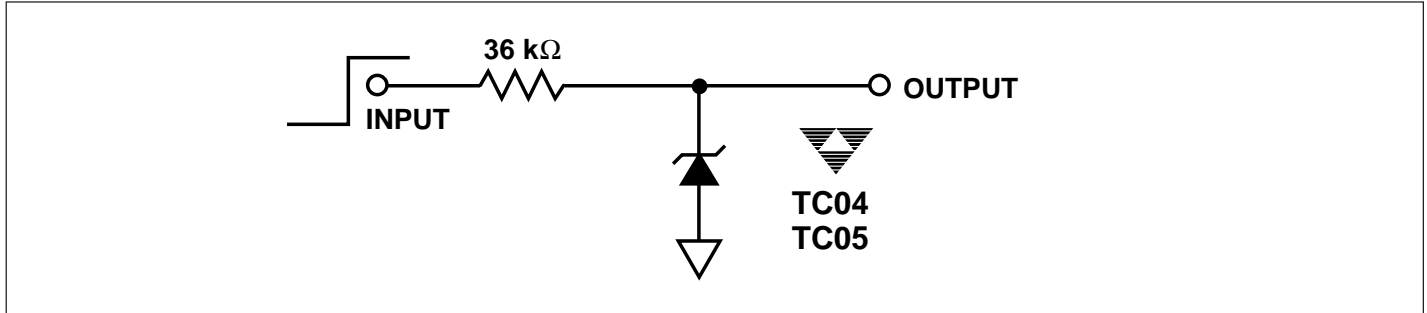
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|--------------------------------------|--|
| Lead Temperature (Soldering, 10 sec) | |
| TO-92 Package | +300°C |
| Surface Mount Package | +300°C |
| Power Dissipation | Limited by Forward/ Reverse Current |

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

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

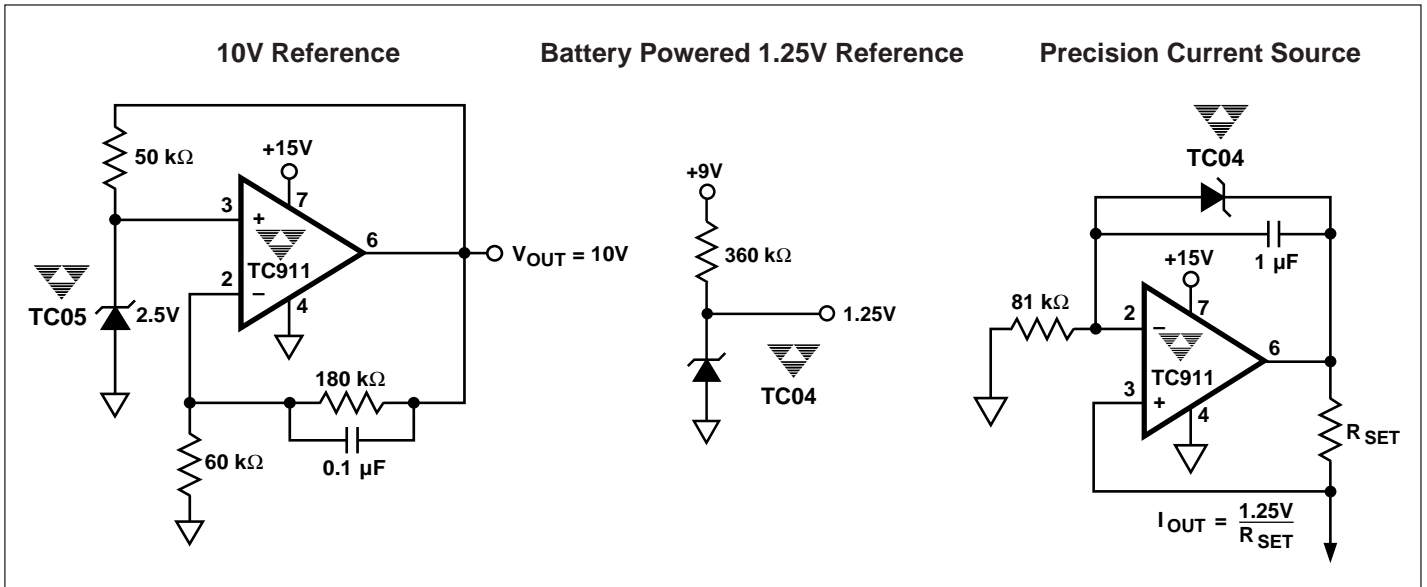
| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|-----------|--|--|------------------|--------------------------|--------------------|------|
| V_{BR} | Reverse Breakdown Voltage: TC04 TC05 | $I_R = 100\mu\text{A}$ | 1.24 2.45 | 1.26 2.50 | 1.28 2.60 | V |
| DV_{BR} | Reverse Breakdown Voltage Change: TC04 TC05 | $15\mu\text{A} < I_R < 20\text{mA}$ $20\mu\text{A} < I_R < 1\text{mA}$ $20\mu\text{A} < I_R < 20\text{mA}$ $25\mu\text{A} < I_R < 1\text{mA}$ | — — — — | 10 0.25 10 0.25 | 20 1 20 1 | mV |
| TC | Temperature Coefficient: TC04A/TC05A TC04B/TC05B | $I_R = 100\mu\text{A}$ | — — | 0.003 0.003 | 0.005 0.01 | %/°C |
| I_R | Reverse Current: TC04 TC05 | | 0.015 0.020 | — — | 20 20 | mA |

RESPONSE TIME TEST CIRCUIT



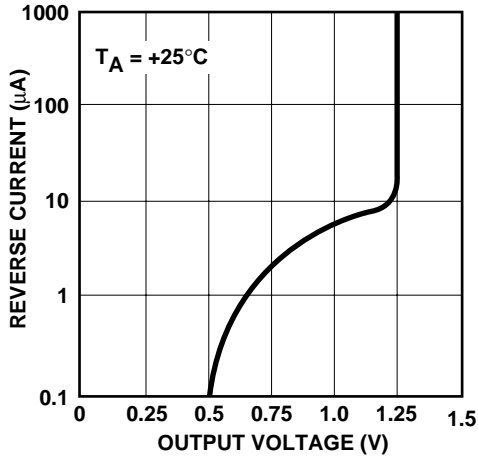
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TYPICAL APPLICATIONS

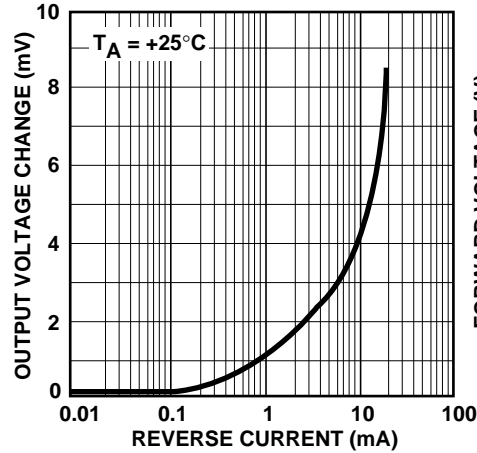


TYPICAL CHARACTERISTICS

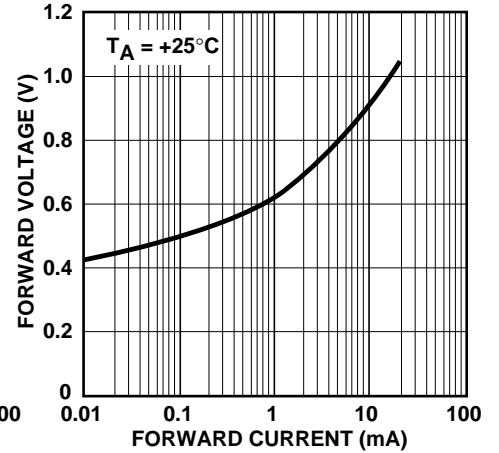
TC04: Output Voltage vs Reverse Current



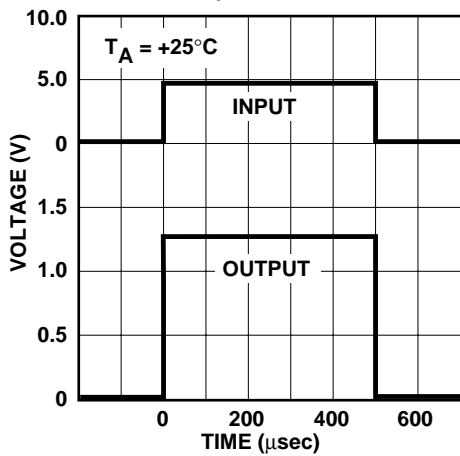
TC04: Output Voltage Change vs Reverse Current



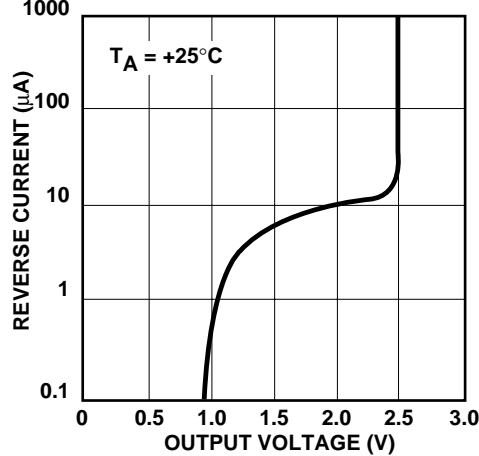
TC04: Forward Voltage vs Forward Current



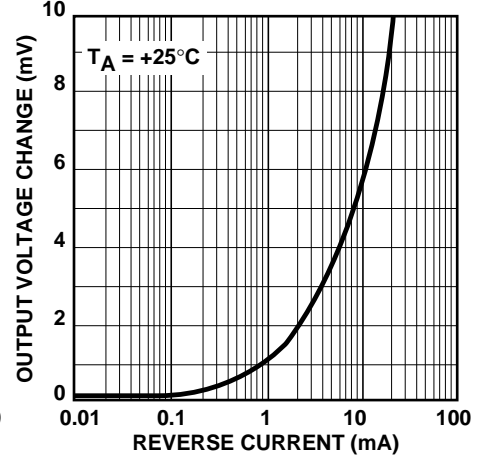
TC04 Response Time



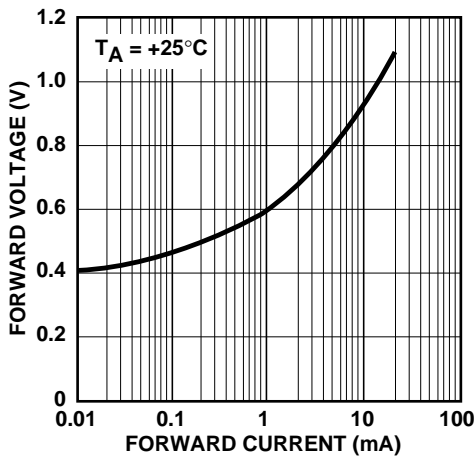
TC05: Output Voltage vs Reverse Current



TC05: Output Voltage Change vs Reverse Current



TC05: Forward Voltage vs Forward Current



TC05 Response Time

