

FEATURES

Ultracompact SC70 package
Low temperature coefficient: 3 ppm/°C
Initial accuracy: 0.2%
No external capacitor required
Low voltage noise: 6 μ V p-p (0.1 Hz to 10.0 Hz)
Wide input voltage range: 4.5 V to 15.0 V
High output load current: 10 mA

ENHANCED PRODUCT FEATURES

Supports defense and aerospace applications (AQEC standard)
Military temperature range -55°C to $+125^{\circ}\text{C}$
Controlled manufacturing baseline
One assembly/test site
One fabrication site
Product change notification
Qualification data available on request

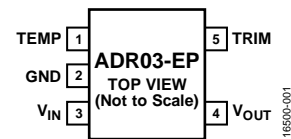
APPLICATIONS

Precision data acquisition systems
High resolution converters
Industrial process control systems
Precision instruments
Auto battery monitoring

GENERAL DESCRIPTION

The ADR03-EP is a precision 2.5 V band gap voltage reference featuring high accuracy, high stability, and low power consumption. The ADR03-EP is housed in a tiny 5-lead SC70 package. The small footprint and wide operating range make the ADR03-EP reference ideally suited for general-purpose and space-constrained applications.

With an external buffer and a simple resistor network, the TEMP terminal can be used for temperature sensing and approximation. A TRIM terminal is provided on the devices for fine adjustment of the output voltage.

PIN CONFIGURATION*Figure 1.*

The ADR03-EP is a compact, low drift voltage reference that provides an extremely stable output voltage from a wide input voltage range. It is available in a 5-lead SC70 and is specified over the -55°C to $+125^{\circ}\text{C}$ military temperature range.

Additional application and technical information can be found in the [ADR03](#) data sheet.

TABLE OF CONTENTS

| | | | |
|----------------------------------|---|---|---|
| Features | 1 | Absolute Maximum Ratings | 4 |
| Enhanced Product Features | 1 | Thermal Resistance | 4 |
| Applications | 1 | ESD Caution | 4 |
| Pin Configuration | 1 | Typical Performance Characteristics | 5 |
| General Description | 1 | Outline Dimensions | 6 |
| Revision History | 2 | Ordering Guide | 6 |
| Specifications | 3 | | |
| Electrical Characteristics | 3 | | |

REVISION HISTORY

1/2018—Revision 0: Initial Version

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

Input voltage (V_{IN}) = 4.5 V to 15.0 V, $T_A = 25^\circ\text{C}$, unless otherwise noted.

Table 1.

| Parameter | Symbol | Test Conditions/Comments | Min | Typ | Max | Unit |
|----------------------------------|--------------------------------|--|-------|----------|----------|------------------------|
| OUTPUT VOLTAGE | V_O | | 2.495 | 2.500 | 2.505 | V |
| INITIAL ACCURACY | V_{OERR} | | | | 5 0.2 | mV % |
| TEMPERATURE COEFFICIENT | TCV_O | $-55^\circ\text{C} < T_A < +125^\circ\text{C}$ | | 3 | 30 | ppm/ $^\circ\text{C}$ |
| DROPOUT VOLTAGE | V_{DO} | | 2 | | | V |
| REGULATION | | | | | | |
| Line | $\Delta V_O / \Delta V_{IN}$ | $V_{IN} = 4.5\text{ V to }15.0\text{ V}, -55^\circ\text{C} < T_A < +125^\circ\text{C}$ | | 7 | 40 | ppm/V |
| Load | $\Delta V_O / \Delta I_{LOAD}$ | Load current (I_{LOAD}) = 0 mA to 10 mA, $-55^\circ\text{C} < T_A < +125^\circ\text{C}, V_{IN} = 7.0\text{ V}$ | | 45 | 80 | ppm/mA |
| QUIESCENT CURRENT | I_{IN} | No load, $-55^\circ\text{C} < T_A < +125^\circ\text{C}$ | | 0.65 | 1 | mA |
| VOLTAGE NOISE | $e_{N\text{ p-p}}$ | 0.1 Hz to 10.0 Hz | | 6 | | $\mu\text{V p-p}$ |
| Density | e_N | 1 kHz | | 230 | | nV/ $\sqrt{\text{Hz}}$ |
| TURN-ON SETTLING TIME | t_R | | | 4 | | μs |
| LONG-TERM STABILITY ¹ | ΔV_O | 1000 hours | | 50 | | ppm |
| OUTPUT VOLTAGE HYSTERESIS | ΔV_{O_HYS} | $-55^\circ\text{C} < T_A < +125^\circ\text{C}$ | | 70 80 | | ppm ppm |
| RIPPLE REJECTION RATIO | RRR | Input frequency (f_{IN}) = 10 kHz | | -75 | | dB |
| SHORT CIRCUIT TO GND | I_{SC} | | | 30 | | mA |
| TEMPERATURE SENSOR | | | | | | |
| Voltage Output at TEMP Pin | V_{TEMP} | | | 550 | | mV |
| Temperature Sensitivity | TCV_{TEMP} | | | 1.96 | | mV/ $^\circ\text{C}$ |

¹ The long-term stability specification is noncumulative. The drift in subsequent 1000 hour periods is significantly lower than in the first 1000 hour period.

ABSOLUTE MAXIMUM RATINGS

Ratings are at 25°C, unless otherwise noted.

Table 2.

| Parameter | Rating |
|--------------------------------------|-----------------|
| Supply Voltage | 15.0 V |
| Output Short-Circuit Duration to GND | Indefinite |
| Storage Temperature Range | -65°C to +150°C |
| Operating Temperature Range | -55°C to +125°C |
| Junction Temperature Range | -65°C to +150°C |
| Lead Temperature (Soldering, 60 sec) | 260°C |

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

THERMAL RESISTANCE

Thermal performance is directly linked to PCB design and operating environment. Careful attention to PCB thermal design is required.

Table 3. Thermal Resistance

| Package Type | θ_{JA} | θ_{JC} | Unit |
|-------------------|---------------|---------------|------|
| KS-5 ¹ | 266.4 | 203.7 | °C/W |

¹ Test Condition 1: Thermal impedance simulated values are based on JEDEC 2S2P thermal test board. See JEDEC JESD-51.

ESD CAUTION



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

TYPICAL PERFORMANCE CHARACTERISTICS

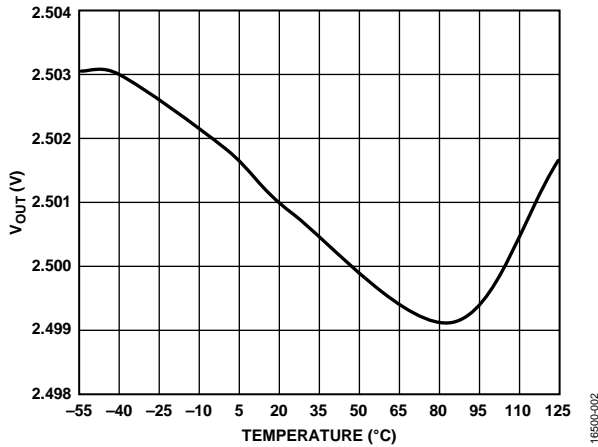


Figure 2. Typical Output Voltage (V_{out}) vs. Temperature

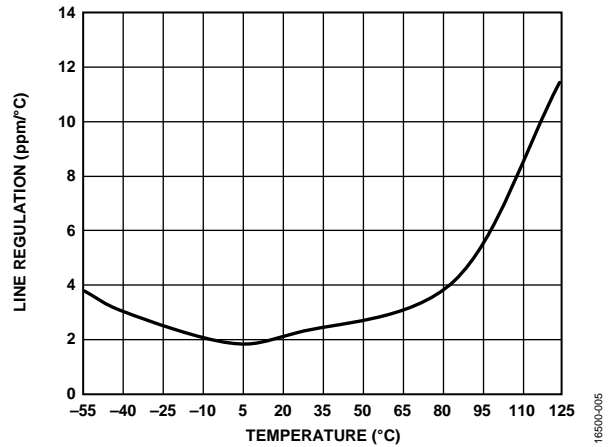


Figure 5. Line Regulation vs. Temperature

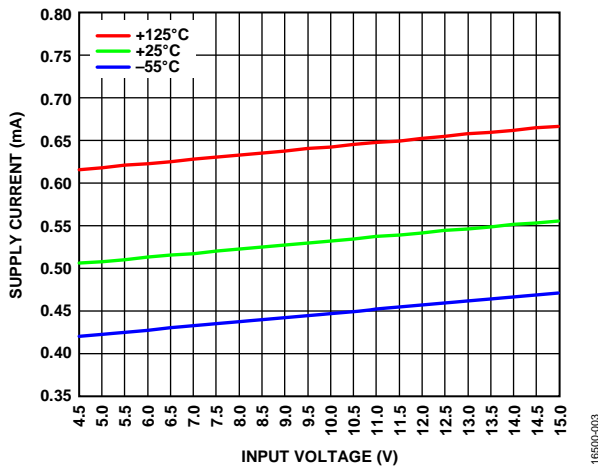


Figure 3. Supply Current vs. Input Voltage at Various Temperatures

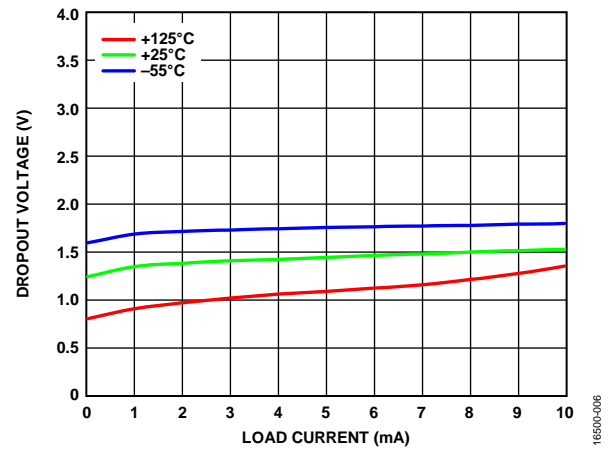


Figure 6. Dropout Voltage vs. Load Current at Various Temperatures

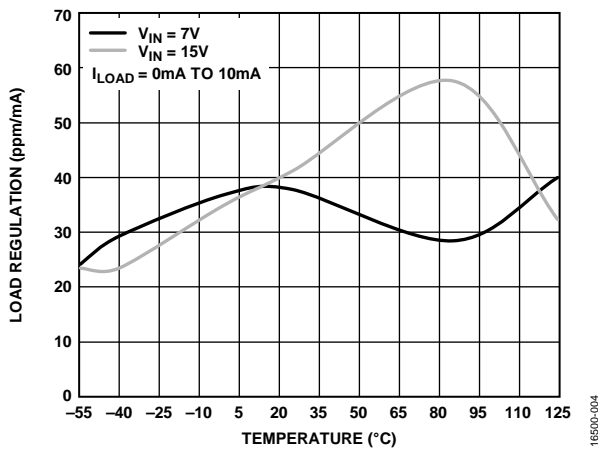
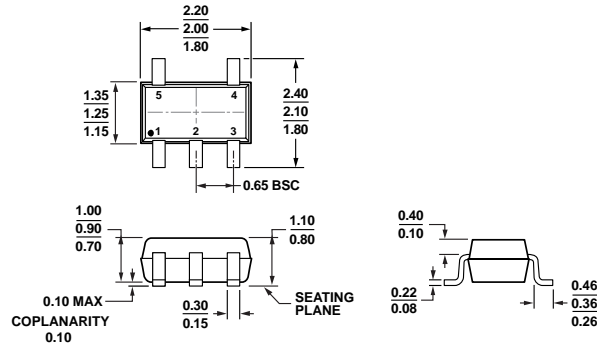


Figure 4. Load Regulation vs. Temperature at Various Input Voltages (V_{in})

OUTLINE DIMENSIONS



COMPLIANT TO JEDEC STANDARDS MO-203-AA
 Figure 7. 5-Lead Thin Shrink Small Outline Transistor Package [SC70] (KS-5)
 Dimensions shown in millimeters

ORDERING GUIDE

| Model ¹ | Output Voltage V _o (V) | Initial Accuracy | | Temperature Coefficient (ppm/°C) | Temperature Range | Package Description | Package Option | Ordering Quantity | Marking Code |
|--------------------|--------------------------------------|------------------|-----|-------------------------------------|-------------------|---------------------|----------------|-------------------|--------------|
| | | (mV) | (%) | | | | | | |
| ADRO3TKSZ-EP-R7 | 2.5 | 5 | 0.2 | 30 | -55°C to +125°C | 5-Lead SC70 | KS-5 | 3,000 | R3N |

¹ Z = RoHS Compliant Part.

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