

**FEATURES****Low temperature coefficient**

5-lead TSOT: 25 ppm/°C

**Initial accuracy ±0.15%****No external capacitor required****Low noise 20 µV p-p (0.1 Hz to 10.0 Hz)****Wide operating range**

12.0 V to 28.0 V

**High output current: 10 mA****ENHANCED PRODUCT FEATURES**

Supports defense and aerospace applications (AQEC standard)

Military temperature range (–55°C to +125°C)

Controlled manufacturing baseline

One assembly/test site

One fabrication site

Enhanced product change notification

Qualification data available on request

**APPLICATIONS**

Precision data acquisition systems

High resolution converters

Industrial process control systems

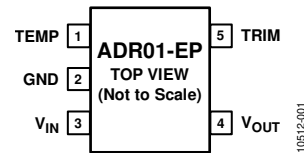
Precision instruments

PCMCIA cards

**GENERAL DESCRIPTION**

The [ADR01-EP](#) is a 10.0 V band gap voltage reference featuring high accuracy, high stability, and low power consumption. This part is housed in a tiny TSOT package. The small footprint and wide operating range make the [ADR01-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

**PIN CONFIGURATION***Figure 1. 5-Lead TSOT Surface-Mount Package*

approximation. A TRIM terminal is provided on the device for fine adjustment of the output voltage.

The [ADR01-EP](#) is a compact, low drift voltage reference that provides an extremely stable output voltage from a wide supply voltage range.

Additional application and technical information can be found in the [ADR01/ADR02/ADR03/ADR06](#) data sheet.

**Rev. 0**

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**REVISION HISTORY**

**1/12—Revision 0: Initial Version**

## SPECIFICATIONS

### ELECTRICAL CHARACTERISTICS

$V_{IN} = 12.0\text{ V to }28.0\text{ V}$ ,  $T_A = 25^\circ\text{C}$ , unless otherwise noted.

Table 1.

Parameter	Symbol	Test Conditions/Comments	Min	Typ	Max	Unit
OUTPUT VOLTAGE	$V_O$	T grade	9.985	10.000	10.015	V
INITIAL ACCURACY	$V_{OERR}$	T grade			15 0.15	mV %
TEMPERATURE COEFFICIENT	$TCV_O$	T grade, 5-lead TSOT, $-55^\circ\text{C} < T_A < +125^\circ\text{C}$			25	ppm/ $^\circ\text{C}$
DROPOUT VOLTAGE	$V_{DO}$		2			V
LINE REGULATION	$\Delta V_O/\Delta V_{IN}$	$V_{IN} = 12.0\text{ V to }28.0\text{ V}$ , $-55^\circ\text{C} < T_A < +125^\circ\text{C}$		7	30	ppm/V
LOAD REGULATION	$\Delta V_O/\Delta I_{LOAD}$	$I_{LOAD} = 0\text{ mA to }10\text{ mA}$ , $-55^\circ\text{C} < T_A < +125^\circ\text{C}$ , $V_{IN} = 15.0\text{ V}$		40	70	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		20		$\mu\text{V p-p}$
VOLTAGE NOISE DENSITY	$e_N$	1 kHz		510		nV/ $\sqrt{\text{Hz}}$
TURN-ON SETTLING TIME	$t_R$			4		$\mu\text{s}$
LONG-TERM STABILITY <sup>1</sup>	$\Delta V_O$	1000 hours		50		ppm
OUTPUT VOLTAGE HYSTERESIS	$\Delta V_{O\_HYS}$			70		ppm
RIPPLE REJECTION RATIO	RRR	$f_{IN} = 10\text{ kHz}$		-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/ $^\circ\text{C}$

<sup>1</sup> 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	36.0 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)	300°C

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

## THERMAL RESISTANCE

$\theta_{JA}$  is specified for the worst-case conditions, that is, a device soldered in a circuit board for surface-mount packages.

Table 3. Thermal Resistance

Package Type	$\theta_{JA}$	$\theta_{JC}$	Unit
5-Lead TSOT (UJ-5)	230	146	°C/W

## 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

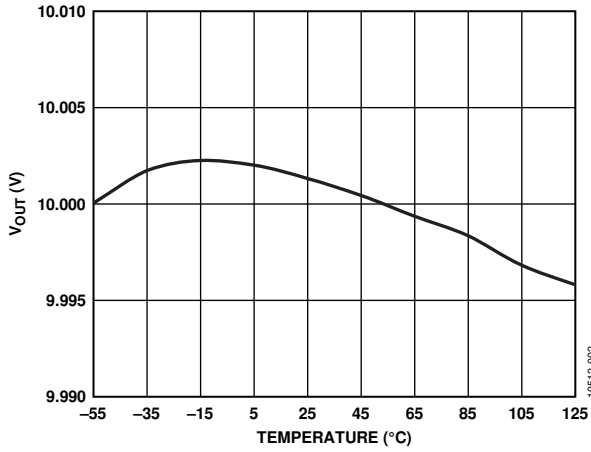


Figure 2. Typical Output Voltage vs. Temperature

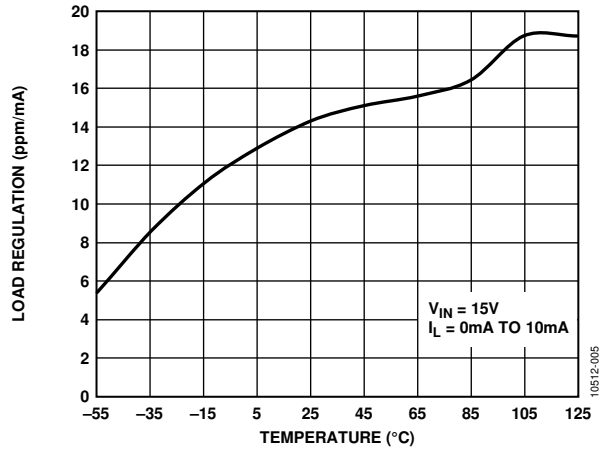


Figure 5. Line Regulation vs. Temperature

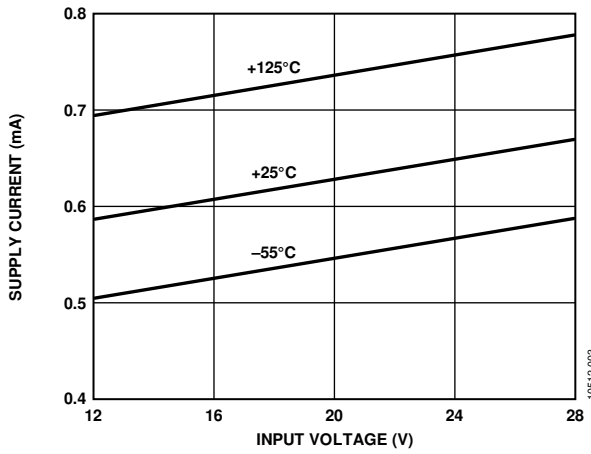


Figure 3. Supply Current vs. Input Voltage

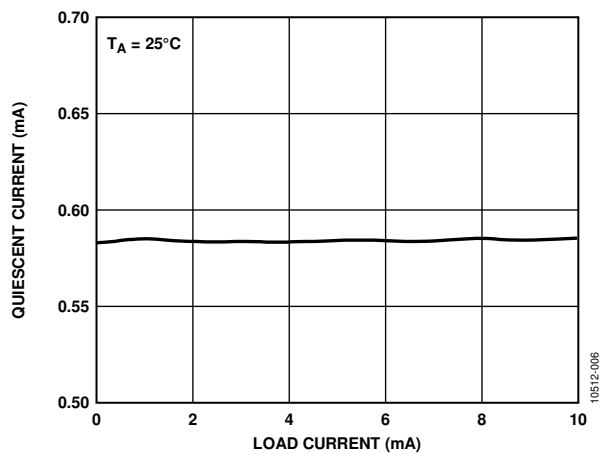


Figure 6. Quiescent Current vs. Load Current

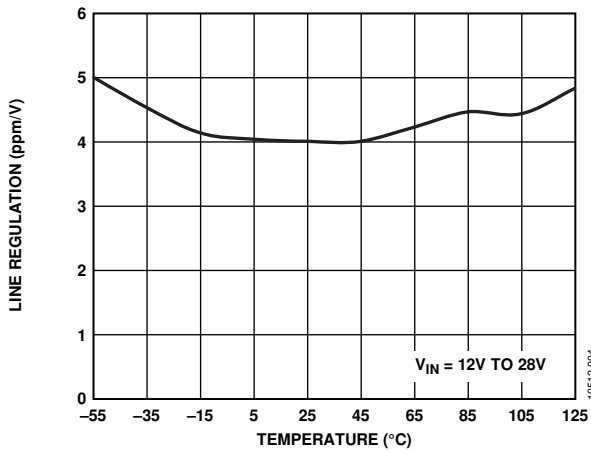
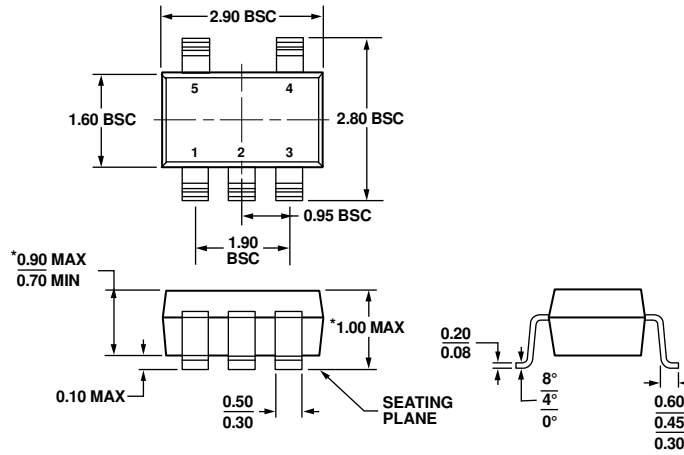


Figure 4. Load Regulation vs. Temperature

OUTLINE DIMENSIONS



\*COMPLIANT TO JEDEC STANDARDS MO-193-AB WITH THE EXCEPTION OF PACKAGE HEIGHT AND THICKNESS.

Figure 7. 5-Lead Thin Small Outline Transistor Package [TSOT] (UJ-5)  
Dimensions shown in millimeters

100708-A

ORDERING GUIDE

Model <sup>1</sup>	Output Voltage V <sub>o</sub> (V)	Initial Accuracy		Temperature Coefficient (ppm/°C)	Temperature Range	Package Description	Package Option	Ordering Quantity	Branding
		(mV)	(%)						
ADR01TUJZ-EP-R7	10	15	0.15	25	-55°C to +125°C	5-Lead TSOT	UJ-5	3000	R3H

<sup>1</sup> Z = RoHS Compliant Part.

**NOTES**

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