

FEATURES

Low temperature coefficient

5-lead TSOT: 25 ppm/°C

Initial accuracy $\pm 0.15\%$

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 $+125^{\circ}\text{C}$)

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

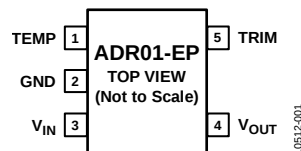


Figure 1. 5-Lead TSOT Surface-Mount Package

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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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

1/12—Revision 0: Initial Version

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS

$V_{IN} = 12.0\text{ V}$ to 28.0 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	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 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 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		μs
LONG-TERM STABILITY ¹	ΔV_O	1000 hours		50		ppm
OUTPUT VOLTAGE HYSTERESIS	ΔV_{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/ $^\circ\text{C}$

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	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

θ_{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	θ_{JA}	θ_{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

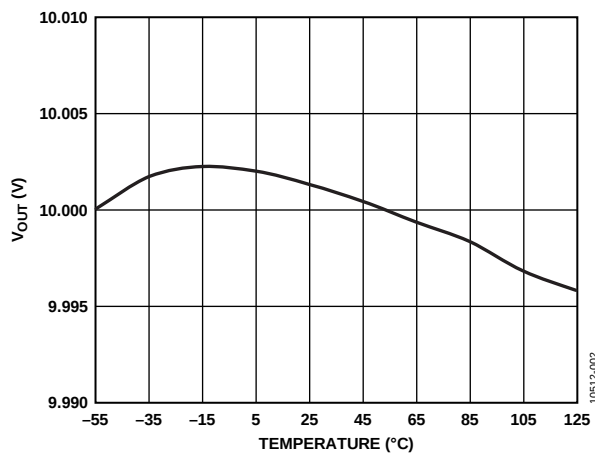


Figure 2. Typical Output Voltage vs. Temperature

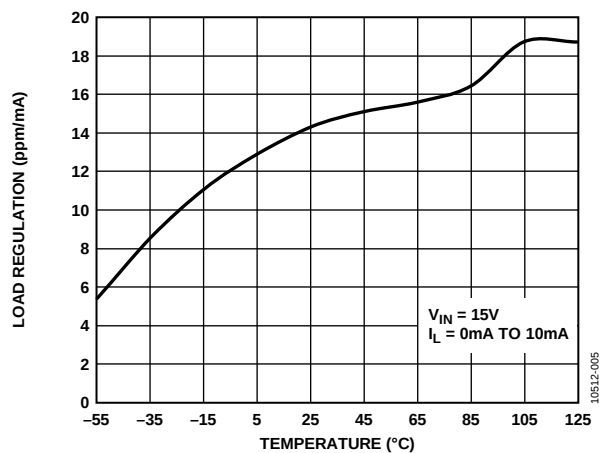


Figure 5. Line Regulation vs. Temperature

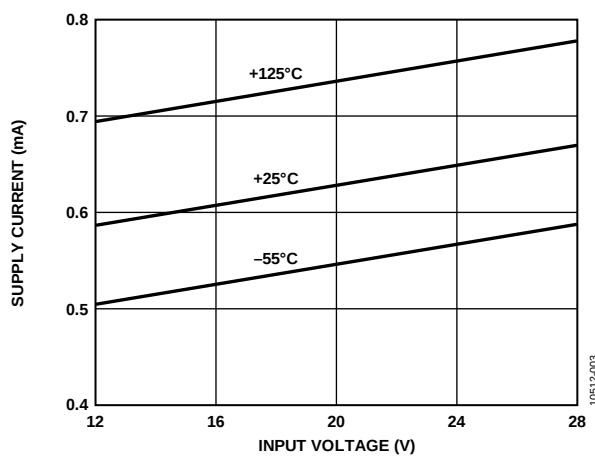


Figure 3. Supply Current vs. Input Voltage

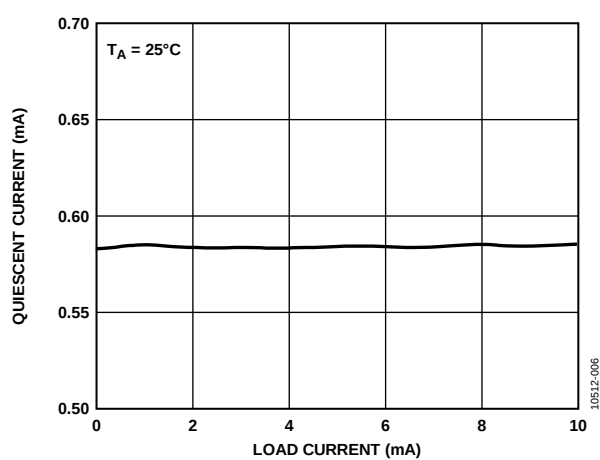


Figure 6. Quiescent Current vs. Load Current

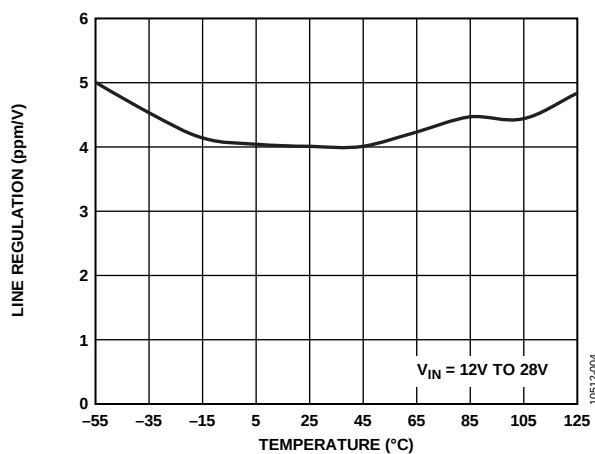
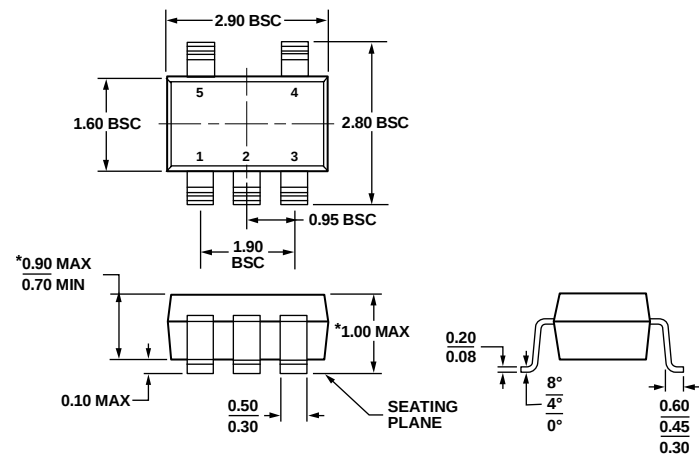


Figure 4. Load Regulation vs. Temperature

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 ¹	Output Voltage V _o (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

¹ Z = RoHS Compliant Part.

NOTES

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