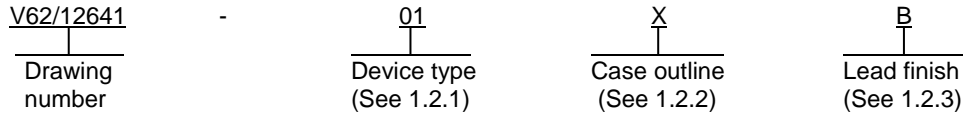




1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance low noise, micropower 5.0 V precision voltage reference microcircuit, with an operating temperature range of -55°C to +125°C.

1.2 Vendor Item Drawing Administrative Control Number. The manufacturer's PIN is the item of identification. The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation:



1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	ADR293-EP	Low noise, micropower 5.0 V precision voltage reference

1.2.2 Case outline(s). The case outlines are as specified herein.

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	JEDEC MO-153-AA	Thin Shrink Small Outline Package

1.2.3 Lead finishes. The lead finishes are as specified below or other lead finishes as provided by the device manufacturer:

<u>Finish designator</u>	<u>Material</u>
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
Z	Other

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	SIZE <b>A</b>	CODE IDENT NO. <b>16236</b>	DWG NO. <b>V62/12641</b>
		REV	PAGE 2

1.3 Absolute maximum ratings. 1/

Supply voltage .....	18.0 V
Output short circuit duration to GND .....	Indefinite
Operating temperature range: .....	-55°C to +125°C
Storage temperature range .....	-65°C to +150°C
Junction temperature range .....	-65°C to +150°C
Lead temperature (soldering, 60 sec) .....	300°C

1.4 Thermal characteristics.

Thermal resistance

Case outline	$\theta_{JA}$	$\theta_{JC}$	Unit
Case X	240	43	°C/W

2. APPLICABLE DOCUMENTS

JEDEC – SOLID STATE TECHNOLOGY ASSOCIATION (JEDEC)

JEP95 – Registered and Standard Outlines for Semiconductor Devices

(Copies of these documents are available online at <http://www.jedec.org> or from JEDEC – Solid State Technology Association, 3103 North 10th Street, Suite 240–S, Arlington, VA 22201.)

3. REQUIREMENTS

3.1 Marking. Parts shall be permanently and legibly marked with the manufacturer’s part number as shown in 6.3 herein and as follows:

- A. Manufacturer’s name, CAGE code, or logo
- B. Pin 1 identifier
- C. ESDS identification (optional)

3.2 Unit container. The unit container shall be marked with the manufacturer’s part number and with items A and C (if applicable) above.

3.3 Electrical characteristics. The maximum and recommended operating conditions and electrical performance characteristics are as specified in 1.3, 1.4, and table I herein.

3.4 Design, construction, and physical dimension. The design, construction, and physical dimensions are as specified herein.

3.5 Diagrams.

3.5.1 Case outline. The case outline shall be as shown in 1.2.2 and figure 1.

3.5.2 Terminal connections. The terminal connections shall be as shown in figure 2.

1/ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/12641</b>
		REV	PAGE 3

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Test conditions $V_S = 6.0\text{ V}$ , $T_A = 25^\circ\text{C}$ unless otherwise specified	Limits			Unit
			Min	Typ	Max	
Output voltage (T Grade)	$V_{OUT}$	$I_{OUT} = 0\text{ mA}$	4.990	5.000	5.010	V
Initial accuracy (T Grade)		$I_{OUT} = 0\text{ mA}$	-10		+10 0.20	mV %
Line regulation (T Grade)	$\Delta V_{OUT}/\Delta V_{IN}$	6.0 V to 15 V, $I_{OUT} = 0\text{ mA}$		40	150	ppm/V
Load regulation (T Grade)	$\Delta V_{OUT}/\Delta I_{LOAD}$	$V_S = 6.0\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to 5 mA		30	150	ppm/mA
Long term stability	$\Delta V_{OUT}$	After 1000 hours of operation @ $125^\circ\text{C}$		50		ppm
Voltage noise	$e_{N\text{ p-p}}$	$f = 0.1\text{ Hz}$ to 10 Hz		15		$\mu\text{V p-p}$
Voltage noise density	$e_N$	$f = 1\text{ kHz}$		640		nV/ $\sqrt{\text{Hz}}$

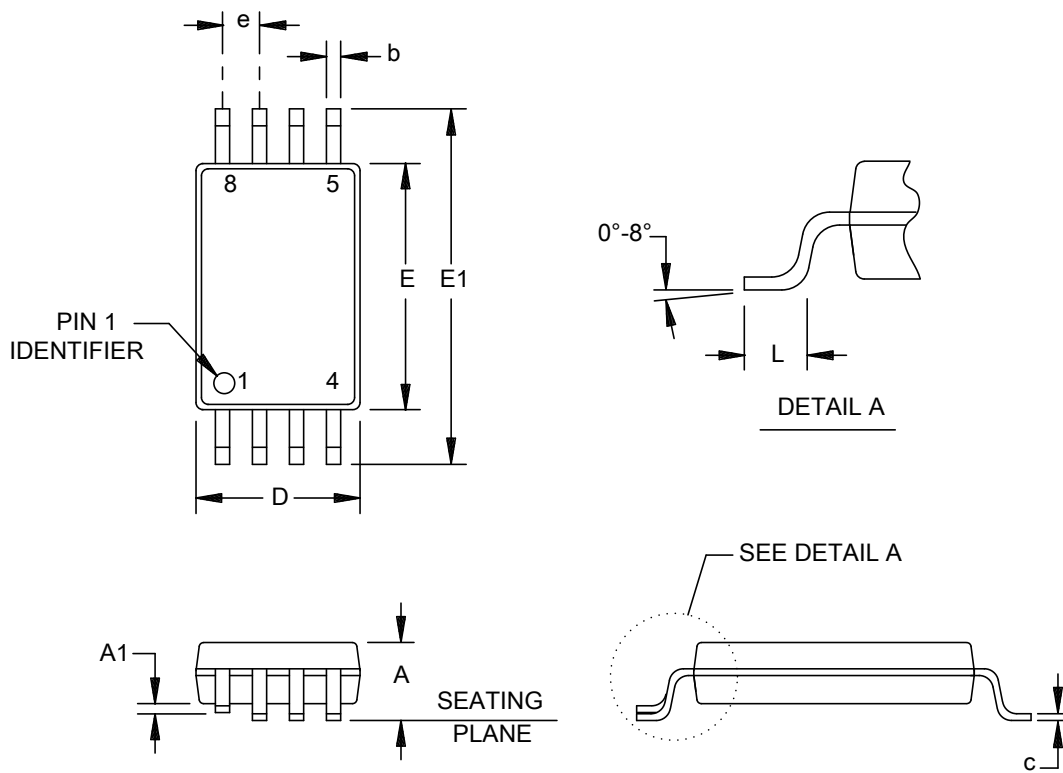
Test	Symbol	Test conditions $V_S = 6.0\text{ V}$ $-25^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$ unless otherwise specified	Limits			Unit
			Min	Typ	Max	
Temperature coefficient (T Grade)	$TCV_{OUT}$	$I_{OUT} = 0\text{ mA}$		10	25	ppm/ $^\circ\text{C}$
Line regulation (T Grade)	$\Delta V_{OUT}/\Delta V_{IN}$	6.0 V to 15 V, $I_{OUT} = 0\text{ mA}$		50	200	ppm/V
Load regulation (T Grade)	$\Delta V_{OUT}/\Delta I_{LOAD}$	$V_S = 6.0\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to 5 mA		30	200	ppm/mA

Test	Symbol	Test conditions $V_S = 6.0\text{ V}$ $-55^\circ\text{C} \leq T_A \leq +125^\circ\text{C}$ unless otherwise specified	Limits			Unit
			Min	Typ	Max	
Temperature coefficient (T Grade)	$TCV_{OUT}$	$I_{OUT} = 0\text{ mA}$		10	30	ppm/ $^\circ\text{C}$
Line regulation (T Grade)	$\Delta V_{OUT}/\Delta V_{IN}$	6.0 V to 15 V, $I_{OUT} = 0\text{ mA}$		70	250	ppm/V
Load regulation (T Grade)	$\Delta V_{OUT}/\Delta I_{LOAD}$	$V_S = 6.0\text{ V}$ , $I_{OUT} = 0\text{ mA}$ to 5 mA		30	300	ppm/mA
Supply current	$I_S$	@ $25^\circ\text{C}$		11 15	15 20	$\mu\text{A}$
Thermal hysteresis (T Grade)	$V_{OUT\text{-HYS}}$			157		ppm

1/ Testing and other quality control techniques are used to the extent deemed necessary to assure product performance over the specified temperature range. Product may not necessarily be tested across the full temperature range and all parameters may not necessarily be tested. In the absence of specific parametric testing, product performance is assured by characterization and/or design.

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/12641</b>
		REV	PAGE 4

Case X



Dimensions					
Symbol	Millimeters		Symbol	Millimeters	
	Min	Max		Min	Max
A		1.20	E	4.30	4.50
A1	0.05	0.15	E1	6.40 BSC	
b	0.19	0.30	e	0.65 BSC	
c	0.09	0.20	L	0.45	0.75
D	2.90	3.10			

**NOTES:**

1. All linear dimensions are in millimeters.
2. Falls within JEDEC MO-153-AA.

FIGURE 1. Case outline.

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/12641</b>
		<b>REV</b>	<b>PAGE 5</b>

Case outline X			
Terminal number	Terminal symbol	Terminal number	Terminal symbol
1	NC	8	NC
2	V <sub>IN</sub>	7	NC
3	NC	6	V <sub>OUT</sub>
4	GND	5	NC

FIGURE 2. Terminal connections.

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/12641</b>
		REV	PAGE 6

4. VERIFICATION

4.1 Product assurance requirements. The manufacturer is responsible for performing all inspection and test requirements as indicated in their internal documentation. Such procedures should include proper handling of electrostatic sensitive devices, classification, packaging, and labeling of moisture sensitive devices, as applicable.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Preservation, packaging, labeling, and marking shall be in accordance with the manufacturer's standard commercial practices for electrostatic discharge sensitive devices.

6. NOTES

6.1 ESDS. Devices are electrostatic discharge sensitive and are classified as ESDS class 1 minimum.

6.2 Configuration control. The data contained herein is based on the salient characteristics of the device manufacturer's data book. The device manufacturer reserves the right to make changes without notice. This drawing will be modified as changes are provided.

6.3 Suggested source(s) of supply. Identification of the suggested source(s) of supply herein is not to be construed as a guarantee of present or continued availability as a source of supply for the item. DLA Land and Maritime maintains an online database of all current sources of supply at <http://www.landandmaritime.dla.mil/Programs/Smcr/>.

Vendor item drawing administrative control number <sup>1/</sup>	Device manufacturer CAGE code	Ordering Quantity	Vendor part number
V62/12641-01XB	24355	96	ADR293TRU-EP
		1000	ADR293TRU-EP-R7

<sup>1/</sup> The vendor item drawing establishes an administrative control number for identifying the item on the engineering documentation.

CAGE code

24355

Source of supply

Analog Devices  
 1 Technology Way  
 P.O. Box 9106  
 Norwood, MA 02062-9106

<b>DLA LAND AND MARITIME COLUMBUS, OHIO</b>	<b>SIZE A</b>	<b>CODE IDENT NO. 16236</b>	<b>DWG NO. V62/12641</b>
		REV	PAGE 7