



1. SCOPE

1.1 Scope. This drawing documents the general requirements of a zero drift, single supply, rail-to-rail input/output operational amplifier 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:

<u>V62/15607</u> Drawing number	-	<u>01</u> Device type (See 1.2.1)	<u>X</u> Case outline (See 1.2.2)	<u>E</u> Lead finish (See 1.2.3)
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1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	AD8629-EP	Zero drift, single supply, rail-to-rail input/output operational amplifier

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

<u>Outline letter</u>	<u>Number of pins</u>	<u>JEDEC PUB 95</u>	<u>Package style</u>
X	8	MS-012-AA	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

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1.3 Absolute maximum ratings. 1/

Supply voltage (V <sub>S</sub> ) .....	6 V
Input voltage .....	GND – 0.3 V to V <sub>S</sub> + 0.3 V
Differential input voltage .....	±5.0 V 2/
Output short circuit duration to GND .....	Indefinite
Junction temperature range (T <sub>J</sub> ) .....	-65°C to +150°C
Storage temperature range (T <sub>STG</sub> ) .....	-65°C to +150°C
Lead temperature (soldering, 60 seconds) .....	300°C
Electrostatic discharge (ESD) :	
Human body model (HBM) .....	±4000 V
Thermal resistance, junction to ambient (θ <sub>JC</sub> ) .....	43°C/W
Thermal resistance, junction to ambient (θ <sub>JA</sub> ) .....	158°C/W

1.4 Recommended operating conditions. 3/

Supply voltage (V <sub>S</sub> ) .....	2.7 V and 5.0 V
Operating free-air temperature range (T <sub>A</sub> ) .....	-55°C to +125°C

- 1/ Stresses beyond those listed under “absolute maximum rating” 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.
- 2/ The differential input voltage is limited to ±5 V or the supply voltage, whichever is less.
- 3/ Use of this product beyond the manufacturers design rules or stated parameters is done at the user’s risk. The manufacturer and/or distributor maintain no responsibility or liability for product used beyond the stated limits.

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2. APPLICABLE DOCUMENTS

JEDEC Solid State Technology Association

JEDEC PUB 95 – 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 22201-2107).

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.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions $V_S = 5.0\text{ V}$ , $V_{CM} = 2.5\text{ V}$ unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit	
					Min	Max		
Input characteristics.								
Offset voltage	$V_{OS}$		+25°C	01		5	$\mu\text{V}$	
			-55°C to +125°C			15		
			+25°C		1 typical			
Input bias current	$I_B$		+25°C	01		100	$\text{pA}$	
			-55°C to +125°C			1.5		$\text{nA}$
			+25°C		30 typical			
Input offset current	$I_{OS}$		+25°C	01		200	$\text{pA}$	
			-55°C to +125°C			250		
			+25°C		50 typical			
Input voltage range			+25°C	01	0	5	V	
Common mode rejection ratio	CMRR	$V_{CM} = 0\text{ V to }5\text{ V}$	+25°C	01	120		dB	
			-55°C to +125°C		140 typical			
					115			130 typical
Large signal voltage gain		$R_L = 10\text{ k}\Omega$ , $V_O = 0.3\text{ V to }4.7\text{ V}$	+25°C	01	125		dB	
			-55°C to +125°C		145 typical			
					120			135 typical
Offset voltage drift	$\Delta V_{OS} / \Delta T$		-55°C to +125°C	01		0.05	$\mu\text{V}/^\circ\text{C}$	
					0.008 typical			

See footnote at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 5.0\text{ V}$ , $V_{CM} = 2.5\text{ V}$ unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Output characteristics.							
Output voltage high	$V_{OH}$	$R_L = 100\text{ k}\Omega$ to ground	+25°C	01	4.99		V
			-55°C to +125°C		4.996 typical		
					4.99		
		$R_L = 10\text{ k}\Omega$ to ground	+25°C		4.95		
			-55°C to +125°C		4.98 typical		
					4.95		
Output voltage low	$V_{OL}$	$R_L = 100\text{ k}\Omega$ to $+V_S$	+25°C	01		5	V
			-55°C to +125°C		1 typical		
						5	
		$R_L = 10\text{ k}\Omega$ to $+V_S$	+25°C			20	
			-55°C to +125°C		10 typical		
						20	
Short circuit limit	$I_{SC}$		+25°C	01	$\pm 25$		mA
			-55°C to +125°C		$\pm 50$ typical		
					$\pm 40$ typical		
Output current	$I_O$		+25°C	01	$\pm 30$ typical		mA
			-55°C to +125°C		$\pm 15$ typical		

See footnote at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 5.0\text{ V}$ , $V_{CM} = 2.5\text{ V}$ , unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Power supply.							
Power supply rejection ratio	PSRR	$V_S = 2.7\text{ V to }5.5\text{ V}$	$-55^\circ\text{C to }+125^\circ\text{C}$	01	115		dB
					130 typical		
Supply current per amplifier	$I_{SY}$	$V_O = V_S/2$	$+25^\circ\text{C}$	01		1.1	mA
					0.85 typical		
			$-55^\circ\text{C to }+125^\circ\text{C}$			1.2	
					1.0 typical		
Input capacitance ( $C_{IN}$ ).							
Differential			$+25^\circ\text{C}$	01	1.5 typical		pF
Common mode			$+25^\circ\text{C}$	01	8.0 typical		pF
Dynamic performance.							
Slew rate	SR	$R_L = 10\text{ k}\Omega$	$+25^\circ\text{C}$	01	1.0 typical		V/ $\mu\text{s}$
Overload recovery time			$+25^\circ\text{C}$	01	0.05 typical		ms
Gain bandwidth product	GBP		$+25^\circ\text{C}$	01	2.5 typical		MHz
Noise performance.							
Voltage noise	$e_{n\text{p-p}}$	0.1 Hz to 10 Hz	$+25^\circ\text{C}$	01	0.5 typical		$\mu\text{Vp-p}$
		0.1 Hz to 1.0 Hz			0.16 typical		
Voltage noise density	$e_n$	$f = 1\text{ kHz}$	$+25^\circ\text{C}$	01	22 typical		nV / $\sqrt{\text{Hz}}$
Current noise density	$i_n$	$f = 10\text{ Hz}$	$+25^\circ\text{C}$	01	5 typical		fA / $\sqrt{\text{Hz}}$

See footnote at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 2.7\text{ V}$ , $V_{CM} = 1.35\text{ V}$ , $V_O = 1.4\text{ V}$ unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Input characteristics.							
Offset voltage	$V_{OS}$		+25°C	01		5	$\mu\text{V}$
			-55°C to +125°C			15	
			+25°C		1 typical		
Input bias current	$I_B$		+25°C	01		100	$\text{pA}$
			30 typical				
			-55°C to +125°C			1.5	$\text{nA}$
1.0 typical							
Input offset current	$I_{OS}$		+25°C	01		200	$\text{pA}$
			-55°C to +125°C			250	
			+25°C		50 typical		
Input voltage range			+25°C	01	0	2.7	V
Common mode rejection ratio	CMRR	$V_{CM} = 0\text{ V to }2.7\text{ V}$	+25°C	01	115		dB
			130 typical				
			-55°C to +125°C		110		
120 typical							
Large signal voltage gain		$R_L = 10\text{ k}\Omega$ , $V_O = 0.3\text{ V to }2.4\text{ V}$	+25°C	01	110		dB
			140 typical				
			-55°C to +125°C		105		
130 typical							
Offset voltage drift	$\Delta V_{OS} /$ $\Delta T$		-55°C to +125°C	01		0.05	$\mu\text{V}/^\circ\text{C}$
					0.002 typical		

See footnote at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 2.7\text{ V}$ , $V_{CM} = 1.35\text{ V}$ , $V_O = 1.4\text{ V}$ unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Output characteristics.							
Output voltage high	$V_{OH}$	$R_L = 100\text{ k}\Omega$ to ground	+25°C	01	2.68		V
			-55°C to +125°C		2.695 typical		
					2.68		
		$R_L = 10\text{ k}\Omega$ to ground	+25°C		2.67		
			-55°C to +125°C		2.68 typical		
					2.67		
Output voltage low	$V_{OL}$	$R_L = 100\text{ k}\Omega$ to $+V_S$	+25°C	01		5	V
			-55°C to +125°C		1 typical		
						5	
		$R_L = 10\text{ k}\Omega$ to $+V_S$	+25°C			20	
			-55°C to +125°C		10 typical		
						20	
Short circuit limit	$I_{SC}$		+25°C	01	$\pm 10$		mA
			-55°C to +125°C		$\pm 15$ typical		
					$\pm 10$ typical		
Output current	$I_O$		+25°C	01	$\pm 10$ typical		mA
			-55°C to +125°C		$\pm 5$ typical		

See footnote at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 2.7\text{ V}$ , $V_{CM} = 1.35\text{ V}$ , $V_O = 1.4\text{ V}$ unless otherwise specified	Temperature, $T_A$	Device type	Limits		Unit
					Min	Max	
Power supply.							
Power supply rejection ratio	PSRR	$V_S = 2.7\text{ V to } 5.5\text{ V}$	$-55^\circ\text{C to } +125^\circ\text{C}$	01	115		dB
					130 typical		
Supply current per amplifier	$I_{SY}$	$V_O = V_S/2$	$+25^\circ\text{C}$	01		1.0	mA
					0.75 typical		
			$-55^\circ\text{C to } +125^\circ\text{C}$			1.2	
					0.9 typical		
Input capacitance ( $C_{IN}$ ).							
Differential			$+25^\circ\text{C}$	01	1.5 typical		pF
Common mode			$+25^\circ\text{C}$	01	8.0 typical		pF
Dynamic performance.							
Slew rate	SR	$R_L = 10\text{ k}\Omega$	$+25^\circ\text{C}$	01	1.0 typical		V/ $\mu\text{s}$
Overload recovery time			$+25^\circ\text{C}$	01	0.05 typical		ms
Gain bandwidth product	GBP		$+25^\circ\text{C}$	01	2.0 typical		MHz
Noise performance.							
Voltage noise	$e_{n\text{p-p}}$	0.1 Hz to 10 Hz	$+25^\circ\text{C}$	01	0.5 typical		$\mu\text{Vp-p}$
Voltage noise density	$e_n$	$f = 1\text{ kHz}$	$+25^\circ\text{C}$	01	22 typical		$\text{nV} / \sqrt{\text{Hz}}$
Current noise density	$i_n$	$f = 10\text{ Hz}$	$+25^\circ\text{C}$	01	5 typical		$\text{fA} / \sqrt{\text{Hz}}$

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.

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Case X

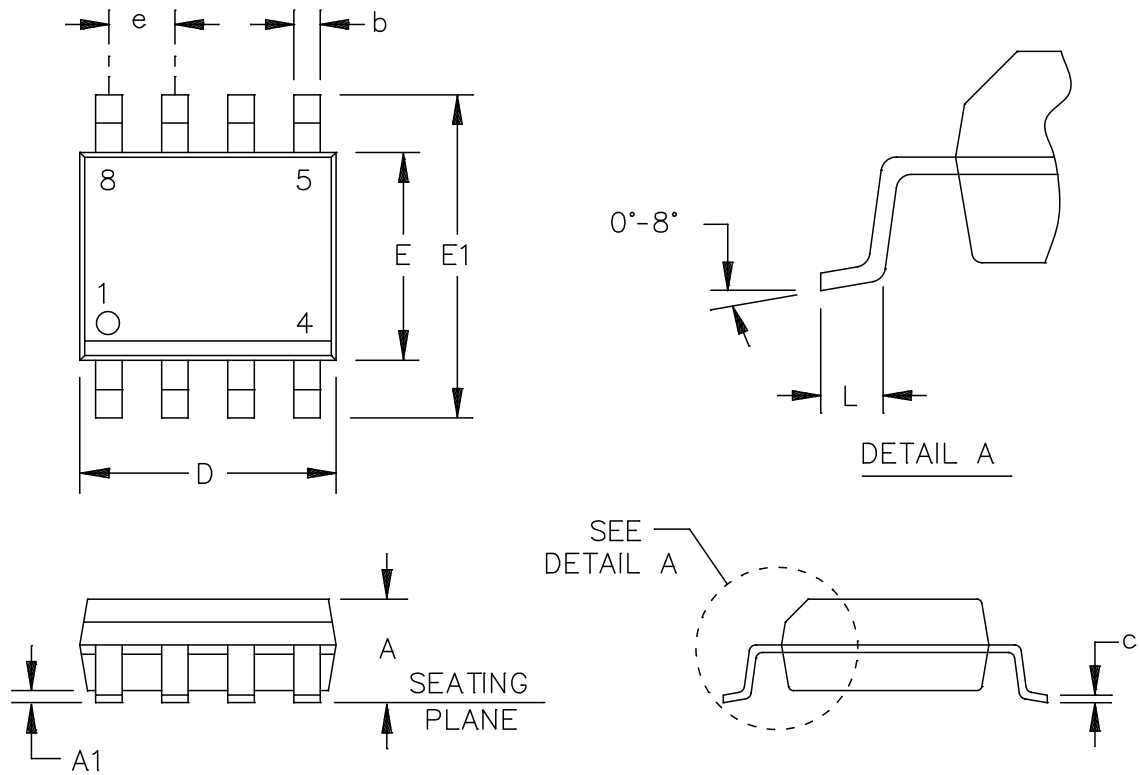


FIGURE 1. Case outline.

<p><b>DLA LAND AND MARITIME COLUMBUS, OHIO</b></p>	<p><b>SIZE A</b></p>	<p><b>CODE IDENT NO. 16236</b></p>	<p><b>DWG NO. V62/15607</b></p>
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Case X – continued.

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.0532	0.0688	1.35	1.75
A1	0.0040	0.0098	0.10	0.25
b	0.0122	0.0201	0.31	0.51
c	0.0067	0.0098	0.17	0.25
D	0.1890	0.1968	4.80	5.00
e	0.0500 BSC		1.27 BSC	
E	0.1497	0.1574	3.80	4.00
E1	0.2284	0.2441	5.80	6.20
L	0.0157	0.0500	0.40	1.27
n	8 leads		8 leads	

NOTE:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only and are not appropriate for use in design.
2. Falls within reference to JEDEC MS-012-AA.

FIGURE 1. Case outline - Continued.

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Device type	01
Case outline	X
Terminal number	Terminal symbol
1	OUTPUT A
2	-INPUT A
3	+INPUT A
4	-V <sub>S</sub>
5	+INPUT B
6	-INPUT B
7	OUTPUT B
8	+V <sub>S</sub>

FIGURE 2. Terminal connections.

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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 <u>1/</u>	Device manufacturer CAGE code	Vendor part number
V62/15607-01XE	24355	AD8629TRZ-EP

1/ 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  
 Route 1 Industrial Park  
 P.O. Box 9106  
 Norwood, MA 02062  
 Point of contact: Raheen Business Park  
 Limerick, Ireland

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