REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	Add Mode of transportation and quantity column under paragraph 6.3. Update document paragraphs to current requirements. - ro	21-04-02	J. ESCHMEYER

Prepared in accordance with ASME Y14.24

Vendor item drawing

REV																						
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REV STATUS OF PAGES	REV		A	A	A	A	A	A	A	A	A	A	A	A	A	A			
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PMIC N/A	PREPARED BY RICK OFFICER	DLA LAND AND MARITIME COLUMBUS, OHIO 43218-3990 https://www.dla.mil/LandandMaritime
Original date of drawing YY-MM-DD 15-07-16	CHECKED BY RAJESH PITHADIA APPROVED BY CHARLES F. SAFFLE	TITLE MICROCIRCUIT, LINEAR, ZERO DRIFT, SINGLE SUPPLY, RAIL-TO-RAIL INPUT/OUTPUT OPERATIONAL AMPLIFIER, MONOLITHIC SILICON
	SIZE: A CODE IDENT. NO.: 16236	DWG NO. V62/15607
	REV: A	PAGE 1 OF 14

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.

AMSC N/A

5962-V008-21

1. SCOPE

1.1 Scope. This drawing documents the general requirements of a high performance 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:

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

1.2.1 Device type(s).

Device type	Generic	Circuit function
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.

Outline letter	Number of pins	JEDEC PUB 95	Package style
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:

Finish designator	Material
A	Hot solder dip
B	Tin-lead plate
C	Gold plate
D	Palladium
E	Gold flash palladium
F	Tin-lead alloy (BGA/CGA)
Z	Other

1.3 Absolute maximum ratings. 1/

Supply voltage (V_S)	6 V
Input voltage	GND – 0.3 V to V_S + 0.3 V
Differential input voltage	±5.0 V 2/
Output short circuit duration to GND	Indefinite
Junction temperature range (T_J)	-65°C to +150°C
Storage temperature range (T_{STG})	-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_{JC})	43°C/W
Thermal resistance, junction to ambient (θ_{JA})	158°C/W

1.4 Recommended operating conditions. 3/

Supply voltage (V_S)	2.7 V and 5.0 V
Operating free-air temperature range (T_A)	-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.

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 https://www.jedec.org.)

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.

TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions V_S = 5.0 V, V_{CM} = 2.5 V unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Input characteristics.							
Offset voltage	V_{OS}		+25°C	01		5	µV
			-55°C to +125°C			15	
			+25°C		1 typical		
Input bias current	I_B		+25°C	01		100	pA
			-55°C to +125°C			1.5	nA
			+25°C		30 typical		pA
Input offset current	I_{OS}		+25°C	01		200	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 V to 5 V	+25°C	01	120		dB
					140 typical		
			-55°C to +125°C		115		
					130 typical		
Large signal voltage gain	A_{VO}	R_L = 10 kΩ, V_O = 0.3 V to 4.7 V	+25°C	01	125		dB
					145 typical		
			-55°C to +125°C		120		
					135 typical		
Offset voltage drift	ΔV_{OS} / ΔT		-55°C to +125°C	01		0.05	µV/°C
					0.008 typical		

See footnote at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

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

See footnote at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

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

See footnote at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions V_S = 2.7 V, V_{CM} = 1.35 V, V_O = 1.4 V unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Input characteristics.							
Offset voltage	V_{OS}		+25°C	01		5	µV
			-55°C to +125°C			15	
			+25°C		1 typical		
Input bias current	I_B		+25°C	01		100	pA
					30 typical		
			-55°C to +125°C			1.5	nA
					1.0 typical		
Input offset current	I_{OS}		+25°C	01		200	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 V to 2.7 V	+25°C	01	115		dB
					130 typical		
			-55°C to +125°C		110		
					120 typical		
Large signal voltage gain	A_{VO}	R_L = 10 kΩ, V_O =0.3 V to 2.4 V	+25°C	01	110		dB
					140 typical		
			-55°C to +125°C		105		
					130 typical		
Offset voltage drift	ΔV_{OS} / ΔT		-55°C to +125°C	01		0.05	µV/°C
					0.002 typical		

See footnote at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

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

See footnote at end of table.

TABLE I. Electrical performance characteristics – Continued. 1/

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

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.

Case X

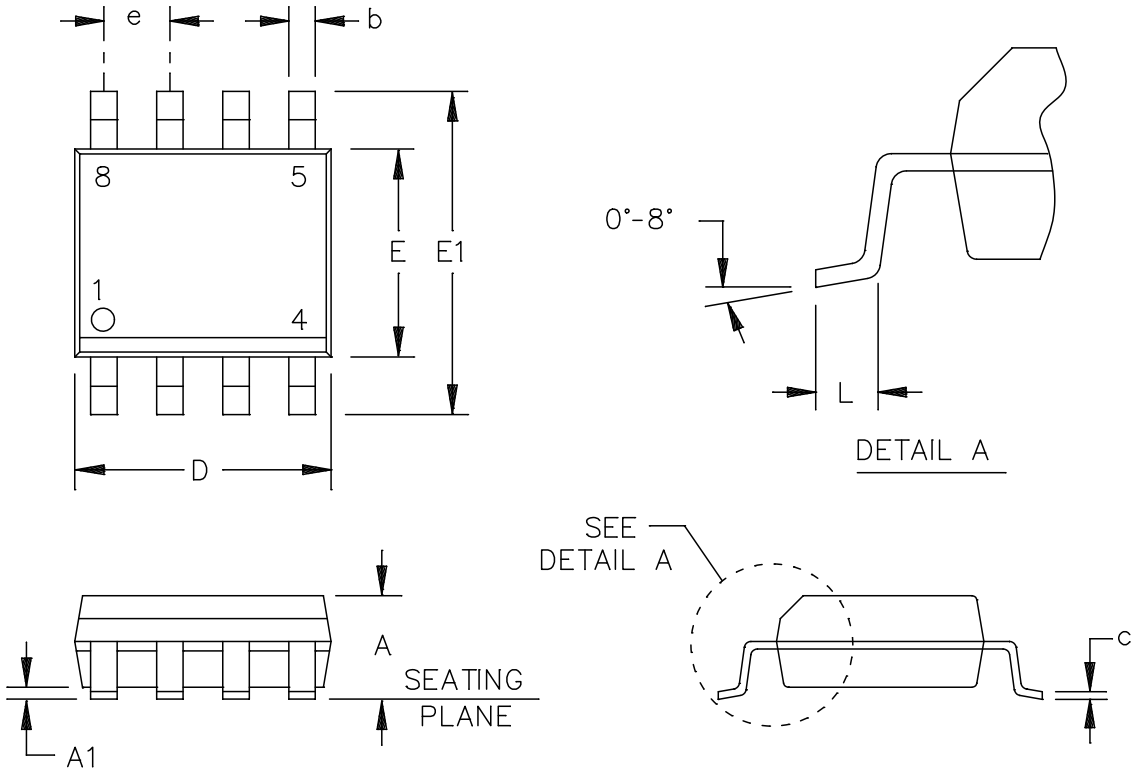

FIGURE 1. Case outline.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 16236	DWG NO. V62/15607
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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.

Device type	01
Case outline	X
Terminal number	Terminal symbol
1	OUTPUT A
2	-INPUT A
3	+INPUT A
4	-V_S
5	+INPUT B
6	-INPUT B
7	OUTPUT B
8	+V_S

FIGURE 2. Terminal connections.

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 https://landandmaritimeapps.dla.mil/programs/smcr/.

Vendor item drawing administrative control number 1/	Device manufacturer CAGE code	Mode of transportation and quantity	Vendor part number
V62/15607-01XE	24355	Tube, 98 units	AD8629TRZ-EP

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

CAGE code	Source of supply
24355	Analog Devices Route 1 Industrial Park P.O. Box 9106 Norwood, MA 02062 Point of contact: 20 Alpha Road Chelmsford, MA 01824-4123