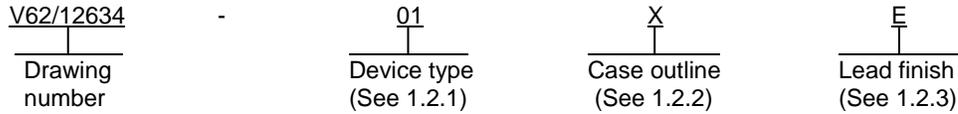


1. SCOPE

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



1.2.1 Device type(s).

<u>Device type</u>	<u>Generic</u>	<u>Circuit function</u>
01	AD8574	Zero drift, single supply, quad 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	14	MO-153-AB-1	Plastic thin shrink small outline

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 range (V_S)	6 V
Input voltage	GND to $V_S + 0.3$ V
Differential input voltage	± 5.0 V <u>2/</u>
Power dissipation (P_D)	138.8 mW typical
Output short circuit duration to GND	Indefinite
Storage temperature range (T_{STG})	-65°C to +150°C
Junction temperature range (T_J)	-65°C to +150°C
Lead temperature (soldering, 60 seconds)	+300°C
Thermal resistance, junction to case (θ_{JC})	36°C/W
Thermal resistance, junction to ambient (θ_{JA})	180°C/W
Electrostatic discharge:	
Human body model (HBM)	2000 V

1.4 Recommended operating conditions. 3/

Supply voltage range (V_S)	5 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/ Differential input voltage is limited to ± 5.0 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 PUB 95 – Registered and Standard Outlines for Semiconductor Devices

(Applications for copies should be addressed to the Electronic Industries Alliance, 2500 Wilson Boulevard, Arlington, VA 22201-3834 or online at <http://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.

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TABLE I. Electrical performance characteristics. 1/

Test	Symbol	Conditions $V_S = 5\text{ V}$, $V_{CM} = 2.5$, $V_O = 2.5\text{ V}$ unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Input characteristics.							
Offset voltage	V_{OS}		+25°C	01		5	μV
			-55°C to +125°C			15	
Input bias current	I_B		+25°C	01		50	pA
			-55°C to +125°C			1.5	
Input offset current	I_{OS}		+25°C	01		70	pA
			-55°C to +125°C			200	
Input voltage range	V_{IN}		+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		115		
Large signal voltage <u>2/</u> gain	A_{VO}	$V_O = 0.3\text{ V to } 4.7\text{ V}$, $R_L = 10\text{ k}\Omega$	+25°C	01	125		dB
			-55°C to +125°C		120		
Offset voltage drift	$\Delta V_{OS} / \Delta T$		-55°C to +125°C	01		0.04	$\mu\text{V}/^\circ\text{C}$
Output characteristics.							
Output voltage high	V_{OH}	$R_L = 100\text{ k}\Omega\text{ to GND}$	+25°C	01	4.99		V
			-55°C to +125°C		4.99		
		$R_L = 10\text{ k}\Omega\text{ to GND}$	+25°C		4.95		
			-55°C to +125°C		4.95		
Output voltage low	V_{OL}	$R_L = 100\text{ k}\Omega\text{ to } +V_S$	+25°C	01		10	mV
			-55°C to +125°C			10	
		$R_L = 10\text{ k}\Omega\text{ to } +V_S$	+25°C			30	
			-55°C to +125°C			30	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 5\text{ V}$, $V_{CM} = 2.5$, $V_O = 2.5\text{ V}$ unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Output characteristics – continued.							
Short circuit limit	I_{SC}		+25°C	01	±25		mA
			-55°C to +125°C		±40 typical		
Output current	I_O		+25°C	01	±30 typical		mA
			-55°C to +125°C		±15 typical		
Power supply.							
Power supply rejection ratio	PSRR	$V_S = 2.7\text{ V}$ to 5.5 V	+25°C	01	120		dB
			-55°C to +125°C		115		
Supply current per amplifier	I_{SY}	$V_O = 0\text{ V}$	+25°C	01		975	µA
			-55°C to +125°C			1075	
Dynamic performance.							
Slew rate	SR	$R_L = 10\text{ k}\Omega$	+25°C	01	0.4 typical		V/µs
Overload recovery time			+25°C	01		0.3	ms
Gain bandwidth product	GBP		+25°C	01	1.5 typical		MHz
Noise performance.							
Voltage noise	enp-p	0 Hz to 10 Hz	+25°C	01	1.3 typical		µVpp
		0 Hz to 1 Hz			0.41 typical		
Voltage noise density	e_n	$f = 1\text{ kHz}$	+25°C	01	51 typical		nV / √Hz
Current noise density	i_n	$f = 10\text{ Hz}$	+25°C	01	2 typical		fA / √Hz

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 2.7\text{ V}$, $V_{CM} = 1.35\text{ V}$, $V_O = 1.35\text{ V}$ 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	
Input bias current	I_B		+25°C	01		50	pA
			-55°C to +125°C			1.5	
Input offset current	I_{OS}		+25°C	01		50	pA
			-55°C to +125°C			200	
Input voltage range	V_{IN}		+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
			-55°C to +125°C		110		
Large signal voltage $\underline{2}$ / gain	A_{VO}	$V_O = 0.3\text{ V to }2.4\text{ V}$, $R_L = 10\text{ k}\Omega$	+25°C	01	110		dB
			-55°C to +125°C		105		
Offset voltage drift	$\Delta V_{OS} / \Delta T$		-55°C to +125°C	01		0.04	$\mu\text{V}/^\circ\text{C}$
Output characteristics.							
Output voltage high	V_{OH}	$R_L = 100\text{ k}\Omega\text{ to GND}$	+25°C	01	2.685		V
			-55°C to +125°C		2.685		
		$R_L = 10\text{ k}\Omega\text{ to GND}$	+25°C		2.67		
			-55°C to +125°C		2.67		
Output voltage low	V_{OL}	$R_L = 100\text{ k}\Omega\text{ to }+V_S$	+25°C	01		10	mV
			-55°C to +125°C			10	
		$R_L = 10\text{ k}\Omega\text{ to }+V_S$	+25°C			20	
			-55°C to +125°C			20	

See footnotes at end of table.

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TABLE I. Electrical performance characteristics – Continued. 1/

Test	Symbol	Conditions $V_S = 2.7\text{ V}$, $V_{CM} = 1.35\text{ V}$, $V_O = 1.35\text{ V}$ unless otherwise specified	Temperature, T_A	Device type	Limits		Unit
					Min	Max	
Output characteristics – continued.							
Short circuit limit	I _{SC}		+25°C	01	±10		mA
			-55°C to +125°C		±10 typical		
Output current	I _O		+25°C	01	±10 typical		mA
			-55°C to +125°C		±5 typical		
Power supply.							
Power supply rejection ratio	PSRR	$V_S = 2.7\text{ V}$ to 5.5 V	+25°C	01	120		dB
			-55°C to +125°C		115		
Supply current per amplifier	I _{SY}	$V_O = 0\text{ V}$	+25°C	01		900	µA
			-55°C to +125°C			1000	
Dynamic performance.							
Slew rate	SR	$R_L = 10\text{ k}\Omega$	+25°C	01	0.5 typical		V/µs
Overload recovery time			+25°C	01	0.05 typical		ms
Gain bandwidth product	GBP		+25°C	01	1.0 typical		MHz
Noise performance.							
Voltage noise	enp-p	0 Hz to 10 Hz	+25°C	01	2.0 typical		µVpp
Voltage noise density	e _n	f = 1 kHz	+25°C	01	94 typical		nV / √Hz
Current noise density	i _n	f = 10 Hz	+25°C	01	2 typical		fA / √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.

2/ Gain testing is dependent upon test bandwidth.

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Case X

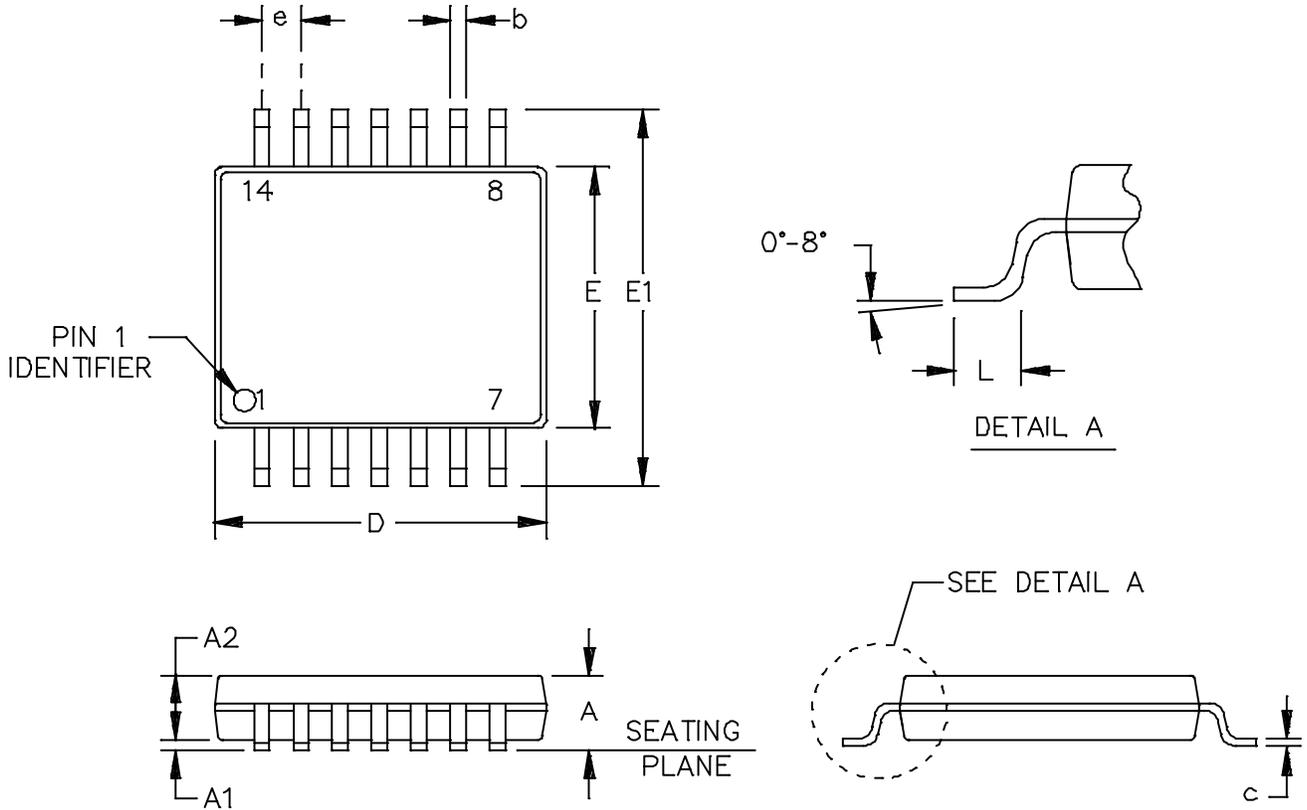


FIGURE 1. Case outline.

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Case X

Symbol	Dimensions			
	Inches		Millimeters	
	Min	Max	Min	Max
A	---	.047	---	1.20
A1	.001	.005	0.05	0.15
A2	.031	.041	0.80	1.05
b	.007	.011	0.19	0.30
c	.003	.007	0.09	0.20
D	.192	.200	4.90	5.10
E	.169	.177	4.30	4.50
E1	.251 BSC		6.40 BSC	
e	.025 BSC		0.65 BSC	
L	.017	.028	0.45	0.75

NOTES:

1. Controlling dimensions are millimeter, inch dimensions are given for reference only.
2. Falls within reference to JEDEC MO-153-AB-1.

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 _S
5	+INPUT B
6	-INPUT B
7	OUTPUT B
8	OUTPUT C
9	-INPUT C
10	+INPUT C
11	-V _S
12	+INPUT D
13	-INPUT D
14	OUTPUT D

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	Transport media, quantity	Vendor part number
V62/12634-01XE	24355	Reel, 2500	AD8574TRU-EP-RL
		Tube, 96	AD8574TRU-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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