



AiP258/AiP358 Dual Operational Amplifiers

Product Specification

Specification Revision History:

Version	Date	Description
2019-12-A1	2019-12	New
2021-12-A2	2021-12	Modify supply voltage range; Modify ordering information
2022-03-A3	2022-03	Modify power supply voltage range
2023-10-B1	2023-10	Update the template
2024-01-B2	2024-01	Add MSOP8 package form



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1、General Description

AiP258/AiP358 consist of two independent, high-gain frequency-compensated operational amplifiers designed to operate from a single supply over a wide range of voltages. Operation from split supplies also is possible if the difference between the two supplies is 3V to 30V, and V_{CC} is at least 1.5V more positive than the input common-mode voltage. The low supply-current drain is independent of the magnitude of the supply voltage.

Applications include transducer amplifiers, DC amplification blocks, and all the conventional operational-amplifier circuits that now can be more easily implemented in single-supply-voltage systems.

Features:

- Wide Supply Ranges
Single Supply: 3V to 36V
Dual Supplies: $\pm 1.5V$ to $\pm 18V$
- Low Supply-Current Drain Independent of Supply Voltage: 0.7mA Typical
- Wide Unity Gain Bandwidth: 0.7MHz
- Low Input Bias and Offset Parameters
Input Offset Voltage: 3mV Typical
Input Offset Current: 2nA Typical
Input Bias Current: 20nA Typical
- Differential Input Voltage Range Equal to Maximum-Rated Supply Voltage: $\pm 36V$
- Open-Loop Differential Voltage Amplification: 100dB Typical
- Internal Frequency Compensation
- Packing Form: SOP8/DIP8/MSOP8

**Ordering Information:****Tube packing specifications:**

Material number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
AiP258DA8.TB	DIP8	AiP258	50 PCS/tube	40 tube/box	2000 PCS/box	Dimensions of plastic enclosure: 9.2mm×6.4mm Pin spacing:2.54mm
AiP358DA8.TB		AiP358				
AiP258SA8.TB	SOP8	AiP258	100 PCS/tube	100 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing:1.27mm
AiP358SA8.TB		AiP358				
AiP358MA8.TB	MSOP8	AiP358	100 PCS/tube	100 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing:0.65mm

Reel packing specifications:

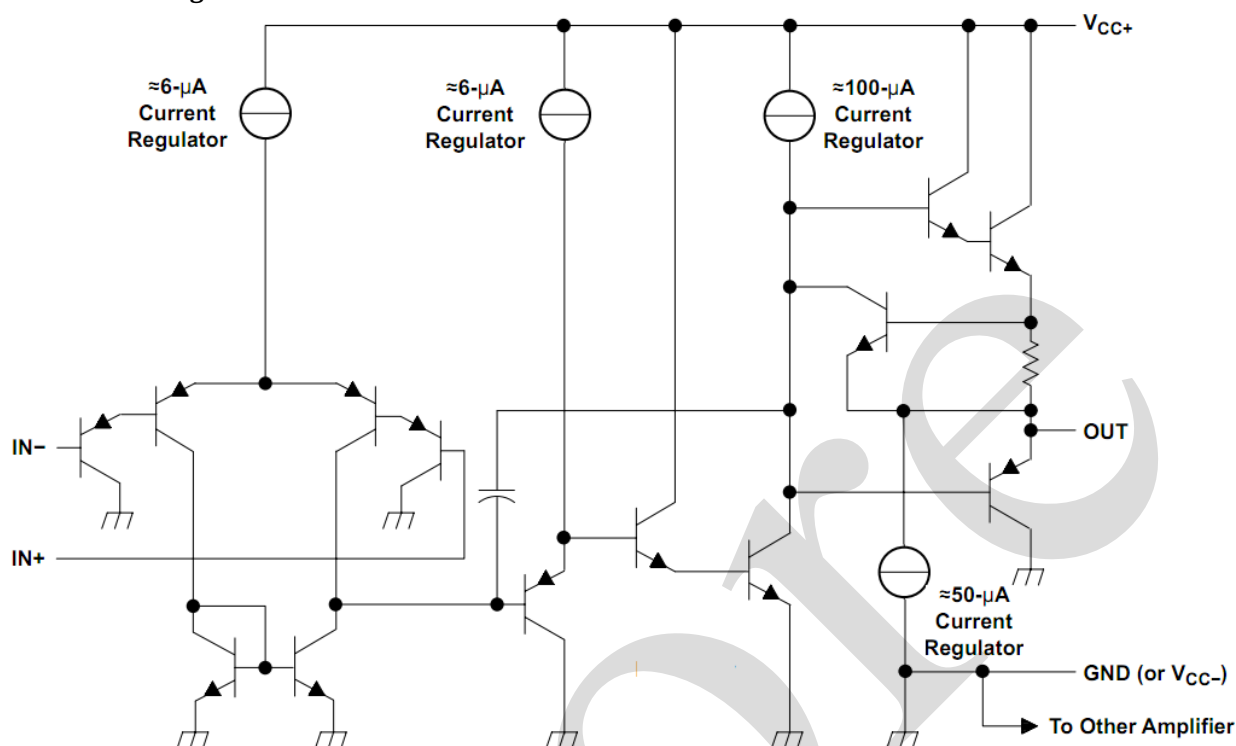
Material number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP258SA8.TR	SOP8	AiP258	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 4.9mm×3.9mm Pin spacing:1.27mm
AiP358SA8.TR		AiP358			
AiP358MA8.TR	MSOP8	AiP358	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 3.0mm×3.0mm Pin spacing:0.65mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.

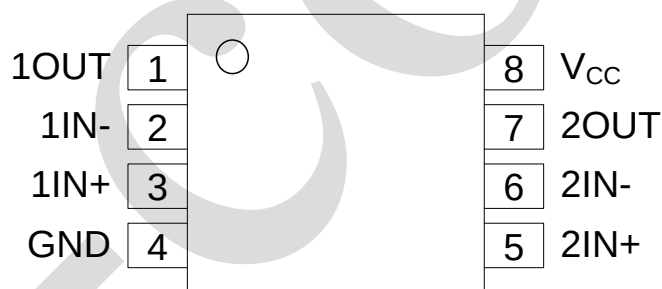


2、Block Diagram And Pin Description

2.1、Block Diagram



2.2、Pin Configurations





2.3、Pin Description

Pin No.	Pin Name	Description
1	1OUT	Channel 1 Output
2	1IN-	Channel 1 Negative input
3	1IN+	Channel 1 Positive input
4	GND	Ground
5	2IN+	Channel 2 Positive input
6	2IN-	Channel 2 Negative input
7	2OUT	Channel 2 Output
8	V _{CC}	Power supply

3、Electrical Parameter

3.1、Absolute Maximum Ratings

(T_{amb}=25℃, All voltage referenced to GND, unless otherwise specified)

Characteristic		Symbol	Conditions		Value	Unit
supply voltage		V _{CC}	-		40 or ±20	V
differential input voltage		V _{ID}	-		±40	V
input voltage		V _I	-		-0.3~40	V
Thermal Resistance	DIP8	R _{θJA}	-		110	℃/W
	SOP8				160	
operating virtual junction temperature		T _J	-		150	℃
storage temperature		T _{stg}	-		-65 to 150	℃
soldering temperature		T _L	10s	DIP8	250	℃
				SOP8/MSOP8	260	

3.2、Recommended Operating Conditions

Characteristic	Symbol	Conditions		Min	Max	Unit
Supply voltage	V _{CC}	-		3	36	V
Common-mode voltage	V _{CM} ^[1]	-		0	V _{CC} -2	V
Operating free air temperature	T _{amb}	-	AiP258	-40	125	℃
			AiP358	-40	85	

Note: [1] The input common mode voltage or either input signal voltage should not be allowed to go negative by more than 0.3V. The upper end of the common mode voltage range is V_{CC}-2V, but either or both inputs can go to +36V without damage, independent of the magnitude of V_{CC}.



3.3、Electrical Characteristics

3.3.1、Electrical Characteristics

($V_{CC}=5V$, $T_{amb}=25^{\circ}C$, unless otherwise noted)

Characteristic	Symbol	Conditions		T _{amb}	Specification parameters						Unit
					AiP258			AiP358			
					Min	Typ	Max	Min	Typ	Max	
input offset voltage	V _{IO}	V _{CC} =5 to 36V, V _{IC} =V _{ICR(min)} V _O =1.4V		25℃	-	3	5	-	3	7	mV
				Full range	-	-	7	-	-	9	
input offset current	I _{IO}	V _O =1.4V		25℃	-	2	30	-	2	50	nA
				Full range	-	-	100	-	-	150	
input bias current	I _{IB}	V _O =1.4V		25℃	-	-20	-150	-	-20	-250	nA
				Full range	-	-	-300	-	-	-500	
common-mode input voltage range	V _{ICR}	V _{CC} =5 to 36V		25℃	0 to V _{CC} -1.5	-	-	0 to V _{CC} -1.5	-	-	V
				Full range	0 to V _{CC} -2	-	-	0 to V _{CC} -2	-	-	
High-level output voltage	V _{OH}	R _L ≥2kΩ		25℃	3.5	-	-	3.5	-	-	V
		V _{CC} =36V	R _L ≥2kΩ	Full range	26	-	-	26	-	-	
			R _L ≥10kΩ	Full range	27	28	-	27	28	-	
Low-level output voltage	V _{OL}	R _L ≤10kΩ		Full range	-	5	20	-	5	20	mV
large-signal differential voltage amplification	A _{VD}	V _{CC} =15V, V _O =1V to 11V, R _L ≥2kΩ		25℃	50	100	-	25	100	-	V/mV
				Full range	25	-	-	15	-	-	
common-mode rejection ratio	CMRR	V _{CC} =5 to 36V, V _{IC} =V _{ICR(min)}		25℃	70	80	-	65	80	-	dB
supply-voltage rejection ratio (ΔV _{CC} /ΔV _{IO})	k _{SVR}	V _{CC} =5 to 36V		25℃	65	100	-	65	100	-	dB
crosstalk attenuation	V _{O1} /V _{O2}	f=1kHz to 20kHz		25℃	-	120	-	-	120	-	dB
output current	I _O	V _{CC} =15V, V _{ID} =1V, V _O =0	Source	25℃	-20	-30	-	-20	-	-	mA
			Source	Full range	-10	-	-	-10	-	-	
		V _{CC} =15V, V _{ID} =-1V, V _O =15V	Sink	25℃	10	20	-	10	20	-	
			Sink	Full range	5	-	-	5	-	-	
		V _{ID} =-1V, V _O =200mV		25℃	12	30	-	12	30	-	uA
short-circuit output current	I _{OS}	V _{CC} =5V, V _O =0V GND=-5V		25℃	-	±40	±60	-	±40	±60	mA



supply current(two amplifiers)	I_{CC}	$V_O=2.5V$, No Load	Full range	-	0.7	1.2	-	0.7	1.2	mA
		$V_{CC}=36V, V_O=0.5V_{CC}$, No Load	Full range	-	1	2	-	1	2	
slew rate at unity gain	SR	$V_{CC}=\pm 18V, R_L=1M\Omega, C_L=30pF, V_I=\pm 10V$	Full range	-	0.3	-	-	0.3	-	V/us
unity-gain bandwidth	B_1	$V_{CC}=\pm 18V, R_L=1M\Omega, C_L=20pF$	Full range	-	0.7	-	-	0.7	-	MHz
equivalent input noise voltage	V_n	$V_{CC}=\pm 18V, R_s=100\Omega, f=1kHz, V_I=0V$	Full range	-	40	-	-	40	-	nV/ $\sqrt{Hz}$



4、Testing Circuit

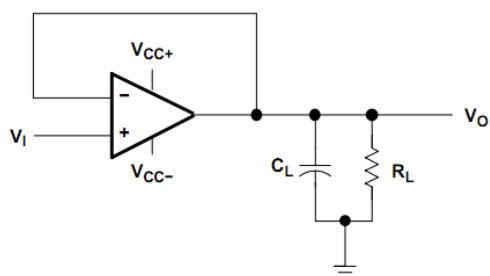


Figure11: Unity-Gain Amplifier

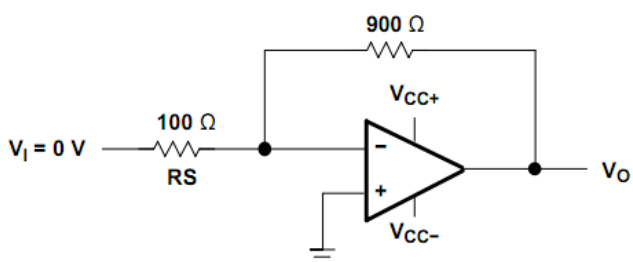
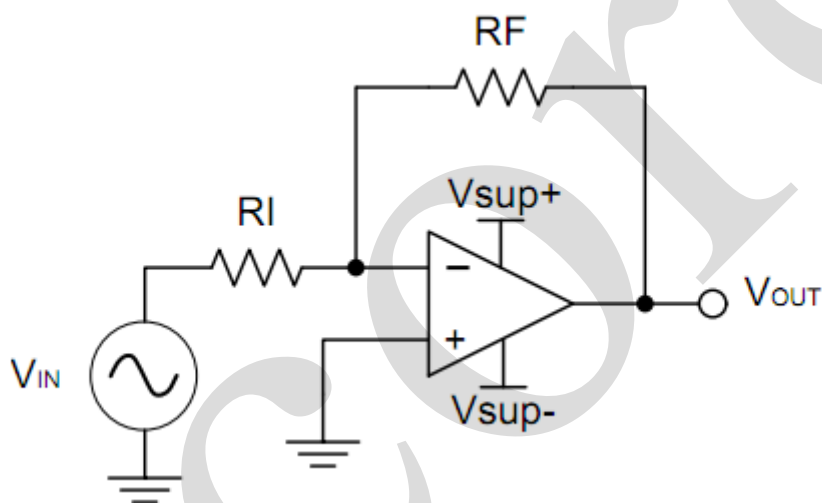


Figure 12: Noise-Test Circuit

5、Typical Application Circuit And Application Note

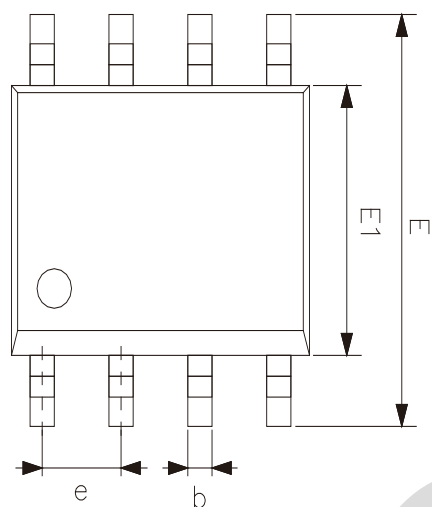
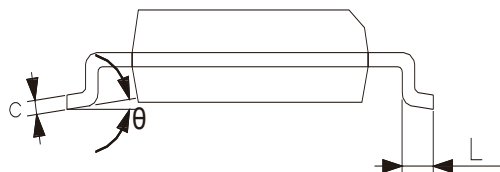
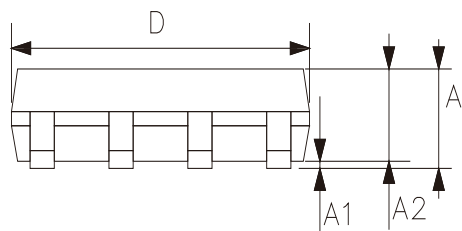
5.1、Application Circuit





6、Package Information

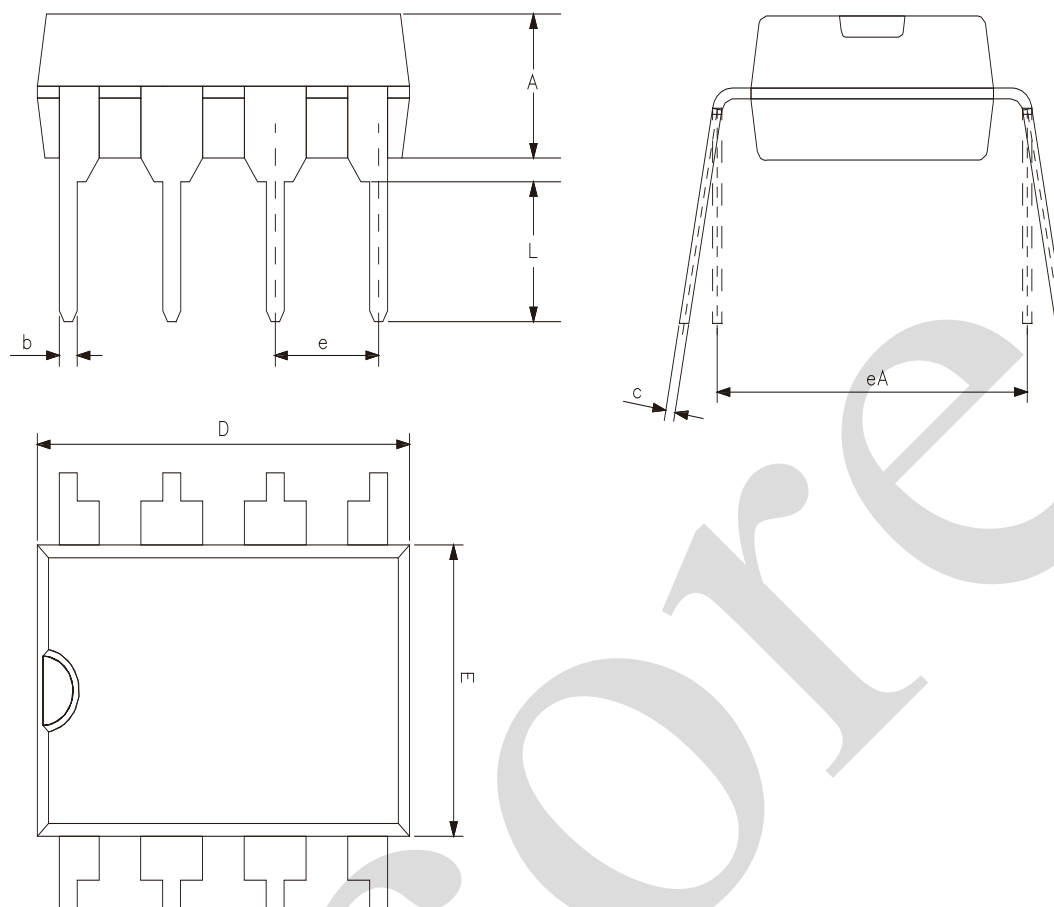
6.1、SOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	1.35	1.80
A1	0.05	0.25
A2	1.25	1.55
D	4.70	5.10
E	5.80	6.30
E1	3.70	4.10
b	0.306	0.51
c	0.19	0.25
e	1.27	
L	0.40	0.89
θ	0°	8°



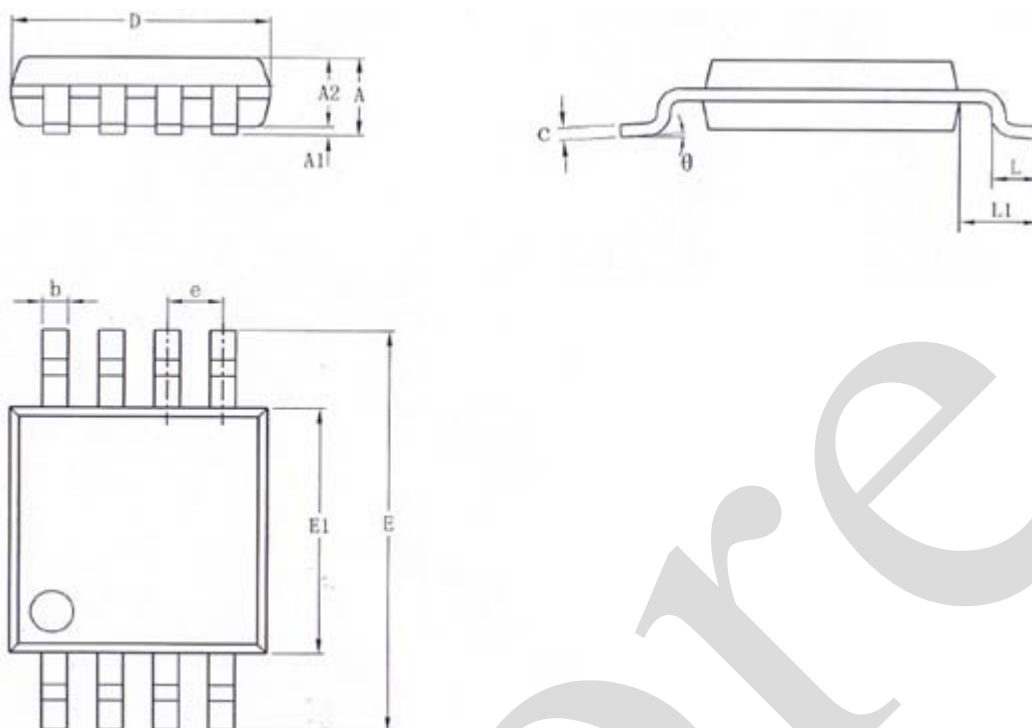
6.2、DIP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	3.00	3.60
b	0.36	0.56
c	0.20	0.36
D	9.00	9.45
E	6.15	6.60
e	2.54	
eA	7.62	9.30
L	3.00	-



6.3、MSOP8



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.10
A1	0.05	0.15
A2	0.75	0.95
b	0.22	0.38
c	0.08	0.23
D	2.90	3.10
E	4.70	5.10
E1	2.90	3.10
e	0.65	
L	0.40	0.80
L1	0.95	
θ	0°	8°



7、Statements And Notes

7.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

7.2、Notes

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