



AiP321LV

Single Rail-to-Rail Operational Amplifier

Product Specification

Specification Revision History:

Version	Date	Description
2021-05-A1	2021-05	New
2022-01-A2	2022-01	Modify ordering information
2023-02-B1	2023-02	Replace the template
2024-12-B2	2024-12	Modify the content



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**1、General Description**

AiP321LV is an input/output rail-to rail operational amplifier with a wide common-mode input voltage range and output voltage range, mainly applied in sensing amplifiers, DC gain modules, audio amplifiers, industrial control, etc.

Features:

- Operating voltage range: 2.5V to 5.5V
- Offset voltage <4mV
- Offset voltage temperature drift: 2uV/°C
- Gain bandwidth: 1MHz
- Output capability: 100mA
- Rail-to rail input and output
- Swing rate: 0.7V/us
- Supply current: 160uA
- Operating temperature range: -40°C to +85°C
- Packing form: SOT23-5

Ordering Information:**Reel packing specifications:**

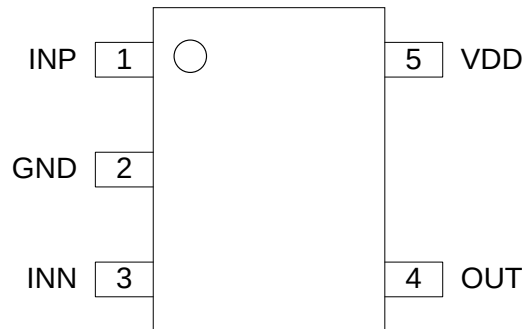
Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
AiP321LVGB235.TR	SOT23-5	321LV	3000PCS/reel	30000PCS/box	Dimensions of plastic enclosure: 2.9mm×1.6mm Pin spacing: 0.95mm

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、Pin Configurations



2.2、Pin Description

Pin	Symbol	Description
1	INP	Operational amplifier positive input
2	GND	Ground
3	INN	Operational amplifier negative input
4	OUT	Operational amplifier output terminal
5	VDD	Power Supply



3、Electrical Parameter

3.1、Absolute Maximum Ratings

($T_{amb}=25^{\circ}\text{C}$, unless otherwise specified)

Characteristic	Symbol	Conditions	Value	Unit
Power Supply Voltage	VDD	-	6	V
Input Voltage	V_I	-	(GND)-0.3 to (VDD)+0.3	V
Differential Input Voltage	V_{DI}	-	± 6	V
Storage Temperature	T_{stg}	-	-65 to +150	$^{\circ}\text{C}$
Junction Temperature	T_J	-	150 (Max.)	$^{\circ}\text{C}$
Operating Temperature Range	T_{amb}	-	-40 to +85	$^{\circ}\text{C}$
Soldering Temperature	T_L	10s	260	$^{\circ}\text{C}$

3.2、Electrical Characteristics

($T_{amb}=25^{\circ}\text{C}$, VDD=5V, GND=0V, $R_L=2\text{k}\Omega$, $C_L=100\text{pF}$, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	2.5	-	5.5	V
Quiescent Current	I_Q	-	-	160	260	μA
Input Offset Voltage	V_{os}	$V_{CM}=0\text{V to }3\text{V}$	-	1	4	mV
Input Offset Voltage Temperature Drift	$\Delta V_{os}/\Delta T$	$T_{amb}=-40^{\circ}\text{C to }85^{\circ}\text{C}$	-	2	-	$\mu\text{V}/^{\circ}\text{C}$
Input Bias Current	I_B	-	-	1	-	pA
Input Offset Current	I_{OS}	-	-	1	-	pA
Common-mode Voltage Range	V_{CMR}	-	(V-)-0.1	-	(V+)+0.1	V
Common-mode Rejection Ratio	CMRR	$V_{CM}=0\text{V to }3\text{V}$	65	85	-	dB
Open Loop Voltage Gain	AOL	$R_{LOAD}=10\text{k}\Omega$	85	110	-	dB
Channel Isolation	Xtalk	$f=1\text{kHz}$, $R_L=2\text{k}\Omega$	-	110	-	dB
Output Short Circuit Current	I_{source}/I_{sink}	-	-	90	120	mA
Power Supply Rejection Ratio	PSRR	-	70	75	-	dB
Phase Margin	PM	$C_{LOAD}=60\text{pF}$, $R_{LOAD}=1\text{k}\Omega$	-	60	-	$^{\circ}$
Unity-gain Bandwidth	GBW	-	-	1	-	MHz
Swing Rate	SR	$AOL=1$, $V_O=1.5\text{V to }3.5\text{V}$, $C_{LOAD}=60\text{pF}$, $R_{LOAD}=1\text{k}\Omega$	-	0.7	-	V/ μs
Equivalent Input Noise Voltage	V_N	$f=1\text{kHz}$	-	30	-	nV _{RMS}
Total Harmonic Distortion	THD	$f=1\text{kHz}$, $AOL=1$, $R_L=2\text{k}\Omega$, $V_O=1\text{V}_{p-p}$	-	0.004	-	%



4、Characteristic Curve

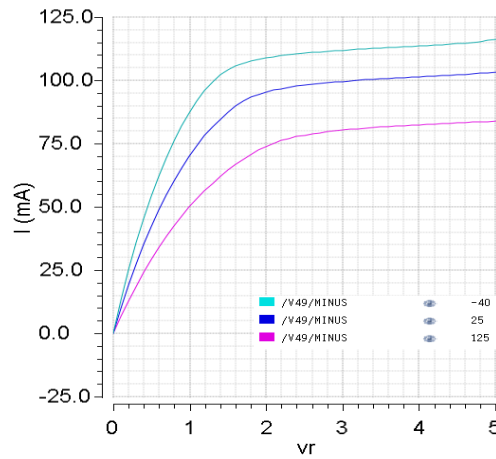


Figure 1. The relationship between I_{SOURCE} and voltage/temperature

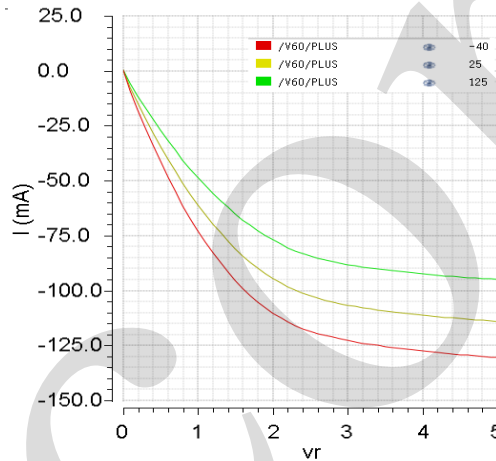


Figure 2. The relationship between I_{SINK} and voltage/temperature

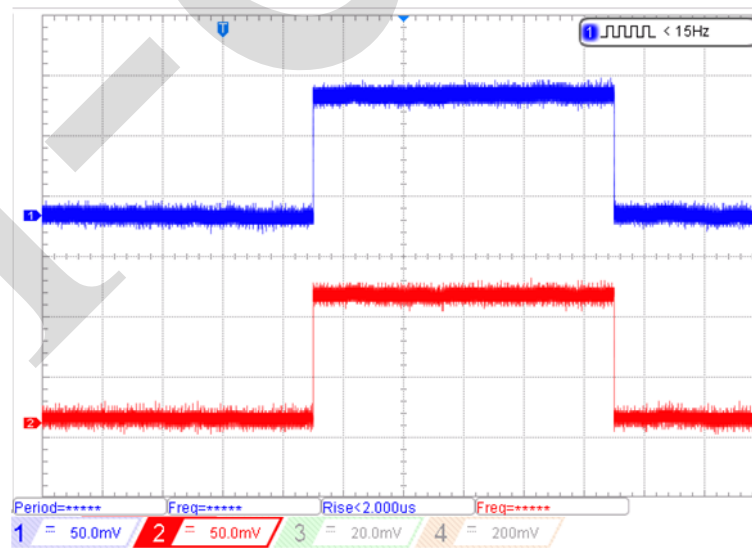
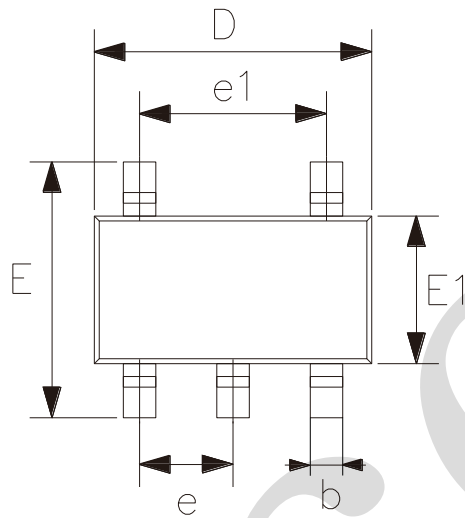
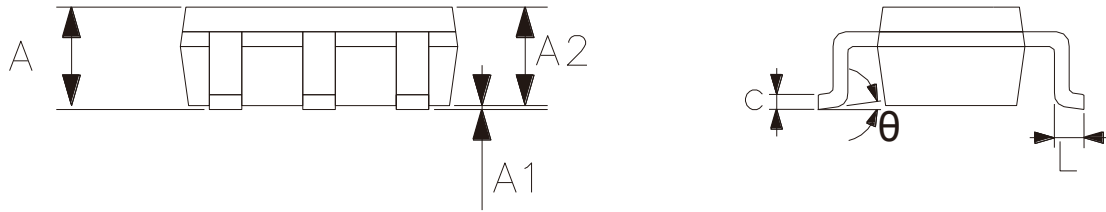


Figure 3. Small Signal Response



5、Package Information

5.1、SOT23-5



2023/12/A	Dimensions In Millimeters	
Symbol	Min.	Max.
A	—	1.26
A1	0.00	0.12
A2	1.00	1.20
b	0.30	0.50
c	0.10	0.20
D	2.82	3.02
E	2.60	3.00
E1	1.50	1.70
e	0.95	
e1	1.80	2.00
L	0.30	0.60
θ	0°	8°



6、Statements And Notes

6.1、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.									

6.2、Notes

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