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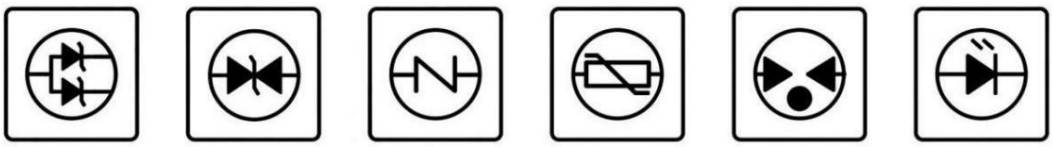
MSKSEMI 美森科
SEMICONDUCTOR



LM321

Product Brochure

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Product Introduction

LM321 is a single-output low-power differential operational amplifier that can be powered by a single or dual power supply. It has high open-loop gain, internal compensation, high common The module has a wide range of analog and temperature stability, as well as output short-circuit protection. It can be applied to sensor amplifier circuits, DC amplifier modules, audio amplifier circuits and In traditional operational amplifier circuits

Features

ÿ Single power supply voltage range: 3Vÿÿÿÿÿÿ36V

ÿ Dual power supply voltage range: ±18V

ÿ Unity gain bandwidth: up to 1.2MHZ

ÿ Output short circuit protection

ÿ Low power consumption: 0.5mA @ V+=5V

ÿ Package: SOT-23-5

Product Usage

ÿ Sensor signal amplifier

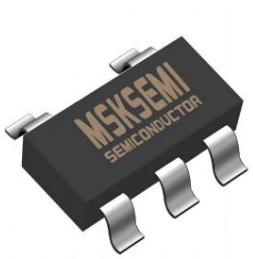
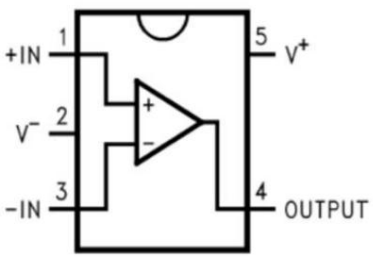
ÿ DC gain

Audio amplifier

ÿ Other application areas

Package and pinout

Define functionality

Package	Pin Definition	Silkscreen
		
TODAY-23-5		

SOT23-5 pin number and pin definition		Functional Description
1	IN+	Non-inverting input
2	V-	Negative power supply
3	IN-	Inverting input
4	OUTPUT	Output
5	V+	Power positive

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Limit parameters

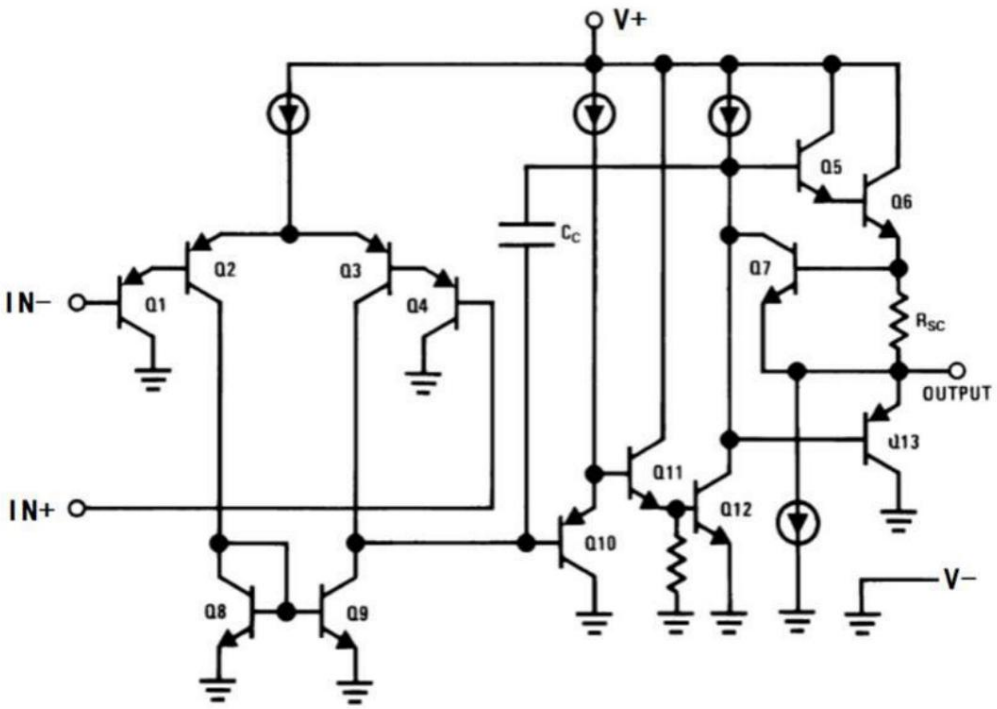
Project	symbol	Limit value (1)	unit
Single power supply voltage	V+	40	In
Dual power supply voltage	Vs	±20	In
Differential input voltage (2)	WIND	±40	In
Common-mode input voltage	VICR	-0.3ÿ40V	In
Output short circuit time	tsc	continuous	
Power dissipation	PD	300	mW
Operating temperature	FACING	0-70	ÿ
Storage temperature	TS	-65-150	ÿ
Soldering temperature	TW	260,10s	ÿ

Note: (1) The limit value refers to the limit value that cannot be exceeded under any conditions. If this limit value is reached, it may cause physical damage such as product degradation; at the same time,

When the parameters are close to the limit, the chip cannot be guaranteed to work properly.

(2) The voltage difference between input IN+ and IN-.

Equivalent schematic diagram



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DC Electrical Characteristics (TA=25ÿ, V+ =5V, V- =GND unless otherwise specified)

project	symbol	Test conditions		Min	Typ	Max	Unit
Input offset voltage	SAW	V+ =5V to MAX, VIC=VICR (min), VO=1.4V				5	mV
Input offset current	IIO	VO = 1.4 V				10	50 nA
Bias current	IBIAS	VO = 1.4 V				50	250 nA
Common-mode input voltage	VICR	V+=5V to 36V		V-			V+ -1.5V In
Open loop voltage gain	AOL	V+=15V,VO=1V to 11V,RLý2kÿ				100	– V/mV
Common Mode Rejection Ratio	CMRR	V+=5V to MAX,VIC=VICR (min)		–		80	– dB
Unity gain bandwidth	GBWP			–		1.2	– MHZ
Power Supply Voltage Rejection Ratio	PSSR ÿVVDD/ÿVIO	V+=5V to MAX, f=20kHz				90	dB
Output high level voltage	VOH	V+ =15V, VID=1V	Iout =-50uA			13.6	In
			Iout =-1mA	–		13.5	– In
			Iout =-5mA	–		13.4	– In
		V+ =28V	RL=2k			26	In
Output low level voltage	VOL	V+ =15V, VID=-1V	Iout =50uA			0.1	In
			Iout =1mA			0.7	In
			Iout =5mA	–		1.0	– In
		V+ =28V	RL=2k	–		0.85	– In
Power supply operating current	ICC	V+ =5V,VO=1/2V+, No load				0.5	m.a.
		V+ =36,VO=1/2V+, No load				0.8	m.a.
Single power supply operating voltage	V+	V- =0V(GND)		3			36 In
Dual power supply operating voltage	VS	V+,V-		-18		–	+18 In

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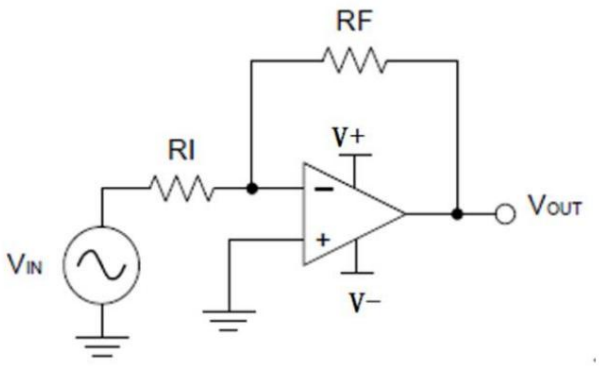
Typical Applications

1. Circuit diagram



2. Design requirements

The power supply voltage must be selected to be larger than the input voltage range

and the output range. For example, if the signal source VIN is amplified from ±0.5V to ±1.8V, setting the power supply to ±5V is sufficient for this application.

3. Design process

Calculate the amplification factor (gain) according to

OFF =-VO/VIN formula (1): AV ------(1)

AV =-VO/VIN=-1.8/0.5=-3.6

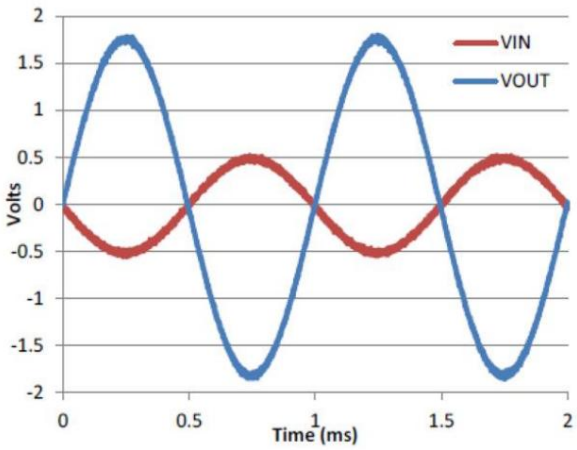
Once the desired gain AV is determined , a value for the RI or RF resistor is selected.

You can choose a value between 1kÿ and 100kÿ. In this example, we will choose RI = 10kÿ, which results in RF = 36kÿ. This is determined by Equation 2.

AV =-RF/RI --------(2)

RF= -AV * RI=3.6*10 = 36 kÿ

4. Application curve chart



Inverting amplifier input voltage vs output voltage

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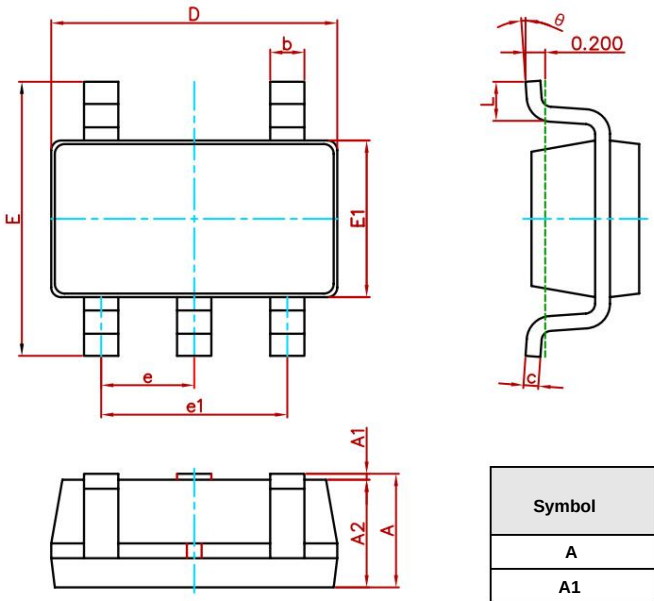
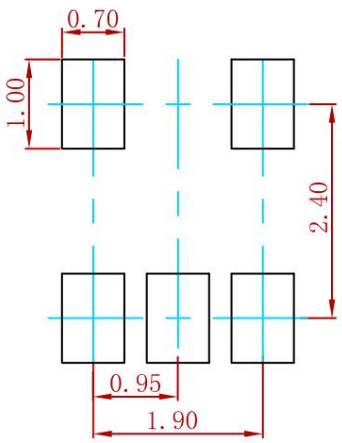
Packaging information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
AND	2.650	2.950	0.104	0.116
E1	1.500	1.700	0.059	0.067
and	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
i	0°	8°	0°	8°

Pad layout



Note:
1.Controlling dimension:in millimeters.
2.General tolerance:±0.05mm.
3.The pad layout is for reference purposes only.

Ordering Information

P/N	PKG	QTY
LM321	TODAY-23-5	3000

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