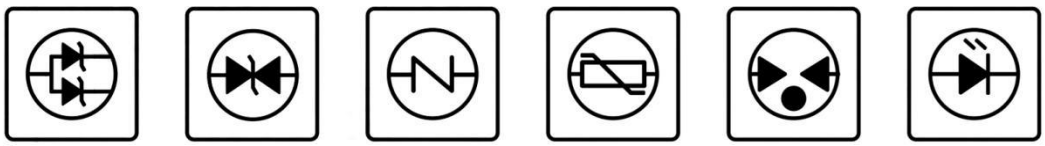
MSKSEMI
SEMICONDUCTOR



Product data sheet

GENERAL DESCRIPTION

LM321是一款单路输出的低功耗差分式运算放大器，可以单电源或双电源供电。具有较高的开环增益、内部补偿、高共模范围和良好的温度稳定性，以及具有输出短路保护的特点。可应用于传感器的放大电路、直流放大模块，音频放大电路和传统的运算放大电路中。

FEATURES

- 单电源电压范围：3V～36V
- 双电源电压范围：±18V
- 单位增益带宽：可达 1.2MHZ
- 输出短路保护
- 低功耗：0.5mA @ V+=5V
- 封装形式：SOT23-5

APPLICATION

- 传感器信号放大器
- 直流增益
- 音频放大器
- 其它应用领域

PIN CONFIGURATION

SOT23-5 管脚序号	管脚定义	功能说明
1	IN+	正相输入
2	V-	电源负
3	IN-	反相输入
4	OUTPUT	输出
5	V+	电源正

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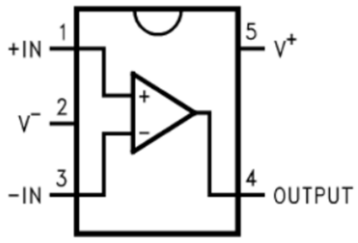


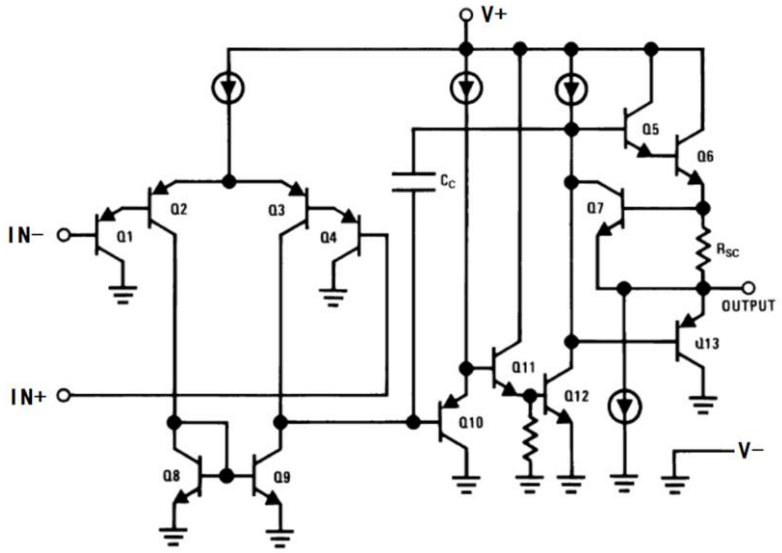
极限参数

项目	符号	极限值(1)	单位
单电源供电电压	V+	40	V
双电源供电电压	Vs	±20	V
差分输入电压(2)	V_{IDR}	±40	V
共模输入电压	V_{ICR}	-0.3～40V	V
输出短路时间	t_{sc}	连续	
耗散功率	P_D	300	mW
工作温度	T_A	0-70	℃
储存温度	T_S	-65-150	℃
焊接温度	T_W	260,10s	℃

注：（1）极限值是指无论在任何条件下都不能超过的极限值。如果达到此极限值，将有可能造成产品劣化等物理性损伤；同时在接近极限参数下，不能保证芯片可以正常工作。

（2）输入IN+与IN-之间的电压差。

等效原理图

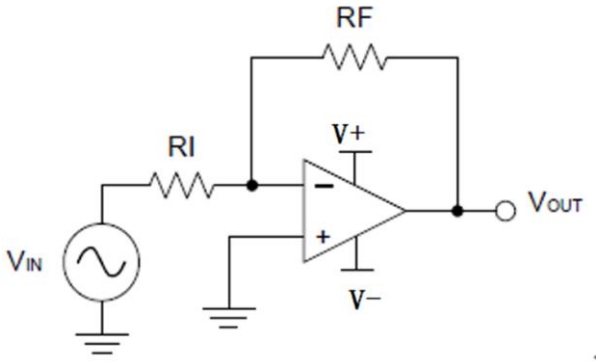


直流电学特性 （T_A=25℃， V+ =5V, V- =GND 除非特别指定）

项目	符号	测试条件		最小值	典型值	最大值	单位
输入失调电压	V_{IO}	V+ =5V to MAX, $V_{IC}=V_{ICR}$(min), VO=1.4V		-	5	-	mV
输入失调电流	I_{IO}	VO = 1.4 V		-	10	50	nA
偏置电流	I_{BIAS}	VO = 1.4 V		-	50	250	nA
共模输入电压	V_{ICR}	V+=5V to 36V		V-	-	V+ -1.5V	V
开环电压增益	A_{OL}	V+=15V, VO=1V to 11V, RL≥2kΩ			100	-	V/mV
共模抑制比	CMRR	V+=5V to MAX, $V_{IC}=V_{ICR}$(min)		-	80	-	dB
单位增益带宽	GBWP			-	1.2	-	MHZ
电源电压抑制比 P_{SSR}	$\Delta V_{VDD}/\Delta V_{IO}$	V+=5V to MAX, f=20kHz		-	90	-	dB
输出高电平电压	VOH	V+ =15V, V_{ID}=1V	Iout =-50uA	-	13.6	-	V
			Iout =-1mA	-	13.5	-	V
			Iout =-5mA	-	13.4	-	V
		V+ =28V	RL=2k		26	-	V
输出低电平电压	VOL	V+ =15V, V_{ID}=-1V	Iout =50uA	-	0.1	-	V
			Iout =1mA	-	0.7	-	V
			Iout =5mA	-	1.0	-	V
		V+ =28V	RL=2k	-	0.85	-	V
电源工作电流	I_{CC}	V+ =5V, VO=1/2V+, No load		-	0.5	-	mA
		V+ =36, VO=1/2V+, No load		-	0.8	-	mA
单电源工作电压	V+	V- =0V(GND)		3	-	36	V
双电源工作电压	VS	V+, V-		-18	-	+18	V

典型应用

1、线路图



2、设计要求

必须选择大于输入电压范围和输出范围的电源电压。

例如，将信号源 VIN 从±0.5 V 放大到±1.8V。将电源设置为± 5 V 足以适应此应用要求。

3、设计过程

根据公式(1)计算放大倍数(增益) A_V

A_V =-VO/VIN ------(1)

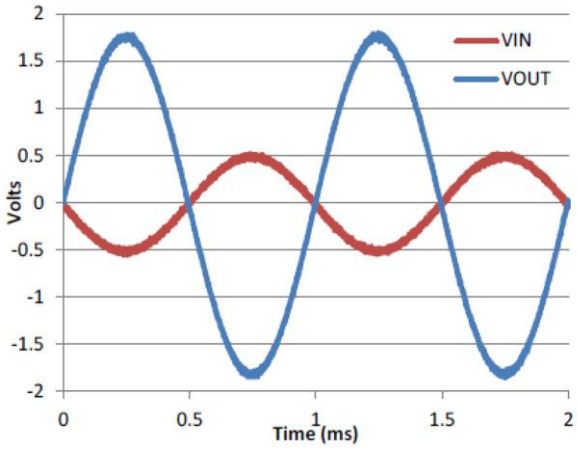
A_V =-VO/VIN=-1.8/0.5=-3.6

一旦确定了所需的增益 A_V，就要为 RI 或 RF 电阻选择一个值。根据运放的电特性及功耗的需要，可选择 1kΩ-100kΩ 范围内的值。本例将选择 RI=10 kΩ，则 RF=36kΩ。这由方程式 2 确定。

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

RF= $-A_V$ * RI=3.6*10 = 36 kΩ

4、应用曲线图



反相放大器的输入电压 VS 输出电压

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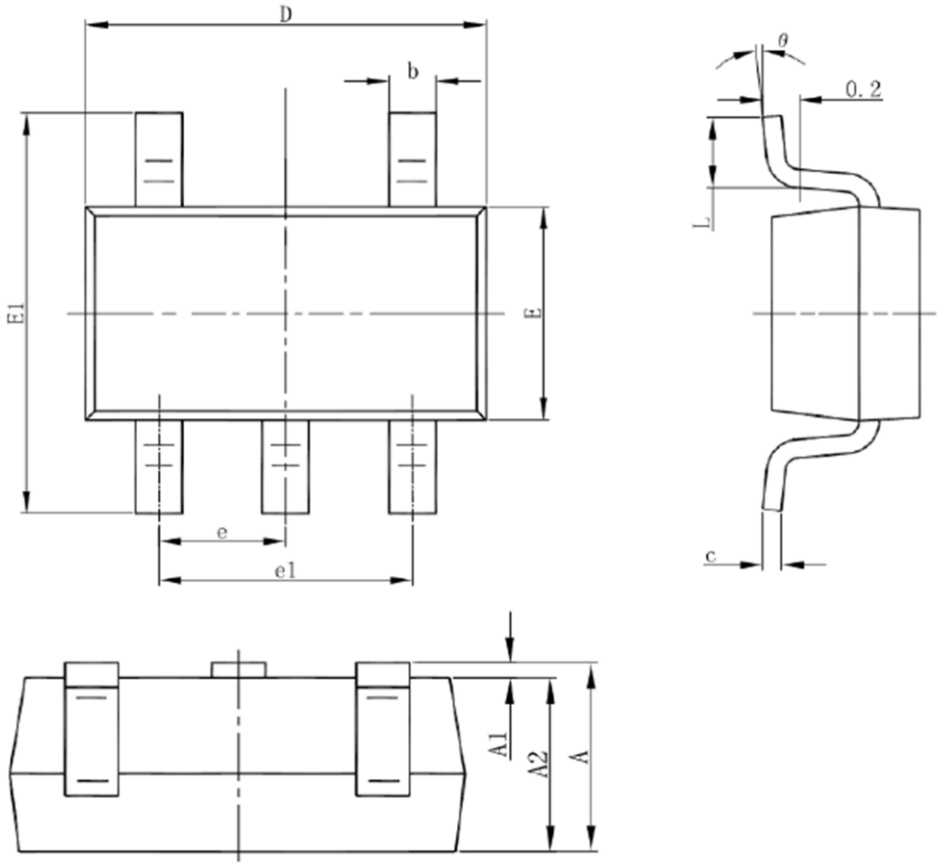

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

单位：英寸/毫米

REEL SPECIFICATION

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

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