Dual operational amplifier

Description

- The LM358 consists of two independent, high-gain, internally frequency-compensated operational amplifiers. It is suitable for single-supply operation over a wide range of supply voltages and can also operate in dual-supply mode.

- Under recommended operating conditions, the supply current is independent of supply voltage. Its applications include sensor amplifiers, DC gain blocks, audio amplifiers, industrial control, DC gain stages, and any other application where operational amplifiers are used with single-supply power.

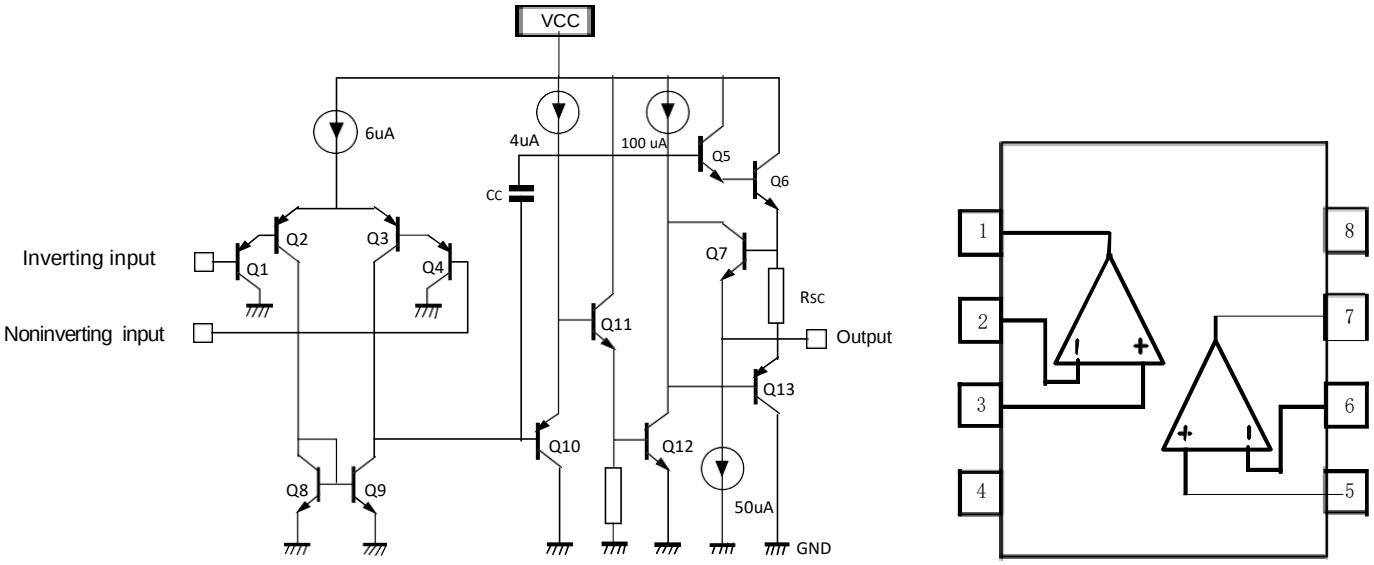
Features

- Internal frequency compensation circuit
- High DC voltage gain (approximately 100dB) with unity gain bandwidth (approximately 1MHz)
- Wide supply voltage range:
- Single supply (3~36V)
- Dual supply (±1.5~±18V)
- Low power consumption: 0.5mA, suitable for battery-powered applications
- Low input bias current: 45nA
- Low input offset voltage: 2mV
- Wide common-mode input voltage range, close to ground
- Wide differential input voltage range, equal to the supply voltage range
- Large output voltage swing (0 to Vcc-1.5V)
- Package form: DIP8, SOP8

Application

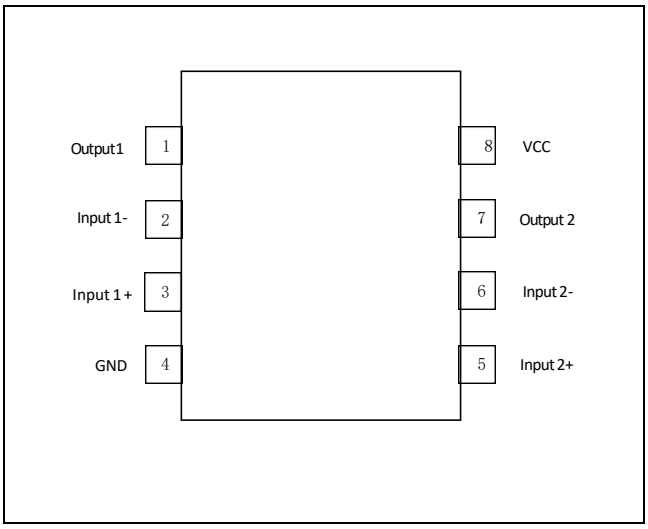
- Sensor Amplifier
- DC gain module
- Audio Amplifier

Internal Schematic Diagram



Internal schematic diagram of LM358

Pinout



Ordering Information

Name	Package
LM358P	DIP-8
LM358S	SOP-8

Pin function description

Dip-8	Pin Name	Pin Function
1	output 1	output 1
2	input 1-	inverting input 1
3	input 1+	non-inverting input 1
4	GND	ground
5	input 2+	non-inverting input 2
6	input 2-	inverting input 2
7	output 2	output 2
8	V_{cc}	supply voltage

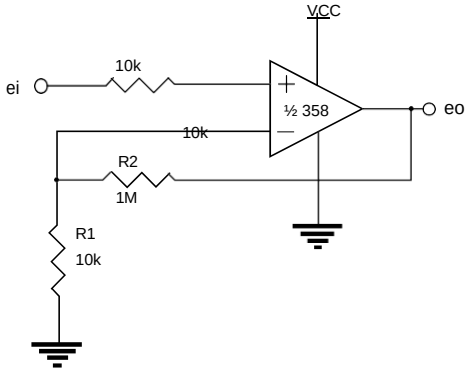
Maximum ratings (Unless otherwise specified, T_{amb}=25℃)

Parameter		Symbol	Min	Max	Uint
supply voltage	single supply	V_{CC}		36	V
	dual supply			±18	V
differential input voltage		V_{IDR}		36	V
common-mode input voltage		V_{IN}	-0.3	36	V
input current		I_{IN}		50	mA
power consumption	DIP packing	P_D		830	mW
	SOP 8			550	
operating ambient temperature		T_A	0	+70	°C
storage temperature		T_{stg}	-65	+150	°C

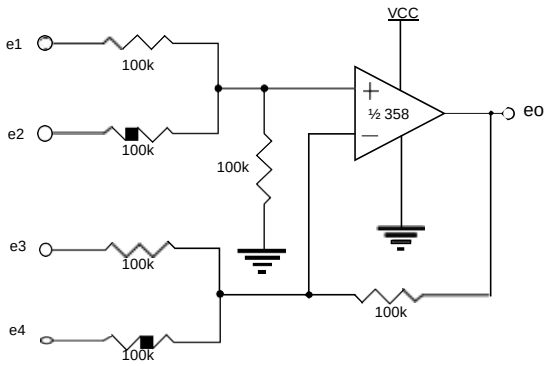
Electrical characteristics (Unless otherwise specified，T_A=0~85°C, V_{CC}=12V。)

Parameter	Text Condictions	Min	Typ	Max	Uint
Input offset voltageV_{IO}	T_a=25℃		2	5.0	mV
input offset currentI_{IO}	T_a=25℃，IIN(+) or IIN(-) ，V_{CM}=0V		3	30	nA
input bias currentI_{BIAS}	T_a=25℃，IIN(+) or IIN(-) ，V_{CM}=0V		45	150	nA
input common-mode voltage range V_{ICR}	T_a=25℃，V_{cc} =30V	0		Vcc-1.5	V
power supply current I_{CC}	Throughout the entire temperature range, R_L= ∞,V_{cc}=5V		0.5	1.2	mA
	Throughout the entire temperature range, R_L= ∞,V_{cc}=30V		1	2	
large signal voltage gain G_V	V_{cc}=15V，T_a=25℃， R_L≥2kΩ，V_o=1 ~11V	50	100		V/mV
common-mode rejection ratio C_{MRR}	DC ，T_a=25℃， V_{CM}=0~ V_{cc}-1.5V	70	85		dB
power supply ripple rejection ratio P_{SRR}	DC，T_a=25℃， V_{cc}=5~30V	65	100		dB
channel separation C_S	T_a=25℃， f=1k~20kHz		120		dB
short-circuit current I_{SC}	V_{cc}=15V， T_a=25℃		40	60	mA
output source current I_{SOURCE}	V_{IN}(+)=1V，V_{IN}(-)=0V ， V_{cc}=15V，V_o=2V	50	100		V/mV
output sink current I_{SINK}	V_{IN}(-)=1V,V_{IN}(+)=0V，V_{cc}=15V ，V_o=2V	10	20		mA
	V_{IN}(-)=1V,V_{IN}(+)=0V，V_{cc}=15V，V_o=200mV	12	50		μA
output high voltage swing V_{OH}	V_{cc} =30V ，R_L=2K	26			V
	V_{cc} =30V ，R_L=10K	27	29		V
output low voltage swing V_{OL}	V_{cc} =15V ，R_L≥10K		5	20	mV
	V_{cc} =15V ，R_L≥10K		5	20	mV

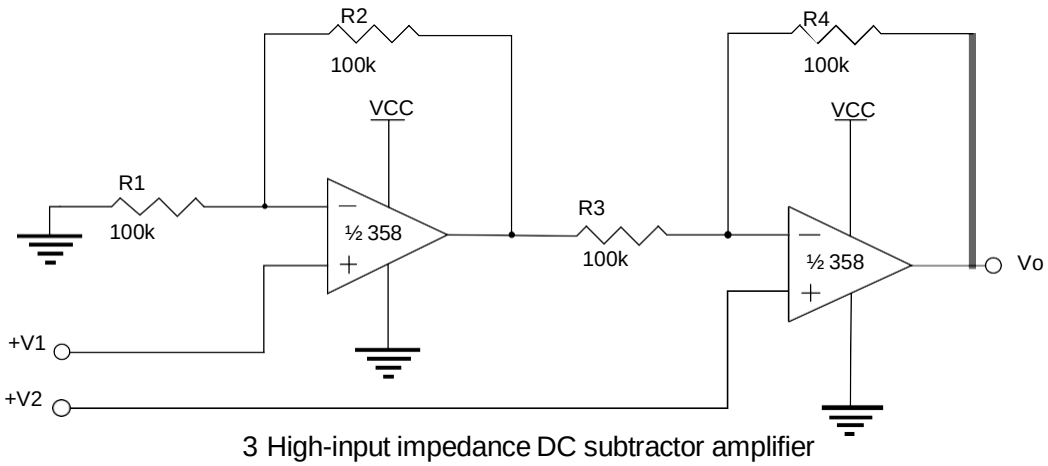
Application circuit diagram



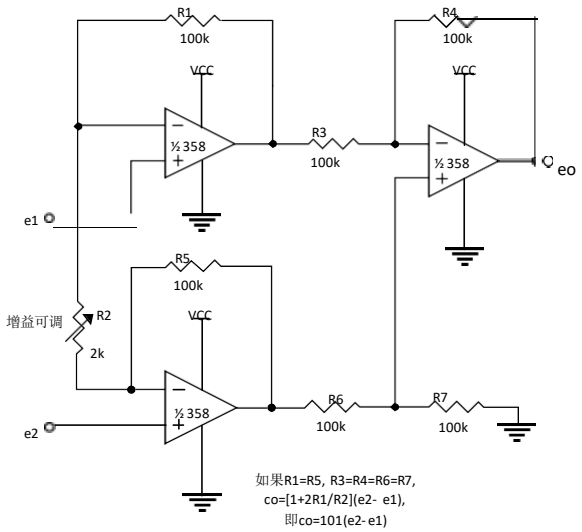
1 Non-inverting DC amplifier



2 DC summing amplifier

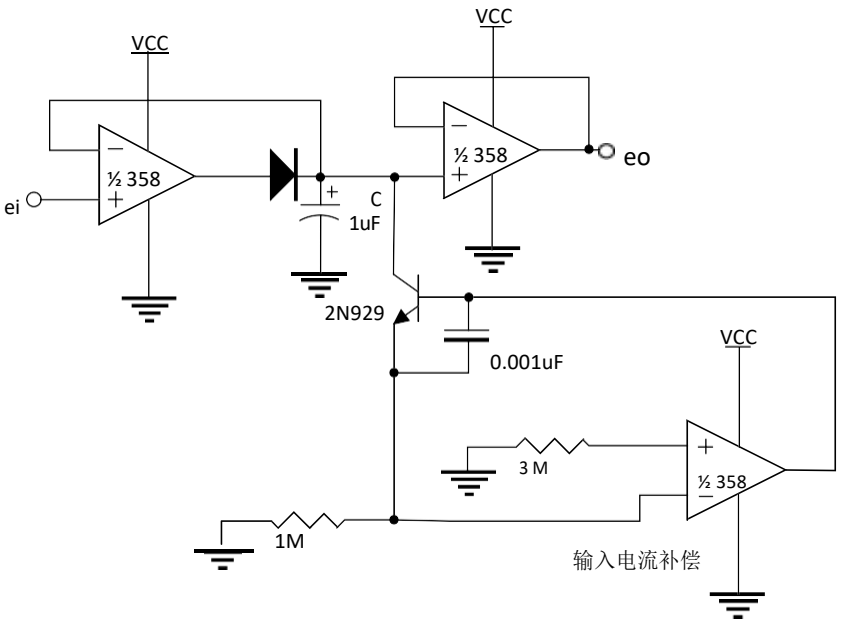


3 High-input impedance DC subtractor amplifier

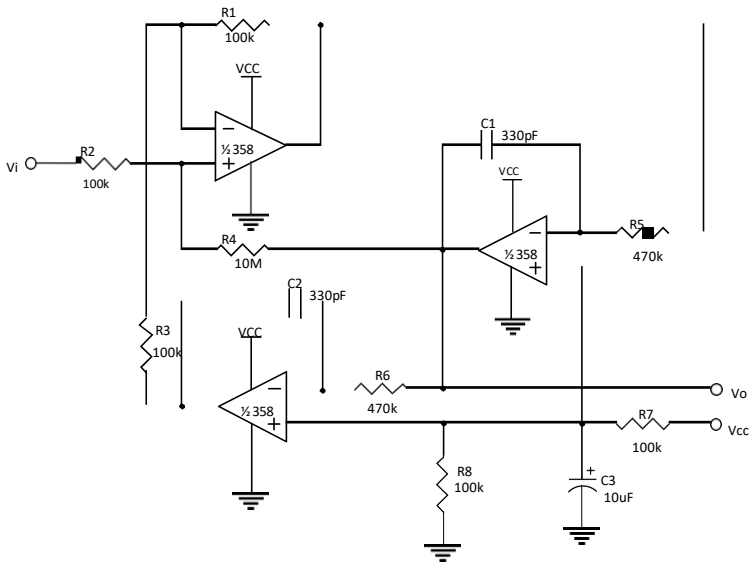


4 High-input impedance, gain-adjustable DC

Application circuit diagram



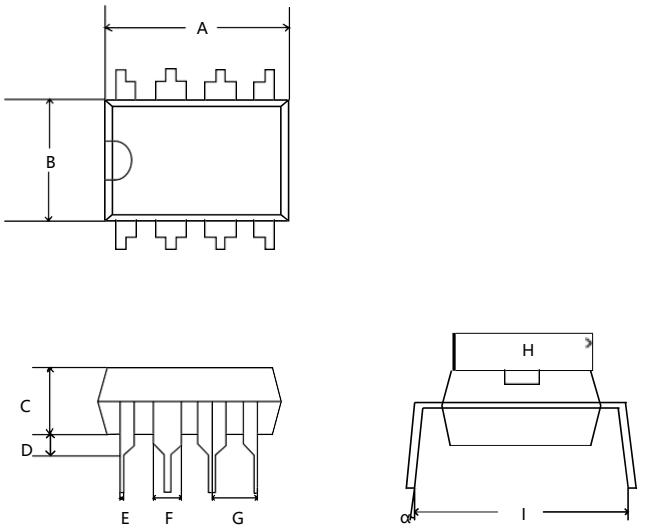
5 Low-drift peak



6 Active bandpass

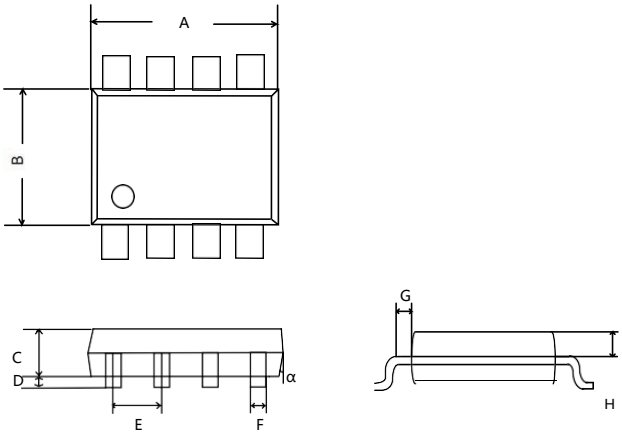
Outline diagram

1、DIP8 Packing



Number	Size(mm)	
	Min	Max
A	9.017	9.525
B	6.096	6.604
C	3.175	3.429
D	3.175	3.683
E	0.4054	0.508
F	1.27	1.778
G	-	-
H	7.493	8.001
I	8.509	9.525
a	0°	15°

2. SOP8 Packing



Number	Size(mm)	
	Min	Max
A	4.7	5.1
B	3.8	4.0
C	1.25	1.45
D	0.1	0.3
E	1.27(Typ)	
F	0.33	0.51
G	0.32(Typ)	
H	0.675	0.725
a	7°	7°