

### Dual operational amplifier

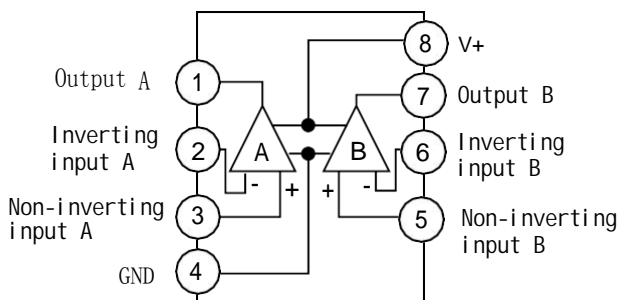
The LM358A consists of two independent high gain operational amplifiers. It can work with a single power supply or with a dual power supply, and the current consumption of the power supply has nothing to do with the power supply voltage. Applications include variable frequency amplifiers, DC gain sections and all conventional op amp circuits.

Available in DIP8 or SOP8 packages.

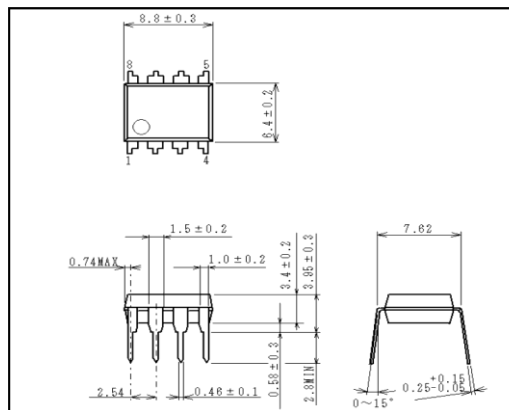
**main features :**

- Can work with single or dual power supply
- Two internally compensated op amps in one package.
- logic circuit matching.
- Low power consumption.
- Wide frequency range

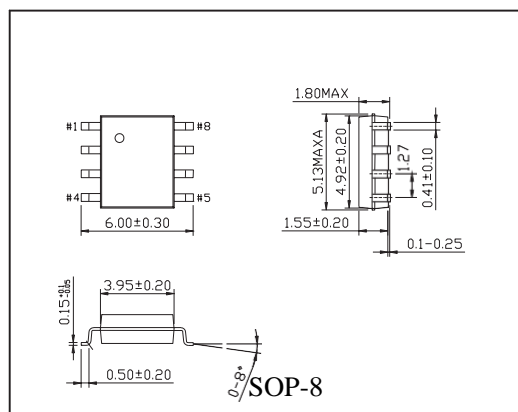
**Functional Block Diagram and Pinout Diagram**



Package Outline Drawing



DIP-8



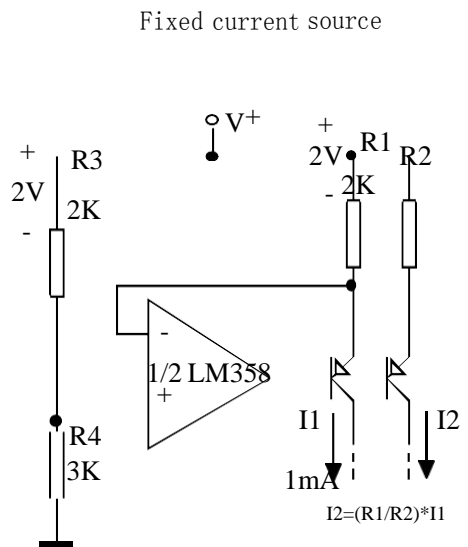
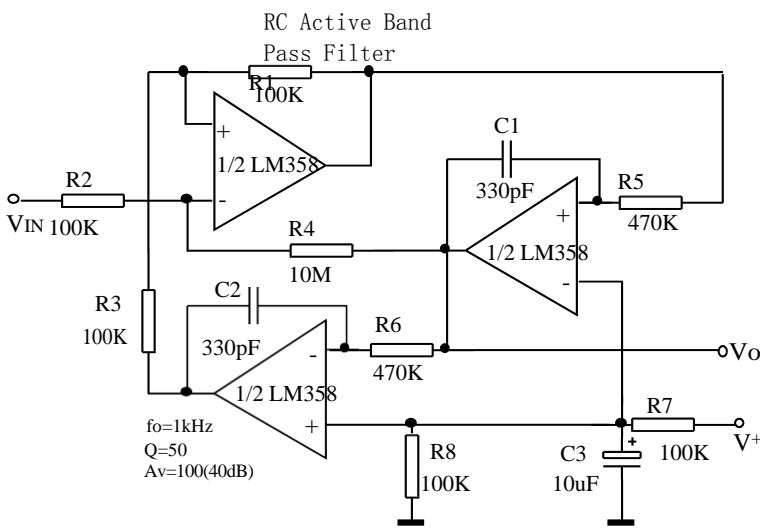
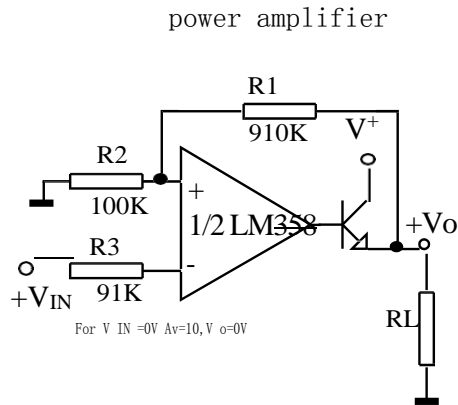
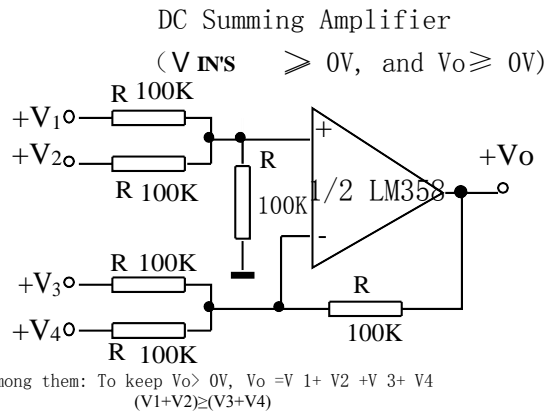
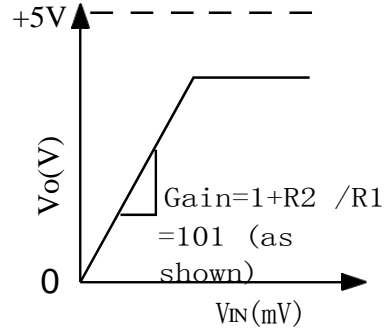
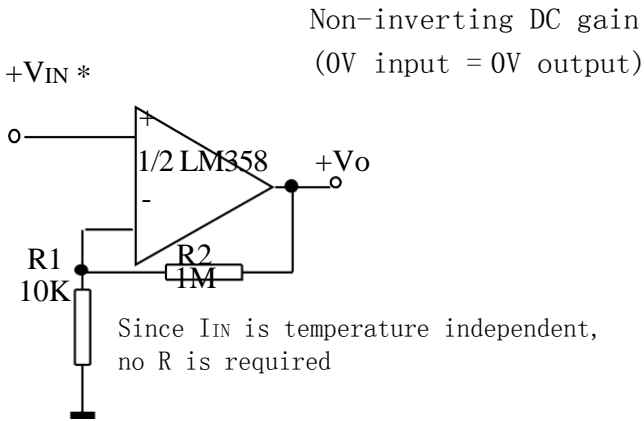
Limit value (absolute maximum rating, if not otherwise specified, Tamb=25°C)

parameter name		value	unit
voltage		36 or ± 18	V
Differential input voltage		36	V
Input voltage		-0.3~36	V
Power consumption (Note 1)	DIP package	550	mW
	SOP package	530	
Output short-circuit current to ground (1 amplifier) (Note 2) (V <sup>+</sup> ≤15V, Ta=25°C)		continued	
Input current (VIN<-0.3V) (Note 3)		50	mA
Working temperature		-25~85	°C
Storage temperature		-65~150	°C

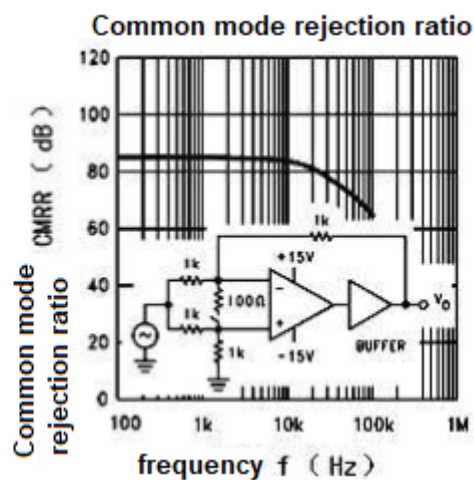
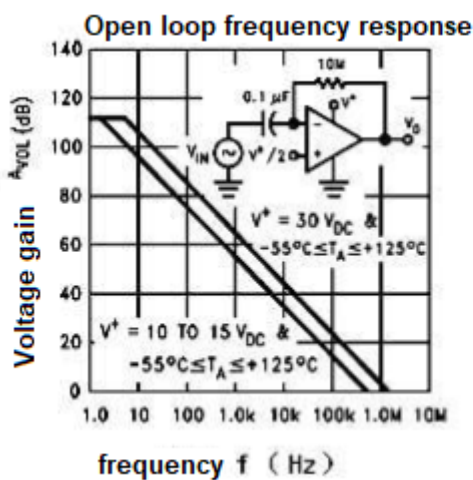
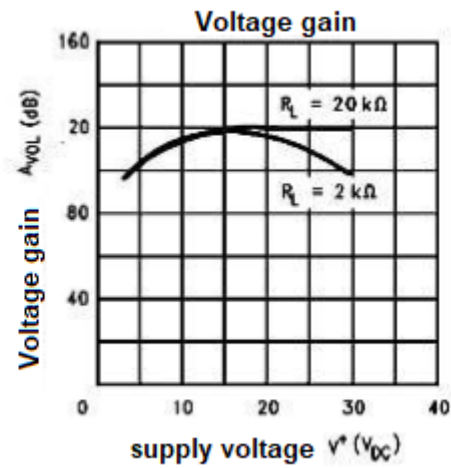
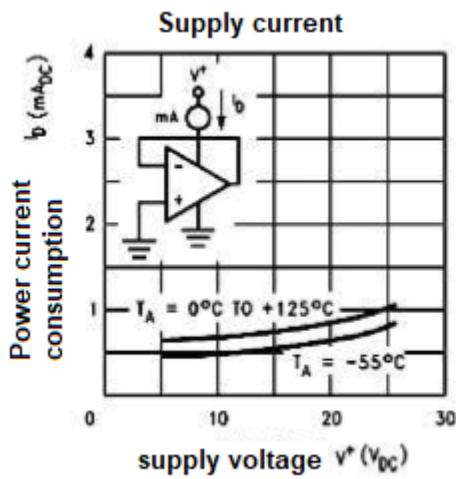
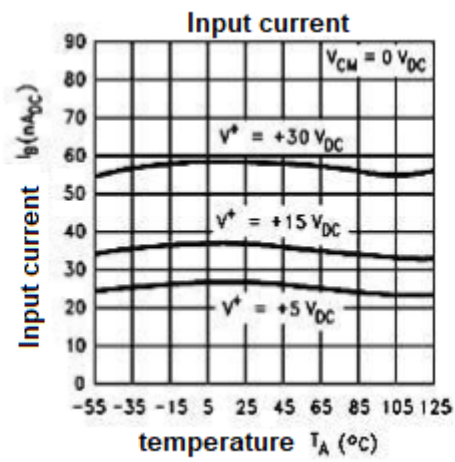
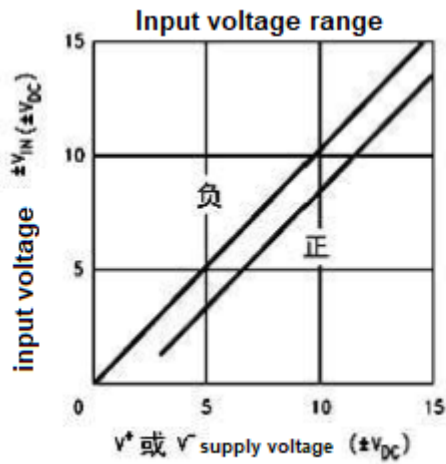
**Electrical characteristics (if not otherwise specified,  $V^+=5.0V$ )**

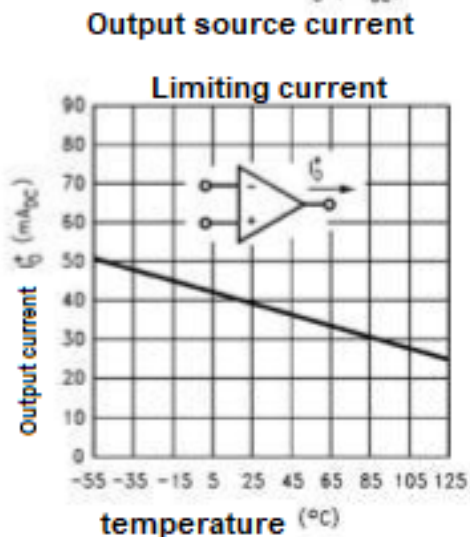
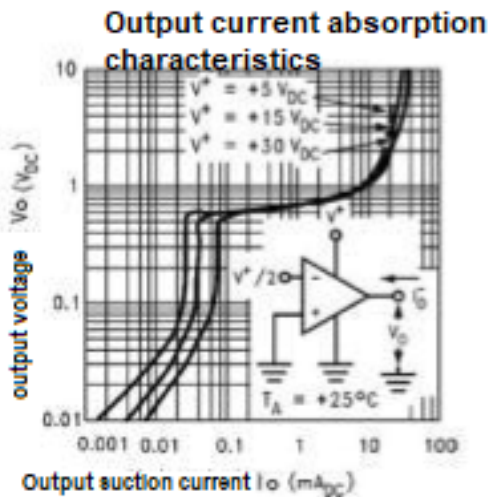
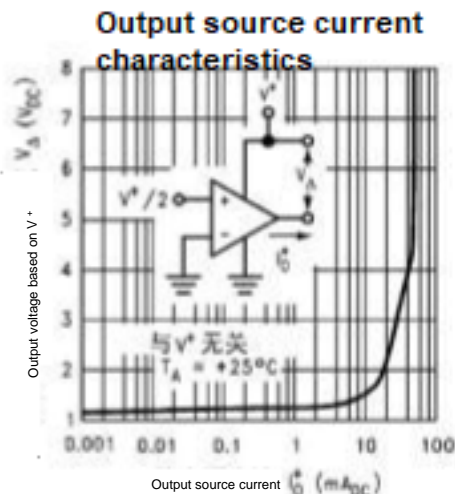
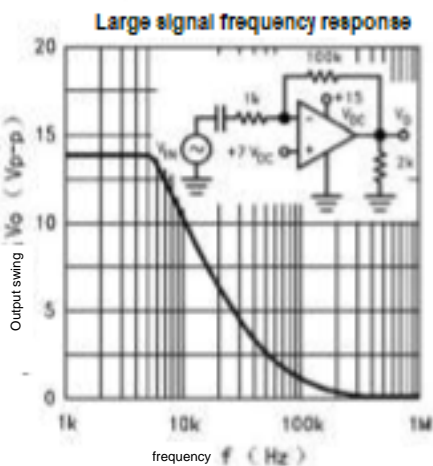
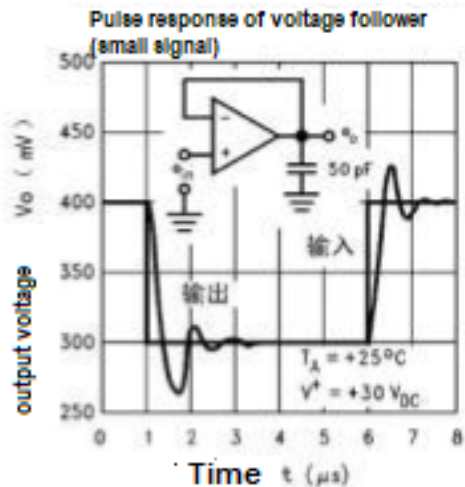
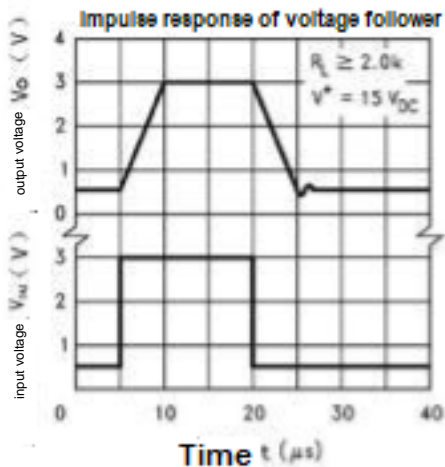
Features	Test Conditions		Specification value			Unit
			MIN	TYP	MAX	
Input offset voltage	Ta = 25			2	5	mV
input bias current	Ta = 25 °C, I <sub>IN (+)</sub> or I <sub>IN (-)</sub> , V <sub>CM</sub> = 0V			45	150	nA
Input offset current	Ta=25°C, I <sub>IN(+)</sub> - I <sub>IN (-)</sub> , V <sub>CM</sub> =0V			3	30	nA
Input Common Mode Voltage Range	Ta=25°C, V <sup>+</sup> =30V		0		V <sup>+</sup> -1.5	V
supply current	Over the entire temperature range, R <sub>L</sub> = ∞ on all operational amplifiers	V <sup>+</sup> =30V		1	2	mA
		V <sup>+</sup> =5V		0.5	1.2	
Large signal voltage gain	V <sup>+</sup> =15V, Ta=25°C, R <sub>L</sub> ≥2kΩ (for V <sub>o</sub> =1~11V)		50	100		V/mV
Common Mode Rejection Ratio	DC, Ta=25°C, V <sub>CM</sub> =0~V <sup>+</sup> -1.5V		70	85		dB
power supply rejection ratio	DC, Ta=25°C, V <sup>+</sup> =5~30V		65	100		dB
Coupling system between amplifiers number	Ta=25°C, f=1~20kHz (all inputs)			-120		dB
Output source current	V <sub>IN(+)</sub> =1V, V <sub>IN(-)</sub> =0V, V <sup>+</sup> =15V, V <sub>o</sub> =2V, Ta=25°C		20	40		mA
output current sink	V <sub>IN(-)</sub> =1V, V <sub>IN(+)</sub> =0V, V <sup>+</sup> =15V, V <sub>o</sub> =2V, Ta=25°C		10	20		mA
	V <sub>IN(-)</sub> =1V, V <sub>IN(+)</sub> =0V, V <sup>+</sup> =15V, V <sub>o</sub> =200mV, Ta=25°C		12	50		μA
short-circuit current to ground	V <sup>+</sup> =15V, Ta=25°C			40	60	mA
Input offset voltage					7	mV
Input offset voltage drift	R <sub>s</sub> =0Ω			7		μV/°C
Input offset current	I <sub>IN(+)</sub> - I <sub>IN (-)</sub>				100	on
Input offset current drift	R <sub>s</sub> =0Ω			10		pA/°C
Input bias current	I <sub>IN(+)</sub> or I <sub>IN(-)</sub>			40	300	nA
Input Common Mode Voltage Range	V <sup>+</sup> =30V		0		V <sup>+</sup> -2	V
Large signal voltage gain	V <sup>+</sup> = 15V, (V <sub>o</sub> = 1 ~ 11V),		25			V/mV
Output voltage swing	V <sub>OH</sub>	V <sup>+</sup> =30V	R <sub>L</sub> =2kΩ	26		V
			R <sub>L</sub> =10kΩ	27	28	V
	V <sub>OL</sub>	V <sup>+</sup> =5V, R <sub>L</sub> =10kΩ		5	20	mV
Output current	source current	V <sub>IN (+)</sub> = 1V, V <sub>IN (-)</sub> = 0V, V <sup>+</sup> = 15V, V <sub>o</sub> = 2V	10	20		mA
	current sink	V <sub>IN (-)</sub> = 1V, V <sub>IN (+)</sub> = 0V, V <sup>+</sup> = 15V, V <sub>o</sub> = 2V	5	8		mA

typical application

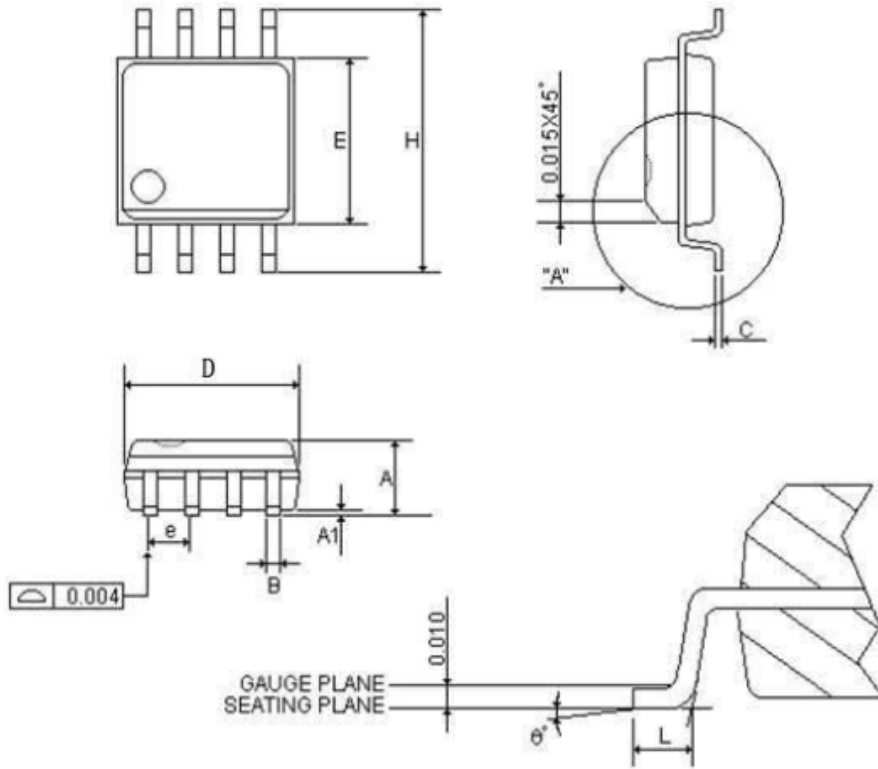


Typical characteristic curve





SOP 8



SYMBOLS	MIN	NOR	MAX	MIN	NOR	MAX
	(inch)			(mm)		
A	0.058	0.064	0.068	1.4732	1.6256	1.7272
A1	0.004	-	0.010	0.1016	-	0.254
B	0.013	0.016	0.020	0.3302	0.4064	0.508
C	0.0075	0.008	0.0098	0.1905	0.2032	0.2490
D	0.186	0.191	0.196	5.9944	6.1214	6.1976
E	0.150	0.154	0.157	3.81	3.9116	3.9878
e	-	0.050	-	-	1.27	-
H	0.228	0.236	0.244	5.7912	5.9944	6.1976
L	0.015	0.025	0.050	0.381	0.635	1.27
0°	0°	-	8°	0°	-	8°