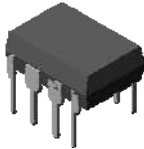
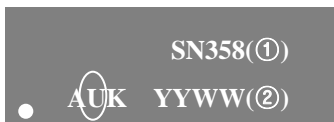



**SOP-8**

**DIP-8**
**ORDERING INFORMATION**

Product	Marking	Package
SN358	SN358	SOP-8
SN358P	SN358P	DIP-8

**▲ Marking Information**


① Device Code

② Year &amp; Week Code

**Description**

The SN358/P consists of two independent high gain

Internally frequency compensated operational amplifiers

designed to operate from a single power supply over a wide range of voltage.

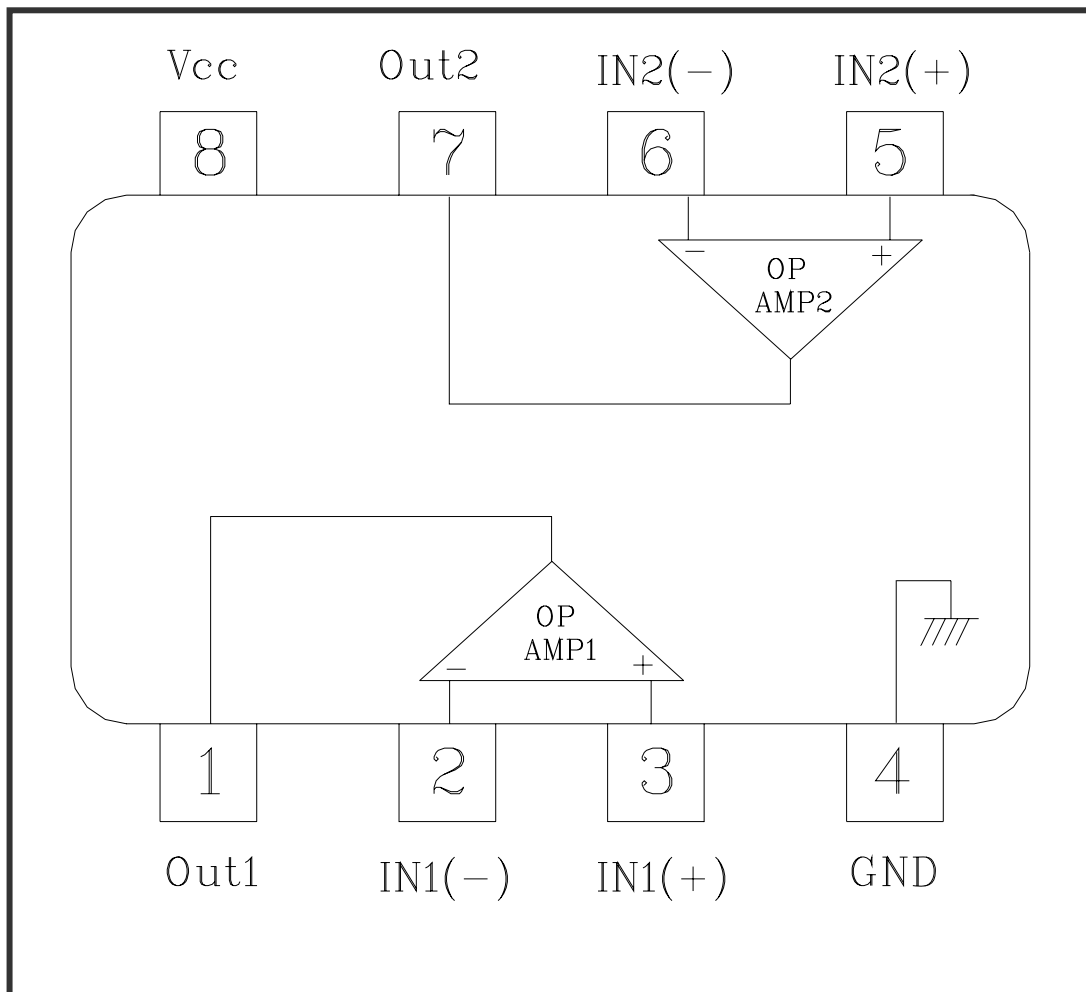
**Application**

- ◆ Transducer amplifier
- ◆ DC gain blocks
- ◆ Conventional operational amplifiers

**Features and Benefits**

- ◆ Input common mode voltage range includes ground
- ◆ Internally frequency compensated for unity gain
- ◆ Large DC voltage gain : 100dB
- ◆ Wide bandwidth for unity gain : 1 MHz
- ◆ Very low power consumption
- ◆ Wide supply voltage range :  
[ Single : 3V ~ 30V, Dual : ±1.5 ~ ±15V ]

## ◆ Internal Block Diagram



## ◆ Pin Description

No	Symbol	I/O	Description
1	Out1	O	OP-Amp1 Output
2	IN1(-)	I	OP-Amp1's Inverting Input
3	IN1(+)	I	OP-Amp1's Non-inverting Input
4	GND	GND	GND
5	IN2(+)	I	OP-Amp2's Non-inverting Input
6	IN2(-)	I	OP-Amp2's Inverting Input
7	Out2	O	OP-Amp2 Output
8	V <sub>CC</sub>	PWR	V <sub>CC</sub> for Dual Operational Amplifier

## Absolute maximum ratings

Characteristic	Symbol	Ratings	Unit	
Supply voltage	$V_{CC}$	36 or $\pm 18$	V	
Differential input voltage	$V_{IND}$	32	V	
Input voltage	$V_{IN}$	-0.3 ~ +32	V	
Power Dissipation	$P_D$	SOP-8	600	mW
		DIP-8	1000	mW
Operating temperature	$T_{opr}$	-45 ~ +85	$^{\circ}C$	
Storage temperature	$T_{stg}$	-55 ~ 150	$^{\circ}C$	

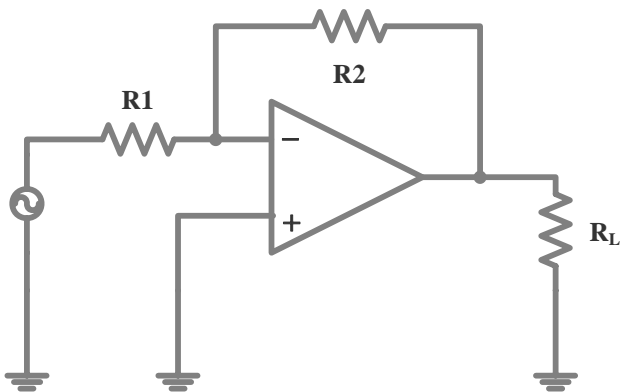
## Electrical Characteristics

(Unless otherwise specified.  $V_{CC} = 5V$  and  $-45^{\circ}C \leq T_a \leq +85^{\circ}C$ )

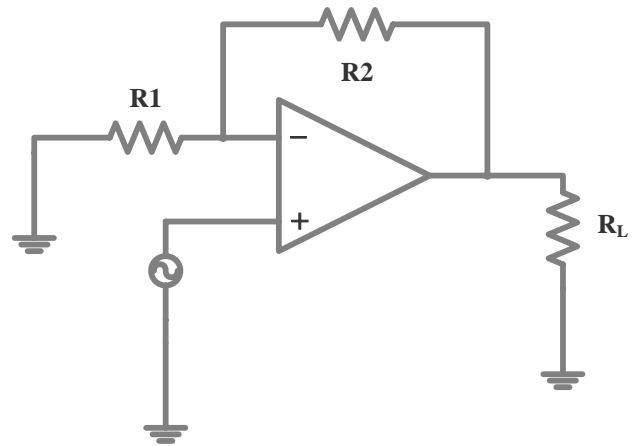
Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Input offset voltage	$V_{IOS}$	$5V \leq V_{CC} \leq 30V$ (Ta=25 $^{\circ}C$ )	-	$\pm 2$	$\pm 7$	mV	
		$R_g = 0\Omega, 0V \leq V_{IC} \leq V_{CC} - 1.5V$	-	-	$\pm 9$		
Input offset voltage drift	$\Delta V_{IOS}/\Delta T$	$R_g = 0\Omega$	-	7	-	$\mu V/^{\circ}C$	
Input offset current	$I_{IOS}$	-	(Ta=25 $^{\circ}C$ )	-	$\pm 5$	$\pm 50$	nA
			-	-	$\pm 150$		
Input offset current drift	$\Delta I_{IOS}/\Delta T$	-	-	10	-	$pA/^{\circ}C$	
Input bias current	$I_{IB}$	-	(Ta=25 $^{\circ}C$ )	-	45	250	nA
			-	-	40	500	
Input common mode voltage range	$V_{ICR}$	$V_{CC} = 30V$	(Ta=25 $^{\circ}C$ )	0	-	$V_{CC} - 1.5$	V
			-	0	-	$V_{CC} - 2$	V
Supply current	$I_{CC}$	$V_{CC} = 30V, R_L = \infty$	-	1	2	mA	
		$V_{CC} = 5V, R_L = \infty$	-	0.7	1.2		
Large signal voltage gain	$G_V$	$V_{CC} = 15V$ $R_L \geq 2 K\Omega$	(Ta=25 $^{\circ}C$ )	25	100	-	V/mV
			-	15	-	-	
Output voltage swing	$V_{OH}$	$V_{CC} = 30V$	$R_L = 2 K\Omega$	26	-	-	V
			$R_L = 10 K\Omega$	27	28	-	
	$V_{OL}$	$V_{CC} = 5V, R_L \leq 10 K\Omega$	-	3	20	mV	
Common mode rejection ratio	CMRR	(Ta=25 $^{\circ}C$ )	65	90	-	dB	
Power supply rejection ratio	PSRR	(Ta=25 $^{\circ}C$ )	65	100	-	dB	
Output source current	$I_{O+}$	$V_{CC} = 15V$ (Ta=25 $^{\circ}C$ )	20	40	-	mA	
		$V_{IN+} = 1V, V_{IN-} = 0V$	10	20	-		
Output sink current	$I_{O-}$	$V_{CC} = 15V$ (Ta=25 $^{\circ}C$ )	10	20	-	mA	
		$V_{IN+} = 0V, V_{IN-} = 1V$	5	8	-		
		$V_{OUT} = 200mV,$ $V_{IN+} = 0V, V_{IN-} = 1V$ (Ta=25 $^{\circ}C$ )	12	50	-	$\mu A$	
Output short circuit to ground	$I_{SC}$	Ta=25 $^{\circ}C$	-	40	60	mA	

Typical Applications

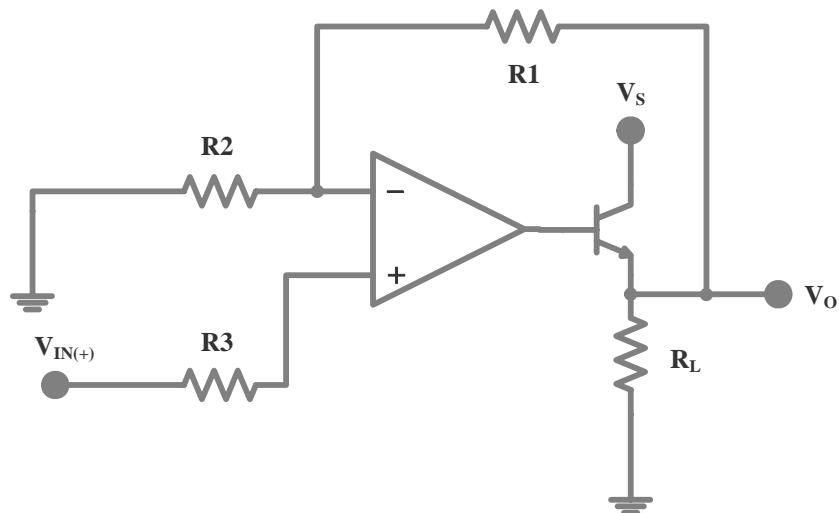
Inverting Amplifier



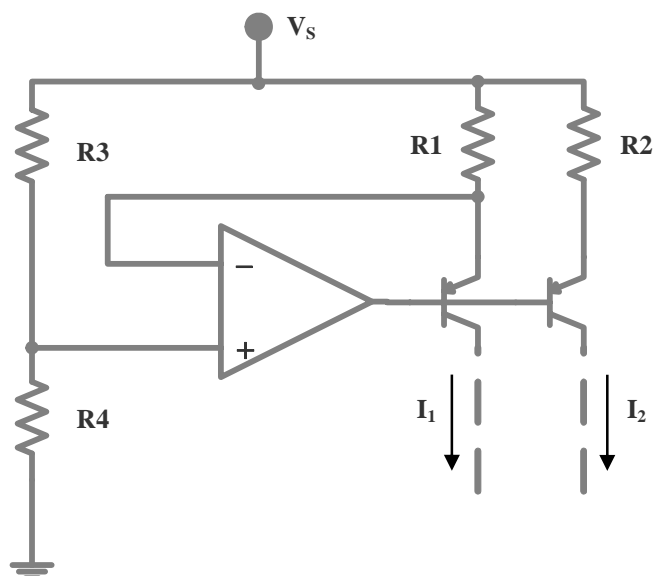
Non-inverting Amplifier



Power Amplifier



Fixed Current Sources



### Electrical Characteristic Curves

Fig. 1  $I_{CC}-V_{CC}$

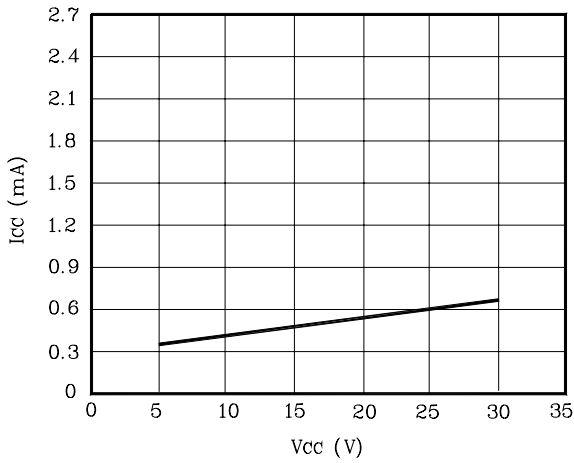


Fig. 2  $I_{IB}-V_{CC}$

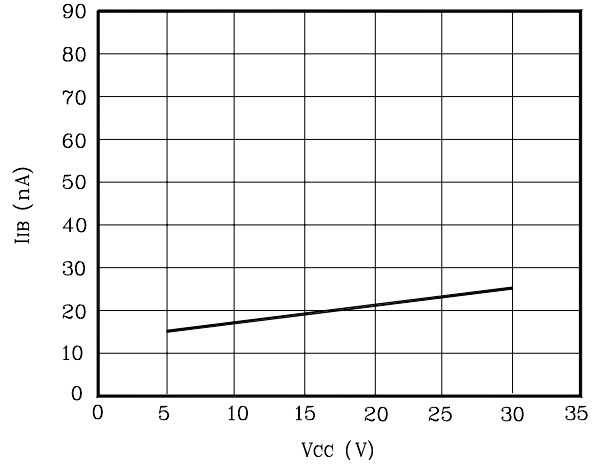


Fig. 3  $V_{IOS}-T_a$

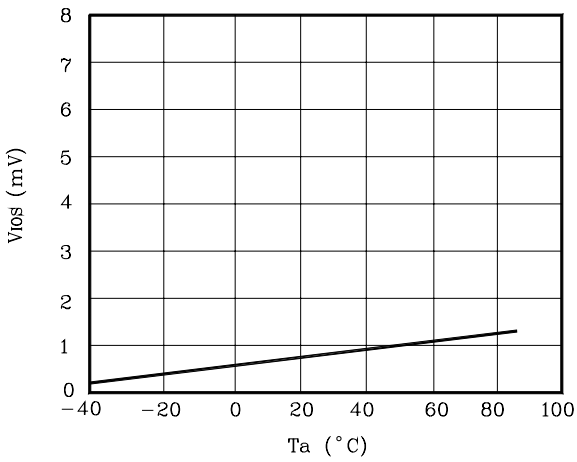


Fig. 4  $I_{O+}-T_a$

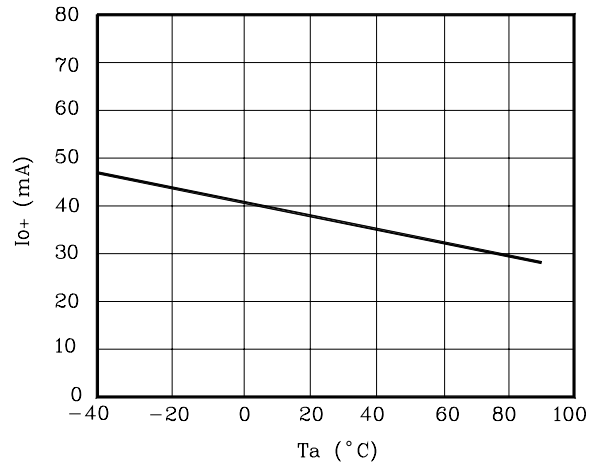


Fig. 5 CMRR-f

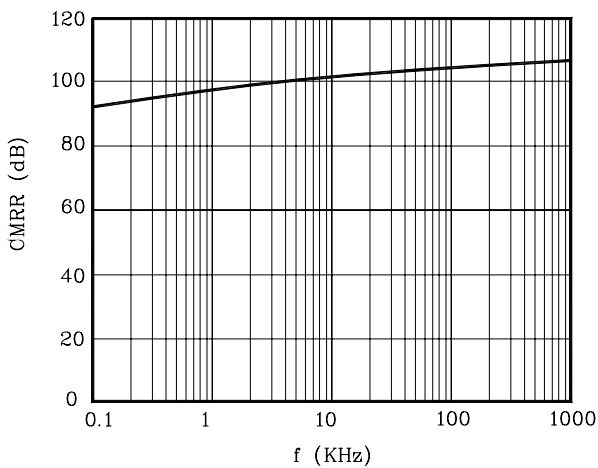
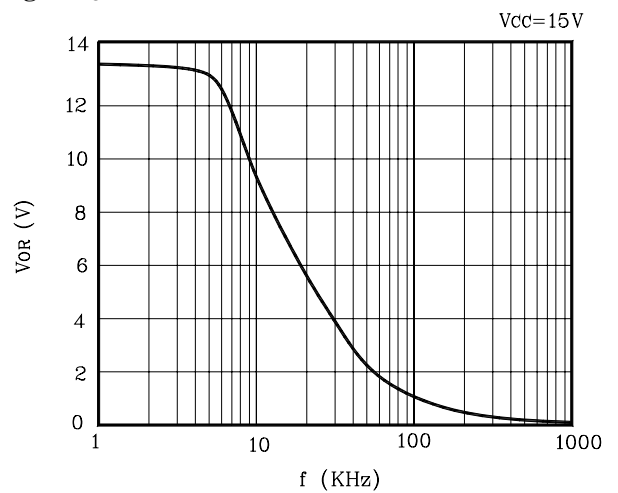
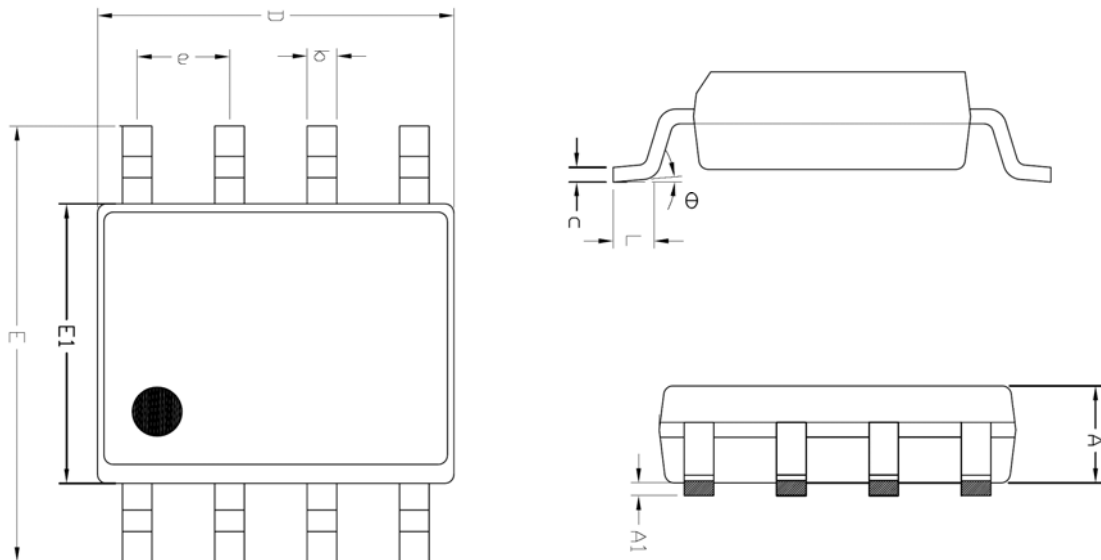


Fig. 6  $V_{OR}-f$

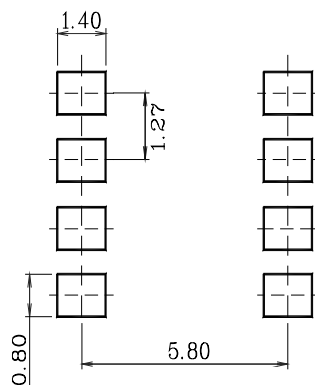


## Outline Dimension (Unit : mm)

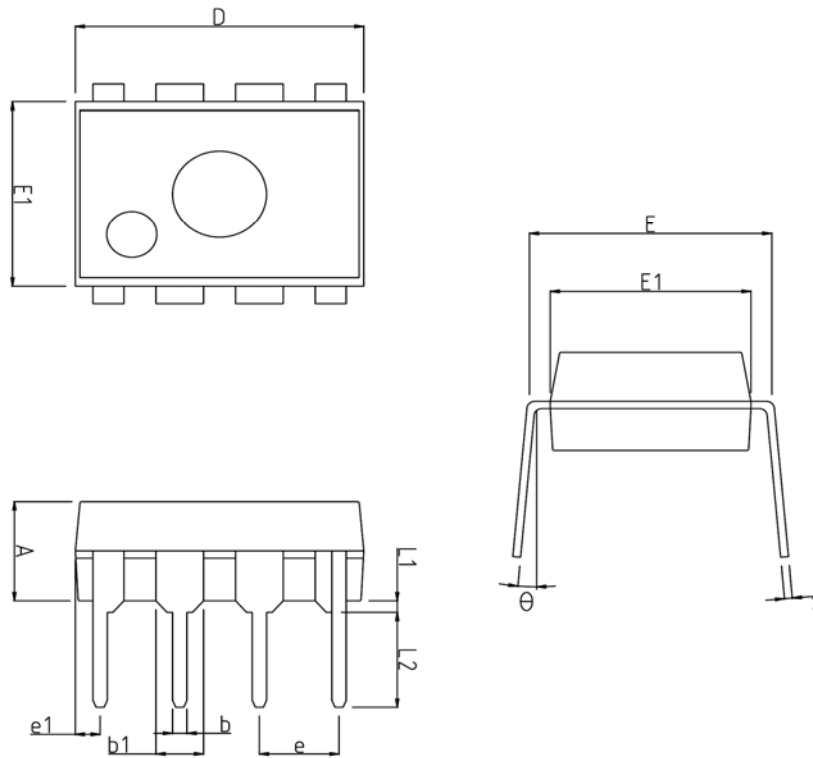


SYMBOL	MILLIMETER(mm)			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	1.245	—	1.445	
A1	0.125	0.175	0.275	
b	0.320	0.420	0.520	
c	0.170	0.220	0.270	
D	4.802	4.902	5.002	
E	5.870	6.020	6.170	
E1	3.761	3.861	3.961	
e	1.270 BSC			
L	0.462	0.562	0.662	
θ	0 °	—	8 °	

## ※ Recommend PCB solder land (Unit : mm)



Outline Dimension (Unit : mm)



SYMBOL	MILLIMETERS			NOTE
	MINIMUM	NOMINAL	MAXIMUM	
A	3.20	3.40	3.60	
b	0.36	0.46	0.56	
b1	1.42	1.52	1.62	
c	0.20	0.25	0.35	
D	9.00	9.20	9.40	
E	7.37	7.62	7.87	
E1	6.20	6.40	6.60	
e	2.54 TYP			
e1	0.79 TYP			
L1	0.33	—	—	
L2	3.00	3.30	3.60	
$\theta$	0°	—	15°	

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