

# AN6550

## Dual Operational Amplifier

### Overview

The AN6550 is a dual operational amplifier with a phase compensation circuit built-in, allowing low voltage operation.

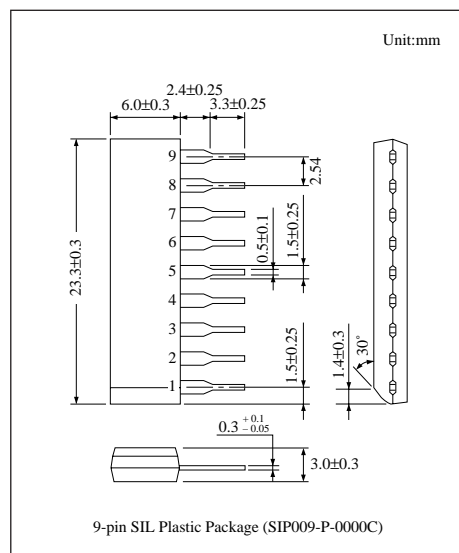
It is suitable for application to various electronic circuits such as active filters and audio preamplifiers.

### Features

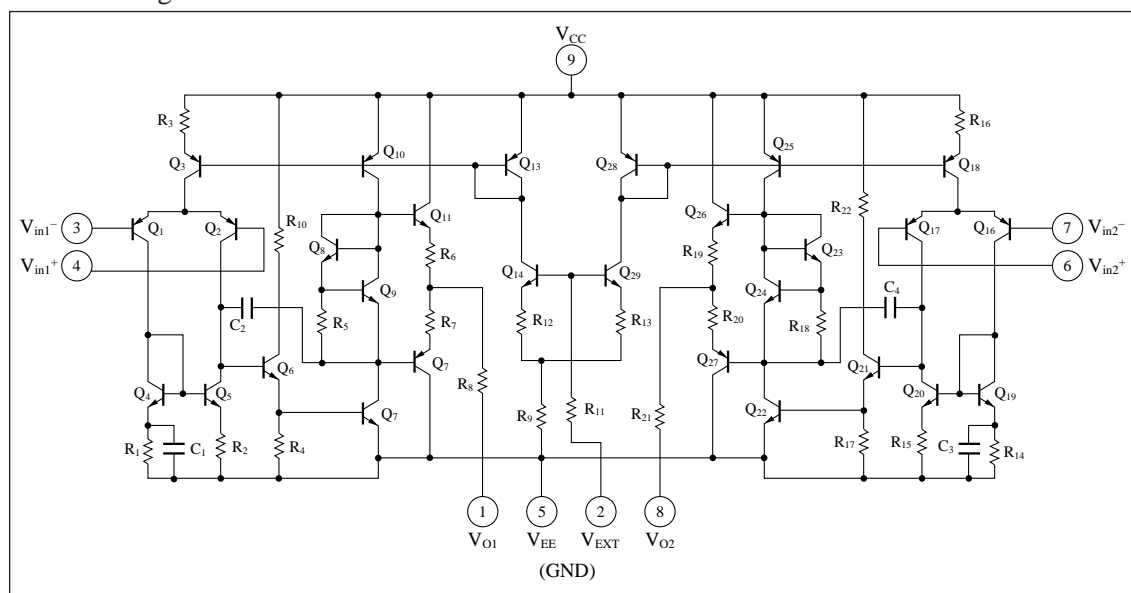
- Phase compensation circuit
- High voltage gain, low noise
- Output short protection circuit
- Low voltage operation( $\pm 2.5\text{V}$  to  $\pm 10\text{V}$ )

### Pin Descriptions

Pin No.	Pin name
1	Ch.1 output
2	External bias
3	Ch.1 inverting input
4	Ch.1 non inverting input
5	$V_{EE}$ (GND)
6	Ch.2 non inverting input
7	Ch.2 inverting input
8	Ch.2 output
9	$V_{CC}$



### Block Diagram



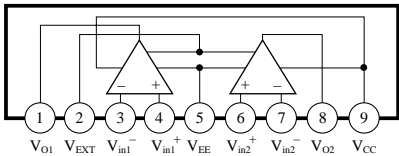
■ Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Rating	Unit
Voltage	Supply voltage	$V_{CC}, V_{EE}$	$\pm 12$	V
	External bias supply voltage	$V_{EXT}$	$V_{EE}$ to $V_{CC}$	V
	Differential input voltage	$V_{ID}$	$\pm 24$	V
	Common-mode input voltage	$V_{ICM}$	$\pm 12$	V
Power dissipation		$P_D$	500	mW
Temperature	Operating ambient temperature	$T_{opr}$	-20 to +75	°C
	Storage temperature	$T_{stg}$	-55 to +150	°C

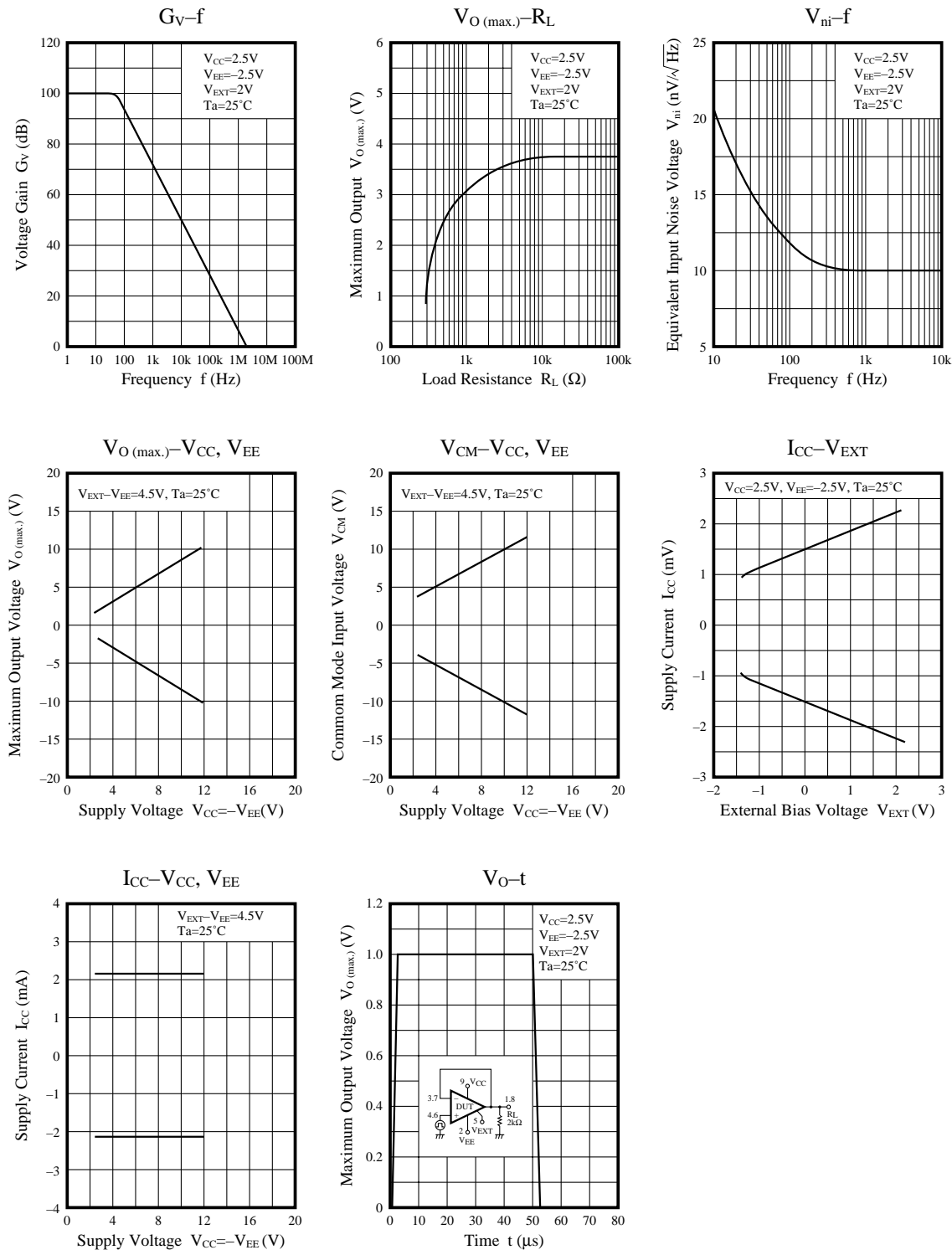
■ Electrical Characteristics ( $V_{CC}=2.5V$ ,  $V_{EE}=-2.5V$ ,  $V_{EXT}=2.0V$ ,  $T_a=25^\circ C$ )

Parameter	Symbol	Condition	min	typ	max	Unit
Input offset voltage	$V_{I(offset)}$	$R_S \leq 10k\Omega$	—	1.5	6	mV
Input offset current	$I_{IO}$		—	5	200	nA
Input bias current	$I_{Bias}$		—	150	500	nA
Voltage gain	$G_V$	$R_L \geq 2k\Omega$	65	100	—	dB
Maximum output voltage	$V_{O(max.)}$	$R_L \geq 10k\Omega$	$\pm 1.2$	$\pm 1.7$	—	V
		$R_L \geq 2k\Omega$	$\pm 1$	$\pm 1.5$	—	V
Common-mode input voltage width	$V_{CM}$		$\pm 1$	$\pm 1.5$	—	V
Common-mode rejection ratio	CMR		70	80	—	dB
Supply voltage rejection ratio	SVR		—	100	300	$\mu V/V$
Power consumption	$P_C$	$R_L = \infty$	—	8	15	mW
Slew rate	SR	$R_L \geq 2k\Omega$	—	0.8	—	V/ $\mu s$
Equivalent input noise voltage	$V_{ni}$	$R_S = 1k\Omega$ , B=10Hz to 30kHz	—	2.5	—	$\mu V_{rms}$

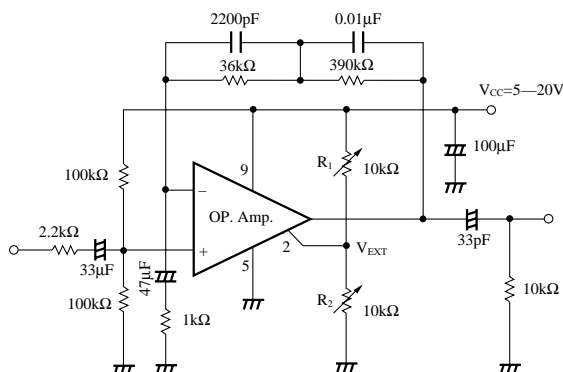
■ Pin Assignments



■ Characteristics Curve



## ■ Application Circuit



RIAA Preamplifier (single power supply operation)

Note)  $R_1$  and  $R_2$  are resistances for setting operational amplifier bias.

Set  $R_1$  and  $R_2$  so that  $V_{EXT}=2.0V$  to  $6.0V$ .

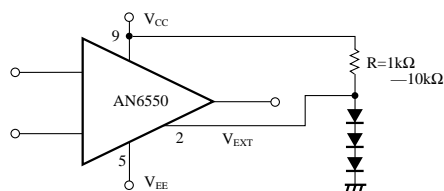
(Recommended Voltage  $V_{EXT}=4.5V$ )

## ■ How to Apply External to the AN6550

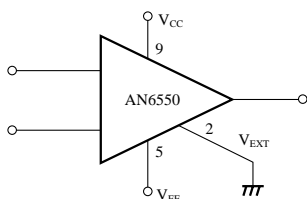
1. The AN6550 is an operational amplifier with a phase compensation circuit built-in, allowing low voltage operation, and its current consumption and bandwidth can be changed by applying external bias to it.
2. As shown below, applies bias voltage to 2  $V_{EXT}$  pin of the AN6550 allows the AN6550 to be handled in the very same way as the AN6551, except for pin connection.

Set  $V_{EXT} \geq V_{EE} + 1V$ .

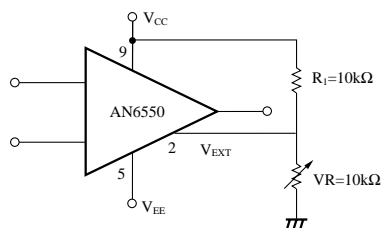
### 1 ) By diode



### 2 ) By connecting $V_{EXT}$ pin to GND

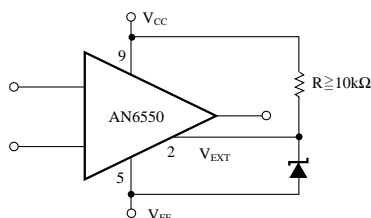


### 3 ) By dividing with resistors



### 4 ) By Zener diode

( $V_{CC}-V_{EE} \geq 6V$ )



## Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).  
Consult our sales staff in advance for information on the following applications:
  - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
  - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.  
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

## Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.  
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.  
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.  
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.