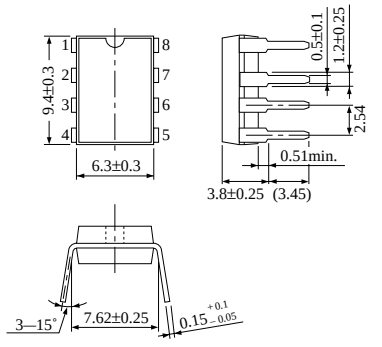
# AN1358 (AN6562), AN1358S (AN6562S)

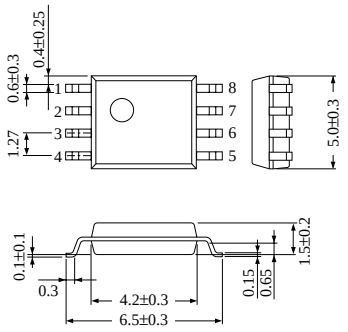
## Dual Operational Amplifiers

AN1358 (AN6562) Unit:mm




8-pin DIL Plastic Package (DIP008-P-0300B)

AN1358S (AN6562S) Unit:mm




8-pin PANAFLAT Plastic Package (SOP008-P-0225A)

### ■ Overview

The AN1358 (AN6562)and AN1358S (AN6562S) are dual operational amplifiers with two phase compensation circuits built-in, have a wide range of operaing supply voltage, and can operate on a single power supply.

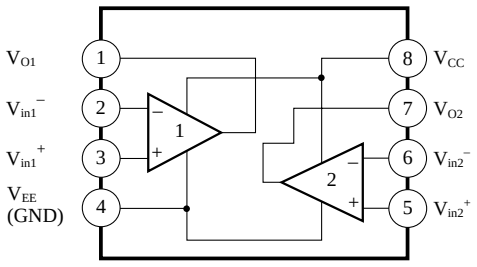
They have electrical characteristics equivalent to those of the conventional operational amplifiers, and are low-powered and suitable for application to various circuits.

Note) The type numbers in ( ) are old ones.

### ■ Features

- Built-in phase compensation circuits
- Wide range of input voltage:0V to $V_{CC}$–1.5V
- Wide range of operating supply voltage:
  Single power supply:3 to 30V
  Dual power supply:±1.5 to ±15V

### ■ Block Diagram



## ■ Absolute Maximum Ratings (Ta=25˚C)

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Supply voltage | | $V_{CC}$ | 32 | V |
| Differential input voltage | | $V_{ID}$ | 32 | V |
| Common-mode input voltage | | $V_{ICM}$ | – 0.3 to +32 | V |
| Output voltage | | $V_O$ | 24 | V |
| Power dissipation | AN1358 (AN6562) | $P_D$ | 350 | mW |
| | AN1358 (AN6562S) | | 360 | |
| Operating ambient temperature | | $T_{opr}$ | –20 to +75 | ˚C |
| Strage temperature | AN1358 (AN6562) | $T_{stg}$ | –55 to +150 | ˚C |
| | AN1358S (AN6562S) | | –55 to +125 | |

## ■ Recommended Operating Range (Ta=25˚C)

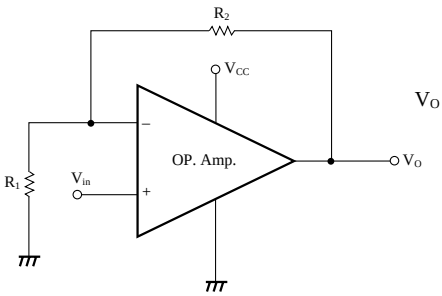
| Parameter | Symbol | Range |
|---|---|---|
| Operating supply voltage range | $V_{CC}$ | Single power supply 3V to 30V |
| | | Dual power supply ±1.5V to ±15V |

## ■ Electrical Characteristics ($V_{CC}$=5V, Ta=25˚C)

| Parameter | Symbol | Condition | min | typ | max | Unit |
|---|---|---|---|---|---|---|
| Input offset voltage | $V_{I\ (offset)}$ | $R_S$=50Ω | — | 2 | 7 | mV |
| Input bias current | $I_{bias}$ | | — | — | 250 | nA |
| Input offset current | $I_{IO}$ | | — | — | 50 | nA |
| Common-mode input voltage width | $V_{CM}$ | | 0 | — | $V_{CC}$–1.5 | V |
| Supply current | $I_{CC}$ | $R_L$=∞ | — | 0.6 | 1.2 | mA |
| Voltage gain | $G_V$ | $R_L$≥2kΩ | — | 100 | — | dB |
| Maximum output voltage | $V_{O\ (max.)}$ | $R_L$≥2kΩ | $V_{CC}$–1.5 | — | — | V |
| Common-mode rejection ratio | CMR | | 65 | 85 | — | dB |
| Supply voltage rejection ratio | SVR | | 65 | 100 | — | dB |
| Channel separation | CS | f=1 to 20kHz | — | 120 | — | dB |
| Output source current | $I_{O\ (source)}$ | $V_{in}^+$=1V, $V_{in}^-$=0V | 20 | 40 | — | mA |
| Output sink current | $I_{SINK}$ | $V_{in}^+$=0V, $V_{in}^-$=1V | 10 | 20 | — | mA |

## ■ Application Circuit

Non-inverting Amplifier



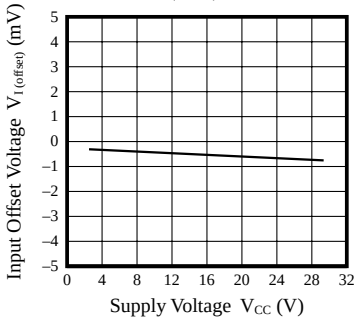

$$V_O = \left(1 + \frac{R_2}{R_1}\right) V_{in}$$

## ■ Pin Descriptions

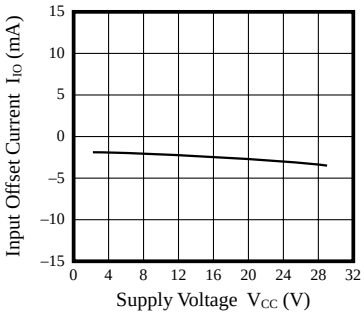
| Pin No. | Pin name |
|---|---|
| 1 | Ch.1 output pin |
| 2 | Ch.1 inverting input pin |
| 3 | Ch.1 non-inverting input pin |
| 4 | Negative supply voltage (GND) |
| 5 | Ch.2 non-inverting input pin |
| 6 | Ch.2 inverting input pin |
| 7 | Ch.2 output pin |
| 8 | Positive supply voltage |

## ■ Characteristics Curve

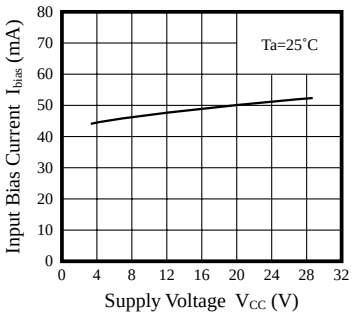
$V_{I\,(offset)}$–$V_{CC}$



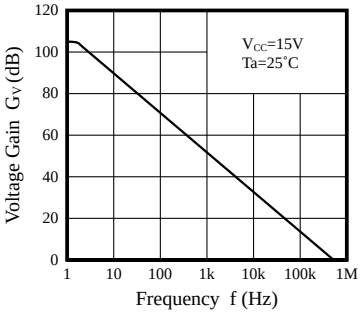

$I_{IO}$–$V_{CC}$



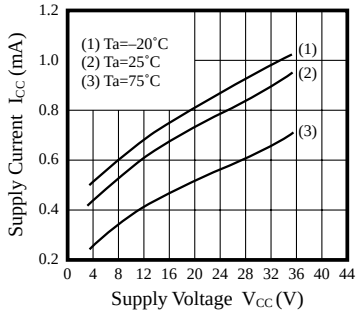

$I_{bias}$–$V_{CC}$



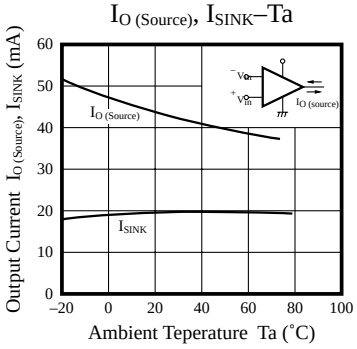

$G_V$–f



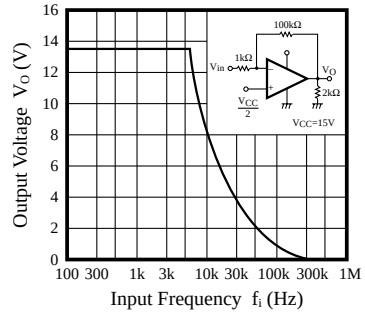

$I_{CC}$–$V_{CC}$



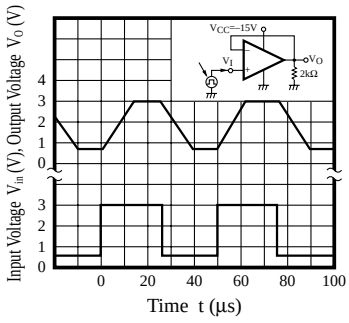

$I_{O\,(Source)}$, $I_{SINK}$–Ta




$V_O$–$f_i$




$V_{in}$, $V_O$–t




$G_V$–$V_{CC}$