



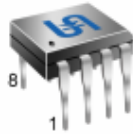
## TS4558

### Dual General Purpose Operational Amplifier

SOP-8



DIP-8



#### Pin Assignment

1. Out A
2. Input A (-)
3. Input A (+)
4. Ground
5. Input B (+)
6. Input B (-)
7. Output B
8. Vcc

Supply Voltage Range -18 V to 18V

Unity Gain Bandwidth 3MHz

Dual Channel Amplifier

### General Description

The TS4558 is dual general purpose operational amplifier, and provide the high common-mode input voltage range and the absence of latch-up make these amplifiers ideal for voltage follower application.

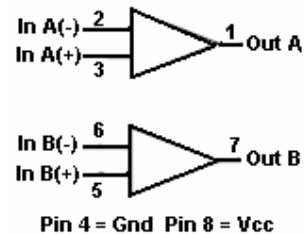
The devices are short circuit protected and the internal frequency compensation ensures stability without external components.

The TS4558 is offered in 8 pin SOP-8 and DIP-8 package.

### Features

- ✧ Short circuit protection
- ✧ Wide common-mode and differential ranges
- ✧ No frequency compensation required
- ✧ Low power consumption
- ✧ No latch-up
- ✧ 3MHz unity gain bandwidth guaranteed
- ✧ Gain and phase match between amplifiers

### Block Diagram



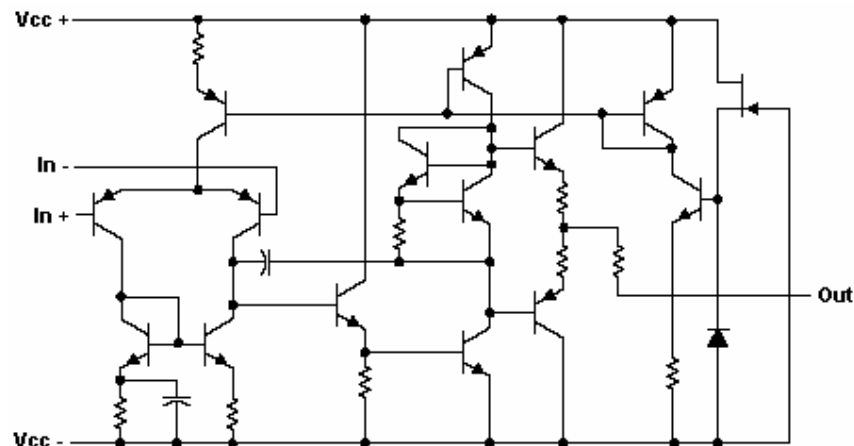
### Applications

- ✧ DVD player
- ✧ Audio application

### Ordering Information

| Part No. | Operating Temp. | Package |
|----------|-----------------|---------|
| TS4558CD | 0 ~ +70 °C      | DIP-8   |
| TS4558CS |                 | SOP-8   |

### Schematic (each amplifier)





| Absolute Maximum Rating                            |                   |                       |      |
|----------------------------------------------------|-------------------|-----------------------|------|
| Supply Voltage                                     | V <sub>CC</sub> + | 18                    | V    |
| Supply Voltage                                     | V <sub>CC</sub> - | - 18                  | V    |
| Differential Input Voltage                         | V <sub>IDR</sub>  | ±30                   | V    |
| Input Voltage                                      | V <sub>in</sub>   | 30                    | V    |
| Package Thermal Impedance                          | SOP-8<br>DIP-8    | θ <sub>ja</sub><br>85 | °C/W |
| Operating Junction Temperature Range               | T <sub>J</sub>    | 0 ~ +125              | °C   |
| Storage Temperature Range                          | T <sub>STG</sub>  | -65 ~ +150            | °C   |
| Lead Temperature 1.6mm(1/16") from case for 10Sec. | T <sub>LEAD</sub> | 260                   | °C   |

Note: Maximum ratings are those values beyond which damage to the device may occur, and functional operation should be restricted to the recommended operating condition.

### Recommended Operating Conditions

|                |                   |      |   |
|----------------|-------------------|------|---|
| Supply Voltage | V <sub>CC</sub> + | 15   | V |
| Supply Voltage | V <sub>CC</sub> - | - 15 | V |

### Electrical Characteristics

(V<sub>CC</sub> = ±15V, T<sub>a</sub> = 25 °C; unless otherwise specified.)

| Parameter                       | Symbol                          | Test Conditions                                     | Min  | Typ | Max  | Unit  |
|---------------------------------|---------------------------------|-----------------------------------------------------|------|-----|------|-------|
| Input Offset Voltage            | V <sub>io</sub>                 | R <sub>s</sub> ≤ 10kΩ                               |      | 0.5 | ±6   | mV    |
| Input Offset Current            | I <sub>io</sub>                 |                                                     |      | 20  | ±200 | nA    |
| Input Bias Current              | I <sub>ib</sub>                 |                                                     |      | 150 | 500  | nA    |
| Input Resistance                | R <sub>i</sub>                  |                                                     | 0.3  | 5   |      | MΩ    |
| Unity Gain Bandwidth            | B <sub>1</sub>                  |                                                     |      | 3   |      | MHz   |
| Large-Signal Voltage Gain       | A <sub>v</sub>                  | R <sub>L</sub> ≥ 2kΩ, V <sub>c</sub> = ±10V         | 20   | 300 |      | V/mV  |
| Output Voltage Swing            | V <sub>om</sub>                 | R <sub>L</sub> ≥ 10kΩ                               | ±12  | ±14 |      | V     |
|                                 |                                 | R <sub>L</sub> ≥ 2kΩ                                | ±10  | ±14 |      |       |
| Input Common-Mode Voltage Range | V <sub>icr</sub>                |                                                     | ±12  | ±13 |      | V     |
| Common-Mode Rejection Ratio     | CMRR                            | R <sub>s</sub> ≤ 10kΩ                               | 70   | 90  |      | dB    |
| Supply Voltage Rejection Ratio  | PSRR                            | R <sub>s</sub> ≤ 10kΩ                               |      | 30  | 150  | uV/V  |
| Slew Rate                       | SR                              | R <sub>L</sub> = 2kΩ, V <sub>in</sub> =10V, L=100pF | 0.8  | 1.6 |      | V/uS  |
| Supply Current                  | I <sup>+</sup> , I <sup>-</sup> |                                                     |      | 2.5 | 5.6  | mA    |
| Power Consumption               | P <sub>c</sub>                  | R <sub>L</sub> = ∞                                  |      | 75  | 170  | mV    |
| Input Noise Voltage             | V <sub>n</sub>                  | R <sub>s</sub> = 1kΩ, f = 30Hz~30KHz                |      |     | 3.5  | uVrms |
| Source Current                  | I <sub>source</sub>             |                                                     | - 20 |     |      | mA    |
| Sink Current                    | I <sub>sink</sub>               |                                                     | 20   |     |      | mA    |

Note 1: All characteristics are measured under open-loop conditions with zero common-mode input voltage, unless otherwise specified.

# Electrical Characteristics Curve

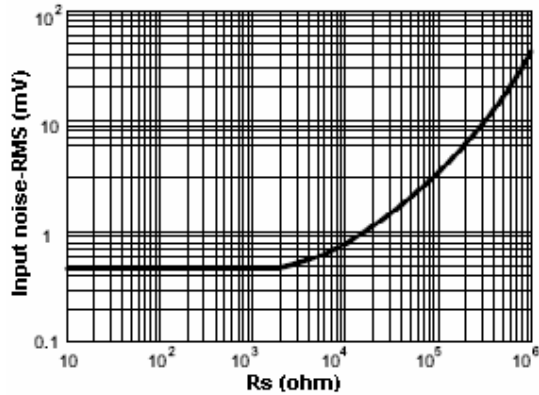


Figure 1. RMS noise vs Rs

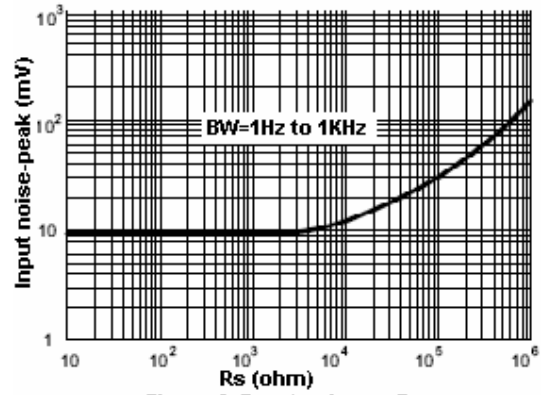


Figure 2. Burst noise vs Rs

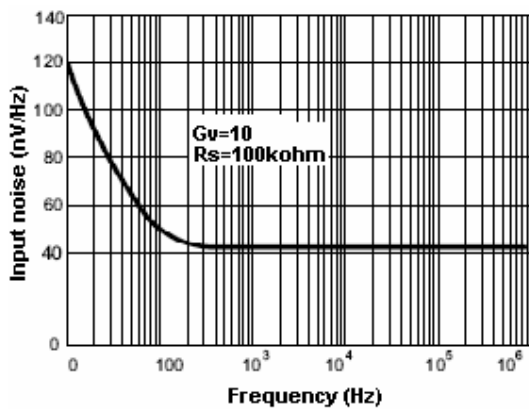


Figure 3. Spectral noise density

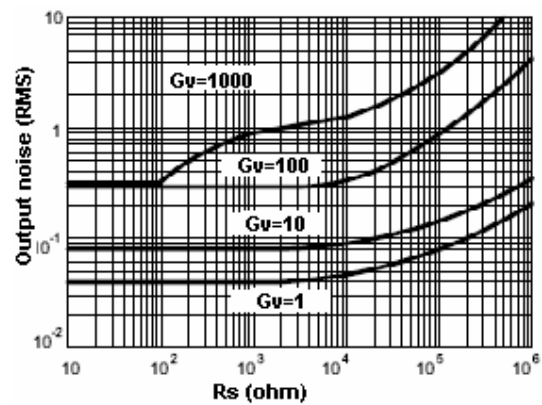


Figure 4. Output noise vs Rs

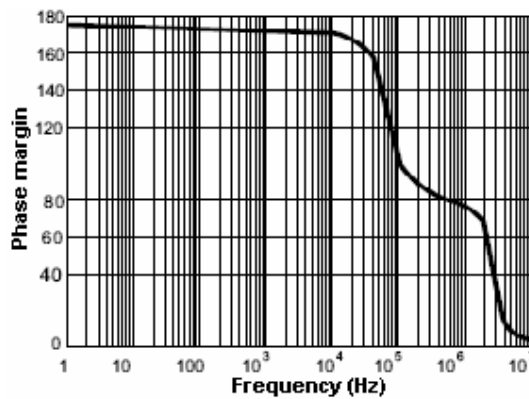


Figure 5. Phase margin vs Frequency

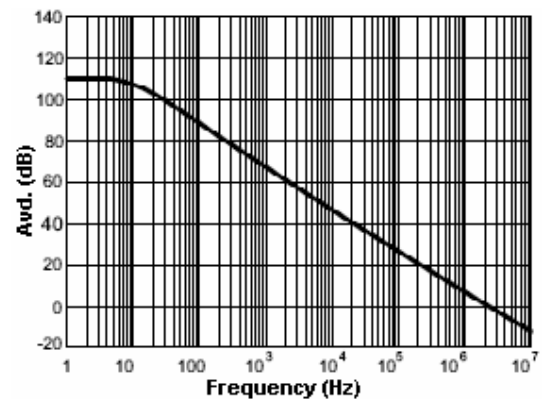


Figure 6. Open loop frequency response

## Electrical Characteristics Curve

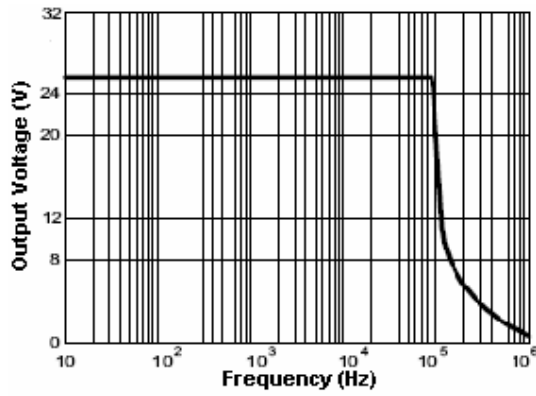


Figure 7. Power bandwidth (large signal)

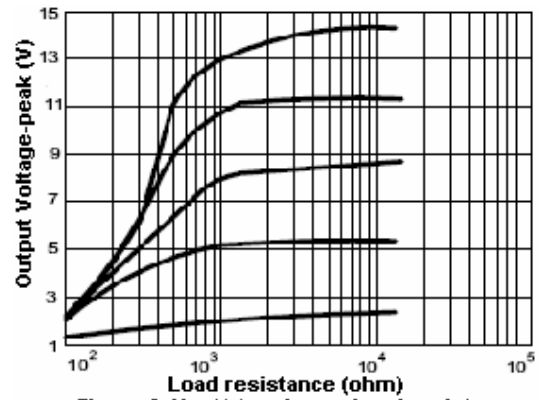
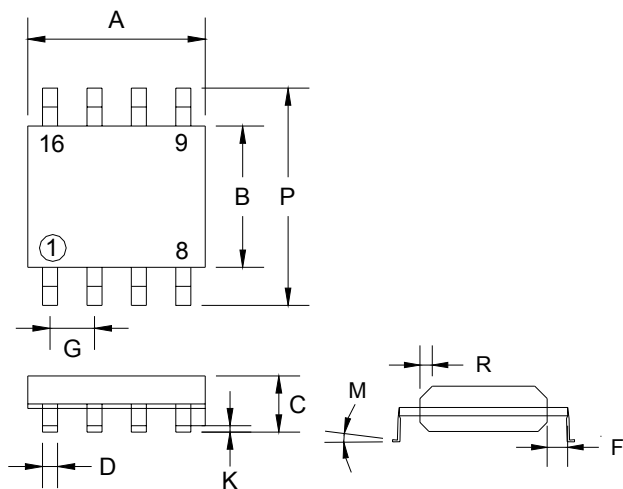


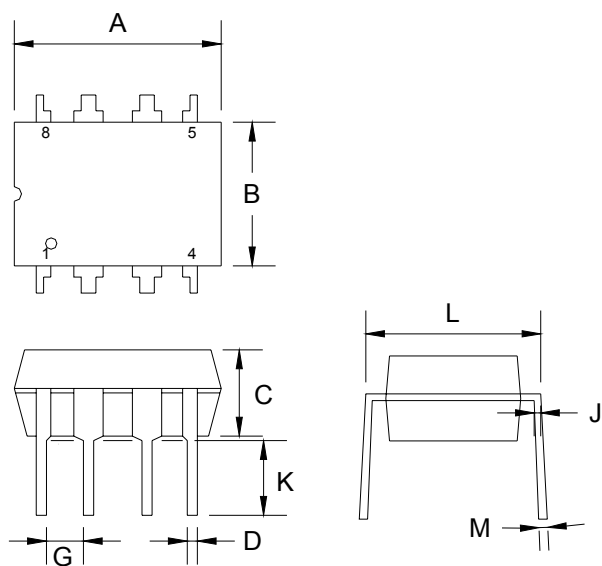
Figure 8. Vout(+) swing vs Load resistance

## SOP-8 Mechanical Drawing



| SOP-8 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 4.80        | 5.00 | 0.189      | 0.196 |
| B               | 3.80        | 4.00 | 0.150      | 0.157 |
| C               | 1.35        | 1.75 | 0.054      | 0.068 |
| D               | 0.35        | 0.49 | 0.014      | 0.019 |
| F               | 0.40        | 1.25 | 0.016      | 0.049 |
| G               | 1.27 (typ)  |      | 0.05 (typ) |       |
| K               | 0.10        | 0.25 | 0.004      | 0.009 |
| M               | 0°          | 7°   | 0°         | 7°    |
| P               | 5.80        | 6.20 | 0.229      | 0.244 |
| R               | 0.25        | 0.50 | 0.010      | 0.019 |

## DIP-8 Mechanical Drawing



| SOP-8 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 9.07        | 9.32 | 0.357      | 0.367 |
| B               | 6.22        | 6.48 | 0.245      | 0.255 |
| C               | 3.18        | 4.45 | 0.125      | 0.135 |
| D               | 0.35        | 0.55 | 0.019      | 0.020 |
| G               | 2.54 (typ)  |      | 0.10 (typ) |       |
| J               | 0.29        | 0.31 | 0.011      | 0.012 |
| K               | 3.25        | 3.35 | 0.128      | 0.132 |
| L               | 7.75        | 8.00 | 0.305      | 0.315 |
| M               | -           | 10°  | -          | 10°   |