# KA4558

## Dual Operational Amplifier

## Features

- No frequency compensation required.
- No latch up.
- Large common mode and differential voltage range.
- Parameter tracking over temperature range.
- Gain and phase match between amplifiers.
- Internally frequency compensated.
- Low noise input transistors.

## Descriptions

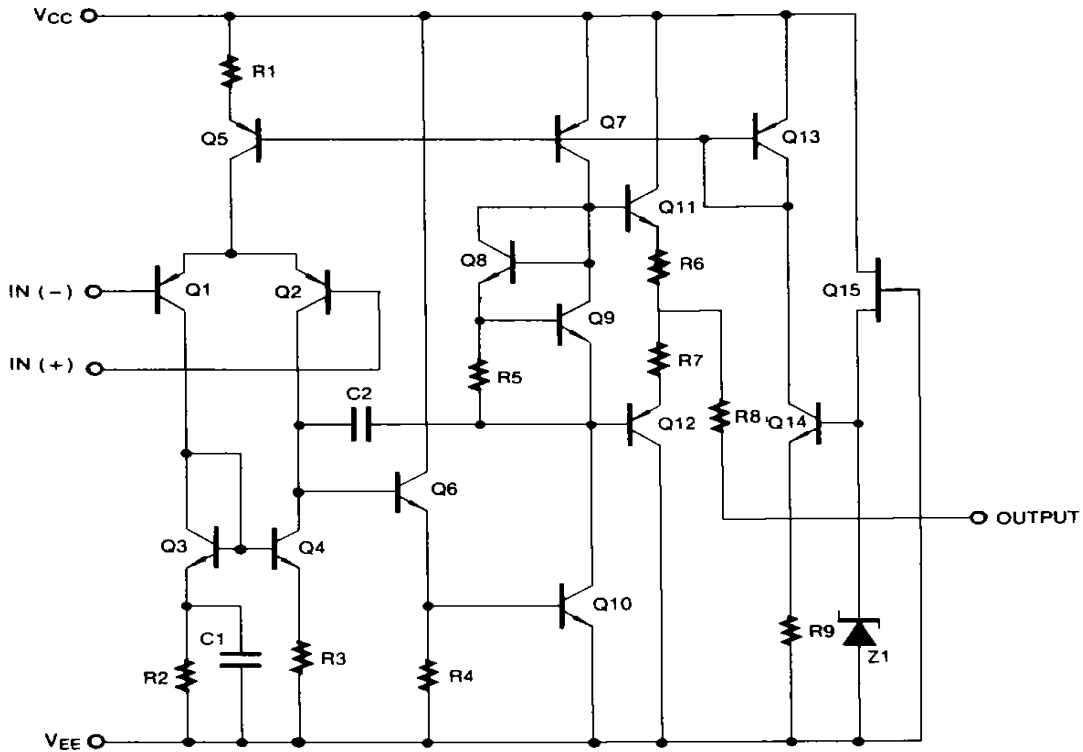The KA4558 is a monolithic integrated circuit designed for dual operational amplifier.

**8-DIP**

**8-SOP**

**9-SIP**
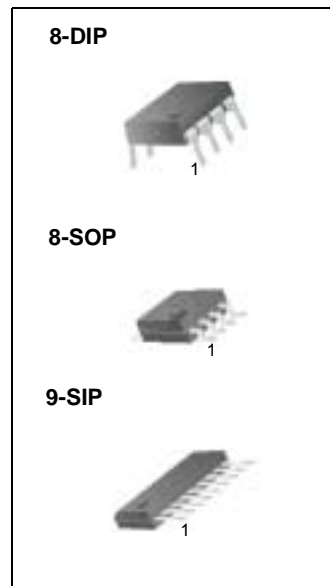
## Internal Block Diagram
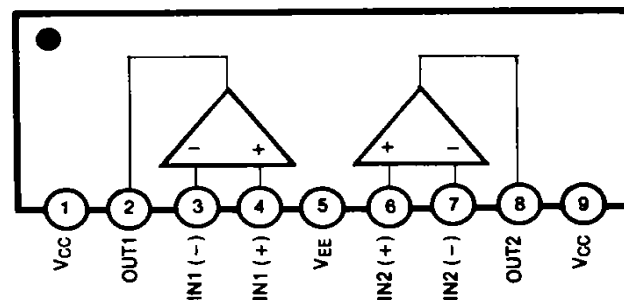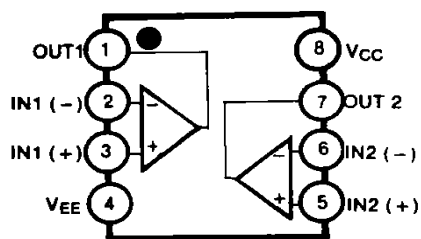
## Schematic Diagram

(One Section Only)



## Absolute Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Supply Voltage | $V_{CC}$ | $\pm22$ | V |
| Differential Input Voltage | $V_{I(DIFF)}$ | 30 | V |
| Input Voltage | $V_I$ | $\pm15$ | V |
| Power Dissipation | $P_D$ | 400 | mW |
| Operating Temperature Range<br>KA4558<br>KA4558I | $T_{OPR}$ | 0 ~ 70<br>-40 ~ 85 | °C |
| Storage Temperature Range | $T_{STG}$ | -65 ~ 150 | °C |

## Electrical Characteristics

($V_{CC}$ = 15V, $V_{EE}$ = - 15V ,$T_A$ = 25 °C unless otherwise specified)

| Parameter | Symbol | Conditions | | KA4558/KA4558I | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| Input Offset Voltage | $V_{IO}$ | $R_S{\le}10K\Omega$ | | - | 2 | 6 | mV |
| | | | Note 1 | - | - | 7.5 | |
| Input Offset Current | $I_{IO}$ | | | - | 5 | 200 | nA |
| | | | $T_A{=}T_{A(MAX)}$ | - | - | 300 | |
| | | | $T_A{=}T_{A(MIN)}$ | - | - | 300 | |
| Input Bias Current | $I_{BIAS}$ | | | - | 30 | 500 | nA |
| | | | $T_A{=}T_{A(MAX)}$ | - | - | 800 | |
| | | | $T_A{=}T_{A(MIN)}$ | - | - | 800 | |
| Large Signal Voltage Gain | $G_V$ | $V_{O(P-P)}{=}\pm10V,R_L{\le}2K\Omega$ | | 20 | 200 | - | V/mV |
| | | | Note 1 | - | - | - | |
| Common Mode Input Voltage Range | $V_{I(R)}$ | | | ±12 | ±13 | - | V |
| | | | Note 1 | - | - | - | |
| Common Mode Rejection Ratio | CMRR | $R_S{\le}10K\Omega$ | | 70 | 90 | - | dB |
| | | | Note 1 | - | - | - | |
| Supply Voltage Rejection Ratio | PSRR | $R_S{\le}10K\Omega$ | | 76 | 90 | - | dB |
| | | | Note 1 | 76 | 90 | - | |
| Output Voltage Swing | $V_{O(P-P)}$ | $R_L{\ge}10K\Omega$ | Note1 | ±12 | ±14 | - | V |
| | | $R_L{\ge}2K\Omega$ | | ±10 | ±13 | - | |
| Supply Current (Both Amplifiers) | $I_{CC}$ | | | - | 3.5 | 5.8 | mA |
| | | | $T_A{=}T_{A(MAX)}$ | - | - | 5.0 | |
| | | | $T_A{=}T_{A(MIN)}$ | - | - | 6.7 | |
| Power Consumption (Both Amplifiers) | $P_C$ | | | - | 70 | 170 | mW |
| | | | $T_A{=}T_{A(MAX)}$ | - | - | 150 | |
| | | | $T_a{=}T_{A(MIN)}$ | - | - | 200 | |
| Slew Rate (Note2) | SR | $V_I{=}10V$, $R_L{\ge}2K\Omega$ $C_I{\le}100pF$ | | 1.2 | - | - | V/μs |
| Rise Time (Note2) | $T_R$ | $V_I{=}20mV$, $R_L{\ge}2K\Omega$ $C_I{\le}100pF$ | | - | 0.3 | - | μs |
| Overshoot (Note2) | OS | $V_I{=}20mV$, $R_L{\ge}2K\Omega$ $C_I{\le}100pF$ | | - | 15 | - | % |

**Note :**

1. KA4558 : $T_{A(MIN)} {\le}T_A{\le}T_{A(MAX)} = 0{\le}T_A{\le} 70$ °C , KA4558I : $T_{A(MIN)} {\le}T_A{\le}T_{A(MAX)} = -40{\le}T_A{\le} +85$ °C
2. Guaranteed by design.
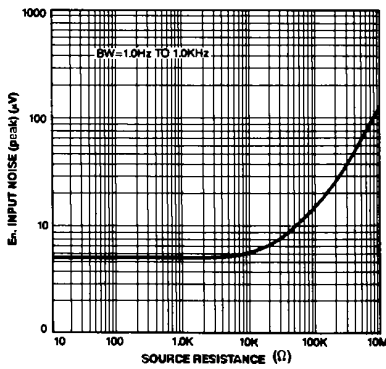
# Typical Performance Characteristics



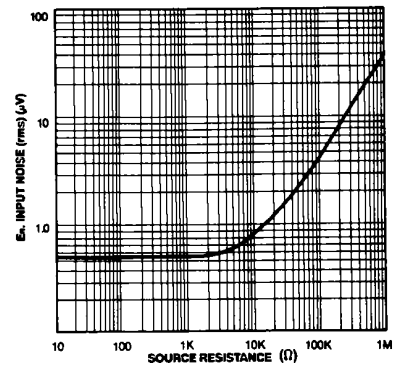Figure 1. Burst Noise vs Source Resistance



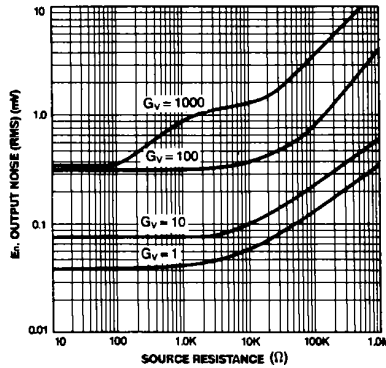Figure 2. RMS Noise vs Source Resistance



Figure 3. Output Noise vs Source Resistance


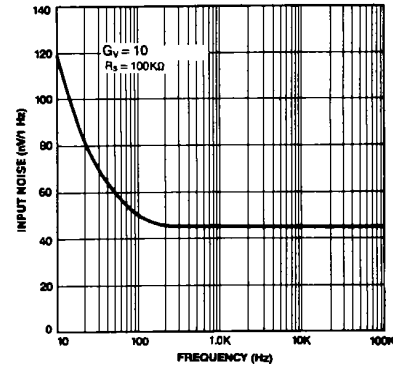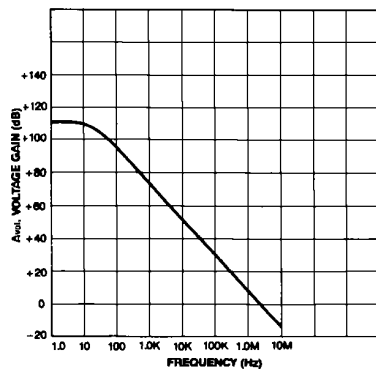
Figure 4. Spectral Noise Density
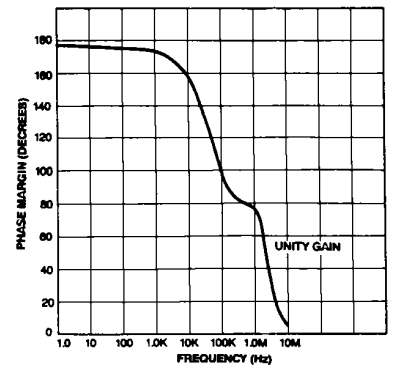


Figure 5. Open Loop Frequency Response



Figure 6. Phase Margin vs Frequency
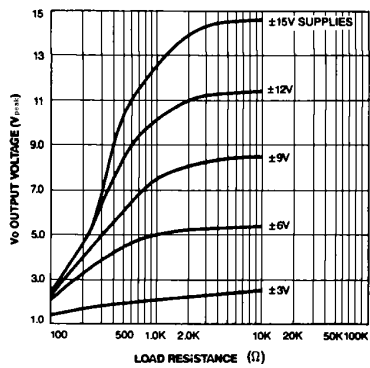
# Typical Performance Characteristics (continued)



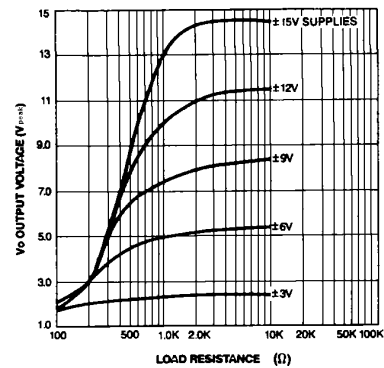**Figure 7. Positive Output Voltage Swing vs Load Resistance**
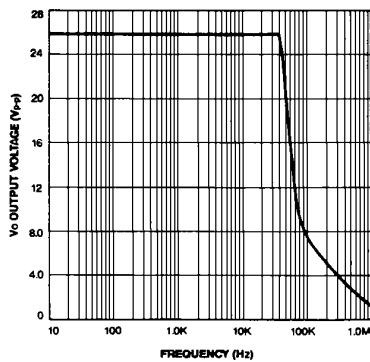


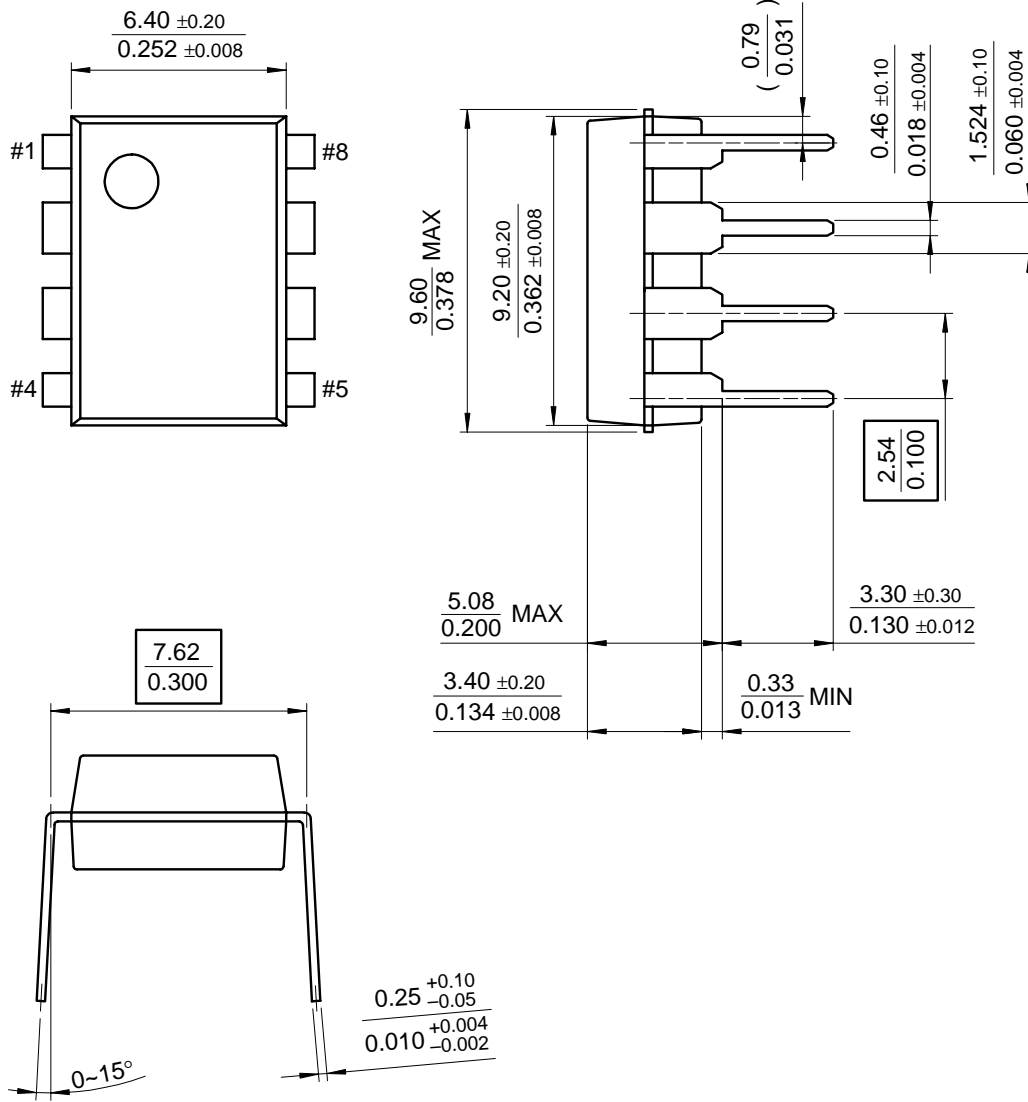**Figure 8. Negative Output Voltage Swing vs Load Resistance**



**Figure 9. Power Bandwidth (Large Signal Output Swing vs Frequency)**

# Mechanical Dimensions

**Package**

## 8-DIP



6.40 ±0.20 / 0.252 ±0.008

#1    #8

#4    #5

9.60 / 0.378 MAX

9.20 ±0.20 / 0.362 ±0.008

( 0.79 / 0.031 )

0.46 ±0.10 / 0.018 ±0.004

1.524 ±0.10 / 0.060 ±0.004

2.54 / 0.100

5.08 / 0.200 MAX

3.40 ±0.20 / 0.134 ±0.008

0.33 / 0.013 MIN

3.30 ±0.30 / 0.130 ±0.012

7.62 / 0.300

0.25 +0.10 −0.05 / 0.010 +0.004 −0.002

0~15°

## Mechanical Dimensions (Continued)

**Package**

# 8-SOP

$\text{MIN} \dfrac{0.1\sim0.25}{0.004\sim0.001}$

$\dfrac{1.55 \pm 0.20}{0.061 \pm 0.008}$

$\left(\dfrac{0.56}{0.022}\right)$

#1     #8

#4     #5

$\dfrac{5.13}{0.202} \text{ MAX}$

$\dfrac{4.92 \pm 0.20}{0.194 \pm 0.008}$

$\dfrac{0.41 \pm 0.10}{0.016 \pm 0.004}$

$\dfrac{6.00 \pm 0.30}{0.236 \pm 0.012}$

$\dfrac{1.80}{0.071} \text{ MAX}$

$\dfrac{1.27}{0.050}$

$\dfrac{\text{MAX0.10}}{\text{MAX0.004}}$

$\dfrac{0.15}{0.006} \begin{smallmatrix}+0.10\\-0.05\end{smallmatrix} \begin{smallmatrix}+0.004\\-0.002\end{smallmatrix}$

$\dfrac{3.95 \pm 0.20}{0.156 \pm 0.008}$

$\dfrac{5.72}{0.225}$

$0\sim8°$

$\dfrac{0.50 \pm 0.20}{0.020 \pm 0.008}$

## Mechanical Dimensions (Continued)

**Package**

# 9-SIP

## Ordering Information

| Product Number | Package | Operating Temperature |
|---|---|---|
| KA4558 | 8-DIP | 0 ~ + 70°C |
| KA4558D | 8-SOP | |
| KA4558S | 9-SIP | |
| KA4558I | 8-DIP | -40 ~ + 85°C |

KA4558

## PUBLICATION ORDERING INFORMATION

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