

DUAL HIGH PERFORMANCE OPERATIONAL AMPLIFIER

SE/NE5512

DESCRIPTION

The 5512 series of high performance operational amplifier provides very good input characteristics. These amplifiers feature low input bias and voltage characteristics such as a 108 op amp with improved CMRR and a high differential input voltage limit achieved through the use of a bias cancellation and PNP input circuits with collector to emitter clamping. The output characteristics are like those of a 741 op amp with improved slew rate and drive capability yet have low supply quiescent current.

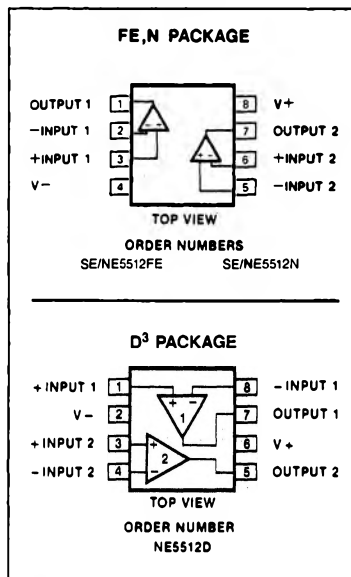
APPLICATIONS

- AC amplifiers
- RC active filters
- Transducer amplifiers
- DC gain block
- Battery operation
- Instrumentation amplifiers

FEATURES

- Low input bias $< \pm 20\text{nA}$
- Low input offset current $< \pm 20\text{nA}$
- Low input offset voltage $< 1\text{mV}$
- Low V_{OS} temperature drift $5\mu\text{V}/^\circ\text{C}$
- Low input bias temperature drift $40\text{pA}/^\circ\text{C}$
- Low input voltage noise $30\text{nV}/\sqrt{\text{Hz}}$
- Low supply current $1.5\text{mA}/\text{amp}$
- High slew rate $1.0\text{V}/\mu\text{s}$
- High CMRR 100dB
- High input impedance $100\text{M}\Omega$
- High PSRR 110dB
- High differential input voltage limit
- No cross-over distortion
- Indefinite output short circuit protection
- Internally compensated for unity gain
- 600Ω drive capability

PIN CONFIGURATIONS

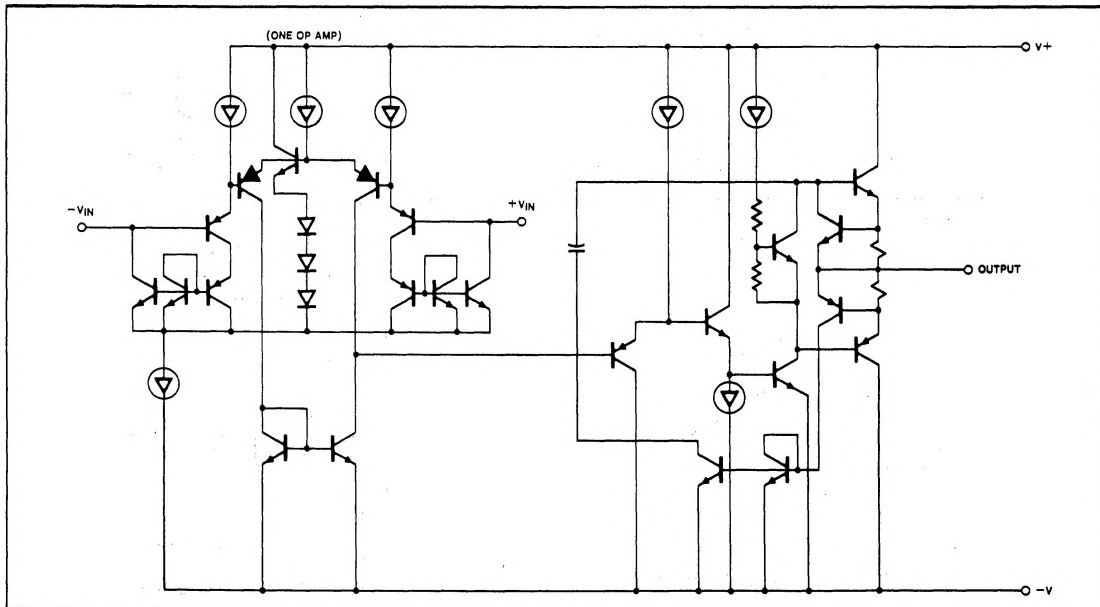


- NOTES:
1. SOL - Released in large SO package only.
 2. SOL and non-standard pinout.
 3. SO and non-standard pinouts.

ABSOLUTE MAXIMUM RATINGS

| Parameter | Rating | Unit |
|---------------------------------------|-------------|------------------|
| V_{CC} Supply Voltage | ± 16 | V |
| V_D Power dissipation | 500 | mW |
| T_A Operating temperature range | | |
| NE5512 | 0 to 70 | $^\circ\text{C}$ |
| SE5512 | -65 to +125 | $^\circ\text{C}$ |
| T_{STG} Storage temperature range | -65 to +150 | $^\circ\text{C}$ |
| T_{SOLD} Lead temperature soldering | 300 | $^\circ\text{C}$ |

EQUIVALENT SCHEMATIC



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ELECTRICAL PERFORMANCE CHARACTERISTICS $V_{CC} = \pm 15V$, F.R. = $-55^{\circ}C$ to $+125^{\circ}C$ (SE), $0^{\circ}C$ to $+70^{\circ}C$ (NE)

| | PARAMETER | TEST CONDITIONS | SE5512 | | | NE5512 | | | UNIT |
|-----------------|-----------------------------------|---|------------------------|--------------------------|----------|------------------------|--------------------------|----------|-------------------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| V_{OS} | Input offset voltage | $R_S = 100\Omega$ $T_A = +25^{\circ}C$ $T_A = F.R.$ | | 0.7 1 | 2 3 | | 1 1.5 | 5 6 | mV |
| ΔV_{OS} | | Over Temp. | | 4 | | | 5 | | $\mu V/^{\circ}C$ |
| I_{OS} | Input offset current | $R_S = 100k\Omega$ $T_A = +25^{\circ}C$ $T_A = F.R.$ | | 3 4 | 10 20 | | 6 8 | 20 30 | nA |
| ΔI_{OS} | | Over Temp. | | 30 | | | 40 | | $pA/^{\circ}C$ |
| I_B | Input bias current | $R_S = 100k\Omega$ $T = +25^{\circ}C$ $T_A = F.R.$ | | 3 4 | 10 20 | | 6 8 | 20 30 | nA |
| ΔI_B | | Over Temp. | | 30 | | | 40 | | $pA/^{\circ}C$ |
| R_{IN} | Input resistance differential | $T_A = 25^{\circ}C$ | | 100 | | | 100 | | M Ω |
| V_{CM} | Input common mode range | $T_A = 25^{\circ}C$ $T_A = F.R.$ | ± 13.5 ± 13 | ± 13.7 ± 13.2 | | ± 13.5 ± 13 | ± 13.7 ± 13.2 | | V |
| CMRR | Input common-mode rejection ratio | $V_{CC} = \pm 15V$ $V_{IN} = \pm 13.5V$ (RM) $T_A = 25^{\circ}C$ $V_{IN} = \pm 13V$ (F.R.) $T_A = F.R.$ | 70 | 100 | | 70 | 100 | | dB |
| A_{VOL} | Large-signal voltage gain | $R_L = 2k\Omega$ $T_A = 25^{\circ}C$ $V_O = \pm 10V$ $T_A = F.R.$ | 50 25 | 200 | | 50 25 | 200 | | V/mV |
| S.R. | Slew rate | $T_A = 25^{\circ}C$ | 0.6 | 1 | | | 1 | | V/ μs |
| GBW | Small-signal unity gain bandwidth | $T_A = 25^{\circ}C$ | | 3 | | | 3 | | MHz |
| θ_M | Phase margin | $T_A = 25^{\circ}C$ | | 45 | | | 45 | | Degree |
| V_{OUT} | Output voltage swing | $R_L = 2k\Omega$ $T_A = 25^{\circ}C$ $T_A = F.R.$ | ± 13 ± 12.5 | ± 13.5 ± 13 | | ± 13 ± 12.5 | ± 13.5 ± 13 | | V |
| V_{OUT} | Output voltage swing | $R_L = 600\Omega^*$ $T_A = 25^{\circ}C$ $T_A = F.R.$ | ± 10 ± 7.5 | ± 11.5 ± 9 | | ± 10 ± 8 | ± 11.5 ± 9 | | V |
| I_{CC} | Power supply current | $R_L = \text{Open}$ $T_A = 25^{\circ}C$ $T_A = F.R.$ | | 3.4 3.6 | 5 5.5 | | 3.4 3.6 | 5 5.5 | mA |
| P_{SRR} | Power supply rejection ratio | $T_A = 25^{\circ}C$ $T_A = F.R.$ | 80 80 | 110 100 | | 80 80 | 110 100 | | dB |
| AA | Amplifier to amplifier coupling | $f = 1kHz$ to $20kHz$ $T_A = 25^{\circ}C$ | | -120 | | | -120 | | dB |
| HD | Total harmonic distortion | $f = 10kHz$ $T_A = 25^{\circ}C$ $V_O = 7V_{RMS}$ | | 0.01 | | | 0.01 | | % |
| V_{INN} | Input noise voltage | $f = 1kHz$ $T_A = 25^{\circ}C$ | | 30 | | | 30 | | nV/\sqrt{Hz} |
| I_{IN} | Input noise current | $f = 1kHz$ $T_A = 25^{\circ}C$ | | .2 | | | .2 | | pA/\sqrt{Hz} |
| I_{SC} | Short circuit | $\pm 15V$ $T_A = 25^{\circ}C$ | | 40 | | | 40 | | mA |

NOTE

For operation at elevated temperature, N package must be derated based on a thermal resistance of $120^{\circ}W$ junction to ambient. Thermal resistance of the FE package is $125^{\circ}W$.

*For additional information, consult the Applications Section.