Signetics

NE/SA/SE5512
Dual High-Performance Operational Amplifier

Product Specification

Linear Products

DESCRIPTION

The 5512 series of high-performance operational amplifiers 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

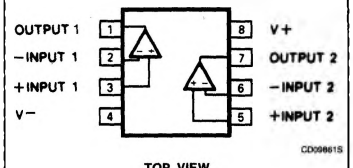
- **AC amplifiers**
- **RC active filters**
- **Transducer amplifiers**
- **DC gain block**
- **Battery operation**
- **Instrumentation amplifiers**

FEATURES

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

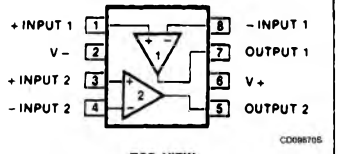
PIN CONFIGURATIONS

FE, N Packages



TOP VIEW

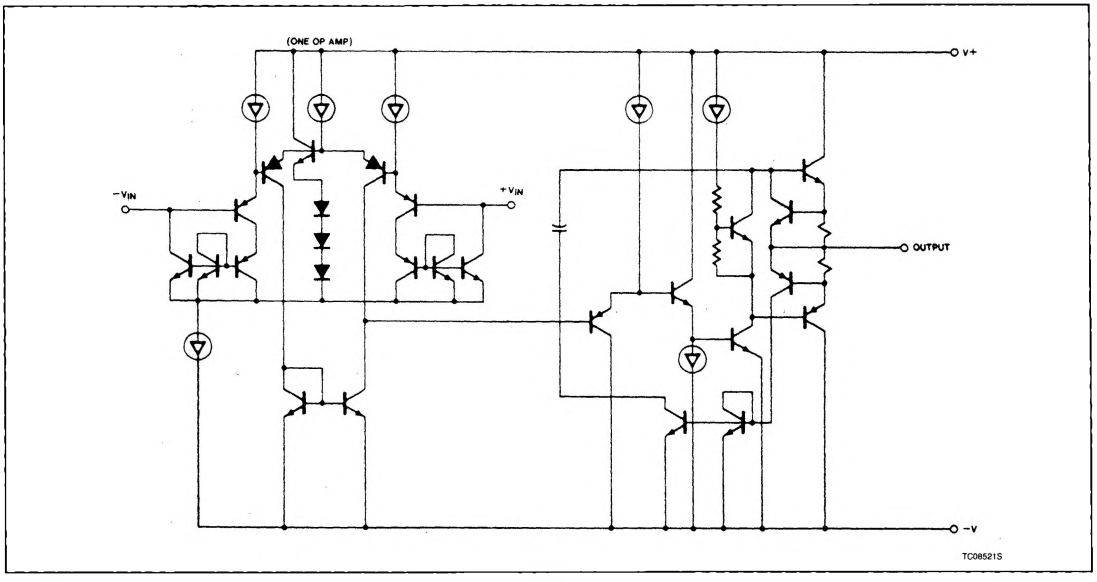
D Package[1]



TOP VIEW

NOTE:
1. The D package pinout is not functionally identical to the FE or N pinout.

EQUIVALENT SCHEMATIC



ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
8-Pin Plastic SO	0°C to +70°C	NE5512D
8-Pin Ceramic DIP	0°C to +70°C	NE5512FE
8-Pin Plastic DIP	0°C to +70°C	NE5512N
8-Pin Plastic SO	−40°C to +85°C	SA5512D
8-Pin Plastic DIP	−40°C to +85°C	SA5512N
8-Pin Ceramic DIP	−55°C to +125°C	SE5512FE
8-Pin Plastic DIP	−55°C to +125°C	SE5512N

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	±16	V
$P_{D\ MAX}$	Maximum power dissipation, T_A = 25°C (still air)[1]		
	FE package	850	mW
	N package	1212	mW
	D package	800	mW
T_A	Operating ambient temperature range		
	NE5512	0 to +70	°C
	SA5512	−40 to +85	°C
	SE5512	−55 to +125	°C
T_{STG}	Storage temperature range	−65 to +150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	300	°C

NOTE:
1. The following derating factors should be applied above 25°C:
   FE package at 6.8mW/°C
   N package at 9.7mW/°C
   D package at 6.4mW/°C

ELECTRICAL PERFORMANCE CHARACTERISTICS

V_{CC} = ± 15V, T_A = 25°C over temperature range, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	SE5512			NE/SA5512			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Input offset voltage	R_S = 100Ω T_A = +25°C Over temp.		0.7 1	2 3		1 1.5	5 6	mV
$\Delta V_{OS}/\Delta T$				4			5		µV/°C
I_{OS}	Input offset current	R_S = 100kΩ T_A = +25°C Over temp.		3 4	10 20		6 8	20 30	nA
$\Delta I_{OS}/\Delta T$				30			40		pA/°C
I_{BIAS}	Input bias current	R_S = 100kΩ T = +25°C Over temp.		3 4	10 20		6 8	20 30	nA
$\Delta I_{BIAS}/\Delta T$				30			40		pA/°C
R_{IN}	Input resistance differential	T_A = 25°C		100			100		MΩ
V_{CM}	Input common mode range	T_A = 25°C Over temp.	± 13.5 ± 13	± 13.7 ± 13.2		± 13.5 ± 13	± 13.7 ± 13.2		V
CMRR	Input common-mode rejection ratio	V_{CC} = ± 15V V_{IN} = ± 13.5V T_A = 25°C V_{IN} = ± 13V Over temp.	70	100		70	100		dB
A_V	Large-signal voltage gain	R_L = 2kΩ T_A = 25°C V_O = ± 10V over temp.	50 25	200		50 25	200		V/mV
SR	Slew rate	T_A = 25°C	0.6	1			1		V/µs
GBW	Small-signal unity gain bandwidth	T_A = 25°C		3			3		MHz
θ_M	Phase margin	T_A = 25°C		45			45		degree
V_{OUT}	Output voltage swing	R_L = 2kΩ T_A = 25°C Over temp.	± 13 ± 12.5	± 13.5 ± 13		± 13 ± 12.5	± 13.5 ± 13		V
V_{OUT}	Output voltage swing	R_L = 600Ω[1] T_A = 25°C Over temp.	± 10 ± 7.5	± 11.5 ± 9		± 10 ± 8	± 11.5 ± 9		V
I_{CC}	Power supply current	R_L = Open T_A = 25°C Over temp.		3.4 3.6	5 5.5		3.4 3.6	5 5.5	mA
PSRR	Power supply rejection ratio	T_A = 25°C Over temp.	80 80	110 100		80 80	110 100		dB
AA	Amplifier-to-amplifier coupling	f = 1kHz to 20kHz, T_A = 25°C		−120			−120		dB
THD	Total harmonic distortion	f = 10kHz T_A = 25°C V_O = $7V_{RMS}$		0.01			0.01		%
V_{NOISE}	Input noise voltage	f = 1kHz T_A = 25°C		30			30		nV/√Hz
I_{NOISE}	Input noise current	f = 1kHz T_A = 25°C		0.2			0.2		pA/√Hz
I_{SC}	Short-circuit current	± 15V, T_A = 25°C		40			40		mA

NOTE:
1. Not to exceed maximum package power dissipation.