Dual high-performance operational amplifier NE/SA/SE5512

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

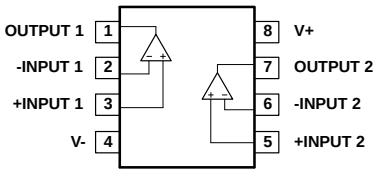
- AC amplifiers
- RC active filters
- Transducer amplifiers
- DC gain block
- Battery operation
- Instrumentation amplifiers

FEATURES

- Low input bias < ±20nA
- Low input offset current < ±20nA
- Low input offset voltage <1mV
- Low VOS temperature drift 5µV/°C
- Low input bias temperature drift 40pA/°C
- Low input voltage noise 30nV/√Hz
- Low supply current 1.5mA/amp
- High slew rate 1.0V/µs
- High CMRR 100dB

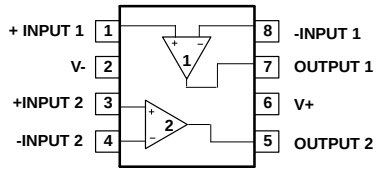
PIN CONFIGURATIONS

N Package



TOP VIEW

D Package[1]



TOP VIEW

NOTE:

1. The D package pinout is not functionally identical to the N pinout.

- High input impedance 100MΩ
- 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

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
8-Pin Plastic Small Outline (SO) Package	0 to 70°C	NE5512D	0174C
8-Pin Plastic Dual In-Line Package (DIP)	0 to 70°C	NE5512N	0404B
8-Pin Plastic Small Outline (SO) Package	-40 to +85°C	SA5512D	0174C
8-Pin Plastic Dual In-Line Package (DIP)	-40 to +85°C	SA5512N	0404B
8-Pin Plastic Dual In-Line Package (DIP)	-55 to +125°C	SE5512N	0404B

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]		
	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

NOTES:
1. The following derating factors should be applied above 25°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_A=+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 band-width	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	Over temp.	80	100		80	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

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

EQUIVALENT SCHEMATIC