

NE/SE5514 Quad High-Performance Operational Amplifier

Product Specification

Linear Products

DESCRIPTION

The NE/SE5514 family of quad operational amplifiers sets new standards in bipolar quad amplifier performance. The amplifiers feature low input bias current and low offset voltages. Pinout is identical to LM324/LM348 which facilitates direct product substitution for improved system performance. Output characteristics are similar to a $\mu A741$ with improved slew and drive capability.

FEATURES

- Low input bias current: $< \pm 3nA$
- Low input offset current: $< \pm 3nA$
- Low input offset voltage: $< 1mV$
- Low supply current: $1.5mA/A$
- $1V/\mu s$ slew rate
- High input impedance: $100M\Omega$
- High common-mode impedance: $10G\Omega$
- Internal compensation for unity gain
- 600Ω drive capability ($7V_{RMS}$)

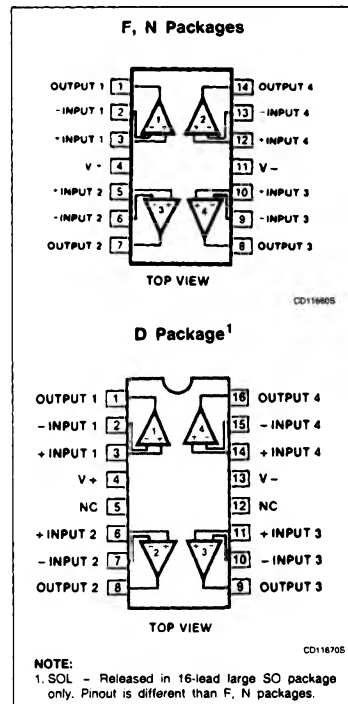
APPLICATIONS

- AC amplifiers
- RC active filters
- Transducer amplifiers
- DC gain block
- Instrumentation amplifier

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
16-Pin Plastic SOL package	0 to $+70^{\circ}C$	NE5514D
14-Pin Ceramic DIP	0 to $+70^{\circ}C$	NE5514F
14-Pin Plastic DIP	0 to $+70^{\circ}C$	NE5514N
14-Pin Ceramic DIP	$-55^{\circ}C$ to $+125^{\circ}C$	SE5514F
14-Pin Plastic DIP	$-55^{\circ}C$ to $+125^{\circ}C$	SE5514N

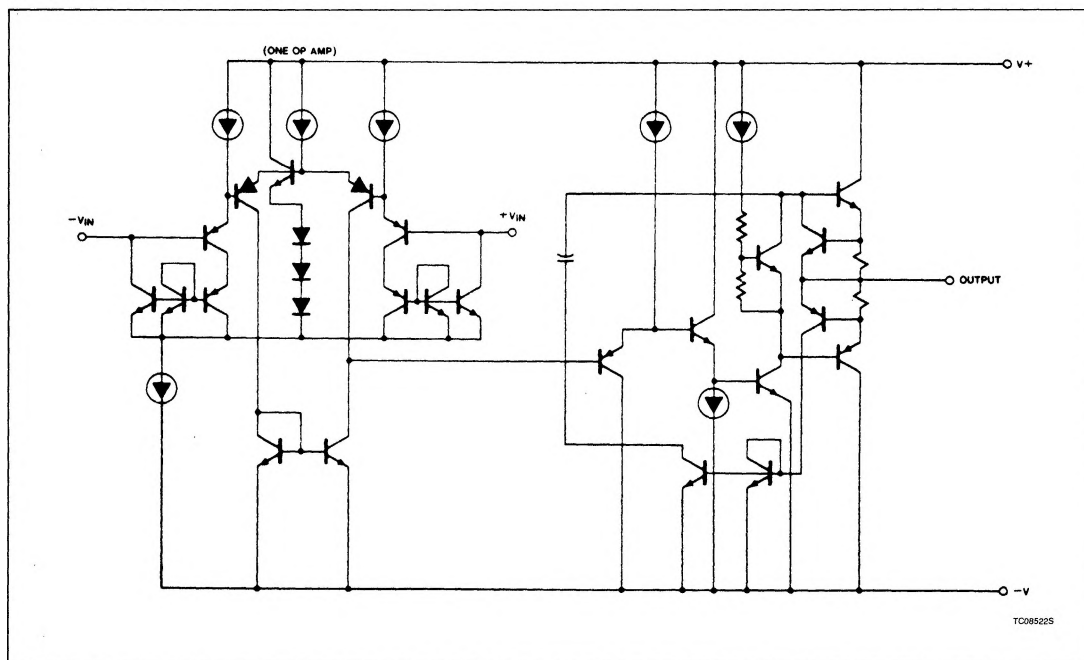
PIN CONFIGURATIONS



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EQUIVALENT SCHEMATIC



ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	± 16	V
V_{DIFF}	Differential input voltage	32	V
V_{IN}	Input voltage	0 to 32	V
	Output short to ground	Continuous	
T_{STG}	Storage temperature range	-65 to +150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	300	°C
T_A	Operating ambient temperature range	0 to 70	°C
	NE5514	-55 to +125	°C
	SE5514		
P_{MAX}	Maximum power dissipation $T_A = 25^\circ\text{C}$ (still-air) ¹		
	F package	1190	mW
	N package	1420	mW
	D package	1250	mW

NOTE:

1. The following derating factors should be applied above 25°C:

F package at 9.5mW/°C

N package at 11.4mW/°C

D package at 10.0mW/°C.

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ELECTRICAL CHARACTERISTICS $V_{CC} = \pm 15V$, $T_A = 25^\circ C$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	SE5514			NE5514			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS} ΔV_{OS}	Input offset voltage	$R_S = 100\Omega$, $T_A = +25^\circ C$, Over temp. Over temp.		0.7 1 4	2 3		1 1.5 5	5 6	mV $\mu V/^\circ C$
I_{OS} ΔI_{OS}	Input offset current	$R_S = 100k\Omega$, $T_A = +25^\circ C$, Over temp. Over temp.		3 4 30	10 20		6 8 40	20 30	nA $pA/^\circ C$
I_{BIAS} ΔI_{BIAS}	Input bias current	$R_S = 100k\Omega$, $T_A = +25^\circ C$, Over temp. Over temp.		3 4 30	10 20		6 8 40	20 30	nA $pA/^\circ C$
R_{IN}	Input resistance differential	$T_A = 25^\circ C$		100			100		M Ω
V_{CM}	Input common mode range	$T_A = 25^\circ C$, Over temp.	± 13.5 ± 13	± 13.7 ± 13.2		± 13.5 ± 13	± 13.7 ± 13.2		V
CMRR	Input common-mode rejection ratio	$V_{CC} = \pm 15V$, c, $V_{IN} = \pm 13.5V$ @ $T_A = 25^\circ C$, $V_{IN} = \pm 13V$ @ Over temp.	70	100		70	100		dB
A_V	Large-signal voltage gain	$R_L = 2k\Omega$, $T_A = 25^\circ C$, $V_C = \pm 10V$, Over temp.	50 25	200		50 25	200		V/mV
SR	Slew rate	$T_A = 25^\circ C$	0.6	1		0.6	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		Degr
V_{OUT}	Output voltage swing	$R_L = 2k\Omega$, $T_A = 25^\circ C$, Over temp.	± 13 ± 12.5	± 13.5 ± 13		± 13 ± 12.5	± 13.5 ± 13		V
V_{OUT}	Output voltage swing	$R_L = 600\Omega$, $T_A = 25^\circ C$, Over temp.	± 10 ± 7.5	± 11.5 ± 9		± 10 ± 8	± 11.5 ± 9		V
I_{CC}	Power supply current	$R_L = \text{Open}$, $T_A = 25^\circ C$, Over temp.		6 7	10 12		6 7	10 12	mA
PSRR	Power supply rejection ratio	Over temp.	80	110		80	110		dB
AA	Amplifier to amplifier coupling	$f = 1kHz$ to $20kHz$, $T_A = 25^\circ C$		-120			-120		dB
THD	Total harmonic distortion	$f = 10kHz$, $T_A = 25^\circ C$, $V_O = 7V_{RMS}$		0.01			0.01		%
V_{NOISE}	Input noise voltage	$f = 1kHz$, $T_A = 25^\circ C$		30			30		nV/ $\sqrt{Hz}$
I_{SC}	Short-circuit current	$T_A = 25^\circ C$	10	40	60	10	40	60	mA