Quad high-performance operational amplifier | NE/SE5514

PIN CONFIGURATIONS

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 in dual supply applications. Output characteristics are similar to a μA741 with improved slew and drive capability.

FEATURES

- Low input bias current: < ±3nA

- Low input offset current: < ±3nA

- Low input offset voltage:<1mV

- Low supply current: 1.5mA/A

- 1V/μs slew rate

- High input impedance: 100MΩ

- High common-mode impedance: 10GΩ

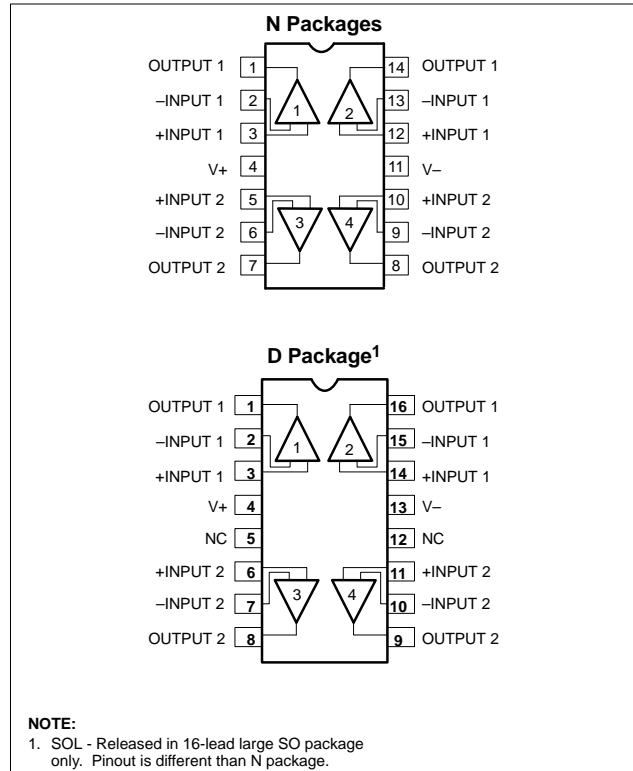- Internal compensation for unity gain

- 600Ω drive capability (7V$_{RMS}$)

APPLICATIONS

- AC amplifiers

- RC active filters

- Transducer amplifiers

- DC gain block

- Instrumentation amplifier

N Packages

Pin		Pin
OUTPUT 1	1	14 OUTPUT 1
−INPUT 1	2	13 −INPUT 1
+INPUT 1	3	12 +INPUT 1
V+	4	11 V−
+INPUT 2	5	10 +INPUT 2
−INPUT 2	6	9 −INPUT 2
OUTPUT 2	7	8 OUTPUT 2

D Package[1]

Pin		Pin
OUTPUT 1	1	16 OUTPUT 1
−INPUT 1	2	15 −INPUT 1
+INPUT 1	3	14 +INPUT 1
V+	4	13 V−
NC	5	12 NC
+INPUT 2	6	11 +INPUT 2
−INPUT 2	7	10 −INPUT 2
OUTPUT 2	8	9 OUTPUT 2

NOTE:
1. SOL - Released in 16-lead large SO package only. Pinout is different than N package.

ORDERING INFORMATION

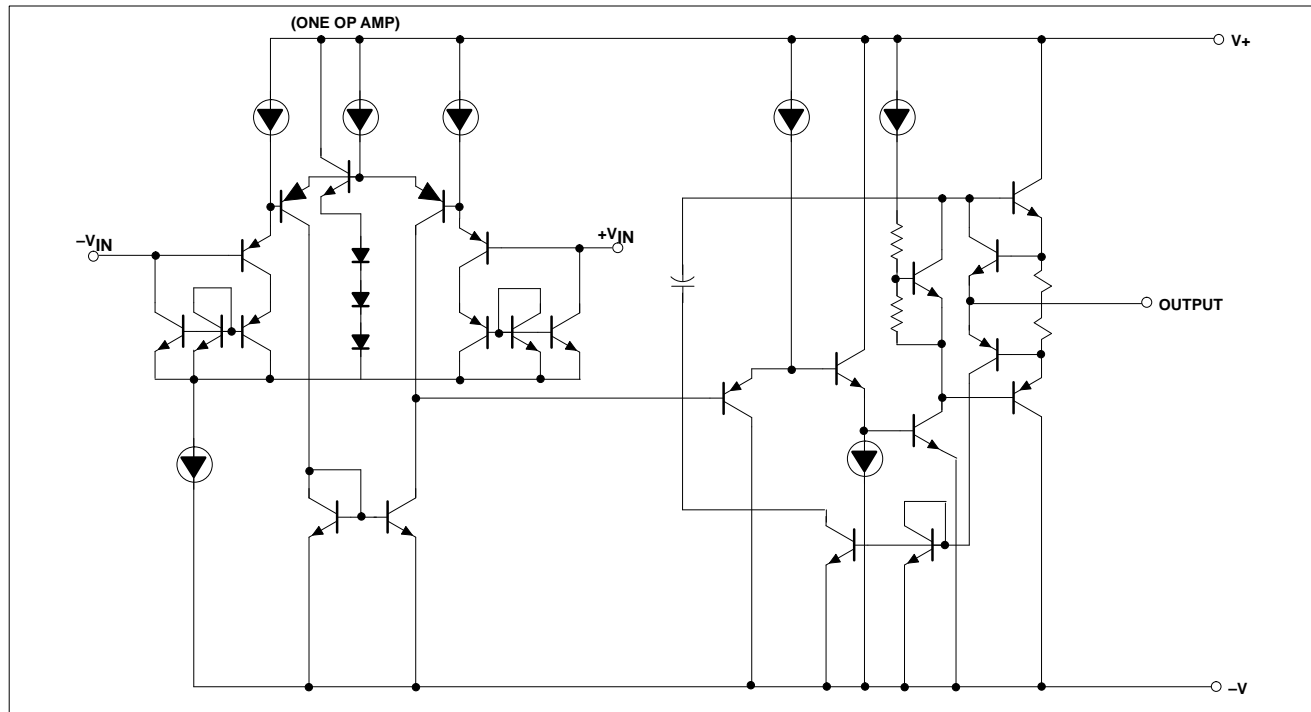| DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
16-Pin Plastic Small Outline Large (SOL) package	0 to +70°C	NE5514D	0171B
14-Pin Plastic Dual In-Line Package (DIP)	0 to +70°C	NE5514N	0405B
14-Pin Plastic Dual In-Line Package (DIP)	-55 to +125°C	SE5514N	0405B

Quad high-performance operational amplifier

NE/SE5514

EQUIVALENT SCHEMATIC

(ONE OP AMP)

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		
	NE5514	0 to 70	°C
	SE5514	-55 to +125	°C
P_{MAX}	Maximum power dissipation		
	T_A=25°C (still-air)[1]		
	N package	1420	mW
	D package	1250	mW

NOTES:

1. The following derating factors should be applied above 25°C
    N package at 11.4mW/°C
    D package at 10.0mW/°C

Quad high-performance operational amplifier

NE/SE5514

ELECTRICAL CHARACTERISTICS

$V_{CC} = \pm15V$, $T_A = 25°C$ unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	SE5514			NE5514			UNIT
			Min	Typ	Max	Min	Typ	Max	
V_{OS}	Input offset voltage	$R_S=100\Omega$, $T_A=+25°C$ Over temp.		0.7 1	2 3		1 1.5	5 6	mV
ΔV_{OS}		Over temp.		4			5		$\mu V/°C$
I_{OS}	Input offset current	$R_S=100k\Omega$, $T_A=+25°C$ Over temp.		3 4	10 20		6 8	20 30	nA
ΔI_{OS}		Over temp.		30			40		$pA/°C$
I_{BIAS}	Input bias current	$R_S=100k\Omega$, $T_A=+25°C$ Over temp.		3 4	10 20		6 8	20 30	nA
ΔI_{BIAS}		Over temp.		30			40		$pA/°C$
R_{IN}	Input resistance differential	$T_A=25°C$		100			100		$M\Omega$
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	$V_{CC}=\pm15V$, $V_{IN}=\pm13.5V$ @ $T_A=25°C$ $V_{IN}=\pm13V$ @ Over temp.	70	100		70	100		dB
A_V	Large-signal voltage gain	$R_L=2k\Omega$, $T_A=25°C$ $V_O = \pm10V$, Over temp.	50 25	200		50 25	200		V/mV
SR	Slew rate	$T_A=25°C$	0.6	1		0.6	1		$V/\mu s$
GBW	Small-signal unity gain band-width	$T_A=25°C$		3			3		MHz
θ_M	Phase margin	$T_A=25°C$		45			45		Deg
V_{OUT}	Output voltage swing	$R_L=2k\Omega$, $T_A=25°C$ Over temp.	±13 ±12.5	±13.5 ±13		±13 ±12.5	±13.5 ±13		V
V_{OUT}	Output voltage swing	$R_L=600\Omega$[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.		6 7	10 12		6 7	10 12	mA
PSRR	Power supply rejection ratio	$\pm5V \leq V_{CC} \leq \pm15V$ Over temp.	80	110		80	110		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		$nV/\sqrt{Hz}$
I_{SC}	Short-circuit current	$T_A=25°C$	10	40	60	10	40	60	mA

NOTES:
1. Not to exceed maximum power dissipation.