

NE542

Dual Low-Noise Preamplifier

Product Specification

DESCRIPTION

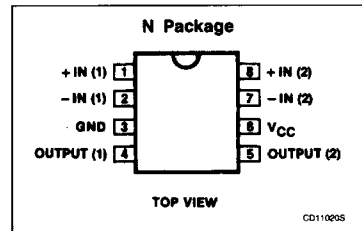
The NE542 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with individual internal power supply decoupler-regulator, providing 110dB supply rejection and 70dB channel separation. Other outstanding features include high gain (104dB), large output voltage swing ($V_{CC}-2V_{P-P}$), and internal compensation to 10dB. The NE542 operates from a single supply across a range of 9 to 24V.

The NE542 is ideal for use in stereo phono, tape, or microphone preamps and other applications requiring low noise amplification of small signals.

FEATURES

- Low noise — $0.7\mu V$ total input noise
- High gain — 104dB open-loop
- Single supply operation
- Wide supply range 9 to 24V
- Power supply rejection 110dB
- Large output voltage swing ($V_{CC}-2V_{P-P}$)
- Wide bandwidth 15MHz unity gain
- Power bandwidth 100kHz ($15V_{P-P}$)
- Internally-compensated (stable at 10dB)
- Short-circuit protected
- High slew rate $5V/\mu s$

PIN CONFIGURATION



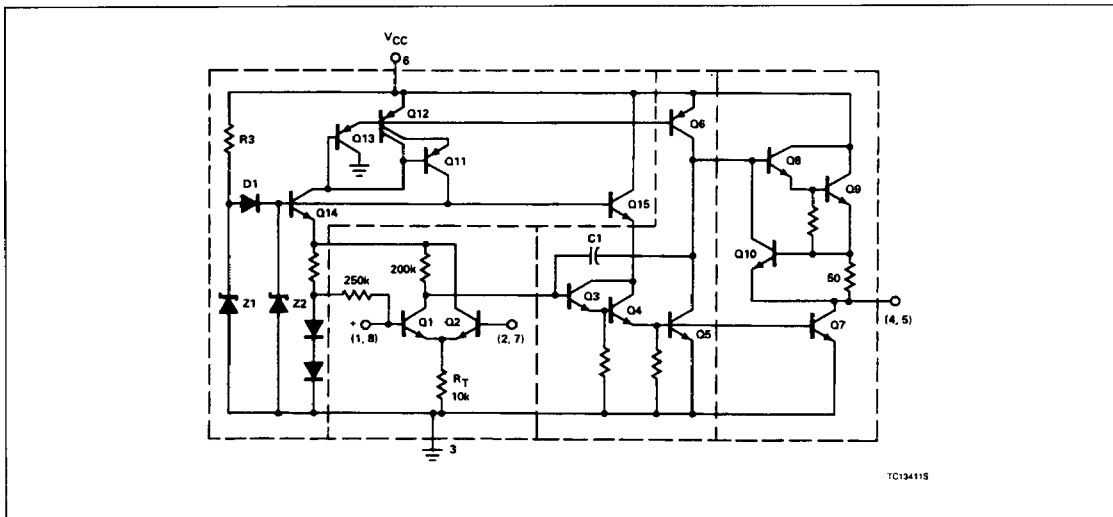
APPLICATIONS

- Tape preamplifier
- Phono preamplifier
- Microphone preamplifier

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
8-Pin Plastic DIP	0 to $+70^{\circ}C$	NE542N

EQUIVALENT CIRCUIT



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ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	+24	V
P_D	Power dissipation	500	mW
T_A	Operating ambient temperature range	0 to +70	°C
T_{STG}	Storage temperature range	-65 to +150	°C
T_{SOLD}	Lead soldering temperature (10sec max)	+300	= dc

DC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$; $V_{CC} = 14\text{V}$, unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{CC}	Supply voltage		9		24	V
I_{CC}	Supply current	$V_{CC} = 9 \text{ to } 18\text{V}$, $R_L = \infty$		9	15	mA
R_{IN}	Input resistance Positive input Negative input			100 200		k Ω k Ω
R_{OUT}	Output resistance	Open-loop		150		Ω

AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$; $V_{CC} = 14\text{V}$, unless otherwise specified.

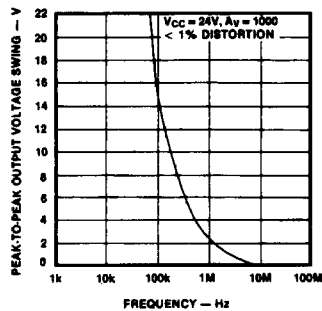
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
A_V	Voltage gain	Open-loop		160,000		V/V
I_{IN}	Negative Input current				0.5	
I_{OUT}	Output current	Source Sink (linear operation)	8 2	14 3		mA mA
V_{OUT}	Output voltage swing		$V_{CC} - 2.5$	$V_{CC} - 2$		V
SR	Small signal bandwidth Slew rate			15 5		MHz V/ μs
P_{BW}	Power bandwidth	15V _{P,P}		100		kHz
V_{IN}	Maximum input voltage	Linear operation, < 2.5% distortion			300	mV _{RMS}
$PSRR$	Power supply rejection ratio	$f = 60, 120\text{Hz}$ $f = 1\text{kHz}$		100 110		dB dB
	Channel separation	$f = 1\text{kHz}$	40	70		dB
THD	Total harmonic distortion	40dB gain, $f = 1\text{kHz}$		0.1	0.3	%
	Total equivalent input noise	$R_S = 600\Omega$, 10 – 10,000Hz		0.7	1.2	μV_{RMS}
	Noise figure	$R_S = 50\text{k}\Omega$, 10 – 10,000Hz		1.2		dB
		$R_S = 20\text{k}\Omega$, 10 – 10,000Hz		1.2		dB
		$R_S = 10\text{k}\Omega$, 10 – 10,000Hz		1.5		dB
		$R_S = 5\text{k}\Omega$, 10 – 10,000Hz		2.4		dB

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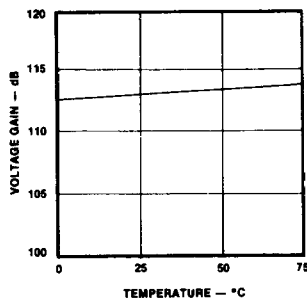
TYPICAL PERFORMANCE CHARACTERISTICS

Large-Signal Frequency Response

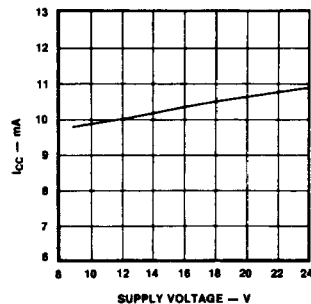


OP09952S

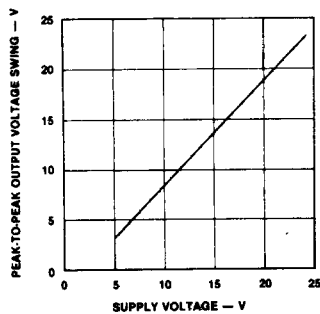
Gain vs Temperature



OP09950S

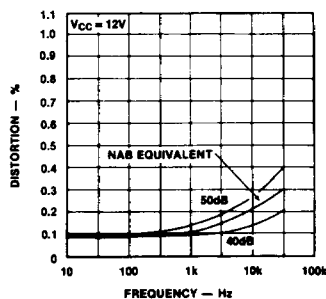
 V_{CC} vs I_{CC} 

OP09970S

Peak-to-Peak Output Voltage Swing vs V_{CC} 

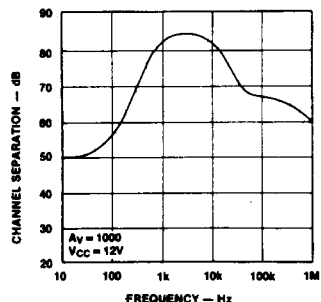
OP09980S

% Distortion



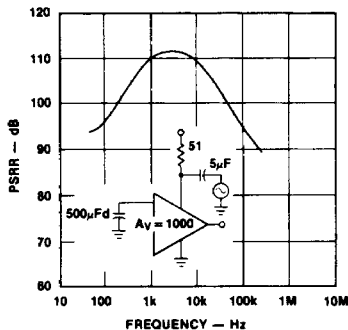
OP09990S

Channel Separation



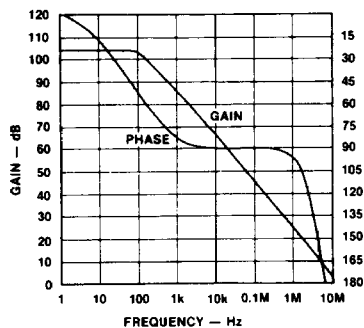
OP10000S

PSRR vs Frequency



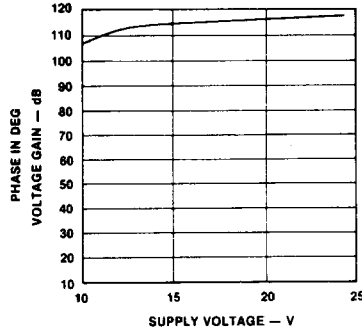
OP10010S

Gain and Phase Response



OP10020S

Voltage Gain vs Supply Voltage

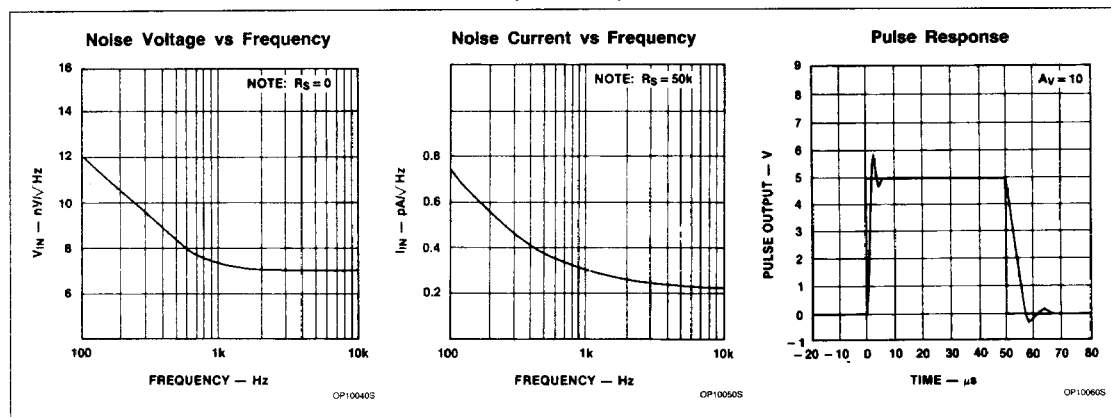


OP10030S

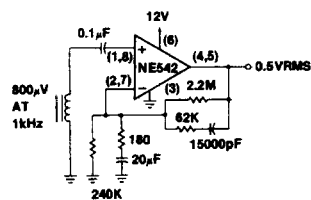
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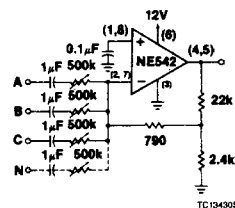
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



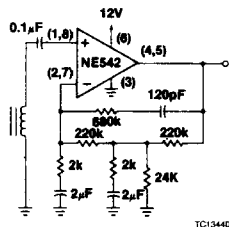
TYPICAL APPLICATIONS



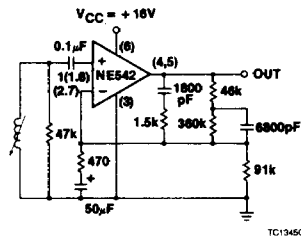
Typical Tape Playback Amplifier



Audio Mixer



Two-Pole Fast Turn-On NAB Tape Preamp



RIAA Magnetic Phono Preamp

NOTE:

All resistor values are typical and in ohms.