DUAL LOW-NOISE PREAMP — NE542

DESCRIPTION

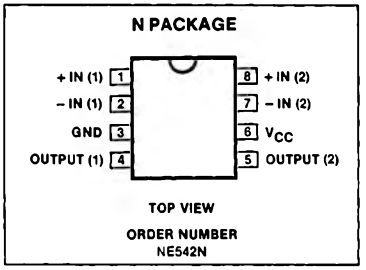
The NE542 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with individual internal power supply decoupler-regulator, providing 110dB supply rejection and 70dB channel separation.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

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

FEATURES

- **Low noise—.7μV 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/μs**

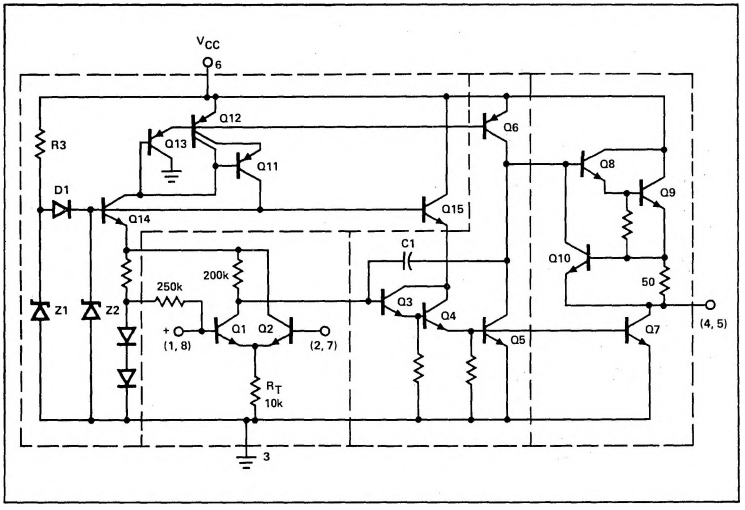
PIN CONFIGURATION



ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage	+24	V
Power dissipation	500	mW
Operating temperature range	0 to +70	°C
Storage temperature range	-65 to +150	°C
Lead temperature (soldering, 60sec)	+300	°C

EQUIVALENT CIRCUIT



DC ELECTRICAL CHARACTERISTICS

$T_A = 25°C$, $V_{CC} = 14V$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	NE542			UNIT
		Min	Typ	Max	
Supply voltage		9		24	V
Supply current	V_{CC} = 9 to 18V, $R_L = \infty$		9	15	mA
Input resistance					
Positive input			100		kΩ
Negative input			200		kΩ
Output resistance	Open loop		150		Ω

DUAL LOW-NOISE PREAMP — NE542

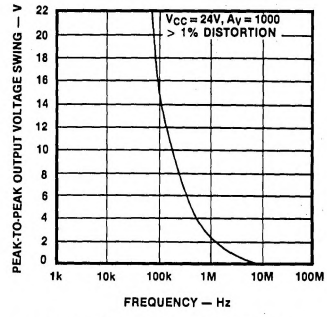
AC ELECTRICAL CHARACTERISTICS

T_A = 25°C, V_{CC} = 14V unless otherwise specified.

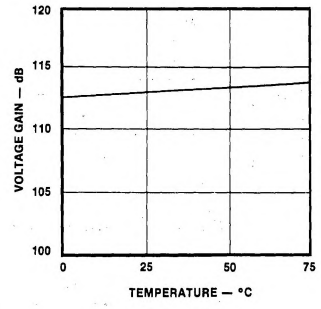
PARAMETER	TEST CONDITIONS	NE542			UNIT
		Min	Typ	Max	
Voltage gain	Open loop		160,000		V/V
Input current Negative input			 .5		 μA
Output current	Source Sink (linear operation)	8 2	14 3		mA mA
Output voltage swing Small signal bandwidth Slew rate Power bandwidth	 15V p-p	V_{CC} -2.5	V_{CC} -2 15 5 100		V MHz V/μs kHz
Maximum input voltage	Linear operation, <2.5% distortion			300	mVrms
Supply rejection ratio Channel separation	f = 60, 120Hz f = 1kHz f = 1kHz	 40	100 110 70		dB dB dB
Total harmonic distortion Total equivalent input Noise	40 dB gain, f = 1kHz RS = 600Ω, 100 - 10,000Hz		.1 .7	.3 1.2	% μVrms
Noise figure	RS = 50kΩ, 10 - 10,000Hz RS = 20kΩ, 10 10,000Hz RS = 10kΩ, 10 - 10,000Hz RS = 5kΩ, 10 - 10,000Hz		1.2 1.2 1.5 2.4		dB dB dB dB

TYPICAL PERFORMANCE CHARACTERISTICS

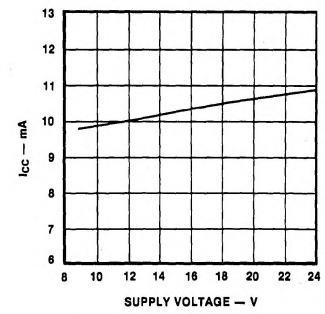
LARGE SIGNAL FREQUENCY RESPONSE



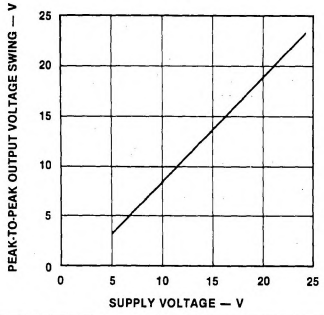
GAIN vs TEMPERATURE



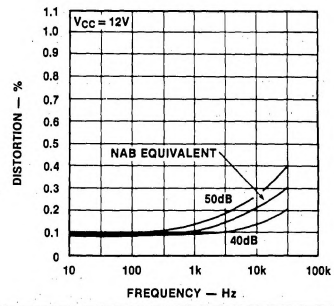
V_{CC} vs I_{CC}



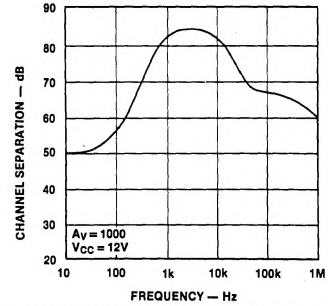
P-P OUTPUT VOLTAGE SWING vs V_{CC}



% DISTORTION



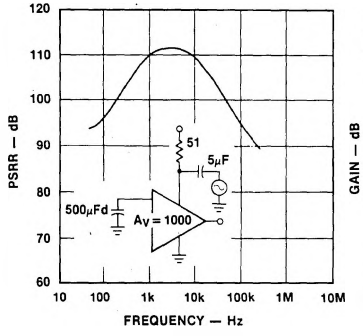
CHANNEL SEPARATION



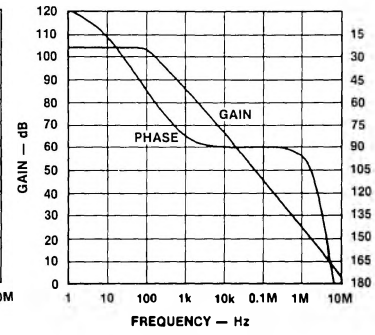
DUAL LOW-NOISE PREAMP NE542

TYPICAL PERFORMANCE CHARACTERISTICS (Cont'd)

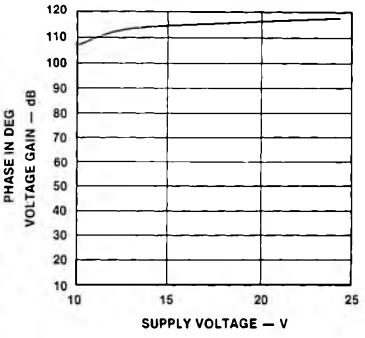
PSRR vs FREQUENCY



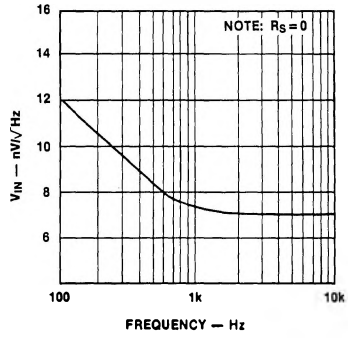
GAIN AND PHASE RESPONSE



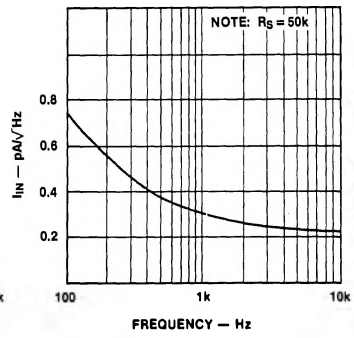
VOLTAGE GAIN vs SUPPLY VOLTAGE



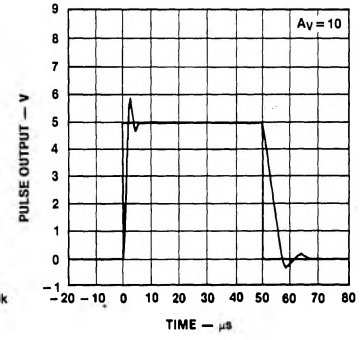
NOISE VOLTAGE vs FREQUENCY



NOISE CURRENT vs FREQUENCY

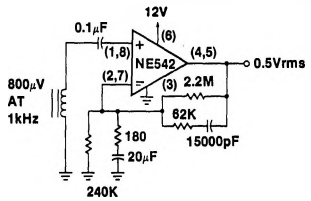


PULSE RESPONSE

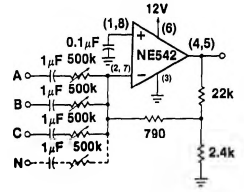


TYPICAL APPLICATIONS

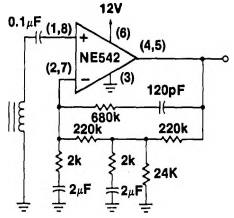
TYPICAL TAPE PLAYBACK AMPLIFIER



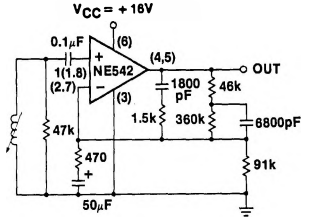
AUDIO MIXER



TWO-POLE FAST TURN-ON NAB TAPE PREAMP



RIAA MAGNETIC PHONO PREAMP



NOTE: All resistors values are typical and in ohms.

*For additional information, consult the Applications Section.