ISI IDEAL SEMICONDUCTOR INC.

"Your Best Defense Against Obsolescence"

NE542
Dual Low-Noise Preamplifier

Product Specification

Linear Products

DESCRIPTION

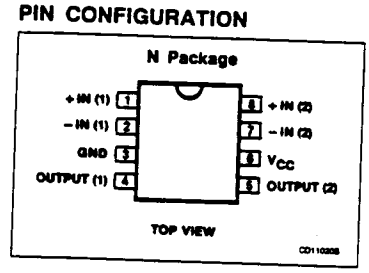
The NE542 is a dual preamplifier for the amplification of low level signals in applications requiring optimum noise performance. Each of the two amplifiers is completely independent, with individual internal power supply decoupler-regulator, providing 110dB supply rejection and 70dB channel separation. 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 — 0.7μV 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



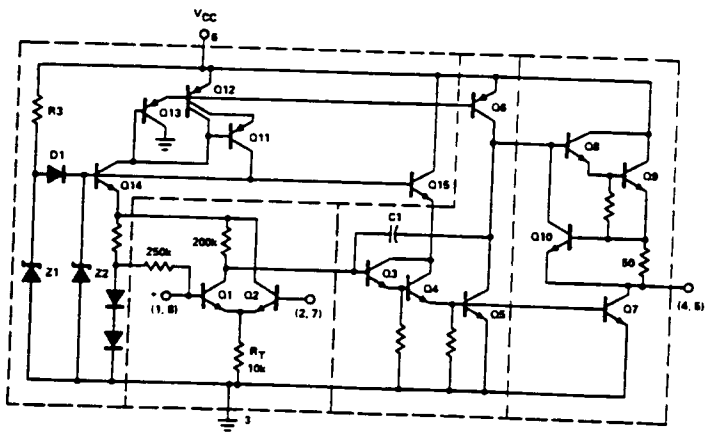
APPLICATIONS

- **Tape preamplifier**
- **Phono preamplifier**
- **Microphone preamplifier**

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE
8-Pin Plastic DIP	0 to +70°C	NE542N

EQUIVALENT CIRCUIT



46721 Fremont Blvd. • Fremont, California 94538 • Telephone: (510) 226-7000 • Fax: (510) 226-1564

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

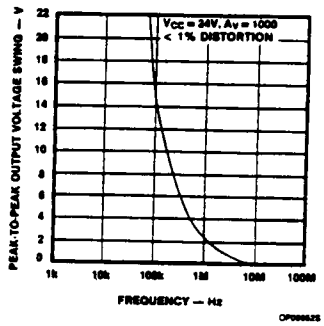
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
V_{CC}	Supply voltage		9		24	V
I_{CC}	Supply current	V_{CC} = 9 to 18V, R_L = ∞		9	15	mA
R_{IN}	Input resistance Positive input Negative input			100 200		kΩ kΩ
R_{OUT}	Output resistance	Open-loop		150		Ω

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

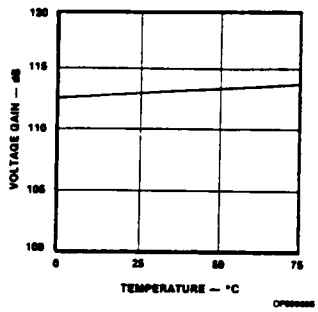
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
A_V	Voltage gain	Open-loop		160,000		V/V
I_{IN}	Negative input current				0.5	
I_{OUT}	Output current	Source Sink (linear operation)	8 2	14 3		mA mA
V_{OUT}	Output voltage swing		V_{CC} −2.5	V_{CC} −2		V
SR	Small signal bandwidth Slew rate			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, 120Hz f = 1kHz		100 110		dB dB
	Channel separation	f = 1kHz	40	70		dB
THD	Total harmonic distortion	40dB gain, f = 1kHz		0.1	0.3	%
	Total equivalent input noise	R_S = 600Ω, 100 – 10,000Hz		0.7	1.2	μV_{RMS}
	Noise figure	R_S = 50kΩ, 10 – 10,000Hz R_S = 20kΩ, 10 – 10,000Hz R_S = 10kΩ, 10 – 10,000Hz R_S = 5kΩ, 10 – 10,000Hz		1.2 1.2 1.5 2.4		dB dB dB dB

TYPICAL PERFORMANCE CHARACTERISTICS

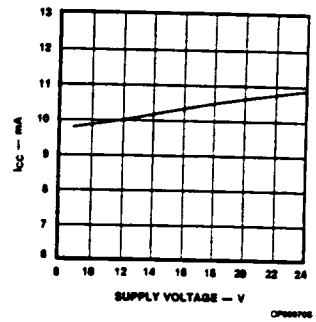
Large-Signal Frequency Response



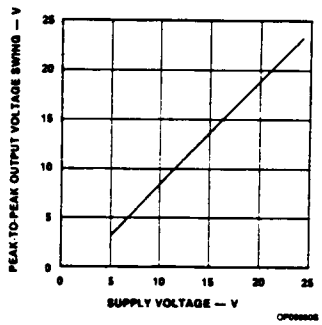
Gain vs Temperature



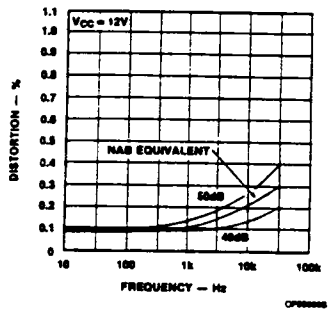
VCC vs ICC



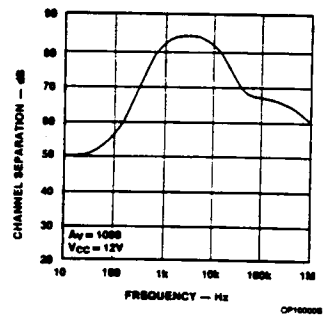
Peak-to-Peak Output Voltage Swing vs VCC



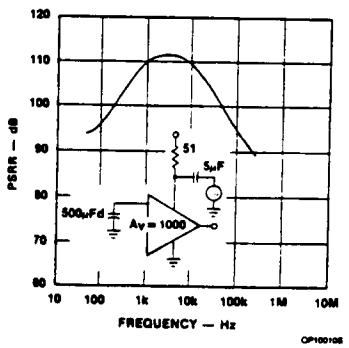
% Distortion



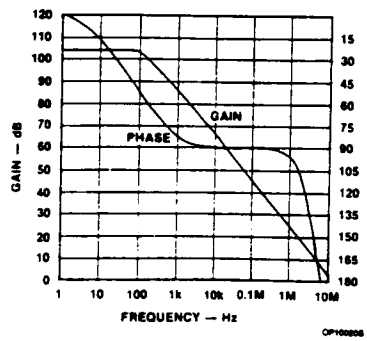
Channel Separation



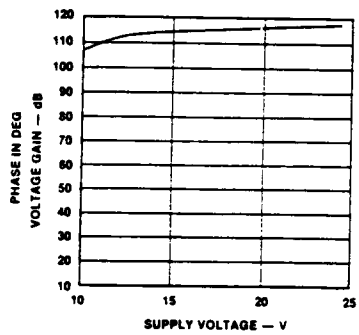
PSRR vs Frequency



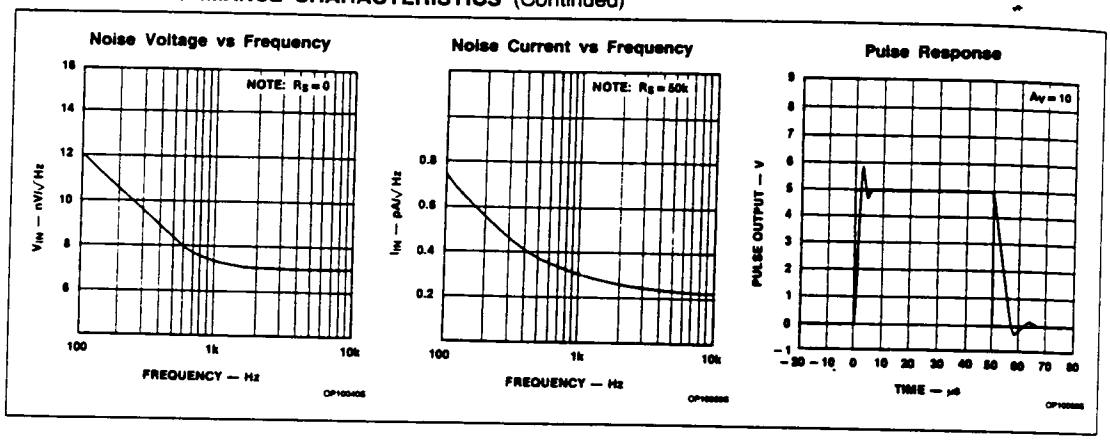
Gain and Phase Response



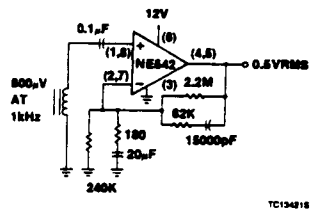
Voltage Gain vs Supply Voltage



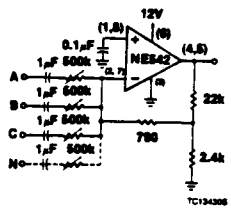
TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



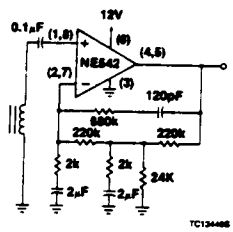
TYPICAL APPLICATIONS



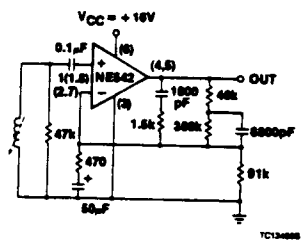
Typical Tape Playback Amplifier



Audio Mixer



Two-Pole Fast Turn-On NAB Tape Preamp



RIAA Magnetic Phono Preamp

NOTE:
All resistor values are typical and in ohms.