

## NH0002/NH0002C current amplifier

### general description

The NH0002/NH0002C is a general purpose thick film hybrid current amplifier that is built on a single substrate. The circuit features:

- High Input Impedance 400 k $\Omega$
- Low Output Impedance 6 $\Omega$
- High Power Efficiency
- Low Harmonic Distortion
- DC to 30 MHz Bandwidth
- Output Voltage Swing that Approaches Supply Voltage
- 400 mA Pulsed Output Current
- Slew rate is typically 200V/ $\mu$ s
- Operation from  $\pm 5$ V to  $\pm 20$ V

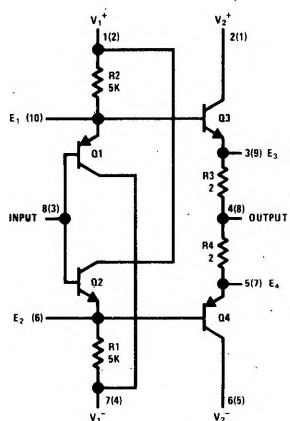
These features make it ideal to integrate with an operational amplifier inside a closed loop configuration to increase current output. The symmetrical output portion of the circuit also provides a low output impedance for both the positive and negative slopes of output pulses.

The NH0002 is available in an 8-lead low-profile TO-5 header; the NH0002C is also available in an 8-lead TO-5, and a 10-pin molded dual-in-line package.

### applications

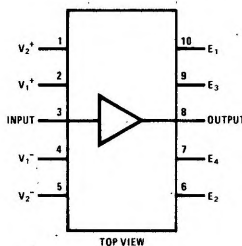
- Line driver
- 30 MHz buffer
- High speed D/A conversion
- Instrumentation buffer
- Precision current source

### schematic and connection diagrams

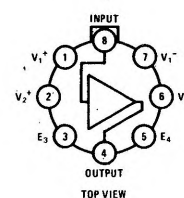


Pin numbers in parentheses denote pin connections for dual in-line package.

Dual-In-Line Package

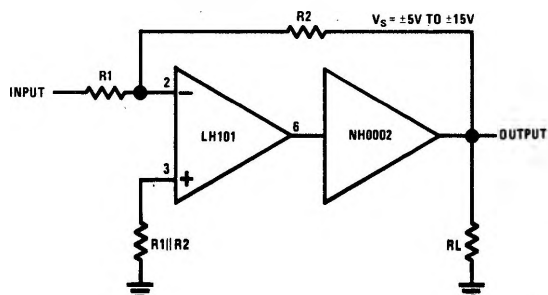


Metal Can Package

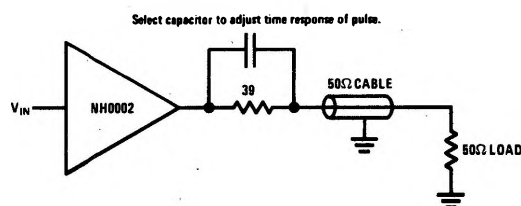


### typical applications

#### High Current Operational Amplifier



#### Line Driver



**absolute maximum ratings**

|                                               |                             |
|-----------------------------------------------|-----------------------------|
| Supply Voltage                                | ±22V                        |
| Power Dissipation Ambient                     | 600 mW                      |
| Input Voltage (Equal to Power Supply Voltage) |                             |
| Storage Temperature Range                     | –65°C to +150°C             |
| Operating Temperature Range                   | NH0002      –55°C to +125°C |
|                                               | NH0002C      0°C to +85°C   |
| Steady State Output Current                   | ±100 mA                     |
| Pulsed Output Current (50 ms On/1 sec Off)    | ±400 mA                     |

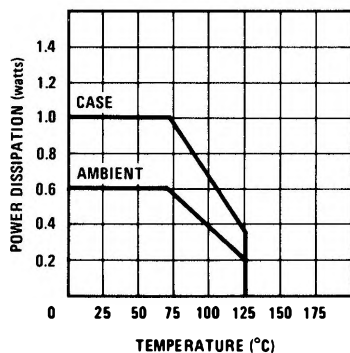
**electrical characteristics** (Note 1)

| PARAMETERS               | CONDITIONS                                                                                                                                                       | MIN | TYP  | MAX   | UNITS         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|------|-------|---------------|
| Voltage Gain             | $R_S = 10\text{ k}\Omega$ , $R_L = 1.0\text{ k}\Omega$<br>$V_{IN} = 3.0\text{ V}_{PP}$ , $f = 1.0\text{ kHz}$<br>$T_A = -55^\circ\text{C to } 125^\circ\text{C}$ | .95 | .97  |       |               |
| AC Current Gain          | $V_{IN} = 1.0\text{ V}_{rms}$<br>$f = 1.0\text{ kHz}$                                                                                                            |     | 40   |       | A/mA          |
| Input Impedance          | $R_S = 200\text{ k}\Omega$ , $V_{IN} = 1.0\text{ V}_{rms}$ ,<br>$f = 1.0\text{ kHz}$ , $R_L = 1.0\text{ k}\Omega$                                                | 180 | 400  | —     | k $\Omega$    |
| Output Impedance         | $V_{IN} = 1.0\text{ V}_{rms}$ , $f = 1.0\text{ kHz}$<br>$R_L = 50\Omega$ , $R_S = 10\text{ k}\Omega$                                                             | —   | 6    | 10    | $\Omega$      |
| Output Voltage Swing     | $R_L = 1.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$                                                                                                                | ±10 | ±11  | —     | V             |
| DC Output Offset Voltage | $R_S = 300\Omega$ , $R_L = 1.0\text{ k}\Omega$<br>$T_A = -55^\circ\text{C to } 125^\circ\text{C}$                                                                | —   | ±10  | ±30   | mV            |
| DC Input Offset Current  | $R_S = 10\text{ k}\Omega$ , $R_L = 1.0\text{ k}\Omega$<br>$T_A = -55^\circ\text{C to } 125^\circ\text{C}$                                                        | —   | ±6.0 | ±10   | $\mu\text{A}$ |
| Harmonic Distortion      | $V_{IN} = 5.0\text{ V}_{rms}$ , $f = 1.0\text{ kHz}$                                                                                                             | —   | 0.1  | —     | %             |
| Bandwidth                | $V_{IN} = 1.0\text{ V}_{rms}$ , $R_L = 50\Omega$ ,<br>$f = 1\text{ MHz}$                                                                                         | 30  | 50   | —     | MHz           |
| Positive Supply Current  | $R_S = 10\text{ k}\Omega$ , $R_L = 1\text{ k}\Omega$                                                                                                             | —   | +6.0 | +10.0 | mA            |
| Negative Supply Current  | $R_S = 10\text{ k}\Omega$ , $R_L = 1\text{ k}\Omega$                                                                                                             | —   | –6.0 | –10.0 | mA            |

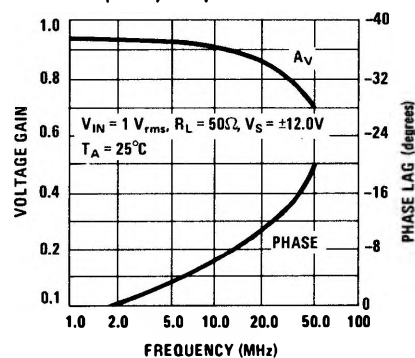
**Note 1:** Specification applies for  $T_A = 25^\circ\text{C}$  with +12V on Pins 1 and 2; –12V on Pins 6 and 7 for the metal can package and +12V on Pins 1 and 2; –12V on Pins 4 and 5 for the dual-in-line package unless otherwise specified. The parameter guarantees for NH0002C apply over the temperature range of 0°C to +85°C, while parameters for the NH0002 are guaranteed over the temperature range –55°C to 125°C.

## typical performance

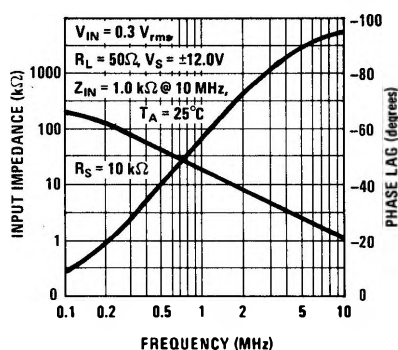
Maximum Power Dissipation



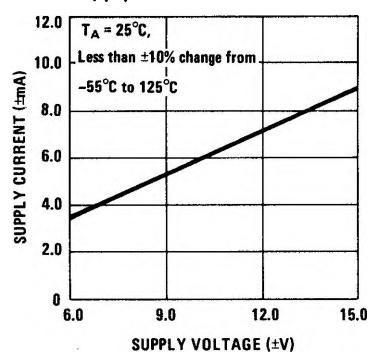
Frequency Response



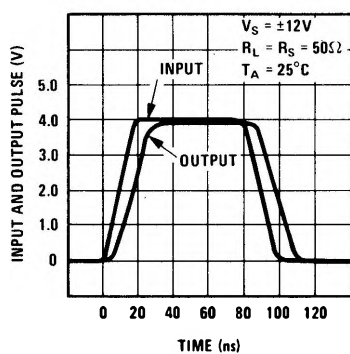
Input Impedance (Magnitude &amp; Phase)



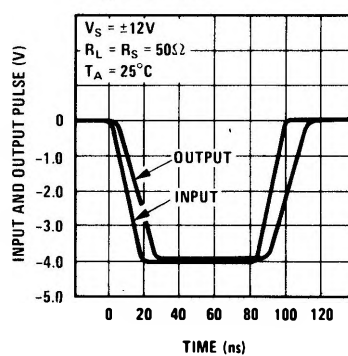
Supply Current



Positive Pulse



Negative Pulse



Input Offset Current

