

LH0002/LH0002C Current Amplifier

General Description

The LH0002/LH0002C is a general purpose current amplifier.

Features

- High input impedance 400 k Ω
- Low output impedance 6 Ω
- 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 200 V/ μ s
- Operation from ± 5 V to ± 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 cir-

cuit also provides a low output impedance for both the positive and negative slopes of output pulses.

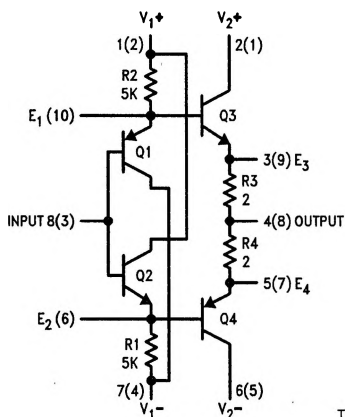
The LH0002 is available in an 8-lead low-profile TO-5 header and a 20-pin leadless chip carrier; the LH0002C is also available in an 8-lead TO-5, and a 10-pin molded dual-in-line package.

The LH0002 is specified for operation over the -55°C to $+125^{\circ}\text{C}$ military temperature range. The LH0002C is specified for operation over the 0°C to $+85^{\circ}\text{C}$ temperature range.

Applications

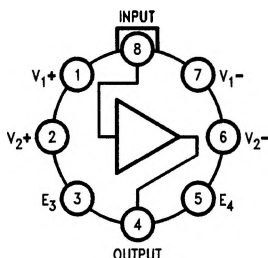
- Line driver
- 30 MHz buffer
- High speed D/A conversion
- Instrumentation buffer
- Precision current source

Schematic and Connection Diagrams



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

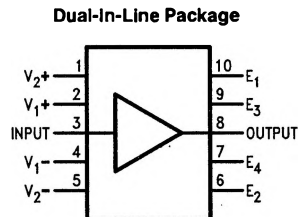
Metal Can Package



Order Number LH0002H or LH0002CH
See NS Package Number H08D

TL/H/5560-1

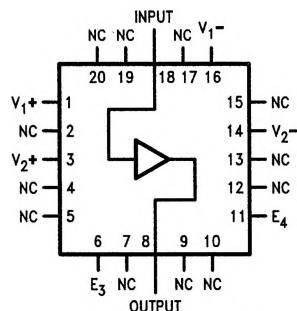
TL/H/5560-3



TL/H/5560-2

Order Number LH0002CN
See NS Package Number N10A

Leadless Chip Carrier



TL/H/5560-6

Order Number LH0002E
See NS Package Number E20A

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

(Note 2)

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	
LH0002	−55°C to +125°C
LH0002C	0°C to +85°C

Steady State Output Current	±100 mA
Pulsed Output Current (50 ms On/1 sec. Off)	±400 mA
Lead Temperature Soldering (10 seconds)	
Metal Can	300°C
Plastic	260°C
ESD rating to be determined.	

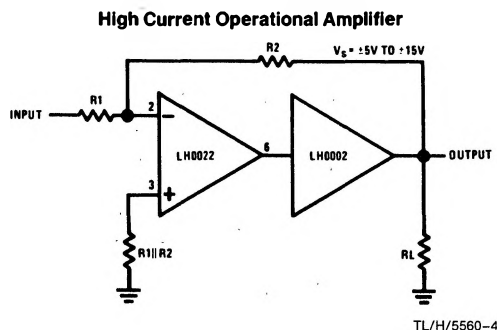
Electrical Characteristics (Note 1)

Parameter	Conditions	Min	Typ	Max	Units
Voltage Gain	$R_S = 10 \text{ k}\Omega$, $R_L = 1.0 \text{ k}\Omega$, $V_{IN} = \pm 10 \text{V}$	0.95	0.97		
AC Current Gain	$V_{IN} = 1.0 \text{ Vrms}$, $f = 1.0 \text{ kHz}$		40		A/mA
Input Impedance	$R_S = 200 \text{ k}\Omega$, $V_{IN} = \pm 1.0 \text{V}$, $R_L = 1.0 \text{ k}\Omega$	180	400		k Ω
Output Impedance	$V_{IN} = \pm 1.0 \text{V}$, $R_L = 50 \Omega$, $R_S = 10 \text{ k}\Omega$		6.0	10	Ω
Output Voltage Swing	$R_L = 1.0 \text{ k}\Omega$, $V_{IN} = \pm 12 \text{V}$	±10	±11		V
Output Voltage Swing	$V_S = \pm 15 \text{V}$, $V_{IN} = \pm 12 \text{V}$, $R_S = 50 \Omega$, $R_L = 100 \Omega$, $T_A = 25^\circ \text{C}$	±10			V
DC Output Offset Voltage	$R_S = 300 \Omega$, $R_L = 1.0 \text{ k}\Omega$		±10	±30	mV
DC Input Offset Current	$R_S = 10 \text{ k}\Omega$, $R_L = 1.0 \text{ k}\Omega$		±6.0	±10	μA
Harmonic Distortion	$V_{IN} = 5.0 \text{ Vrms}$, $f = 1.0 \text{ kHz}$		0.1		%
Rise Time	$R_L = 50 \Omega$, $\Delta V_{IN} = 100 \text{ mV}$		7.0	12	ns
Positive Supply Current	$R_S = 10 \text{ k}\Omega$, $R_L = 1.0 \text{ k}\Omega$		+6.0	+10	mA
Negative Supply Current	$R_S = 10 \text{ k}\Omega$, $R_L = 1.0 \text{ k}\Omega$		−6.0	−10	mA

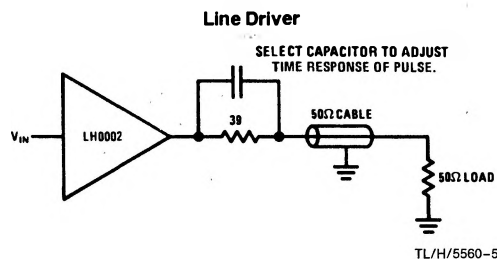
Note 1: Specification applies for $T_A = 25^\circ \text{C}$ with +12V on Pins 1 and 2; −12V on Pins 6 and 7 for the metal can package and +12V on Pins 1 and 2; −12V on Pins 4 and 5 for the dual-in-line package unless otherwise specified. The parameter guarantees for LH0002C apply over the temperature range of 0°C to +85°C, while parameters for the LH0002 are guaranteed over the temperature range −55°C to +125°C unless otherwise specified.

Note 2: Refer to RETS0002X for LH0002 military specifications.

Typical Applications

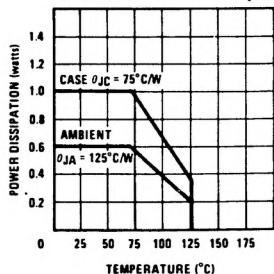


*Previously called NH0002/NH0002C

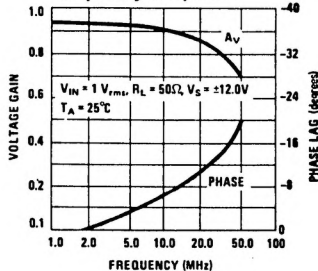


Typical Performance Characteristics

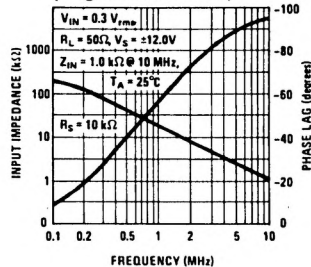
Maximum Power Dissipation



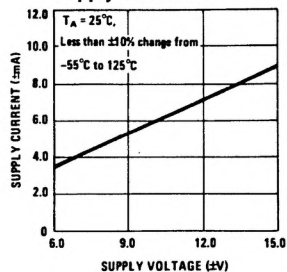
Frequency Response



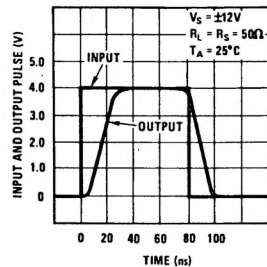
Input Impedance (Magnitude & Phase)



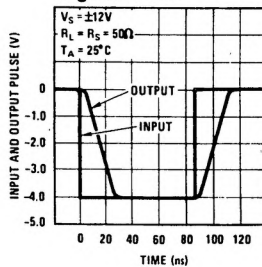
Supply Current



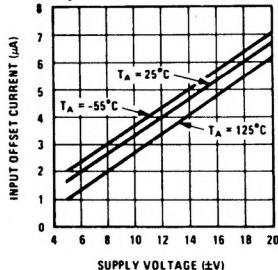
Positive Pulse



Negative Pulse



Input Offset Current



TL/H/5560-7