National Semiconductor Corporation

LH0002/LH0002C Current Amplifier

General Description

The LH0002/LH0002C is a general purpose current amplifier.

Features

- High input impedance 400 kΩ
- Low output impedance 6Ω
- 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/μs
- Operation from ±5V to ±20V

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.

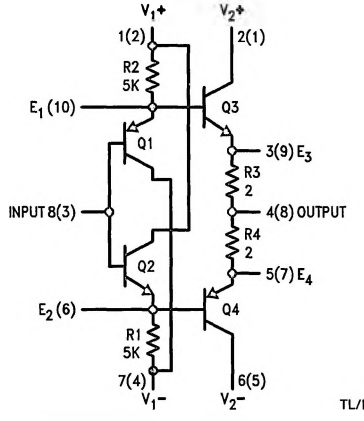
The LH0002 is available in an 8-lead low-profile TO-5 header and a 20-pin leadless chip carrier; the LH0002C is also available in an 8-lead TO-5, and a 10-pin molded dual-in-line package.

The LH0002 is specified for operation over the −55°C to +125°C military temperature range. The LH0002C is specified for operation over the 0°C to +85°C temperature range.

Applications

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

Schematic and Connection Diagrams



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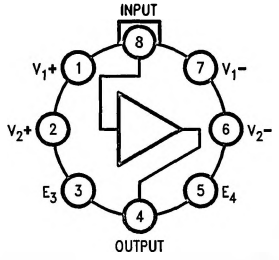
Pin numbers in parentheses denote pin connections for dual-in-line package.

Metal Can Package



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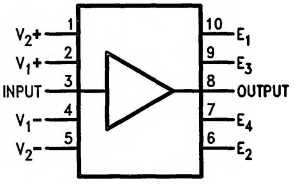
Order Number LH0002H or LH0002CH
See NS Package Number H08D

Dual-In-Line Package



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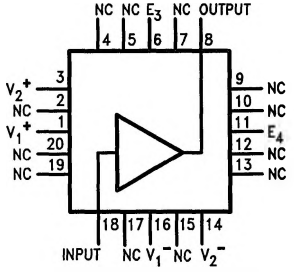
Order Number LH0002CN
See NS Package Number N10A

Leadless Chip Carrier



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Order Number LH0002E
See NS Package Number E20A

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, 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)

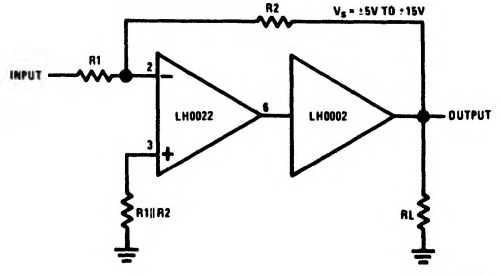
Parameter	Conditions	Min	Typ	Max	Units
Voltage Gain	R_S = 10 kΩ, R_L = 1.0 kΩ, V_{IN} = ±10V	0.95	0.97		
AC Current Gain	V_{IN} = 1.0 Vrms, f = 1.0 kHz		40		A/mA
Input Impedance	R_S = 200 kΩ, V_{IN} = ±1.0V, R_L = 1.0 kΩ	180	400		kΩ
Output Impedance	V_{IN} = ±1.0V, R_L = 50Ω, R_S = 10 kΩ		6.0	10	Ω
Output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

Note 1: Specification applies for T_A = 25°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

High Current Operational Amplifier



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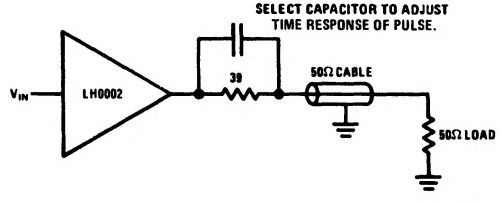
Line Driver



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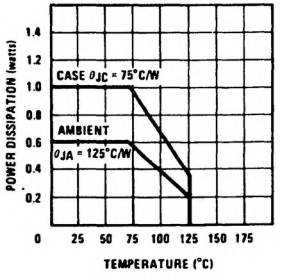
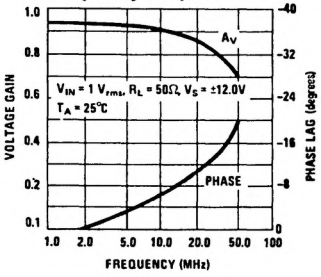
*Previously called NH0002/NH0002C

Typical Performance Characteristics

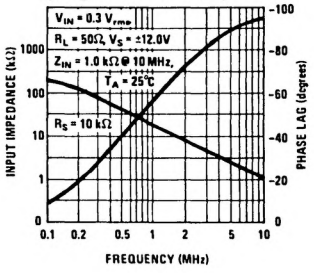
Maximum Power Dissipation



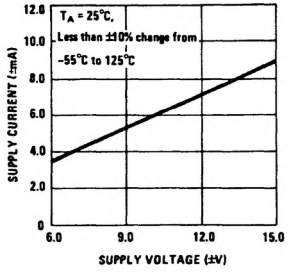
Frequency Response



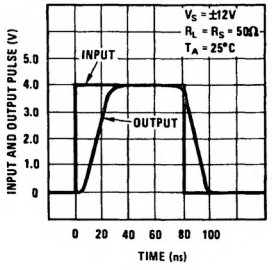
Input Impedance (Magnitude & Phase)



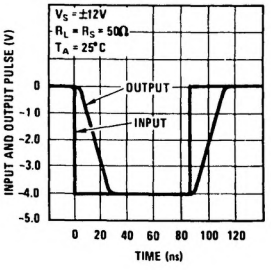
Supply Current



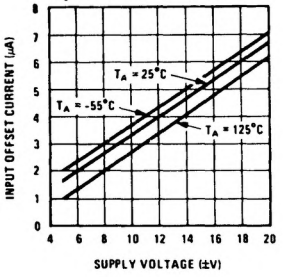
Positive Pulse



Negative Pulse



Input Offset Current



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