



Operational Amplifiers

LH0002/LH0002C

LH0002/LH0002C* current amplifier

general description

The LH0002/LH0002C is a general purpose thick film hybrid current amplifier that is built on a single substrate. The circuit 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 200V/ μ s
- Operation from $\pm 5V$ to $\pm 20V$

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.

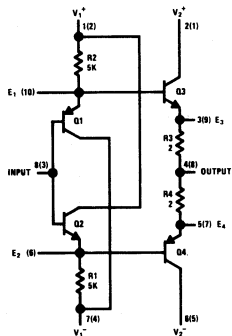
The LH0002 is available in an 8-lead low-profile TO-5 header; the LH0002C is also available in an 8-lead TO-5, and a 10-pin molded dual-in-line package.

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

applications

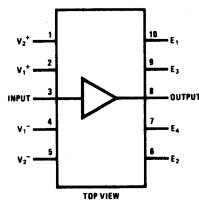
- Line driver
- 30 MHz buffer
- High speed D/A conversion
- Instrumentation buffer
- Precision current source

schematic and connection diagrams



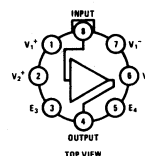
Pin numbers in parentheses denote pin connections for dual-in-line package.

Dual-In-Line Package



Order Number LH0002CN
See Package 21

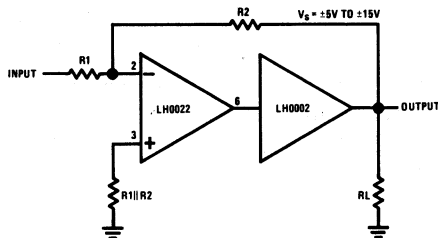
Metal Can Package



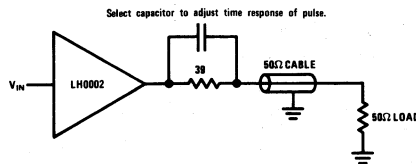
Order Number LH0002H
or LH0002CH
See Package 11

typical applications

High Current Operational Amplifier



Line Driver



*Previously called NH0002/NH0002C

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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	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

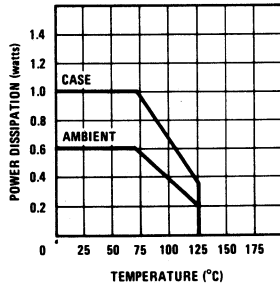
electrical characteristics (Note 1)

PARAMETERS	CONDITIONS	MIN	TYP	MAX	UNITS
Voltage Gain	$R_S = 10\text{ k}\Omega$, $R_L = 1.0\text{ k}\Omega$ $V_{IN} = 3.0\text{ V}_{PP}$, $f = 1.0\text{ kHz}$ $T_A = -55^\circ\text{C}$ to 125°C	.95	.97		
AC Current Gain	$V_{IN} = 1.0\text{ V}_{rms}$ $f = 1.0\text{ kHz}$		40		A/mA
Input Impedance	$R_S = 200\text{ k}\Omega$, $V_{IN} = 1.0\text{ V}_{rms}$, $f = 1.0\text{ kHz}$, $R_L = 1.0\text{ k}\Omega$	180	400	-	k Ω
Output Impedance	$V_{IN} = 1.0\text{ V}_{rms}$, $f = 1.0\text{ kHz}$ $R_L = 50\Omega$, $R_S = 10\text{ k}\Omega$	-	6	10	Ω
Output Voltage Swing	$R_L = 1.0\text{ k}\Omega$, $f = 1.0\text{ kHz}$	±10	±11	-	V
Output Voltage Swing	$V_S = \pm 15\text{V}$, $V_{IN} = \pm 10\text{V}$, $R_L = 100\Omega$, $T_A = 25^\circ\text{C}$	±9.5V			
DC Output Offset Voltage	$R_S = 300\Omega$, $R_L = 1.0\text{ k}\Omega$ $T_A = -55^\circ\text{C}$ to 125°C	-	±10	±30	mV
DC Input Offset Current	$R_S = 10\text{ k}\Omega$, $R_L = 1.0\text{ k}\Omega$ $T_A = -55^\circ\text{C}$ to 125°C	-	±6.0	±10	μA
Harmonic Distortion	$V_{IN} = 5.0\text{ V}_{rms}$, $f = 1.0\text{ kHz}$	-	0.1	-	%
Bandwidth	$V_{IN} = 1.0\text{ V}_{rms}$, $R_L = 50\Omega$, $f = 1\text{ MHz}$	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

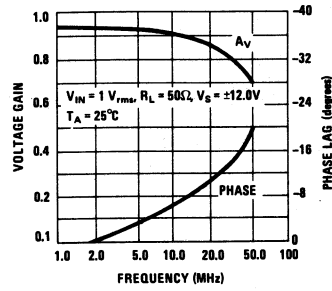
Note 1: Specification applies for $T_A = 25^\circ\text{C}$ with +12V on Pins 1 and 2; -12V on Pins 6 and 7 for the metal can package and +12V on Pins 1 and 2; -12V on Pins 4 and 5 for the dual-in-line package unless otherwise specified. The parameter guarantees for LH0002C apply over the temperature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

typical performance

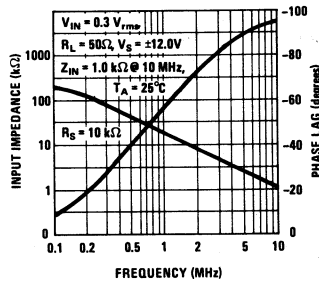
Maximum Power Dissipation



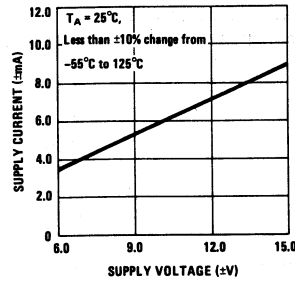
Frequency Response



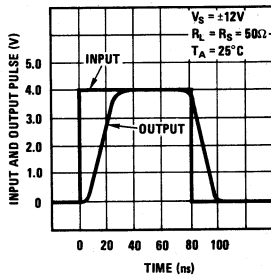
Input Impedance (Magnitude & Phase)



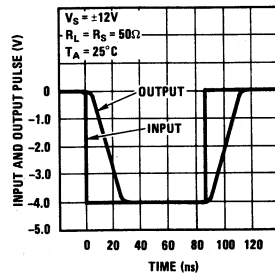
Supply Current



Positive Pulse



Negative Pulse



Input Offset Current

