National Semiconductor

August 1992

LH0003
Wide Bandwidth Operational Amplifier

General Description

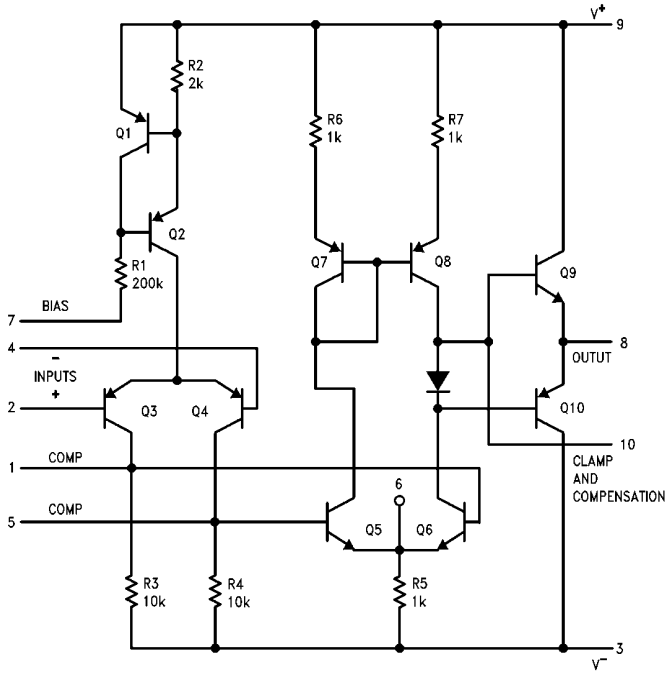
The LH0003/LH0003C is a general purpose operational amplifier which features: slewing rate up to 70 V/μs, a gain bandwidth of up to 30 MHz, and high output currents. Other features are:

Features

- Very low offset voltage — Typically 0.4 mV
- Large output swing — > ±10V into 100Ω load
- High CMRR — Typically > 90 dB
- Good large signal frequency response — 50 kHz to 400 kHz depending on compensation

The LH0003 is specified for operation over the −55°C to +125°C military temperature range. The LH0003C is specified for operation over the 0°C to +85°C temperature range.

Schematic and Connection Diagrams



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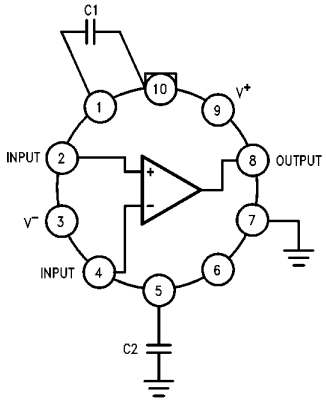

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Top View

Order Number LH0003H, LH0003H-MIL or LH0003CH
See NS Package Number H10G

Absolute Maximum Ratings

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

Supply Voltage	±20V
Power Dissipation	See curve
Differential Input Voltage	±7V
Input Voltage	Equal to supply
Load Current	120 mA
Operating Temperature Range LH0003	−55°C to +125°C
LH0003C	0°C to +85°C
Storage Temperature Range	−65°C to +150°C
Lead Temperature (Soldering, 10 sec.)	300°C

Electrical Characteristics (Notes 1 & 2)

Parameter	Conditions	Min	Typ	Max	Units
Input Offset Voltage	$R_S < 100\Omega$		0.4	3.0	mV
Input Offset Current			0.02	0.2	μA
Input Bias Current			0.4	2.0	μA
Supply Current	$V_S = \pm 20V$		1.2	3	mA
Voltage Gain	$R_L = 100k$, $V_S = \pm 15V$, $V_{OUT} = \pm 10V$	20	70		V/mV
Voltage Gain	$R_L = 2k$, $V_S = \pm 15V$, $V_{OUT} = \pm 10V$	15	40		V/mV
Output Voltage Swing	$V_S = \pm 15$, $R_L = 100\Omega$	±10	±12		V
Input Resistance			100		kΩ
Average Temperature Coefficient of Offset Voltage	$R_S < 100\Omega$		4		μV/°C
Average Temperature Coefficient of Bias Current			8		nA/°C
CMRR	$R_S < 100\Omega$, $V_S = \pm 15V$, $V_{IN} = \pm 10V$	70	90		dB
PSRR	$R_S < 100\Omega$, $V_S = \pm 15V$, $\Delta V = 5V$ to 20V	70	90		dB
Equivalent Input Noise Voltage	$R_S = 100\Omega$, f = 10 kHz to 100 kHz, $V_S = \pm 15V$		1.8		μVrms

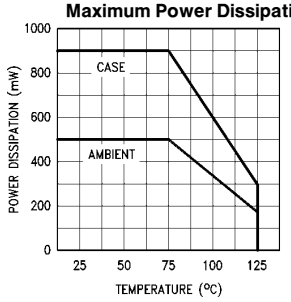
Note 1: These specifications apply for Pin 7 grounded, for $\pm 5V < V_S < \pm 20V$, with capacitor $C_1 = 90$ pF from pin 1 to pin 10 and $C_2 = 90$ pF from pin 5 to ground, over the specified operating temperature range, unless otherwise specified.

Note 2: Typical values are for $t_{AMBIENT} = 25°C$ unless otherwise specified.

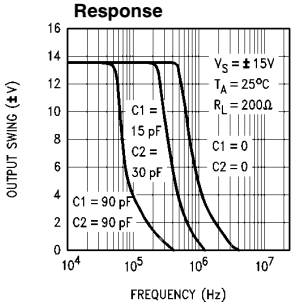
Note 3: See #RETS0003X for the LM0003H military specifications.

Typical Performance Characteristics

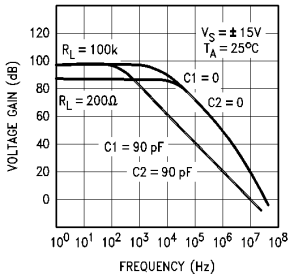
Maximum Power Dissipation



Large Signal Frequency Response



Open Loop Frequency Response



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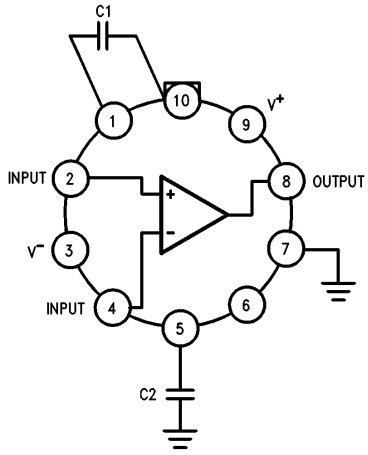
Typical Applications

High Slew Rate Unity Gain Inverting Amplifier



*Previously called NH0003/NH0003C

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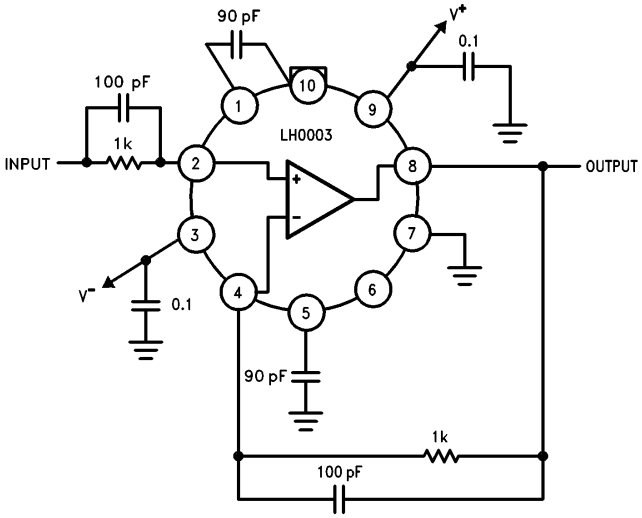
Typical Compensation

Circuit Gain	C_1 pF	C_2 pF	Slew Rate $R_L > 200\Omega$, V/μs	Full Output Frequency $R_L = 200\Omega$ $V_{OUT} = \pm 10V$
≥40	0	0	70	400 kHz
≥10	5	30	30	350
≥5	15	30	15	250
≥2	50	50	5	100
≥1	90	90	2	50

Unity Gain Follower



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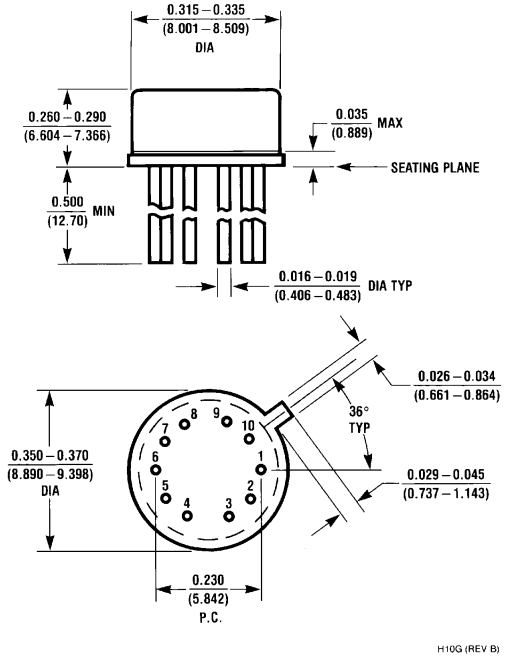
Physical Dimensions inches (millimeters)

Lit. # 106240



10 Lead .230 Dia P.C. Metal Can Package (H)
Order Number LH0003H, LH0003H-MIL or LH0003CH
NS Package Number H10G

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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