National Semiconductor

LH0003
Wide Bandwidth Operational Amplifier

General Description

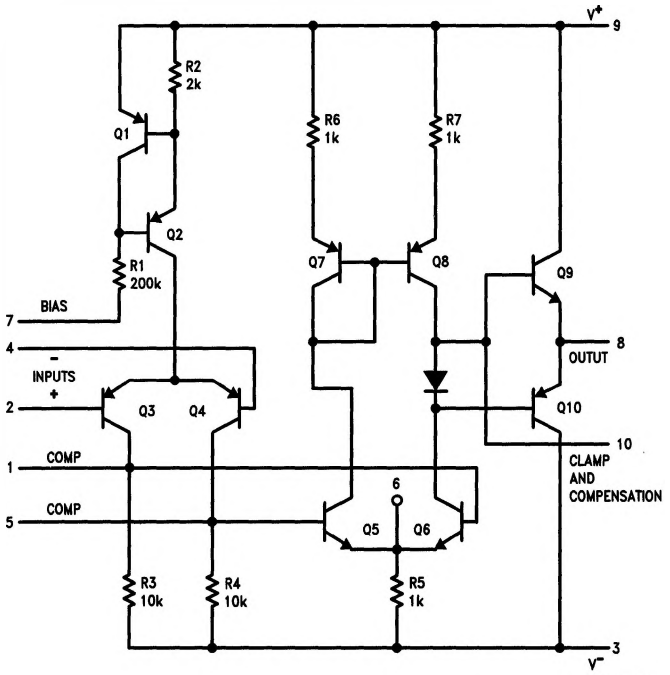
The LH0003/LH0003C is a general purpose operational amplifier which features: slewing rate up to 70 V/μs, a gain bandwidth of up to 30 MHz, and high output currents. Other features are:

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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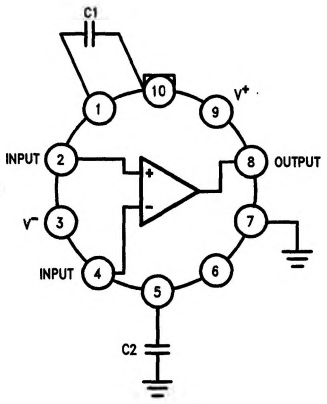

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Top View

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

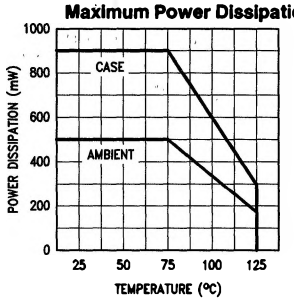
Note 1: These specifications apply for Pin 7 grounded, for $\pm 5V < V_S < \pm 20V$, with capacitor C_1 = 90 pF from pin 1 to pin 10 and C_2 = 90 pF from pin 5 to ground, over the specified operating temperature range, unless otherwise specified.

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

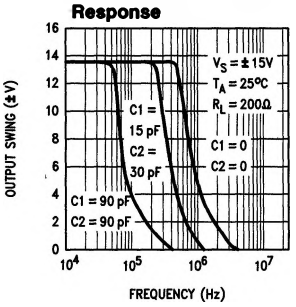
Note 3: See #RETS0003X for the LM0003H military specifications.

Typical Performance Characteristics

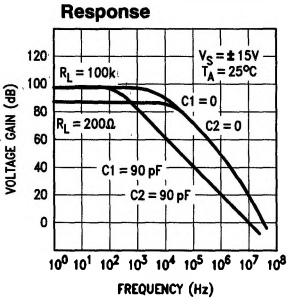
Maximum Power Dissipation



Large Signal Frequency Response



Open Loop Frequency Response



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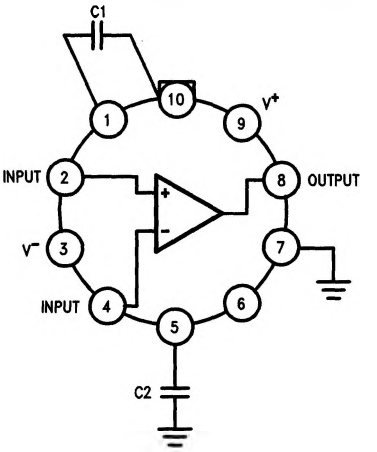
Typical Applications

High Slew Rate Unity Gain Inverting Amplifier



*Previously called NH0003/NH0003C

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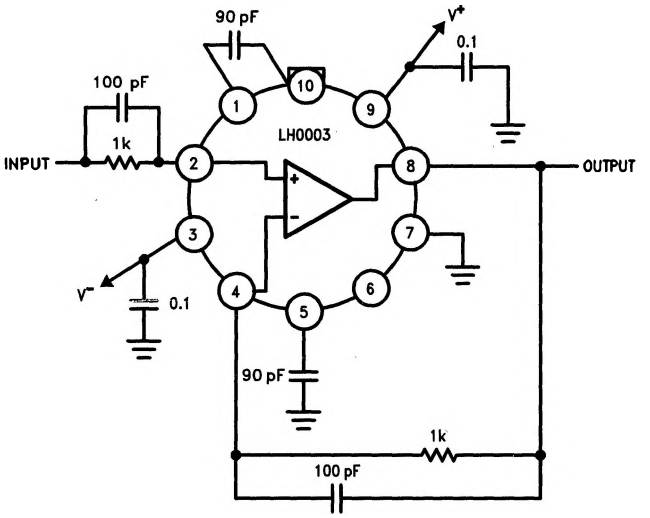
Typical Compensation

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 kHz
≥5	15	30	15	250 kHz
≥2	50	50	5	100 kHz
≥1	90	90	2	50 kHz

Unity Gain Follower



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