National Semiconductor Corporation

PRELIMINARY

LH0003/LH0003C
Wide Bandwidth Operational Amplifier

General Description

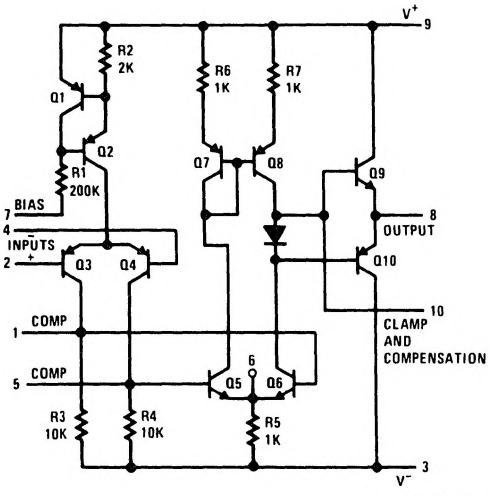
The LH0003/LH0003C is a general purpose operational amplifier which features: slewing rate up to 70 V/μs, a gain bandwidth of up to 30 MHz, and high output currents.

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.

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

Schematic and Connection Diagrams



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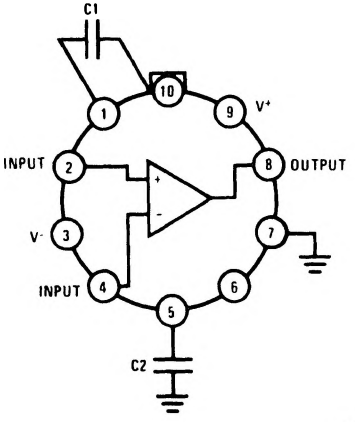

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Top View

Order Number LH0003H or LH0003CH
See NS Package Number H10G

Typical Compensation

Circuit Gain	C_1 pF	C_2 pF	Slew Rate $R_L > 200\Omega$, V/μsec	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	

Absolute Maximum Ratings

If Military/Aerospace specified devices are required, contact the National Semiconductor Sales Office/ Distributors for availability and specifications. (Note 3)

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.)	260°C

ESD rating to be determined.

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
	$R_L = 2k, V_S = \pm 15V, V_{OUT} = \pm 10V$	15	40		V/mV
Output Voltage Swing	$V_S = \pm 15V, R_L = 100\Omega$	±10	±12		V
Input Resistance			100		kΩ
Average Temperature Coefficient of Offset Voltage	$R_S \leq 100\Omega$		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 $V_S = \pm 15V$ dc		1.8		μVrms

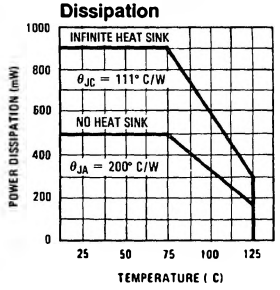
Note 1: These specifications apply for Pin 7 grounded, for $\pm 5V < V_S < \pm 20V$, with capacitor C_1 = 90 pF from Pin 1 to Pin 10 and C_2 = 90 pF from Pin 5 to ground, over the specified operating temperature range, unless otherwise specified.

Note 2: Typical values are for T_A = 25°C unless otherwise specified.

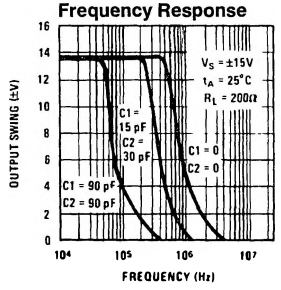
Note 3: Refer to RETS0003X for LH0003H military specifications.

Typical Performance Characteristics

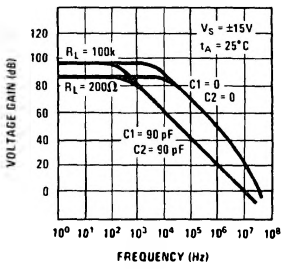
Maximum Power Dissipation



Large Signal Frequency Response



Open Loop Frequency Response



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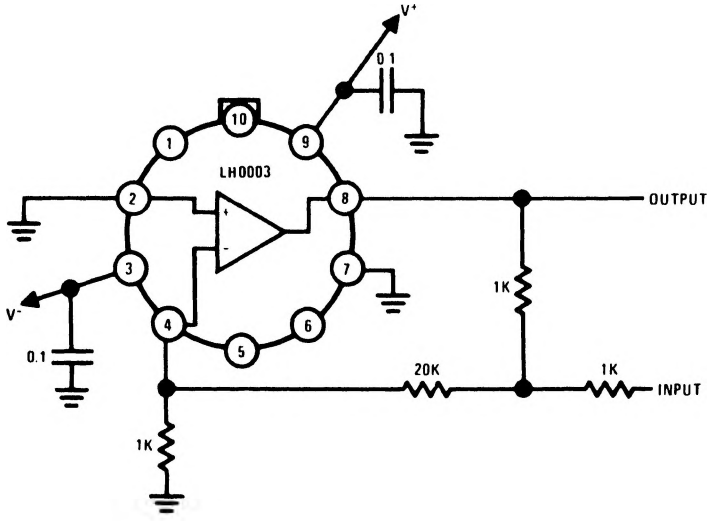
Typical Applications

High Slew Rate Unity Gain Inverting Amplifier



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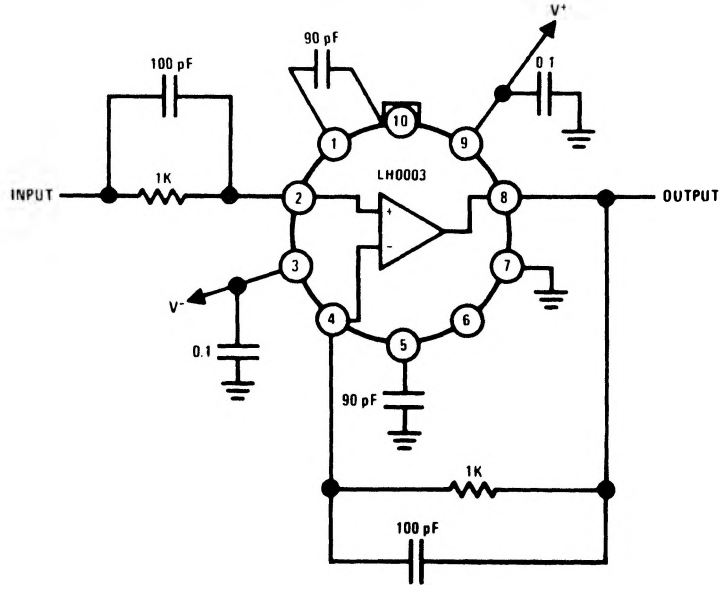
Unity Gain Follower



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