

LH0003 Wide Bandwidth Operational Amplifier

General Description

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

- High CMRR
- Good large signal frequency response

Typically > 90 dB
50 kHz to 400 kHz depending on compensation

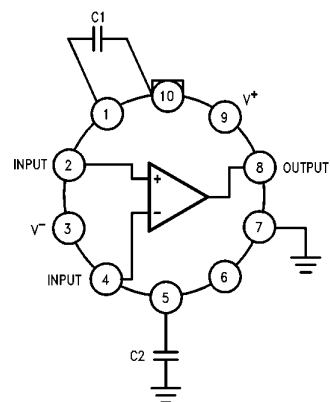
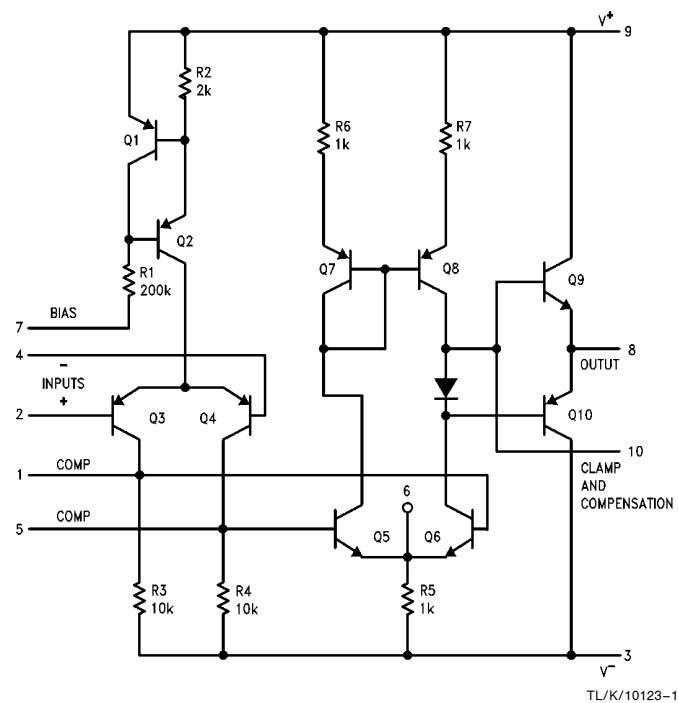
The LH0003 is specified for operation over the -55°C to $+125^{\circ}\text{C}$ military temperature range. The LH0003C is specified for operation over the 0°C to $+85^{\circ}\text{C}$ temperature range.

Features

- Very low offset voltage
- Large output swing

Typically 0.4 mV
> $\pm 10\text{V}$ into 100 Ω load

Schematic and Connection Diagrams



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	$\pm 20V$
Power Dissipation	See curve
Differential Input Voltage	$\pm 7V$

Input Voltage	Equal to supply
Load Current	120 mA
Operating Temperature Range LH0003	-55°C to $+125^{\circ}\text{C}$
LH0003C	0°C to $+85^{\circ}\text{C}$
Storage Temperature Range	-65°C to $+150^{\circ}\text{C}$
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		$k\Omega$
Average Temperature Coefficient of Offset Voltage	$R_S < 100\Omega$		4		$\mu\text{V}/^{\circ}\text{C}$
Average Temperature Coefficient of Bias Current			8		$\text{nA}/^{\circ}\text{C}$
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	$R_S = 100\Omega, f = 10\text{ kHz}$ to 100 kHz $V_S = \pm 15V$		1.8		μVrms

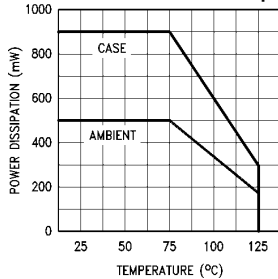
Note 1: These specifications apply for Pin 7 grounded, for $\pm 5V < V_S < \pm 20V$, with capacitor $C_1 = 90\text{ pF}$ from pin 1 to pin 10 and $C_2 = 90\text{ pF}$ from pin 5 to ground, over the specified operating temperature range, unless otherwise specified.

Note 2: Typical values are for $t_{\text{AMBIENT}} = 25^{\circ}\text{C}$ unless otherwise specified.

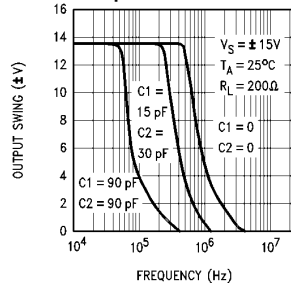
Note 3: See #RETS0003X for the LM0003H military specifications.

Typical Performance Characteristics

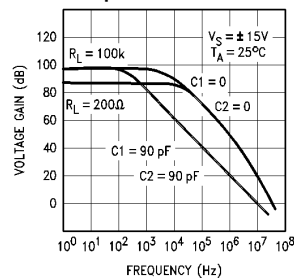
Maximum Power Dissipation



Large Signal Frequency Response



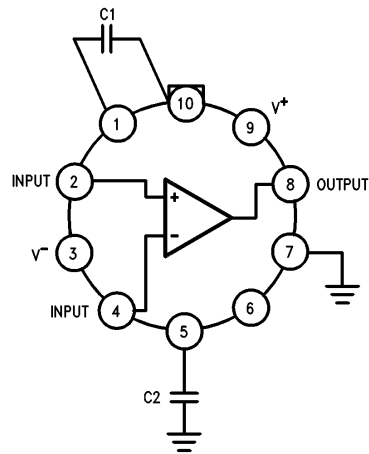
Open Loop Frequency Response



TL/K/10123-5

Typical Applications

High Slew Rate Unity Gain Inverting Amplifier



*Previously called NH0003/NH0003C

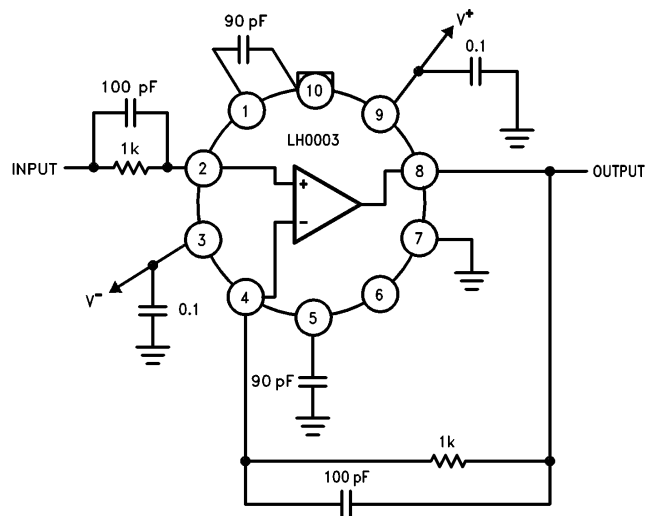
TL/K/10123-2

Typical Compensation

Circuit Gain	C ₁ pF	C ₂ pF	Slew Rate R _L > 200Ω, V/μs	Full Output Frequency R _L = 200Ω V _{OUT} = ±10V
≥40	0	0	70	400
≥10	5	30	30	350
≥5	15	30	15	250
≥2	50	50	5	100
≥1	90	90	2	50

} kHz

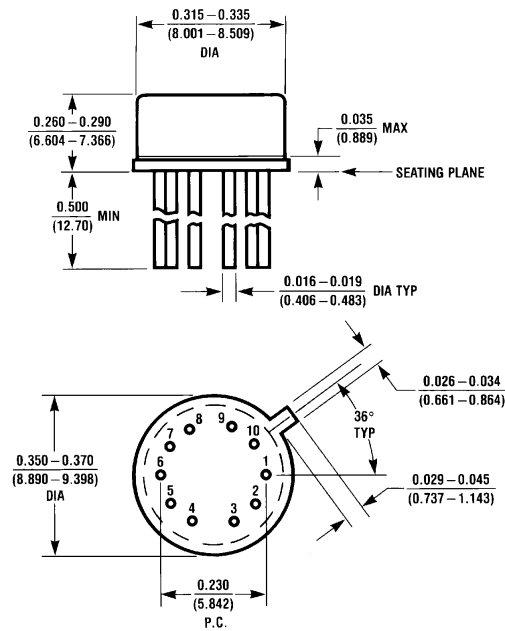
Unity Gain Follower



TL/K/10123-4

Physical Dimensions inches (millimeters)

Lit. # 106240



H10G (REV B)

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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National Semiconductor Corporation
 1111 West Bardin Road
 Arlington, TX 76017
 Tel: 1(800) 272-9959
 Fax: 1(800) 737-7018

National Semiconductor Europe
 Fax: (+49) 0-180-530 85 86
 Email: cnjwge@tevm2.nsc.com
 Deutsch Tel: (+49) 0-180-530 85 85
 English Tel: (+49) 0-180-532 78 32
 Français Tel: (+49) 0-180-532 93 58
 Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
 19th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: (852) 2737-1600
 Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
 Tel: 81-043-299-2309
 Fax: 81-043-299-2408

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