National Semiconductor

January 1989

LH0033-200 Fast Buffer Amplifier

General Description

The LH0033-200 is a high speed, FET input, voltage follower/buffer designed to provide high current drive at frequencies from DC to over 100 MHz. The LH0033-200 will provide ±10 mA into 1 kΩ loads (±100 mA peak) at slew rates of 1500 V/μs. In addition, the LH0033-200 exhibits excellent phase linearity up to 20 MHz.

It is intended to fulfill a wide range of buffer applications such as high speed line drivers, video impedance transformation, nuclear instrumentation amplifiers, op amp isolation buffer for driving reactive loads and high impedance input buffers for high speed A/D's and comparators. For additional applications information, see AN-48.

These devices are constructed using specially selected junction FETs and active laser trimming to achieve guaranteed performance specifications. The LH0033-200 is specified for −55°C to +200°C operation and is available in a 1.5W TO-8 metal package.

Features

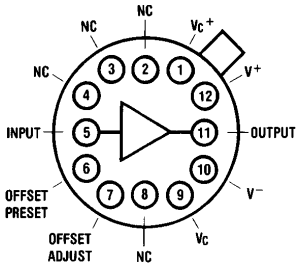
- 200°C operation
- Fast — 1000 V/μs
- Wide range single or dual supply
- Wide power bandwidth — DC to 100 MHz
- High output drive — ±10V with 50Ω load
- Low phase linearity — 2°
- Fast rise times — 2 ns
- High current gain — 120 dB
- High input resistance — $10^{10}\Omega$
- Expected life in operation — 160 hours

Advantages

- Only +10V supply needed for 5V p-p out
- Speed does not degrade system performance
- Wide data range for phase-encoded systems
- Output drive adequate for most loads
- Single pre-calibrate package

Connection Diagram

Metal Can Package



TL/K/8786–1

Top View

Case is electrically isolated

Order Number LH0033G-200
See NS Package Number G12B

RRD-B30M115/Printed in U. S. A.

Absolute Maximum Ratings

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

Supply Voltage ($V^+ - V^-$)	40V
Maximum Power Dissipation	1.5W
Maximum Junction Temperature	225°C
Input Voltage	Equal to Supplies
Continuous Output Current	±100 mA
Peak Output Current	±200 mA
Operating Temperature Range	−55°C to +125°C
Storage Temperature Range	−65°C to +225°C
Lead Temperature (Soldering, 10 sec.)	260°C

ESD rating is to be determined.

DC Electrical Characteristics $V_S = \pm 15V$, $T_{MIN} \leq T_A \leq T_{MAX}$ unless otherwise specified (Note 2)

Symbol	Parameter	Conditions	Limits			Units
			Min	Typ	Max	
V_{OS}	Output Offset Voltage	$R_S = 100\Omega$ (Note 1)			40	mV
I_B	Input Bias Current	$V_{IN} = 0V$, $T_J = T_A = T_{MAX}$			50	nA
A_V	Voltage Gain	$V_O = \pm 10V$, $R_S = 100\Omega$, $R_L = 1.0\ k\Omega$	0.90	0.98		V/V
Z_{IN}	Input Impedance	$R_L = 1\ k\Omega$		10^{11}		Ω
Z_{OUT}	Output Impedance	$V_{IN} = \pm 1.0V$, $R_L = 1.0\ k\Omega$		6.0		Ω
V_O	Output Voltage Swing	$V_I = \pm 14V$, $R_L = 1.0\ k\Omega$	±12			V
I_S	Supply Current	$V_{IN} = 0V$		20	25	mA

Note 1: When supply voltages are ±15V, no load operating junction temperature may rise 40°C–60°C above ambient and more under load conditions. Accordingly, V_{OS} may change one to several mV, and I_B will change significantly during warm-up. Refer to I_B vs. temperature graph for expected values.

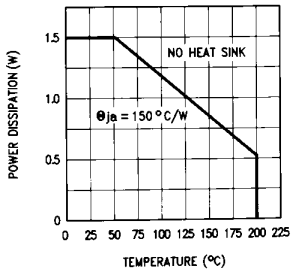
Note 2: In order to limit maximum junction temperature to +225°C it may be necessary to operate with $V_S < \pm 15$ when T_A or T_C exceeds specific values depending on the P_D within the device package. Total P_D is the sum of quiescent and load-related dissipation.

AC Electrical Characteristics $T_C = 25°C$, $V_S = \pm 15V$, $R_S = 50\Omega$, $R_L = 1.0\ k\Omega$

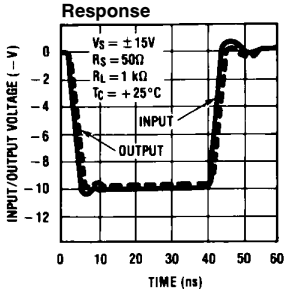
Symbol	Parameter	Conditions	Limits			Units
			LH0033			
			Min	Typ	Max	
S_R	Slew Rate	$V_{IN} = \pm 10V$	1000	1500		V/μs
BW	Bandwidth	$V_{IN} = 1.0\ V_{rms}$		100		MHz

Typical Performance Characteristics

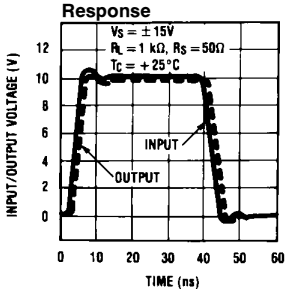
Power Derating—LH0033



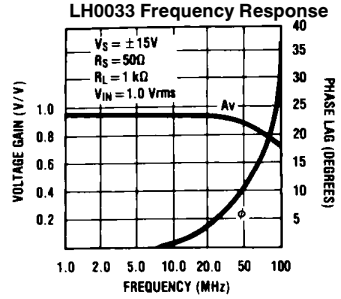
LH0033 Negative Pulse Response



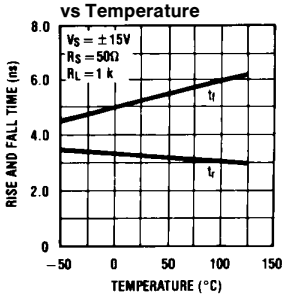
LH0033 Positive Pulse Response



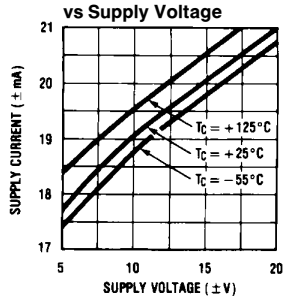
LH0033 Frequency Response



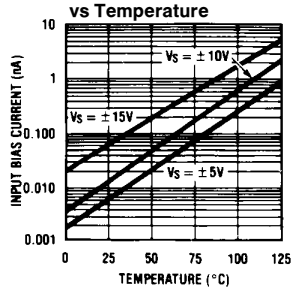
LH0033 Rise and Fall Time vs Temperature



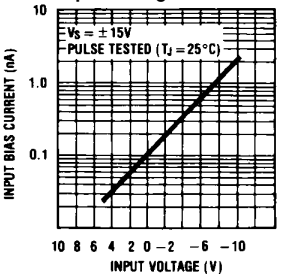
LH0033 Supply Current vs Supply Voltage



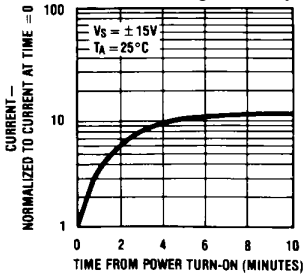
LH0033 Input Bias Current vs Temperature



LH0033 Input Bias Current vs Input Voltage



LH0033 Normalized Input Bias Current During Warm-Up

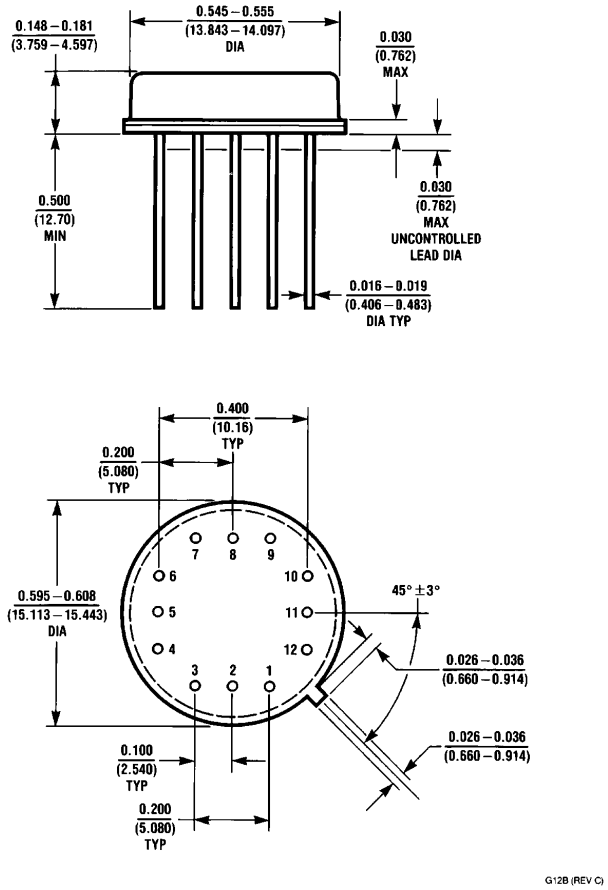


TL/K/8786–2

For applications information, see LH0033/LH0063 Datasheet

Physical Dimensions inches (millimeters)

Lit. # 106285



12-Lead Metal Can Package (G)
Order Number LH0033G-200
NS Package Number G12B

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