National Semiconductor

August 2000

LM1458/LM1558
Dual Operational Amplifier

General Description

The LM1458 and the LM1558 are general purpose dual operational amplifiers. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent.

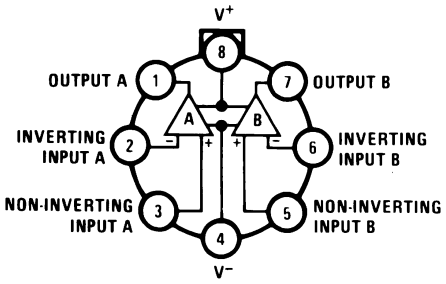
The LM1458 is identical to the LM1558 except that the LM1458 has its specifications guaranteed over the temperature range from 0˚C to +70˚C instead of −55˚C to +125˚C.

Features

- No frequency compensation required
- Short-circuit protection
- Wide common-mode and differential voltage ranges
- Low-power consumption
- 8-lead can and 8-lead mini DIP
- No latch up when input common mode range is exceeded

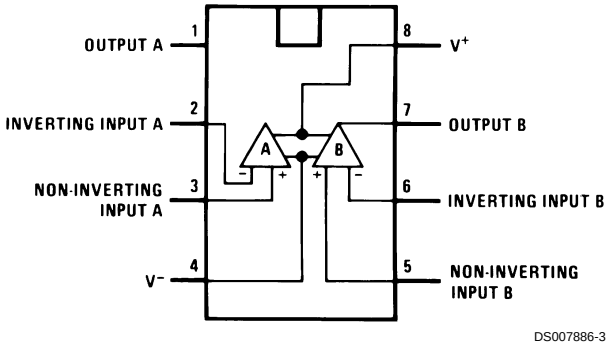
Connection Diagrams

Metal Can Package



Top View
Order Number LM1558H, LM1558H/883 or LM1458H
See NS Package Number H08C

Dual-In-Line Package



Top View
Order Number LM1558J/883, LM1458M, LM1458MX or LM1458N
See NS Package Number J08A, M08A or N08E

Absolute Maximum Ratings (Note 1)

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

(Note 5)

Supply Voltage
- LM1558 ±22V
- LM1458 ±18V

Power Dissipation (Note 2)
- LM1558H/LM1458H 500 mW
- LM1458N 400 mW

Differential Input Voltage ±30V

Input Voltage (Note 3) ±15V

Output Short-Circuit Duration Continuous

Operating Temperature Range
- LM1558 −55˚C to +125˚C
- LM1458 0˚C to +70˚C

Storage Temperature Range −65˚C to +150˚C

Lead Temperature (Soldering, 10 sec.) 260˚C

Soldering Information
- Dual-In-Line Package
  - Soldering (10 seconds) 260˚C
- Small Outline Package
  - Vapor Phase (60 seconds) 215˚C
  - Infrared (15 seconds) 220˚C

See AN-450 “Surface Mounting Methods and Their Effect on Product Reliability” for other methods of soldering surface mount devices.

ESD tolerance (Note 6) 300V

Electrical Characteristics (Note 4)

Parameter	Conditions	LM1558			LM1458			Units
		Min	Typ	Max	Min	Typ	Max	
Input Offset Voltage	T_A = 25˚C, $R_S \le 10$ kΩ		1.0	5.0		1.0	6.0	mV
Input Offset Current	T_A = 25˚C		80	200		80	200	nA
Input Bias Current	T_A = 25˚C		200	500		200	500	nA
Input Resistance	T_A = 25˚C	0.3	1.0		0.3	1.0		MΩ
Supply Current Both Amplifiers	T_A = 25˚C, V_S = ±15V		3.0	5.0		3.0	5.6	mA
Large Signal Voltage Gain	T_A = 25˚C, V_S = ±15V V_{OUT} = ±10V, $R_L \ge 2$ kΩ	50	160		20	160		V/mV
Input Offset Voltage	$R_S \le 10$ kΩ			6.0			7.5	mV
Input Offset Current				500			300	nA
Input Bias Current				1.5			0.8	µA
Large Signal Voltage Gain	V_S = ±15V, V_{OUT} = ±10V $R_L \ge$ kΩ	25			15			V/mV
Output Voltage Swing	V_S = ±15V, R_L = 10 kΩ	±12	±14		±12	±14		V
	R_L = 2 kΩ	±10	±13		±10	±13		V
Input Voltage Range	V_S = ±15V	±12			±12			V
Common Mode Rejection Ratio	$R_S \le 10$ kΩ	70	90		70	90		dB
Supply Voltage Rejection Ratio	$R_S \le 10$ kΩ	77	96		77	96		dB

Note 1: “Absolute Maximum Ratings” indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

Note 2: The maximum junction temperature of the LM1558 is 150˚C, while that of the LM1458 is 100˚C. For operating at elevated temperatures, devices in the H08 package must be derated based on a thermal resistance of 150˚C/W, junction to ambient or 20˚C/W, junction to case. For the DIP the device must be derated based on a thermal resistance of 187˚C/W, junction to ambient.

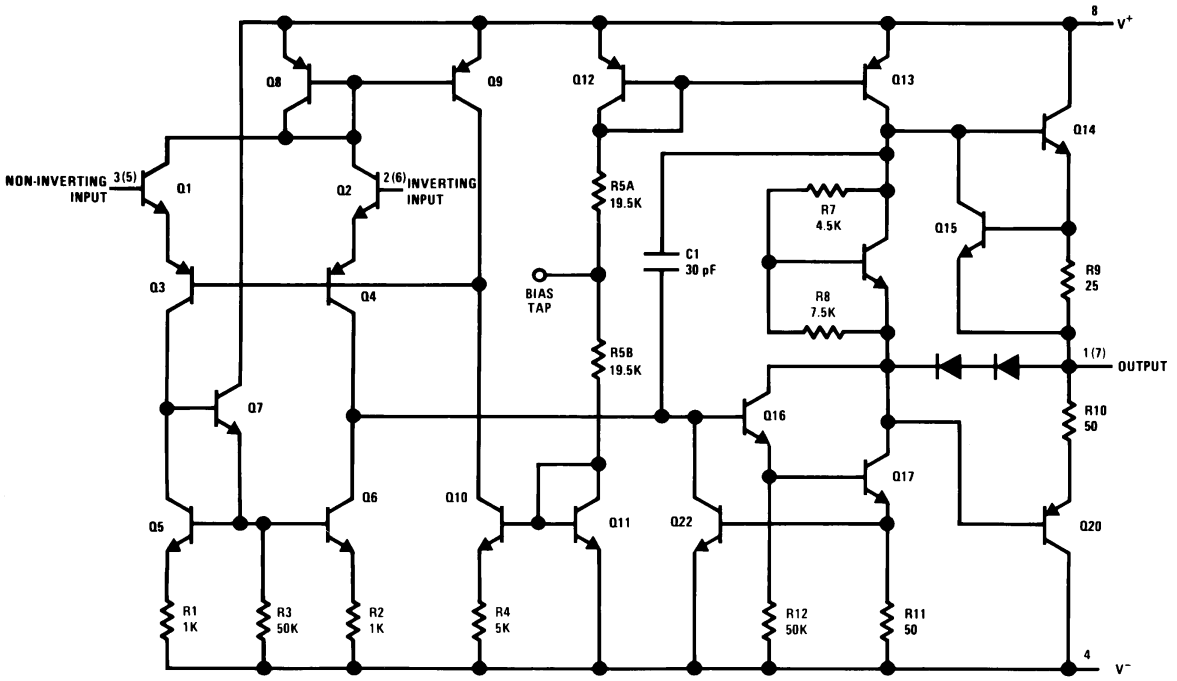
Note 3: For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

Note 4: These specifications apply for V_S = ±15V and −55˚C ≤ T_A ≤ 125˚C, unless otherwise specified. With the LM1458, however, all specifications are limited to 0˚C ≤ T_A ≤ 70˚C and V_S = ±15V.

Note 5: Refer to RETS 1558V for LM1558J and LM1558H military specifications.

Note 6: Human body model, 1.5 kΩ in series with 100 pF.

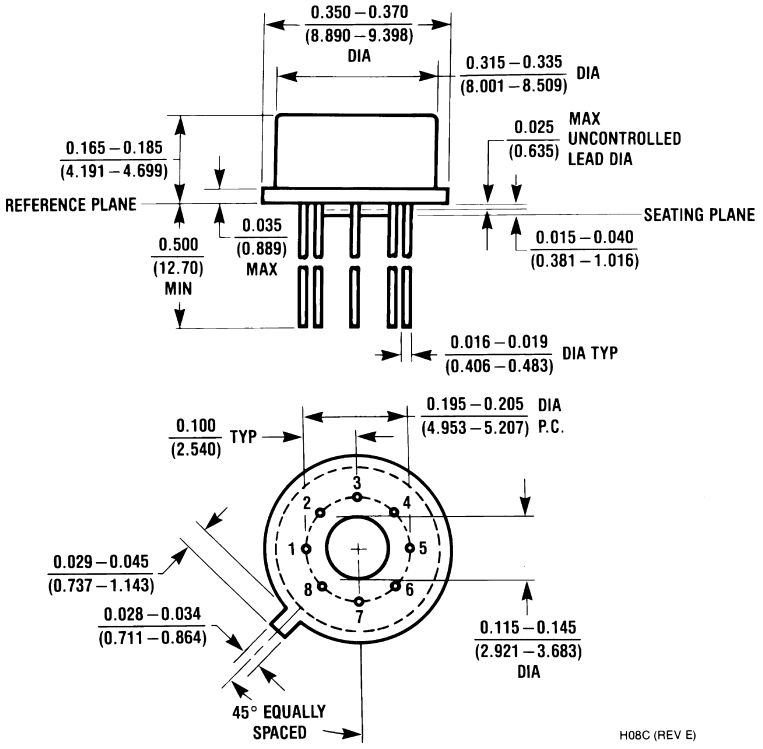
Schematic Diagram



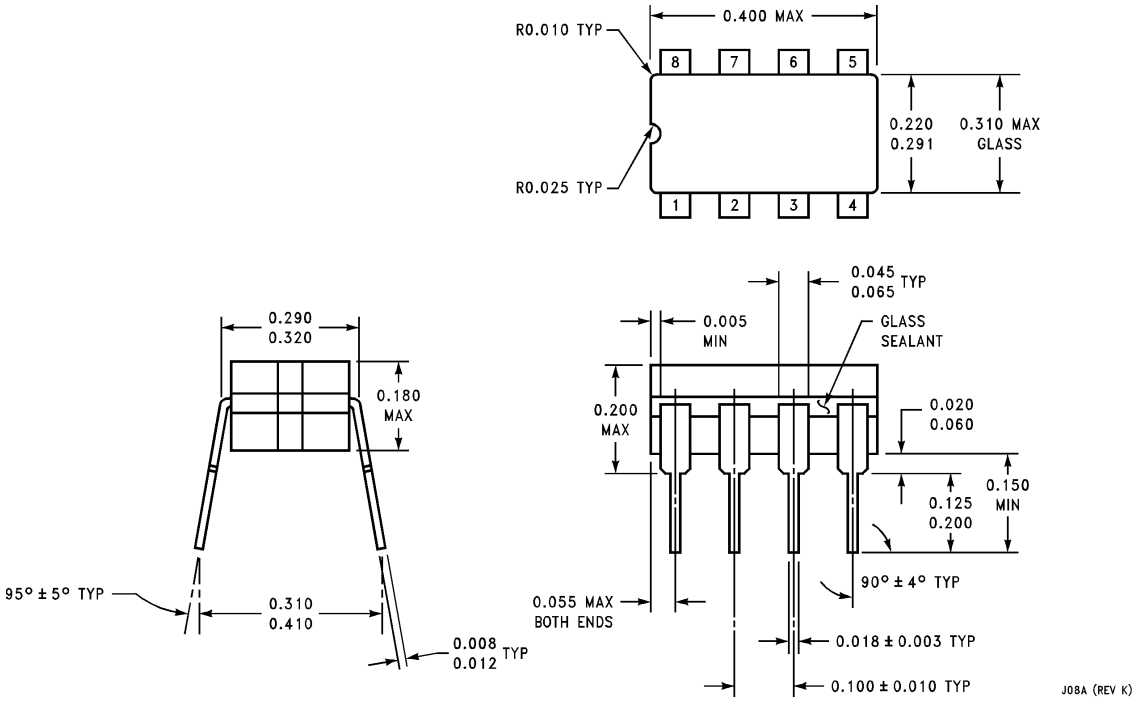
DS007886-1

Numbers in parentheses are pin numbers for amplifier B.

Physical Dimensions inches (millimeters) unless otherwise noted

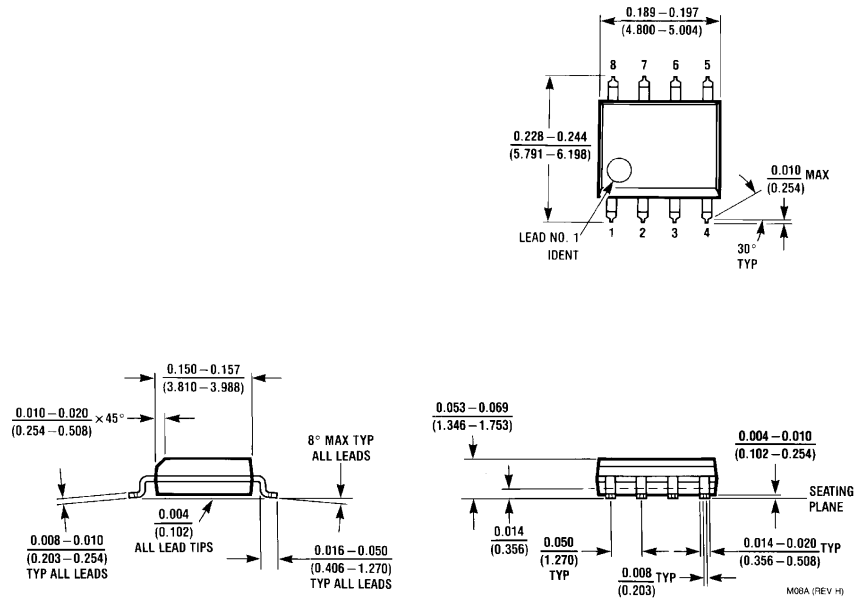


Metal Can Package (H)
Order Number LM1558H, LM1558H/883 or LM1458H
NS Package Number H08C

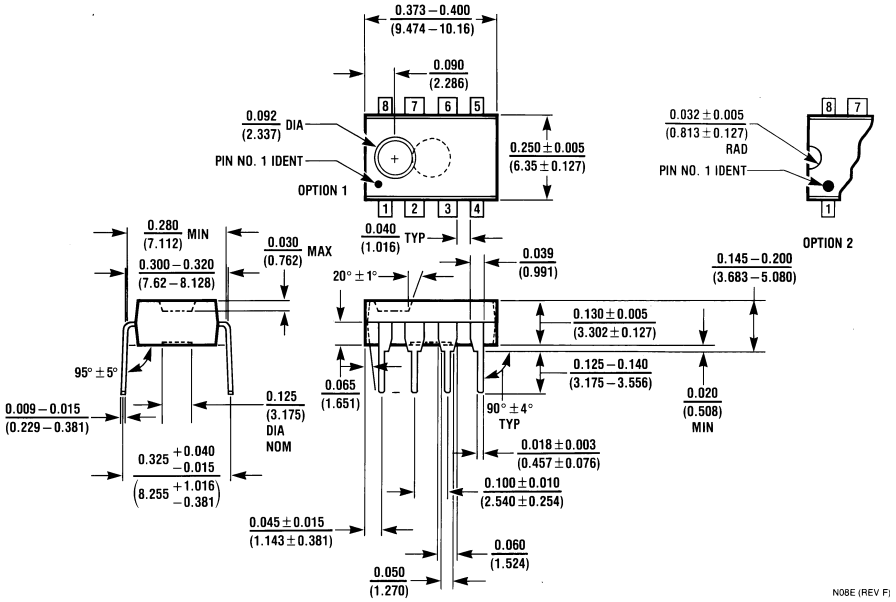


Small Outline Package (M)
Order Number LM1458M or LM1458MX
NS Package Number M08A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



Small Outline Package (M)
Order Number LM1458M or LM1458MX
NS Package Number M08A



Molded Dual-In-Line Package (N)
Order Number LM1458N
NS Package Number N08E

Notes

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
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.

National Semiconductor Corporation
Americas
Tel: 1-800-272-9959
Fax: 1-800-737-7018
Email: support@nsc.com
www.national.com

National Semiconductor Europe
Fax: +49 (0) 180-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 69 9508 6208
English Tel: +44 (0) 870 24 0 2171
Français Tel: +33 (0) 1 41 91 8790

National Semiconductor Asia Pacific Customer Response Group
Tel: 65-2544466
Fax: 65-2504466
Email: ap.support@nsc.com

National Semiconductor Japan Ltd.
Tel: 81-3-5639-7560
Fax: 81-3-5639-7507