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National Semiconductor

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# 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.

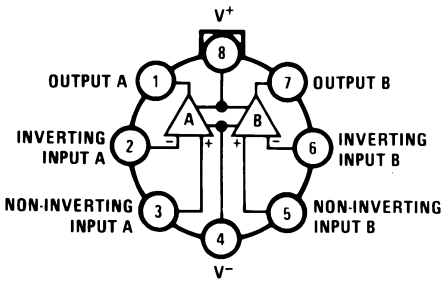
The LM1458 is identical to the LM1558 except that the LM1458 has its specifications guaranteed over the temperature range from 0˚C to +70˚C instead of −55˚C to +125˚C.

## 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**

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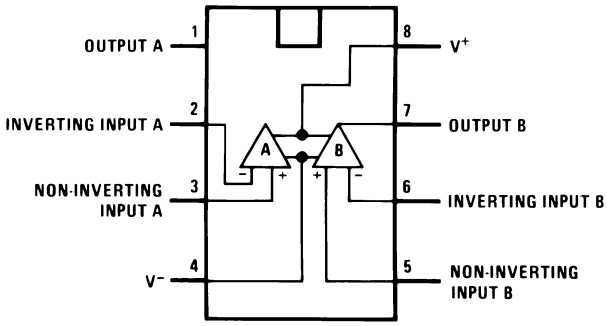
**Top View**
**Order Number LM1558H, LM1558H/883 or LM1458H**
**See NS Package Number H08C**

**Dual-In-Line Package**

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

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## 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<br>$V_{OUT}$ = ±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<br>$R_L \ge$ 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.

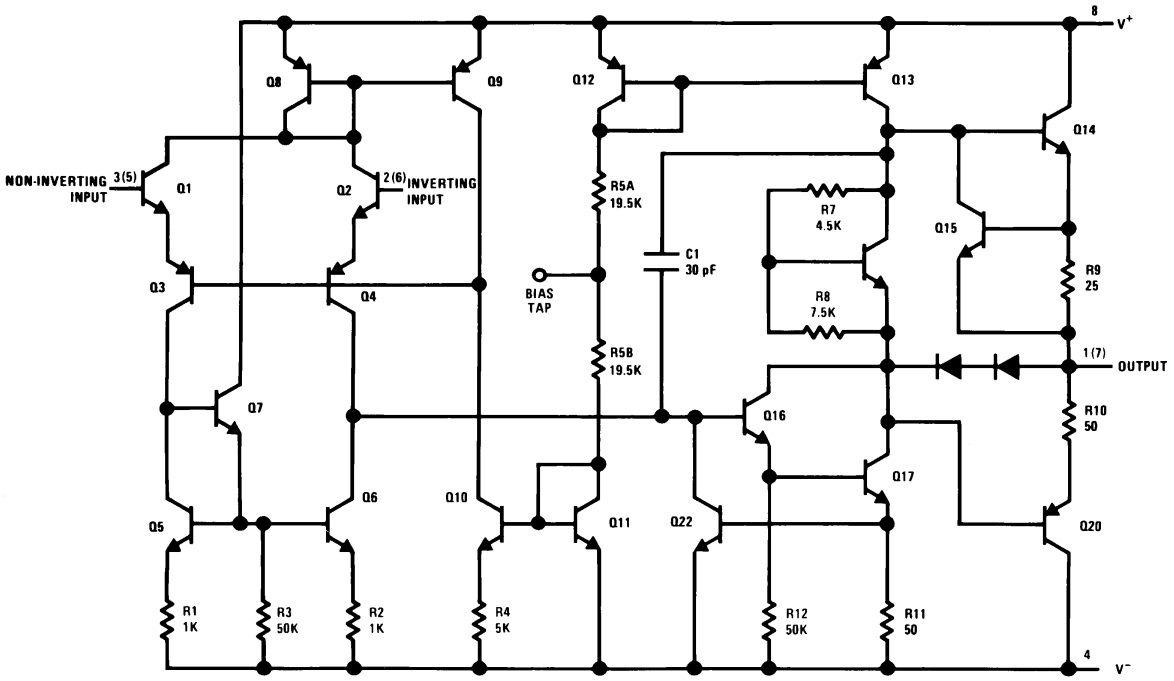
**Note 3:** For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.

**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

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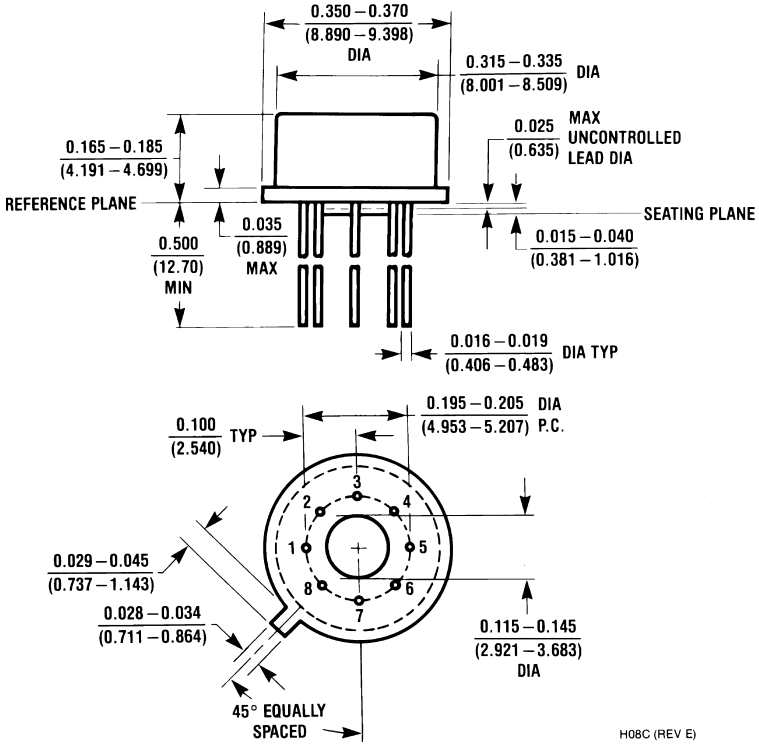
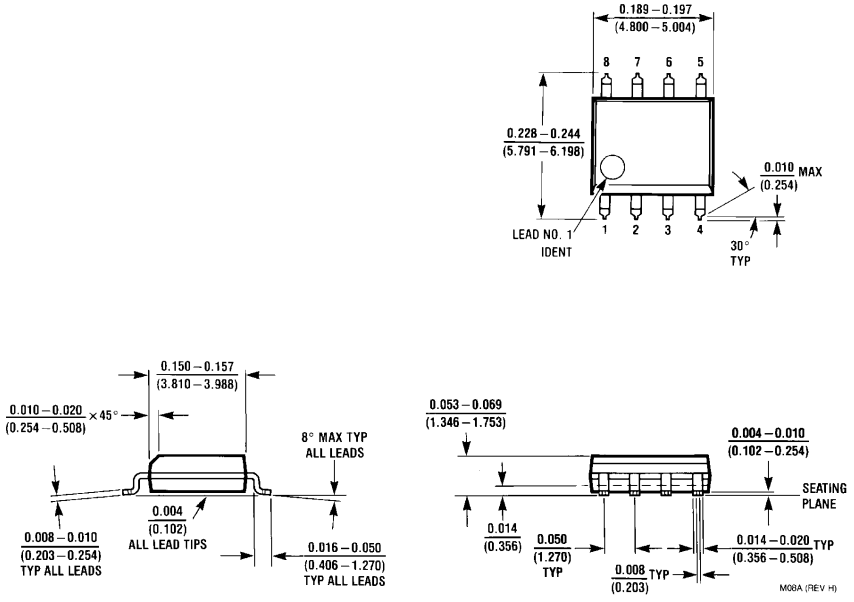
Numbers in parentheses are pin numbers for amplifier B.

## Physical Dimensions inches (millimeters)

unless otherwise noted

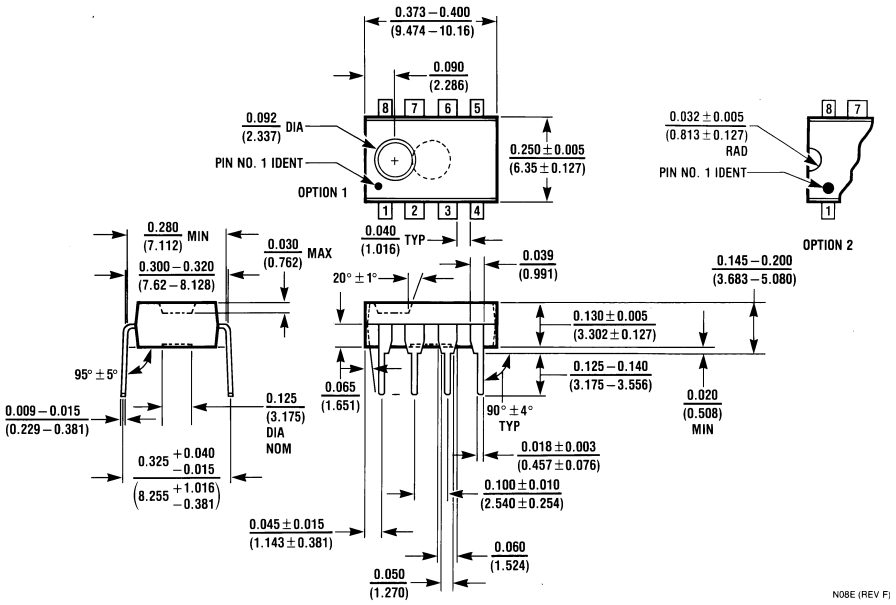



**Metal Can Package (H)**
**Order Number LM1558H, LM1558H/883 or LM1458H**
**NS Package Number H08C**




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

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




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

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