

LM1458/LM1558 Dual Operational Amplifier

 Check for Samples: [LM1458](#), [LM1558](#)

FEATURES

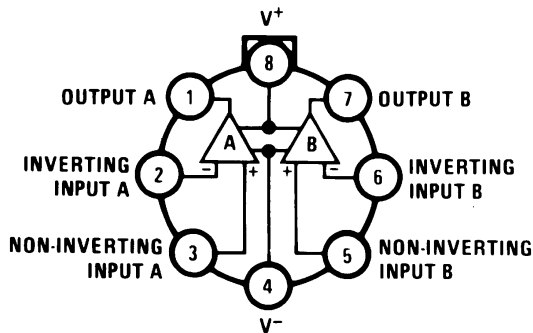
- No Frequency Compensation Required
- Short-Circuit Protection
- Wide Common-Mode and Differential Voltage Ranges
- Low-Power Consumption
- 8-Lead TO-99 and 8-Lead PDIP
- No Latch Up When Input Common Mode Range is Exceeded

DESCRIPTION

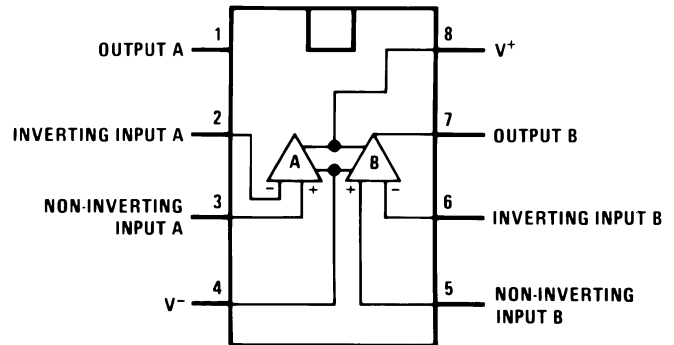
The LM1458 and the LM1558 are general purpose dual operational amplifiers. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent.

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.

Connection Diagram



**Figure 1. TO-99 Package
(Top View)**
See Package Number LMC (O-MBCY-W8)



**Figure 2. Dual-In-Line Package
(Top View)**
See Package Number D (R-PDSO-G8) or
P (R-PDIP-T8)



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.



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Absolute Maximum Ratings⁽¹⁾⁽²⁾⁽³⁾

| | |
|---|-----------------|
| Supply Voltage | |
| LM1558 | ±22V |
| LM1458 | ±18V |
| Power Dissipation ⁽⁴⁾ | |
| LM1558H/LM1458H | 500 mW |
| LM1458N | 400 mW |
| Differential Input Voltage | ±30V |
| Input Voltage ⁽⁵⁾ | ±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 | |
| PDIP Package | |
| Soldering (10 seconds) | 260°C |
| SOIC 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 ⁽⁶⁾ | 300V |

- (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.
- (2) Refer to RETS 1558V for LM1558J and LM1558H military specifications.
- (3) If Military/Aerospace specified devices are required, please contact the TI Sales Office/Distributors for availability and specifications.
- (4) 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 LMC 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 PDIP the device must be derated based on a thermal resistance of 187°C/W, junction to ambient.
- (5) For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
- (6) Human body model, 1.5 kΩ in series with 100 pF.

Electrical Characteristics⁽¹⁾

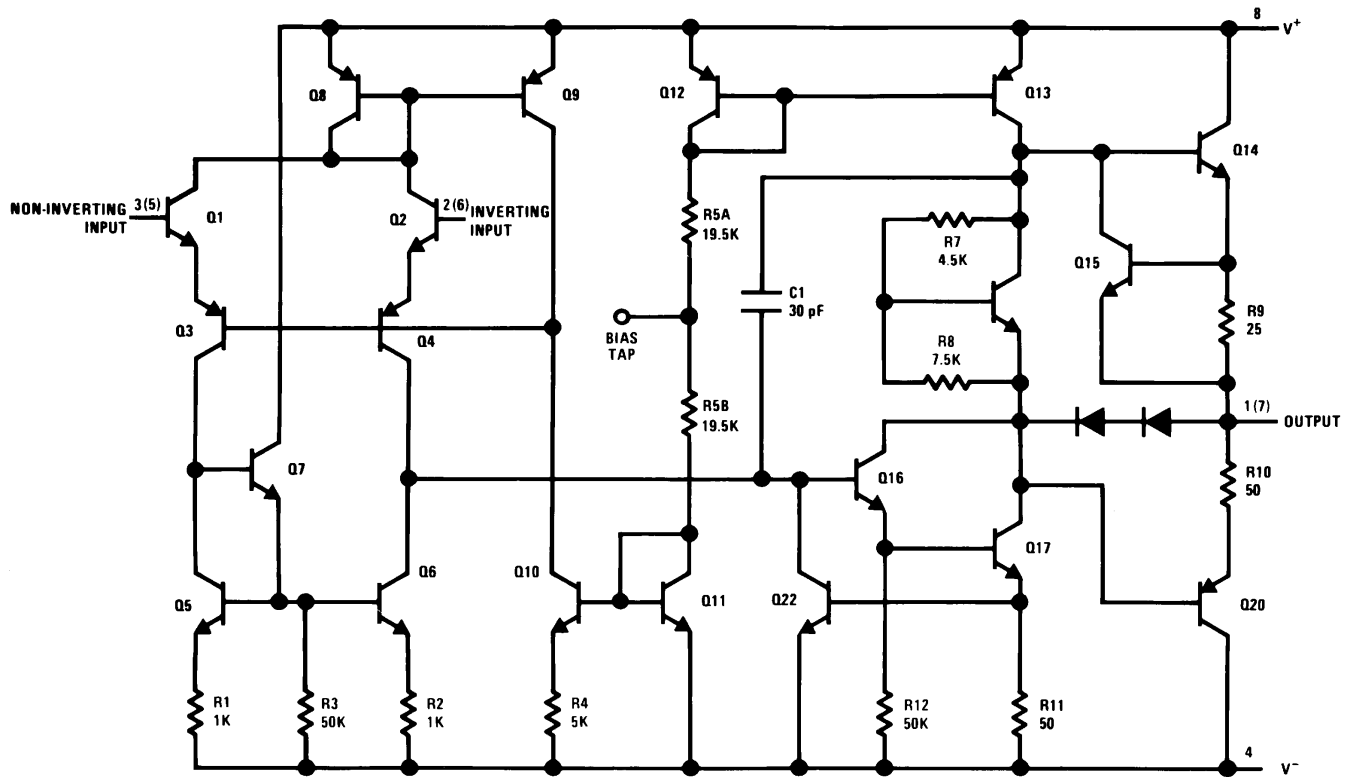
| Parameter | Conditions | LM1558 | | | LM1458 | | | Units |
|--------------------------------|---|------------|------------|-----|------------|------------|-----|--------|
| | | Min | Typ | Max | Min | Typ | Max | |
| Input Offset Voltage | $T_A = 25^\circ\text{C}$, $R_S \leq 10\text{ k}\Omega$ | | 1.0 | 5.0 | | 1.0 | 6.0 | mV |
| Input Offset Current | $T_A = 25^\circ\text{C}$ | | 80 | 200 | | 80 | 200 | nA |
| Input Bias Current | $T_A = 25^\circ\text{C}$ | | 200 | 500 | | 200 | 500 | nA |
| Input Resistance | $T_A = 25^\circ\text{C}$ | 0.3 | 1.0 | | 0.3 | 1.0 | | MΩ |
| Supply Current Both Amplifiers | $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$ | | 3.0 | 5.0 | | 3.0 | 5.6 | mA |
| Large Signal Voltage Gain | $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{V}$ $V_{OUT} = \pm 10\text{V}$, $R_L \geq 2\text{ k}\Omega$ | 50 | 160 | | 20 | 160 | | V/mV |
| Input Offset Voltage | $R_S \leq 10\text{ k}\Omega$ | | | 6.0 | | | 7.5 | mV |
| Input Offset Current | | | | 500 | | | 300 | nA |
| Input Bias Current | | | | 1.5 | | | 0.8 | μA |
| Large Signal Voltage Gain | $V_S = \pm 15\text{V}$, $V_{OUT} = \pm 10\text{V}$ $R_L \geq \text{k}\Omega$ | 25 | | | 15 | | | V/mV |
| Output Voltage Swing | $V_S = \pm 15\text{V}$, $R_L = 10\text{ k}\Omega$ $R_L = 2\text{ k}\Omega$ | ±12 ±10 | ±14 ±13 | | ±12 ±10 | ±14 ±13 | | V V |

- (1) These specifications apply for $V_S = \pm 15\text{V}$ and $-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$, unless otherwise specified. With the LM1458, however, all specifications are limited to $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ and $V_S = \pm 15\text{V}$.

Electrical Characteristics ⁽¹⁾ (continued)

| Parameter | Conditions | LM1558 | | | LM1458 | | | Units |
|--------------------------------|------------------------------|----------|-----|-----|----------|-----|-----|-------|
| | | Min | Typ | Max | Min | Typ | Max | |
| Input Voltage Range | $V_S = \pm 15V$ | ± 12 | | | ± 12 | | | V |
| Common Mode Rejection Ratio | $R_S \leq 10\text{ k}\Omega$ | 70 | 90 | | 70 | 90 | | dB |
| Supply Voltage Rejection Ratio | $R_S \leq 10\text{ k}\Omega$ | 77 | 96 | | 77 | 96 | | dB |

SCHMATIC DIAGRAM



Numbers in parentheses are pin numbers for amplifier B.

REVISION HISTORY

| Changes from Revision C (March 2013) to Revision D | Page |
|--|-------------------|
| • Changed layout of National Data Sheet to TI format | 3 |

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead/Ball Finish | MSL Peak Temp (3) | Op Temp (°C) | Top-Side Markings (4) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-------------------------|------------------|----------------------|--------------|--------------------------|-------------------------|
| LM1458M | ACTIVE | SOIC | D | 8 | 95 | TBD | Call TI | Call TI | 0 to 70 | LM1458M | Samples |
| LM1458M/NOPB | ACTIVE | SOIC | D | 8 | 95 | Green (RoHS & no Sb/Br) | CU SN | Level-1-260C-UNLIM | 0 to 70 | LM1458M | Samples |
| LM1458MX | ACTIVE | SOIC | D | 8 | 2500 | TBD | Call TI | Call TI | 0 to 70 | LM1458M | Samples |
| LM1458MX/NOPB | ACTIVE | SOIC | D | 8 | 2500 | Green (RoHS & no Sb/Br) | CU SN | Level-1-260C-UNLIM | 0 to 70 | LM1458M | Samples |
| LM1458N | ACTIVE | PDIP | P | 8 | 40 | TBD | Call TI | Call TI | 0 to 70 | LM1458N | Samples |
| LM1458N/NOPB | ACTIVE | PDIP | P | 8 | 40 | Green (RoHS & no Sb/Br) | SN | Level-1-NA-UNLIM | 0 to 70 | LM1458N | Samples |
| LM1558H | ACTIVE | TO-99 | LMC | 8 | 500 | TBD | Call TI | Call TI | -55 to 125 | LM1558H | Samples |
| LM1558H/NOPB | ACTIVE | TO-99 | LMC | 8 | 500 | Green (RoHS & no Sb/Br) | POST-PLATE | Level-1-NA-UNLIM | -55 to 125 | LM1558H | Samples |
| MC1458CP1 | ACTIVE | PDIP | P | 8 | 40 | TBD | Call TI | Call TI | 0 to 70 | LM1458N | Samples |
| MC1458P1 | ACTIVE | PDIP | P | 8 | 40 | TBD | Call TI | Call TI | 0 to 70 | LM1458N | Samples |
| MC1558G | ACTIVE | TO-99 | LMC | 8 | 500 | TBD | Call TI | Call TI | -55 to 125 | LM1558H | Samples |

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

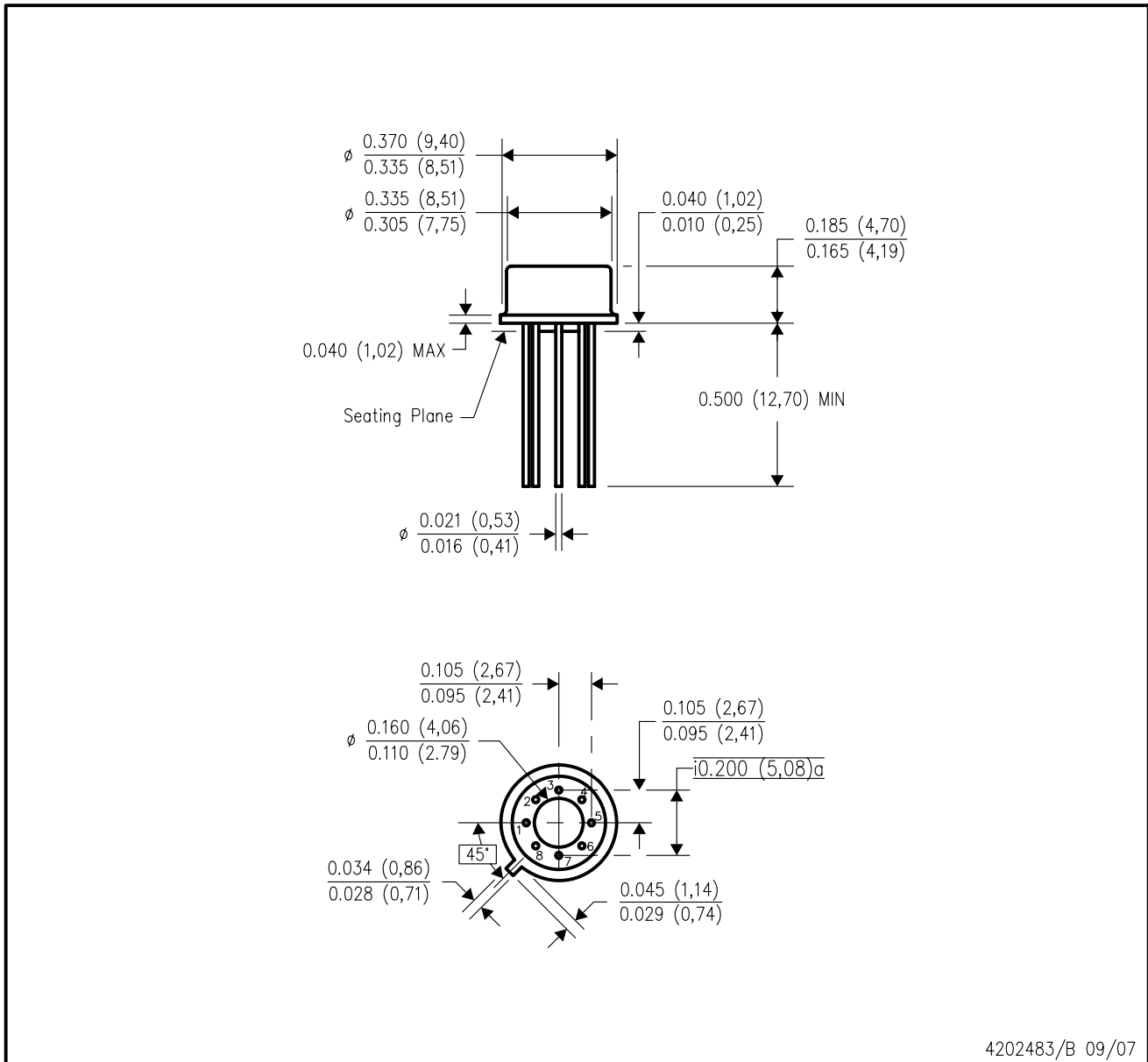
(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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LMC (O-MBCY-W8)

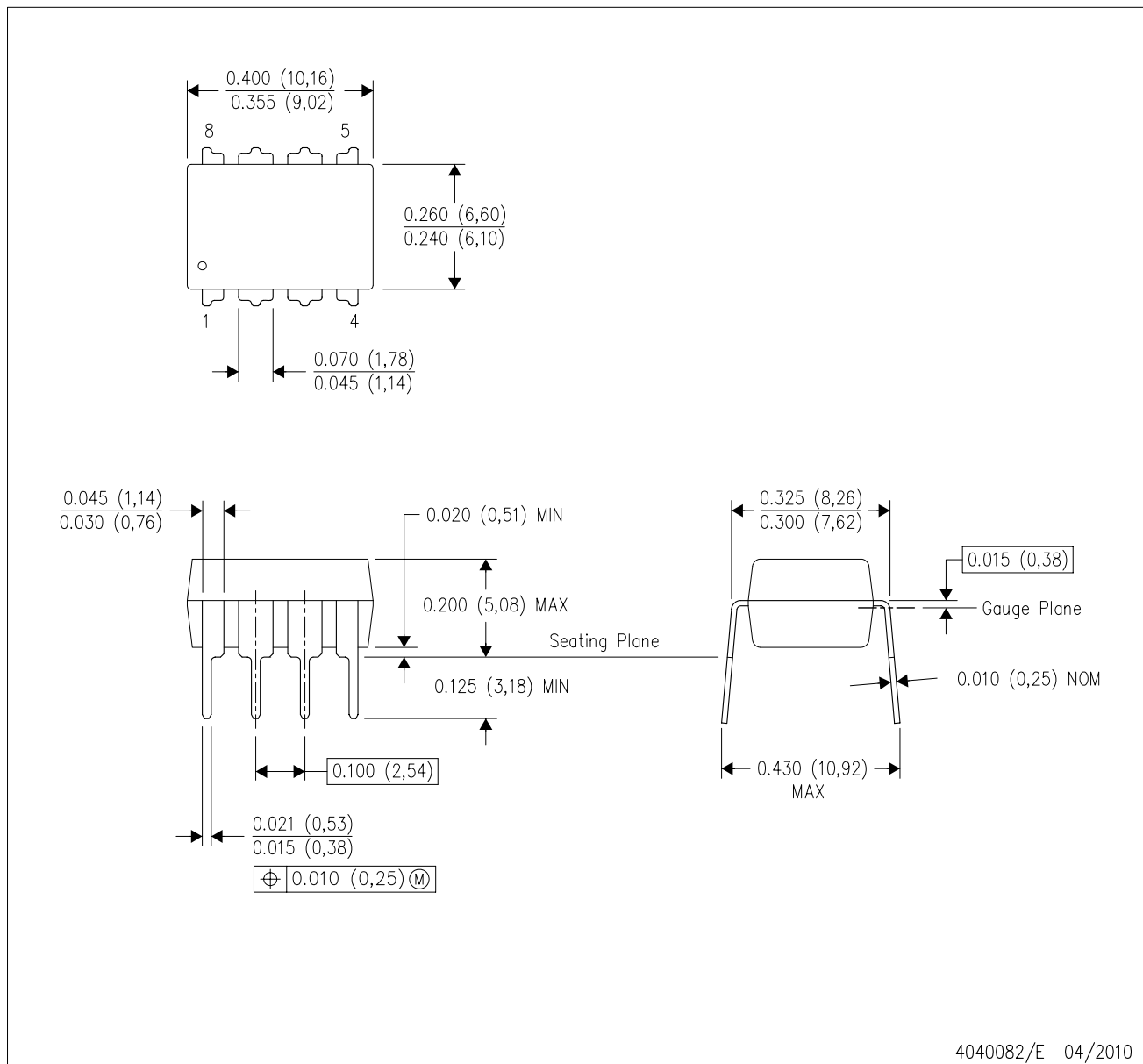
METAL CYLINDRICAL PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Leads in true position within 0.010 (0,25) R @ MMC at seating plane.
 - D. Pin numbers shown for reference only. Numbers may not be marked on package.
 - E. Falls within JEDEC MO-002/TO-99.

P (R-PDIP-T8)

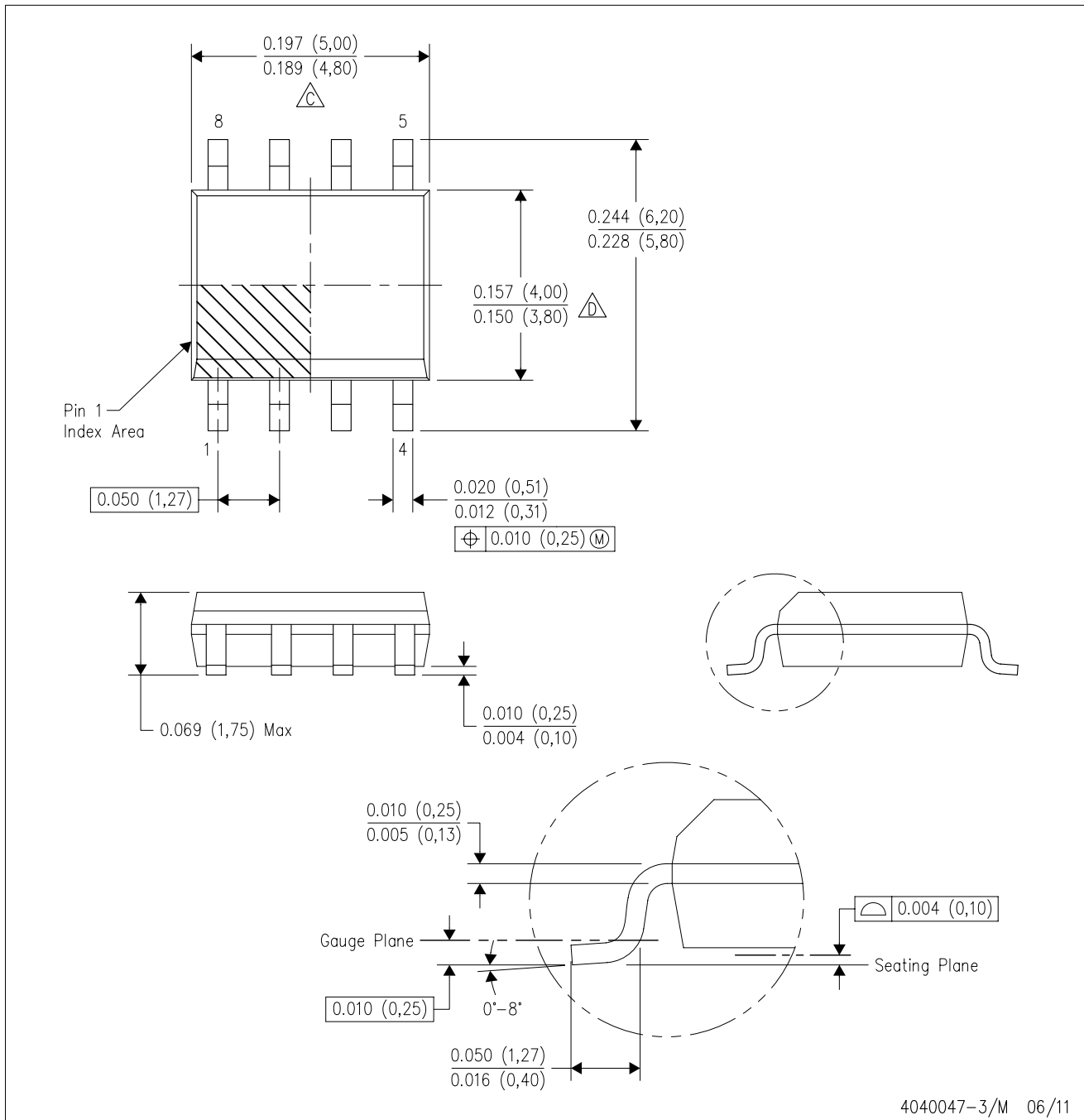
PLASTIC DUAL-IN-LINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Falls within JEDEC MS-001 variation BA.

D (R-PDSO-G8)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
 - Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
 - E. Reference JEDEC MS-012 variation AA.

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