

OP07x 高精度オペアンプ

1 特長

- 低ノイズ
- 外付け部品不要
- 低コストでチョッパ・アンプを置き換え
- 幅広い入力電圧範囲:
0V~±14V (通常は ±15V 電源)
- 幅広い供給電圧範囲: ±3V~±18V

2 アプリケーション

- アナログ入力モジュール
- バッテリ試験装置
- 実験室およびフィールド計測
- 温度トランスミッタ
- 商用ネットワークおよびサーバーの PSU (電源)

3 説明

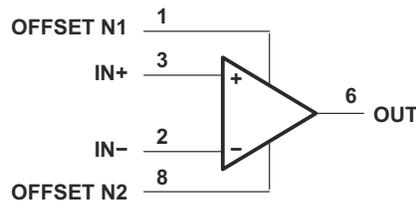
OP07C および OP07D (OP07x) デバイスは、低ノイズ、チョッパレス、バイポーラ入力トランジスタを特徴とするアンプ回路により、低オフセットと長期安定性を実現します。ほとんどのアプリケーションでは、オフセット・ヌリング周波数補償のための外付け部品は必要ありません。入力電圧範囲が広く、同相信号除去が非常に優れた完全な差動入力により、ノイズの多い環境や非反転アプリケーションで最大の柔軟性と性能を実現します。温度範囲全体にわたって、低いバイアス電流と非常に高い入力インピーダンスが維持されます。

性能の向上と幅広い温度範囲については、低消費電力の次世代 [OPA207](#) と、大きい容量性負荷ドライブ能力を持つ [OPA202](#) をご覧ください。

パッケージ情報

| 部品番号 | パッケージ ⁽¹⁾ | 本体サイズ (公称) |
|--------------|----------------------|-----------------|
| OP07C, OP07D | D (SOIC, 8) | 4.90mm × 3.91mm |
| | P (PDIP, 8) | 9.81mm × 6.35mm |
| | PS (SO, 8) | 6.20mm × 5.30mm |

- (1) 利用可能なパッケージと OP07 については、このデータシートの末尾にある注文情報を参照してください。



簡略回路図

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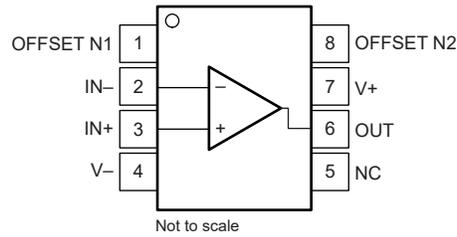
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4 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

| Changes from Revision G (November 2014) to Revision H (July 2022) | Page |
|--|------|
| • 「特長」の「幅広い入力電圧範囲」の箇条書き項目に電源条件を追加..... | 1 |
| • Changed VCC ₊ to V ₊ and VCC ₋ to V ₋ | 3 |
| • Changed supply voltage abbreviation from VCC ₊ and VCC ₋ to V _S in <i>Absolute Maximum Ratings</i> and throughout the data sheet..... | 4 |
| • Changed note 5 in <i>Absolute Maximum Ratings</i> to include a note that fast-ramping shorts to the positive supply can damage the device..... | 4 |
| • Changed Electrostatic discharge Human-body model and Charged-device model from 1000 V to ±1000 V.... | 4 |
| • Added new values to <i>Thermal Information</i> | 4 |
| • Changed <i>Electrical Characteristics</i> format..... | 5 |
| • Changed parameter name from supply-voltage sensitivity to power supply rejection ratio in <i>Electrical Characteristics</i> | 5 |
| • Changed parameter name from input offset voltage to Input voltage noise density in <i>Electrical Characteristics</i> | 5 |
| • Changed input current noise density unit from nV/√Hz to pA/√Hz in <i>Electrical Characteristics</i> | 5 |
| • Changed parameter name from large-signal differential voltage gain to open-loop voltage gain in <i>Electrical Characteristics</i> | 5 |
| • Changed parameter name from peak output voltage to voltage output swing in <i>Electrical Characteristics</i> | 5 |
| • Changed functional block diagram..... | 8 |
| • Changed text to clarify how to adjust input mismatches using null pins in <i>Application Information</i> | 9 |
| Changes from Revision F (January 2014) to Revision G (November 2014) | Page |
| • 「アプリケーション」セクション、「製品情報」表、「ピン機能」表、「取り扱いに関する定格」表、「熱に関する情報」表、「代表的特性」セクション、「機能説明」セクション、「デバイスの機能モード」セクション、「アプリケーションと実装」セクション、「電源に関する推奨事項」セクション、「レイアウト」セクション、「デバイスおよびドキュメントのサポート」セクション、「メカニカル、パッケージ、および注文情報」セクションを追加..... | 1 |
| Changes from Revision E (May 2004) to Revision F (January 2014) | Page |
| • 「注文情報」表を削除..... | 1 |

5 Pin Configuration and Functions



**图 5-1. D Package, 8-Pin SOIC,
P Package, 8-Pin PDIP,
and PS Package, 8-Pin SO
(Top View)**

表 5-1. Pin Functions

| PIN | | TYPE | DESCRIPTION |
|-----------|-----|--------|--|
| NAME | NO. | | |
| IN+ | 3 | Input | Noninverting input |
| IN- | 2 | Input | Inverting input |
| NC | 5 | — | Do not connect |
| OFFSET N1 | 1 | Input | External input offset voltage adjustment |
| OFFSET N2 | 8 | Input | External input offset voltage adjustment |
| OUT | 6 | Output | Output |
| V+ | 7 | — | Positive supply |
| V- | 4 | — | Negative supply |

6 Specifications

6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) ⁽¹⁾

| | | | MIN | MAX | UNIT |
|------------------|-------------------------------------|-----------------------------|------------|-----|------|
| V _S | Supply voltage ⁽²⁾ | Single supply | | 44 | V |
| | | Dual supply | | ±22 | |
| | Input voltage | Differential ⁽³⁾ | | ±30 | V |
| | | Single-ended ⁽⁴⁾ | | ±22 | |
| | Output short-circuit ⁽⁵⁾ | | Continuous | | |
| T _J | Operating junction temperature | | –55 | 150 | °C |
| T _{stg} | Storage temperature | | –65 | 150 | °C |

- (1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) All voltage values, unless otherwise noted, are with respect to the midpoint between V+ and V–.
- (3) Differential voltages are at IN+ with respect to IN–.
- (4) The magnitude of the input voltage must never exceed the magnitude of the supply voltage or 15 V, whichever is less.
- (5) The output can be shorted to ground or to the negative power supply. Fast ramping shorts to the positive supply can cause permanent damage and eventual destruction.

6.2 ESD Ratings

| | | | VALUE | UNIT |
|--------------------|-------------------------|--|-------|------|
| V _(ESD) | Electrostatic discharge | Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾ | ±1000 | V |
| | | Charged-device model (CDM), per JEDEC specification JESD22-C101 ⁽²⁾ | ±1000 | |

- (1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.
- (2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)

| | | | MIN | NOM | MAX | UNIT |
|-----------------|-------------------------------|------------------------|-----|-----|-----|------|
| V _S | Supply voltage | Single supply | 6 | | 36 | V |
| | | Dual supply | ±3 | | ±18 | |
| V _{CM} | Common-mode input voltage | V _S = ±15 V | –13 | | 13 | V |
| T _A | Operating ambient temperature | | 0 | | 70 | °C |

6.4 Thermal Information

| THERMAL METRIC ⁽¹⁾ | | OP07x | | UNIT |
|-------------------------------|--|----------|----------|------|
| | | D (SOIC) | P (PDIP) | |
| | | 8 PINS | 8 PINS | |
| R _{θJA} | Junction-to-ambient thermal resistance | 127.6 | 85 | °C/W |
| R _{θJC(top)} | Junction-to-case (top) thermal resistance | 67.1 | 68.6 | °C/W |
| R _{θJB} | Junction-to-board thermal resistance | 71.4 | 55.6 | °C/W |
| ψ _{JT} | Junction-to-top characterization parameter | 18.7 | 38.3 | °C/W |
| ψ _{JB} | Junction-to-board characterization parameter | 70.6 | 55.2 | °C/W |
| R _{θJC(bot)} | Junction-to-case (bottom) thermal resistance | — | — | °C/W |

- (1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC Package Thermal Metrics](#) application report.

6.5 Electrical Characteristics

at $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{ V}$, $R_L = 2\text{ k}\Omega$ connected to mid-supply, and $V_{CM} = V_{OUT} = \text{mid-supply}$ (unless otherwise noted)⁽¹⁾.

| PARAMETER | | TEST CONDITIONS | | MIN | TYP | MAX | UNIT | |
|----------------------------|--|---|--|--|------------|-----------|------------------------------|--|
| OFFSET VOLTAGE | | | | | | | | |
| V_{OS} | Input offset voltage | OP07C | | | ± 60 | | μV | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | ± 85 | | | |
| | | OP07D | | | | ± 150 | | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | | ± 250 | | |
| dV_{OS}/dT | Input offset voltage drift | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | OP07C | | ± 0.5 | | $\mu\text{V}/^\circ\text{C}$ | |
| | | | OP07D | | | ± 2.5 | | |
| | Long-term drift of input offset voltage ⁽²⁾ | | | | ± 0.4 | | $\mu\text{V}/\text{mo}$ | |
| | Offset adjustment range | $R_S = 20\text{ k}\Omega$, see セクション 8.1 | | | ± 4 | | mV | |
| PSRR | Power supply rejection ratio | $V_S = \pm 3\text{ V to } \pm 18\text{ V}$ | | | 7 | 32 | $\mu\text{V}/\text{V}$ | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | 10 | 51 | | |
| INPUT BIAS CURRENT | | | | | | | | |
| I_B | Input bias current | OP07C | | | ± 1.8 | | nA | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | ± 2.2 | | | |
| | | OP07D | | | | ± 12 | | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | | ± 14 | | |
| | Input bias current drift | | OP07C | | ± 18 | | $\text{pA}/^\circ\text{C}$ | |
| | | | OP07D | | | ± 50 | | |
| I_{OS} | Input offset current | OP07C | | | ± 0.8 | | nA | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | ± 1.6 | | | |
| | | OP07D | | | | ± 6 | | |
| | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | | ± 8 | | |
| | Input offset current drift | | OP07C | | 12 | | $\text{pA}/^\circ\text{C}$ | |
| | | | OP07D | | | ± 50 | | |
| NOISE | | | | | | | | |
| | Input voltage noise | $f = 0.1\text{ Hz to } 10\text{ Hz}$ | | | 0.38 | | μV_{PP} | |
| e_N | Input voltage noise density | $f = 10\text{ Hz}$ | | | 10.5 | | $\text{nV}/\sqrt{\text{Hz}}$ | |
| | | $f = 100\text{ Hz}$ | | | 10.2 | | | |
| | | $f = 1\text{ kHz}$ | | | 9.8 | | | |
| | Input current noise | $f = 0.1\text{ Hz to } 10\text{ Hz}$ | | | 15 | | pA_{PP} | |
| i_N | Input current noise density | $f = 10\text{ Hz}$ | | | 0.35 | | $\text{pA}/\sqrt{\text{Hz}}$ | |
| | | $f = 100\text{ Hz}$ | | | 0.15 | | | |
| | | $f = 1\text{ kHz}$ | | | 0.13 | | | |
| INPUT VOLTAGE RANGE | | | | | | | | |
| V_{CM} | Common-mode voltage | | | ± 13 | ± 14 | | V | |
| | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | | ± 13 | ± 13.5 | | | |
| CMRR | Common-mode rejection ratio | OP07C | $V_{CM} = \pm 13\text{ V}$ | | 100 | 120 | dB | |
| | | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | 97 | 120 | | |
| | | OP07D | $V_{CM} = \pm 13\text{ V}$ | | 94 | 110 | | |
| | | | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | 94 | 106 | | |
| INPUT CAPACITANCE | | | | | | | | |
| r_I | Input resistance | | | 7 | 33 | | M Ω | |
| OPEN-LOOP GAIN | | | | | | | | |

6.5 Electrical Characteristics (continued)

at $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{ V}$, $R_L = 2\text{ k}\Omega$ connected to mid-supply, and $V_{CM} = V_{OUT} = \text{mid-supply}$ (unless otherwise noted)⁽¹⁾.

| PARAMETER | | TEST CONDITIONS | | MIN | TYP | MAX | UNIT |
|-----------------|------------------------|---|-------------------------------------|-----|-----|-----|------|
| A _{OL} | Open-loop voltage gain | 1.4 V < V _O < 11.4 V, R _L = 500 kΩ | OP07C | 100 | 400 | | V/mV |
| | | | OP07D | | 400 | | |
| | | V _O = ±10 V | | 120 | 400 | | |
| | | | T _A = -40°C to +125°C | 100 | 400 | | |

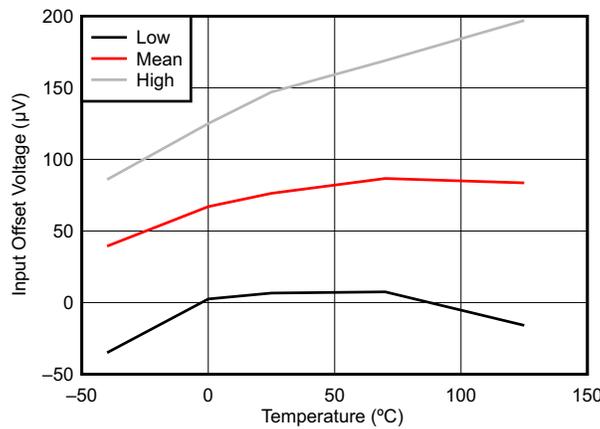
6.5 Electrical Characteristics (continued)

at $T_A = 25^\circ\text{C}$, $V_S = \pm 15\text{ V}$, $R_L = 2\text{ k}\Omega$ connected to mid-supply, and $V_{CM} = V_{OUT} = \text{mid-supply}$ (unless otherwise noted)⁽¹⁾.

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---------------------------|----------------------|---|------------|------------|-----|------------------|
| FREQUENCY RESPONSE | | | | | | |
| | Unity gain bandwidth | | 0.4 | 0.6 | | MHz |
| SR | Slew rate | $V_S = 5\text{ V}$, $R_L = 2\text{ k}\Omega$ | | 0.3 | | V/ μs |
| OUTPUT | | | | | | |
| | Voltage output swing | | ± 11.5 | ± 12.8 | | V |
| | | $T_A = 0^\circ\text{C to } 70^\circ\text{C}$ | ± 11 | ± 12.6 | | |
| | | $R_L = 10\text{ k}\Omega$ | ± 12 | ± 13 | | |
| | | $R_L = 1\text{ k}\Omega$ | | ± 12 | | |
| POWER SUPPLY | | | | | | |
| P_D | Power dissipation | No load | | 80 | 150 | mW |
| | | $V_S = \pm 3\text{ V}$, no load | | 4 | 8 | |

- (1) The specifications listed in the *Electrical Characteristics* apply to OP07C and OP07D.
- (2) Because long-term drift cannot be measured on the individual devices before shipment, this specification is not intended to be a warranty. This specification is an engineering estimate of the averaged trend line of drift versus time over extended periods after the first 30 days of operation.

6.6 Typical Characteristics



6-1. Input-Offset Voltage vs Temperature

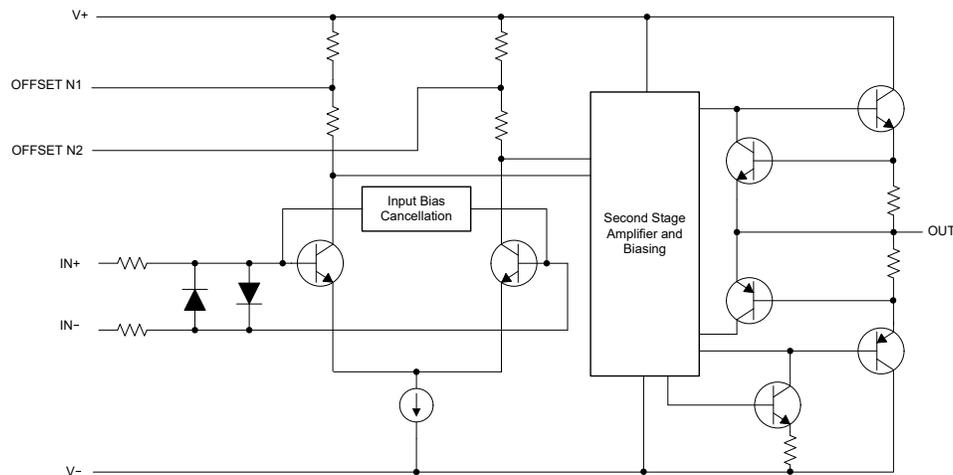
7 Detailed Description

7.1 Overview

These devices offer low offset and long-term stability by means of a low-noise, chopperless, bipolar-input-transistor amplifier circuit. For most applications, external components are not required for offset nulling and frequency compensation. The true differential input, with a wide input-voltage range and outstanding common-mode rejection, provides maximum flexibility and performance in high-noise environments and in noninverting applications. Low bias currents and extremely high input impedances are maintained over the entire temperature range.

These devices are characterized for operation from 0°C to 70°C.

7.2 Functional Block Diagram



7.3 Feature Description

7.3.1 Offset-Voltage Null Capability

The input offset voltage of operational amplifiers (op amps) arises from unavoidable mismatches in the differential input stage of the op-amp circuit caused by mismatched transistor pairs, collector currents, current-gain betas (β), collector or emitter resistors, and so on. The input offset pins allow the designer to adjust for these mismatches by external circuitry. See [セクション 8](#) for more details on design techniques.

7.3.2 Slew Rate

The slew rate is the rate at which an operational amplifier can change the output when there is a change on the input. The OP07x have a 0.3-V/ μ s slew rate.

7.4 Device Functional Modes

The OP07x are powered on when the supply is connected. The devices can be operated as single-supply operational amplifiers or dual-supply amplifiers, depending on the application.

8 Application and Implementation

注

以下のアプリケーション情報は、TI の製品仕様に含まれるものではなく、TI ではその正確性または完全性を保証いたしません。個々の目的に対する製品の適合性については、お客様の責任で判断していただくこととなります。お客様は自身の設計実装を検証しテストすることで、システムの機能を確認する必要があります。

8.1 Application Information

The input offset voltage of operational amplifiers (op amps) arises from unavoidable mismatches in the differential input stage of the op-amp circuit caused by mismatched transistor pairs, collector currents, current-gain betas (β), collector or emitter resistors, and so on. The input offset pins allow the designer to adjust for these mismatches with external circuitry. [図 8-1](#) shows how these input mismatches can be adjusted by putting resistors or a potentiometer between the null pins. Use a potentiometer to fine tune the circuit during testing or for applications that require precision offset control. For more information about designing using the input-offset pins, see the [Nulling Input Offset Voltage of Operational Amplifiers application report](#).

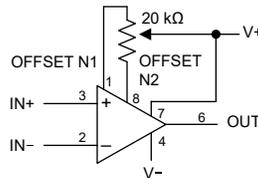


図 8-1. Input Offset-Voltage Null Circuit

8.2 Typical Application

The voltage follower configuration of the operational amplifier is used for applications where a weak signal is used to drive a relatively high current load. This circuit is also called a buffer amplifier or unity gain amplifier. The inputs of an operational amplifier have a very high resistance that puts a negligible current load on the voltage source. The output resistance of the operational amplifier is almost negligible, so the amplifier can provide as much current as necessary to the output load.

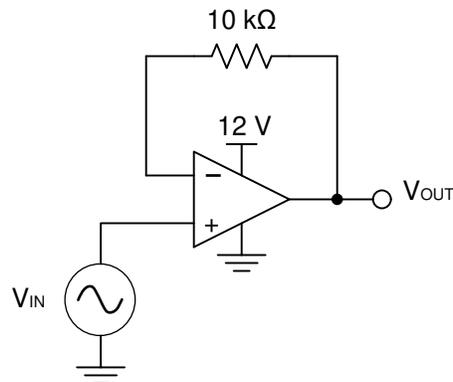


図 8-2. Voltage Follower Schematic

8.2.1 Design Requirements

- Output range of 2 V to 11 V
- Input range of 2 V to 11 V

8.2.2 Detailed Design Procedure

8.2.2.1 Output Voltage Swing

The output voltage of an operational amplifier is limited by the internal circuitry to some level less than the supply rails. For this amplifier, the output voltage swing is within ± 12 V, which accommodates the input and output voltage requirements.

8.2.2.2 Supply and Input Voltage

For correct operation of the amplifier, neither input must be higher than the recommended positive supply rail voltage or lower than the recommended negative supply rail voltage. The chosen amplifier must be able to operate at the supply voltage that accommodates the inputs. Because the input for this application goes up to 11 V, the supply voltage must be 12 V. Using a negative voltage on the lower rail, rather than ground, allows the amplifier to maintain linearity for inputs below 2 V.

8.2.3 Application Curves

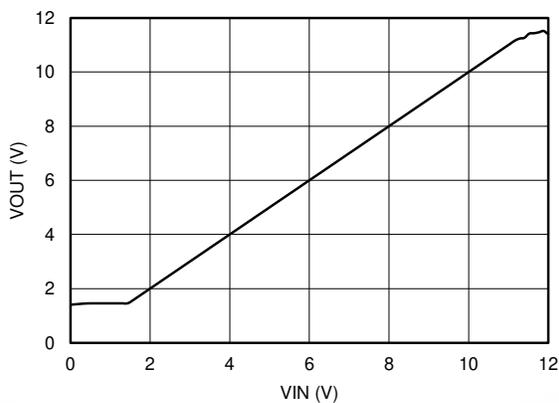


图 8-3. Output Voltage vs Input Voltage

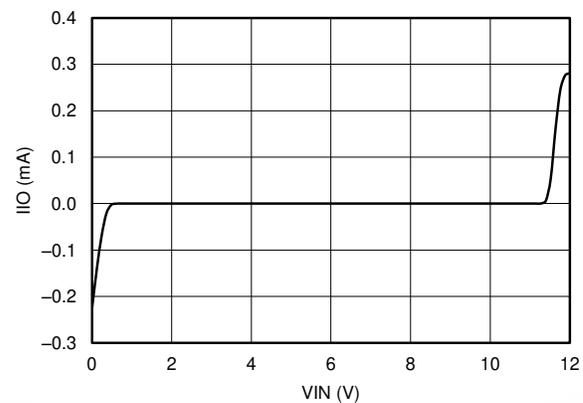


图 8-4. Current Drawn by the Input of the Voltage Follower (I_{IO}) vs Input Voltage

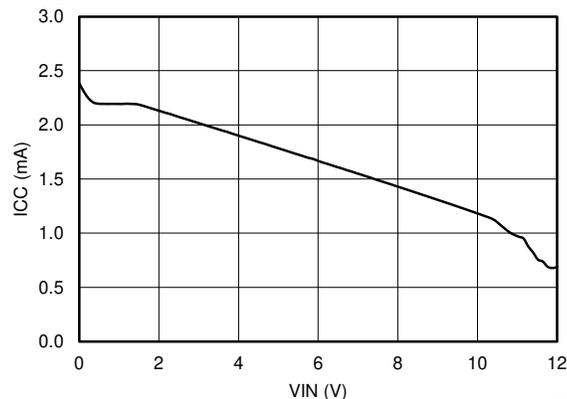


图 8-5. Current Drawn from Supply (I_{CC}) vs Input Voltage

8.3 Power Supply Recommendations

The OP07x operate from ± 3 V to ± 18 V supplies; many specifications apply from 0°C to 70°C.

注意

Supply voltages larger than ± 22 V can permanently damage the device. See also [セクション 6.1](#).

Place 0.1- μ F bypass capacitors close to the power-supply pins to reduce errors coupling in from noisy or high-impedance power supplies. For more details on bypass capacitor placement, see [セクション 8.4.1](#).

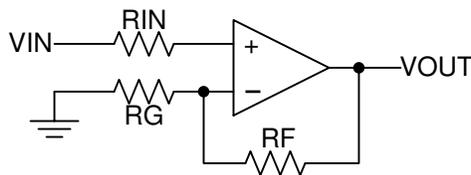
8.4 Layout

8.4.1 Layout Guidelines

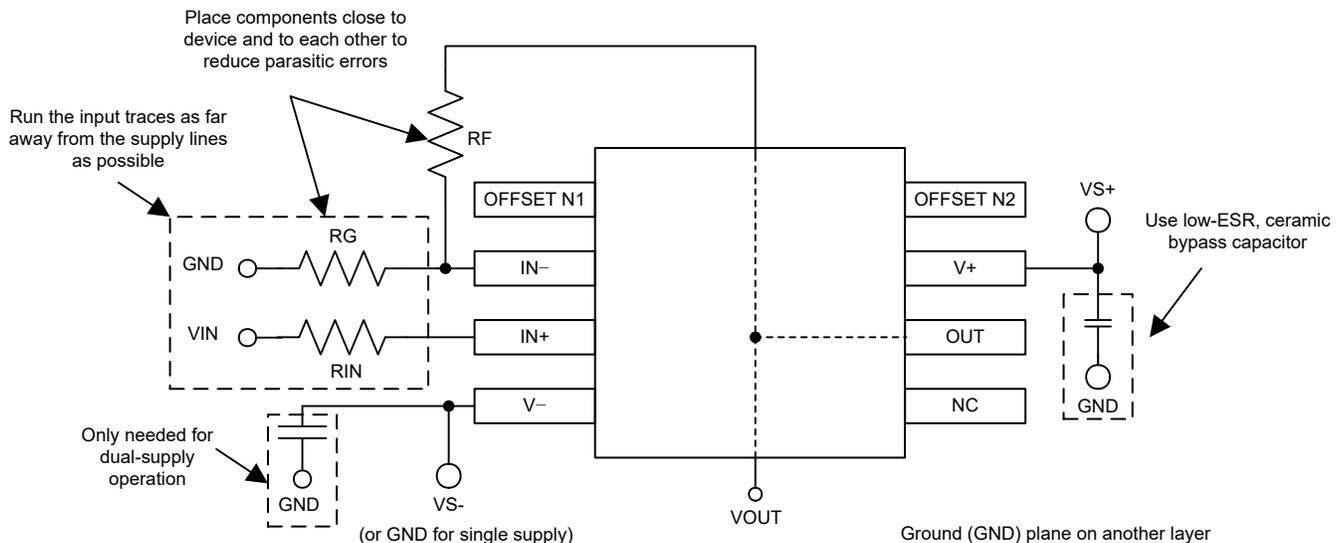
For best operational performance of the device, use good PCB layout practices, including:

- Noise can propagate into analog circuitry through the power pins of the circuit as a whole, as well as the operational amplifier. Bypass capacitors are used to reduce the coupled noise by providing low-impedance power sources local to the analog circuitry.
 - Connect low-ESR, 0.1- μF ceramic bypass capacitors between each supply pin and ground, placed as close to the device as possible. A single bypass capacitor from V+ to ground is applicable for single supply applications.
- Separate grounding for analog and digital portions of circuitry is one of the simplest and most-effective methods of noise suppression. On multilayer PCBs, one or more layers are usually devoted to ground planes. A ground plane helps distribute heat and reduces EMI noise pickup. Make sure to physically separate digital and analog grounds, paying attention to the flow of the ground current.
- To reduce parasitic coupling, run the input traces as far away from the supply or output traces as possible. If it is not possible to keep them separate, it is much better to cross the sensitive trace perpendicularly, as opposed to in parallel, with the noisy trace.
- Place the external components as close to the device as possible. Keeping RF and RG close to the inverting input minimizes parasitic capacitance, as shown in [セクション 8.4.2](#).
- Keep the length of input traces as short as possible. Always remember that the input traces are the most sensitive part of the circuit.
- Consider a driven, low-impedance guard ring around the critical traces. A guard ring can significantly reduce leakage currents from nearby traces that are at different potentials.

8.4.2 Layout Example



8-6. Operational Amplifier Schematic for Noninverting Configuration



8-7. Operational Amplifier Board Layout for Noninverting Configuration

9 Device and Documentation Support

9.1 ドキュメントの更新通知を受け取る方法

ドキュメントの更新についての通知を受け取るには、[ti.com](https://www.ti.com) のデバイス製品フォルダを開いてください。「更新の通知を受け取る」をクリックして登録すると、変更されたすべての製品情報に関するダイジェストを毎週受け取れます。変更の詳細については、修正されたドキュメントに含まれている改訂履歴をご覧ください。

9.2 サポート・リソース

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9.3 Trademarks

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9.4 静電気放電に関する注意事項



この IC は、ESD によって破損する可能性があります。テキサス・インスツルメンツは、IC を取り扱う際には常に適切な注意を払うことを推奨します。正しい取り扱いおよび設置手順に従わない場合、デバイスを破損するおそれがあります。

ESD による破損は、わずかな性能低下からデバイスの完全な故障まで多岐にわたります。精密な IC の場合、パラメータがわずかに変化するだけで公表されている仕様から外れる可能性があるため、破損が発生しやすくなっています。

9.5 用語集

[テキサス・インスツルメンツ用語集](#) この用語集には、用語や略語の一覧および定義が記載されています。

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser based versions of this data sheet, refer to the left hand navigation.

PACKAGING INFORMATION

| Orderable Device | Status (1) | Package Type | Package Drawing | Pins | Package Qty | Eco Plan (2) | Lead finish/ Ball material (6) | MSL Peak Temp (3) | Op Temp (°C) | Device Marking (4/5) | Samples |
|------------------|---------------|--------------|-----------------|------|-------------|-----------------|--------------------------------------|----------------------|--------------|-------------------------|---------|
| OP-07DP | ACTIVE | PDIP | P | 8 | 50 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | OP-07DP | Samples |
| OP-07DPS | ACTIVE | SO | PS | 8 | 80 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP-07D | Samples |
| OP-07DPSR | ACTIVE | SO | PS | 8 | 2000 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP-07D | Samples |
| OP07-W | ACTIVE | WAFERSALE | YS | 0 | 3603 | TBD | Call TI | Call TI | | | Samples |
| OP07CD | LIFEBUY | SOIC | D | 8 | 75 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07C | |
| OP07CDE4 | LIFEBUY | SOIC | D | 8 | 75 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07C | |
| OP07CDG4 | LIFEBUY | SOIC | D | 8 | 75 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07C | |
| OP07CDR | ACTIVE | SOIC | D | 8 | 2500 | RoHS & Green | NIPDAU SN | Level-1-260C-UNLIM | 0 to 70 | OP07C | Samples |
| OP07CDRE4 | LIFEBUY | SOIC | D | 8 | 2500 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07C | |
| OP07CDRG4 | LIFEBUY | SOIC | D | 8 | 2500 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07C | |
| OP07CP | ACTIVE | PDIP | P | 8 | 50 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | OP07CP | Samples |
| OP07DD | ACTIVE | SOIC | D | 8 | 75 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07D | Samples |
| OP07DDR | ACTIVE | SOIC | D | 8 | 2500 | RoHS & Green | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | OP07D | Samples |
| OP07DP | ACTIVE | PDIP | P | 8 | 50 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | OP07DP | Samples |
| OP07DPE4 | ACTIVE | PDIP | P | 8 | 50 | RoHS & Green | NIPDAU | N / A for Pkg Type | 0 to 70 | OP07DP | 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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 1000 ppm threshold requirement.

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

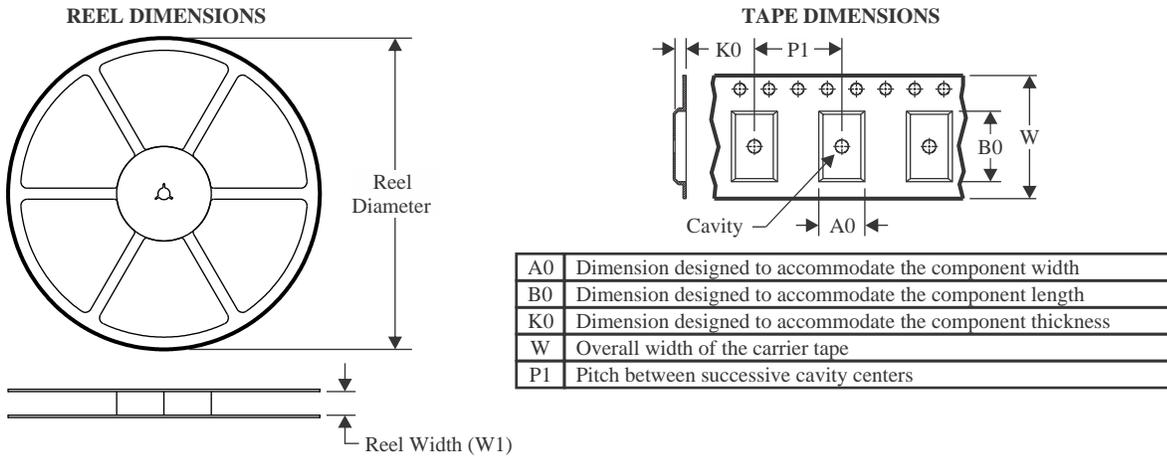
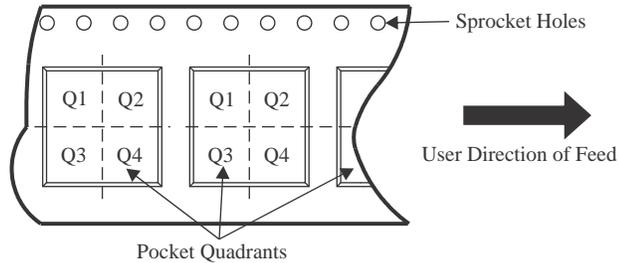
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device 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 Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


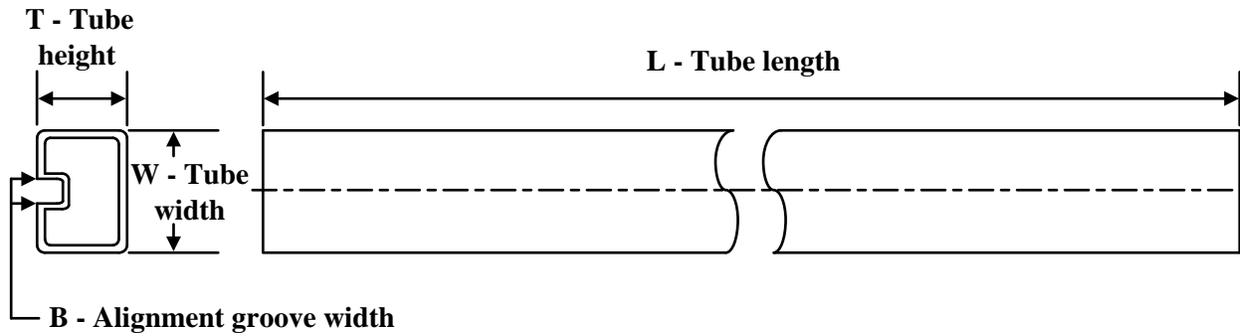
*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|-----------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| OP-07DPSR | SO | PS | 8 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| OP07CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| OP07CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| OP07CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| OP07CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| OP07CDRG4 | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| OP07DDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS

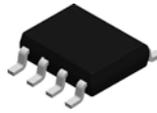

*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|-----------|--------------|-----------------|------|------|-------------|------------|-------------|
| OP-07DPSR | SO | PS | 8 | 2000 | 356.0 | 356.0 | 35.0 |
| OP07CDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| OP07CDR | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |
| OP07CDR | SOIC | D | 8 | 2500 | 356.0 | 356.0 | 35.0 |
| OP07CDR | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |
| OP07CDRG4 | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |
| OP07DDR | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |

TUBE


*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (μm) | B (mm) |
|----------|--------------|--------------|------|-----|--------|--------|--------|--------|
| OP-07DP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| OP-07DPS | PS | SOP | 8 | 80 | 530 | 10.5 | 4000 | 4.1 |
| OP07CD | D | SOIC | 8 | 75 | 507 | 8 | 3940 | 4.32 |
| OP07CDE4 | D | SOIC | 8 | 75 | 507 | 8 | 3940 | 4.32 |
| OP07CDG4 | D | SOIC | 8 | 75 | 507 | 8 | 3940 | 4.32 |
| OP07CP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| OP07DD | D | SOIC | 8 | 75 | 507 | 8 | 3940 | 4.32 |
| OP07DP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| OP07DPE4 | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |

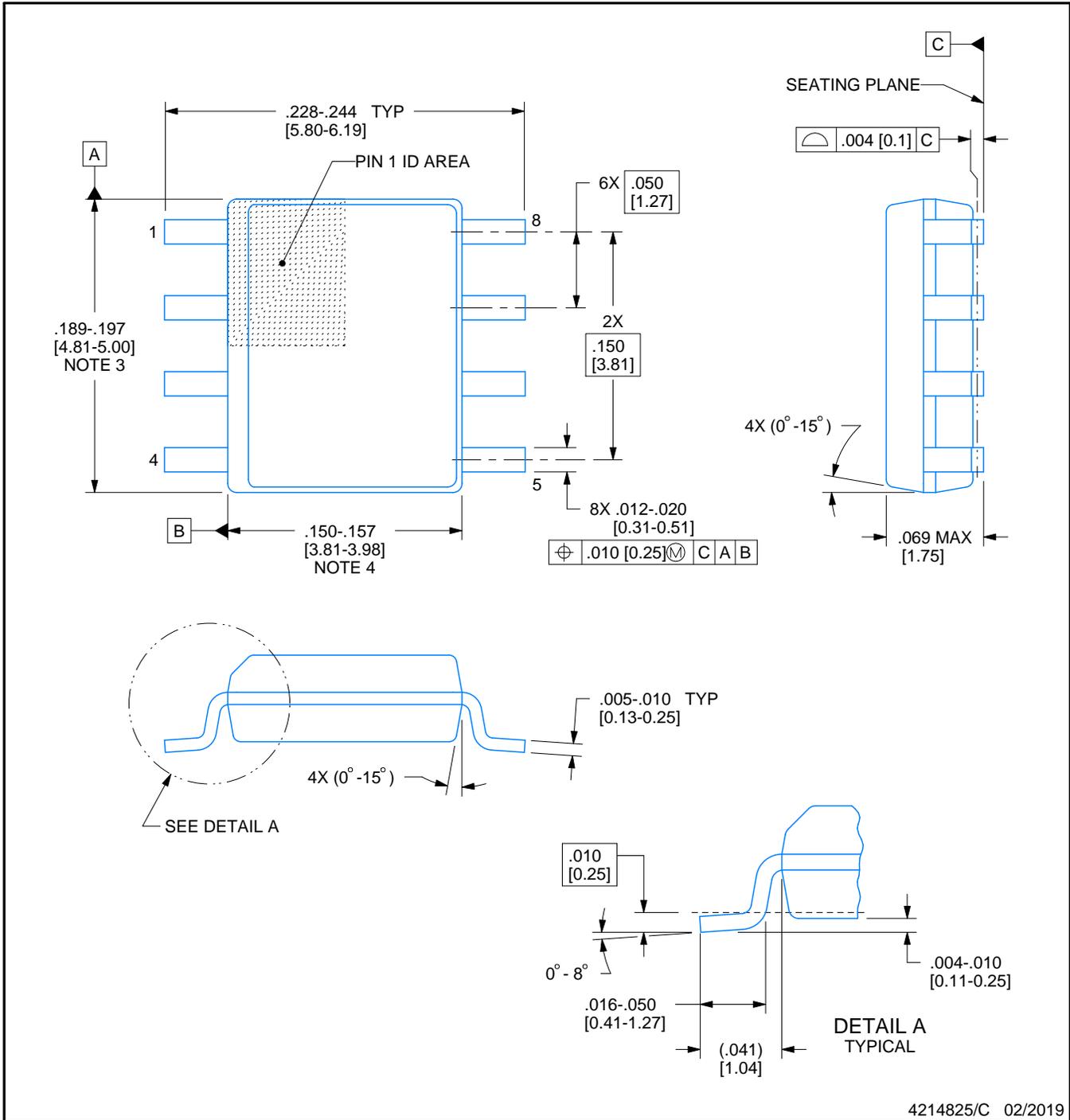


D0008A

PACKAGE OUTLINE

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



4214825/C 02/2019

NOTES:

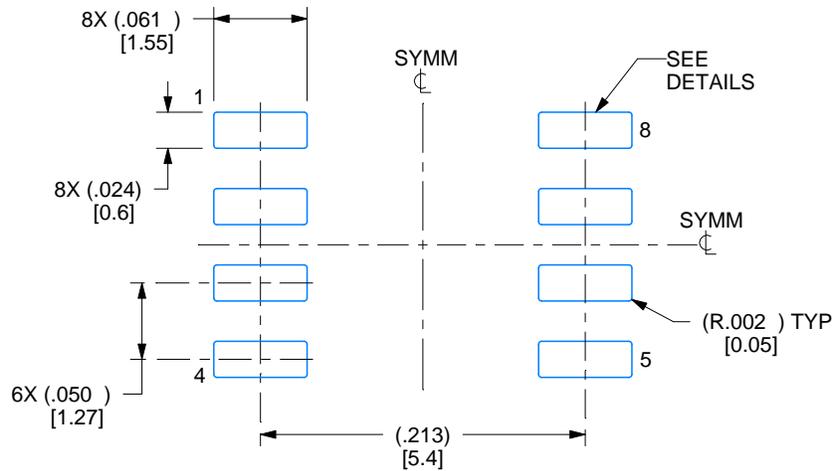
1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed $.006$ [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.

EXAMPLE BOARD LAYOUT

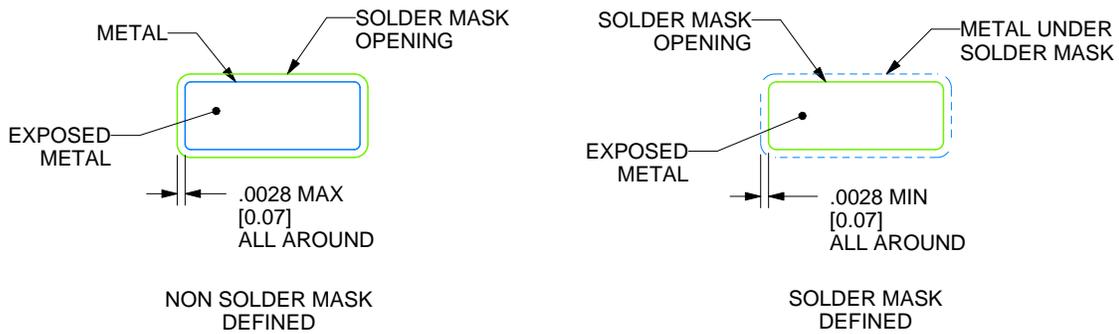
D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X



SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

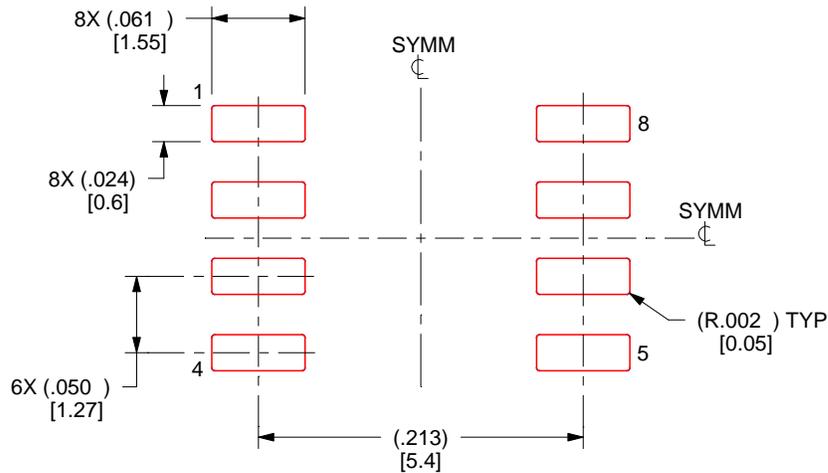
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

D0008A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.125 MM] THICK STENCIL
SCALE:8X

4214825/C 02/2019

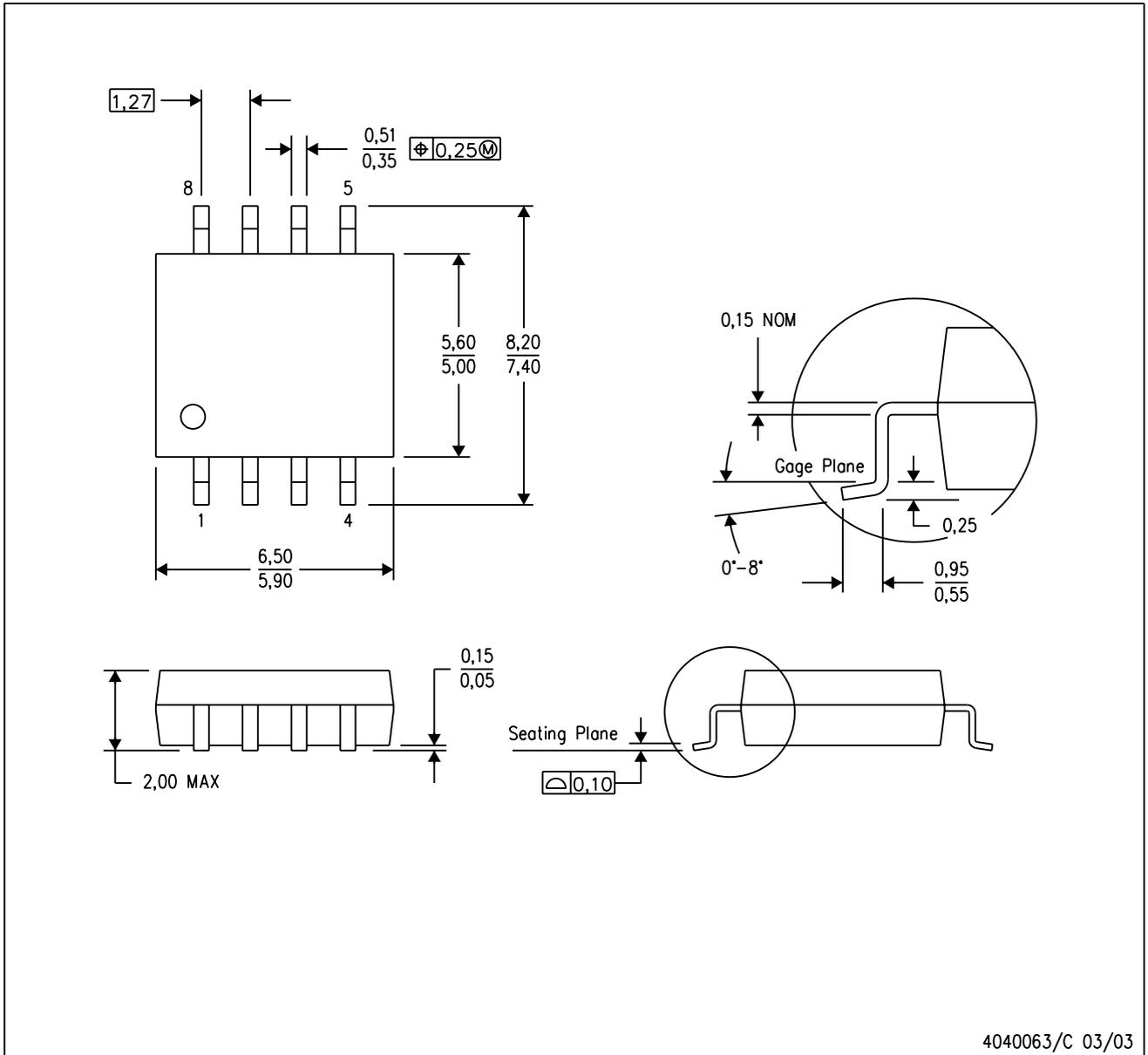
NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

MECHANICAL DATA

PS (R-PDSO-G8)

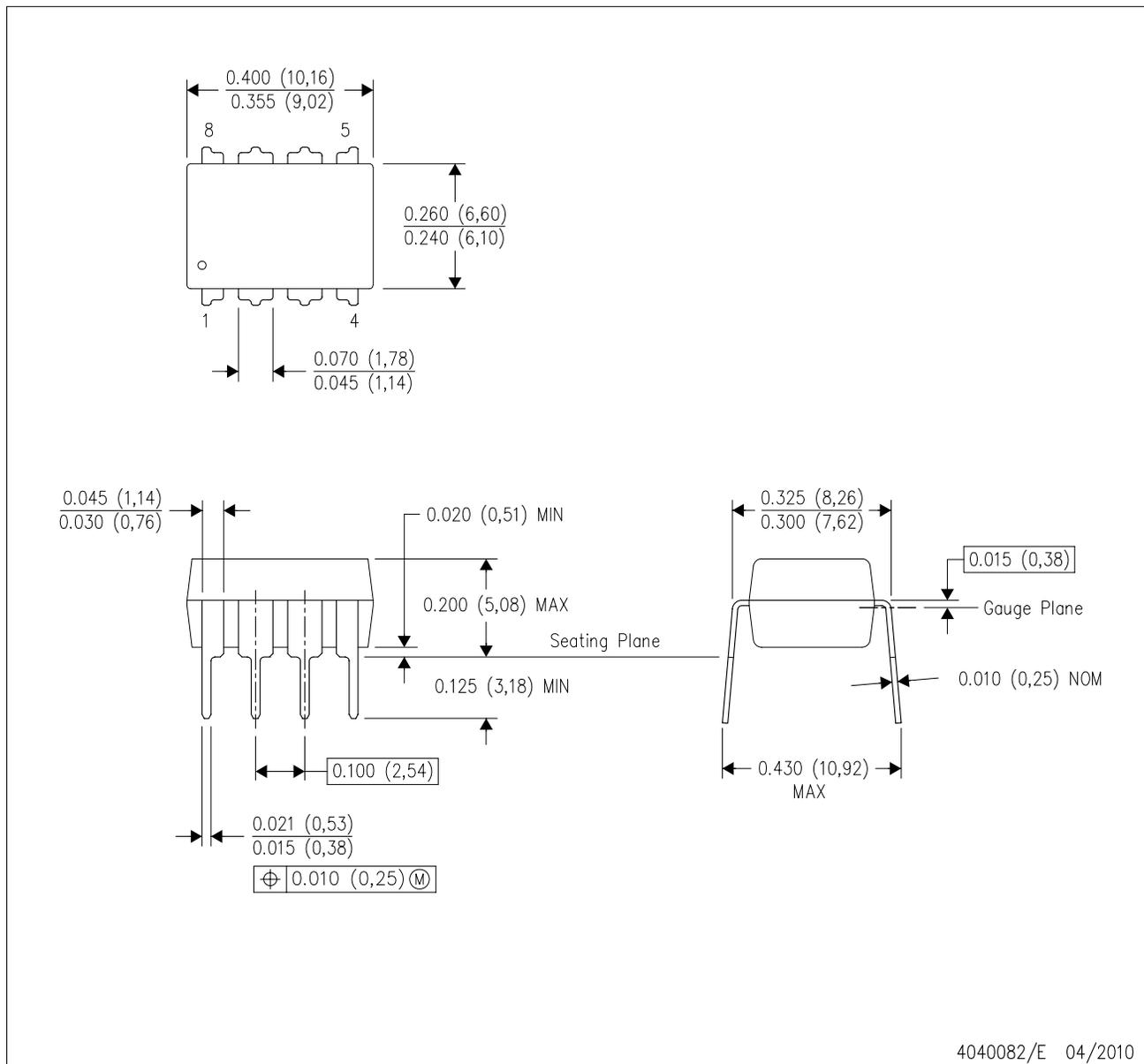
PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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.

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