

FEATURES

- Rail-to-rail output**
- Gain bandwidth product: 4 MHz typical**
- Low offset voltage: 175 μ V**
- Unity-gain stable**
- High slew rate: 4.0 V/ μ s typical**
- Low noise: 3.9 nV/ \sqrt Hz typical**

GENERAL DESCRIPTION

The **OP284** die is available only through this specification.

The **OP284** is a dual operational amplifier, featuring a 4 MHz bandwidth and rail-to-rail inputs and outputs. It is guaranteed to operate in single-supply from 3 V to 36 V, or dual-supply from ± 1.5 V to ± 18 V.

This amplifier is superb for single-supply applications requiring both ac and precision dc performance. The combination of wide bandwidth, low noise, and precision makes the **OP284** useful in a wide variety of applications, including filters and instrumentation.

For application information, please refer to the **OP284** package product data sheet and webpage.

The **OP284CHIPS** die is specified for 25°C operations only.

OP284 CHIP DIMENSIONS AND PAD LAYOUT

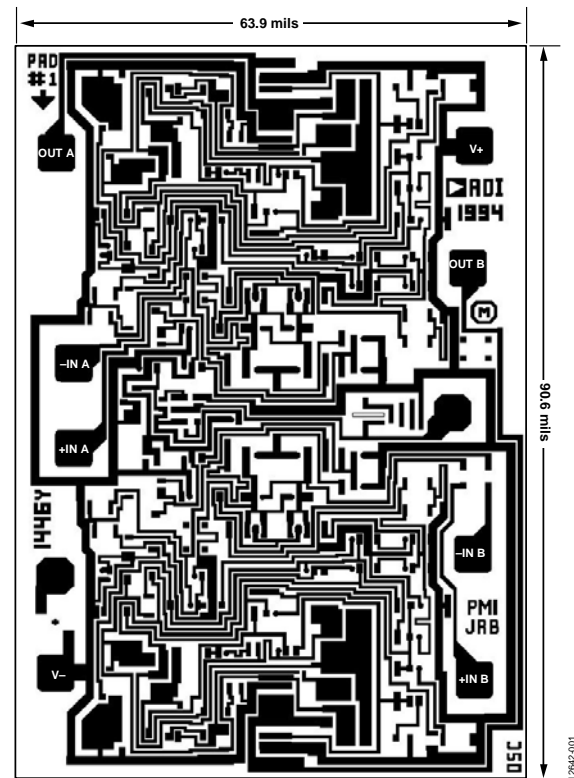


Figure 1. **OP284** Metal Mask Die Image

Table 1. Die Physical Characteristics

| Parameter | Value |
|-----------------------|----------------------------------|
| Die Size | 63.9 mils \times 90.6 mils |
| Back Grind Thickness | 19 mils |
| Bond Pad Opening Size | 104 μ m \times 104 μ m |
| Top Metal Composition | AlCu |
| Passivation | OxyNitride |
| Polyimide | 21 μ m |
| Die Marker | 1446Y |
| Substrate Bias | V- |

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REVISION HISTORY

12/14—Rev. 0 to Rev. A

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9/14—Revision 0: Initial Version

SPECIFICATIONS

ELECTRICAL CHARACTERISTICS, $V_{SY} = \pm 15.0\text{ V}$

$V_{SY} = \pm 15.0\text{ V}$, $V_{CM} = 0\text{ V}$, $V_{OUT} = 0\text{ V}$, $T_A = +25^\circ\text{C}$, unless otherwise noted.

Table 2.

| Parameter | Symbol | Test Conditions/Comments | Min | Typ | Max | Unit |
|------------------------------|--------------------------|--|------|------|---------|------------------------------|
| INPUT CHARACTERISTICS | | | | | | |
| Offset Voltage | V_{OS} | | | | 175 | μV |
| Offset Voltage Drift | $\Delta V_{OS}/\Delta T$ | | | 0.3 | | $\mu\text{V}/^\circ\text{C}$ |
| Input Bias Current | I_B | | | | 150 | nA |
| Input Offset Current | I_{OS} | | | | 50 | nA |
| Input Voltage Range | | | -15 | | +15 | V |
| Common-Mode Rejection Ratio | CMRR | $V_{CM} = -15.0\text{ V to }+15.0\text{ V}$ | 80 | 90 | | dB |
| Large Signal Voltage Gain | A_{VO} | $-10.0\text{ V} \leq V_O \leq +10.0\text{ V}$, $R_L = 2\text{ k}\Omega$ | 150 | 1000 | | V/mV |
| OUTPUT CHARACTERISTICS | | | | | | |
| Output Voltage High | V_{OH} | $I_L = 1.0\text{ mA}$ | 14.8 | | | V |
| Output Voltage Low | V_{OL} | $I_L = 1.0\text{ mA}$ | | | -14.875 | V |
| Short-Circuit Current | I_{OUT} | | -10 | | +10 | mA |
| POWER SUPPLY | | | | | | |
| Power Supply Rejection Ratio | PSRR | $V_{SY} = \pm 2\text{ V to } \pm 18\text{ V}$ | 90 | | | dB |
| Supply Current per Amplifier | I_{SY} | $V_O = 0\text{ V}$ | | | 2.0 | mA |
| DYNAMIC PERFORMANCE | | | | | | |
| Slew Rate | SR | $R_L = 2\text{ k}\Omega$ | 2.4 | 4.0 | | V/ μs |
| Gain Bandwidth Product | GBP | | | 4.25 | | MHz |
| Phase Margin | Φ_M | | | 50 | | Degrees |
| NOISE PERFORMANCE | | | | | | |
| Voltage Noise | e_n p-p | 0.1 Hz to 10 Hz | | 0.3 | | $\mu\text{V p-p}$ |
| Voltage Noise Density | e_n | $f = 1\text{ kHz}$ | | 3.9 | | $\text{nV}/\sqrt{\text{Hz}}$ |
| Current Noise Density | i_n | | | 0.4 | | $\text{pA}/\sqrt{\text{Hz}}$ |

ABSOLUTE MAXIMUM RATINGS

Table 3.

| Parameter | Rating |
|---|--------------------------|
| Supply Voltage | ±18 V |
| Input Voltage | $V- \leq V_{IN} \leq V+$ |
| Differential Input Voltage ¹ | ±0.6 V |
| Output Short-Circuit Duration to GND | Indefinite |
| Functional Temperature Range | -40°C to +125°C |

¹ Limit the input current to less than 5 mA to prevent degradation or destruction of the input devices.

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

ESD CAUTION



ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

OUTLINE DIMENSIONS

DIE PAD DESCRIPTIONS

Die center is the reference location at $0.0\ \mu\text{m} \times 0.0\ \mu\text{m}$. Pad coordinates are to the center of each pad. Waffle pack orientation is the chamfer corner to the OUTA pad.

Table 4. Pad Mnemonics, Function Descriptions, and Coordinates

| Mnemonic | Description | Pad Coordinates (μm) |
|----------|--|-----------------------------------|
| OUTA | Output of Channel A. | $-660 \times +780$ |
| -INA | Negative Input Channel A. | $-608 \times +149$ |
| +INA | Positive Input Channel A. | -608×-107 |
| V- Pad | Negative Power Supply. Substrate is connected to V-. | -662×-780 |
| +INB | Positive Input Channel B. | $+590 \times -800$ |
| -INB | Negative Input Channel B. | $+586 \times -424$ |
| OUTB | Output Channel B. | 570×437 |
| V+ | Positive Power Supply. | 590×802 |
| NC | No Connect—Factory Use Only. | -664×-490 |
| NC | No Connect—Factory Use Only. | 524×0 |

ORDERING GUIDE

| Model | Functional Temperature Range | Package Option/Count | Package Option |
|------------|---|----------------------|----------------|
| OP284CHIPS | -40°C to $+125^{\circ}\text{C}$ | Waffle Pack/221 | DIE |

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