

### FEATURES

**TL082/TL084 compatible**  
**Low input bias current: 10 pA maximum**  
**Offset voltage**  
     5.5 mV maximum (ADTL082A/ADTL084A)  
     9 mV maximum (ADTL082J/ADTL084J)  
**±15 V operation**  
**Low noise: 16 nV/√Hz**  
**Wide bandwidth: 5 MHz**  
**Slew rate: 20 V/μs**  
**CMRR: 80 dB minimum**  
**Total harmonic distortion: 0.001%**  
**Supply current: 1.2 mA typical**  
**Unity-gain stable**

### APPLICATIONS

**General-purpose amplification**  
**Power control and monitoring**  
**Active filters**  
**Industrial/process control**  
**Data acquisition**  
**Sample and hold circuits**  
**Integrators**  
**Input buffering**

### GENERAL DESCRIPTION

The ADTL082 and ADTL084 are JFET input amplifiers that provide industry-leading performance over TL08x devices. The ADTL082A and ADTL084A are improved versions of TL08x A, I, and Q grades. The ADTL082J and ADTL084J are industry alternatives to the TL08x standard and C grades.

The ADTL08x family offers lower noise, offset voltage, offset drift over temperature, and bias current over the TL08x. In addition, the ADTL08x family has better common-mode rejection and slew rates.

These op amps are ideal for various applications, including process control, industrial and instrumentation equipment,

active filtering, data conversion, buffering, and power control and monitoring.

The A grade amplifiers are available in lead-free packaging. The standard grade amplifiers are available in both leaded and lead-free packaging.

The ADTL082A and ADTL084A are specified over the extended industrial (−40°C to +125°C) temperature range. The ADTL082J and ADTL084J are specified over the commercial (0°C to 70°C) temperature range.

### PIN CONFIGURATIONS

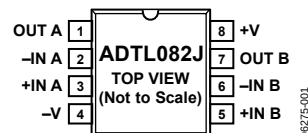


Figure 1. 8-Lead SOIC\_N (R-8)

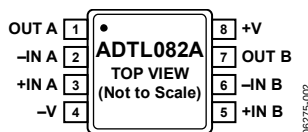


Figure 2. 8-Lead MSOP (RM-8)

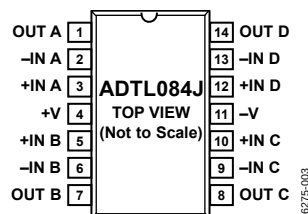


Figure 3. 14-Lead SOIC\_N (R-14)

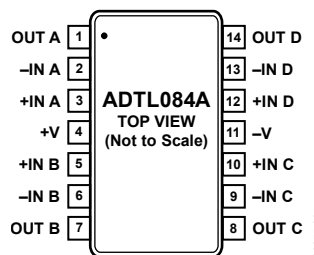


Figure 4. 14-Lead TSSOP (RU-14)

#### Rev. B

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TABLE OF CONTENTS

|                               |   |                                           |    |
|-------------------------------|---|-------------------------------------------|----|
| Features .....                | 1 | Thermal Resistance .....                  | 4  |
| Applications .....            | 1 | Power Sequencing .....                    | 4  |
| Pin Configurations .....      | 1 | ESD Caution.....                          | 4  |
| General Description .....     | 1 | Typical Performance Characteristics ..... | 5  |
| Revision History .....        | 2 | Outline Dimensions .....                  | 8  |
| Specifications.....           | 3 | Ordering Guide .....                      | 10 |
| Absolute Maximum Ratings..... | 4 |                                           |    |

REVISION HISTORY

|                                  |    |
|----------------------------------|----|
| 11/07—Rev. A to Rev. B           |    |
| Changes to Ordering Guide .....  | 10 |
| 4/07—Rev. 0 to Rev. A            |    |
| Changes to Table 1 .....         | 3  |
| 1/07—Revision 0: Initial Version |    |

## SPECIFICATIONS

$V_{CC} = \pm 15\text{ V}$ ,  $V_{CM} = 0\text{ V}$ ,  $T_A = 25^\circ\text{C}$ , over all grades, unless otherwise noted.

Table 1.

| Parameter                    | Symbol                   | Conditions                                                                                | J Grade  |            |     | A Grade    |            |     | Unit                           |
|------------------------------|--------------------------|-------------------------------------------------------------------------------------------|----------|------------|-----|------------|------------|-----|--------------------------------|
|                              |                          |                                                                                           | Min      | Typ        | Max | Min        | Typ        | Max |                                |
| INPUT CHARACTERISTICS        |                          |                                                                                           |          |            |     |            |            |     |                                |
| Offset Voltage               | $V_{OS}$                 | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     |          | 2          | 9   |            | 1.5        | 5.5 | mV                             |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            | 10  |            |            | 8   | mV                             |
|                              |                          |                                                                                           |          |            |     |            |            | 9   | mV                             |
| Offset Voltage Drift         | $\Delta V_{OS}/\Delta T$ | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     |          | 15         |     |            |            |     | $\mu\text{V}/^{\circ}\text{C}$ |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            |     | 10         |            |     | $\mu\text{V}/^{\circ}\text{C}$ |
| Input Bias Current           | $I_B$                    | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     |          | 2          | 100 |            | 2          | 100 | pA                             |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            | 3   |            |            | 3   | nA                             |
|                              |                          |                                                                                           |          |            |     |            |            | 5   | nA                             |
| Input Offset Current         | $I_{OS}$                 | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     |          | 2          | 100 |            | 2          | 100 | pA                             |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            | 3   |            |            | 3   | nA                             |
|                              |                          |                                                                                           |          |            |     |            |            | 5   | nA                             |
| Input Voltage Range          | $V_{CM}$                 | $V_{CM} = -11\text{ V to }+15\text{ V}$                                                   | -11      |            | +15 | -11        |            | +15 | V                              |
| Common-Mode Rejection Ratio  | CMRR                     |                                                                                           | 80       | 86         |     | 80         | 86         |     | dB                             |
| Input Impedance              | $R_{IN}$                 |                                                                                           |          | $10^{12}$  |     |            | $10^{12}$  |     | $\Omega$                       |
| Large Signal Voltage Gain    | $A_{VO}$                 | $R_L = 2\text{ k}\Omega$ ,<br>$V_O = -10\text{ V to }+10\text{ V}$                        | 100      | 200        |     | 100        | 200        |     | V/mV                           |
|                              |                          | $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$                                      | 90       | 200        |     | 90         | 200        |     | V/mV                           |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            |     | 50         | 200        |     | V/mV                           |
| OUTPUT CHARACTERISTICS       |                          |                                                                                           |          |            |     |            |            |     |                                |
| Maximum Output Voltage Swing | $V_O$                    | $R_L = 10\text{ k}\Omega$                                                                 | $\pm 12$ | $\pm 13.5$ |     | $\pm 13$   | $\pm 13.5$ |     | V                              |
|                              |                          | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     | $\pm 12$ |            |     | $\pm 13$   |            |     | V                              |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            |     | $\pm 13$   |            |     | V                              |
|                              |                          | $R_L = 2\text{ k}\Omega$                                                                  |          |            |     | $\pm 12.5$ | $\pm 13.3$ |     | V                              |
|                              |                          | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     | $\pm 10$ |            |     | $\pm 12$   |            |     | V                              |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            |     | $\pm 12$   |            |     | V                              |
| Short-Circuit Output Current | $I_{SC}$                 |                                                                                           |          | $\pm 27$   |     |            | $\pm 27$   |     | mA                             |
| POWER SUPPLY                 |                          |                                                                                           |          |            |     |            |            |     |                                |
| Power Supply Rejection Ratio | PSRR                     | $V_{DD} = 8\text{ V to }36\text{ V}$                                                      | 80       | 86         |     | 80         | 86         |     | dB                             |
| Supply Current per Amplifier | $I_{SY}$                 | $0^{\circ}\text{C} \leq T_A \leq +70^{\circ}\text{C}$                                     |          | 1.2        | 1.8 |            | 1.2        | 1.8 | mA                             |
|                              |                          | $-40^{\circ}\text{C} \leq T_A \leq +125^{\circ}\text{C}$                                  |          |            | 1.9 |            |            | 1.9 | mA                             |
|                              |                          |                                                                                           |          |            |     |            |            | 2.0 | mA                             |
| DYNAMIC PERFORMANCE          |                          |                                                                                           |          |            |     |            |            |     |                                |
| Slew Rate                    | SR                       |                                                                                           |          | 20         |     |            | 20         |     | V/ $\mu\text{s}$               |
| Gain Bandwidth Product       | GBP                      |                                                                                           |          | 5          |     |            | 5          |     | MHz                            |
| Phase Margin                 | $\phi_M$                 |                                                                                           |          | 63         |     |            | 63         |     | Degrees                        |
| Total Harmonic Distortion    | THD                      | $V_{IN} = 6\text{ V rms}$ , $f = 1\text{ kHz}$ ,<br>$A_V = +1$ , $R_L = 2\text{ k}\Omega$ |          | 0.001      |     |            | 0.001      |     | %                              |
| Channel Separation           | CS                       | $f = 10\text{ kHz}$                                                                       |          | 120        |     |            | 120        |     | dB                             |
| NOISE PERFORMANCE            |                          |                                                                                           |          |            |     |            |            |     |                                |
| Voltage Noise Density        | $e_n$                    | $f = 1\text{ kHz}$                                                                        |          | 16         |     |            | 16         |     | nV/ $\sqrt{\text{Hz}}$         |

## ABSOLUTE MAXIMUM RATINGS

Table 2.

| Parameter                           | Rating                                          |
|-------------------------------------|-------------------------------------------------|
| Supply Voltage                      | $\pm 18\text{ V}$ or $+36\text{ V}$             |
| Input Voltage                       | $\pm V$ supply                                  |
| Differential Input Voltage          | $\pm V$ supply                                  |
| Output Short Circuit to GND         | Indefinite                                      |
| Storage Temperature Range           | $-65^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ |
| Operating Temperature Range         | $-40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$ |
| Lead Temperature (Soldering 60 sec) | $300^{\circ}\text{C}$                           |
| Junction Temperature                | $150^{\circ}\text{C}$                           |

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

## THERMAL RESISTANCE

Table 3. Thermal Resistance

| Package Type          | $\theta_{JA}$ | $\theta_{JC}$ | Unit                 |
|-----------------------|---------------|---------------|----------------------|
| 8-Lead SOIC_N (R-8)   | 158           | 43            | $^{\circ}\text{C/W}$ |
| 8-Lead MSOP (RM-8)    | 210           | 45            | $^{\circ}\text{C/W}$ |
| 14-Lead SOIC_N (R-14) | 120           | 36            | $^{\circ}\text{C/W}$ |
| 14-Lead TSSOP (RU-14) | 180           | 35            | $^{\circ}\text{C/W}$ |

## POWER SEQUENCING

The op amp supplies must be established simultaneously with, or before, the application of any input signals.

If this is not possible, the input current must be limited to 10 mA.

## 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.

## TYPICAL PERFORMANCE CHARACTERISTICS

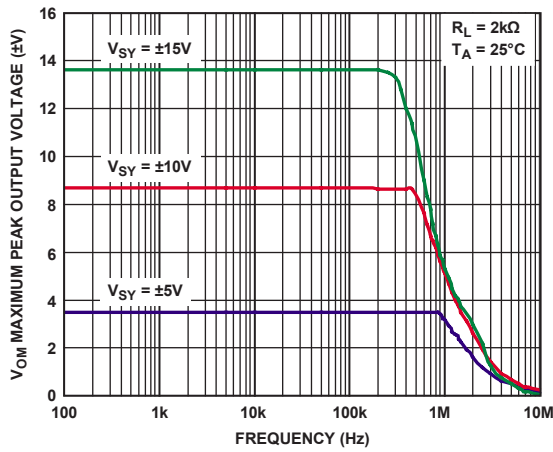


Figure 5. Maximum Peak Output Voltage vs. Frequency

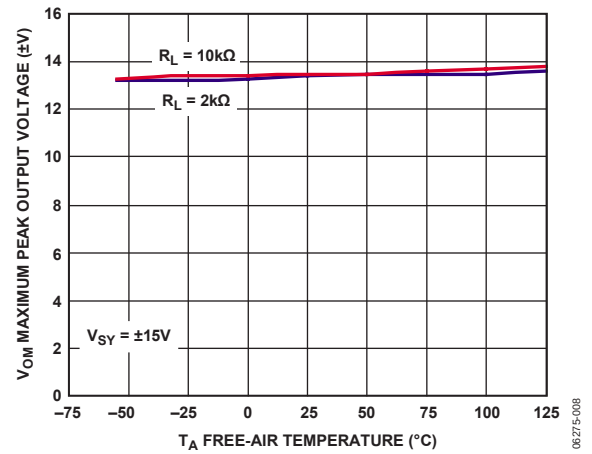


Figure 8. Maximum Peak Output Voltage vs. Free-Air Temperature

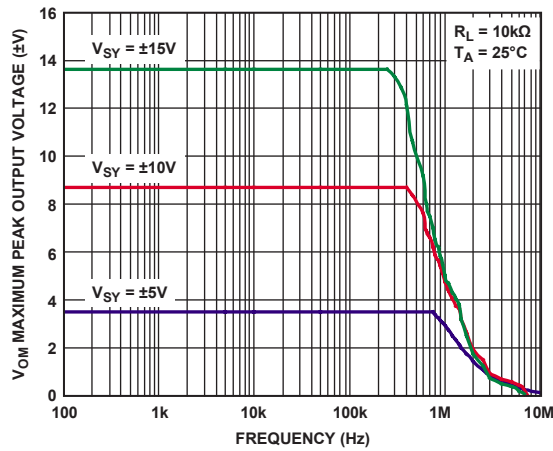


Figure 6. Maximum Peak Output Voltage vs. Frequency

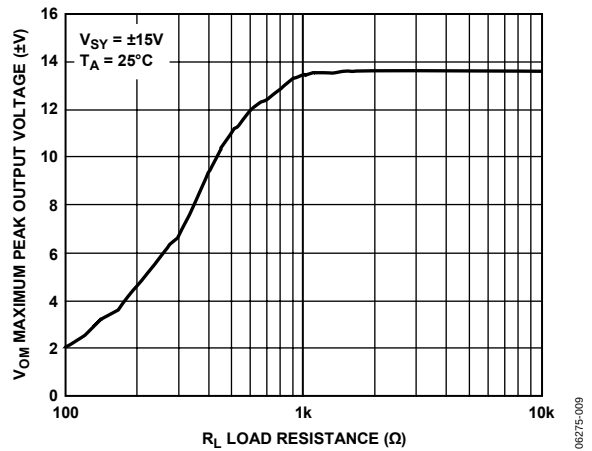


Figure 9. Maximum Peak Output Voltage vs. Load Resistance

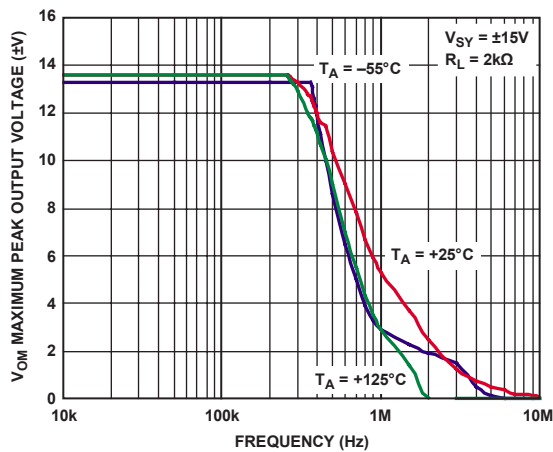


Figure 7. Maximum Peak Output Voltage vs. Frequency

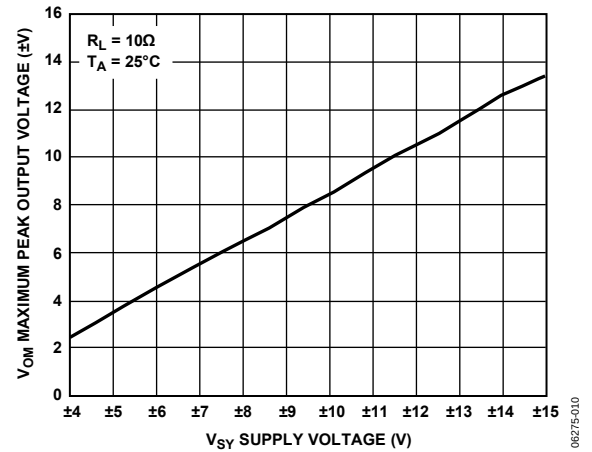


Figure 10. Maximum Peak Output Voltage vs. Supply Voltage

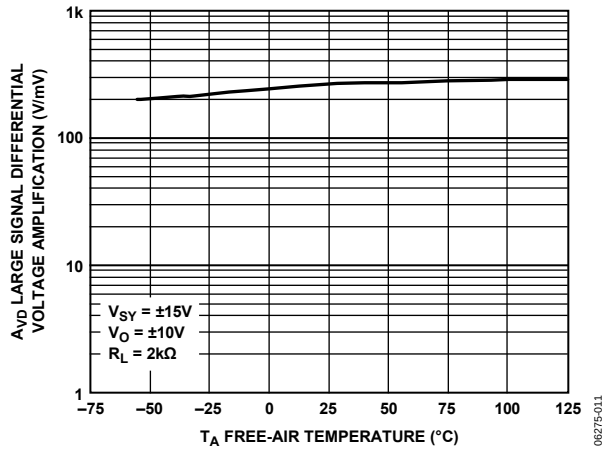


Figure 11. Large Signal Differential Voltage Amplification vs. Free-Air Temperature

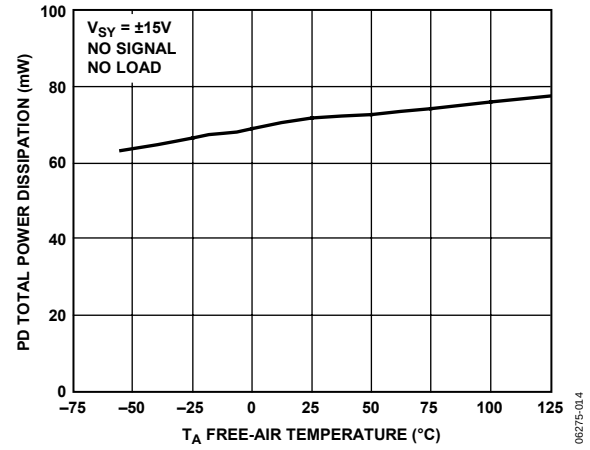


Figure 14. Total Power Dissipation vs. Free-Air Temperature

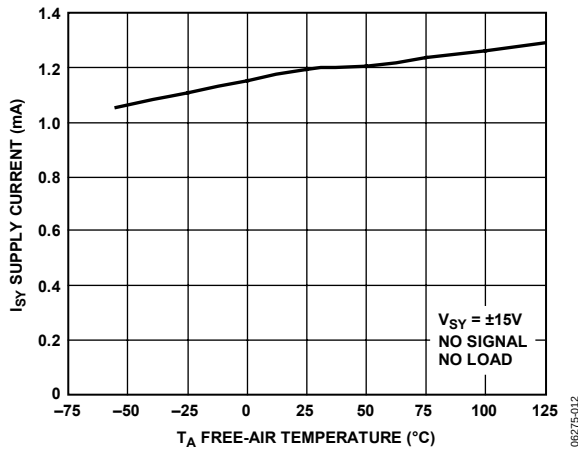


Figure 12. Supply Current Per Amplifier vs. Free-Air Temperature

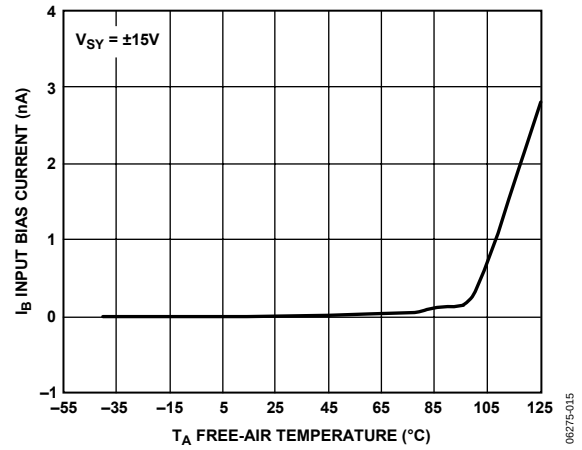


Figure 15. Input Bias Current vs. Free-Air Temperature

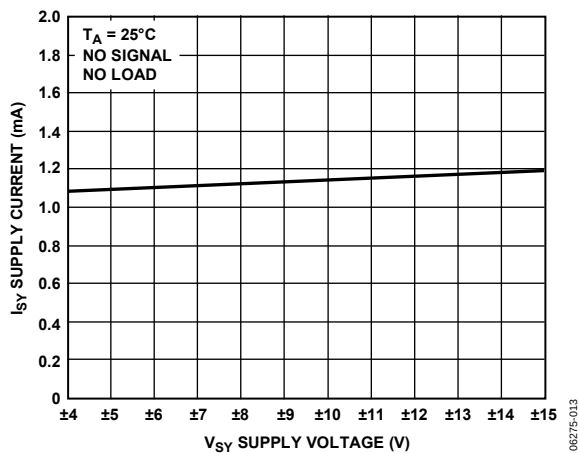


Figure 13. Supply Current vs. Supply Voltage

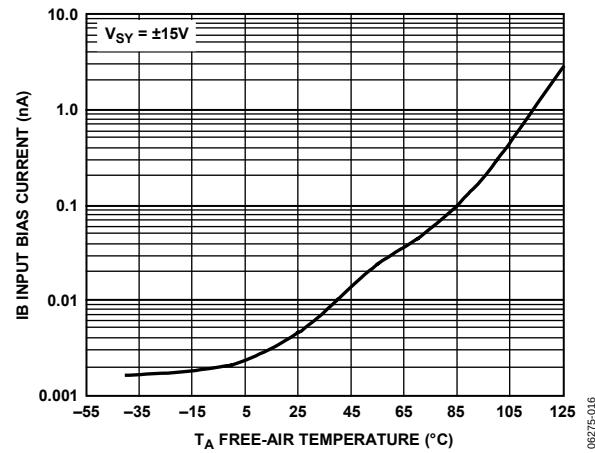


Figure 16. Input Bias Current vs. Free-Air Temperature

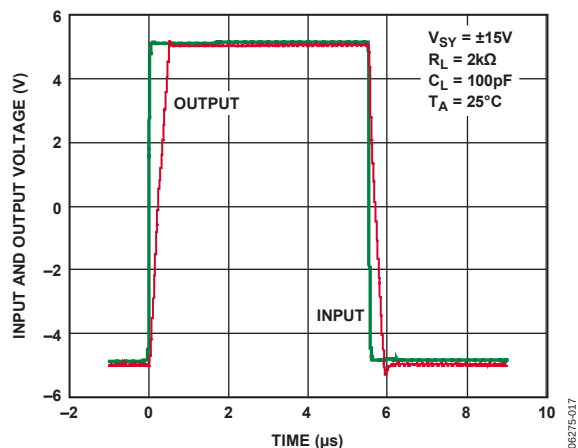


Figure 17. Large Signal Response

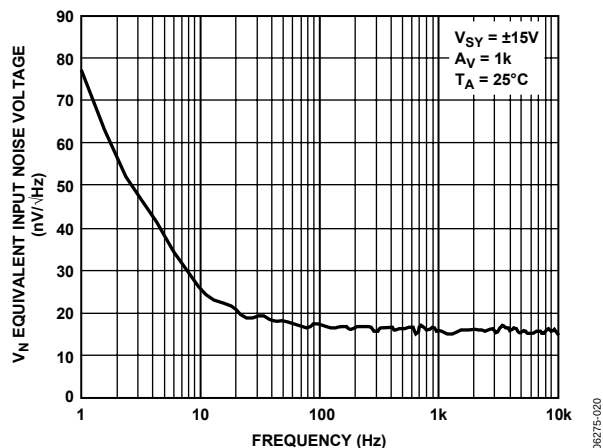


Figure 20. Voltage Noise Density vs. Frequency

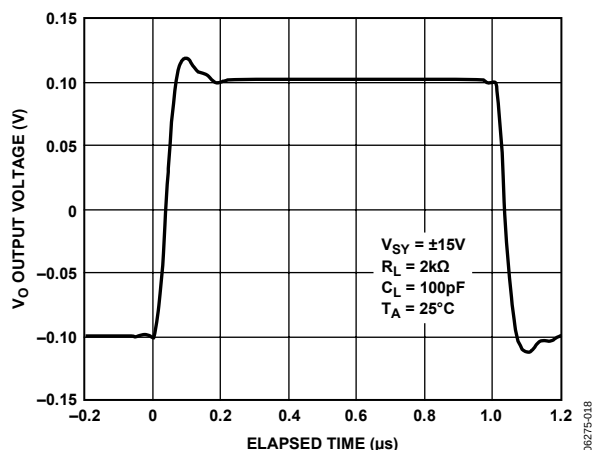


Figure 18. Small Signal Response

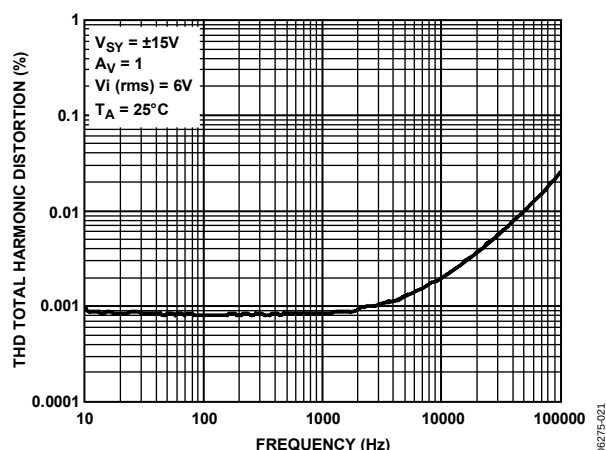


Figure 21. Total Harmonic Distortion vs. Frequency

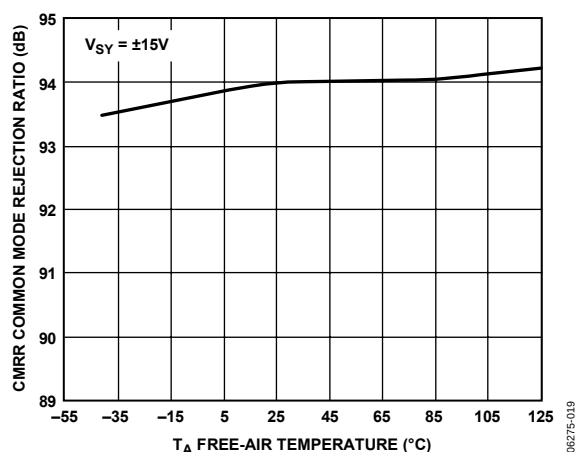
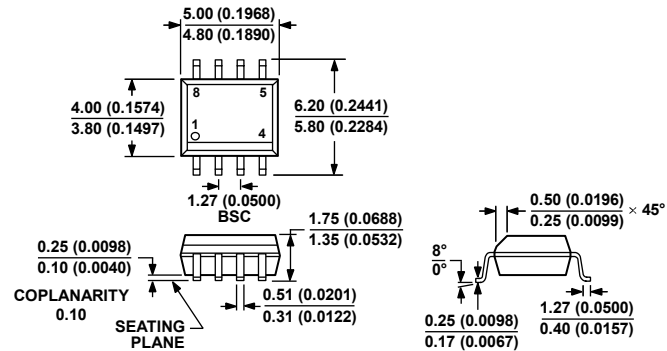


Figure 19. Common-Mode Rejection Ratio vs. Free-Air Temperature

## OUTLINE DIMENSIONS



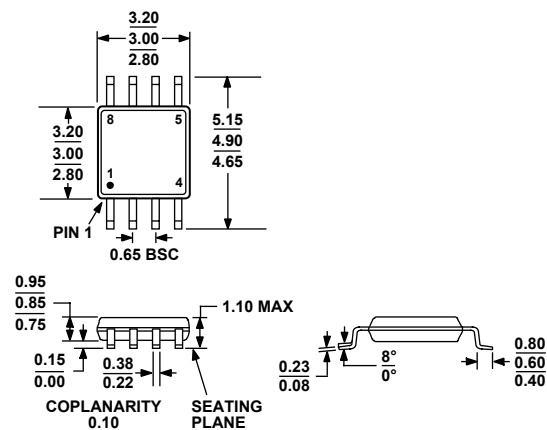
COMPLIANT TO JEDEC STANDARDS MS-012-AA

CONTROLLING DIMENSIONS ARE IN MILLIMETERS; INCH DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF MILLIMETER EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

Figure 22. 8-Lead Standard Small Outline Package [SOIC\_N]  
Narrow Body (R-8)

Dimensions shown in millimeters and (inches)

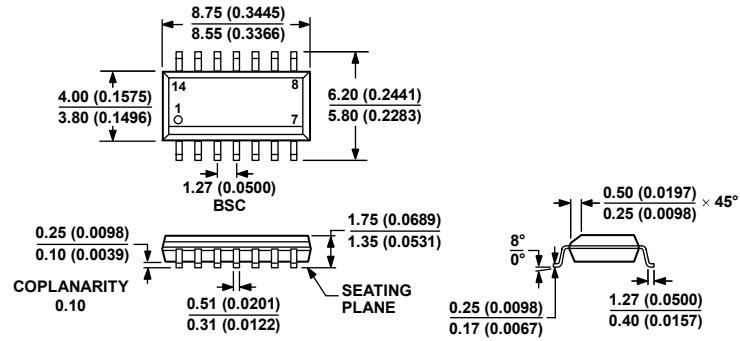
019407-A



COMPLIANT TO JEDEC STANDARDS MO-187-AA

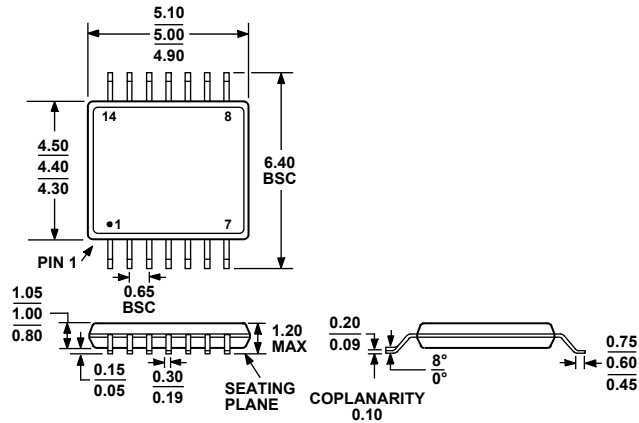
Figure 23. 8-Lead Mini Small Outline Package [MSOP]  
(RM-8)

Dimensions shown in millimeters



COMPLIANT TO JEDEC STANDARDS MS-012-AB  
CONTROLLING DIMENSIONS ARE IN MILLIMETERS; INCH DIMENSIONS  
(IN PARENTHESES) ARE ROUNDED-OFF MILLIMETER EQUIVALENTS FOR  
REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

Figure 24. 14-Lead Standard Small Outline Package [SOIC\_N]  
Narrow Body (R-14)  
Dimensions shown in millimeters and (inches)



COMPLIANT TO JEDEC STANDARDS MO-153-AB-1  
Figure 25. 14-Lead Thin Shrink Small Outline Package [TSSOP]  
(RU-14)  
Dimensions shown in millimeters

# ADTL082/ADTL084

## ORDERING GUIDE

| Model                         | Temperature Range | Package Description | Package Option | Branding |
|-------------------------------|-------------------|---------------------|----------------|----------|
| ADTL082JR                     | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            | A18      |
| ADTL082JR-REEL                | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            |          |
| ADTL082JR-REEL7               | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            |          |
| ADTL082JRZ <sup>1</sup>       | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            |          |
| ADTL082JRZ-REEL <sup>1</sup>  | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            |          |
| ADTL082JRZ-REEL7 <sup>1</sup> | 0°C to +70°C      | 8-Lead SOIC_N       | R-8            |          |
| ADTL082ARZ <sup>1</sup>       | −40°C to +125°C   | 8-Lead SOIC_N       | R-8            |          |
| ADTL082ARZ-REEL <sup>1</sup>  | −40°C to +125°C   | 8-Lead SOIC_N       | R-8            |          |
| ADTL082ARZ-REEL7 <sup>1</sup> | −40°C to +125°C   | 8-Lead SOIC_N       | R-8            |          |
| ADTL082ARMZ-R2 <sup>1</sup>   | −40°C to +125°C   | 8-Lead MSOP         | RM-8           |          |
| ADTL082ARMZ-REEL <sup>1</sup> | −40°C to +125°C   | 8-Lead MSOP         | RM-8           | A18      |
| ADTL084JR                     | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084JR-REEL                | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084JR-REEL7               | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084JRZ <sup>1</sup>       | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084JRZ-REEL <sup>1</sup>  | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084JRZ-REEL7 <sup>1</sup> | 0°C to +70°C      | 14-Lead SOIC_N      | R-14           |          |
| ADTL084ARZ <sup>1</sup>       | −40°C to +125°C   | 14-Lead SOIC_N      | R-14           |          |
| ADTL084ARZ-REEL <sup>1</sup>  | −40°C to +125°C   | 14-Lead SOIC_N      | R-14           |          |
| ADTL084ARZ-REEL7 <sup>1</sup> | −40°C to +125°C   | 14-Lead SOIC_N      | R-14           |          |
| ADTL084ARUZ <sup>1</sup>      | −40°C to +125°C   | 14-lead TSSOP       | RU-14          |          |
| ADTL084ARUZ-REEL <sup>1</sup> | −40°C to +125°C   | 14-lead TSSOP       | RU-14          |          |

<sup>1</sup> Z = RoHS Compliant Part.

**NOTES**

## **NOTES**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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