

### FEATURES

TL082 / TL084 compatible

Low input bias current: 10 pA max

Offset voltage: 5mV max (ADTL082A/ADTL084A)

9 mV max (ADTL082/ADTL084)

±5 V to ±15 V operation

Low noise: 15 nV/√Hz

Wide bandwidth: 6 MHz

Slew rate: 20V/μs

CMRR: 80 dB min

Total Harmonic Distortion: 0.003 %

Supply current: 1.2 mA typ

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 providing industry-leading performance over TL08x devices. The ADTL082A and ADTL084A are improved versions of TL08x A-, I- and Q- grades. The ADTL082 and ADTL084 offer improvements over 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 rate.

These op amps are ideal for various applications including

#### Rev. PrA

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### PIN CONFIGURATIONS

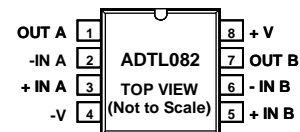


Figure 1. 8-Lead SOIC (R-8)

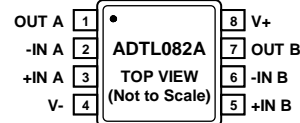


Figure 2. 8-Lead MSOP (RM-8)

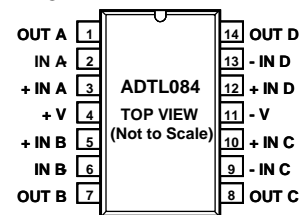


Figure 3. 14-Lead SOIC (R-14)

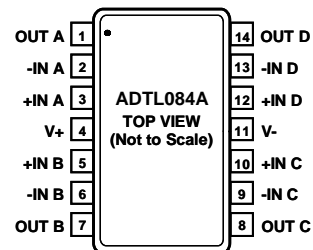


Figure 4. 14-Lead TSSOP (RU-14)

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 grades are available in both leaded and lead-free packaging. For high precision grades of these devices, see the ADA4000-2 (dual) and ADA4000-4 (quad).

The ADTL082A and ADTL084A are specified over the extended industrial (-40° to 125°C) temperature range. The ADTL082 and ADTL084 are specified over the commercial (0° to 70°C) temperature range.

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**REVISION HISTORY**

1/06—Rev Pr0: Initial Version

3/06—Rev PrA

## 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	Min	Typ	Max	Unit
<b>INPUT CHARACTERISTICS</b>						
Offset Voltage	$V_{OS}$	ADTL082 / ADTL084 $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$		2	9	mV
					15	mV
		ADTL082A / ADTL084A $-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)		1.5	5	mV
					9	mV
Offset Voltage Drift	$\Delta V_{OS}/\Delta T$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)		2.0	6.5	$\mu\text{V}/^\circ\text{C}$
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)		2.0	7.5	$\mu\text{V}/^\circ\text{C}$
Input Bias Current	$I_B$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)		0.2	20	pA
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)			100	pA
Input Offset Current	$I_{OS}$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)		0.1	0.5	pA
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)			50	pA
Input Voltage Range	$V_{CM}$		-11		12	V
Common-Mode Rejection Ratio	CMRR	$V_{CM} = 0\text{ V to } 5.0\text{ V}$	80	86		dB
Open-Loop Input Impedance	$R_{IN}$			10		M $\Omega$
Large Signal Voltage Gain	$A_{VO}$	$R_L = 2\text{ k}\Omega$ , $V_O = -10\text{ V to } 10\text{ V}$	160	700		V/mV
<b>OUTPUT CHARACTERISTICS</b>						
Maximum Output Voltage Swing	$V_{O,MAX}$	$R_L = 10\text{ k}\Omega$ $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)	$\pm 12$	$\pm 13.5$		V
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)	$\pm 12$			V
		$R_L = 2\text{ k}\Omega$ $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)	$\pm 11$	$\pm 13$		V
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)	$\pm 10$	$\pm 12$		V
Short-Circuit Output Current	$I_{SC}$		$\pm 10$	$\pm 12$		V
				$\pm 20$		mA
<b>POWER SUPPLY</b>						
Power Supply Rejection Ratio	PSRR	$V_{DD} = 5.0\text{ V to } 30\text{ V}$	80	86		dB
Supply Current per Amplifier	$I_{SY}$	$0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$ (all grades)		1.0	1.2	mA
		$-40^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$ (A grade)			2.2	mA
					2.5	mA
<b>DYNAMIC PERFORMANCE</b>						
Slew Rate	SR	$R_L = 2\text{ k}\Omega$		20		V/ $\mu\text{s}$
Gain Bandwidth Product	GBP			6		MHz
Phase Margin	$\phi_M$			74		Degrees
Total Harmonic Distortion	THD	$V_{IN} = 6\text{ V}_{RMS}$ , $f = 1\text{ kHz}$ , $A_V = +1$ , $R_L = 2\text{ k}\Omega$		0.003		%
Channel Separation	CS	$f = 10\text{ kHz}$		120		dB
<b>NOISE PERFORMANCE</b>						
Voltage Noise Density	$e_n$	$f = 1\text{ kHz}$		15		nV/ $\sqrt{\text{Hz}}$

## ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Rating
Supply Voltage	36V
Input Voltage	GND to $V_{DD}$
Differential Input Voltage	TBD
Output Short-Circuit to GND	Indefinite
Storage Temperature Range	-65°C to +150°C
Operating Temperature Range	-40°C to +125°C
Lead Temperature Range (Soldering 60 sec)	300°C
Junction Temperature	150°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	°C/W
8-Lead MSOP (RM-8)	210	45	°C/W
14-Lead SOIC (R-14)	120	36	°C/W
14-Lead TSSOP (RU-14)	180	35	°C/W

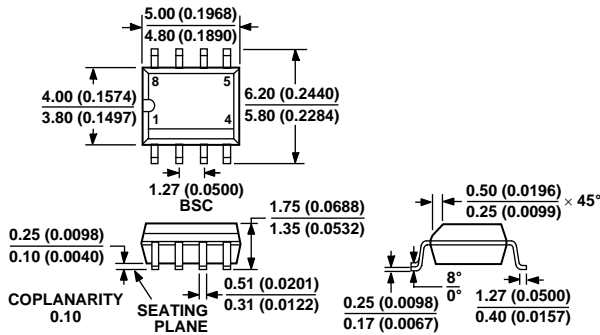
## ESD CAUTION



### ESD (electrostatic discharge) sensitive device.

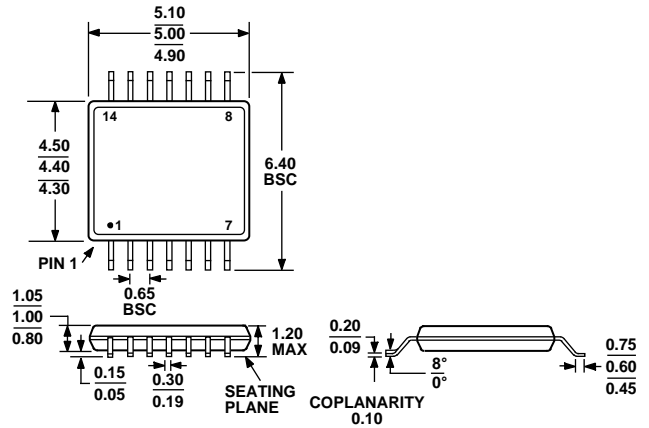
Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

OUTLINE DIMENSIONS



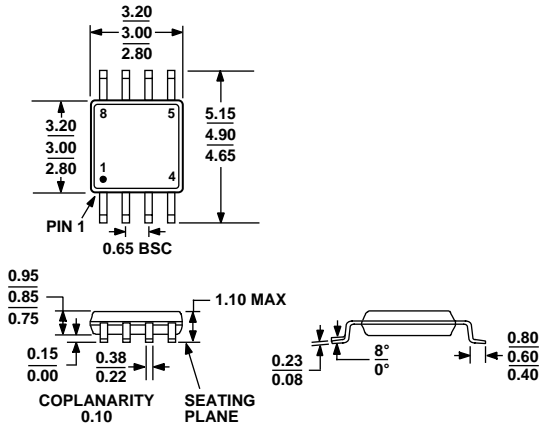
COMPLIANT TO JEDEC STANDARDS MS-012-AA  
 CONTROLLING DIMENSIONS ARE IN MILLIMETERS; INCH DIMENSIONS (IN PARENTHESES) ARE ROUNDED-OFF MILLIMETER EQUIVALENTS FOR REFERENCE ONLY AND ARE NOT APPROPRIATE FOR USE IN DESIGN.

Figure 22. 8-Lead Small Outline Package [SOIC\_N] Narrow Body (R-8)  
 Dimensions shown in millimeters and (inches)



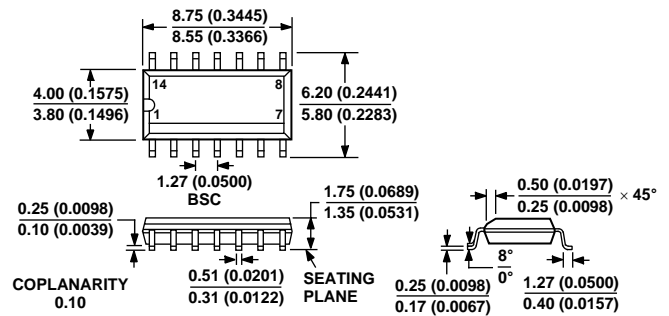
COMPLIANT TO JEDEC STANDARDS MO-153-AB-1

Figure 24. 14-Lead Thin Shrink Small Outline Package [TSSOP] (RU-14)  
 Dimensions shown in millimeters



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 25. 14-Lead Standard Small Outline Package [SOIC] (R-14)  
 Dimensions shown in millimeters

**ORDERING GUIDE**

Model	Temperature Range	Package Description	Package Option
ADTL082R	0°C to +70°C	8-Lead SOIC_N	R-8
ADTL082R-REEL	0°C to +70°C	8-Lead SOIC_N	R-8
ADTL082R-REEL7	0°C to +70°C	8-Lead SOIC_N	R-8
ADTL082RZ <sup>1</sup>	0°C to +70°C	8-Lead SOIC_N	R-8
ADTL082RZ-REEL <sup>1</sup>	0°C to +70°C	8-Lead SOIC_N	R-8
ADTL082RZ-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
ADTL082ARUZ <sup>1</sup>	-40°C to +125°C	8-lead MSOP	RM-8
ADTL082ARUZ-REEL <sup>1</sup>	-40°C to +125°C	8-lead MSOP	RM-8
ADTL084R	0°C to +70°C	14-Lead SOIC_N	R-14
ADTL084R-REEL	0°C to +70°C	14-Lead SOIC_N	R-14
ADTL084R-REEL7	0°C to +70°C	14-Lead SOIC_N	R-14
ADTL084RZ <sup>1</sup>	0°C to +70°C	14-Lead SOIC_N	R-14
ADTL084RZ-REEL <sup>1</sup>	0°C to +70°C	14-Lead SOIC_N	R-14
ADTL084RZ-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 = Pb-free part