Low Distortion 1.2GHz Differential Amplifier

Preliminary Technical Data — AD8350

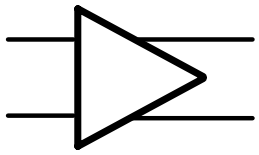
FEATURES

High Dynamic Range
Output IP3: +24 dBm @250 MHz
Low Noise Figure: 6.1 dB @250 MHz
TwoGain Versions:
AD8350-15 15 dB
AD8350-20 20 dB
-3 dB Bandwidth: 1.2 GHz
Performance Bandwidth: 500 MHz
Single/Dual Supply Operation: +5 to +10V, +/-5V
Supply Current: 28 mA
Input/Output Impedance: 200 ohms
Single Ended or Differential Input Drive
8 Pin SOIC & microSO Packages

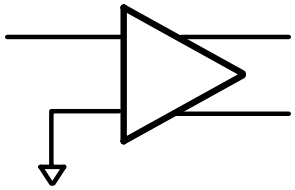
APPLICATIONS

Cellular Base Stations
Communications Receivers
RF/IF Gain Block
Differential A to D Buffer
SAW Filter Interface
High Performance Video
High Speed Data Transmission

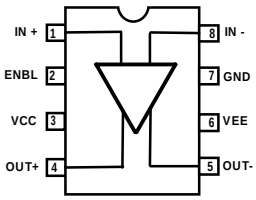
Differential Input/Output



Single In/Differential Out



8 Pin SOIC and Micro-SO Package (with enable)



PRODUCT DESCRIPTION

The AD8350 series are high performance fully-differential amplifiers useful in RF and IF circuits up to 1200 MHz. The amplifier has excellent noise figure of 6.1 dB at 250 MHz. It offers a high output third order intercept (OIP3) of +24dBm at 250 MHz. Gain versions of 15 and 20 dB are offered.

The AD8350 is designed to meet the demanding performance requirements of communications transceiver applications. It enables a high dynamic range differential signal chain, with exceptional linearity and increased common-mode rejection. The device can be used as a general purpose gain block, an A-to-D buffer, and high speed data interface driver, among other functions. The AD8350 input can also be used in a single ended mode, providing a low distortion single-ended to differential conversion.

The amplifier can be operated down to 5 volt with an OIP3 is +22 dBm at 250 MHz and slightly reduced distortion performance. The wide bandwidth, high dynamic range and temperature stability make this product ideal for the various RF and IF frequencies required in cellular, PCS, wireless local loop and other applications.

The AD8350 is offered in two small SMT packages: an 8 pin SOIC and a microSO package. It operates from +/- 5 or 0 to +10 volt power supplies in the SOIC package, drawing 28mA typical. Alternatively, the amplifier can be operated from a single +5 volt supply in the microSO package. The SOIC version offers a power enable function for power-sensitive applications. The AD8350 is fabricated using Analog Devices' proprietary high speed complementary bipolar process. The device is available in the industrial (-40° to +85°C) temperature range.

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AD8350 SPECIFICATIONS

SINGLE ENDED AND DIFFERENTIAL OPERATION

(Unless otherwise noted T_A=+25; Freq =250MHz, 200Ω source & load, 20dB gain version)

PARAMETER	CONDITION/NOTE		+10V (or +/-5V)	+5V	UNITS
AC PERFORMANCE					
Operating Frequency			1200		MHz
Gain			20		dB
Output 2rd Order Intercept	@ 250 MHz		+30	+27	dBm
Output 3rd Order Intercept	@250 MHz		+24	+22	dBm
Input 1 dB Gain Compression			-0.5	-7	dBm
Noise Figure			6.1	6.1	dB
Spectral Input Noise Voltage			1.7	1.7	nV/√Hz
Isolation	Input to Output		-22		dB
CMRR			TBD		dB
PSRR			TBD		dB
INPUT CHARACTERISTICS					
Input Impedance			200		Ω
Input Capacitance	less package effects		1.7		pF
Input Return Loss			22		dB
OUTPUT CHARACTERISTICS					
Output Impedance			200		Ω
Output Return Loss			19		dB
POWER SUPPLIES					
Positive Supply (Vs)			10	5	V
Supply Current			32	28	mA
ABSOLUTE MAXIMUM RATINGS					
Power Supply			11		VDC
Input Power				8	dBm
Operating Temperature		-40		+85	°C

PIN FUNCTION DESCRIPTIONS

PIN	NAME	DESCRIPTION
1,8	IN+, IN-	Differential Inputs. IN+ and IN- should be ac-coupled (pins have a dc bias level of mid-supply). Differential input impedance is 200Ω. To drive the input single-ended, one input should be ac-coupled to ground. Single-ended input impedance is equal to 175Ω.
2	ENBL	Power up pin. A high level (Vcc) enables the device; a low level (0V) puts the device in sleep mode.
3,6	VCC, VEE	Power supply. For dual supply operation, +/-5V can be used. For single supply operation a supply voltage of +5V to +10V on VCC (VEE = 0V) is recommended
4,5	OUT+, OUT-	Differential Ouput. OUT+ and OUT- should be ac-coupled (pins have a dc bias level of mid-supply). Differential output impedance is 200Ω.
7	GND	Ground Reference for ENBL

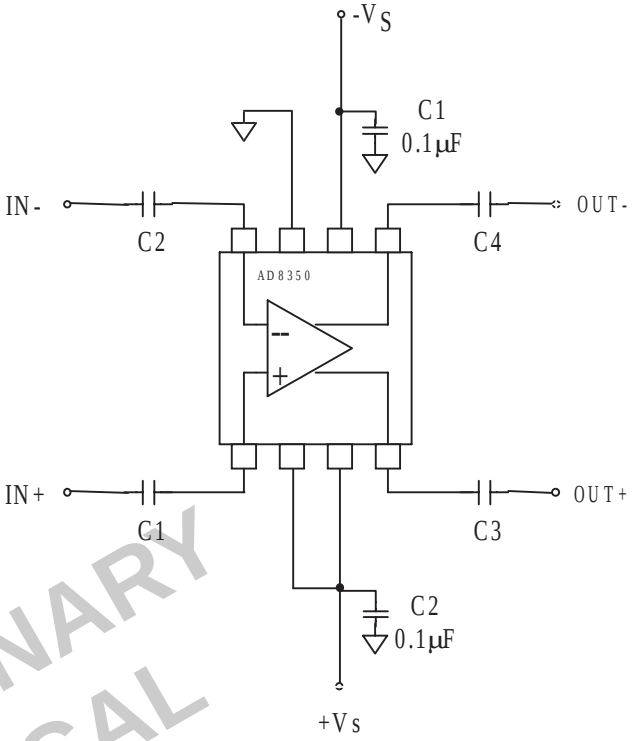

Figure 1. AD8350 Basic Connections for dual supply operation

Basic Connections

Figure 1 shows the basic connections for operating the AD8350. A power supply in the range +/-2.5 V to +/-5 V is required. Both power supply pins should be decoupled using 0.1uF capacitors. Figure 2 shows the recommended connections for operation on a single supply. Vee is now grounded and a voltage of between +5V and +10V is applied to the Vcc pin. The ENBL pin is tied to the positive supply for normal operation and should be pulled to ground to put the device in sleep mode. Both the inputs and the outputs have dc bias levels at mid-supply and should normally be ac-coupled.

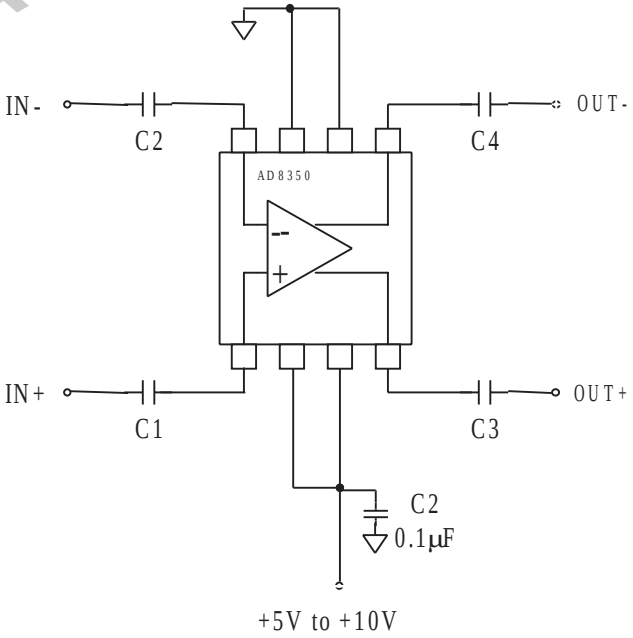

Figure 2. Basic Connections for single supply operation

Evaluation Board

Figure 3 shows the schematic of the AD8350 evaluation board as it is shipped from the factory. The board is configured to allow easy evaluation using single-ended 50Ω test equipment. The input and output transformers have a 4 to 1 impedance ratio and transform the AD8350's 200Ω input and output impedances to 50Ω.

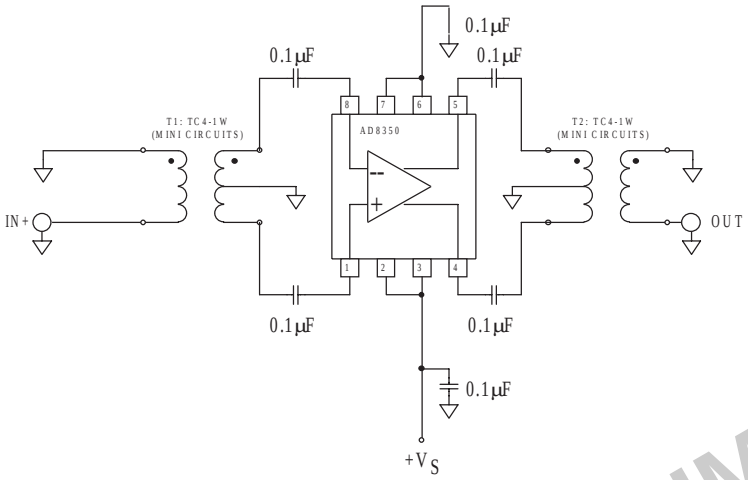

Figure 3. AD8350 Evaluation Board