Dual 260 MHz Gain = +2.0 & +2.2 Buffer

AD8079

FEATURES

Factory Set Gain
- **AD8079A: Gain = +2.0 (Also +1.0 & –1.0)**
- **AD8079B: Gain = +2.2 (Also +1 & –1.2)**
- **Gain of 2.2 Compensates for System Gain Loss**
- **Minimizes External Components**
- **Tight Control of Gain and Gain Matching (0.1%)**

Optimum Dual Pinout
- **Simplifies PCB Layout**
- **Low Crosstalk of –70 dB @ 5 MHz**

Excellent Video Specifications (R_L = 150 Ω)
- **Gain Flatness 0.1 dB to 50 MHz**
- **0.01% Differential Gain Error**
- **0.02° Differential Phase Error**

Low Power of 50 mW/Amplifier (5 mA)

High Speed and Fast Settling
- **260 MHz, –3 dB Bandwidth**
- **750 V/μs Slew Rate (2 V Step), 800 V/μs (4 V Step)**
- **40 ns Settling Time to 0.1% (2 V Step)**

Low Distortion of –65 dBc THD, f_C = 5 MHz

High Output Drive of Over 70 mA
- **Drives Up to 8 Back-Terminated 75 Ω Loads (4 Loads/ Side) While Maintaining Good Differential Gain/ Phase Performance (0.01%/0.17°)**

High ESD Tolerance (5 kV)

Available in Small 8-Pin SOIC

APPLICATIONS

Differential A-to-D Driver

Video Line Driver

Differential Line Driver

Professional Cameras

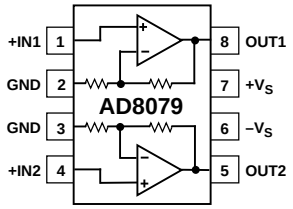
Video Switchers

Special Effects

RF Receivers

FUNCTIONAL BLOCK DIAGRAM

8-Pin Plastic SOIC



PRODUCT DESCRIPTION

The AD8079 is a dual, low power, high speed buffer designed to operate on ±5 V supplies. The AD8079's pinout offers excellent input and output isolation compared to the traditional dual amplifier pin configuration. With two ac ground pins separating both the inputs and outputs, the AD8079 achieves very low crosstalk of less than –70 dB at 5 MHz.

Additionally, the AD8079 contains gain setting resistors factory set at G = +2.0 (A grade) or Gain = +2.2 (B grade) allowing circuit configurations with minimal external components. The B grade gain of +2.2 compensates for gain loss through a system by providing a single-point trim. Using active laser trimming of these resistors, the AD8079 guarantees tight control of gain and channel-channel gain matching. With its performance and configuration, the AD8079 is well suited for driving differential cables and transformers. Its low distortion and fast settling are ideal for buffering high speed dual or differential A-to-D converters.

The AD8079 features a unique transimpedance linearization circuitry. This allows it to drive video loads with excellent differential gain and phase performance of 0.01% and 0.02° on only 50 mW of power per amplifier. It features gain flatness of 0.1 dB to 50 MHz. This makes the AD8079 ideal for professional video electronics such as cameras and video switchers.

The AD8079 offers low power of 5 mA/amplifier (V_S = ±5 V) and can run on a single +12 V power supply while delivering over 70 mA of load current. All of this is offered in a small 8-pin SOIC package. These features make this amplifier ideal for portable and battery powered applications where size and power are critical.

The outstanding bandwidth of 260 MHz along with 800 V/μs of slew rate make the AD8079 useful in many general purpose high speed applications where dual power supplies of ±3 V to ±6 V are required.

The AD8079 is available in the industrial temperature range of –40°C to +85°C.

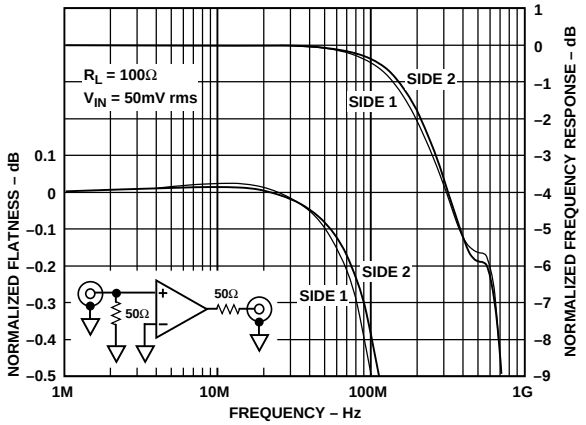


Figure 1. Frequency Response and Flatness

AD8079—SPECIFICATIONS (@ T_A = +25°C, V_S = ±5 V, R_L = 100 Ω, unless otherwise noted)

Parameter	Conditions	AD8079A/AD8079B Min	Typ	Max	Units
DYNAMIC PERFORMANCE					
–3 dB Small Signal Bandwidth	V_{IN} = 50 mV rms		260		MHz
Bandwidth for 0.1 dB Flatness	V_{IN} = 50 mV rms		50		MHz
Large Signal Bandwidth	V_{IN} = 1 V rms		100		MHz
Slew Rate	V_O = 2 V Step		750		V/µs
	V_O = 4 V Step		800		V/µs
Settling Time to 0.1%	V_O = 2 V Step		40		ns
Rise & Fall Time	V_O = 2 V Step		2.5		ns
NOISE/HARMONIC PERFORMANCE					
Total Harmonic Distortion	f_C = 5 MHz, V_O = 2 V p-p		–65		dBc
Crosstalk, Output to Output	f = 5 MHz		–70		dB
Input Voltage Noise	f = 10 kHz		2.0		nV/√Hz
Input Current Noise	f = 10 kHz, +In		2.0		pA/√Hz
Differential Gain Error	NTSC, R_L = 150 Ω		0.01		%
	R_L = 75 Ω		0.01		%
Differential Phase Error	NTSC, R_L = 150 Ω		0.02		Degree
	R_L = 75 Ω		0.07		Degree
DC PERFORMANCE					
Offset Voltage, RTO			10	15	mV
	T_{MIN}–T_{MAX}		10	20	mV
Offset Drift, RTO			20		µV/°C
+Input Bias Current			3.0	6.0	±µA
	T_{MIN}–T_{MAX}			10	±µA
Gain	No Load	1.998/2.198	2.0/2.2	2.002/2.202	V/V
	R_L = 150 Ω	1.995/2.195	2.0/2.2	2.005/2.205	V/V
Gain Matching	Channel-to-Channel, No Load		0.1		%
	Channel-to-Channel, R_L = 150 Ω		0.5		%
INPUT CHARACTERISTICS					
+Input Resistance	+Input		10		MΩ
+Input Capacitance	+Input		1.5		pF
OUTPUT CHARACTERISTICS					
Output Voltage Swing	R_L = 150 Ω	2.7	3.1		±V
	R_L = 75 Ω		2.8		±V
Output Current[1]			70		mA
Short Circuit Current[1]		85	110		mA
POWER SUPPLY					
Operating Range		±3.0		±6.0	V
Quiescent Current/Both Amplifiers	T_{MIN}–T_{MAX}		10.0	11.5	mA
Power Supply Rejection Ratio, RTO	$+V_S$ = +4 V to +6 V, $–V_S$ = –5 V	49	69		dB
	$–V_S$ = – 4 V to – 6 V, $+V_S$ = +5 V	40	50		dB
+Input Current	T_{MIN}–T_{MAX}		0.1	0.5	µA/V

NOTES

[1]Output current is limited by the maximum power dissipation in the package. See the power derating curves.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS[1]

Supply Voltage . . . . . 12.6 V
Internal Power Dissipation[2]
Small Outline Package (R) . . . . . 0.9 Watts
Input Voltage . . . . . $\pm V_S$
Output Short Circuit Duration
. . . . . Observe Power Derating Curves
Storage Temperature Range . . . . . –65°C to +125°C
Operating Temperature Range (A Grade) . . . –40°C to +85°C
Lead Temperature Range (Soldering 10 sec) . . . . . +300°C

NOTES
[1]Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and 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.
[2]Specification is for device in free air:
8-Pin SOIC Package: θ_{JA} = 160°C/Watt

MAXIMUM POWER DISSIPATION

The maximum power that can be safely dissipated by the AD8079 is limited by the associated rise in junction temperature. The maximum safe junction temperature for plastic encapsulated devices is determined by the glass transition temperature of the plastic, approximately +150°C. Exceeding this limit temporarily may cause a shift in parametric performance due to a change in the stresses exerted on the die by the package. Exceeding a junction temperature of +175°C for an extended period can result in device failure.

While the AD8079 is internally short circuit protected, this may not be sufficient to guarantee that the maximum junction temperature (+150°C) is not exceeded under all conditions. To ensure proper operation, it is necessary to observe the maximum power derating curves.

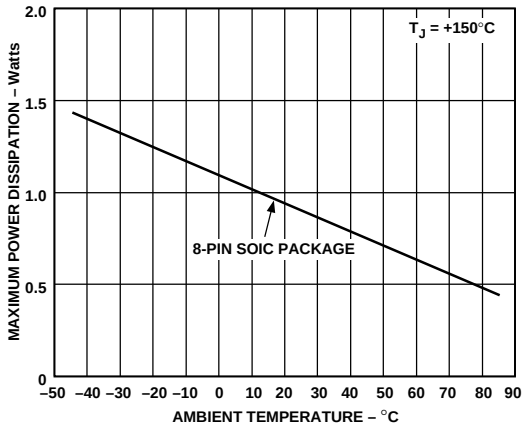


Figure 2. Plot of Maximum Power Dissipation vs. Temperature

ORDERING GUIDE

Model	Gain	Temperature Range	Package Description	Package Option
AD8079AR	G = +2.0	–40°C to +85°C	8-Pin Plastic SOIC	SO-8
AD8079AR-REEL	G = +2.0	–40°C to +85°C	REEL SOIC	SO-8
AD8079AR-REEL7	G = +2.0	–40°C to +85°C	REEL 7 SOIC	SO-8
AD8079BR	G = +2.2	–40°C to +85°C	8-Pin Plastic SOIC	SO-8
AD8079BR-REEL	G = +2.2	–40°C to +85°C	REEL SOIC	SO-8
AD8079BR-REEL7	G = +2.2	–40°C to +85°C	REEL 7 SOIC	SO-8

CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the AD8079 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

8-Lead SOIC (SO-8)