



AD8310

The AD8310 is available in the industrial temperature range of -40°C to $+85^{\circ}\text{C}$ in an 8-lead MSOP package.

SPECIFICATIONS

$T_A = 25^\circ\text{C}$, $V_S = 5\text{ V}$, unless otherwise noted.

Table 1.

Parameter	Conditions	Min	Typ	Max	Unit
INPUT STAGE					
Maximum Input ¹	Inputs INHI, INLO Single-ended, p-p	±2.0	±2.2		V
			4		dBV
Equivalent Power in 50 Ω	Termination resistor of 52.3 Ω		17		dBm
	Differential drive, p-p		20		dBm
Noise Floor	Terminated 50 Ω source		1.28		nV/ $\sqrt{\text{Hz}}$
Equivalent Power in 50 Ω	440 MHz bandwidth		−78		dBm
Input Resistance	From INHI to INLO	800	1000	1200	Ω
Input Capacitance	From INHI to INLO		1.4		pF
DC Bias Voltage	Either input		3.2		V
LOGARITHMIC AMPLIFIER					
Output VOUT					
±3 dB Error Dynamic Range	From noise floor to maximum input		95		dB
Transfer Slope	10 MHz $\leq f \leq 200\text{ MHz}$	22	24	26	mV/dB
	Overtemperature, $-40^\circ\text{C} < T_A < +85^\circ\text{C}$	20		26	mV/dB
Intercept (Log Offset) ²	10 MHz $\leq f \leq 200\text{ MHz}$	−115	−108	−99	dBV
	Equivalent dBm (re 50 Ω)	−102	−95	−86	dBm
	Overtemperature, $-40^\circ\text{C} \leq T_A \leq +85^\circ\text{C}$	−120		−96	dBV
	Equivalent dBm (re 50 Ω)	−107		−83	dBm
	Temperature sensitivity		−0.04		dB/ $^\circ\text{C}$
Linearity Error (Ripple)	Input from −88 dBV (−75 dBm) to +2 dBV (+15 dBm)		±0.4		dB
Output Voltage	Input = −91 dBV (−78 dBm)		0.4		V
	Input = 9 dBV (22 dBm)		2.6		V
Minimum Load Resistance, R_L			100		Ω
Maximum Sink Current			0.5		mA
Output Resistance			0.05		Ω
Video Bandwidth			25		MHz
Rise Time (10% to 90%)	Input Level = −43 dBV (−30 dBm), $R_L \geq 402\ \Omega$, $C_L \leq 68\text{ pF}$		15		ns
	Input Level = −3 dBV (+10 dBm), $R_L \geq 402\ \Omega$, $C_L \leq 68\text{ pF}$		20		ns
Fall Time (90% to 10%)	Input Level = −43 dBV (−30 dBm), $R_L \geq 402\ \Omega$, $C_L \leq 68\text{ pF}$		30		ns
	Input Level = −3 dBV (+10 dBm), $R_L \geq 402\ \Omega$, $C_L \leq 68\text{ pF}$		40		ns
Output Settling Time to 1%	Input Level = −13 dBV (0 dBm), $R_L \geq 402\ \Omega$, $C_L \leq 68\text{ pF}$		40		ns
POWER INTERFACES					
Supply Voltage, VPOS		2.7		5.5	V
Quiescent Current	Zero-signal	6.5	8.0	9.5	mA
Overtemperature	$-40^\circ\text{C} < T_A < +85^\circ\text{C}$	5.5	8.5	10	mA
Disable Current			0.05		μA
Logic Level to Enable Power	High condition, $-40^\circ\text{C} < T_A < +85^\circ\text{C}$		2.3		V
Input Current when High	3 V at ENBL		35		μA
Logic Level to Disable Power	Low condition, $-40^\circ\text{C} < T_A < +85^\circ\text{C}$		0.8		V

¹ The input level is specified in dBV, because logarithmic amplifiers respond strictly to voltage, not power. 0 dBV corresponds to a sinusoidal single-frequency input of 1 V rms. A power level of 0 dBm (1 mW) in a 50 Ω termination corresponds to an input of 0.2236 V rms. Therefore, the relationship between dBV and dBm is a fixed offset of 13 dBm in the special case of a 50 Ω termination.

² Guaranteed but not tested; limits are specified at six sigma levels.

ABSOLUTE MAXIMUM RATINGS

Table 2.

Parameter	Value
Supply Voltage, V_S	7.5 V
Input Power (re 50 Ω), Single-Ended	18 dBm
Differential Drive	22 dBm
Internal Power Dissipation	200 mW
θ_{JA}	200°C/W
Maximum Junction Temperature	125°C
Operating Temperature Range	-40°C to +85°C
Storage Temperature Range	-65°C to +150°C
Lead Temperature (Soldering 60 sec)	300°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.

ESD 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 this product 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.



PIN CONFIGURATION AND FUNCTION DESCRIPTIONS



Figure 2. Pin Configuration

Table 3. Pin Function Descriptions

Pin No.	Mnemonic	Function
1	INLO	One of Two Balanced Inputs. Biased roughly to VPOS/2.
2	COMM	Common Pin. Usually grounded.
3	OFLT	Offset Filter Access. Nominally at about 1.75 V.
4	VOUT	Low Impedance Output Voltage. Carries a 25 mA maximum load.
5	VPOS	Positive Supply. 2.7 V to 5.5 V at 8 mA quiescent current.
6	BFIN	Buffer Input. Used to lower post-detection bandwidth.
7	ENBL	CMOS Compatible Chip Enable. Active when high.
8	INHI	Second of Two Balanced Inputs.

OUTLINE DIMENSIONS

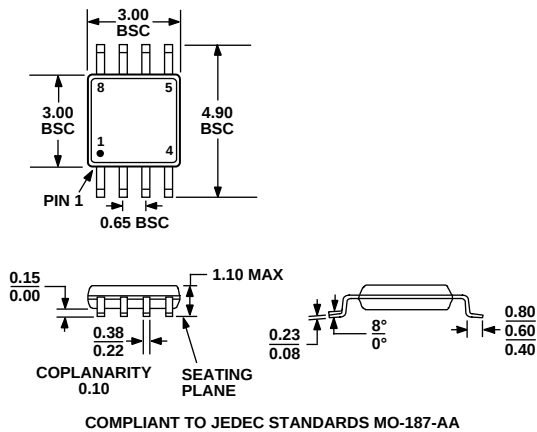


Figure 43. 8-Lead Mini Small Outline Package [MSOP]
(RM-8)
Dimensions shown in millimeters

ORDERING GUIDE

Model	Temperature Range	Package Description	Package Option	Branding
AD8310ARM	–40°C to +85°C	8-Lead MSOP, Tube	RM-8	J6A
AD8310ARM-REEL7	–40°C to +85°C	8-Lead MSOP, 7 Tape and Reel	RM-8	J6A
AD8310ARMZ ¹	–40°C to +85°C	8-Lead MSOP, Tube	RM-8	J6A
AD8310ARMZ-REEL7 ¹	–40°C to +85°C	8-Lead MSOP, 7 Tape and Reel	RM-8	J6A
AD8310-EVAL		Evaluation Board		

¹ Z = Pb-free part.