

Scope

This specification covers the detail requirements for a monolithic, dc coupled, demodulating, 250 MHz logarithmic amplifier, whose transfer function is

$$I_{OUT} = 1 \text{ mA} \times [\text{Log}_{10} (|V_{IN}| / (1 \text{ mV}))]$$

The electrical specifications match the Standard Microcircuit Drawing (SMD) 5962-95598 in effect at the release of this data sheet. For a copy of the latest official SMD, contact DESC-ELDS.

Part Number/Case Outline

For case outline dimensions, see Package Information Appendix of general specifications ADI-M-1000. The complete part number of this SMD device package is as follows:

Device Type	SMD Part Number	ADI Similar Part Number	Package Description	Package Designation ADI	Package Designation MIL-STD-1835
01	5962-9559801MRA	AD641SQ	20-Pin Cerdip	Q-20	GDIP1-T20

Absolute Maximum Ratings¹ ($T_A = +25^\circ\text{C}$ unless otherwise noted)

Supply Voltages ($\pm V_S$)	$\pm 7.5 \text{ V}$
Input Voltage (Pin 1 or Pin 20 to COM)	-3 V to $+300 \text{ mV}$
Attenuator Input Voltage (Pin 5 to Pin 3/4)	$\pm 4 \text{ V}$
Power Dissipation (P_D)	900 mW
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering 10 sec)	$+300^\circ\text{C}$

Recommended Operating Conditions

Operating Voltage Range ($+V_S$)	4.5 V to 5.5 V
Operating Voltage Range ($-V_S$)	-4.5 V to -5.5 V
Operating Temperature Range (T_A)	-55°C to $+125^\circ\text{C}$

Thermal Characteristics

Thermal Resistance, Junction-to-Case (θ_{JC})	$25^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Ambient (θ_{JA})	$120^\circ\text{C}/\text{W}$

NOTE

¹Permanent damage may occur if any absolute maximum rating is exceeded. Functional operation is not implied, and device reliability may be impaired by exposure to higher than recommended voltages for extended periods of time.

REV. A

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices.

© Analog Devices, Inc., 1995

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 617/329-4700 Fax: 617/326-8703

AD641—SPECIFICATIONS

Table 1. Electrical Performance Characteristics

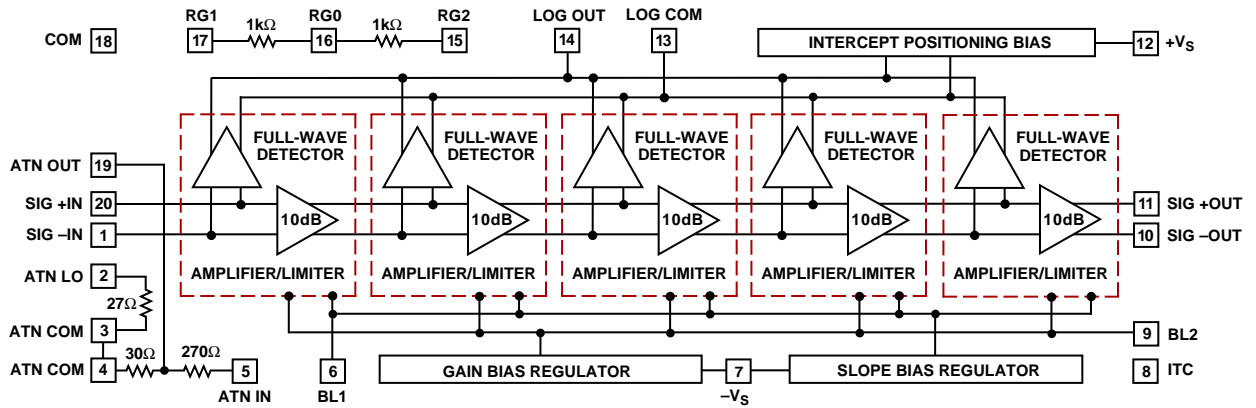
Test	Symbol	Conditions -55°C ≤ T _C ≤ +125°C unless otherwise specified	Group A Subgroups	Device Type	Min	Max	Units
Total Absolute DC Accuracy	T _A	V _{IN} = ±1 mV to ±100 mV I _{OUT} = 1 mA × Log10 (V _{IN} /1 mV)	1	01	-0.9	0.9	dB
			2, 3		-1.8	1.8	
		V _{IN} = ±1 mV to ±100 mV Using Attenuator I _{OUT} = 1 mA × Log10 (V _{IN} /1 mV)	1		-1.5	1.5	
			2, 3		-2.0	2.0	
Total Absolute DC Accuracy Transfer Function vs. Supplies	T _A	±V _S = ±4.5 V to ±7.5 V V _{IN} = ±1 mV to ±100 mV I _{OUT} = 1 mA × Log10 (V _{IN} /1 mV)	1	01	-1.0	1.0	dB
DC Linearity	LE _{DC}	V _{IN} = ±1 mV to ±100 mV	1	01	-0.6	0.6	dB
Input Offset Voltage	V _{OS}	Differential	1	01	-200	200	μV
			2, 3		-300	300	
Slope Current	I _{YDC}	At DC	1, 2, 3	01	0.98	1.02	mA
Slope Current vs. Supplies		±V _S = ±4.5 V to ±7.5 V	1		-0.4	0.4	
Intercept Voltage	V _{XDC}	At DC	1	01	0.95	1.05	mV
			2, 3		0.90	1.10	
		Using Attenuator	1		9.0	11.0	
Application Resistors	R _A		1	01	995	1005	Ω
			2, 3		990	1010	
Log Conformance (AC Linearity) ¹	LE _{AC}	Single Config. Freq = 250 MHz Input Level = -44 dBm to 0 dBm	4	01	-2.0	2.0	dB
		Single Config. Freq. = 250 MHz Input Level = -42 dBm to -4 dBm	5, 6		-2.5	2.5	
		Dual Config. Freq. = 250 MHz Input Level = -60 dBm to -2 dBm	4		-2.0	2.0	
		Dual Config. Freq. = 250 MHz Input Level = -56 dBm to -4 dBm	5, 6		-2.5	2.5	
AC Slope Current ^{1, 2}	I _{YAC}	Freq. ≤ 1 MHz, T _A = +25°C	4	01	0.98	1.02	mA
		Freq. = 30 MHz, T _A = +25°C			0.91	0.97	
		Freq. = 60 MHz, T _A = +25°C			0.86	0.94	
AC Intercept Voltage ¹	V _{XAC}	Freq. = 250 MHz	4	01	-40.84	-39.96	dBm
			5, 6		-40.59	-39.47	
Supply Current	+IS	+V _S = 5.0 V Static Conditions	1, 2, 3	01		15.0	mA
	-IS	-V _S = -5.0 V Static Conditions				60.0	

NOTES

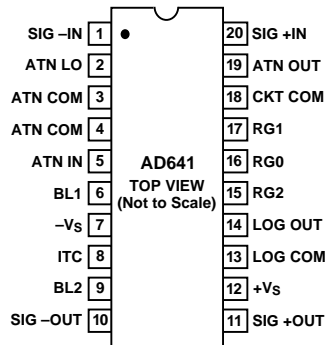
¹If not tested, guaranteed to the limits specified.

²Slope is measured by linear regression over central region of transfer function.

Functional Block Diagram and Terminal Assignments



Q-20 Package



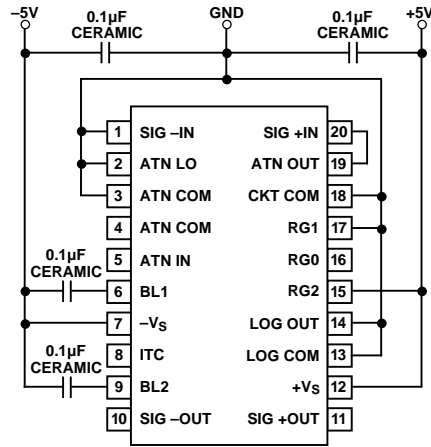
Microcircuit Technology Group

This microcircuit is covered by technology group (49).

AD641

Life Test /Burn-In Circuit

Steady state life test is per MIL-STD-883 Method 1005. Burn-in is per MIL-STD-883 Method 1015 test condition (B).



C2066-6-10/95

PRINTED IN U.S.A.