DC Coupled Demodulating 120 MHz Logarithmic Amplifier

AD640

1.1 Scope.

This specification covers the detail requirements for a monolithic, dc-coupled, demodulating, 120 MHz logarithmic amplifier, whose transfer function is

$$I_{OUT} = 1\ mA * \left(Log_{10} \frac{|\ V_{IN}\ |}{(1\ mV)} \right)$$

1.2 Part Number.

The complete part number per Table 1 of this specification is as follows:

Device	Part Number
−1	AD640T(X)/883B

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline:

(X)	Package	Description
D	D-20	20-Pin DIP
E	E-20A	20-Pin Leadless Chip Carrier

1.3 Absolute Maximum Ratings. (T_A = +25°C unless otherwise noted)

Supply Voltages ..... ±7.5 V
Input Voltage (Pin 1 or Pin 20 to COM) ..... −3 V to +300 mV
Attenuator Input Voltage (Pin 5 to Pin 3/4) ..... ±3 V
Operating Temperature Range ..... −55°C to +125°C
Storage Temperature Range ..... −65°C to +150°C
Lead Temperature (Soldering 60 sec) ..... +300°C

1.5 Thermal Characteristics.

Thermal Resistance θ_{JC} = 25°C/W for D-20, E-20A
θ_{JA} = 95°C/W for D-20, E-20A

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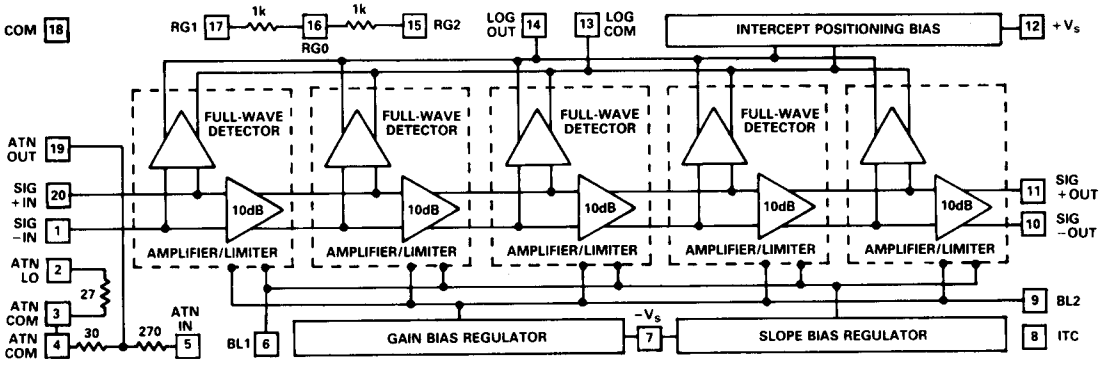
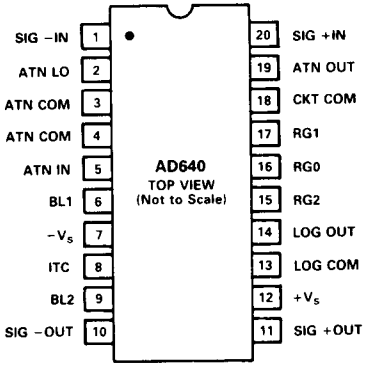
Table 1.

Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition	Units
Total Absolute DC Accuracy	TA	−1	0.9	0.9	1.8		V_{IN} = ±1 mV to ±100 mV	±dB
			2.0			2.0	V_{IN} = ±0.75 mV to ±200 mV	
			1.5	1.5	2.0		V_{IN} = ±10 mV to ±1 V Using Attenuator	
			2.5			2.5	V_{IN} = ±7.5 mV to ±2 V Using Attenuator	
vs. Supplies			1.0			1.0	$±V_S$ = ±4.5 V to ±7.5 V V_{IN} = ±1 mV to ±100 mV	
DC Linearity	LE_{DC}	−1	0.6	0.6			V_{IN} = ±1 mV to ±100 mV	±dB
Input Offset Voltage	V_{OS}	−1	200	200	300		Differential	±μV
Input Bias Current	I_B	−1	25					±μA
Slope Current	IY_{DC}	−1	0.02	0.02	0.02		From Nominal of 1.00 mA	±mA
vs. Supplies		−1	0.4			0.4	$±V_S$ = ±4.5 V to ±7.5 V	%/V
Intercept Voltage	VX_{DC}	−1	0.05	0.05	0.1		From Nominal of 1.00 mV	±mV
			1.0	1.0			From Nominal of 10.0 mV Using Attenuator	±mV
Application Resistors	R_A	−1	5			5	From Nominal of 1000 Ω	±Ω
AC Linearity	LE_{AC}	−1	1.0 0.5 1.5 1.0				f = 1 MHz, −40 dBm to −2 dBm f = 1 MHz, −35 dBm to −10 dBm f = 1 MHz, −75 dBm to 0 dBm Cascaded Operation f = 1 MHz, −70 dBm to −10 dBm Cascaded Operation	±dB
AC Slope Current	IY_{AC}	−1	0.02 0.03 0.04				From Nominal of 1.00 mA f≤1 MHz From Nominal of 0.94 mA f = 30 MHz From Nominal of 0.90 mA f = 60 MHz	±mA
AC Intercept Voltage	VX_{AC}	−1	1.0				From Nominal of −88.6 dBm f≤1 MHz	±dBm
Supply Current	$+I_S$ $-I_S$	−1	15 60	15 60	15 60			mA
Supply Voltage	V_S	−1	±4.5 ±7.5					±V min to max

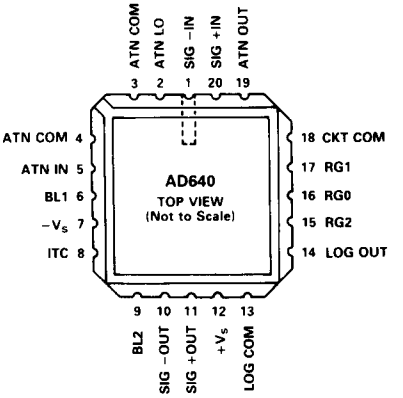
3.2.1 Functional Block Diagram and Terminal Assignments.



20-Pin Ceramic (D) Package



20-Pin LCC (E) Package



3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (49).

4.2.1 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).