



12-Bit Monolithic D/A Converter

AD DAC87

1.1 Scope.

T-51-09-12

This specification covers the detail requirements for a complete monolithic 12-bit voltage output D/A converter. (The hybrid version is detailed on page 979.)

1.2 Part Number.

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

Device	Part Number
-1	AD DAC87D-CBI-V/883B

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000: package outline: D-24.

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

$+V_S$ to Power Ground	0V to +18V
$-V_S$ to Power Ground	0V to -18V
Signal Inputs (Pins 1 to Pin 12) to Power Ground	-1.0V to +7V
Ref In to Reference Ground	$\pm 12\text{V}$
Bipolar Offset to Reference Ground	$\pm 12\text{V}$
10V Span R to Reference Ground	$\pm 12\text{V}$
20V Span R to Reference Ground	$\pm 24\text{V}$
Ref Out	Indefinite Short-to-Power Ground or $+V_S$
Storage Temperature Range	-65°C to $+150^\circ\text{C}$
Lead Temperature (Soldering 10sec)	$+300^\circ\text{C}$

1.5 Thermal Characteristics.

Thermal Resistance $\theta_{JC} = 25^\circ\text{C/W}$
 $\theta_{JA} = 48^\circ\text{C/W}$

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Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition ¹	Units
Relative Accuracy	RA	-1	1/2	1/2	3/4		All Bits with Positive Errors On All Bits Negative Errors On	± LSB max
Differential Nonlinearity	DNL	-1	3/4	3/4	1		Major Transitions	± LSB max
Gain Error	A _E	-1	0.2	0.2				± % FSR max
Gain Temperature Coefficient	TCA _E	-1	20		20		Includes Internal Reference	± ppm/°C max
Offset Error	V _{OS}	-1	0.1	0.1				± % FSR max
Offset Temperature Coefficient	TCV _{OS}	-1	3		3			± ppm/°C max
Bipolar Offset Error	B _{POE}	-1	0.1	0.1			Bipolar	± % FSR max
B/P Offset Temperature Coefficient	TCB _{POE}	-1	10		10		Bipolar	± ppm/°C max
Reference Output Voltage	V _{REF}	-1	6.23 6.37	6.23 6.37			No External Load and 2.5mA External Load	V min V max
Reference Temperature Coefficient	V _{REFTC}	-1	20		10		No External Load	± ppm/°C max
Slew Rate	V _{SL}	-1	10					V/μs min
Settling Time to 0.01% FSR	t _{SL}	-1	4				FSR Change with 10kΩ Feedback	μs max
			3				5kΩ Feedback	
Output Short Circuit Current	I _{SC}	-1	40					mA max
Power Supply Rejection	PSR	-1	0.002	0.002			13.5V ≤ V _{CC} ≤ 16.5V, V _{EE} = -15V V _{CC} = 15V, -16.5V ≤ V _{EE} ≤ -13.5V 11.4V ≤ V _{CC} ≤ 12.6V, V _{EE} = -12V V _{CC} = 12V, -12.6V ≤ V _{EE} ≤ -11.4V	± % FSR/% max
Power Supply Current	I _{CC}	-1	10	10				mA max
	I _{EE}	-1	20	20				
Digital Input High Voltage	V _{IH}	-1	2.0	2.0	2.0			V min
Digital Input Low Voltage	V _{IL}	-1	0.8	0.8	0.8			V max
Digital Input High Current	I _{IH}	-1	250	250			V _{IH} = 5.5V	μA max
Digital Input Low Current	I _{IL}	-1	100	100			V _{IL} = 0.8V	μA max
Output Current	I _{OUT}	-1	5					± mA min

NOTE

¹V_{CC} = +15V, V_{EE} = -15V, Pin 16 to Pin 24. Unipolar configuration unless otherwise noted.

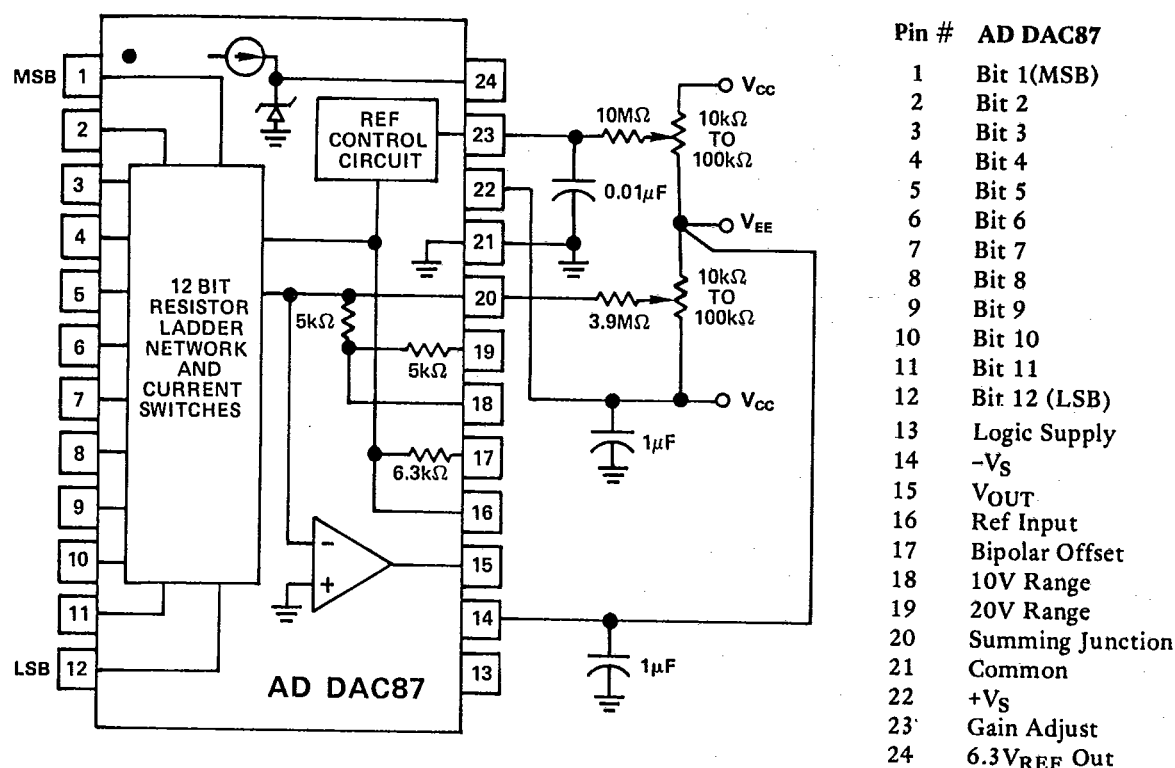
Unipolar - 0 to +10V; Pin 15 to Pin 18, Pin 17 to Pin 21, Pin 19 open.

Bipolar - ±10V; Pin 15 to Pin 19, Pin 17 to Pin 20, Pin 18 open.

Table 1.

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3.2.1 Functional Block Diagram and Terminal Assignments.**3.2.4 Microcircuit Technology Group.**

This microcircuit is covered by technology group (56).

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).

