

1.1 Scope.

This specification covers the detail requirements for a monolithic CMOS 14-bit digital-to-analog converter. The device is configured to accept right-justified data in two bytes from an 8-bit data bus. A novel low-leakage configuration enables the AD7534 to exhibit excellent output leakage current characteristics over the specified temperature range.

1.2 Part Number.

The complete part numbers per Table 1 of this specification are as follows:

Device	Part Number
–1	AD7534SQ/883B
–2	AD7534TQ/883B

1.2.3 Case Outline.

See Appendix 1 of General Specification ADI-M-1000; package outline: Q-20

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

V_{DD} (Pin 19) to DGND	–0.3V, +17V
V_{SS} (Pin 20) to AGND	–15V, +0.3V
V_{REF} (Pin 1) to AGND	±25V
V_{RFB} (Pin 2) to AGND	±25V
Digital Input Voltage (Pins 7-18) to DGND	–0.3V, V_{DD}
V_{PIN3} to DGND	–0.3V, V_{DD}
AGND to DGND	–0.3V, V_{DD}
Power Dissipation	
Up to $+75^\circ\text{C}$	450mW
Derates above $+75^\circ\text{C}$	6mW/ $^\circ\text{C}$
Operating Temperature Range	–55 $^\circ\text{C}$ to $+125^\circ\text{C}$
Storage Temperature	–65 $^\circ\text{C}$ to $+150^\circ\text{C}$
Lead Temperature (Soldering 10sec)	$+300^\circ\text{C}$

1.5 Thermal Characteristics.

Thermal Resistance $\theta_{JC} = 35^\circ\text{C/W}$
 $\theta_{JA} = 120^\circ\text{C/W}$

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Table 1.

Test	Symbol	Device ²	Design Limit $T_{min}-T_{max}$	Sub Group 1	Sub Group 2, 3	Sub Group 4	Test Condition ¹	Units
Resolution	RES	-1, 2	14					Bits
Relative Accuracy	RA	-1 -2	± 2 ± 1	± 2 ± 2	± 2 ± 1	± 1		LSB max
Differential Nonlinearity	DNL	-1, 2	± 1	± 1	± 1	± 1	Guaranteed Monotonic to 14-Bits	LSB max
Gain Error ²	A _E	-1 -2	± 8 ± 4	± 8 ± 8	± 8 ± 4	± 4		LSB max
Gain Tempco	TC _{AE}	-1 -2	± 5 ± 2.5					ppm/°C max
Supply Rejection (Δ Gain/ Δ V _{DD})		-1, 2	± 0.02	± 0.01	± 0.02		Δ V _{DD} = $\pm 5\%$	% per % max
Output Leakage Current (Pin 3)	I _{OUT}	-1, 2	± 20	± 5	± 20		V _{SS} = -300mV (DAC Register Loaded with All 0's)	nA max
		-1, 2	± 150	± 5	± 150		V _{SS} = 0V	nA max
Output Current Settling Time @ 25°C	t _{SL}	-1, 2	1.5				To 0.003% of FSR. I _{OUT} Load = 100 Ω , C _{EXT} = 13pF. DAC Register Alternately Loaded with All 1's and All 0's.	μ s max
Feedthrough Error ³	FT	-1, 2	10				V _{REF} = ± 10 V, 10kHz Sine Wave DAC Register Loaded with All 0's	mV p-p max
Input Resistance, Pin 1	R _{IN}	-1, 2	3.5	3.5	3.5		Typical Input Resistance = 6k Ω	k Ω min
			10	10	10			k Ω max
Input High Voltage	V _{IH}	-1, 2	2.4	2.4	2.4			V min
Input Low Voltage	V _{IL}	-1, 2	0.8	0.8	0.8			V max
Input Leakage Current	I _{IN}	-1, 2	± 10	± 1	± 10		V _{IN} = 0V or V _{DD}	μ A max
Input Capacitance	C _{IN}	-1, 2	7					pF max
Analog Output Capacitance: (Pin 3)	C _{OUT}	-1, 2	260 130				DAC Register Loaded with All 1's DAC Register Loaded with All 0's	pF max
Address Valid to Write Setup Time	t _{AWS}	-1, 2	0					ns min
Address Valid to Write Hold Time	t _{AWH}	-1, 2	0					ns min
Data Setup Time	t _{DS}	-1, 2	180					ns min
Data Hold Time	t _{DH}	-1, 2	30					ns min
Chip Select to Write Setup Time	t _{CWS}	-1, 2	0					ns min
Chip Select to Write Hold Time	t _{CWH}	-1, 2	0					ns min
Write Pulse Width	t _{WR}	-1, 2	240					ns min
Power Supply Voltage Range	V _{DD}	-1, 2	11.4				Specs Guaranteed Over This Range	V min
			15.75					V max
	V _{SS}	-1, 2	-200				Specs Guaranteed Over This Range	mV min
			-500					mV max
Power Supply Current	I _{DD}	-1, 2	3	3	3		All Digital Inputs V _{IL} or V _{IH} All Digital Inputs 0 or V _{DD}	mA max
			500	500	500			μ A max

NOTES

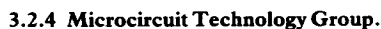
¹V_{DD} = +12V to 15V; V_{REF} = +10V, V_{PIN3} = V_{PIN4} = 0V, V_{SS} = -300mV unless otherwise stated.

Specifications are guaranteed for a V_{DD} of +12V to +15V with a tolerance of $\pm 5\%$; testing is performed at 12V and 15V only. At V_{DD} = 5V, the device is fully functional with a slight degradation in performance.

²Measured using internal feedback resistor and includes effects of leakage current and gain T.C.

³Feedthrough can be further reduced by connecting the metal lid to ground.

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4.2.1 Life Test/Burn-In Circuit.

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V + TURNS ON FIRST

V +	= +15V
V -	= 300mV GENERATED FROM CIRCUIT ABOVE
V _{REF}	= +10V
DATA	= V +
DGND	= GND
WR	= DGND

INPUT CODE = 11111111
DAC CODE = 111111 11111111