



10-Bit, 400 MSPS D/A Converters

ANALOG DEVICES INC

65E D

AD9720/AD9721

1.1 Scope.

This specification covers the requirements for 10-bit, high speed digital-to-analog converters (DACs). The AD9720/883B is a 10-bit ECL-compatible DAC that features update rates of 400 Msps; the TTL-compatible AD9721/883B will update at 100 Msps.

1.2 Part Number.

The complete part numbers are as follows:

Device	Part Number
-1	AD9720T(X)/883B
-2	AD9721T(X)/883B

1.2.3 Case Outline.

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

(X)	Package	Description
E	E-28A	28-Pin Leadless Chip Carrier
Q	Q-28	28-Pin Cerdip

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

Positive Supply Voltage ($+V_S$)	.....	+6 V
Negative Supply Voltage ($-V_S$)	.....	-7 V
Digital Input Voltages (D_1 - D_{10} , <u>CLOCK</u> , <u>CLOCK</u>)	.....	
AD9720	.....	0 V to $-V_S$
AD9721	.....	-0.5 V to $+V_S$
Internal Reference Output Current	.....	500 μA
Control Amplifier Input Voltage Range	.....	0 V to -4.0 V
Control Amplifier Output Current		± 2.5 mA
Reference Input Voltage (V_{REF})	.....	-3.7 V to $-V_S$
Analog Output Current	.....	30 mA
Operating Temperature Range (Case)	.....	
AD9720/AD9721TE/TQ	.....	-55°C to +125°C
Junction Temperature	.....	+175°C
Storage Temperature Range (Case)	.....	-65°C to +150°C
Lead Soldering Temperature (10 sec)	.....	+300°C

1.5 Thermal Characteristics.

Maximum junction temperature should not be allowed to exceed +175°C. Typical thermal impedances with parts soldered in place; no air flow:

- 28-pin ceramic DIP: $\theta_{JA} = 35^\circ\text{C/W}$, $\theta_{JC} = 10^\circ\text{C/W}$;
- 28-pin LCC: $\theta_{JA} = 41^\circ\text{C/W}$, $\theta_{JC} = 13^\circ\text{C/W}$.

AD9720/AD9721—SPECIFICATIONS

Table 1.

Test	Symbol	Device	Design Limits ¹	Sub Group 1	Sub Group 2, 3	Sub Group 4	Sub Group 5, 6	Sub Group 9	Sub Group 10, 11	Test Conditions ²	Units
Differential Nonlinearity	DNL	All				±1.0	±1.5				LSB
Integral Nonlinearity	INL	All				±1.5	±2.0				LSB
Zero-Scale Offset Error	I _{OS}	All		60	75						μA max
Full-Scale Gain Error		All		15	15						% max
Internal Reference Voltage	V _{IR}	All		-1.15 -1.35	-1.15 -1.35						V min V max
Internal Reference Output Current	I _{IR}	All	-50 +500								μA min μA max
Output Compliance Range	V _{OC}	All	-1.5 +3							@ +25°C @ +25°C	V min V max
Output Resistance	R _O	All	210							@ +25°C	Ω typ
Output Update Rate			-1 -2 400 100								typ
Digital Logic "1" Input Voltage	V _{IH}	-1 -2		-0.9 2.0	-0.9 2.0						V min
Digital Logic "0" Input Voltage	V _{IL}	-1 -2		-1.6 0.8	-1.6 0.8						V max
Digital Logic "1" Input Current	I _{IH}	-1 -2		50 400	50 400						μA max
Digital Logic "0" Input Current	V _{IL}	-1 -2		2 700	2 700						μA max
Setup Time ³	t _S	-1 -2	1.2 1.2								ns min
Hold Time ⁴	t _H	-1 -2	2.8 2.3								ns min
Clock Pulse Width "LOW"	t _{LPW}	-1 -2	1.4 1.3							@ +25°C @ +25°C	ns min
Clock Pulse Width "HIGH"	t _{HPW}	-1 -2	1.6 1.5							@ +25°C @ +25°C	ns min
Supply Current	+I _S	-2		30	30						mA max
-V _S Supply Current	-I _S	-1 -2		280 290	290 300						mA max

NOTES

¹Value shown is over full temperature range unless otherwise noted in Test Condition. Numbers in this column indicate specifications are guaranteed but not tested.

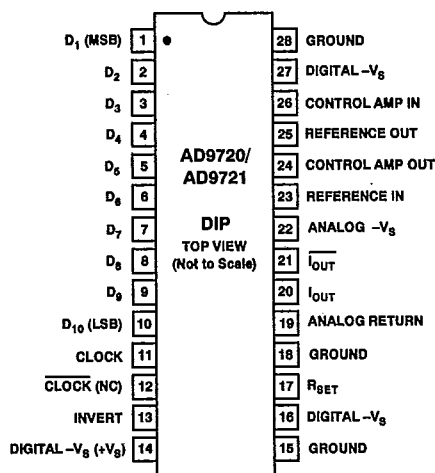
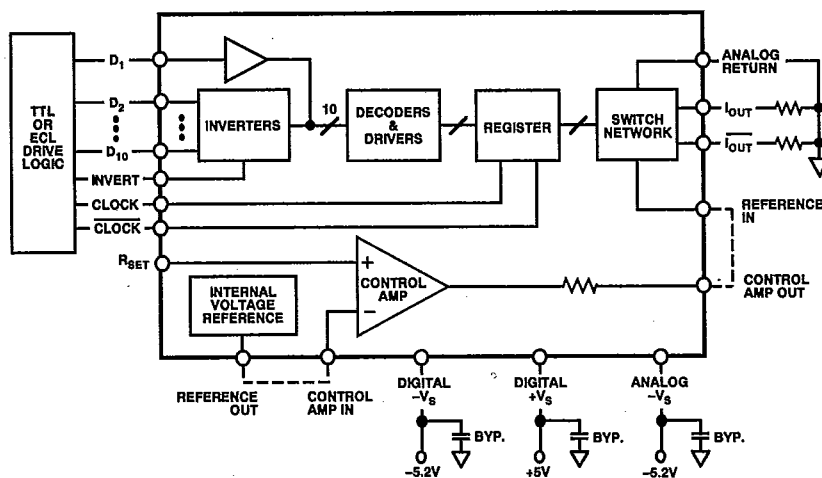
²+V_S = +5 V (AD9721 only); -V_S = -5.2 V; reference voltage = -1.25 V; R_{SET} = 1,960 Ω, unless otherwise indicated.

³Data must remain stable for specified time prior to falling edge of CLOCK signal.

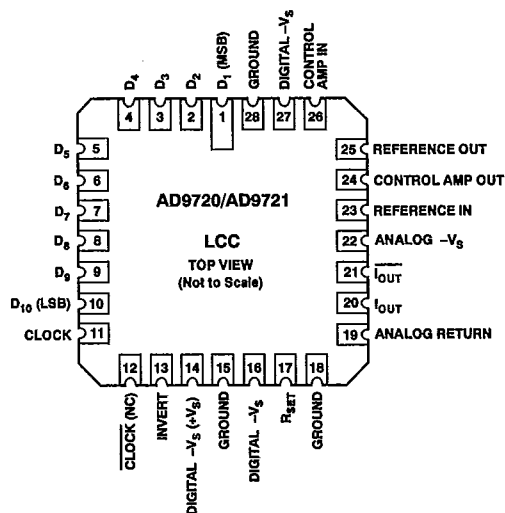
⁴Data must remain stable for specified time after rising edge of CLOCK signal.

ANALOG DEVICES INC

3.2.1 Functional Block Diagram and Terminal Assignments.



AD9720 (AD9721) Pinouts
(SOIC Pinouts Same as DIP)



LCC AD9720 (AD9721) Pinouts

3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (D-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).

