

1.1 Scope.

This specification covers the detail requirements for a precision, ultrahigh speed, current/voltage output 12-bit resolution, multiplying D/A converter.

1.2 Part Number.

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

Device	Part Number
-1	AD668SQ/883B

1.23 Case Outline.

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

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

V_{CC} to REFCOM	0 V to +18 V
V_{EE} to REFCOM	0 V to -18 V
REFCOM to LCOM	+100 mV to -10 V
ACOM to LCOM	± 100 mV
THCOM to LCOM	± 500 mV
REFCOM to REFIN (1, 2)	18 V
I_{BPO} to LCOM	± 5 V
I_{OUT} to LCOM	-5 V to V_{TH}
Digital Inputs to THCOM	-500 mV to +7 V
REFIN1 to REFIN2	36 V
V_{TH} to THCOM	-0.7 V to +1.4 V
Logic Threshold Control Input Current	5 mA
Power Dissipation	670 mW
Storage Temperature Range Q (Cerdip) Package	-65°C to +150°C
Junction Temperature	+175°C
Lead Temperature Range (Soldering 10 seconds)	+300°C

1.5 Thermal Characteristics.

Thermal Resistance: $\theta_{JC} = 25^\circ\text{C}/\text{W}$
 $\theta_{JA} = 75^\circ\text{C}/\text{W}$

AD668 — SPECIFICATIONS

Table 1.

Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Test Condition ¹	Units
Relative Accuracy ²	RA	-1	1/2	1/2	3/4	All Bits with Positive Errors On, All Bits with Negative Errors On	±LSB max
Differential Nonlinearity ²	DNL	-1	1	1	1	Major Carry Errors	±LSB max
Gain Error ²	A _E	-1	1.0	1.0		All Bits On	±% FSR max
Gain Temperature Coefficient ³	TCA _E	-1	40 150		40	All Bits On, V _{OUT} Mode All Bits On, I _{OUT} Mode	± ppm/°C max ± ppm/°C typ
Unipolar Offset Error ²	V _{OS}	-1	0.20	0.20		All Bits Off	±% FSR max
Unipolar Offset TC ³	TCV _{OS}	-1	8		8	All Bits Off	± ppm/°C max
Bipolar Offset Error ²	B _{POE}	-1	1.0	1.0		All Bits Off, Bipolar	±% FSR max
Bipolar Offset TC ³	TCB _{POE}	-1	25		25	All Bits Off, Bipolar	± ppm/°C max
Bipolar Zero Error ²	B _{PZE}	-1	0.50	0.50		MSB On, All Other Bits Off, Bipolar	±% FSR max
Bipolar Zero TC ³	TCB _{PZE}	-1	20		20	MSB On, All Other Bits Off, Bipolar	± ppm/°C max
Analog Offset Error ²	A _{VOS}	-1	1.0	1.0		All Bits On	±% of V _{NOM} max
Analog Offset TC ³	TCA _{VOS}	-1	20		20	All Bits On	± ppm of V _{NOM} max
Output Resistance	R _{OUT}	-1	160 240				Ω min Ω max
Voltage Settling Time	t _{SV}	-1	110				ns typ to 0.025%
Current Settling Time	t _{SI}	-1	90				ns typ to 0.025%
Full-Scale Transition	t _{FS}	-1	11			10% to 90% Rise Time 90% to 10% Fall Time	ns typ
Glitch Impulse	GI	-1	350				pV sec typ
Compliance Voltage	CV	-1	2 1.2				-V min +V max
Output Current	I _{OUT}	-1		10.137 10.343		Unipolar All Bits On	+mA min +mA max
				5.017 5.223		Bipolar All Bits On	+mA min +mA max
Power Supply Rejection Ratio	PSRR	-1	0.05	0.05		V _{CC} = +15 V ± 10%, +12 V ± 10% V _{EE} = -15 V ± 10%, -12 V ± 10%	±% FS/V max
Power Supply Current ^{4, 5}	I _{CC} I _{EE}	-1 -1	32 9	32 9		All Bits High	+mA max -mA max
Power Consumption	P _C	-1	615				mW max
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	10	10	10	V _{IH} = 2 V	±μA max
Digital Input Low Current	I _{IL}	-1	0.5 100	0.5 100	0.5 200	V _{IL} = 0.0 V	-μA min -μA max

NOTES

¹V_{CC} = +15 V, V_{EE} = -15 V, V_{IH} = 2.0 V, V_{IL} = 0.8 V, REFIN2 = +5 V in series with a 50 Ω resistor, REFIN1 = GND, T_A = +25°C unless otherwise specified.

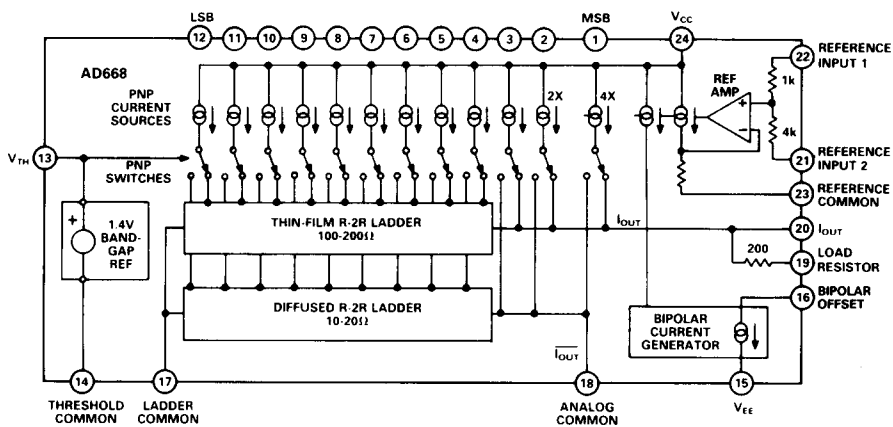
²Measured in I_{OUT} mode.

³Measured in V_{OUT} mode.

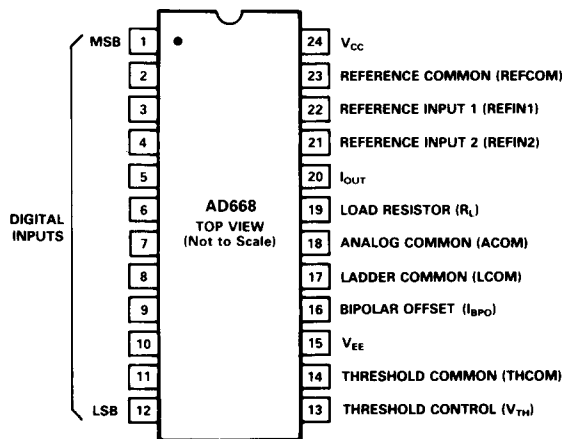
⁴Guaranteed for +10.8 V ≤ V_{CC} ≤ +16.5 V.

⁵Guaranteed for -10.8 V ≤ V_{EE} ≤ -16.5 V.

3.2.1 Functional Block Diagram and Terminal Assignments.



24-Lead Cerdip Package



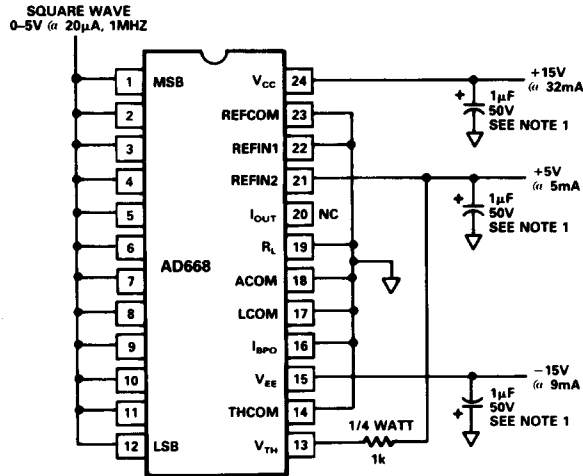
3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (56).

AD668

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).



NOTES

1. CAPACITORS EVERY 10 DEVICES.
2. ALL CURRENT RATINGS ARE MAX/PART.