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°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: θ_{JC} = 25°C/W
θ_{JA} = 75°C/W

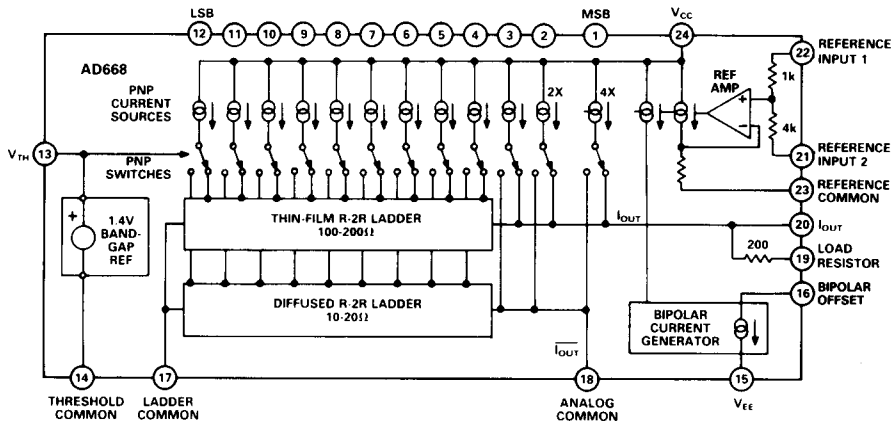
AD668—SPECIFICATIONS

Table 1.

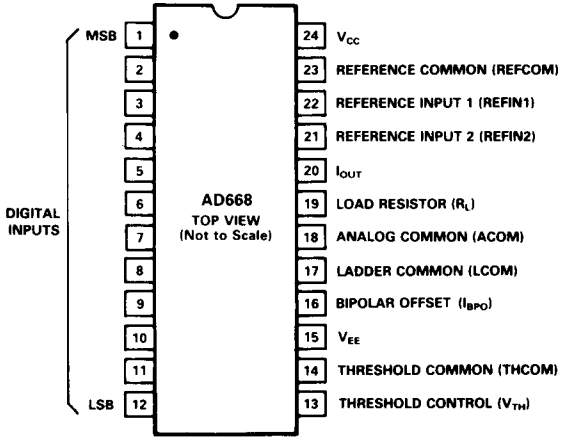
Test	Symbol	Device	Design Limit @ +25°C	Sub Group 1	Sub Group 2, 3	Test Condition[1]	Units
Relative Accuracy[2]	RA	−1	1/2	1/2	3/4	All Bits with Positive Errors On, All Bits with Negative Errors On	±LSB max
Differential Nonlinearity[2]	DNL	−1	1	1	1	Major Carry Errors	±LSB max
Gain Error[2]	A_E	−1	1.0	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
[1]V_{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.
[2]Measured in I_{OUT} mode.
[3]Measured in V_{OUT} mode.
[4]Guaranteed for +10.8 V ≤ V_{CC} ≤ +16.5 V.
[5]Guaranteed for −10.8 V ≤ V_{EE} ≤ −16.5 V.

3.2.1 Functional Block Diagram and Terminal Assignments.



24-Lead Cerdip Package

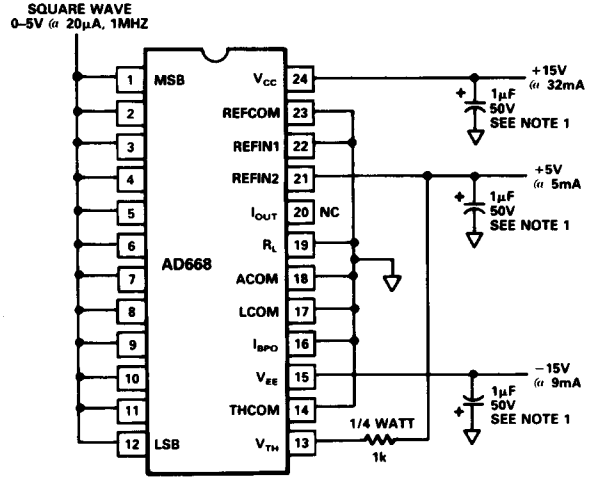


3.2.4 Microcircuit Technology Group.

This microcircuit is covered by technology group (56).

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.