

1.1 Scope.

This specification covers the detail requirements for a precision, ultrahigh speed, current/voltage output 12-bit resolution D/A converter with internal high stability buried Zener reference.

1.2 Part Number.

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

Device	Part Number
-1	AD568SQ/883B
-2	AD568SE/883B

1.2.3 Case Outline.

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

Device	Package	Description
-1	Q-24	24-Pin DIP
-2	E-28A	28-Pin LCC

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

V_{CC} to RefCOM	0V to +18V
V_{EE} to RefCOM	0V to -18V
RefCOM to LCOM	+100mV to -10V
ACOM to LCOM	$\pm 100\text{mV}$
THCOM to LCOM	$\pm 500\text{mV}$
SPANs to LCOM	$\pm 12\text{V}$
I_{BPO} to LCOM	$\pm 5\text{V}$
I_{OUT} to LCOM	-5V to V_{TH}
Digital Inputs to THCOM	-500mV to +7V
Voltage Across Span Resistors	12V
V_{TH} to THCOM	-0.7V to +1.4V
Logic Threshold Control Input Current	5mA
Power Dissipation	1000mW
Storage Temperature Range Q (Cerdip) Package	-65°C to +150°C
Junction Temperature	175°C
Lead Temperature (Soldering, 10secs)	+300°C

1.5 Thermal Characteristics.

Thermal Resistance θ_{JC}	= $25^\circ\text{C}/\text{W}$ for Q-24
θ_{JA}	= $75^\circ\text{C}/\text{W}$ for Q-24
θ_{JC}	= $42^\circ\text{C}/\text{W}$ for E-28A
θ_{JA}	= $125^\circ\text{C}/\text{W}$ for E-28A

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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
		-2	1/2	1/2	1		
Differential Nonlinearity ²	DNL	-1, 2	1	1	1	Major Carry Errors	± LSB max
Gain Error ²	A _E	-1, 2	1.0	1.0		All Bits On	± % FSR max
Gain Temperature Coefficient	TCA _E	-1	50		50	All Bits On, V _{OUT} Mode	± ppm/°C max
		-2	60		60		
		-1, 2	150		150	All Bits On, I _{OUT} Mode	
Unipolar Offset Error ²	V _{OS}	-1, 2	0.20	0.20		All Bits Off	± % FSR max
Unipolar Offset TC ³	TCV _{OS}	-1, 2	5		5	All Bits Off	± ppm/°C max
Bipolar Offset Error ²	B _{POE}	-1, 2	1.0	1.0		All Bits Off, Bipolar	± % FSR max
Bipolar Offset TC ³	TCB _{POE}	-1	30		30	All Bits Off, BIP	± ppm/°C max
		-2	40		40		
Bipolar Zero Error ²	B _{PZE}	-1, 2	0.20	0.20		MSB On, All Other Bits Off, Bipolar	± % FSR max
Bipolar Zero TC ³	TCB _{PZE}	-1, 2	15		15	MSB On, All Other Bits Off, Bipolar	± ppm/°C max
Output Resistance	R _{OUT}	-1, 2	160				Ω min
			240				Ω max
Voltage Settling Time	t _{SV}	-1, 2	50				ns typ to 0.025%
Current Settling Time	t _{SI}	-1, 2	35				ns typ to 0.025%
Full-Scale Transition	t _{FS}	-1, 2	11			10% to 90% Reset Time 90% to 10% Fall Time	ns typ
Glitch Impulse	GI	-1, 2	350				pV-sec typ
Compliance Voltage	CV	-1, 2	2				- V min
			1.2				+ V max
Output Current	I _{OUT}	-1, 2		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, 2	0.05	0.05		V _{CC} = +13.5V to +16.5V V _{EE} = -13.5V to -16.5V	± % FS/V max
Power Supply Current ^{4, 5}	I _{CC}	-1, 2	32	32		All Bits High	+ mA max
	I _{EE}	-1, 2	8	8			- mA max
Power Consumption	P _C	-1, 2	625				mW max
Digital Input High Voltage	V _{IH}	-1, 2	2.0	2.0	2.0		+ V min
Digital Input Low Voltage	V _{IL}	-1, 2	0.8	0.8	0.8		+ V max
Digital Input High Current	I _{IH}	-1, 2	10	10	10	V _{IH} = 2V	± μA max
Digital Input Low Current	I _{IL}	-1, 2	0.5	0.5	0.5	V _{IL} = 0.0V	- μA min
			100	100	200		- μA max

NOTES

¹V_{CC} = +15V, V_{EE} = -15V, V_{IH} = 2.0V, V_{IL} = 0.8V, T_A = +25°C unless otherwise specified.

V_{IH} = +2.0V and V_{IL} = 0.8V guaranteed design limits at -55°C and +125°C.

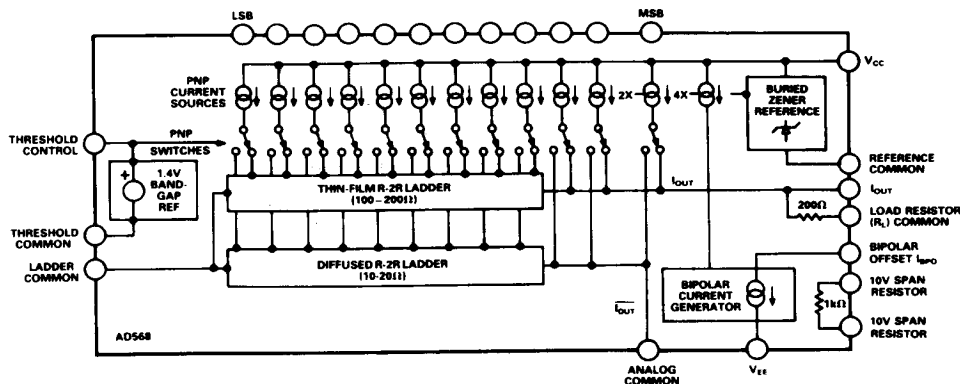
²Measured in I_{OUT} mode.

³Measured in V_{OUT} mode.

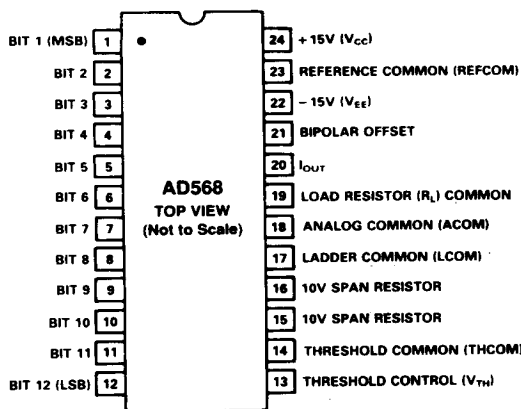
⁴Guaranteed for +13.5 ≤ V_{CC} ≤ +16.5V.

⁵Guaranteed for -13.5 ≤ V_{EE} ≤ -16.5V.

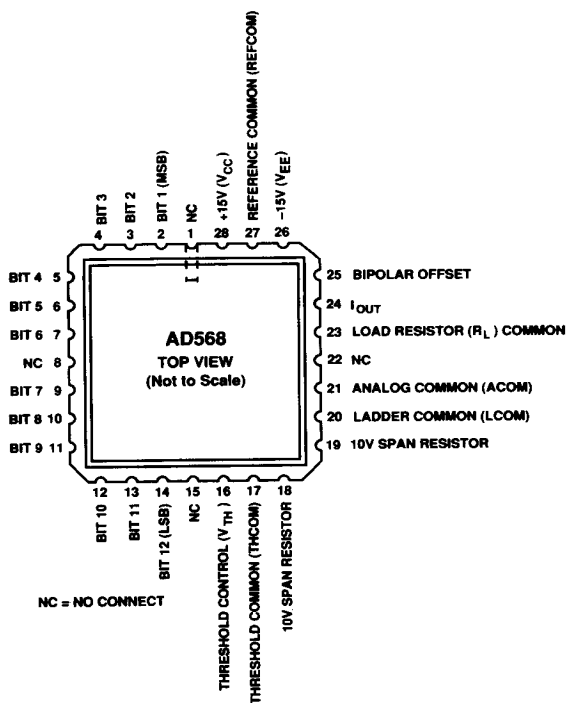
3.2.1 Functional Block Diagram and Terminal Assignments.



24-Lead "Skinny" Cerdip Package



28-Lead LCC 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).

