

1.0 SCOPE

This specification documents the detail requirements for space qualified product manufactured on Analog Devices, Inc.'s QML certified line per MIL-PRF-38535 Level V except as modified herein.

The manufacturing flow described in the STANDARD SPACE LEVEL PRODUCTS PROGRAM brochure is to be considered a part of this specification. <http://www.analog.com/aerospace>

This data sheet specifically details the space grade version of this product. A more detailed operational description and a complete data sheet for commercial product grades can be found at www.analog.com/AD561

2.0 Part Number. The complete part number(s) of this specification follow:

Part Number

Description

AD561-703D

Low Cost 10-Bit Monolithic D/A Converter

AD561-713D

Radiation Tested, Low Cost 10-Bit Monolithic D/A Converter

2.1 Case Outline.

Letter

Descriptive designator

Case Outline (Lead Finish per MIL-PRF-38535)

D

GDIP2-T16

16-Lead sidebrazed dual-in-line package

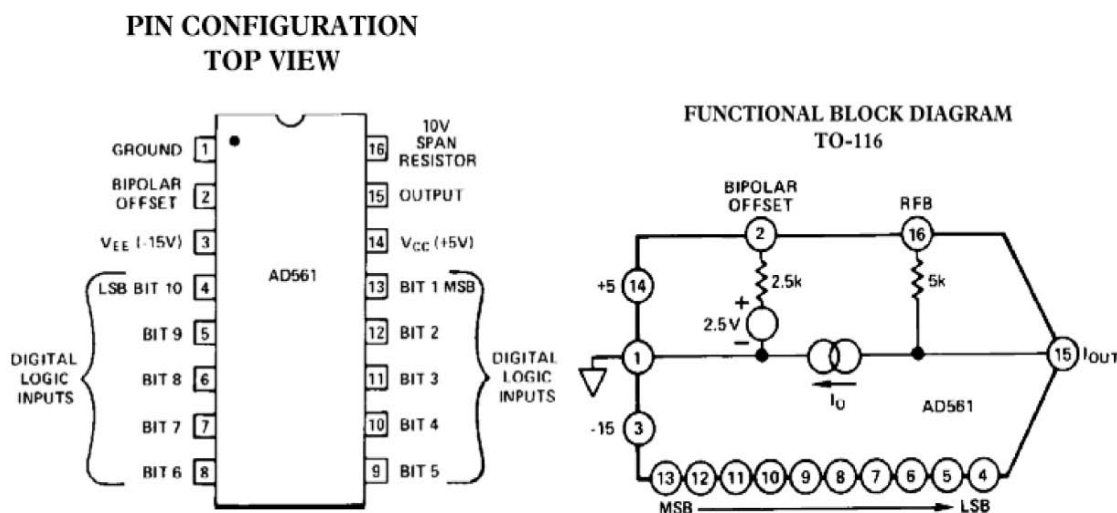


Figure 1 - Terminal connections.

ASD0011258

Rev. F

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective companies.

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106,
U.S.A.

Tel: 781.329.4700

www.analog.com

Fax: 781.326.8703 © 2008 Analog Devices, Inc. All rights reserved.

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

Operating Temperature Range.....	-55°C to $+125^\circ\text{C}$
Storage Temperature Range.....	-65°C to $+150^\circ\text{C}$
Power Dissipation	500mW
Lead Temperature (Soldering, 60 sec.)	$+300^\circ\text{C}$
Maximum Junction Temperature (T_J)	$+175^\circ\text{C}$
Supply Voltage.....	$\pm 16.5\text{V}$
Digital Input Voltage (V_{IN})	V_{CC} to Ground
Output Voltage Compliance (V_{OUT}).....	-2V to $+10\text{V}$
10V Span Resistor to Ground.....	V_{CC} to V_{EE}

3.1 Thermal Characteristics:

Thermal Resistance, Sidebrazed (D) Package

Junction-to-Case (Θ_{JC}) = 30°C/W Max

Junction-to-Ambient (Θ_{JA}) = 100°C/W Max

4.0 Electrical Table:

TABLE I

Parameter See notes at end of table	Symbol	Conditions (Note 1/)	Sub-group	Limit Min	Limit Max	Units
Relative Accuracy	RA	All Bits with + or - Errors on	1		$\frac{1}{2}$	LSB
Differential Nonlinearity	DNL	Major carry transitions	1, 2, 3		1	
Gain Error	A_E	With fixed 25Ω resistor	1		$\pm\frac{1}{2}$	%FS
Gain Error TC	TCA_E		2, 3		± 60	ppm of FS $^\circ\text{C}$
Unipolar Offset Error	V_{OS}	Note 2	1		± 0.05	%FS
Unipolar Error TC	TCV_{OS}				± 10	ppm of FS $^\circ\text{C}$
Bipolar Zero Error	B_{PZE}	With 10Ω resistor	1		± 3.5	LSB
Bipolar Zero Error TC	TCB_{PZE}		2, 3		± 20	ppm of FS $^\circ\text{C}$
Output Current	I_{OUT}	Digital inputs at logic "1"	1	1.5	2.4	mA
Power Supply Gain Sensitivity	PSS1	V_{CC} , +4.5V to +5.5V V_{CC} , 13.5V to +16.5V	1		± 10	ppm of FS /%
	PSS2	V_{EE} , -10.8V to -13.2V V_{EE} , - 13.2V to -16.5V	1		± 25	
Power Supply Current 2/	I_{CC}	V_{CC} , +4.5V to +16.5V	1		10	mA
	I_{EE}	V_{EE} , -10.8V to -16.5V	1		16	
Power Dissipation	PD		1		500	mW
Digital Input High Voltage	V_{IH}		1	2.0		V
Digital Input Low Voltage	V_{IL}		1		0.8	
Digital Input High Current	I_{IH}	Digital "1" = 15V	1		± 100	nA
Digital Input Low Current	I_{IL}	Digital "0" = 0V	1		± 25	μA

TABLE I NOTES:

1/ $V_{CC} = +5\text{V}$, $V_{EE} = -15\text{V}$, unless otherwise specified.

2/ Also tested in CMOS mode. $V_{CC} = +15\text{V}$, $V_{EE} = -15\text{V}$, $V_{IH} = 10.5\text{V}$, $V_{IL} = 4.5\text{V}$.

4.1 Electrical Test Requirements:

Table II	
Test Requirements	Subgroups (in accordance with MIL-PRF-38535, Table III)
Interim Electrical Parameters	1
Final Electrical Parameters	1, 2, 3 <u>1/</u> <u>2/</u>
Group A Test Requirements	1, 2, 3
Group C end-point electrical parameters	1 <u>2/</u>
Group D end-point electrical parameters	1
Group E end-point electrical parameters	1

1/ PDA applies to Subgroup 1. Deltas excluded from PDA

2/ See table III for delta parameters and limits.

4.2 Table III. Lifetest / Burn-in delta limits.

Table III				
TEST TITLE	BURN-IN ENDPOINT	LIFETEST ENDPOINT	DELTA LIMIT	UNITS
I _{CC}	10	10	±3	mA
I _{EE}	16	16	±3	mA
B _{PZE}	±3.5	±3.5	±2	LSB

5.0 Life Test/Burn-In Circuit:

- 5.1 HTRB is not applicable for this drawing.
- 5.2 Burn-in is per MIL-STD-883 Method 1015 test condition B.
- 5.3 Steady state life test is per MIL-STD-883 Method 1005.

Rev	Description of Change	Date
A	Initiate	June 30, 2000
B	Correct Typo's in Table I. No limits changed. Update Table III.	June 29, 2001
C	Update web address. Delete subgroups 4, 5, & 6 from Table II as they are not on Table I.	Feb. 20, 2002
D	Update web address. Delete Burn-in Circuit.	Jun. 20, 2003
E	Correct Typo's in 2.1 Case Outline, Descriptive designator. Change from GDIP1-T16 to GDIP2-T16.	Nov. 18, 2003
F	Update header/footer & add to 1.0 Scope description.	Feb. 21, 2008