8-Bit Low Cost Signal Conditioning ADC

AD670

1.0 SCOPE

This specification documents the detailed requirements for Analog Devices space qualified die including die qualification as described for Class K in MIL-PRF-38534, Appendix C, Table C-II except as modified herein.

The manufacturing flow described in the STANDARD DIE PRODUCTS PROGRAM brochure at http://www.analog.com/marketSolutions/militaryAerospace/pdf/Die_Broc.pdf is to be considered a part of this specification.

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/AD670

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

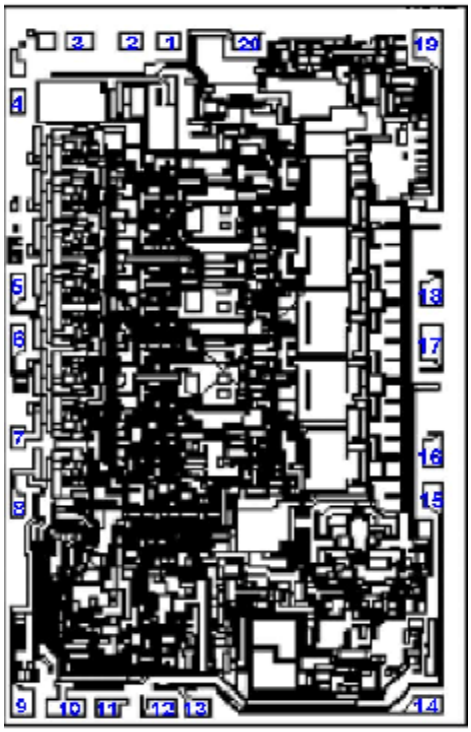
Part Number	Description
AD670-000C	8-Bit Low Cost Signal Conditioning ADC

3.0 Die Information

3.1 Die Dimensions

Die Size	Die Thickness mil	Bond Pad Metalization
111 mil x 174 mil	19 mil ± 2 mil	Al/Cu

3.2 Die Picture



1. D0 (LSB)
2. D1
3. D2
4. D3
5. D4
6. D5
7. D6
8. D7 (MSB)
9. STATUS
10. POWER GROUND
11. BPO/UPO*
12. FORMAT
13. R/W*
14. CE*
15. CS*
16. -VIN HI
17. -VIN LOW
18. +VIN HI
19. +VIN LOW
20. +VCC

* = Active Low

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3.3 Absolute Maximum Ratings 1/

V_{CC} to Ground ..... 0V to +7.5V
Digital Inputs (Pin 11 – 15) ..... -0.5V to V_{CC} +0.5V
Digital Outputs (Pin 1 – 9)..... Momentary Short to V_{CC} or ground
Analog Inputs (Pin 16 – 19) ..... ±30V
Storage Temperature Range ..... -65°C to +150°C
Junction Temperature (T_J)……..……..+150C
Operating Temperature Range..... -55°C to +125°C
Absolute Maximum Ratings Notes:

1./ Stresses above the absolute maximum rating may cause permanent damage to the device. Extended operation at the maximum levels may degrade performance and affect reliability.

4.0 Die Qualification

In accordance with class-K version of Mil-Prf-38534, Appendix C, Table C-II, except as modified herein.

(a) Qual Samples Size and Qual Acceptance Criteria – 25/2

(b) Qual Sample Package – DIP

(c) Pre-screen electrical test over temperature performed post-assembly prior to die qualification.

Table I -Dice Electrical Characteristics

Parameter	Symbol	Conditions 1/	Limit Min	Limit Max	Units
Relative Accuracy	RA	2/		±0.5	LSB
Differential Nonlinearity	DNL	3/ 4/	8		Bits
Gain Error	A_E	2/		±1.5	LSB
Unipolar Offset Error	O_E	0V to +2.55V input range FS		±1	LSB
Bipolar Offset Error	B_{OE}	-1.28V to +1.27V FS		±1	LSB
Power Supply Current	I_{CC}	VCC = 5.5V (DB0-DB7, R/W - High); (STATUS, CE, CS, FORMAT, BPO, UPO - LOW)		45	mA
Digital Input High Voltage	V_{IH}	4/	2		V
Digital Input Low Voltage	V_{IL}	4/		0.8	V
Digital Input High Current	I_{IH}	V_{IH} = 5V 4/		100	µA
Digital Input Low Current	I_{IL}	V_{IL} = 0V 4/	-100		µA
Digital Output Low Voltage	V_{OL}	I_{OL} = 1.6mA, V_{CC} = 5.5V		0.4	V
Digital Output High Voltage	V_{OH}	I_{OH} = 0.5mA, V_{CC} = 4.5V	2.4		V
Three-State Leakage Current	I_{OZ}	Vapplied = 0V and 5V 4/		±40	µA
Conversion Time	T_C			10	µs

Table I Notes:

1/ V_{CC} = +5V, T_A = 25°C, unless otherwise specified.

2/ Tested on both 2.55V full scale and -1.28V to 1.27V full scale.

3/ Minimum resolution for which there are no missing codes.

4/ Parameter is tested at V_{CC} = +5V, but is guaranteed from V_{CC} = 4.5V to V_{CC} = 5.5V.

Table II -Electrical Characteristics for Qual Samples						
Parameter	**Symbol**	**Conditions 1/**	**Sub-groups**	**Limit Min**	**Limit Max**	**Units**
Relative Accuracy	RA	2/	1		±0.5	LSB
			2, 3		±1	
Differential Nonlinearity	DNL	3/, 4/	1, 2, 3	8		Bits
Gain Error	A_E	2/	1		±1.5	LSB
			2, 3		±2.5	
Unipolar Offset Error	O_E	0V to +2.55V input range FS	1		±1	LSB
			2, 3		±2	
Bipolar Offset Error	B_{OE}	-1.28V to +1.27V FS	1		±1	LSB
			2, 3		±2	
Power Supply Current	I_{CC}	VCC = 5.5V (DB0-DB7, R/W - High); (STATUS, CE, CS, FORMAT, BPO, UPO - LOW)	1, 2, 3		45	mA
Digital Input High Voltage	V_{IH}	4/	1, 2, 3	2		V
Digital Input Low Voltage	VIL	4/	1		0.8	V
			2, 3		0.7	
Digital Input High Current	IIH	V_{IH} = 5V 4/	1, 2, 3		100	µA
Digital Input Low Current	I_{IL}	V_{IL} = 0V 4/	1, 2, 3	-100		µA
Digital Output Low Voltage	V_{OL}	I_{OL} = 1.6mA, V_{CC} = 5.5V	1, 2, 3		0.4	V
Digital Output High Voltage	V_{OH}	I_{OH} = 0.5mA, V_{CC} = 4.5V	1, 2, 3	2.4		V
Three-State Leakage Current 4/	I_{OZ}	Vapplied = 0V and 5V	1, 2, 3		±40	µA

Table II Notes:

1/ V_{CC} = +5V, unless otherwise specified.
2/ Tested on both 2.55V full scale and -1.28V to 1.27V full scale.
3/ Minimum resolution for which there are no missing codes.
4/ Parameter is tested at V_{CC} = +5V, but is guaranteed from V_{CC} = 4.5V to V_{CC} = 5.5V.

Table III - Life Test Endpoint and Delta Parameter (Product is tested in accordance with Table II with the following exceptions)								
Parameter	Symbol	Sub-groups	Post Burn In Limit		Post Life Test Limit		Life Test Delta	Units
			Min	Max	Min	Max		
Power Supply Current	I_{CC}	1		50		55	±5	mA
		2, 3				55		
Digital Output High Voltage	V_{OH}	1	2.4		2.4		±.2	V
		2, 3			2.4			
Digital Output Low Voltage	V_{OL}	1		0.4		0.4	±.1	V
		2, 3				0.4		

5.0 Life Test/Burn-In Information

5.1 HTRB is not applicable for this drawing.

5.2 Burn-in is per MIL-STD-883 Method 1015 test condition B or C.

5.3 Steady state life test is per MIL-STD-883 Method 1005.

Rev	Description of Change	Date
A	Initiate	20-DEC-01
B	Correct typo's on table III. VOH is 2.4V minimum. Remove ± from endpoint limits.	27-Mar-02
C	Update web address. Make revision letter same on all pages	4-Mar-03
D	Update 1.0 Scope description	11-Jul-07
E	Update header/footer & add to 1.0 Scope Description.	19-Feb-08
F	Add Junction Temperature (T_J)……+150°C to 3.3 Absolute Maximum Ratings	March 31, 2008
G	Updated Section 4.0c note to indicate pre-screen temp testing being performed.	6-JUN-2009
H	Updated fonts and sizes to ADI standards	22-Sep-2011