ANALOG DEVICES

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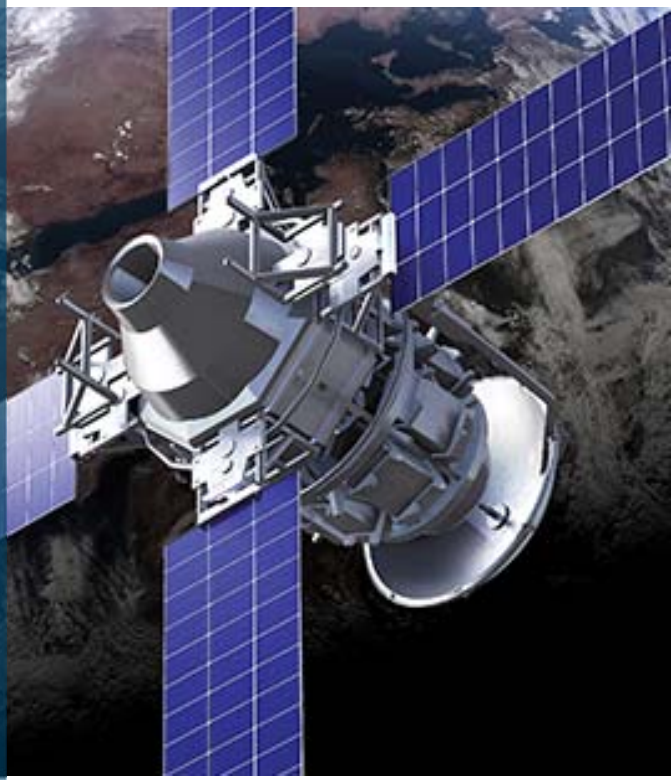
RF & MICROWAVE STANDARD SPACE LEVEL PRODUCTS PROGRAM

March 2018



For general information on Analog Devices Space Qualified products please visit the following address.

http://www.analog.com/aerospace

For technical inquiries on Aerospace Engineering Models please email us at aero@analog.com

For Sales and Distribution contacts please visit the following address.

http://www.analog.com/en/about-adi/corporate-information/sales-distribution.html

ANALOG DEVICES STANDARD RF & MICROWAVE SPACE LEVEL PROGRAM

The Analog Devices Chelmsford, Massachusetts RF and Microwave design and manufacturing operations have been supporting high-reliability device screening and qualification for the space, aerospace, avionics, military programs with Source Control Drawings for over three decades. The facility is a major component supplier to hundreds of military radar, ECM/EW, data link and communications programs worldwide. The facility is qualified by major spacecraft OEMs worldwide, shipping tens of thousands of space grade components which are currently operational on a multitude of commercial, scientific & military spacecraft. The facility is ISO 9001and AS9100-Certified with a Class 100 environment for S-level products.

Analog Devices now offers a lower cost and reduced time to market alternative to customer Source Control Drawings. Analog Devices will continue to support devices to a specific source control drawing. However, in most cases, our standard RF & MICROWAVE Space Level devices should satisfy most customers' requirements for full process control, traceability, reliability and lot qualifications at reduced cost and lead-times.

Analog Devices Standard Space Level high-reliability device screening and qualification is based on an internally defined equivalent flow per MIL-PRF-38535 QML level "V" except as noted herein (see Attachment 1).

The electrical parameters and end points for the Analog Devices Standard Space Level RF & MICROWAVE devices will be as described in the current Analog Devices Space Level datasheets for each standard device offered.

Features of Analog Standard Space Level RF & MICROWAVE Program Includes the following:

1. Wafer SEM Inspection on products except where not applicable. See datasheet.
2. Wafer lot traceability.
3. Device Marking with standard part number, lot seal date code and Analog Devices logo.
4. Complete device screening, Attachments 1
5. Quality Conformance Inspection, Attachments 2 and 2A.
6. Product Change Notification.

COMMITMENT TO THE SPACE MARKET

Since 1985, Analog Devices Chelmsford has offered standard and custom MMIC die, hermetic packaged die, MIC hybrids, subsystems and instrumentation for analog, digital and mixed-signal IC military and space applications. We leverage our IC design capabilities to select the optimum device technologies for these applications. We employ internal resources for engineering, prototyping and production assembly/test. High reliability screening is offered for all products to customer specifications and / or requirements outlined in MIL-PRF-38534/38535.

Our products are developed using state-of-the art GaN, GaAs / InGaP , InP, SOI, SiGe, CMOS and SiGe BiCMOS semiconductor processes utilizing MESFET, HEMT, pHEMT, HBT and PIN devices.

Analog Devices Chelmsford is a one-stop solution provider which has the unique ability to provide products that are designed, developed and manufactured in-house from the IC level to the integrated module/subsystem. In doing so, Analog Devices Chelmsford provides unparalleled value and service to our customers through our ability to control cost, performance, schedule, obsolescence and reliability.

Visit our web site (http://www.analog.com/aerospace) or call our factory contacts for the latest Class S updates as well as for radiation information on these and other products.

See our Space Qualified Parts List. The table beginning on page 3 lists the standard product offered by Analog Device's Aerospace Product Line http://www.analog.com/media/en/news-marketing-collateral/product-selection-guide/SpaceQualifiedPartsList.pdf

Product is also available in accordance with source control drawings. Please call factory for further information.

For further information see contact list on cover page.

ANALOG DEVICES STANDARD LEVEL RF & MICROWAVE SPACE LEVEL PROGRAM MANUFACTURING LOCATION

Space Level Screening	Wafer Fab	Assembly	Screening and Quality Conformance Inspection
	•		
Standard Space Level Product high-reliability device screening and qualification.	SEM Inspection, most models: • ADI Wilmington MA • ADI Limerick, Ireland • TSMC Taiwan • Various Foundries	Chelmsford, MA	Chelmsford, MA
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ATTACHMENT 1

Analog Devices Standard Space Level High-Reliability Device Screening

Test	Status/ Alternate Flow	Pkg/ Process	Exceptions	Comments MIL-STD-883 Test Method and Condition
1. ESD	No change			Initial qualification
2. Wafer Lot Acceptance	May not be available from some fabs		Noted on datasheet if not available. SEM available on all products when applicable.	TM 5007
3. Non-destruct bond pull	No change			100% to TM2023
4. Internal Visual	No change			100% to TM2010, condition A
5. Temperature Cycling	10 cycles			100% to TM1010, condition C
6. Constant Acceleration	No change			100% to TM2001, condition E
7. Visual inspection	No change			100% to TM2009
8. PIND	No change			100% to TM2020, condition A
9. Serialization	No change			100% to TM2009
10. X-ray*	No change			100% to TM2012
11. T1. Pre Burn-in Elec.	No change			100% in accordance with device specification
12. Burn-in	No change			100% to TM1015, 240 hr
13. T2 Post-Burn-In Elec.	No change			100% in accordance with device specification
14. PDA	No change			5%, 3% catastrophic
15. Final Electrical	No change			100% in accordance with device specification
16. Group A	No change			MIL-PRF-38535
17. Seal, Fine Leak	No change			100% to TM1014, condition A
18. Seal, Gross leak	No change			100% to TM1014, condition C
19. External Visual	No change			100% to TM2009
20. Radiation Latch-up	No change			When specified
QCI--				
21. Group B	No change			MIL-PRF-38535
22. Group C	No change			MIL-PRF-38535
23. Group D	No change			MIL-PRF-38535
24. Group E	No change		Noted on the datasheet if not available.	MIL-PRF-38535

* MIL-STD-883, Test Method 2012 X-Ray inspection acceptance requirements may include solder fillet as part of design seal width for LH and G packages.

ATTACHMENT 2

Analog Devices RF & Microwave Standard Space Level Offers

1. Group B per MIL-PRF-38535, Table II with attributes.
2. Group C per MIL-PRF-38535, Table IV with attributes and variables.
3. Group D per MIL-PRF-38535, Table V.
4. Group E, subgroup 2. Certificate of Conformance and test report.
    a. Standard Radiation Test Plan. Test in accordance with MIL-PRF-38535 with test points at 0K, 100Krad, and post 24 hours biased anneal.
5. Delta measurements over pre and post burn-in on selected parameters based on Analog Space Level Data Sheets.
6. SEM inspection on most products except where not applicable. See datasheet.
7. Test report with each shipment includes:
    A. 100% processing attributes data.
    B. Electrical test variable data.
    C. Radiographic inspection report.
    D. Failure analysis report, if applicable.
    E. Group A attributes data.
    F. Certificate of Conformance.
    G. Quality Conformance Inspection data.

ATTACHMENT 2A

Quality Conformance Inspection Minimum Sampling Plan

Group B, MIL-PRF-38535, Table II

Subgroup	Test	Sample Size / Acc	Remarks
1	Resistance to solvents	3(0)	Not required for laser marking.
2	Bond Strength	22(0)*	
	Die Shear	3(0)	
3	Solderability	22(0)**	

* Applies to the number of wires in minimum of 4 devices.
** Applies to the number of leads on a minimum of 3 devices.

Group C, MIL-PRF-38535, Table IV

Subgroup		Test	Sample Size / Acc	Remarks
1		Life Test	45(0)	MIL-PRF-38535, app B, ¶ 4.2 c-1

Group D, MIL-PRF-38535, Table V

Subgroup	Test	Sample Size / Acc	Remarks
1	Physical Dimensions	15(0)	Electrical rejects may be used
2	a. Lead Integrity b. Seal	45(0)*	Electrical rejects may be used
3	a. Thermal shock b. Temperature cycling c. Moisture resistance d. Seal e. Visual f. End-point Electrical	15(0)	Electrically good parts, Destroyed
4	a. Shock b. Vibration, variable freq. c. Acceleration d. Seal e. Visual Examination f. End-Point Electrical	15(0)	Electrically good parts, Destroyed
5	a. Salt Atmosphere		Not Performed
6	Internal water vapor	3(0) or 5(1)	Electrical rejects may be used
7	Adhesion of lead finish	15(0)*	Electrical rejects may be used
8	Lid Torque	5(0)	Electrical rejects may be used
9	Soldering Heat	3(0)**	

* Applies to number of leads in minimum of 3 samples.
** Performed at qualification or design changes which may affect this test.

ATTACHMENT 2A

Technology Conformance Inspection Minimum Sampling Plan

Group E-Subgroup 2, MIL-PRF-38535, Table B-I

Subgroup	Test	Sample Size / Acc	Remarks
2	Total Ionization Dose	22(0) / wafer lot or 4(0) / wafer	MIL STD 883 Method 1019, Cond. A

ATTACHMENT 3

Analog Devices RF & Microwave Standard Space Level Product Ordering Information

See Space Qualified Parts List Brochure (http://www.analog.com/aerospace) for list of product / package offering.

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        |-------------------------------------------------------------Device Type
        |       |-----------------------------------------------------Total Dose Radiation Designator (Optional)
        |       |       |-------------------------------------------Electrical Grade
        |       |       |       |-----------------------------------Radiation option for non "R" rated parts
        |       |       |       |       |-----------------------------Lead Finish
        |       |       |       |       |       |-----------Package Suffix
ADH1118 R       7       0       1       LH5
        |       |       |       |       |       |-----------Packages:
        |       |       |       |       |                   C = DIE (Chips)
        |       |       |       |       |                   LH5 = Hermetic 5.1 x 5.1 x 1.4mm, surface mount package
        |       |       |       |       |                   LH250 = Hermetic 6.35 x 6.35 x 1.27mm, SM package
        |       |       |       |       |                   LSH6 = Hermetic 6.0 X 6.0 X 1.52, surface mount package
        |       |       |       |       |                   LSH7 = Hermetic 7.0 X 7.0 X 1.52, surface mount package
        |       |       |       |       |                   G7 = Hermetic 16.1 x 17.3 x 1.7mm, surface mount package
        |       |       |       |       |                   G8 = Hermetic 10.2 x 4.6 x 1.8mm, surface mount package
        |       |       |       |       |                   G24 = Hermetic 12.4 X 12.4 X 2.4, surface mount package
        |       |       |       |       |                   G16 = Hermetic 11.4 x 11.4 x 1.7mm, SM package
        |       |       |       |       |                   G32 = Hermetic 16 x 16 x 1.96mm, surface mount package
        |       |       |       |       |-----------------------Lead Finish:
        |       |       |       |                           0 = DIE (Chips) Lead Finish is N/A
        |       |       |       |                           1 = Gold finish
        |       |       |       |                           3 = Hot Solder DIP Lead Finish
        |       |       |       ||-----------------------------Radiation option:
        |       |       |                                   0 = Standard product
        |       |       |                                   1 = Radiation Test - No Lot Jeopardy, call factory
        |       |       ||-------------------------------------Electrical Grade:
        |       |                                           -000 = Standard Die – call factory for datasheet
        |       |                                           -7XX = Standard Grade, see device datasheet.
        |       |
        |       |-----------------------------------------------------Total Dose Radiation Designation (Optional)
        |                                                   MIL-PRF-38535 ¶ 3.4.3 RHA (no neutron test)
        |
        |-------------------------------------------------------------Per Analog Devices Space Level Data Sheets
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Examples:

ADH1118R701LH5 = ADH1118, LH5 package, Gold Lead Finish, Qualified to 100Krad TID.
ADH1118R700C = ADH1118, Class K Die, Qualified to 100Krad

REVISION HISTORY

Rev	Description of Change	Date
0	Initiate	March 1, 2018