

REVISIONS

REV.	ECO NO.	DESCRIPTION OF UPDATE	APPROVED	DATE
-	RLSD	N/A	C. HEISELMAN	04/20/00
A	11715	Per ECO	C. HEISELMAN	07/11/04
B	16865	Add 5.1.9 flow down to subtier	C. HEISELMAN	01/21/10
C	18483	Correct temperature callout in 4.4.2	C. HEISELMAN	09/13/11
D	20757	Add 5.1.10 Requirements for record retention	C. HEISELMAN	01/03/14
E	176066	Tie in Anaren Doc. #81000, general clarification, remove redundant information now located in 81000.	R. ROEHM	02/27/15
F	176715	Add detail drawing requirements and delete redundant information	C. HEISELMAN	04/02/15
G	188289	Add thin film to title block; add thin film dwg tie in (paragraph 3.3)	<i>[Signature]</i>	10/25/16



REVISION INDEX	REVISION																														
	SHEET	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
	REVISION	G	G	G	G	G																									
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

PROPRIETARY NOTICE

This document is Proprietary Data of MSK.

The information contained herein shall not be reproduced, used or disclosed to others without the authorization of MSK.

DO NOT SCALE DRAWING	APPROVALS		MSK	DOCUMENT CONTROL STAMP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS ± - DECIMALS ± - ANGLE ± -	DRAFTER J. VANDEUSEN	DATE 10/13/16	TITLE PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES	
	DRAFTING CHECK <i>[Signature]</i>	DATE 10/24/16		
MATERIAL N/A	ENGINEERING CHECK <i>[Signature]</i>	DATE 10/25/16		
FINISH N/A	QUALITY ASSURANCE <i>[Signature]</i>	DATE 10/21/16	MSK DWG. NO. 1026-8309	REV. G
			SHEET 1 OF 5	DEPARTMENT / COPY NO.

MSK DWG. NO. 1026-8309	REV. G	SHEET 2 OF 5	SCALE NTS	SIZE A
---------------------------	-----------	-----------------	--------------	-----------

1.0 PURPOSE:

The purpose of this document is to define the requirements for procurement of thinfilm or thickfilm substrates manufactured by a supplier and used in MSK hybrids/MCM's. This document is used in conjunction with Anaren Document #81000.

2.0 APPLICATION:

This procedure shall apply to all thickfilm substrates as follows:


- 2.1 **Condition A** - Elements to be used in "fully" compliant hybrid products as defined in MIL-PRF-38534 Class H. Purchase order shall not delete any of the requirements of this specification. Substrate element evaluation shall be performed by the substrate manufacturer prior to shipment of the lot.
- 2.2 **Condition B** - Elements intended to be used in full compliance with MIL-PRF-38534 Class H or K but element evaluation will be the responsibility of MSK.
- 2.3 **Condition C** - Elements to be used on devices which do not impose MIL-PRF-38534.
- 2.4 **Condition D** - Elements to be used in "fully" compliant hybrid products as defined in MIL-PRF-38534 Class K. Purchase order shall not delete any of the requirements of this specification. Substrate element evaluation shall be performed by the substrate manufacturer prior to shipment of the lot.

3.0 REFERENCE DOCUMENTS:

- 3.1 Purchase order.
- 3.2 Applicable MSK Detail Drawings for the thickfilm substrates
 - 3.2.1 Printed substrate: 1829-XXXXX
 - 3.2.2 Outsource Thickfilm Print Requirement Form: 8356A.XX
 - 3.2.3 Ceramic Substrate Drawing: 1013-XXXX
 - 3.2.4 MSK substrate fabrication flow chart 2422-1563
- 3.3 Applicable MSK detail drawing for thinfilm substrates
 - 3.3.1 Substrate Drawing: 1013-XXXX
- 3.4 MIL-PRF-38534
- 3.5 MIL-STD-883 TM2032
- 3.6 ISO 14644-1, -2 or MIL-STD-209
- 3.7 Anaren supplier requirements for Quality, Design & Manufacturing, Document #81000

4.0 DEFINITIONS:

- 4.1 **Element** - A constituent of the hybrid microcircuit that contributes directly to its operation.
- 4.2 **Substrate Inspection Lot** - Substrate inspection lot will consist of homogeneous printed substrates (thick or thinfilm) having the same number of layers, manufactured using the same facilities, processes, materials and vacuum deposited, plated or printed as one lot.

DO NOT SCALE DRAWING	APPROVALS						DOCUMENT CONTROL STAMP	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLE ± - ± - ± -	DRAFTER	DATE		TITLE PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES				
	DRAFTING CHECK	DATE						
	ENGINEERING CHECK	DATE						
MATERIAL N/A	QUALITY ASSURANCE	DATE		MSK DWG. NO. 1026-8309	REV. G	SHEET 2 OF 5	DEPARTMENT / COPY NO.	

MSK DWG. NO. 1026-8309	REV. G	SHEET 3 OF 5	SCALE NTS	SIZE A
----------------------------------	------------------	------------------------	---------------------	------------------

4.3 Element Evaluation - As applicable to this specification and shall consist of substrate evaluation IAW MIL-PRF-38534 for Class H or K (as applicable).

4.4 Environmentally controlled area:

4.4.1 Class 8 per ISO 14644-1, -2 or Class 100,000 per MIL-STD-209.

4.4.2 Temperature 25°C +3, -5°C

4.4.3 Pressure .01" water column or greater.

4.4.4 Humidity - RH 30 to 65%.

4.4.5 Element storage shall be in a nitrogen atmosphere dry box.

5.0 REQUIREMENTS:

5.1 General:

5.1.3 All material and processes used by the supplier (for thickfilm or thinfilm) will be suitable for polymeric adhesive, soldering or eutectic die mounting where specified. As applicable to the substrate design, pad metallization shall be suitable for thermosonic, ultrasonic and/or thermo compression bonding of gold or aluminum wire and shall be capable of withstanding a pull test as specified per MIL-STD-883 Method 2011.

5.1.4 For thickfilm substrates, all material and processes used by the supplier will be suitable for hybrid/MCM assembly. Materials shall be specified by MSK. The basic thickfilm substrate fabrication process shall be in accordance with substrate fabrication flow chart drawing 2422-1563 latest revision. Any deviation to this process shall be documented and approved by MSK in writing prior to beginning the substrate fabrication.

5.1.5 All electrical test and visual inspection shall be done at the element level with rejects identified and removed from the lot.

6.0 PROCEDURE:

6.1 Condition A:

6.1.1 The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.

6.1.2 The supplier shall perform 100% visual to TM2032, Class H in an environmentally controlled area and ensure compliance to all visual, electrical and mechanical specifications. The supplier shall perform 100% electrical testing (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or MSK Drawing.

6.1.3 Element evaluation shall be performed by the supplier for each substrate inspection lot in accordance with MIL-PRF-38534 for Class H devices to ensure compliance with the electrical characteristics and/or applicable MSK Drawing.

Element evaluation documentation and test samples will be provided with each lot.

DO NOT SCALE DRAWING	APPROVALS					DOCUMENT CONTROL STAMP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLE ± - ± - ± - ± -	DRAFTER	DATE	TITLE PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES			
	DRAFTING CHECK	DATE				
	ENGINEERING CHECK	DATE				
MATERIAL N/A	QUALITY ASSURANCE	DATE	MSK DWG. NO. 1026-8309	REV. G	SHEET 3 OF 5	DEPARTMENT / COPY NO.

MSK DWG. NO. 1026-8309	REV. G	SHEET 4 OF 5	SCALE NTS	SIZE A
---------------------------	-----------	-----------------	--------------	-----------

6.1.4 Delivery Conditions:

- 6.1.4.1** The supplier is responsible for ensuring that elements are packaged properly so as to avoid damage during shipment. Thickfilm and thinfilm substrates shall have protection between each substrate top side surface.
- 6.1.4.2** The MSK Dwg number, name of manufacturer, quantity and lot number are to be clearly marked on each container.
- 6.1.4.3** **Certificate of Compliance**, as defined in Document #81000.
- 6.1.4.4** Element evaluation data (as required) shall be supplied for each substrate inspection lot.
- 6.1.4.5** Documentation - Evidence of the supplier's inspection documentation shall be maintained at the suppliers facility. The evidence maintained should include the following:
 - a. Name of operation, specification number and revision of each process or test.
 - b. Part number and manufacturer internal lot identification number (s).
 - c. Date(s) of test and operator identification.
 - d. Calibration control number and calibration due date of all major equipment components used for test.
 - e. Quantity tested and rejected for each process or test and actual quantity tested if sampled.
 - f. Specific major conditions of test that are verifiable by operator including times, temperatures and inspection magnification.
 - g. For electrical test, test program number and revision levels (as applicable).

6.2 Condition B:

- 6.2.1** The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.
- 6.2.2** The supplier shall perform 100% visual inspection to TM2032 Class H and K in an environmentally controlled area and ensure compliance to all visual and mechanical specifications.
- 6.2.3** The supplier shall perform 100% electrical test (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or MSK Drawing.
- 6.2.4** Substrates shall be capable of passing substrate element evaluation in accordance with MIL-PRF-38534 Class H or K.
- 6.2.5** Delivery conditions shall be in accordance with paragraph 6.1.4.

6.3. Condition C:

- 6.3.1** The supplier shall guarantee performance that the substrates shall conform to the electrical, mechanical and visual specifications of the applicable MSK Drawing.
- 6.3.2** Delivery conditions shall be in accordance with paragraph 6.1.4.

DO NOT SCALE DRAWING	APPROVALS			MSK			DOCUMENT CONTROL STAMP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLE ± - ± - ± - ± -	DRAFTER	DATE		PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES			
	DRAFTING CHECK	DATE					
	ENGINEERING CHECK	DATE					
MATERIAL N/A	QUALITY ASSURANCE	DATE		MSK DWG. NO. 1026-8309	REV. G	SHEET 4 OF 5	DEPARTMENT / COPY NO.

MSK DWG. NO. 1026-8309	REV. G	SHEET 5 OF 5	SCALE NTS	SIZE A
----------------------------------	------------------	------------------------	---------------------	------------------

6.4 Condition D:

- 6.4.1** The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.
- 6.4.2** For MIL-PRF-38534, the supplier shall perform 100% visual to TM2032 Class K in an environmentally controlled area and ensure compliance to all visual, electrical and mechanical specifications. The supplier shall perform 100% electrical testing (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or MSK Drawing.
- 6.4.3** Element evaluation shall be performed by the supplier for each substrate inspection lot in accordance with MIL-PRF-38534 for Class K devices to ensure compliance with the manufacturer's electrical characteristics and/or applicable MSK Drawing.

Element evaluation documentation and test samples will be provided with each lot.

6.4.4 Delivery Conditions:

- 6.4.4.1** Delivery conditions shall be in accordance with paragraph 6.1.4.

7.0 ACCEPT/REJECT CRITERIA:

- 7.1** Accept all lots which pass the applicable paragraphs of this procedure and the MSK drawing.
- 7.2** Reject any device(s) and separate it from the lot which fails an electrical parameter or visual/mechanical criteria.
- 7.3** Reject any lot which does not pass element evaluation.

8.0 QUALITY ASSURANCE PROVISIONS:

- 8.1** MSK reserves the right to perform testing in accordance with paragraph 2.0 and any failure of the material to meet the requirements of this document shall be cause for rejection of the shipment.
- 8.2** MSK reserves the right to review any vendor program, process and data to assure conformance to the requirements of this specification, the purchase order and the applicable MSK Drawing.

DO NOT SCALE DRAWING	APPROVALS					DOCUMENT CONTROL STAMP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACTIONS DECIMALS ANGLE ± - ± - ± - ± -	DRAFTER	DATE	PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES			
	DRAFTING CHECK	DATE				
	ENGINEERING CHECK	DATE				
MATERIAL N/A	QUALITY ASSURANCE	DATE	MSK DWG. NO. 1026-8309	REV. G	SHEET 5 OF 5	DEPARTMENT / COPY NO.