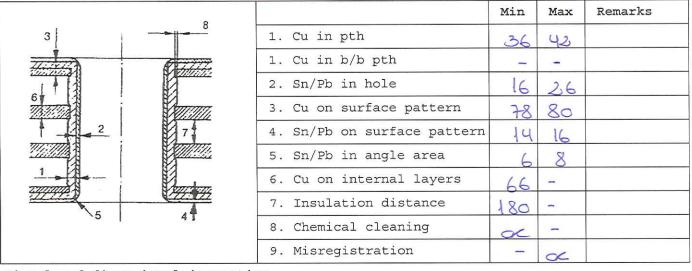


Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-2A-2B-2C-2D

Microsection from appropriate testcoupon. Results in microns.



Visual and dimensional inspection

Examination of base laminate	a	External dimensions	oc
Examination of conductive pattern	ac	Dimension of holes	oc_

Tests

Tape test of soldermask	_	D.W.V. 1000 VAC/mm	CK
Bond strength 26,37 N/mm ²	oc	Current Carrying Capacity 10A 4 sec	oc
Peel strength 17,64 N/cm	oc	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235°C, SSEC.	oc.
Intra layer > 10.000 Mohm / 500V DC	X	Termal Stress 5 x 188° Closec.	α
Inter layer >100.000 Mohm / 500V DC	oc	Rework simulation test	os.
Bow and twist	oc	Flexible test	_
		Electrical test	α

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

See attachment	
8	

Certificate of conformance

Inspec	ted QC	(00)	Approved PA	
Date	97 -04- 2014	(U2)	Date 187-04-2016 la Andiser	

BUILDUP-/MATERIAL REPORT

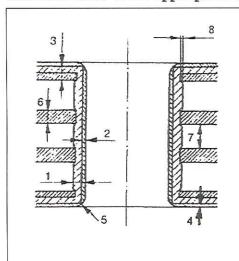
Customer	NECAS	Order No.	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

ThickA	ThickB	Туре	Stk	Material type	L A	GrA	LВ	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7



Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-3A-3B-3C-3D

Microsection from appropriate testcoupon. Results in microns.



	Min	Max	Remarks
1. Cu in pth	46	54	
1. Cu in b/b pth	1	1	
2. Sn/Pb in hole	14	22	
3. Cu on surface pattern	76	78	
4. Sn/Pb on surface pattern	16	18	
5. Sn/Pb in angle area	6	8	
6. Cu on internal layers	66	_	
7. Insulation distance	174	-	
8. Chemical cleaning	oc	_	
9. Misregistration	-	CK	

Visual and dimensional inspection

Examination of base laminate	oc	External dimensions	K
Examination of conductive pattern	a	Dimension of holes	\propto

Tests

Tape test of soldermask	_	D.W.V. 1000 VAC/mm	a
Bond strength ≥6,37 N/mm²	oc	Current Carrying Capacity 10A 4 sec	oc
Peel strength 16,39 N/cm	a	Heat Sink high voltage test	1 3
Insulations resistance :		Solderability 235° (SSEC)	X
Intra layer > 10.000 Mohm / 500V DC	a	Termal Stress 5 x 288° C, OSEC.	oc
Inter layer >100.000 Mohm / 500V DC	a	Rework simulation test	0K
Bow and twist	oc	Flexible test	-
=		Electrical test	a

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

Se attachment	-

Certificate of conformance

7 -04- 2014

Date

This to certify that the material on your subject order, shipped from our plant has been processed, inspected and found in accordance with all specifications referred to on your Drawing and/or Purchase Order.
We futher certify that appropriate Records and/or Certificates are on file for your

We futher cert examinition up		Records	and/or	Certificates	are	on	file	for	your
Inspected QC			Approve	ed PA					ii.

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BJILDUP-/MATERIAL REPORT

Customer	NECAS	Order No.	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

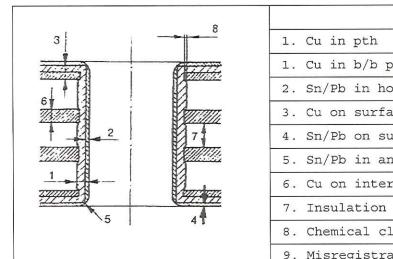
ThickA	ThickB	Туре	Stk	Material type	L A	GrA	LВ	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	х	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7



Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-4A-4B-4C-4D-

Microsection from appropriate testcoupon. Results in microns.

4E-4F-46-4H



	Min	Max	Remarks
1. Cu in pth	38	52	
1. Cu in b/b pth	-	-	
2. Sn/Pb in hole	16	24	
3. Cu on surface pattern	82	86	
4. Sn/Pb on surface pattern	14	16	
5. Sn/Pb in angle area	8	10	
6. Cu on internal layers	66		
7. Insulation distance	188	-	
8. Chemical cleaning	oc	== 1	
9. Misregistration	-	oc	

Visual and dimensional inspection

Examination of base laminate	* oce	External dimensions	oc
Examination of conductive pattern	CK	Dimension of holes	QL.

Tests

Tape test of soldermask	_	D.W.V. 1000 VAC/mm	oc
Bond strength = 6,37 N/mm ²	ac	Current Carrying Capacity 10A 4 sec	oc
Peel strength 17,28 N/cm	or	Heat Sink high voltage test	_
Insulations resistance :		Solderability 235°C,SSEC.	CC
Intra layer > 10.000 Mohm / 500V DC	CC	Termal Stress 5×288°C \05EC.	oc
Inter layer >100.000 Mohm / 500V DC	oc	Rework simulation test	oc
Bow and twist	OC.	Flexible test	_
		Electrical test	oc

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

"See attachments.	

Certificate of conformance

Inspected QC		Approved PA	19
Date 87 -04-2014	(Q2)	Date 197-04-2014 la Andiser	

Attachment to Test report and Certificate Printca of Conformance



File No:

Remarks: 2220-40004 A1

 * Impurity in the base laminate. Not visible to the naked eye. Accepted according to Ref: 6.2.2-7b Applies to PCB No: 4A

BUILDUP-/MATERIAL REPORT

Customer	NECAS	+	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

ThickA	ThickB	Туре	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7



Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-5A-58-5C-5D

Microsection from appropriate testcoupon. Results in microns.

SE	-5F	860	-5H

		Min	Max	Remarks
3	1. Cu in pth	46	58	112
	1. Cu in b/b pth			
	2. Sn/Pb in hole	20	24	
6 t	3. Cu on surface pattern	90	96	
7	4. Sn/Pb on surface pattern	10	12	
	5. Sn/Pb in angle area	6	10	
	6. Cu on internal layers	66		
III II	7. Insulation distance	199	_	
-5 41	8. Chemical cleaning	oc	-	
	9. Misregistration	1=	oc	

Visual and dimensional inspection

Examination of base laminate	oc	External dimensions	SK.
Examination of conductive pattern	C	Dimension of holes	- C

Tests

Tape test of soldermask	_	D.W.V. 1000 VAC/mm	oc
Bond strength ≥6,37 N/mm²	a	Current Carrying Capacity 10A 4 sec	a
Peel strength 6,21 N/cm	oc	Heat Sink high voltage test	1-
Insulations resistance :		Solderability 235° C. SSEC .	a
Intra layer > 10.000 Mohm / 500V DC	0K	Termal Stress 5 × 288 C LOSEC.	oc.
Inter layer >100.000 Mohm / 500V DC	X	Rework simulation test	oc.
Bow and twist	X	Flexible test	-
		Electrical test	cc

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

See attachment.	9

Certificate of conformance

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Inspected QC	00	Approved PA	
Date 87-04-2014	Q2)	Date 87-04-2016 la Andiser	

BUILDUP-/MATERIAL REPORT

Customer	NECAS	Order No.	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

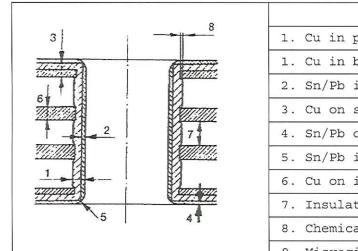
ThickA	ThickB	Туре	Stk	Material type	L A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	х	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	х	5	×	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7



Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-6A-6B-6C-6D

Microsection from appropriate testcoupon. Results in microns.

							-		
6	E	-	6	F	-1	6	-6	5	7



	Min	Max	Remarks
1. Cu in pth	40	56	
1. Cu in b/b pth	-	_	
2. Sn/Pb in hole	14	20	
3. Cu on surface pattern	80	88	
4. Sn/Pb on surface pattern	19	16	
5. Sn/Pb in angle area	6	8	
6. Cu on internal layers	66	-	
7. Insulation distance	186	-	
8. Chemical cleaning	oc	-	
9. Misregistration	-	oc	

Visual and dimensional inspection

Examination of base laminate	oc	External dimensions	a c
Examination of conductive pattern	oc	Dimension of holes	a a

Tests

Tape test of soldermask	-	D.W.V. 1000 VAC/mm	oc
Bond strength = 6,37 N/mm²	oc	Current Carrying Capacity 10A 4 sec	X
Peel strength 6.39 N/cm	oc.	Heat Sink high voltage test	-
Insulations resistance :		Solderability 235° CSSC.	a
Intra layer > 10.000 Mohm / 500V DC	CC	Termal Stress 5×288°C, loseC.	oc
Inter layer >100.000 Mohm / 500V DC	oc	Rework simulation test	a
Bow and twist	X	Flexible test	=
9		Electrical test	a

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

See attachment.	
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Certificate of conformance

Inspected QC		Approved PA	8.
Date 87- 04- 2014	(Q2)	Date 87-04-2014 a Andiser	

BUILDUP-/MATERIAL REPORT

Customer	NECAS	Order No.	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

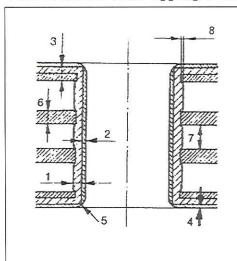
ThickA	ThickB	Туре	Stk	Material type	L	A	GrA	L B	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1	L		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N						ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	2	х	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N						ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	ŀ	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N						ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	C)		6		ARLON 1105759A7



Ref.spec.	ECSS-Q-ST-70-11C	Order No.	IN1-40506-1
Customer	NECAS	Conf.No.	44325
PCB No.	NANOPOWER-P31U-9	File.No.	40004A-1-1A-16-1C-10-

Microsection from appropriate testcoupon. Results in microns.

1E-1F-16-1H



	Min	Max	Remarks
1. Cu in pth	40	50	
1. Cu in b/b pth	_	-	_
2. Sn/Pb in hole	8	24	
3. Cu on surface pattern	80	80	
4. Sn/Pb on surface pattern	6*	12	Minor
5. Sn/Pb in angle area	4	8	
6. Cu on internal layers	66		
7. Insulation distance	184	-	
8. Chemical cleaning	oc	1	
9. Misregistration	-	oc	

Visual and dimensional inspection

Examination of base laminate	oc	External dimensions	X
Examination of conductive pattern	X	Dimension of holes	X

Tests

			1
Tape test of soldermask	_	D.W.V. 1000 VAC/mm	oc
Bond strength 26,37 N/mm ²	oc	Current Carrying Capacity 10A 4 sec	oc.
Peel strength 16,39 N/cm	\propto	Heat Sink high voltage test	_
Insulations resistance :		Solderability 235°C, SSEC.	cc
Intra layer > 10.000 Mohm / 500V DC	00	Termal Stress S × 288° CloseC.	oc
Inter layer >100.000 Mohm / 500V DC	oc	Rework simulation test	\propto
Bow and twist	oc.	Flexible test	_
		Electrical test	oc

Remarks Drying prior to processing is mandatory. See www.printca.dk for details

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Certificate of conformance

Inspected QC	Approved PA
Date 17-04-2014 Q2	Date 87-04-2016a Andusen
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EUILDUP-/MATERIAL REPORT

Customer	NECAS	Order No.	IN1-40506-1
PCB No.	NANOPOWER-P31U-9	Conf.No.	44325
		File.No.	40004A-1

ThickA	ThickB	Туре	Stk	Material type	L A	GrA	ьв	GrB	Lot no.
35	35	0.005"		Laminate Polyimide 85N	1		0		ARLON 1105759A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	2	x	3	x	ARLON 1075221A7
		1080	3	Prepreg Polyimide 85N					ARLON 1126227B108B
70	70	0.008"		Laminate Polyimide 85N	4	x	5	x	ARLON 1075221A7
		1080	2	Prepreg Polyimide 85N					ARLON 1126227B108B
35	35	0.005"		Laminate Polyimide 85N	0		6		ARLON 1105759A7

Attachment to Test report and certificate of conformance

2220-40004 A1

The boards are compliant to requirements defined in ECSS-Q-ST-70-11-C and our PID 1.13 which was ESA approved from May 2013 to Feb. 2014.

Be aware that per 07-04-2014 we are not considered qualified by ESA to ECSS-Q-ST-70-10-C as maintenance qualification is pending.

Boards are further tested with increased stress criteria of 5xTS288 and RWS380 to screen for good PTH integrity.