COMMON PARTS/MATERIALS, SPACE USE, APPLICATION DATA SHEET FOR

Part Description	TRANSFORMERS AND INDUCTORS, POWER
Part Number and Type	NASDA 2110/A116-T000
Applicable Specification	JAXA-QTS-2110 JAXA-QTS-2110/A116

August 2022

Prepared and Established by Tamura Corporation

Issued by Japan Aerospace Exploration Agency

This document is the English version of JAXA QTS/ADS which was originally written and authorized in Japanese and carefully translated into English for international users. If any question arises as to the context or detailed description, it is strongly recommended to verify against the latest official Japanese version.

The release date of the English version of this specification: February 10, 2023

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Revision Log

Rev.	Date	Revised Contents
NC	01 Nov. 2005	Original (Converted from NASDA-ADS-1241 to reflect transition from QPL system to QML system.)
A	11 Dec. 2008	(1) Revised in accordance with the extension of the qualification coverage. Outline Operating voltage: 175Vpeak max. → 250Vpeak max. Dielectric withstanding voltage: AC500V max. → AC700V max. Paragraph 3.1: Rated power: 97VA → 100VA Page 11: Added comparison of the rating before and after extension of the qualification coverage. (2) Others Page 12: Added outgassing data of insulating film and adhesive (erroneously omitted).
B	20 June 2012	(1) Page 15: Outgassing Data of Materials Added data for wire of Furukawa Magnet Wire and Hitachi Cable. (2) Pages 6 through 11: Updated the test data of limit tests. Added change rates and graphs to the limit test data in Tables 4-1, 4-2, 5-1, 5-2, 6-1, 6-2, 7-1 and 7-2. (3) Page 4: Changed the contact due to reorganization. Before → After Avio & Industrial Devices → Electronic Components Business Unit → Business Sector Components Quality Assurance Group → Quality Assurance Group (4) Pages 12 and 13: Reflected the results from re-certified Qualification test. Changed the data from the original Qualification test data to the re-certified Qualification test data. (5) Page 3: Added paragraph 6 RELIABILITY (6) Others Page 13: Added the table title of Table 9 " Evaluation Test Results (Electrical Characteristics)".
C	21 Feb. 2018	(1) Page 4: Changed contact in association with organization change Components Quality Assurance Group →Magnetic Business Unit, Production Management dept., Quality Assurance Group (2) Page 5: Added Manufacture line identification letter to the serial number in the marking; Added marking example; W: Wakayanagi Tamura Corporation, No letter added: Tamura corporation (3) Page 13, Table 9: Added the data for “sample made by Wakayanagi Tamura Corporation” to the parameter range.

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Rev.	Date	Revised Contents
D	6 Jan. 2020	(1) Page 4, Paragraph 9: Changed contact division and telephone number in association with organization change. (2) Page 15, Table 11: Added a note for the name change of No. 6 Adhesive tape “560S”.
E	22 Aug. 2022	(1) Page 4, Paragraph 9: Changed contact division and telephone number in association with organization change. ・ Quality Assurance Division, Components Quality Assurance Management Department, AO Quality Assurance Section → Magnetic Business Unit, AVIO Department, Quality Assurance Group ・ +81-49-284-9163 → +81-50-3664-0489

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COMMON PARTS AND MATERIALS, SPACE USE,
APPLICATION DATA SHEET FOR

1. GENERAL

1.1 Scope

This Application Data Sheet details additional general information necessary for parts selection and/or equipment design that is not contained in JAXA-QML. Users are encouraged to look into other information sources for specific applications, and responsible for their decisions on part selection and usage.

1.2 Applicable Documents

(1) JAXA-QTS-2000	Common Parts/Materials, Space Use, General Specification for
(2) JAXA-QTS-2110	Transformers and Inductors, High Reliability, Space Use, General Specification For
(3) JAXA-QTS-2110/A116	NASDA 2110/A116 Type, Transformers and Inductors, Power, High Reliability, Space Use, Detail Specification For

1.3 Supplementary Information

Tamura Corporation obtained certification of JAXA-QTS-2110/A116 (QML system) without changing the qualification coverage of NASDA-QTS-39013C/116. Therefore, the applicable data of NASDA-QTS-39013C/116 and JAXA-QTS-2110/A116 are the same. To use this data sheet, the specification number and part number shall be replaced as shown below.

Detail specification number

Detail specification No. of NASDA-QTS-39013C	Corresponding detail specification No. of JAXA-QTS-2110
NASDA-QTS-39013C/116	JAXA-QTS-2110/A116

Parts number

Part No. of NASDA-QTS-39013C	Corresponding part No. of JAXA-QTS-2110
NASDA 39013/116T1X000	NASDA 2110/A116-T000

2. SUMMARY OF PRODUCTS

The transformer described in this data sheet is an open type high reliability product for electrical equipment to be installed on satellites and/or launch vehicles.

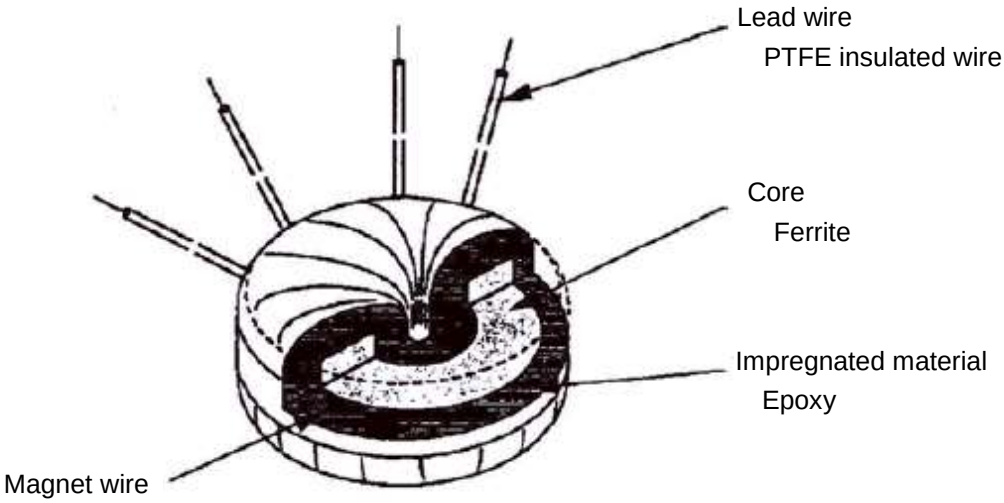
2.1 Externals, Dimensions and Mass

Externals, dimensions, mass and markings of the transformer are shown below.

Part number	Externals, dimensions and markings	Mass (typ.)
NASDA 2110/A116-T000	See Figure 1	302g

2.2 Construction

The transformer is of an epoxy resin impregnated open type. Magnet wires are wound around a toroidal core. The magnet wires or PTFE coated wires are pulled out to serve as the leads. The following figure shows a simplified internal construction.



3. USAGE

3.1 Rating

The transformer is rated as follows.

Part number	Rated power	Operating frequency	Operating ambient temperature (1)	Temperature rise (1)	Input voltage
NASDA 2110/A116-T000	100VA	50kHz	-55°C to 100°C	30°C max.	50Vrms

Note (1) Operating ambient temperature + Temperature rise = Maximum operating temperature
: Class S (130°C) max.

3.2 Mounting Methods

It is recommended to mount the transformer as follow.

(a) Use both a retainer plate and epoxy adhesive. The retainer plate shall be fastened with stainless-steel screws.

4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS

4.1 Electrical Characterisitcs

The transformers satisfied the electrical characteristics specified in the detail specification. Test results are shown in Tables 8 and 9.

4.2 Environmental Resistance

The transformers satisfied the environmental conditions specified in the detail specification. Test results are shown in Tables 8 and 9.

4.3 Outgassing

Outgassing data of organic materials used in the transformer is shown in Table 11.

5. ENVIRONMENTAL LIMIT

Vibration and shock tests were conducted to evaluate the mechanical strength.
The vibration test results are shown in Table 1.
The shock test results are shown in Table 2.

The thermal shock tests (Condition I: +115°C as the 3rd step temperature, Condition II: +130°C as the 3rd step temperature) were conducted to evaluate the thermal strength.
The thermal shock test results are shown in Table 3.

Each limit test result in Tables 2 and 3 (Condition I) is composed of data obtained from standard parts before extended qualification (operating voltage: 175Vpeak max., dielectric withstanding voltage: AC500V max.) Externals, constructions, dimensions, mass, and materials of standard parts are the same before and after the extension while some ratings are slightly different. See the comparison of the electric characteristics before and after extension of the qualification coverage in Table 10 for detail.

6. RELIABILITY

6.1 Possible Failure Mode

· Open circuit (breaking, bad connection)
· Short circuit (Insulation breakage, insulating film breakage)
· Low Inductance (iron core breakage, flexure, layer short)

7. HANDLING AND STORAGE CONDITIONS

(1) Caution shall be used not to give excess stress such as drop impact.
(2) It is advisable to store the transformer under the following conditions.

Items	Conditions
(1) Temperature	+0°C to +35°C
(2) Relative humidity	75%RH max.
(3) Pressure	86kPa to 106kPa
(4) Others	It is advisable to store where vibrations and shocks are minimal.

8. PRECAUTIONS

8.1 Instructions for Purchaser

If purchaser's specification is included in the "qualification coverage" specified in the detail specification, JAXA-QTS-2110/A116, paragraph 3.1, or if "qualification by similarity" specified in JAXA-QTS-2110, Appendix A paragraph A3.1.1.1), is applicable, products can be provided as JAXA qualified parts. In this case, the purchaser can specify requirements for specific applications in product specification (refer to JAXA-QTS-2110, paragraph 6.3) for each procurement.

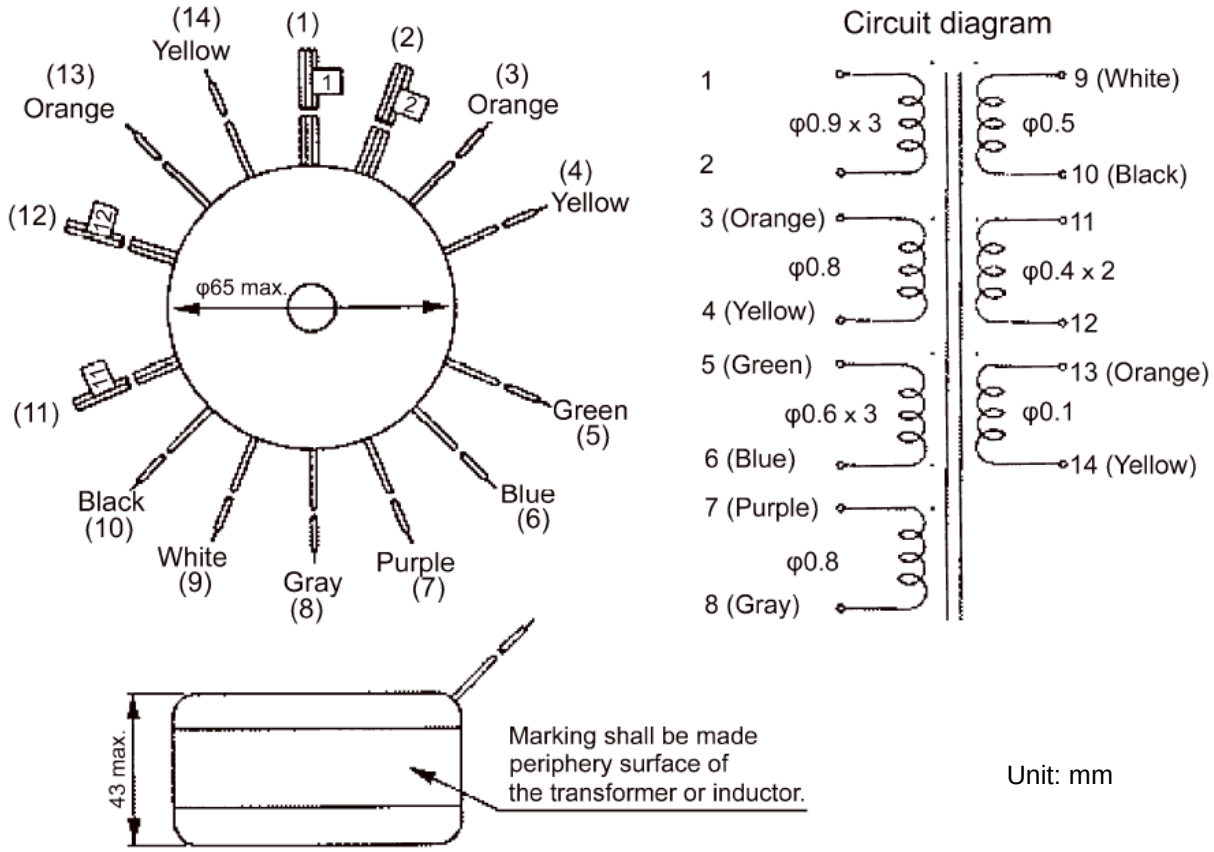
8.2 Instructions for User

- Apply sufficient amount of adhesive to the bonding surface.
- The acceptable adhesive is rigid epoxy adhesive.
- It is advisable to keep the operating frequency deviation within ±5% of the rated operating frequency.
- It is advisable to operate the transformer within the rated output power and direct current.
- Operate the transformer in the temperature class S (130°C) as a maximum.
- Use the transformer in consideration of its outgassing characteristics.

9. OTHERS

Direct all inquiries about this data sheet to Tamura Corporation.

Manufacturer	TAMURA CORPORATION Electronic Components Business Sector, Magnetic Business Unit AVIO Department, Quality Assurance Group
Address	5-30, Chiyoda 5-chome, Sakado-city, Saitama 350-0214, Japan
Telephone	+81-50-3664-0489



Unit: mm

1. Lead wire length: 100mm min.
   AWG 18 for terminals 5, 6
   AWG 20 for terminals 3, 4, 7, 8
   AWG 24 for terminals 9, 10
   AWG 30 for terminals 13, 14
   Direct wire leads of φ0.9mm x 3 for terminals 1, 2
   Direct wire leads of φ0.4mm x 2 for terminals 11, 12
   Insulator removed approx.10mm at the end
2. Mass: 350g max.
3. Markings:
   NASDA 2110/A116-T000
   Terminal identification
   Lot identification code
   Serial number and manufacture line identification letter

(Marking example)

Serial number — No. 1 W — Manufacture line identification letter:
Letter “W”: Wakayanagi Tamura Corporation
No letter added: Tamura Corporation

Trademark

Figure 1. Externals, Dimensions and Markings

Table 1. Evaluation Results of Vibration Limit Test

Test item	Test condition	Results
Random vibration	Step 1 MIL-STD-202 Test method: 214 Test condition: II-H (34.02Grms) 30 minutes each for three axis Step 2 MIL-STD-202 Test method: 214 Test condition: II-J (43.92Grms) 15 minutes each for three axis Step 3 MIL-STD-202 Test method: 214 Test condition: II-K (53.79Grms) 15 minutes each for three axis	0 out of 5 There were no defects in appearance, withstanding voltage, insulation resistance, inductance and DC resistance. See Tables 4-1 and 4-2 for the test data.

Table 2. Evaluation Results of Shock Limit Test

Test item	Test condition	Results
Shock	Step 1 MIL-STD-202 Test method: 213 Test condition: E (Half-sine shock pulse: 1000G, 0.5ms) 3 times each for 6 directions Step 2 MIL-STD-202 Test method: 213 Test condition: F (Half-sine shock pulse: 1500G, 0.5ms) 3 times each for 6 directions Step 3 MIL-STD-202 Test method: 213 Test condition: (Half-sine shock pulse: 2000G, 0.5ms) 3 times each for 6 directions Step 4 MIL-STD-202 Test method: 213 Test condition: (Half-sine shock pulse: 2500G, 0.5ms) 3 times each for 6 directions	0 out of 5 There were no defects in appearance, withstanding voltage, insulation resistance, inductance and DC resistance. (Steps 3 and 4 were cancelled because the adhesion was failed in step 3.) See Tables 5-1 and 5-2 for the test data.

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Table 3. Evaluation Results of Thermal Shock Limit Test

<table>
<tr><th>Test item</th><th>Test condition</th><th>Results</th></tr>
<tr><td rowspan="2">Thermal shock</td><td rowspan="2">MIL-STD-202
Test method: 107
Test condition:
<table>
<tr><th rowspan="2">Step</th><th colspan="2">Temperature (°C)</th><th rowspan="2">Time (min)</th></tr>
<tr><th>Condition I</th><th>Condition II</th></tr>
<tr><td>1</td><td colspan="2">-55</td><td>60 MIN</td></tr>
<tr><td>2</td><td colspan="2">+25</td><td>5 MAX</td></tr>
<tr><td>3</td><td>+115</td><td>+130</td><td>60 MIN</td></tr>
<tr><td>4</td><td colspan="2">+25</td><td>5 MAX</td></tr>
</table>
Cycles: 1,000 max.</td><td>Condition I test results
0 to 1000 cycles
0 out of 5 pieces

There were no defects in appearance, withstanding voltage, insulation resistance, inductance and DC resistance.

See Tables 6-1 and 6-2 for the test data.</td></tr>
<tr><td>Condition II test results
0 to 400 cycles
0 out of 5 pieces

There were no defects in appearance, withstanding voltage, insulation resistance, inductance and DC resistance.

400 to 600 cycles
2 out of 5 pieces

600 to 800 cycles
2 out of 3 pieces

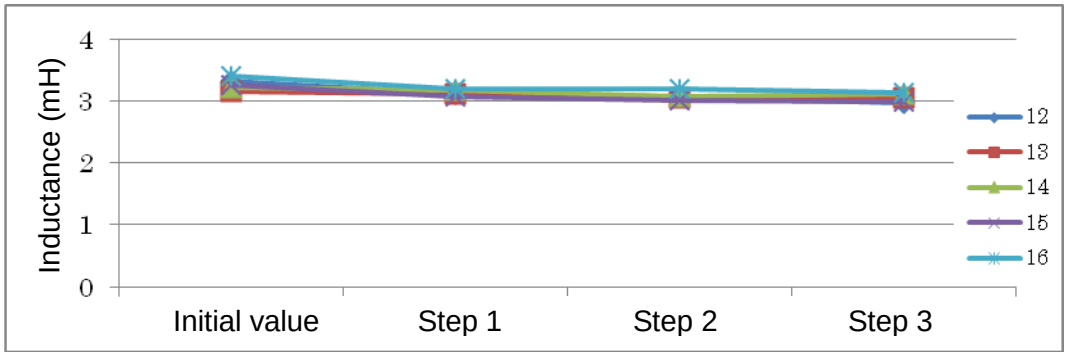
800 to 1000 cycles
0 out of 1 pieces

For the failed parts at each cycle, the test was cancelled due to the breaking of wire.

See Tables 7-1 and 7-2 for the test data.</td></tr>
</table>

Table 4-1. Vibration Limit Test Data

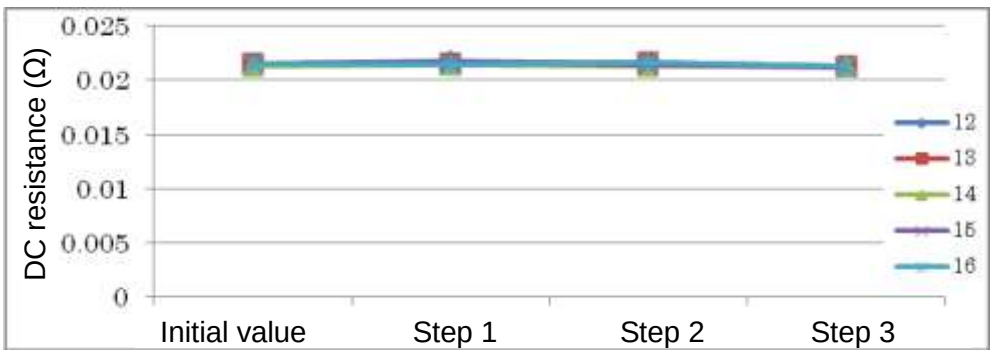
Test sample No.	Inductance between (1-2) (mH)						
	Initial value	Step 1		Step 2		Step 3	
		Measured	Change rate	Measured	Change rate	Measured	Change rate
12	3.32	3.11	-6.3%	3.07	-7.5%	2.96	-10.8%
13	3.15	3.12	-1.0%	3.05	-3.2%	3.04	-3.5%
14	3.22	3.17	-1.6%	3.06	-5.0%	3.12	-3.1%
15	3.25	3.08	-5.2%	3.01	-7.4%	2.99	-8.0%
16	3.4	3.19	-6.2%	3.19	-6.2%	3.13	-7.9%



Note: Inductance: within $^{+10}_{-30}$ % of the initial value (at 10kHz, 1V)

Table 4-2. Vibration Limit Test Data

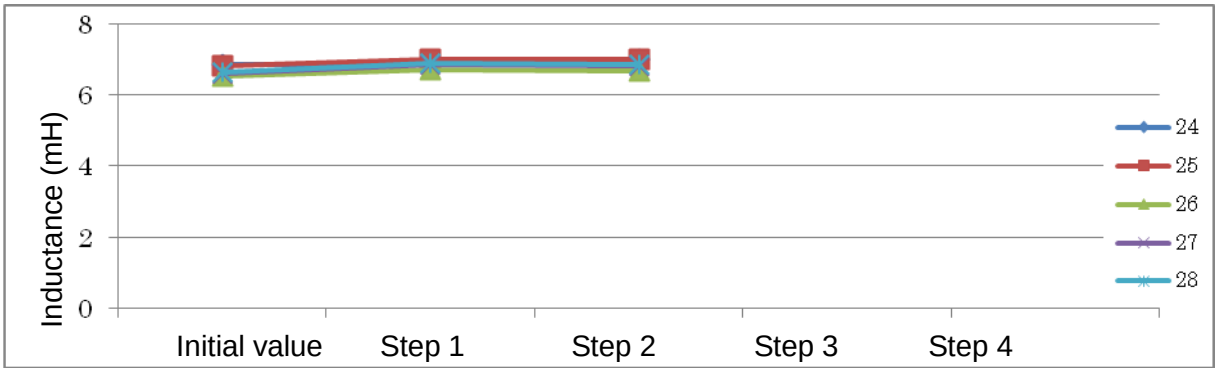
Test sample No.	DC resistance between (1-2) (Ω)						
	Initial value	Step 1		Step 2		Step 3	
		Measured	Change rate	Measured	Change rate	Measured	Change rate
12	0.0215	0.0218	1.4%	0.0215	0.0%	0.0213	-0.9%
13	0.0215	0.0215	0.0%	0.0217	0.9%	0.0213	-0.9%
14	0.0213	0.0214	0.5%	0.0213	0.0%	0.0213	0.0%
15	0.0215	0.0216	0.5%	0.0214	-0.5%	0.0212	-1.4%
16	0.0215	0.0214	-0.5%	0.0217	0.9%	0.0213	-0.9%



Note: DC resistance: ±5% of the initial value (at 25 ±5°C)

Table 5-1 Shock Limit Test Data

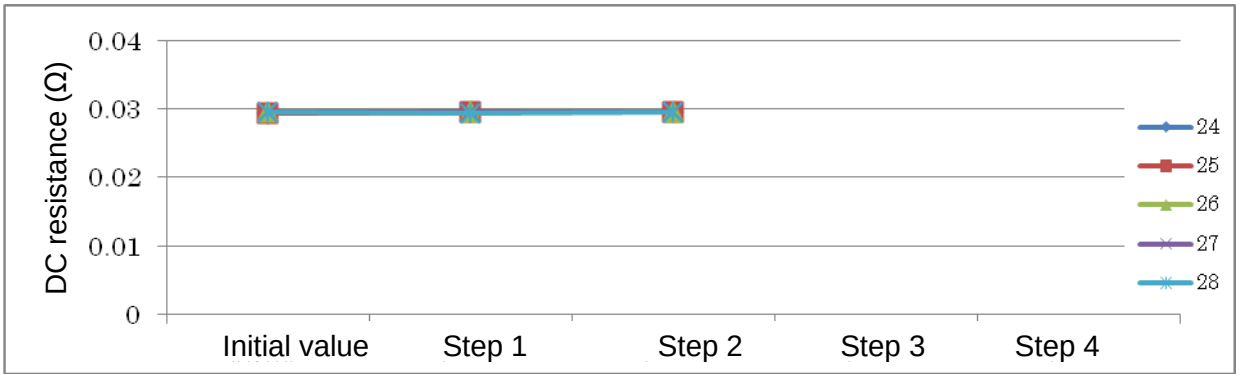
Test sample No.	Inductance between (1-2) (mH)								
	Initial value	Step 1		Step 2		Step 3		Step 4	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
24	6.848	6.878	0.4%	7.003	2.3%		—		—
25	6.814	7.014	2.9%	6.999	2.7%		—		—
26	6.537	6.72	2.8%	6.686	2.3%		—		—
27	6.617	6.868	3.8%	6.826	3.2%		—		—
28	6.632	6.886	3.8%	6.849	3.3%		—		—



Note: Inductance: within $^{+10}_{-30}$ % of the initial value (at 10kHz, 1V)

Table 5-2 Shock Limit Test Data

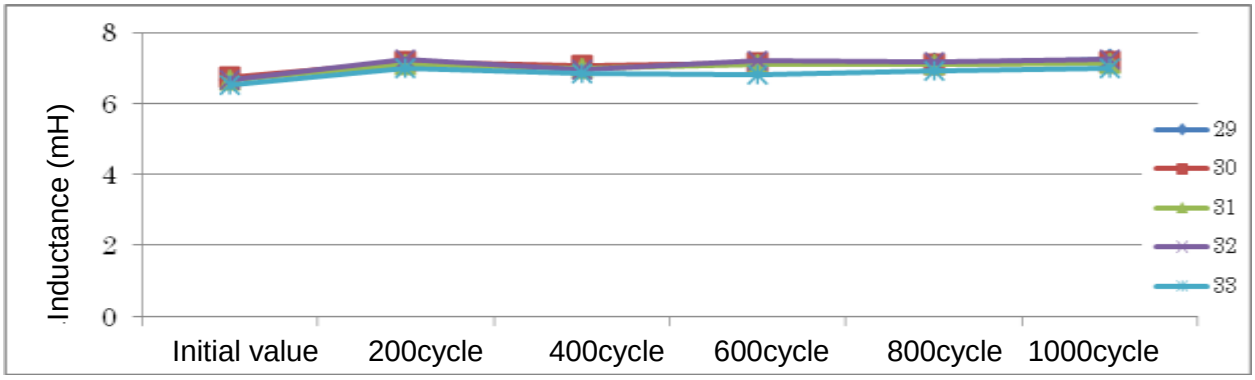
Test sample No.	DC resistance between (1-2) (Ω)								
	Initial value	Step 1		Step 2		Step 3		Step 4	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
24	0.0294	0.0296	0.7%	0.0295	0.3%		—		—
25	0.0294	0.0295	0.3%	0.0296	0.7%		—		—
26	0.0295	0.0295	0.0%	0.0296	0.3%		—		—
27	0.0295	0.0296	0.3%	0.0296	0.3%		—		—
28	0.0295	0.0294	-0.3%	0.0296	0.3%		—		—



Note: DC resistance: ±5% of the initial value (at 25 ±5°C)

Table 6-1. Thermal Shock Limit Test Data (Condition I)

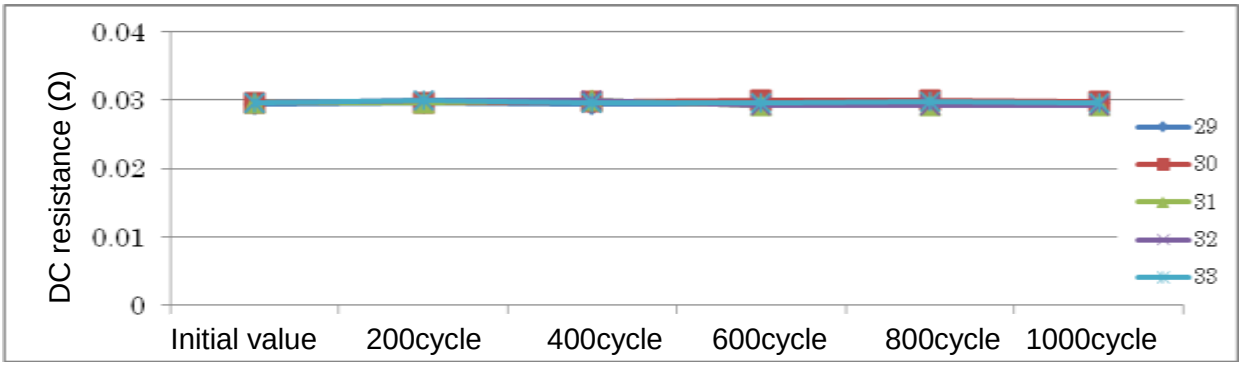
Test sample No.	Inductance between (1-2) (mH)										
	Initial value	200 cycle		400 cycle		600 cycle		800 cycle		1,000 cycle	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
29	6.664	7.187	7.8%	7.039	5.6%	7.129	7.0%	7.134	7.1%	7.245	8.7%
30	6.743	7.154	6.1%	7.06	4.7%	7.123	5.6%	7.096	5.2%	7.157	6.1%
31	6.664	7.079	6.2%	6.995	5.0%	7.089	6.4%	7.084	6.3%	7.133	7.0%
32	6.66	7.232	8.6%	6.939	4.2%	7.194	8.0%	7.162	7.5%	7.232	8.6%
33	6.515	7.006	7.5%	6.858	5.3%	6.816	4.6%	6.92	6.2%	6.999	7.4%



Note: Inductance: within $^{+10}_{-30}$ % of the initial value (at 10kHz, 1V)

Table 6-2. Thermal Shock Limit Test Data (Condition I)

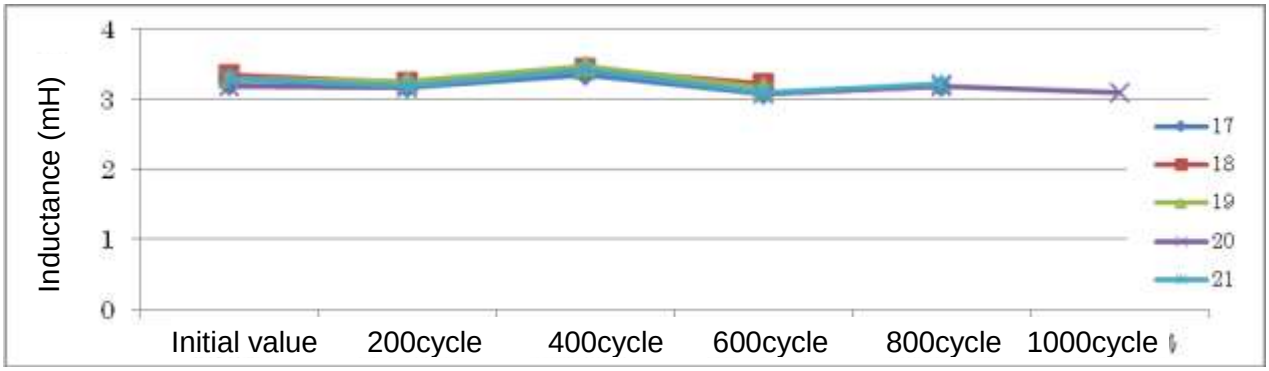
Test sample No.	DC resistance between (1-2) (Ω)										
	Initial value	200 cycle		400 cycle		600 cycle		800 cycle		1,000 cycle	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
29	0.0294	0.0295	0.3%	0.0294	0.0%	0.0294	0.0%	0.0294	0.0%	0.0295	0.3%
30	0.0295	0.0296	0.3%	0.0298	1.0%	0.03	1.7%	0.0299	1.4%	0.0298	1.0%
31	0.0296	0.0296	0.0%	0.0299	1.0%	0.0293	-1.0%	0.0293	-1.0%	0.0293	-1.0%
32	0.0295	0.03	1.7%	0.0299	1.4%	0.0293	-0.7%	0.0293	-0.7%	0.0293	-0.7%
33	0.0295	0.03	1.7%	0.0295	0.0%	0.0295	0.0%	0.0297	0.7%	0.0296	0.3%



Note: DC resistance: ±5% of the initial value (at 25 ±5°C)

Table 7-1. Thermal Shock Limit Test Data (Condition II)

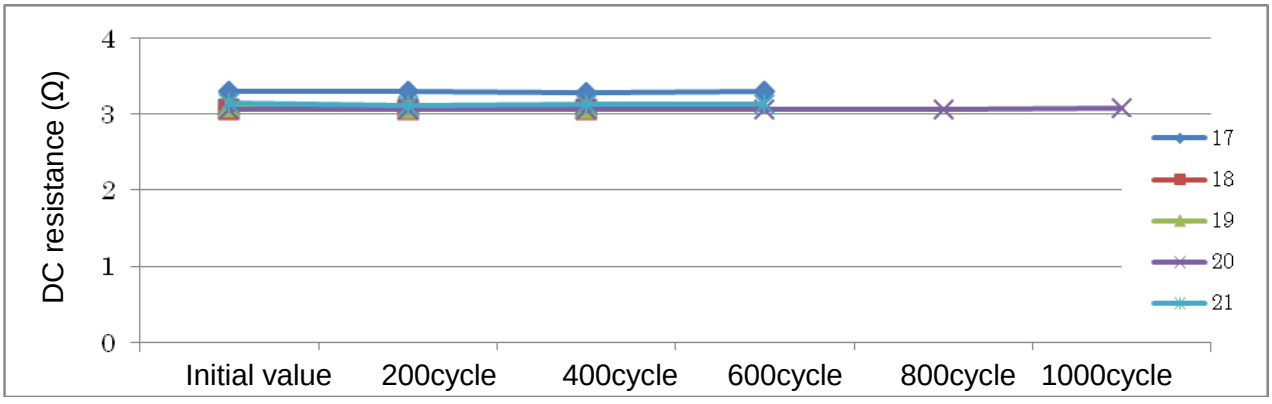
Test sample No.	Inductance between (1-2) (mH)										
	Initial value	200 cycle		400 cycle		600 cycle		800 cycle		1,000 cycle	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
17	3.2	3.16	-1.3%	3.35	4.7%	3.08	-3.8%	3.19	-0.3%		-
18	3.34	3.23	-3.3%	3.43	2.7%	3.21	-3.9%		-		-
19	3.3	3.25	-1.5%	3.48	5.5%	3.16	-4.2%		-		-
20	3.18	3.17	-0.3%	3.42	7.5%	3.08	-3.1%	3.19	0.3%	3.09	-2.8%
21	3.29	3.18	-3.3%	3.42	4.0%	3.1	-5.8%	3.21	-2.4%		-



Note: Inductance: within $^{+10}_{-30}$ % of the initial value (at 10kHz, 1V)

Table 7-2. Thermal Shock Limit Test Data (Condition II)

Test sample No.	DC resistance between (13-14) (Ω)										
	Initial value	200 cycle		400 cycle		600 cycle		800 cycle		1,000 cycle	
		Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate	Measured	Change rate
17	3.3	3.297	-0.1%	3.291	-0.3%	3.294	-0.2%		-		-
18	3.067	3.058	-0.3%	3.06	-0.2%		-		-		-
19	3.105	3.086	-0.6%	3.081	-0.8%		-		-		-
20	3.069	3.07	0.0%	3.072	0.1%	3.069	0.0%	3.065	-0.1%	3.077	0.3%
21	3.142	3.121	-0.7%	3.14	-0.1%	3.139	-0.1%		-		-



Note: DC resistance: ±5% of the initial value (at 25 ±5°C)

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Table 8. Evaluation Test Results (Environmental Resistance and Electrical Characteristics)

Item no.		Test item	Test method([1])	Pass/Fail criteria	Test result (Parameter range)		
Group						Passed	Failed
I	1	Thermal shock	A.4.4.6.3	No corrosions affecting electrical performance nor mechanical damages	Acceptable	8	0
II	2	Material, design, structure, externals, dimension, marking, workmanship	A.4.4.2 A.4.4.3	Markings, dimension, mass and structures shall be as specified in the detail specification.	Acceptable	8	0
	3	Electrical characteristics	A.4.4.4.1	Shown in Table 9.		8	0
	4	Withstanding voltage (ambient pressure)	A.4.4.4.2.1	No dielectric breakdown	Acceptable	8	0
	5	Withstanding voltage (reduced pressure)	A.4.4.4.2.2	No dielectric breakdown	Acceptable	8	0
	6	Interlayer withstanding voltage	A.4.4.4.3	No dielectric breakdown	Acceptable	8	0
	7	Insulation resistance	A.4.4.4.4	10,000MΩ min.	100,000MΩ min.	8	0
	8	Bacteria resistance	—	External materials shall be processed to prevent bacterial infestation.	Bacteria resistance material used		
III	9	Life	A.4.4.7.1	No mechanical or electrical damages	Acceptable	2	0
	10	Visual and mechanical inspection (post-test)	A.4.4.2.1	Markings, dimension, mass and structures shall be as specified in the detail specification	Acceptable	2	0
	11	Electrical characteristics	A.4.4.4.1	Shown in Table 9.		2	
IV	12	Terminal strength	A.4.4.5.1	No loosening, breakage or other mechanical damages to the terminals	Acceptable	6	0
	13	Temperature rise	A.4.4.4.6	30°C max.	2.4 to 3.2°C	2	0
	14	Vibration	A.4.4.6.1	No mechanical damages	Acceptable	6	0
	15	Shock	A.4.4.6.2	No mechanical damages	Acceptable	6	0
	16	Moisture resistance	A.4.4.6.5	No corrosions affecting electrical performance nor mechanical damages	Acceptable	6	0
	17	Overload	A.4.4.4.1.21	No corrosions affecting electrical performance nor mechanical damages	Acceptable	6	0
	18	Electrical characteristics	A.4.4.4.1	Shown in Table 9.		6	0
	19	Visual and mechanical inspection (post-test)	A.4.4.2.1	Markings, dimension, mass and structures shall be as specified in the detail specification	Acceptable	6	0
	20	DPA	A.4.4.3.1	No gap or cracks	Acceptable	3	0

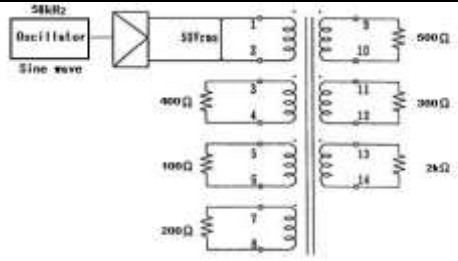
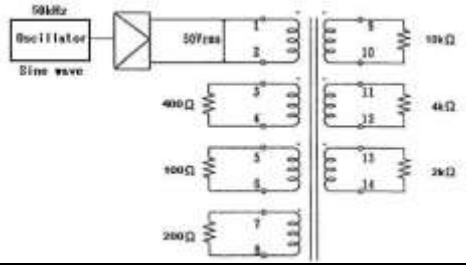
Note ([1]) Indicates paragraph number of JAXA-QTS-2110.

Table 9. Evaluation Test Results (Electrical Characteristics)

NASDA 2110/A116-T000

Item	Pass/Fail criteria		Parameter Range	
			Tamura Corporation Sakado factory sample	Wakayanagi Tamura sample
Inductance	Between (1-2) 2.3mH min. at 10kH, 1.0V		3.21 to 3.49mH	3.01 to 3.11mH
Transformer turns ratio	(3– 4) / (1–2) 2.250 ± 3%		-0.2 to 0.0%	0.1 to 0.2%
	(5– 6) / (1–2) 1.000 ± 3%		-0.1 to 0.1%	-0.1 to 0.0%
	(7– 8) / (1–2) 1.750 ± 3%		-0.1 to 0.0%	0.0 to 0.1%
	(9–10) / (1–2) 3.540 ± 3%		-0.2 to 0.0%	0.3 to 0.4%
	(11–12) / (1–2) 2.000 ± 3%		-0.1 to 0.0%	0.3 to 0.4%
	(13–14) / (1–2) 0.500 ± 4%		-0.2 to 0.3%	0.1 to 0.3%
DC resistance	Between (1 – 2) 0.03Ω max.		0.0215 to 0.0225Ω	0.0206 to 0.0208Ω
	Between (3 – 4) 0.30Ω max.		0.166 to 0.169Ω	0.160 to 0.161Ω
	Between (5 – 6) 0.08Ω max.		0.0508 to 0.0517Ω	0.0489 to 0.0490Ω
	Between (7 – 8) 0.25Ω max.		0.152 to 0.154Ω	0.144 to 0.145Ω
	Between (9– 10) 1.20Ω max.		0.783 to 0.796Ω	0.751 to 0.756Ω
	Between (11–12) 0.50Ω max.		0.372 to 0.388Ω	0.352 to 0.355Ω
	Between (13–14) 4.00Ω max.		3.031 to 3.219Ω	2.934 to 2.951Ω
Polarity	Test points 1, 3, 5, 7, 9, 11 and 13 shall have the same polarity.		Acceptable	Acceptable
Dimensions	A (Diameter)	Φ65mm max.	59.5 to 60.0mm	57.4 to 57.8mm
	B (Height)	43mm max.	37.9 to 38.6mm	37.1 to 37.2mm
	C (Lead length)	100mm min.	133 to 135mm	135mm
Volume	–		105.9 to 108.5cm^3	95.95 to 97.56 cm^3
Mass	350g max.		284.0 to 290.6g	277.1 to 280.3g

Table 10. Comparison of the Ratings Before and After Extension of the Qualification Coverage

	NASDA 2110/A116-T000 (before extension)	NASDA 2110/A116-T000 (after extension)
Item	Rating	
Operation frequency	50kHz±10%	Same as on the left
Power supply voltage	$50V_{rms}$	Same as on the left
Winding ratio	(3– 4) / (1–2) = 1.500 ± 3% (5– 6) / (1–2) = 0.800 ± 3% (7– 8) / (1–2) = 1.300 ± 3% (9–10) / (1–2) = 2.475 ± 3% (11–12) / (1–2) = 1.300 ± 3% (13–14) / (1–2) = 0.300 ± 4%	(3– 4) / (1–2) = 2.250 ± 3% (5– 6) / (1–2) = 1.000 ± 3% (7– 8) / (1–2) = 1.750 ± 3% (9–10) / (1–2) = 3.540 ± 3% (11–12) / (1–2) = 2.000 ± 3% (13–14) / (1–2) = 0.500 ± 4%
Inductance	(1–2) = 5.0mH min. at 10kHz 1.0V	(1–2) = 2.3mH min. at 10kHz 1.0V
DC resistance	(1 – 2) = 0.05Ω max. (3 – 4) = 0.30Ω max. (5 – 6) = 0.08Ω max. (7 – 8) = 0.30Ω max. (9– 10) = 1.20Ω max. (11–12) = 0.55Ω max. (13–14) = 4.00Ω max.	(1 – 2) = 0.03Ω max. (3 – 4) = 0.30Ω max. (5 – 6) = 0.08Ω max. (7 – 8) = 0.25Ω max. (9– 10) = 1.20Ω max. (11–12) = 0.50Ω max. (13–14) = 4.00Ω max.
Output	97VA	100VA
Polarity	Test points 1, 3, 5, 7, 9, 11, and 13 shall have the same polarity.	Same as on the left.
Test circuit		

E-A4-30337E

Table 11. Outgassing Data

JAXA qualified parts (NASDA 2110/A116-T000)

Outgassing Data of Materials

No.	Name of materials	Part Number	Materials	TML (%)	CVCM (%)	Mass (g) (reference)
1	Insulating tape	No. 56	Polyester	2.181	0.516	1
2	Insulating film	Lumirror	Polyester	0.150	0.000	0.5
3-1	Wire	PEW (insulator) (Sumitomo Electric Wintec Co., Ltd.)	Polyester	0.122	0.009	---
3-2	Wire	PEW (insulator) (Furukawa Magnet Wire Co., Ltd.)	Polyester	0.009	0.000	---
3-3	Wire	PEW (insulator) (Hitachi Cable Ltd.)	Polyester	0.008	0.001	---
4	Lead wire	TYPE E (insulator)	PTFE	0.005	0.008	---
5	Adhesive tape	650S	Polyimide / silicone-based adhesive	1.664	0.491	0.5
6	Adhesive tape	560S([1])	Polyamide / acrylic-based adhesive	2.932	0.335	0.5
7	Adhesive	Bond E Set	Epoxy-based adhesive	3.738	0.072	2
8	Insulating tape	Merubon electrical insulating tape	Polyester	0.120	0.029	1.5
9	Adhesive	Aron alpha #201	α-Cyanoacrylate resin	14.310	0.120	0.001
10	Ink	MARKEM7224 (Black)	Epoxy	5.408	0.013	0.05
11	Adhesive tape	No. 69	Glass / silicone–based adhesive	1.672	0.827	1
12	Impregnated material	No. 235	Epoxy	4.980	0.140	25
The outgassing data for the finished product				0.000	0.000	32.051

Note ([1]): The name of the material “560S “ in this qualified part has been changed to “5600 #5” in 2019, however, these materials are identical.
This outgassing data was obtained in 1989 with the part number “560S”.