

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

Part Description	TRANSFORMERS AND INDUCTORS, POWER
Part Number and Type	NASDA2110/A122-T000
Applicable Specification	JAXA-QTS-2110 JAXA-QTS-2110/A122

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

Revision Log

Rev.	Date	Revised Contents				
NC	17 Feb. 2006	Original				
A	20 June 2012	<p>(1) Page 7: Outgassing Data of Materials Added data for wire of Furukawa Magnet Wire and Hitachi Cable.</p> <p>(2) Page 3: Changed the contact due to reorganization.</p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 50%;">Before</td> <td style="text-align: center; width: 50%;">After</td> </tr> <tr> <td>Avio & Industrial Devices Business Unit Quality Assurance Group</td> <td>Electronic Components Business Sector Components Quality Assurance Group</td> </tr> </table> <p>(3) Page 3: Added paragraph 6 RELIABILITY</p> <p>(4) Others: Page 5: Added the table number (Table 1). Pages 5 and 6: Updated the test data. (the data of Group A and B tests of Quality Conformance test was updated) Page 6: Added the table title of Table 2 "Evaluation Test Results (Electrical Characteristics)".</p>	Before	After	Avio & Industrial Devices Business Unit Quality Assurance Group	Electronic Components Business Sector Components Quality Assurance Group
Before	After					
Avio & Industrial Devices Business Unit Quality Assurance Group	Electronic Components Business Sector Components Quality Assurance Group					
B	8 Feb. 2018	<p>(1) Page 3: Changed contact in association with organization change Components Quality Assurance Group →Magnetic Business Unit, Production Management dept., Quality Assurance Group</p> <p>(2) Page 4: Added Manufacture line identification letter to the serial number in the marking; Added marking example; W: Wakayanagi Tamura Corporation, No letter added: Tamura corporation</p> <p>(3) Page 6, Table 2: Added the data for "sample made by Wakayanagi Tamura Corporation" to the parameter range.</p>				
C	6 Jan. 2020	<p>(1) Page 3, Paragraph 8: Changed contact division and telephone number in association with organization change.</p> <p>(2) Page 7, Table 3: Added a note for the name change of No. 6 Adhesive tape "560S".</p>				
D	22 Aug. 2022	<p>(1) Page 3, Paragraph 8: Changed contact division and telephone number in association with organization change.</p> <ul style="list-style-type: none"> • 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/A122 | NASDA 2110/A122 Type, Transformers and Inductors, Power, High Reliability, Space Use, Detail Specification For |

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

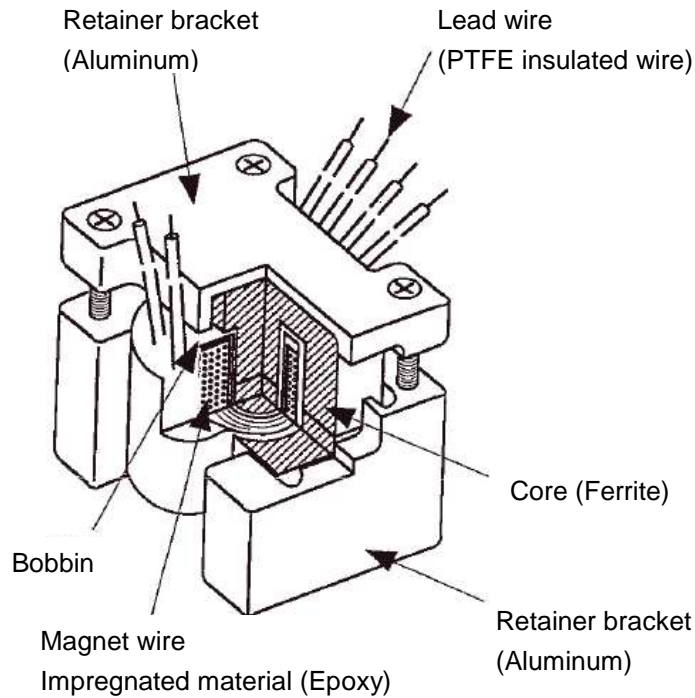
Externals, dimensions, mass and markings of the transformer are shown below.

Part number	Externals, dimensions and marking	Mass (nominal value)
NASDA 2110/A122-T000	See Figure 1	184g

2.2 Construction

The transformer is of an epoxy resin impregnated open type and composed of coils, PQ type ferrite core and aluminum retainer brackets. The coils are made of magnet wires which are wound around a bobbin and direct wires or PTFE insulated wires are pulled out to serve as the leads. The following figure shows outline internal construction.

E-A4-30339D



3. USAGE

3.1 Rating

Ratings of transformers are as follows.

Part number	Rated power	Operating frequency	Operating ambient temperature (1)	Temperature rise (1)	Input voltage
NASDA2110/A122-T000	81VA	100kHz	-55°C to +100°C	30°C max.	60Vrms

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 follows.

(1) Fasten with stainless-steel screws.

4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS

4.1 Electrical Characterisitcs

The transformer satisfied the electrical characteristics specified in the detail specification. Test results are shown in Tables 1 and 2.

4.2 Environmental Resistance

The transformer satisfied the environmental conditions specified in the detail specification. Test results are shown in Tables 1 and 2.

4.3 Outgassing

Outgassing data of organic materials used in the transformers is shown in Table 3.

5. 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.

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. PRECAUTIONS

7.1 Instructions for Purchaser

If purchaser's specification is included in the "qualification coverage" specified in the detail specification, JAXA-QTS-2110/A122, paragraph 3.1, or if "qualification by similarity" specified in JAXA-QTS-2110, Appendix A (paragraph A.3.1.1.1), 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.

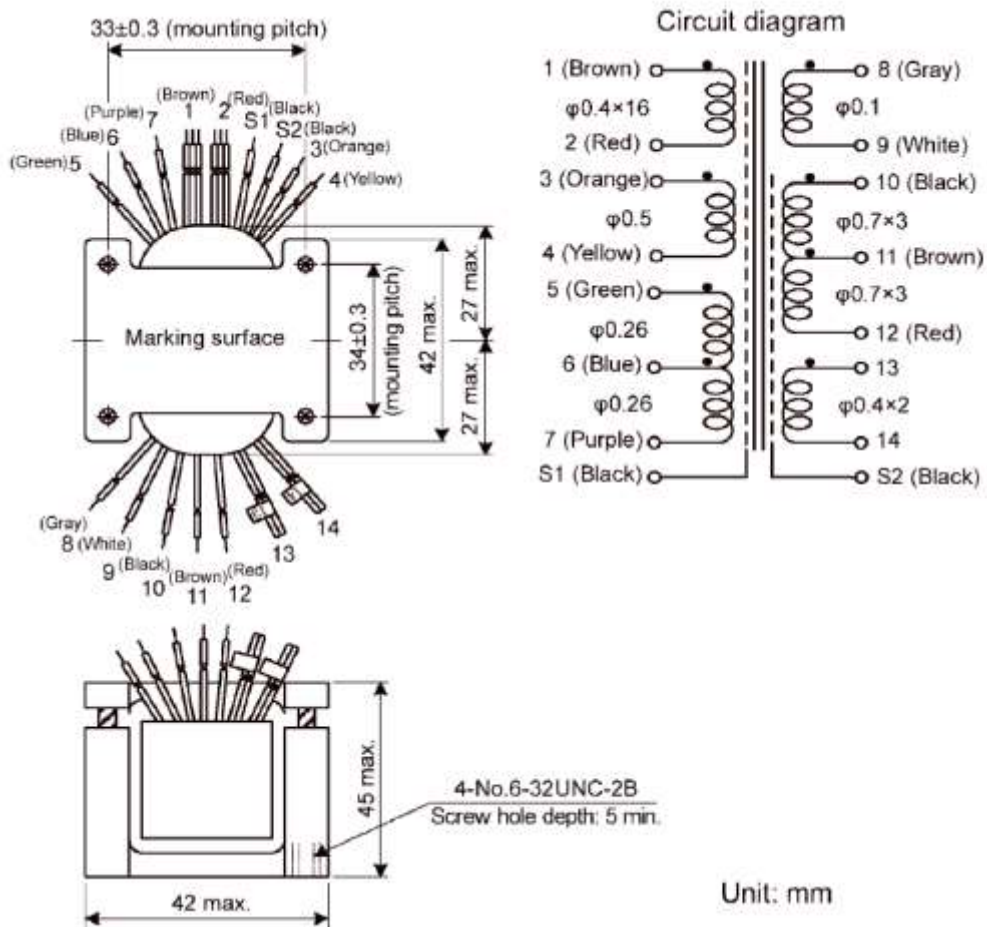
7.2 Instructions for User

- It is advisable to keep the operating frequency deviation within $\pm 5\%$ 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.

8. 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



1. Terminal length: 100mm min.
 AWG 18 x 3 for terminals 1, 2
 AWG 22 for terminals 5, 6, 7, 10, 11, 12
 AWG 24 for terminals 3, 4
 AWG 30 for terminals 8, 9
 Direct wire leads of $\varnothing 0.4 \times 2$ for terminals 13, 14
 AWG 28 for terminals S1, S2
 Insulator removed approx. 10mm at the end

2. Mass: 220g max.

3. Markings

N2110/A122-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

E-A4-30339D

Table 1. 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	3	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	3	0
	3	Electrical characteristics	A.4.4.4.1	Shown in Table 2.		3	0
	4	Withstanding voltage (ambient pressure)	A.4.4.4.2.1	No dielectric breakdown	Acceptable	3	0
	5	Withstanding voltage (reduced pressure)	A.4.4.4.2.2	No dielectric breakdown	Acceptable	3	0
	6	Interlayer withstanding voltage	A.4.4.4.3	No dielectric breakdown	Acceptable	3	0
	7	Insulation resistance	A.4.4.4.4	10,000MΩ min.	100,000MΩ min.	3	0
	8	Bacteria resistance	—	External materials shall be processed to prevent bacterial infestation.	Bacteria resistance material used		
III ⁽²⁾	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 2.		2	
IV	12	Terminal strength	A.4.4.5.1	No loosening, breakage or other mechanical damages to the terminals	Acceptable	3	0
	13	Temperature rise	A.4.4.4.6	30°C max.	2.1 to 2.2°C	3	0
	14	Vibration	A.4.4.6.1	No mechanical damages	Acceptable	3	0
	15	Shock	A.4.4.6.2	No mechanical damages	Acceptable	3	0
	16	Moisture resistance	A.4.4.6.5	No corrosions affecting electrical performance nor mechanical damages	Acceptable	3	0
	17	Overload	A.4.4.4.1.21	No corrosions affecting electrical performance nor mechanical damages	Acceptable	3	0
	18	Electrical characteristics	A.4.4.4.1	Shown in Table 2.		3	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	3	0
	20	DPA	A.4.4.3.1	No gap or cracks	Acceptable	3	0

Notes ⁽¹⁾ Indicates paragraph number of JAXA-QTS-2110.

⁽²⁾ The evaluation test results in Group III consist of test data from NASDA-QTS-39013C. The temperature at the 3rd step when the data were obtained was 115°C.

Table 2. Evaluation Test Results (Electrical Characteristics)

NASDA 2110/A122-T000

Item	Pass/Fail criteria		Parameter range	
			Tamura Corporation Sakado factory sample	Wakayanagi Tamura sample
Inductance	Between (1-2) 100μH min.		141.4 to 152.3μH	145.2 to 147.2μH
Transformer turns ratio	(3 - 4) / (1 - 2)	2.00 ± 3%	-0.1%	-0.1%
	(5 - 6) / (1 - 2)	1.00 ± 3%	-0.1%	-0.1 to 0.0%
	(6 - 7) / (1 - 2)	1.00 ± 3%	-0.1%	-0.1 to 0.0%
	(8 - 9) / (1 - 2)	0.500 ± 4%	-0.2%	-0.1%
	(10-11) / (1 - 2)	0.800 ± 3%	-0.1%	-0.1 to 0.0%
	(11-12) / (1 - 2)	0.800 ± 3%	-0.1%	-0.1%
	(13-14) / (1 - 2)	1.00 ± 3%	-0.1%	-0.1%
DC resistance	Between (1 - 2) 0.01Ω max.		0.007 to 0.009Ω	0.0079 to 0.0084Ω
	Between (3 - 4) 0.20Ω max.		0.138 to 0.139Ω	0.138 to 0.139Ω
	Between (5 - 6) 0.40Ω max.		0.290 to 0.297Ω	0.282 to 0.285Ω
	Between (6 - 7) 0.40Ω max.		0.290 to 0.298Ω	0.283 to 0.285Ω
	Between (8 - 9) 1.6Ω max.		1.176 to 1.211Ω	1.123 to 1.142Ω
	Between (10-11) 0.03Ω max.		0.023Ω	0.0222 to 0.0225Ω
	Between (11-12) 0.03Ω max.		0.023 to 0.024Ω	0.0224 to 0.0228Ω
Polarity	Test points 1, 3, 5, 6, 8, 10, 11 and 13 shall have the same polarity.		Acceptable	Acceptable
	Dimensions			
Dimensions	A (Length)	42mm max.	41.0 to 41.1mm	41.0 to 41.1mm
	B (Width)	42mm max.	41.0mm	41.0 to 41.1mm
	C (Height)	45mm max.	42.1 to 42.2mm	42.1 to 42.4mm
	D (Lead length)	100mm min.	120mm	116 to 118mm
Volume	-		67.3 to 72.7cm ³	70.94 to 71.45 cm ³
Mass	220g max.		196.2 to 197.3g	193.8 to 194.5g

Table 3. Outgassing Data

JAXA qualified parts (NASDA2110/A122-T000)		Outgassing Data of Materials				
No.	Category	Part Number	Material name	TML (%)	CVCM (%)	Mass (g) (Reference)
1	Bobbin	E-B1-30218	PPS	0.055	0.012	5.3
2-1	Wire	PEW (insulator) (Sumitomo Electric Wintec Co., Ltd.)	Polyester	0.122	0.009	---
2-2	Wire	PEW (insulator) (Furukawa Magnet Wire Co., Ltd.)	Polyester	0.009	0.000	---
2-3	Wire	PEW (insulator) (Hitachi Cable Ltd.)	Polyester	0.008	0.001	---
3	Adhesive tape	No. 56	Polyester	2.181	0.516	0.2
4	Lead wire	TYPE E (insulator)	PTFE	0.005	0.008	---
5	Adhesive tape	650S	Polyimide / silicone- based adhesive	1.664	0.491	0.1
6	Adhesive tape	560S ⁽¹⁾	Polyamide / acrylic-based adhesive	2.932	0.335	0.05
7	Adhesive	Aron alpha #201	α-Cyanoacrylate resin	14.310	0.120	0.001
8	Adhesive	Bond E set	Epoxy-based adhesive	3.738	0.072	1.2
9	Insulating paper	410	Polyamide fiber	2.966	0.010	0.01
10	Reinforcement	No. 253	Epoxy	2.471	0.061	0.4
11	Impregnated material	No. 235	Epoxy	4.980	0.140	2.5
12	Coating material	Melami No. 1 (black)	Melamine resin-based	3.461	0.845	0.1
13	Adhesive	Patch Kit 1C	Epoxy	0.709	0.004	0.2
14	Adhesive	Loctite325	Anaerobic adhesive	2.45	0.11	0.05
15	Insulating film	Kapton H type	Polyimide	0.904	0.002	0.05
16	Adhesive	1401B	Synthetic-resin	6.453	0.023	0.05
17	Spacer	E-Z1-30280	Polyamide fiber	2.966	0.010	0.65
18	Adhesive	SE1700	Silicon	0.750	0.294	1.2
19	Adhesive tape	No. 69	Glass/ silicone-based adhesive	1.672	0.827	0.05
20	Ink	MARKEM7224 (black)	Epoxy	5.408	0.013	0.05
The outgassing data for the finished product				1.905	0.098	12.161

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".