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

Part Description	TRANSFORMERS AND INDUCTORS, POWER
Part Number and Type	JAXA 2110/A152-T000
Applicable Specification	JAXA-QTS-2110 JAXA-QTS-2110/A152

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	30 Sept. 2006	Original
A	20 June 2012	(1) Page 7: Outgassing Data of Materials Added data for wire of Furukawa Magnet Wire and Hitachi Cable. Added Outgassing data for the final product. (2) Page 3: Changed the contact due to reorganization. Before: Avio & Industrial Devices Business Unit Quality Assurance Group After: Electronic Components Business Sector Components Quality Assurance Group (3) Page 3: Added paragraph 6 RELIABILITY (4) Pages 5 and 6: Reflected the re-certified qualification test data results Replaced the initial qualification test data with the latest test data for re-certification. (5) Others: Page 5: Added table number in Table 1. Page 6: Added the table title of Table 2 "Evaluation Test Results (Electrical Characteristics)".
B	16 February 2017	(1) Page 4 Markings: Added manufacture line identification code to the serial number in (3) Markings Added a marking example; a symbol, “W” indicates that products are manufactured in Wakayanagi Tamura Corporation; no symbol indicates that the products are manufactured in Tamura Corporation. (2) Page 6, Table 2: Added data of the samples manufactured in Wakayanagi Tamura Corporation in the range of measurement.
C	22 Aug. 2022	(1) Page 3, Paragraph 8: Changed contact division and telephone number in association with organization change. ・ AVIO Department → Magnetic Business Unit, AVIO Department ・ +81-49-284-3105 → +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/A152	JAXA 2110/A152 Type, Transformers and Inductors, Power, (Outgassing-qualified), 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, which satisfies the outgassing requirements, for electric 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)
JAXA 2110/A152-T000	See Figure 1	304g

2.2 Construction

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

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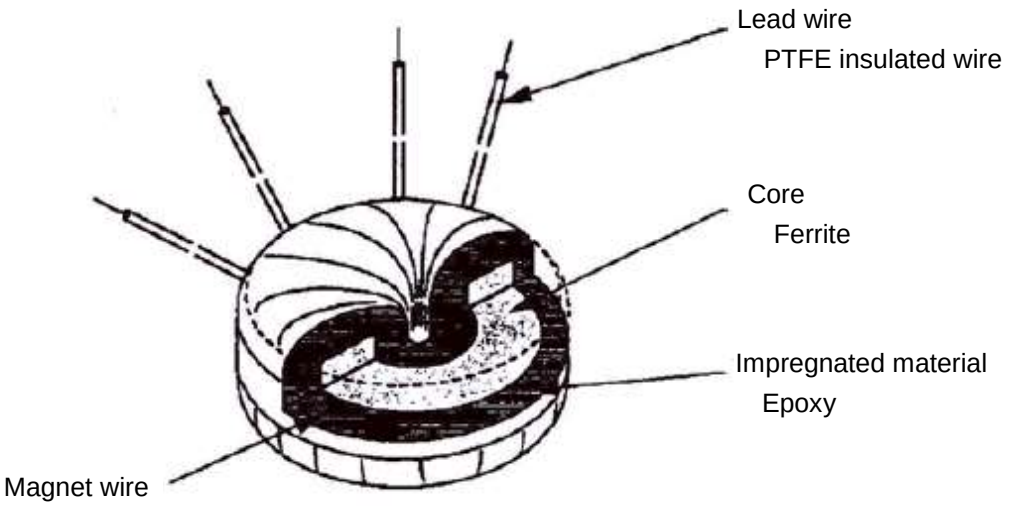


3. USAGE

3.1 Rating

The transformer is rated as follows.

Part number	Rated power	Operating frequency	Operating ambient temperature ([1])	Temperature rise ([1])	Input voltage
JAXA2110/A152-T000	97VA	50kHz	-55°C to 100°C	30°C max.	50Vrms

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

3.2 Installation Methods

It is recommended to install the transformer as follows.

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

4.2 Environmental Resistance

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

4.3 Outgassing

The transformer satisfies the outgassing requirements specified in the detail specification. Outgassing data of organic materials used in the transformer is shown in Table 3.

5. HANDLING AND STORAGE CONDITIONS

(1) Use caution not to expose the transformer to excessive stresses such as shock by drop.
(2) It is recommended 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 recommended 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/A152, 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 certified 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.

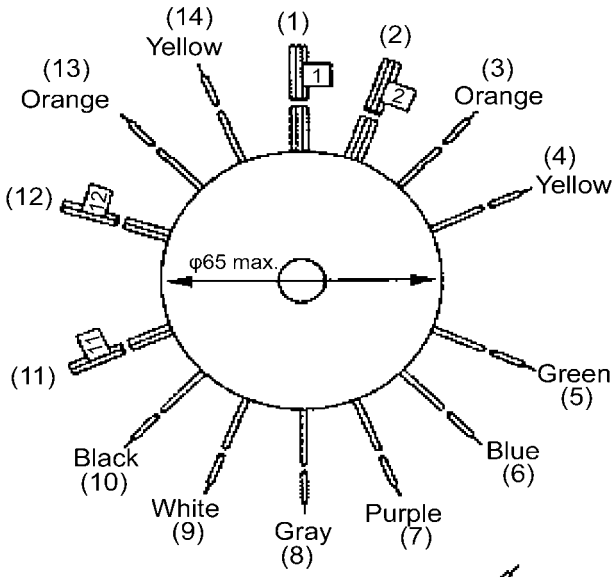
7.2 Instruction for Use

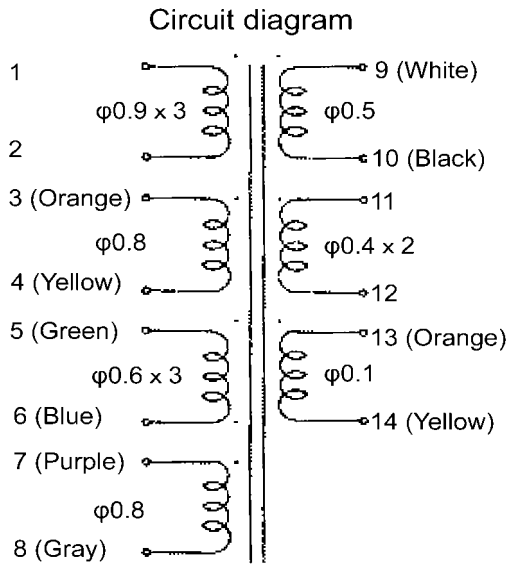
• Apply sufficient adhesive to the bonding surface.
• The acceptable adhesive is rigid epoxy adhesive.
• It is recommended to maintain the operating frequency deviation within ±5% of the rated operating frequency.
• It is recommended to operate the transformer within the rated output power and direct current.
• Operate the transformer in the temperature class S (130°C) as a maximum.

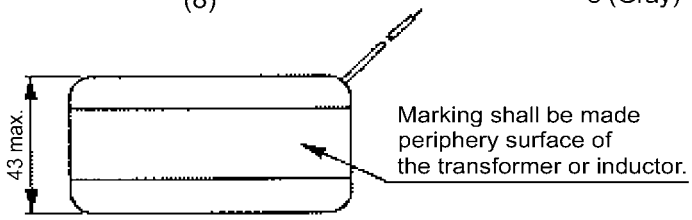
8. OTHERS

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-shi, Saitama 350-0214, Japan
Telephone	+81-50-3664-0489







Unit: mm

(1) Lead wire length: 100mm min.
No.18 AWG for terminals 5, 6
No.20 AWG for terminals 3, 4, 7, 8
No.24 AWG for terminals 9, 10
No.30 AWG 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:
JAXA2110/A152-T000
Lot identification code
Serial number and manufacture line identification code

(Marking example)

Serial number — NO.1 W — Manufacture line identification code
W: Wakayanagi Tamura Corporation
No symbol: Tamura Corporation

Trademark
Terminal identification

Figure 1. Externals, Dimensions and Markings

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Table 1. Evaluation Test Results (Environmental Resistance and Electrical Characteristics)

Item no. Group		Test item	Test method([1])	Pass/Fail criteria	Test result (Parameter range)	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 2.		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 2.		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.	2.8 to 3.7°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 2.		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.

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Table 2. Evaluation Test Results (Electrical Characteristics)

JAXA2110/A152-T000

Item	Pass/Fail criteria		Parameter Range	
			Tamura Corporation Sakado factory sample	Wakayanagi Tamura sample
Inductance	Between (1-2) 3.0mH min.		5.73 to 6.40mH	5.50 to 6.54mH
Transformer turns ratio	(3– 4) / (1–2) 1.500 ± 3%		-0.1 to 0.1%	0.0%
	(5– 6) / (1–2) 0.800 ± 3%		-0.1 to 0.1%	0.0%
	(7– 8) / (1–2) 1.300 ± 3%		0.1 to 0.2%	0.0%
	(9–10) / (1–2) 2.475 ± 3%		0.3 to 0.4%	0.1 to 0.3%
	(11–12) / (1–2) 1.300 ± 3%		0.1 to 0.2%	0.0 to 0.1%
	(13–14) / (1–2) 0.300 ± 4%		0.1 to 0.4%	0.0 to 0.2%
DC resistance	Between (1 – 2) 0.05Ω max.		0.029 to 0.031Ω	0.029 to 0.030
	Between (3 – 4) 0.30Ω max.		0.162 to 0.164Ω	0.162 to 0.163
	Between (5 – 6) 0.08Ω max.		0.057 to 0.059Ω	0.057 to 0.059
	Between (7 – 8) 0.30Ω max.		0.163 to 0.165Ω	0.161 to 0.163
	Between (9– 10) 1.20Ω max.		0.799 to 0.812Ω	0.792 to 0.807
	Between (11–12) 0.55Ω max.		0.346 to 0.356Ω	0.347 to 0.353
	Between (13–14) 4.00Ω max.		2.718 to 2.889Ω	2.623 to 2.705
Polarity	Test points 1, 3, 5, 7, 9, 11 and 13 shall have the same polarity.		Acceptable	Acceptable
Dimensions	A (Diameter)	Φ65mm MAX	59.2 to 59.8mm	58.2 to 59.6mm
	B (Height)	43mm MAX	38.6 to 39.2mm	38.0 to 38.4mm
	C (Lead length)	100mm MIN	134 to 135mm	135mm
Volume	–		107.4 to 109.1cm^3	101.0 to 107.1cm^3
Mass	350g max.		299.8 to 305.6g	294.7 to 300.5g

Table 3. Outgassing Data

JAXA certified parts (JAXA 2110/A152-T000)

Outgassing Data of Materials

No.	Name of materials	Part Number	Materials	TML (%)	CVCM (%)	Mass (g) (reference)
1	Adhesive tape	No. 1205	Polyimide/ acrylic adhesive	0.859	0.065	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	Insulating film	KAPTON H type	Polyimide	0.904	0.002	0.5
6	Insulating tape	MERUBON insulating tape	Polyester	0.120	0.029	2
7	Adhesive	ECOBOND 104	Epoxy type	0.325	0.006	2
8	Ink	M-9-N	Epoxy type	0.490	0.035	0.05
9	Impregnated material	No. 280	Epoxy	0.581	0.047	40
The outgassing data for the finished product				0.555	0.044	46.05