

Registration No. 1224

JAXA-QTS-2110/A153D
13 December 2019

Superseding
JAXA-QTS-2110/A153C
Cancelled
13 December 2019

TRANSFORMERS AND INDUCTORS, POWER,
(OUTGASSING-QUALIFIED),
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR
(JAXA 2110/A153 TYPE)

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: June 25, 2021

Revision Log

Rev.	Date	Revised contents
NC	25 July 2011	Original
A	3 July 2017	Paragraph 1.1: Scope: Added “The products per this specification are manufactured...or Wakayanagi Tamura Corporation (Kurihara city of Miyagi)” Paragraph 3.2: Externals, Construction, Dimensions, Marking and Mass: Added “Additionally, manufacture line identification letter “W” is added to...” and a marking example in (4).
B	25 Oct. 2018	Paragraph 3.1: Table 2 Qualification coverage (6) Construction and material of terminal: changed terminal plating from Tin + copper to solder (Sn90).
C	1 Apr. 2019	Paragraph 1.1: Scope: Deleted the description about Tamura Corporation (Sakado city of Saitama) due to unification of the facility. Paragraph 3.2: Externals, Construction, Dimensions, Marking and Mass: <ul style="list-style-type: none"> ▪ Changed description due to unification of the facility. ▪ Changed manufacturer line identification letter to manufacturer line letter in the text and marking example.
D	13 Dec. 2019	Paragraph 3.2: Externals, Construction, Dimensions, Marking and Mass: (4) Added “and manufacture line letter”. (error corrected) Paragraph 4.5: Change to tests and inspections: Added the description about the shortening of applied time of the test voltage in insulation resistance test.

JAXA-QTS-2110/A153D 13 December 2019	J A X A Parts Specification	Page	– ii –
Contents			
1. GENERAL		1	
1.1 Scope.....		1	
1.2 Part Number		1	
1.3 Rating		1	
2. APPLICABLE DOCUMENTS.....		2	
3. REQUIREMENTS		2	
3.1 Qualification Coverage		2	
3.2 External Construction, Dimension, Marking and Mass.....		3	
3.3 Performance		5	
3.4 Electrical Characteristic.....		8	
4. QUALITY ASSURANCE PROVISIONS.....		9	
4.1 In-Process Inspection.....		9	
4.2 Qualification Test		9	
4.3 Quality Conformance Inspection		9	
4.4 Long-Term Storage		9	
4.5 Change to Tests and Inspections		9	
5. PREPARATION FOR DELIVERY.....		9	
6. NOTES.....		9	

**JAXA 2110/A153 TYPE,
TRANSFORMERS AND INDUCTORS, POWER,
(OUTGASSING-QUALIFIED),
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR**

1. GENERAL

1.1 Scope

This specification establishes the detail requirements for transformers and inductors with a ferrite core (JAXA 2110/A153 type) of space use, high reliability, transformers and inductors that satisfied JAXA-QTS-2110, Transformers and Inductors, High Reliability, Space use, General Specification for. The products per this specification are manufactured in Wakayanagi Tamura Corporation (Kurihara city of Miyagi). Transformers and inductors specified herein shall meet the requirements for outgassing.

1.2 Part Number

The part number shall be indicated in accordance with paragraph A.1.2, Appendix A of JAXA-QTS-2110 as shown below. When a purchaser designates a specific part number, the corresponding part number in this specification shall be provided in a product specification.

(Example)

JAXA⁽¹⁾ 2110/A153 – T000

|
Identification number

Note: ⁽¹⁾ "JAXA" indicates the common part for space use and may be abbreviated to "J."

1.3 Rating

The rating shall be as specified in Table 1.

Table 1. Rating

Item	Applicable paragraph of JAXA-QTS-2110	Identification number	
		T000	T001 or subsequent
Grade	A.3.3.8	6 (open type)	
Operating ambient temperature	–	-55 to +100°C	As specified in the product specification.
Class	A.3.6.1	S (130°C)	
Operating frequency	–	200kHz	
Input voltage	–	40Vrms	
Output power	–	66.36VA	

JAXA-QTS-2110/A153D 13 December 2019	J A X A Parts Specification	Page	– 2 –
2. APPLICABLE DOCUMENTS			
Applicable documents shall be as specified in paragraph A.2.1, Appendix A of JAXA-QTS-2110.			
3. REQUIREMENTS			
Requirements shall be as follows and as specified in Section A.3, Appendix A of JAXA-QTS-2110.			
3.1 Qualification Coverage			
The qualification coverage shall be as specified in Table 2.			
Table 2. Qualification Coverage			
No.	Item	Specification	
1	Class (maximum operating temperature)	S (130°C) max.	
2	External/internal mounting structure	Combination of soldering and adhesion	
	External dimensions (mm)	Excluding terminals: 34 x 36.2 x 14 ^H max. Terminal length: 4.4 max. (Including terminals: 34 x 45 x 14 ^H max.)	
	Total volume (cm ³) ⁽¹⁾	17.23 max.	
3	Operating voltage	254V _{peak} max.	
	Insulation	Polyimide, equivalent or better	
	Electric field strength	127V/mil max.	
4	Magnet wire diameter (mm)	φ0.2 min.	
	Coating material	Polyester, equivalent or better	
5	Grade	6	
	Insulation, impregnation, and filling material	Epoxy impregnation	
6	Construction and material of terminal	Gull-wing Phosphor bronze: 0.2mm x 1.5mm min. Terminal plating: Solder (Sn90)	
	Terminal strength	MIL-STD-202, test method 211, test condition A Applied force: 2.2N max. JAXA-QTS-2110 A.4.4.5.1.2 c) Force for bending: 2.2N max.	
7	Shock	MIL-STD-202, test method 213 Test condition E (1,000G, 0.5ms) max.	
	Vibration	MIL-STD-202, test method 204, test condition D max. MIL-STD-202, test method 214, test condition II-H max.	
8	Core material	Ferrite	
	Core shape	Shell-type (PQ type)	
9	Dielectric withstanding voltage	AC 720V max.	
10	Outgassing	TML: 1.0% max., CVCM: 0.1% max.	
Note ⁽¹⁾ : Excluding terminals.			

3.2 External Construction, Dimension, Marking and Mass

The externals, constructions, dimensions and mass shall be as specified in Figure 1. Marking items shall be as follows in accordance with paragraph A.3.4.1, Appendix A of JAXA-QTS-2110. If the product specification has marking requirements, marking shall be made as specified in the product specification. Marking location shall be as shown in Figure 1. Additionally, manufacture line letter “W” is added to the end of the serial number or to the location specified in the product specification.

- (1) Part number in this specification
- (2) Terminal identification (See Figure 1)
- (3) Lot identification code
- (4) Serial number and manufacture line letter

(Marking example)

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

(5) Trademark

If the marking area on the transformer or inductor is limited, the items above may be abbreviated or omitted in the following order of precedence.

- (1) “2110/A” of the part number
- (2) Trademark
- (3) Lot identification code

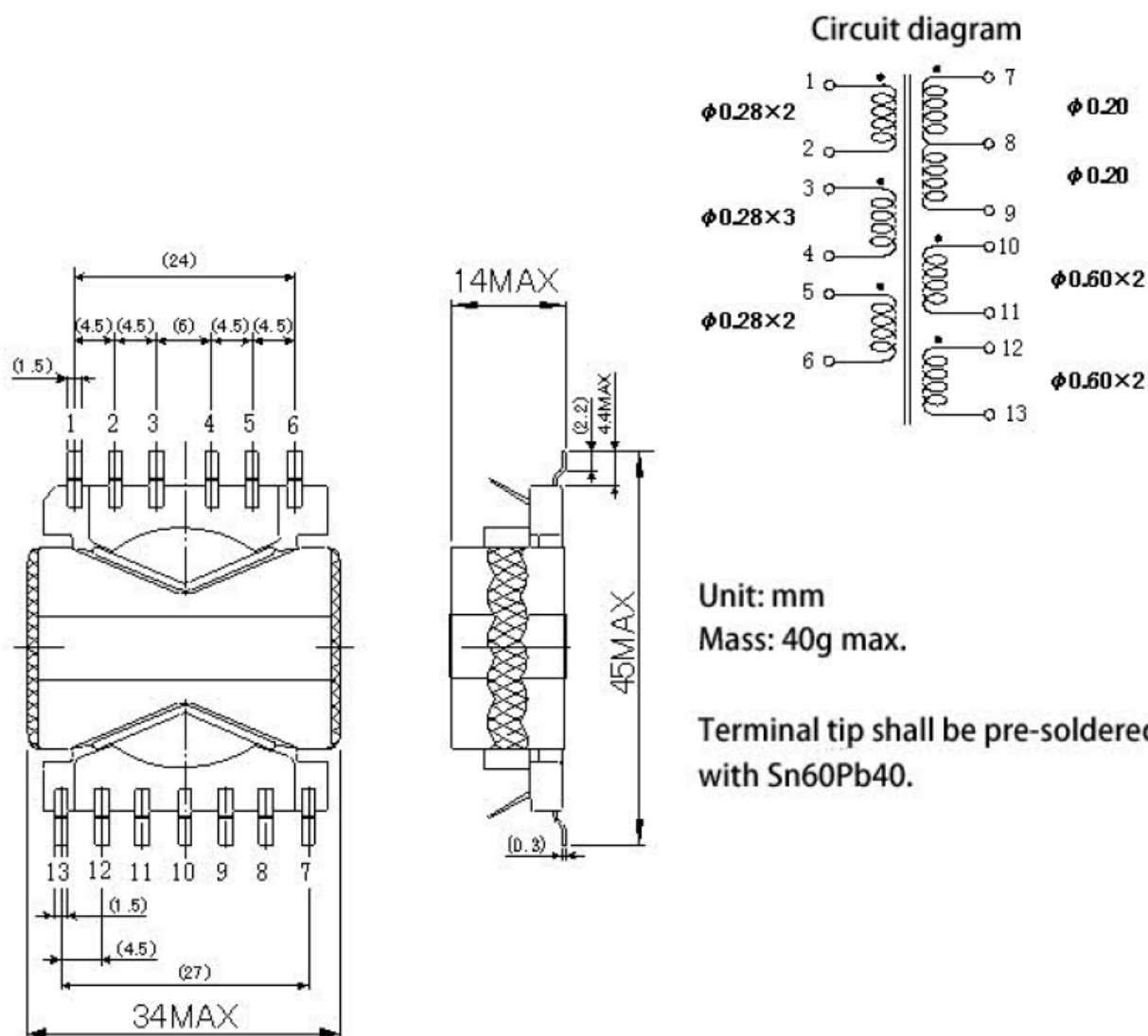


Figure 1. Externals, Construction, Dimensions, Marking and Mass⁽¹⁾

Note: ⁽¹⁾ Figure 1 shall be applicable to all certified products. Externals, construction, dimensions, marking and mass of Individual product included in the qualification coverage shall be as specified in the product specification.

3.3 Performance

Performance requirements shall be as specified in Table 3.

Table 3. Performance Requirements⁽¹⁾

Item	Requirement paragraph of JAXA-QTS-2110	Requirement
Electrical characteristics	A.3.7.1	As specified in Table 4.
Dielectric withstanding voltage	A.3.7.2	At barometric pressure: AC720V for 1 minute At reduced pressure: 1.1kPa, AC320V for 1 minute ⁽²⁾
Interlayer withstanding voltage	A.3.7.3	400kHz, sine wave of 80Vrms applied between (1-2) for 5±0.5s
Insulation resistance	A.3.7.4	DC500V, a) 10,000MΩ min.
Corona discharge	A.3.7.5	N/A as the voltage is less than discharge inception voltage.
Temperature rise	A.3.7.6	30°C max. (ambient temperature: 100°C)
Overload	A.3.7.7	Ambient temperature: 130°C – measured temperature rise ⁽³⁾
Conductivity	A.3.7.8	As specified in Appendix A of JAXA-QTS-2110.
Terminal strength	A.3.8.1	Pull test: applied force 2.2N Bend test: force for bending 2.2N
Solderability	A.3.8.2	MIL-STD-202, method 208, soldering iron test method
Resistance to soldering heat	A.3.8.3	MIL-STD-202, method 210, test method A
Seal	A.3.8.4	N/A as this product is grade 6.
Vibration	A.3.9.1	High frequency: As specified in Appendix A of JAXA-QTS-2110 ⁽³⁾ Random: As specified in Appendix A of JAXA-QTS-2110 ⁽³⁾
Shock	A.3.9.2	Test condition: E (1,000G, 0.5ms) ⁽³⁾
Thermal shock	A.3.9.3	As specified in Appendix A of JAXA-QTS-2110.
Immersion	A.3.9.4	N/A as this product is grade 6.
Moisture resistance	A.3.9.5	As specified in Appendix A of JAXA-QTS-2110 ⁽³⁾
Flammability	A.3.9.6	N/A as this product is grade 6.
Resistance to solvent	A.3.9.7	N/A as this product is grade 6.
Life	A.3.10.1	Ambient temperature: 130°C – measured temperature rise

Notes: ⁽¹⁾ This table shall be applicable to all certified products. Performance of individual product included in the qualification coverage shall be as specified in the product specification.

⁽²⁾ Dielectric withstanding voltage test (reduced pressure) shall be performed with insulation protected the terminals with tubes or clay.

⁽³⁾ Tests shall be performed with fixing the products on the test board in Figure 2 as shown in Figure 3.

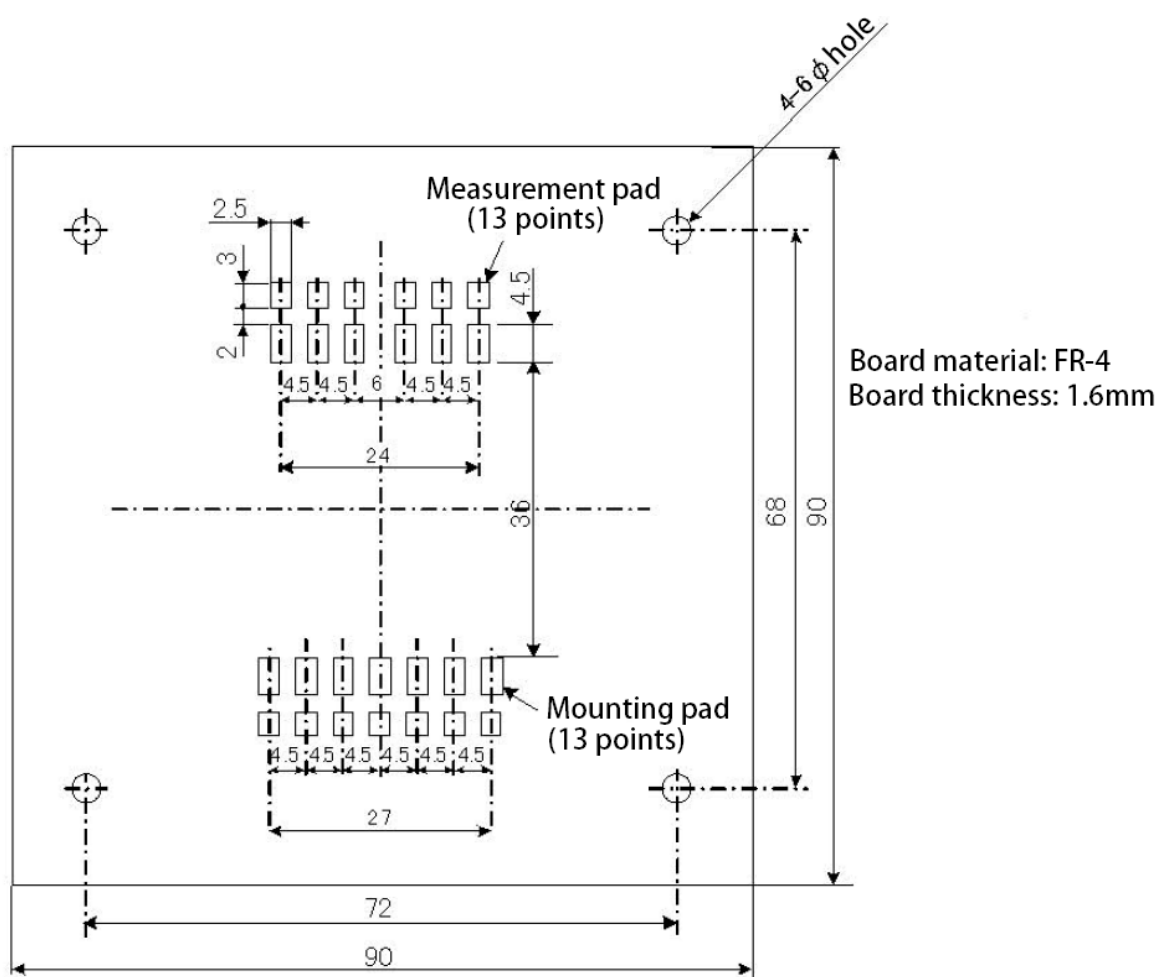


Figure 2. Test Board Dimensions

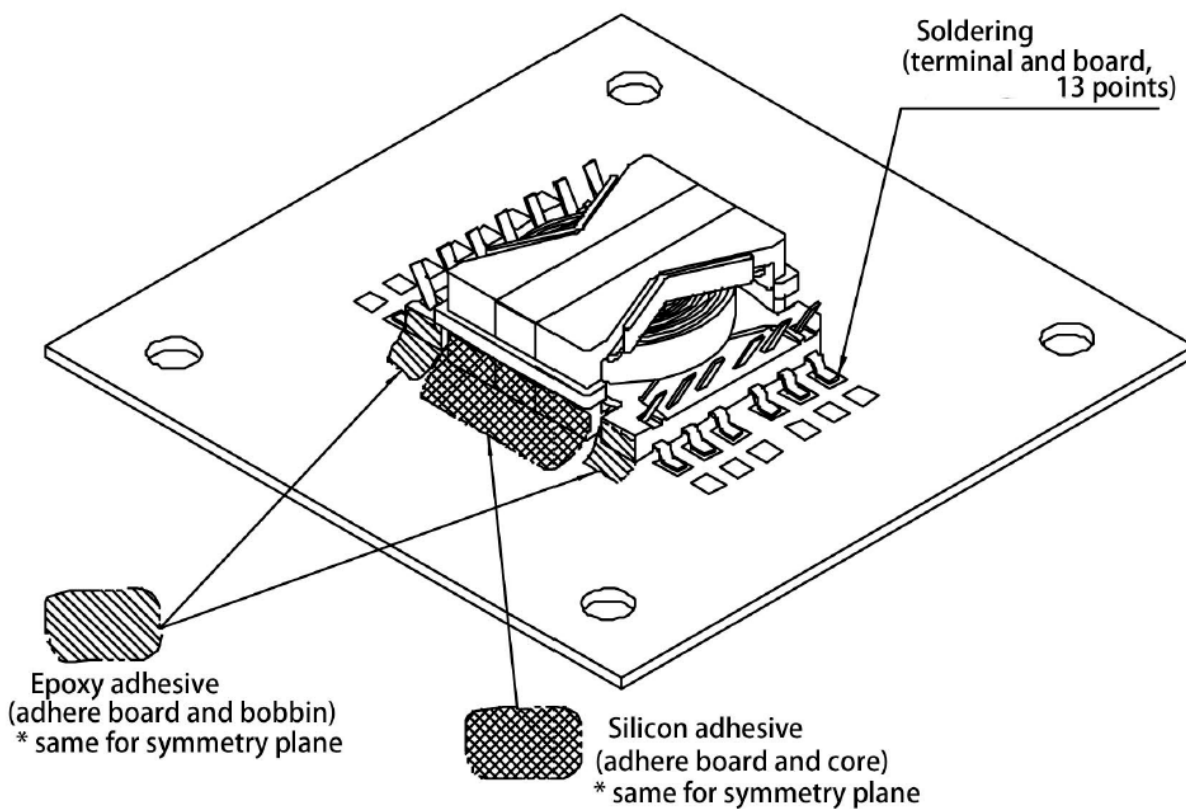
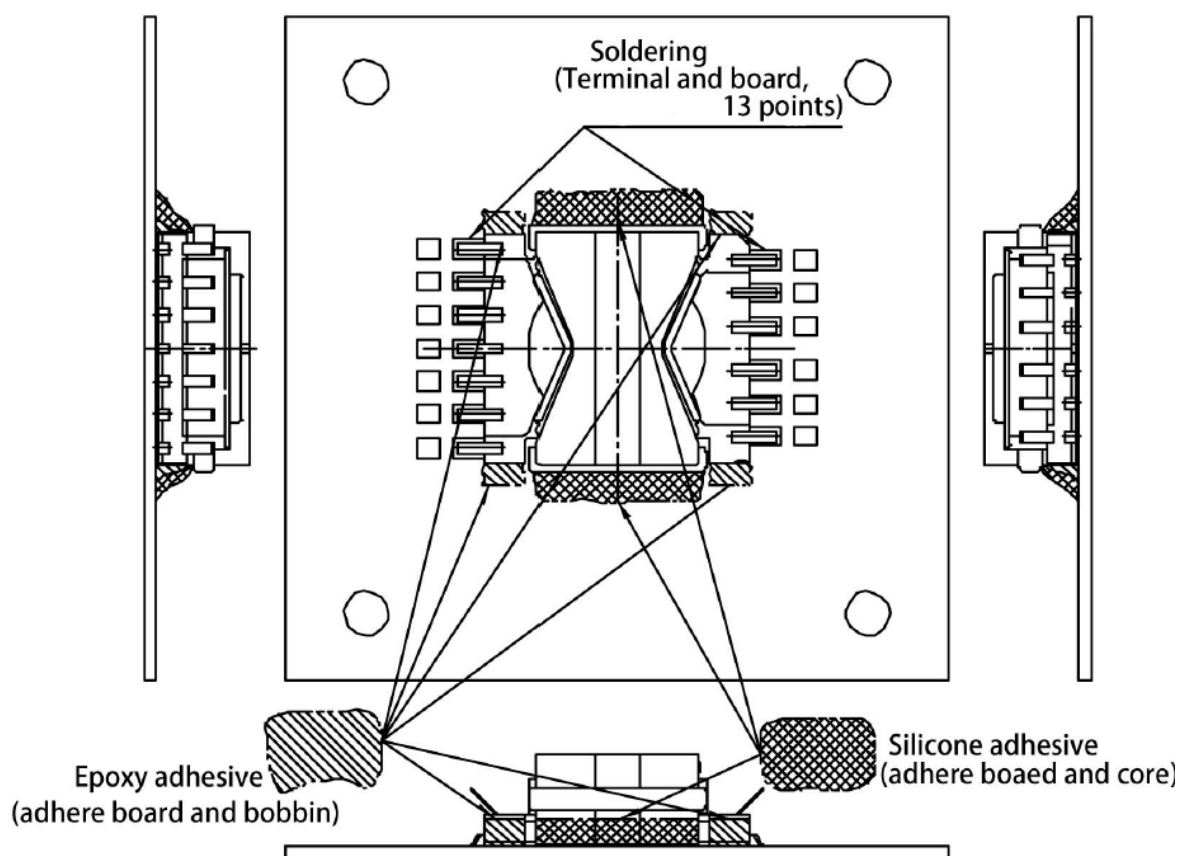


Figure 3. Test Board Mounting Method

3.4 Electrical Characteristic

The electrical characteristics shall be as shown in Table 4.

Table 4. Electrical Characteristics⁽¹⁾

Item	Rating
Operating frequency	200kHz±10%
Power supply voltage	40Vrms
Winding ratio	$(1-2) / (5-6) = 1.00 \pm 5\%$ $(3-4) / (5-6) = 1.00 \pm 5\%$ $(7-8) / (5-6) = 2.25 \pm 5\%$ $(8-9) / (5-6) = 2.25 \pm 5\%$ $(10-11) / (5-6) = 0.417 \pm 5\%$ $(12-13) / (5-6) = 0.417 \pm 5\%$
Inductance	(5-6) = 40μH min. at 10kHz, 0.05V
DC resistance (at 20°C)	$(1-2) = 190\text{m}\Omega$ max., $(8-9) = 1.7\Omega$ max $(3-4) = 140\text{m}\Omega$ max., $(10-11) = 30\text{m}\Omega$ max $(5-6) = 130\text{m}\Omega$ max., $(12-13) = 25\text{m}\Omega$ max $(7-8) = 1.8\Omega$ max.
Output	66.36VA
Polarity	Test points 1, 3, 5, 7, 8, 10, and 12 shall have the same polarity.
Test circuit	<p style="text-align: center;"><u>Circuit diagram</u></p>

Note: ⁽¹⁾ This table shall be applicable to all certified products. Electrical characteristics of individual product included in the qualification coverage shall be as specified in the product specification.

JAXA-QTS-2110/A153D 13 December 2019	J A X A Parts Specification	Page	– 9 –
<p>4. QUALITY ASSURANCE PROVISIONS</p> <p>Quality assurance provisions shall be as specified in Section A.4, Appendix A of JAXA-QTS-2110.</p> <p>4.1 In-Process Inspection</p> <p>The in-process inspection shall be as specified in paragraph A.4.1, Appendix A of JAXA-QTS-2110.</p> <p>4.2 Qualification Test</p> <p>The qualification test shall be as specified in paragraph A.4.2, Appendix A of JAXA-QTS-2110.</p> <p>4.3 Quality Conformance Inspection</p> <p>The quality conformance inspection shall be as specified in paragraph A.4.3, Appendix A of JAXA-QTS-2110.</p> <p>4.4 Long-Term Storage</p> <p>Long-term storage shall be as specified in paragraph A.4.5, Appendix A of JAXA-QTS-2110.</p> <p>4.5 Change to Tests and Inspections</p> <p>a) Insulation Resistance</p> <p>(Standard) Insulation resistance in accordance with test method 302 of MIL-STD-202 is specified as follows. “If the instrument reading indicates that an insulation resistance meets the specified limit (2 min.), and is steady or increasing, the test may be terminated before the end of the specified period (2 min.)”</p> <p>(Shortening of test time) From the test result and verification result, it was verified that the instrument reading increases or become stable within 2 minutes from the start of voltage application. Therefore, when the above condition is met and the measurement reaches the 10-times of 10 thousand MΩ as a minimum (which is more than 100 thousand MΩ), the test may be terminated before 2-minute passes.</p> <p>5. PREPARATION FOR DELIVERY</p> <p>Preparation for delivery shall be as specified in Section A.5, Appendix A of JAXA-QTS-2110.</p> <p>6. NOTES</p> <p>Details of notes shall be as specified in Section A.6, Appendix A of JAXA-QTS-2110.</p>			