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24 March 2023

Superseding

JAXA-QTS-2050/H101D

Cancelled

24 March 2023

RESISTORS, FIXED, WIRE WOUND,
POWER TYPE, CHASSIS MOUNTED,
HIGH RELIABILITY, SPACE USE,
(RES 60, 65, 70 and 75 TYPES)
DETAIL SPECIFICATION FOR

Prepared and Established by SEIDEN TECHNO CO., LTD.

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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.

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E	24 Mar 2023	Reflected the change of document by Seiden Techno Co., Ltd. Document No: ASA-8100-H101(Rev. E)
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Revision History

Rev.	Date	Description
NC	10 Nov. 2006	Original
A	20 April 2009	Revised in accordance with the revised general specification, JAXA-QTS-2050A, Appendix H. Table 4: Changed the applicable document to Appendix A of JAXA-QTS-2050A. Table 6: Changed the test method paragraph number. Table 7: Changed the test method paragraph number. Table 8: Changed the test method paragraph number. Table 9: Changed the test method paragraph number. Table 10: Changed the test method paragraph number.
B	23 May 2011	Changed the wound core material for RES75 from beryllia ceramics to alumina ceramics (the use of beryllia ceramics was discontinued).
C	15 May 2012	Changed the followings in the Qualification Test (paragraph 4.2) and Thermal shock [I] and Thermal shock [II] in the Quality Conformance Inspection (paragraph 4.3). Table 7: Added Note ⁽⁴⁾ . Table 8: Added Note ⁽⁴⁾ . Table 10: Added Note ⁽¹⁾ . Paragraph 4.5: Changed the test condition (test can be performed with either of DC voltage or AC voltage) and added the reason (heat generation during the application of DC voltage and AV voltage is equivalent).
D	22 July 2020	Cover: Changed corporate name. Paragraph 4.4 Long-Term Storage Specified the storage conditions for purchaser.
E	24 Mar 2023	Revised in accordance with the revised general specification, JAXA-QTS-2050G, Table 4: Added “Mass” to test item of Requirement paragraph H.3.3: Table 7: Added “Mass” to test item of Requirement paragraph H.3.3. Table 8: Added “Mass” to test item of Requirement paragraph H.3.3. Changed the test item title from Dielectric withstanding voltage to Dielectric withstanding voltage (Atmospheric pressure), changed test method paragraph number from H.4.4.4.4 to H.4.4.4.4.1.

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**RESISTORS, FIXED, WIRE WOUND,
POWER TYPE, CHASSIS MOUNTED,
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR
(NASDA RES 60, 65, 70, 75 TYPES)**

1. GENERAL

1.1 Scope

This specification establishes the detailed requirements for JAXA-QTS-2050 Appendix H, the chassis mounted, power type, wire wound, fixed resistors (hereinafter referred to as "resistors") RES 60, 65, 70, 75 Types to be used for electronic equipment installed on spacecrafts such as satellites.

1.2 Part Number

The part numbers for the resistors covered in this specification shall be classified by style, resistance tolerance, and nominal resistance as shown in Table 1 and assigned as the following example:

(Example)	NASDA ⁽¹⁾	<u>RES65</u>	<u>E</u>	<u>1001</u>
		Style	Resistance tolerance	Nominal resistance
		(paragraph H.1.3.1)	(paragraph H.1.3.2)	(paragraph H.1.3.3)

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

Table 1. Part Numbers

Item	Applicable paragraph of JAXA-QTS-2050	Article
Style	H.1.3.1	RES60, RES65, RES70, RES75
Resistance tolerance	H.1.3.2	F ($\pm 1\%$)
Nominal resistance	H.1.3.3	(e.g.) 1000...100 Ω (specified by a 4-digit number)

1.3 Ratings

The ratings are shown in Table 2.

Table 2. Specifications

Item	Requirement paragraph of JAXA-QTS-2050	Article				
		RES60	RES65	RES70	RES75	
Operating temperature range	H.3.5.2	-55°C to +275°C				
Ambient temperature	H.3.5.3	25°C				
Derating curve	H.3.5.4	Refer to Figures 1 and 2				
Style	-	-	-	-	-	
Nominal resistance range (Ω)	H.3.5.1	Minimum resistance	0.1	0.1	0.1	0.1
		Maximum resistance (Nominal Diameter of the wire: 0.025 mm)	3320	5620	12100	39200
Rated power (chassis mounted) W ⁽¹⁾	H.3.5.3	-	5	10	15	30
Rated power (free air) W	H.3.5.3	-	3	6	8	10

Note ⁽¹⁾: The chassis dimensions are specified in Table 3.

Table 3. Dimensions of Chassis

Unit: mm

Style	Length x width x height	Thickness
RES60 RES65	(152 ± 3) x (101 ± 3) x (51x ± 3)	1.0 ± 0.1
RES70 RES75	(178 ± 3) x (127 ± 3) x (51x ± 3)	1.0 ± 0.1

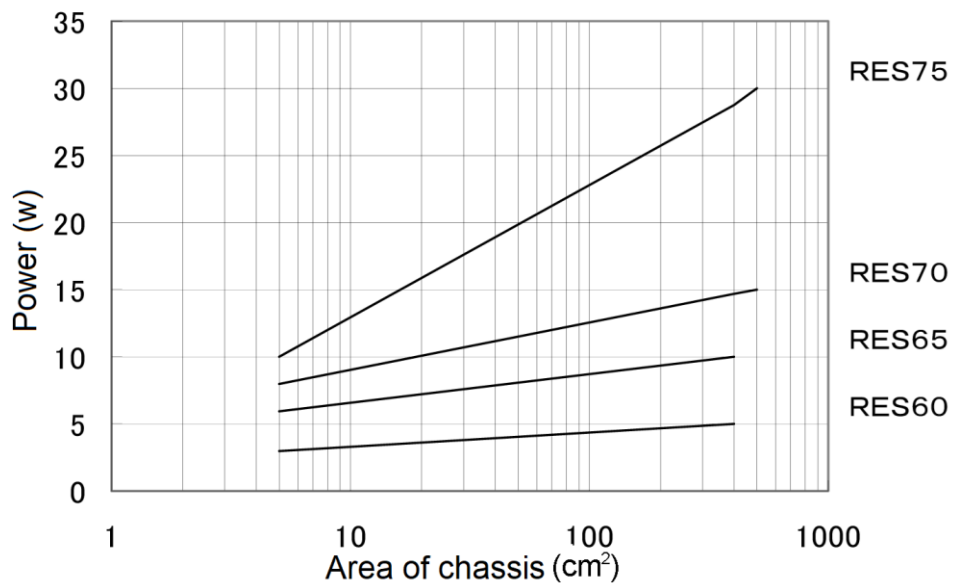


Figure 1. Derating Curve with respect to Surface Size of Chassis

Notes: (1) Figure 1 indicates the derating curve with respect to the surface size of chassis when the resistor is installed on the chassis.

(2) The operating ambient temperature is 25°C.

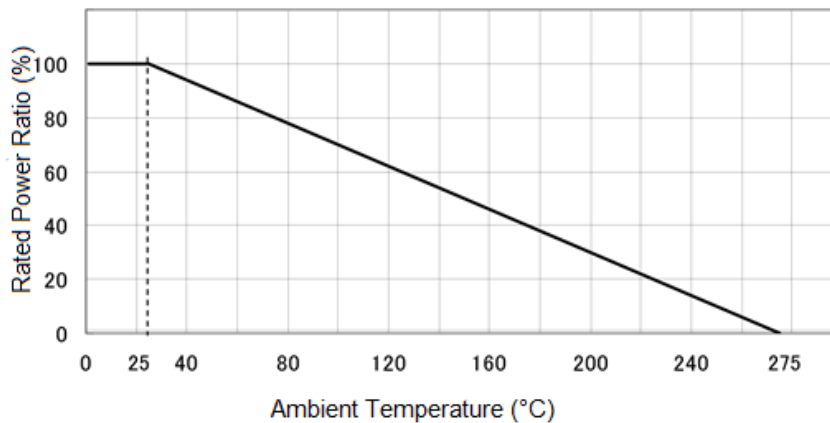


Figure 2. Derating Curve

2. APPLICABLE DOCUMENTS

The applicable documents are as specified in paragraph 2.1 of JAXA-QTS-2050.

3. REQUIREMENTS

The requirements are as specified in paragraph H.3, Appendix H of JAXA-QTS-2050 and as provided below.

3.1 Performance

The performance is specified in Table 4.

Table 4. Performance

Item	Requirement paragraph of JAXA-QTS-2050	Performance	
Materials	H.3.2	As specified in Appendix H of JAXA-QTS-2050	
Externals, dimensions, mass and marking	H.3.3	As specified in Figure 3 and Table 5	
DPA	H.3.4.1	Shall be in accordance with the requirements specified in the quality conformance program	
Resistance	H.3.6.1	Within the resistance Tolerance	
Resistance-temperature Characteristics	H.3.6.2	Resistance	$10^{-6}/^{\circ}\text{C}$
		Less than $1\ \Omega$	± 100
		$1\ \Omega$ to $19.60\ \Omega$	± 50
		$20\ \Omega$ as a minimum	± 30
Power conditioning	H.3.6.3	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Dielectric withstanding voltage	H.3.6.4	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Insulation resistance	H.3.6.5	10,000M Ω as a minimum	
Short-time overload	H.3.6.6	Allowable resistance change $\pm (0.3\% + 0.05\ \Omega)$	
Terminal strength	H.3.7.1	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Solderability	H.3.7.2	Flat part of the terminal: 95% as a minimum	
High frequency vibration	H.3.8.1.1	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Random vibration	H.3.8.1.2	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Shock	H.3.8.2	Allowable resistance change $\pm (0.2\% + 0.05\ \Omega)$	
Heat resistance	H.3.8.3	Allowable resistance change $\pm (0.5\% + 0.05\ \Omega)$	
Thermal shock [I]	H.3.8.4.1	Allowable resistance change $\pm (0.3\% + 0.05\ \Omega)$	

Table 4. Performance (Continued)

Item	Requirement paragraph of JAXA-QTS-2050	Performance
Thermal shock [II]	H.3.8.4.2	Allowable resistance change $\pm (0.75\% + 0.05\Omega)$
Moisture resistance	H.3.8.5	Allowable resistance change $\pm (0.5\% + 0.05\Omega)$
		Insulation Resistance: 1,000M Ω minimum
Resistance to solvents	H.3.8.6	There shall be no defects with the marking
Low temperature storage	H.3.8.7	Allowable resistance change $\pm (0.3\% + 0.05\Omega)$
Stability	H.3.8.8	Allowable resistance change $\pm (1.0\% + 0.05\Omega)$
Life	H.3.9.1	Allowable resistance change
		2,000 hours $\pm(1.0\% + 0.05\Omega)$ 4,000 hours $\pm(1.0\% + 0.05\Omega)$

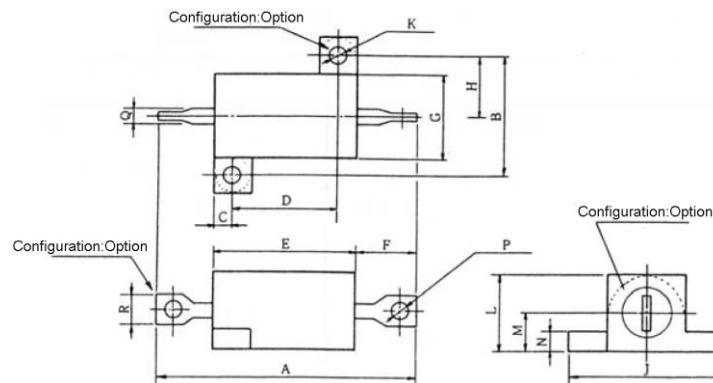


Figure 3. Construction and Dimensions

Table 5. Dimensions, Marking and Mass

Style		RES60	RES65	RES70	RES75
Dimensions mm	A ± 1.6	28.6	34.9	49.2	70.6
	B ± 0.3	12.5	15.9	19.8	21.4
	C ± 0.8	2.0	2.4	4.4	4.8
	D ± 0.3	11.3	14.3	18.3	39.7
	E ± 1.6	15.2	19.1	27.0	49.2
	F ± 1.6	6.8	7.9	11.1	11.1
	G ± 1.6	8.5	11.1	13.5	15.1
	H ± 0.8	6.2	7.9	9.9	10.7
	J ± 0.8	16.4	20.6	27.8	29.4
	K ± 0.1	2.4	2.4	3.2	3.2
	L ± 0.8	8.1	10.3	14.3	15.9
	M ± 1.6	3.4	5.2	7.1	7.9
	N ± 0.8	1.7	2.4	2.4	2.4
	P ± 0.1	1.3	2.2	2.2	2.2
	Q ± 0.1	1.5	2.0	2.0	2.0
R $^{+0.5}_0$	2.2	3.6	3.6	3.6	
Mass g (maximum)		3	8	15	32
Marking (Minimum requirement)		RES60 F1001 SEF 0634 ⁽¹⁾	RES65 F1001 SEF 0634 ⁽¹⁾	RES70 F1001 SEF 0634 ⁽¹⁾	RES75 F1001 SEF 0634 ⁽¹⁾

Note: ⁽¹⁾ SEF stands for Seiden Techno.Co., LTD and the number indicates the year and week manufactured.

4. QUALITY ASSURANCE PROVISIONS

The quality assurance provisions are as specified in paragraph H.4 of JAXA-QTS-2050 and as provided below.

4.1 In-Process Inspection

The In-process inspection shall be performed in accordance with paragraph 4.3 of JAXA-QTS-2050. Specifically, inspection items specified in Table 6 shall be performed.

Table 6. In-Process Inspection

Item	Requirement paragraph of JAXA-QTS-2050	Test method paragraph of JAXA-QTS-2050	Number of samples
Externals and dimensions	H.3.3	H.4.4.2	100%
Spot welding	–	–	100%
Dielectric withstanding voltage	–	–	100%
Resistance	–	–	100%

4.2 Qualification Test

The qualification Test shall be performed in accordance with paragraph H.4.1, Appendix H of JAXA-QTS-2050. Specifically, test items specified in Table 7 shall be performed.

Table 7. Qualification Test

Test			Requirement paragraph	Test method paragraph	Criteria for Pass/Fail	
Group	Order	Item			Number of samples	No. of defects allowed (1)
I	1	Externals, dimensions, mass and marking ⁽²⁾	H.3.3	H.4.4.2	100%	0
IA	1	Power conditioning	H.3.6.3	H.4.4.4.3		
	2	Resistance	H.3.6.1	H.4.4.4.1		
IB	1	DPA	H.3.4.1	H.4.4.3.1	2	0
II	1	Resistance-temperature characteristics	H.3.6.2	H.4.4.4.2	24	1
	2	Heat Resistance	H.3.8.3	H.4.4.6.3		
	3	Low temperature storage	H.3.8.7	H.4.4.6.7		
	4	Dielectric withstanding voltage	H.3.6.4	H.4.4.4.4		
	5	Insulation resistance	H.3.6.5	H.4.4.4.5		
	6	Thermal shock [I] ⁽⁴⁾	H.3.8.4.1	H.4.4.6.4.1		
	7	Short-time overload	H.3.6.6	H.4.4.4.6		
	8	Moisture resistance	H.3.8.5	H.4.4.6.5		
	9	Terminal strength	H.3.7.1	H.4.4.5.1		
III	1	Shock	H.3.8.2	H.4.4.6.2	20	1
	2	High frequency vibration	H.3.8.1.1	H.4.4.6.1.1		
	3	Thermal shock [III] ⁽⁴⁾	H.3.8.4.2	H.4.4.6.4.2		
IV	1	Random vibration	H.3.8.1.2	H.4.4.6.1.2	20	1
V	1	Life	H.3.9.1	H.4.4.7.1	231	0
VI	1	Stability	H.3.8.8	H.4.4.6.8	27	1
VII	1	Solderability	H.3.7.2	H.4.4.5.2	10 (Optional resistance)	0
	2	Resistance to solvents	H.3.8.6	H.4.4.6.6		
-	1	Materials	H.3.2	-	⁽³⁾	

Notes: (1) Even if a sample failed multiple test items in the same test group, the number of defects shall be counted as one.

(2) For dimensions and mass, use "JIS Z 9015-1 General Inspection Level II" AQL 1.0%.

(3) Submit data which proves that the materials satisfy the design specification.

(4) The load condition shall be DC voltage or AC voltage equivalent of 50% of the rated power.

4.3 Quality Conformance Inspection

The quality conformance inspection shall be performed in accordance with paragraph H.4.2 of JAXA-QTS-2050. Specifically, inspection items specified in Tables 8, 9 and 10 shall be performed.

Table 8. Quality Conformance Inspection (Group A)

Group	Order	Test Item	Requirement paragraph	Test method paragraph	Criteria for Pass/Fail	
					Number of samples	No. of defects allowed ⁽²⁾
A1	1	Power conditioning	H.3.6.3	H.4.4.4.3	100%	0
	2	Resistance	H.3.6.1	H.4.4.4.1		
A2	1	Externals, dimensions, mass and marking ⁽³⁾	H.3.3	H.4.4.2		
A3 ⁽¹⁾	1	DPA	H.3.4.1	H.4.4.3.1	2	0
A4 ⁽¹⁾	1	Resistance-temperature characteristics	H.3.6.2	H.4.4.4.2	10	0
	2	Dielectric withstanding voltage (Atmospheric pressure)	H.3.6.4	H.4.4.4.4.1		
	3	Insulation resistance	H.3.6.5	H.4.4.4.5		
	4	Thermal shock [I] ⁽⁴⁾	H.3.8.4.1	H.4.4.6.4.1		

Notes: ⁽¹⁾ Sampling method for Groups A3 and A4 shall be constant sampling. Samples for Group A4 shall be selected from those of the highest resistance.

⁽²⁾ Even if a sample failed multiple test items in the same test group, the number of defects shall be counted as one.

⁽³⁾ For dimensions and mass, use "JIS Z 9015-1 General Inspection Level II" AQL 1.0%.

⁽⁴⁾ The load condition shall be DC voltage or AC voltage equivalent of 50% of the rated power.

Table 9. Quality Conformance Inspection (Group B)

Group	Order	Test Item	Requirement paragraph	Test method paragraph	Criteria for Pass/Fail	
					Number of samples	No. of defects allowed
B1	1	Heat resistance	H.3.8.3	H.4.4.6.3	10	0
	2	Low temperature storage	H.3.8.7	H.4.4.6.7		
	3	Short-time overload	H.3.6.6	H.4.4.4.6		
	4	Moisture resistance	H.3.8.5	H.4.4.6.5		
	5	Terminal strength	H.3.7.1	H.4.4.5.1		
B2	1	Life	H.3.9.1	H.4.4.7.1	10	0
B3	1	Stability	H.3.8.8	H.4.4.6.8	10	0
B4	1	Solderability	H.3.7.2	H.4.4.5.2	8	0
	2	Resistance to solvents	H.3.8.6	H.4.4.6.6		

Table 10. Quality Conformance Inspection (Group C)

Test			Requirements paragraph	Test method paragraph	Criteria for Pass/Fail	
Group	Order	Item			Number of samples	No. of defects allowed
C1	1	Random vibration	H.3.8.1.2	H.4.4.6.1.2	10	0
C2	1	Shock	H.3.8.2	H.4.4.6.2	10	0
	2	High frequency vibration	H.3.8.1.1	H.4.4.6.1.1		
	3	Thermal shock [II] ⁽¹⁾	H.3.8.4.2	H.4.4.6.4.2		

Note: (1) The load condition shall be DC voltage or DC voltage equivalent of 50% of the rated power.

4.4 Long-Term Storage

Long-term storage shall be in accordance with paragraph 4.7 of JAXA-QTS-2050. The products shall be stored at room temperature (15 to 35°C) and at the normal humidity (45 to 75%RH) in the package provided by the manufacturer. The products shall not be stored directly on the floor. It is desirable that the resistors stored more than 12 months after delivery are submitted to re-Inspection performed by the manufacturer.

4.5 Changes of Test and Inspection

Change the requirements for Thermal shock [I] and Thermal Shock [II] as follows.

- a) Changed content: Thermal shock tests can be performed using either of DC voltage or AC voltage though it is specified as “DC voltage equivalent of 50% of the rated power” in JAXA-QTS-2050, Appendix H.
- b) Reason for change: There is no difference between DC voltage and AC voltage in terms of test condition as the heat generation during the application of DC voltage and AC voltage to the same product with the same load factor is equivalent.

5. PREPARATION FOR DELIVERY

Preparation for delivery shall be in accordance with paragraph 5 of JAXA-QTS-2050.

6. NOTE

Refer to the paragraph 6 of JAXA-QTS-2050.