

Cancelled

Title: RESISTORS, FIXED, WIRE WOUND, POWER TYPE,
CHASSIS MOUNTED, HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR
(RES40 and 50 NON-INDUCTIVE TYPES)

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RESISTORS, FIXED, WIRE WOUND,
POWER TYPE, CHASSIS MOUNTED,
HIGH RELIABILITY, SPACE USE,
(RES 40 and 50 NON-INDUCTIVE 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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Revision Log				
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 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	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).		
C	22 July 2020	Cover: Changed corporate name. Paragraph 4.4 Long-Term Storage Specified the storage conditions for purchaser.		

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**RESISTORS, FIXED, WIRE WOUND,
POWER TYPE, CHASSIS MOUNTED,
HIGH RELIABILITY, SPACE USE,
DETAIL SPECIFICATION FOR
(NASDA RES 40 AND RES 50 NON-INDUCTIVE 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 40 and 50 non-inductive 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 shown in Table 1 and assigned as the following example:

(Example)	NASDA ⁽¹⁾	<u>RES40</u>	<u>F</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	JAXA-QTS-2050 applicable provisions	Article
Style	H.1.3.1	RES40, RES50
Resistance tolerance	H.1.3.2	F (±1%)
Nominal resistance	H.1.3.3	(e.g.) 1000…100Ω(specified by a 4-digit number)

1.3 Ratings

The ratings are shown in Table 2.

Table 2. Specifications

Item	JAXA-QTS-2050 requirements	Article		
Operating temperature range	H.3.5.2	-55°C~+275°C		
Ambient temperature	H.3.5.3	25°C		
Derating curve	H.3.5.4	Refer to Figures 1 and 2		
Style	-	-	RES40	RES50
Nominal resistance range Ω	H.3.5.1	Minimum resistance	0.51	0.51
		Maximum resistance (Nominal Diameter of the wire: 0.0315 mm)	137	562
Rated power (chassis mounted) W ⁽¹⁾	H.3.5.3	-	5	15
Rated power (free air)W	H.3.5.3	-	3	8

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

Table 3. Dimensions of Chassis

Unit: mm

Style	Length x width x height	Thickness
RES40	(152 ± 3) x (101 ± 3) x (51x ± 3)	1.0 ± 0.1
RES50	(178 ± 3) x (127 ± 3) x (51x ± 3)	1.0 ± 0.1

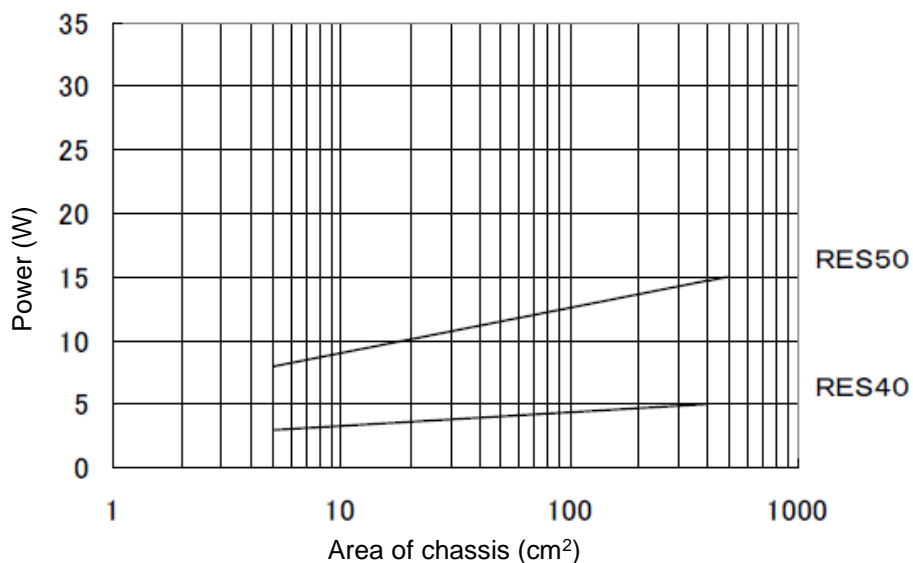
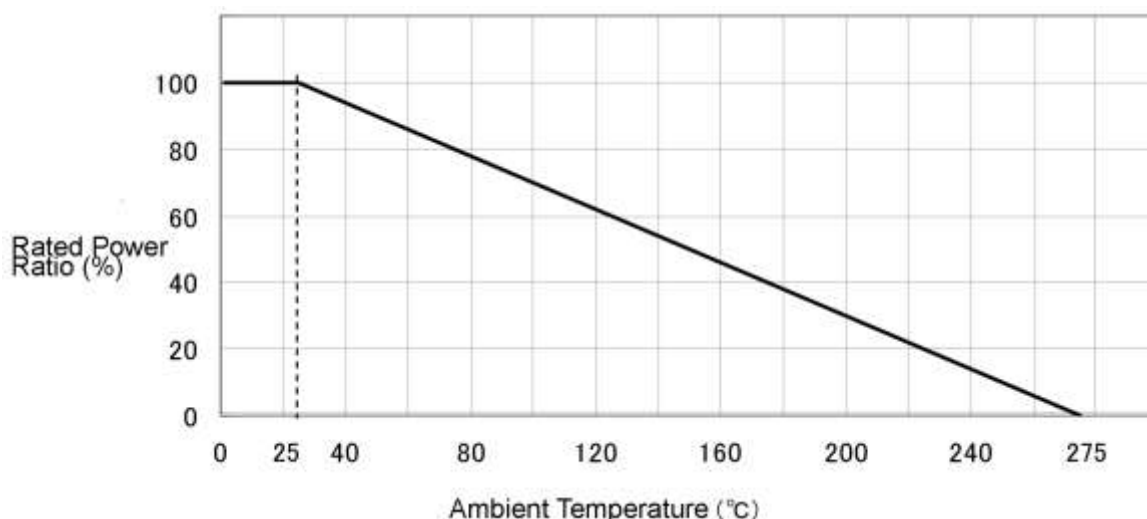


Figure 1. Derating Curve with respect to Surface Size of Chassis

- 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

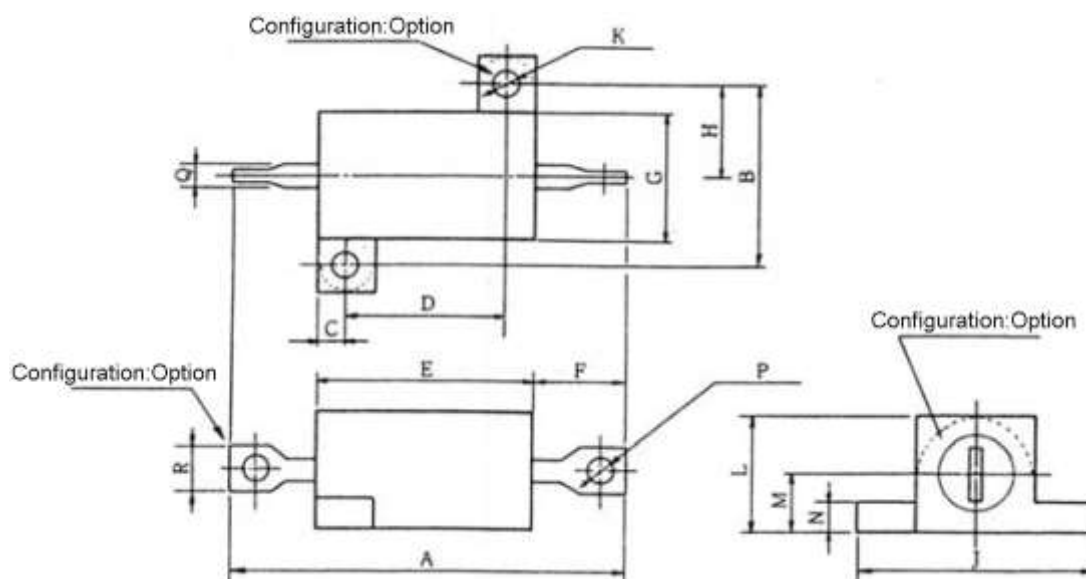
The performance is specified in Table 4.

Table 4. Performance

Item	JAXA-QTS-2050 requirements	Performance	
Materials	H.3.2	As specified in Appendix H of JAXA-QTS-2050A	
Externals, dimensions, 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	$10,000\ \text{M}\Omega$ as a minimum	
Short-time overload	H.3.6.6	Allowable resistance change $\pm (0.3\% + 0.05\ \Omega)$	
Reactance	H.3.6.7	Series inductance	Parallel capacitance
		$0.5\ \mu\text{H}$	$5\ \text{pF}$
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)

Paragraph	JAXA-QTS-2050 requirements	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	RES40	RES50
Dimensions mm	A ± 1.6	28.6
	B ± 0.3	12.5
	C ± 0.8	2.0
	D ± 0.3	11.3
	E ± 1.6	15.2
	F ± 1.6	6.8
	G ± 1.6	8.5
	H ± 0.8	6.2
	J ± 0.8	16.4
	K ± 0.1	2.4
	L ± 0.8	8.1
	M ± 1.6	3.4
	N ± 0.8	1.7
	P ± 0.1	1.3
	Q ± 0.1	1.5
	R ₀ ^{+0.5}	2.2

Table 5. Dimensions, Marking, and Mass (Continued)

Style	RES40	RES50
Mass g (maximum)	3.3	16.5
Marking (Minimum requirement)	RES40 F1001 SEF 0634 ⁽¹⁾	RES50 F1001 SEF 0634 ⁽¹⁾

Note (1) SEF stands for Seidentechno Co., LTD and the number indicates the year and week when the product was 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

Paragraph	JAXA-QTS-2050 Requirements	JAXA-QTS-2050 Test method	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.

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Table 7. Qualification Test						
Test			Requirements paragraph	Test method paragraph	Criteria for Pass/Fail	
Group	Order	Item			Number of samples	No. of defects allowed ⁽¹⁾
I	1	Externals, dimensions, 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	Reactance	H.3.6.7	H.4.4.4.7	24	1
	2	Resistance-temperature characteristics	H.3.6.2	H.4.4.4.2		
	3	Heat resistance	H.3.8.3	H.4.4.6.3		
	4	Low temperature storage	H.3.8.7	H.4.4.6.7		
	5	Dielectric withstanding voltage	H.3.6.4	H.4.4.4.4		
	6	Insulation resistance	H.3.6.5	H.4.4.4.5		
	7	Thermal shock [I] ⁽⁴⁾	H.3.8.4.1	H.4.4.6.4.1		
	8	Short-time overload	H.3.6.6	H.4.4.4.6		
	9	Moisture resistance	H.3.8.5	H.4.4.6.5		
	10	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 [II] ⁽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)

Test			Requirements paragraph	Test method paragraph	Criteria for Pass/Fail	
Group	Order	Item			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, 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	Reactance	H.3.6.7	H.4.4.4.7	10	0
	2	Resistance-temperature characteristics	H.3.6.2	H.4.4.4.2		
	3	Dielectric withstanding voltage	H.3.6.4	H.4.4.4.4		
	4	Insulation resistance	H.3.6.5	H.4.4.4.5		
	5	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)

Test			Requirements paragraph	Test method paragraph	Criteria for Pass/Fail	
Group	Order	Item			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	H4.4.7.1	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.