

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

Part Description	THERMISTORS, CHIP, NEGATIVE TEMPERATURE COEFFICIENT
Part Number and Type	JAXA 2160/A101 2012
Applicable Specification	JAXA-QTS-2160 JAXA-QTS-2160/A101

February 2026

Prepared and Established by TATEYAMA
KAGAKU DEVICE TECHNOLOGY CO., LTD.

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 data sheet: 28 May 2026

Records of Revisions

Rev.	Date	Description
NC	9 April 2010	Original.
A	10 September 2010	Reflected S3SU-2602 (Rev. A), issued by TATEYAMA KAGAKU DEVICE TECHNOLOGY CO., LTD.
B	15 January 2013	Reflected S3SU-2602 (Rev. B), issued by TATEYAMA KAGAKU DEVICE TECHNOLOGY CO., LTD.
C	24 February 2026	Reflected S3SU-2602 (Rev. C), issued by TATEYAMA KAGAKU DEVICE TECHNOLOGY CO., LTD.
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Revision Log

Rev.	Date	Description																
NC	9 April 2010	Original.																
A	10 September 2010	<ol style="list-style-type: none"> 1. Paragraph 2.1: Externals, Dimensions and Images Replaced the figure with a photograph. 2. Paragraph 2.3: Construction Changed the thermistor to NTC thermistor. 3. Paragraph 2.4: Added a paragraph to specify that the thermistors are NTC thermistors. 4. Paragraph 3.1: Added two items for rated temperature range. 5. Paragraph 4: Characteristics under normal operating conditions Specified the specification value to indicate measurement items. 6. Paragraph 4.3: Characteristics under various operating conditions Added low temperature operating test results as a reference. 																
B	15 January 2013	<p>Revised in association with the detail specification, JAXA-QTS-2160/A101B revision. Revised paragraphs shall be as follows:</p> <ol style="list-style-type: none"> 1. Paragraph 2.2 Mass: Corrected errors 2. Paragraph 2.3: Construction : Changed the diagram 3. Paragraph 3.1 Rating: Added Zero-power resistance tolerance and B value tolerance. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Item</th> <th>JAXA-QTS-2160 Applicable paragraph</th> <th>Before</th> <th>After</th> </tr> </thead> <tbody> <tr> <td>Nominal Zero-power resistance (Ω)</td> <td>A.3.5.d)</td> <td>2.186K to 1.388M</td> <td>1.000K to1.388M</td> </tr> <tr> <td>Zero-power resistance tolerance (%)</td> <td>A.3.5.e)</td> <td>J=\pm5%, K=\pm10%</td> <td>F=\pm1%, G=\pm2%, H=\pm3%, J=\pm5%, K=\pm10%</td> </tr> <tr> <td>B value tolerance</td> <td>A.3.5.c)</td> <td>G=\pm2%, H=\pm3%, J=\pm5%</td> <td>F=\pm1%, G=\pm2%, H=\pm3%, J=\pm5%</td> </tr> </tbody> </table> <ol style="list-style-type: none"> 4. Paragraph 4: Characteristics under normal conditions Updated the test data to the latest version 5. Paragraph 8: Others Added Tokyo branch, Nagoya sales office and Osaka sales office and listed addresses and telephone numbers. 	Item	JAXA-QTS-2160 Applicable paragraph	Before	After	Nominal Zero-power resistance (Ω)	A.3.5.d)	2.186K to 1.388M	1.000K to1.388M	Zero-power resistance tolerance (%)	A.3.5.e)	J= \pm 5%, K= \pm 10%	F= \pm 1%, G= \pm 2%, H= \pm 3%, J= \pm 5%, K= \pm 10%	B value tolerance	A.3.5.c)	G= \pm 2%, H= \pm 3%, J= \pm 5%	F= \pm 1%, G= \pm 2%, H= \pm 3%, J= \pm 5%
Item	JAXA-QTS-2160 Applicable paragraph	Before	After															
Nominal Zero-power resistance (Ω)	A.3.5.d)	2.186K to 1.388M	1.000K to1.388M															
Zero-power resistance tolerance (%)	A.3.5.e)	J= \pm 5%, K= \pm 10%	F= \pm 1%, G= \pm 2%, H= \pm 3%, J= \pm 5%, K= \pm 10%															
B value tolerance	A.3.5.c)	G= \pm 2%, H= \pm 3%, J= \pm 5%	F= \pm 1%, G= \pm 2%, H= \pm 3%, J= \pm 5%															
C	24 February 2026	<p>Revised in association with the detail specification, JAXA-QTS-2160/A101C revision. Revised paragraphs shall be as follows:</p> <ol style="list-style-type: none"> 1. Paragraph 2.3: Construction Changed the diagram. 2. Paragraph 3.1: Ratings Changed the ratings of heat dissipation constant and thermal time constant to align with the detail specification. 3. Paragraph 4: Characteristics under normal conditions <ol style="list-style-type: none"> (1) Paragraph 4.1: Electrical characteristics Changed zero-power resistance, dimensions, resistance-temperature characteristics, heat dissipation constant, thermal time constant, insulation resistance and short-time load. (2) Paragraph 4.2: Mechanical characteristics 																

Revision Log

Rev.	Date	Description
		<p>(a) Changed board bending and resistance to soldering heat. (b) Deleted adherence, random vibration, shock and high frequency vibration.</p> <p>(3) Paragraph 4.3: Characteristics under environmental and various operating conditions (a) Changed thermal shock [I], thermal shock [II], moisture resistance, thermal shock [IV], immersion cycling, high-temperature exposure and life. (b) Deleted low temperature operation.</p> <p>(4) Paragraph 5: Reliability Changed paragraph 5.1: failure rate.</p> <p>(5) Paragraph 8: Others Changed the address of Tokyo branch and removed Nagoya sales office.</p>
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**COMMON PARTS/MATERIALS,
SPACE USE,
APPLICATION DATA SHEET FOR**

1. GENERAL

1.1 Scope

This application data sheet provides additional detailed information necessary for designing or selecting products not contained in JAXA QML. Relevant information not covered in this document shall also be considered. Users are responsible for all aspects pertaining to selection and use of the product(s) specified in this document.

1.2 Applicable Documents

JAXA -QTS-2160

Thermistors, High Reliability, Space Use, General Specification For

JAXA -QTS-2160/A101

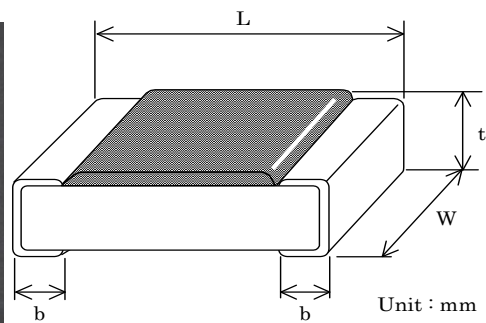
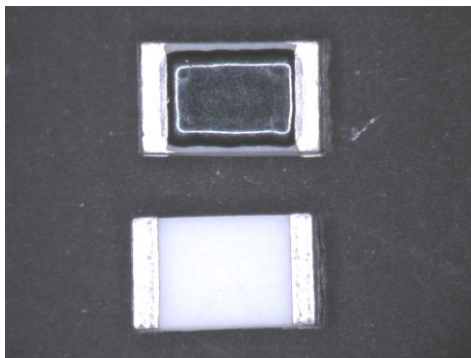
Thermistors, Chip, Negative Temperature Coefficient, High Reliability, Space Use, Detail Specification For

1.3 Reference Documents

Reference documents shall be as specified in paragraphs 2.2 and A.2.2 of JAXA-QTS-2160.

2. SUMMARY OF PRODUCT

2.1 Externals, Dimensions and Images



(mm)

Style	L	W	t	b
JAXA 2160/A101 2012	2.00±0.20	1.25±0.20	0.55±0.10	0.40±0.20

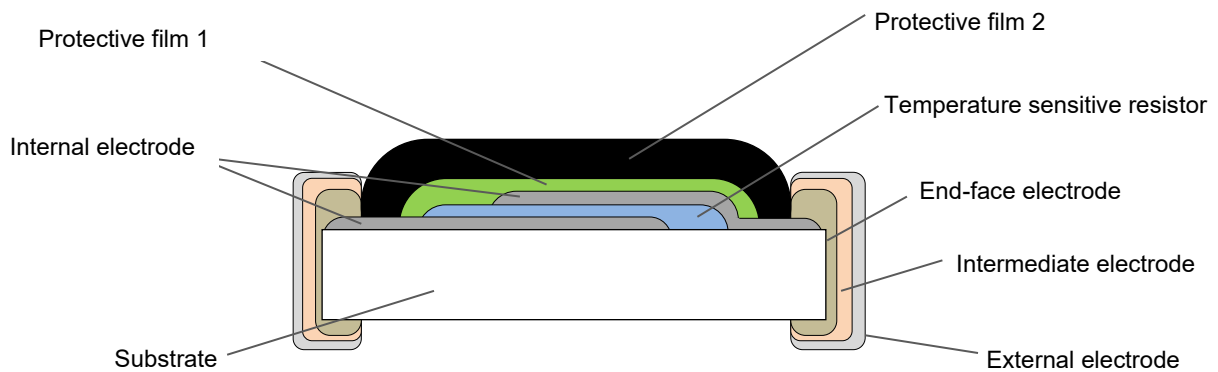
2.2 Mass

Table 2. Mass

Style	Mass (reference)
JAXA 2160/A101 2012	5 mg

2.3 Construction

The schematic diagram of the thermistor is shown below.



2.4 Type of Thermistors

The thermistors specified in this application data sheet shall be the Negative Temperature Coefficient (NTC) thermistors whose zero-power resistance decreases with increasing temperature.

3. USAGE

3.1 Ratings

Item	JAXA-QTS-2160	Ratings
		JAXA 2160/A101 2012
Operating temperature range (°C)	A.3.5.a)	-25 to +125
Operating temperature range (°C) ⁽¹⁾	—	-40 to +125
Storage temperature range (°C) ⁽²⁾	—	-55 to +125
Rated ambient temperature(°C)	—	25
Derating curve	—	Refer to Figure 1
Nominal zero-power resistance range (Ω)	A.3.5.d)	1.000K to 1.388M
Zero-power resistance tolerance (%)	A.3.5.e)	F=±1%, G=±2%, H=±3%, J=±5%, K=±10%
Nominal B-value range (K) 25 °C /85 °C	A.3.5.b)	2610 to 4800
B-value tolerance	A.3.5.c)	F=±1%, G=±2%, H=±3%, J=±5%
Heat dissipation constant (in air)	A.3.6.5	Maximum 1.5 mW/°C
Thermal time constant (in air)	A.3.6.6	Maximum 5.0 sec
Allowable operating power (mW)	A.3.5.g)	5
Rated power (mW at 25 °C)	A.3.5.f)	130
Marking	A.3.3.3	There are no marking on this parts.

Notes: ⁽¹⁾ Temperature range which allows parts energization but sets no specification of zero-power resistance tolerance.

⁽²⁾ Temperature range which allows parts to keep their performances even if they are left unloaded.

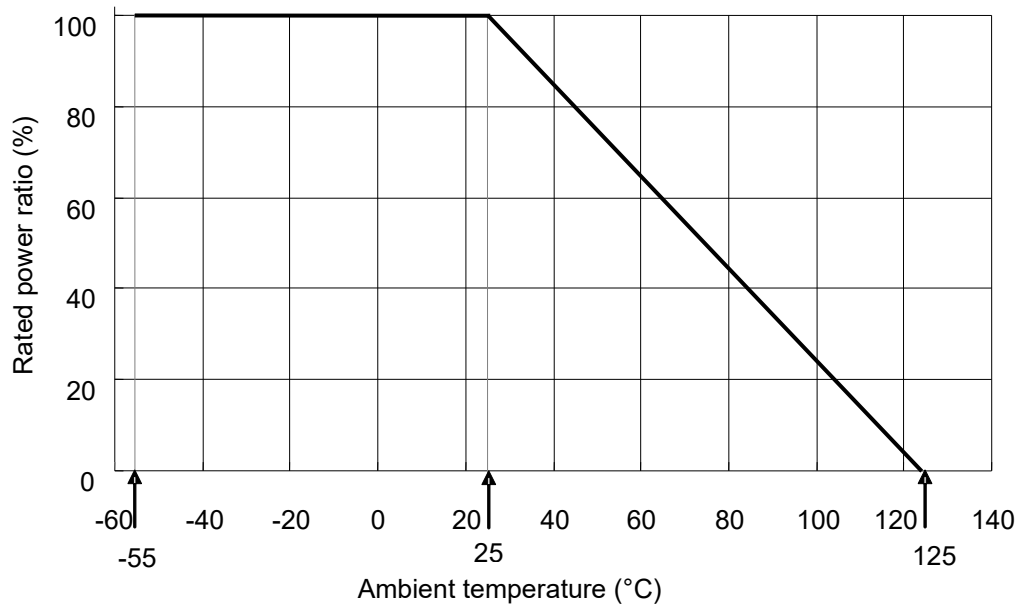


Figure 1. Derating Curve

3.2 Recommended Operating Conditions

Allowable operating power is a power at which the temperature rise by self heating is allowable. It is recommended to operate the thermistors 5 mW of the allowable operating power or less to ensure the accuracy of temperature correction and temperature measurement.

3.3 Notes for Circuit Design

Allowable temperature rise "t" is calculated by the following formula.

Allowable temperature rise "t" = (allowable operating power)/(heat dissipation constant)
 Rated power is a power at which a thermistor can have a load continuously at rated ambient temperature and calculated by the following formula.

$$\begin{aligned} \text{Rated power} &= \text{heat dissipation constant} \times (\text{maximum ambient temperature} - 25) \\ &= 1.3 \text{ mW} \times (125 - 25) = 130 \text{ mW} \end{aligned}$$

If a power exceeding the rated power is applied, the thermistors may cause thermal runaway resulting in characteristic change or destruction of the thermistors.

3.4 Mounting Method

Solder: eutectic solder of Sn-Pb alloy (melting-point temperature: 183 °C).

Flux: Less corrosive rosin system flux if needed.

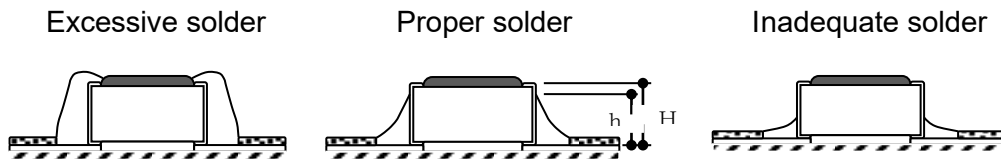
Mounting method	Preheating	Soldering
Reflow	150 to 180 °C 60 to 120 sec.	230 °C for 10 sec. at peak 200 °C for 40 to 50 sec
Air Flow	100 to 140 °C 30 to 60 sec.	260 °C for 5 sec. at peak
Hand soldering	-	350 °C max for 10 sec.

3.5 Cleaning

The cleaning shall be performed using alcohol (non-chlorine) solvents by soaking for 10 minutes as a maximum or ultrasonic cleaning for 3 minutes as a maximum.

3.6 Soldering

The recommended fillet shall be “Chip height $H/2 < \text{Fillet height } h < \text{Chip height } H$ ”



4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS

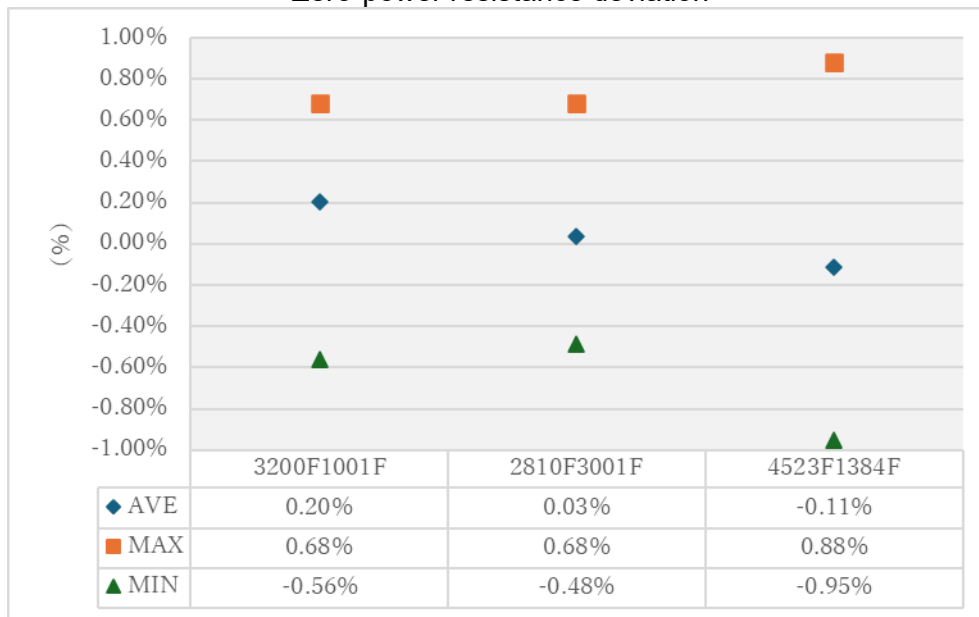
4.1 Electrical Characteristics

[Zero-power resistance n=355]

Conditions: +25±0.05 °C

R₂₅ deviation: ±1%

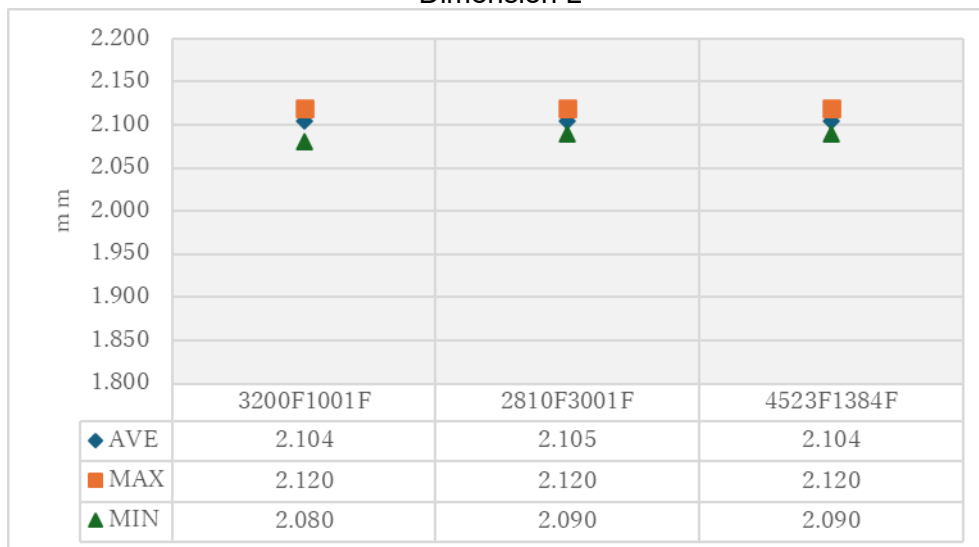
Zero-power resistance deviation



[Dimensions n=13] Conditions: vernier caliper, micrometer

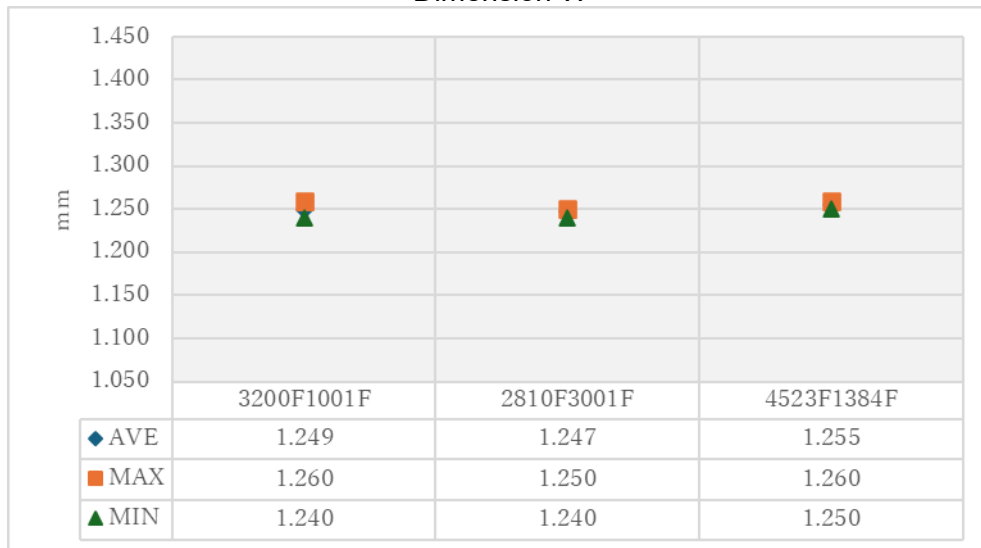
Specification: dimension L=2.00±0.20 mm, W=1.25±0.20 mm, H=0.55±0.10 mm

Dimension L



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Dimension W



Dimension H

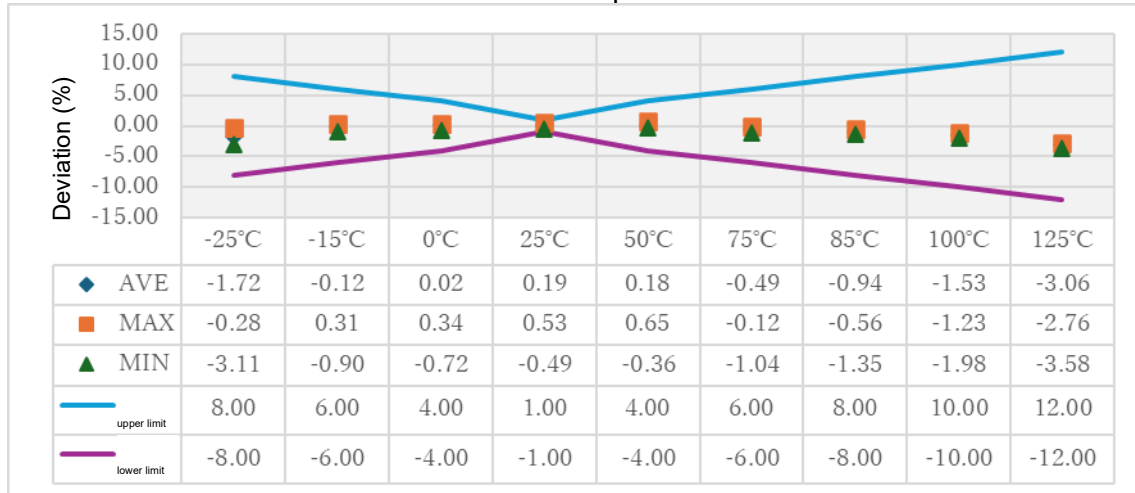


[Resistance temperature characteristics n=20]

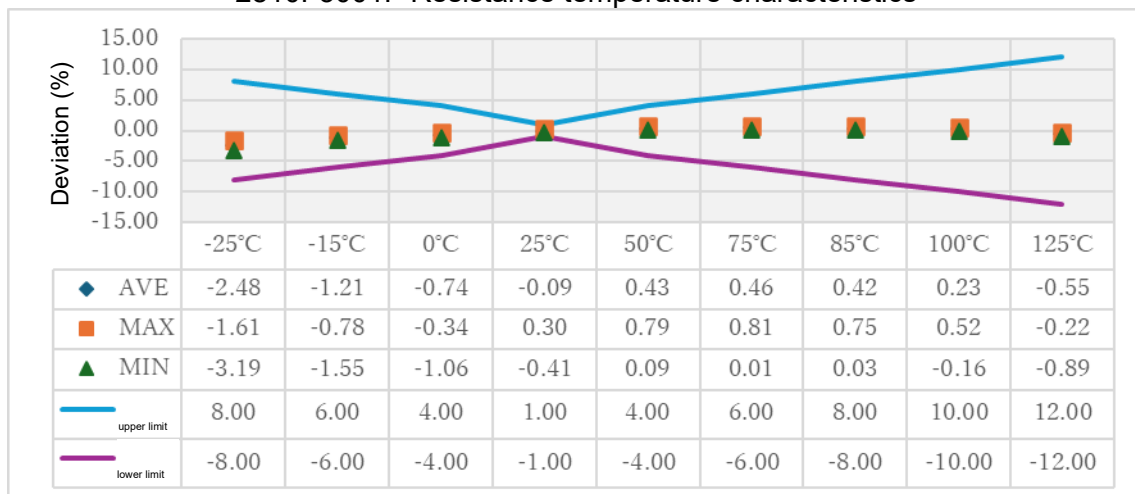
Conditions: -25 °C, -15 °C, 0 °C, 25 °C, 50 °C, 75 °C, 85 °C, 100 °C, 125 °C ± 0.05 °C

Zero-power resistance deviation: ±8%(-25 °C, 85 °C), ±4%(0 °C, 50 °C), ±1%(25 °C),
±6%(-15 °C, 75 °C), ±10% (100 °C), ±12% (125 °C)

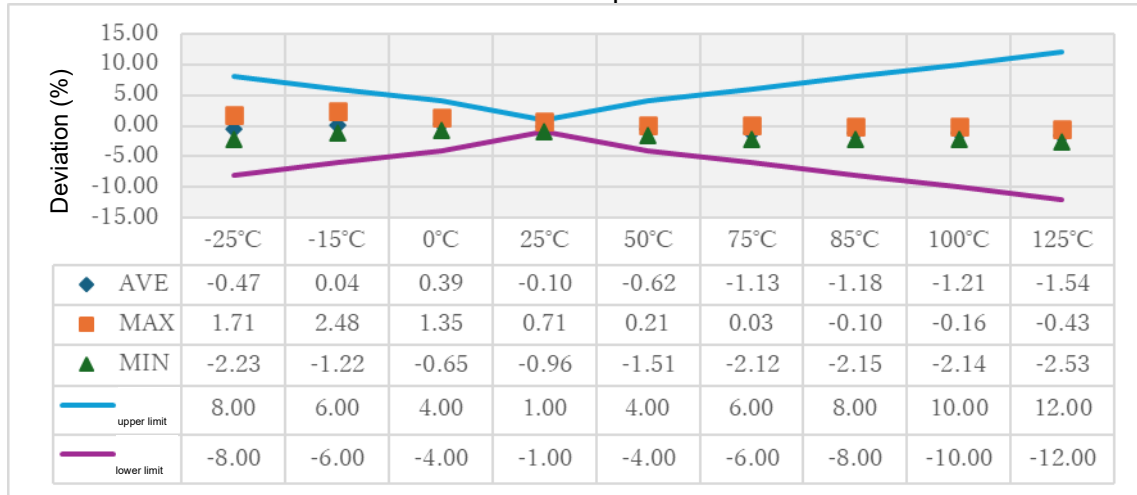
3200F1001F Resistance temperature characteristics



2810F3001F Resistance temperature characteristics



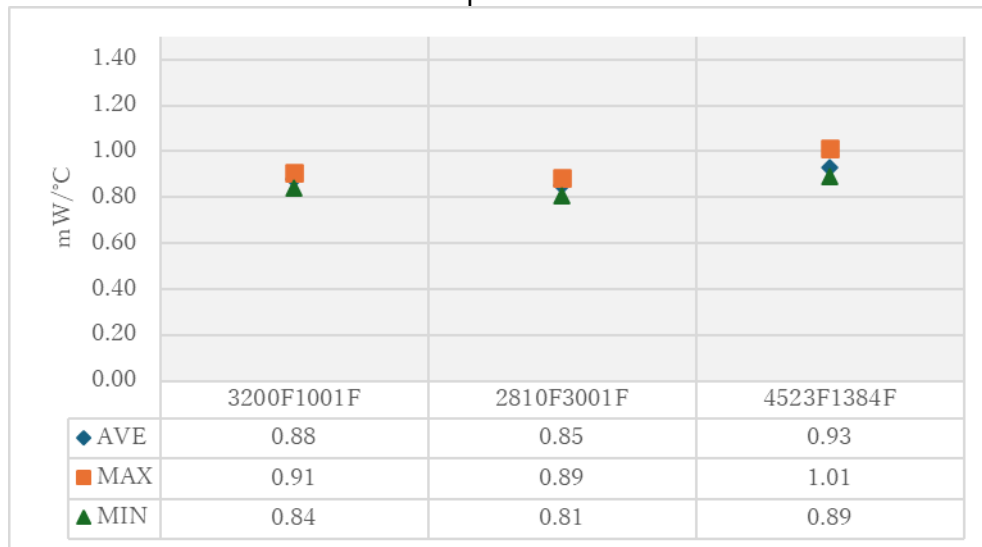
4523F1384F Resistance temperature characteristics



[Heat dissipation constant n=20]

Conditions: 25 °C, Heat dissipation constant: Maximum 1.5 mW/°C

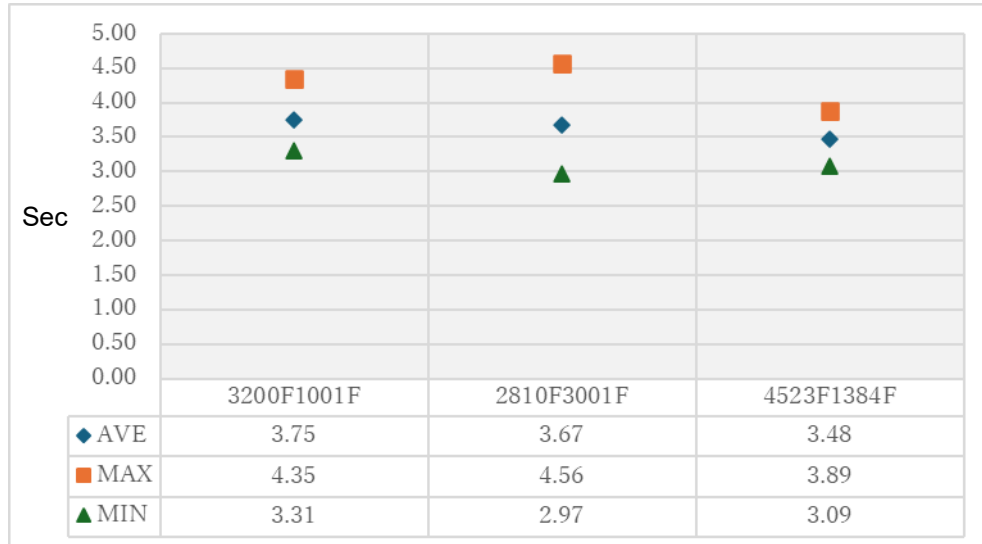
Heat dissipation constant



[Thermal time constant n=20]

Conditions: 43.4 °C (63.2%) during 75 °C to 25 °C, Thermal time constant: Maximum 5 seconds

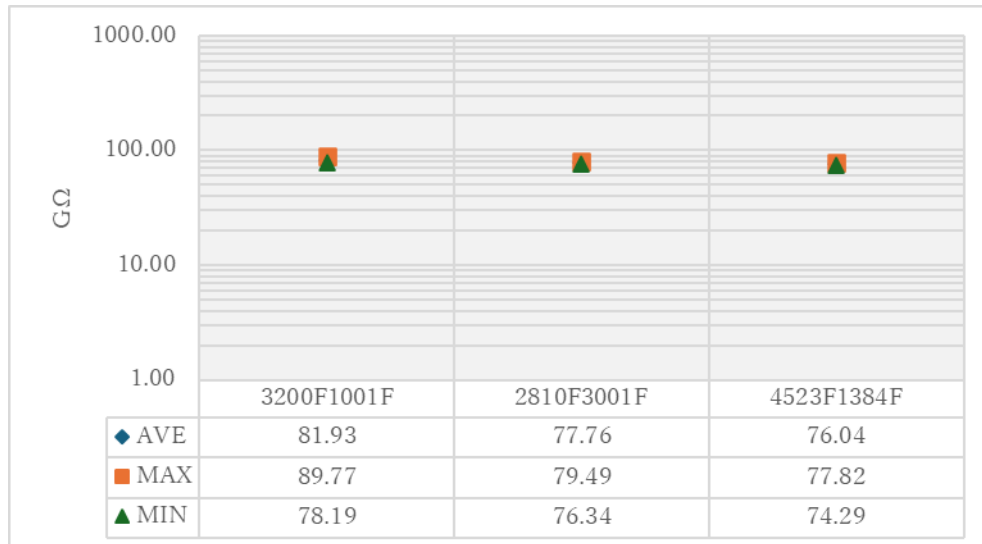
Thermal time constant



[Insulation resistance n=20]

Conditions: DC100V for 2 minutes, Insulation resistance: 1,000MΩ (1GΩ) min.

Insulation resistance

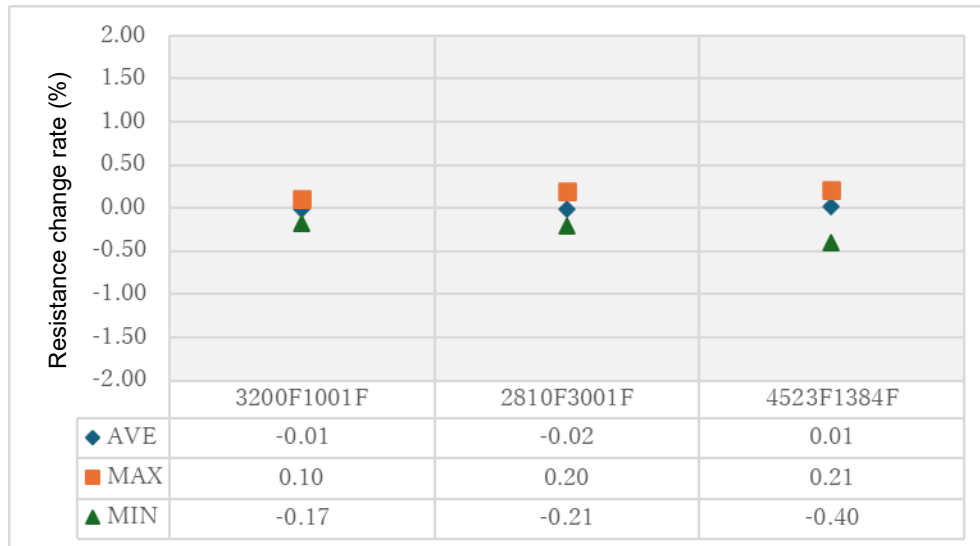


[Short-time load n=355]

Conditions: Apply 5 mW, ON for 5 minutes, OFF for 10 minutes, 10 cycles

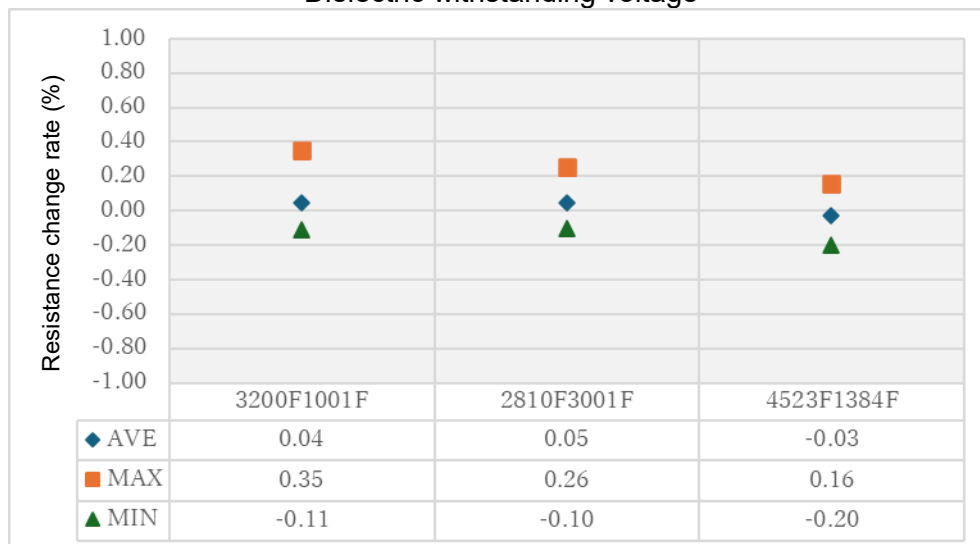
R₂₅ change rate: ±2.0%

Short-time load



[Dielectric withstanding voltage (atmospheric pressure) n=20] Conditions: AC500V for 2 minutes, R₂₅ change rate: ±1.0%

Dielectric withstanding voltage

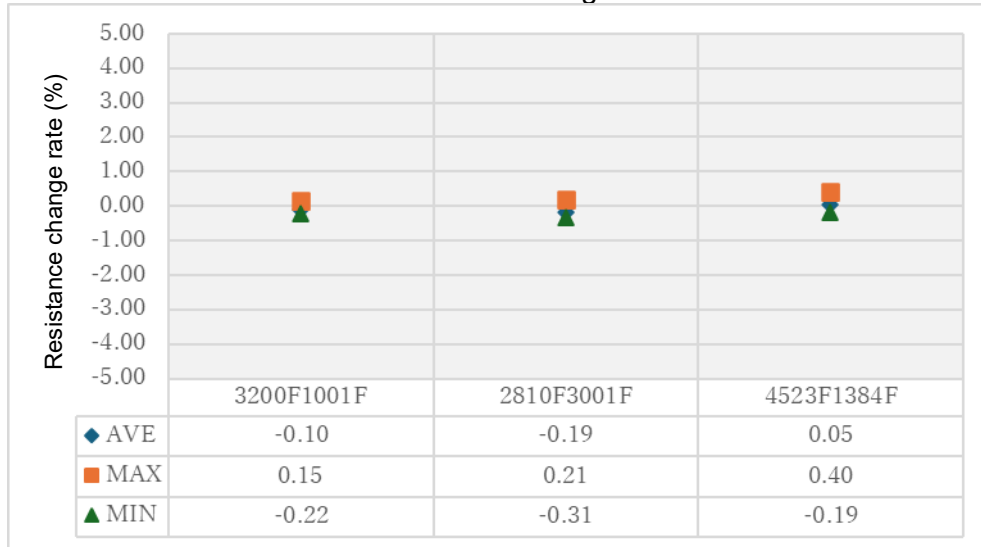


4.2 Mechanical Characteristics

[Board bending n=20]

Conditions: Flexure 2 mm, 10 seconds, one time, R₂₅ change rate: ±5% (in air)

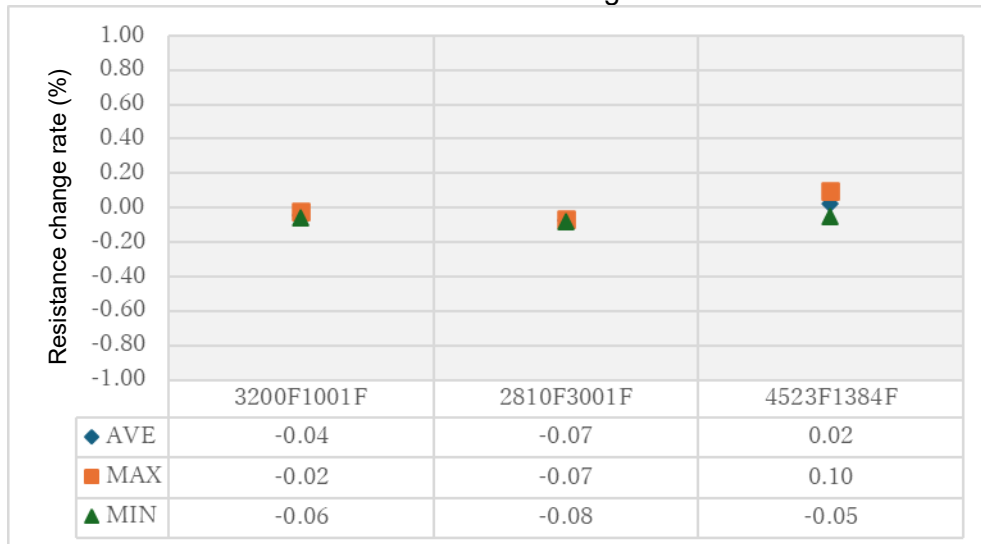
Board Bending



[Resistance to soldering heat n=20]

Conditions: Solder reflow 235±5 °C for 30 sec. x 2 times, R₂₅ change rate: ±1%

Resistance to soldering heat



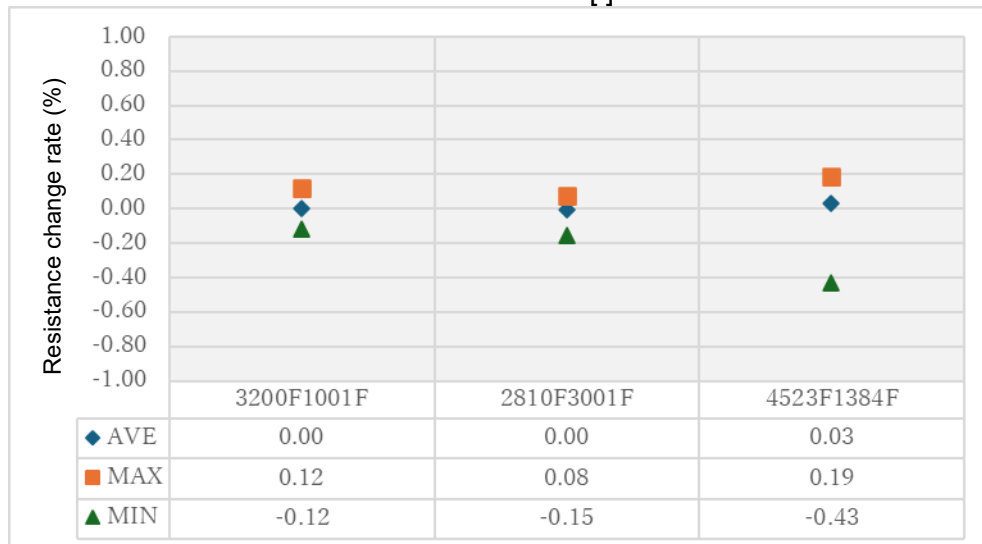
4.3 Characteristics under Environmental and Various Operating Conditions

[Thermal shock [I] n=355]

Conditions: -55 °C for 15 minutes to -125 °C for 15 minutes, 10 cycles

R₂₅ change rate: ±1%

Thermal shock [I]

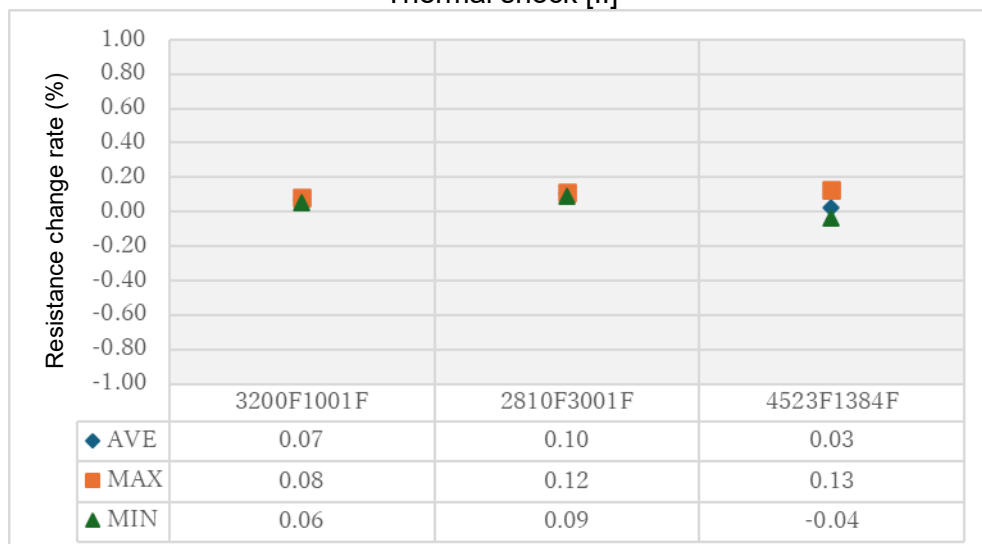


[Thermal shock [II] n=20]

Conditions: -30 °C for 15 minutes to +100 °C for 15 minutes, 1,000 cycles

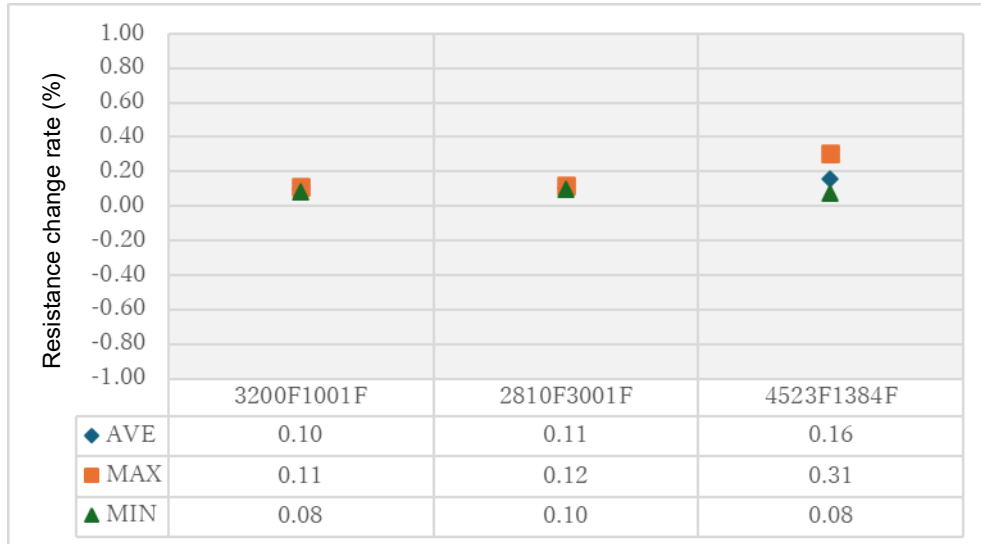
R₂₅ change rate: ±1%

Thermal shock [II]



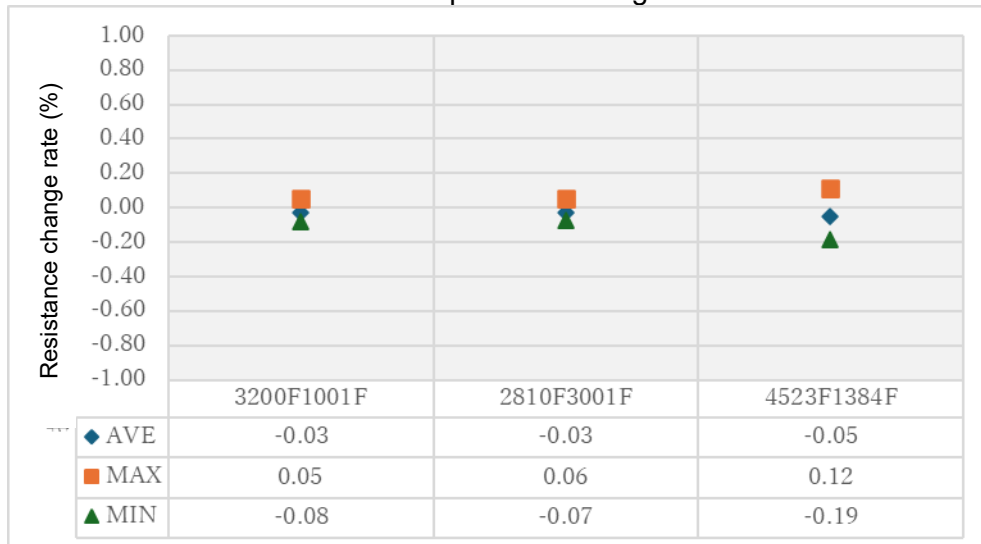
[Moisture resistance n=20]
Conditions: 25 °C to 65 °C, 90 to 95% RH, -10 °C for 10 cycles
R₂₅ change rate: ±1%

Moisture resistance



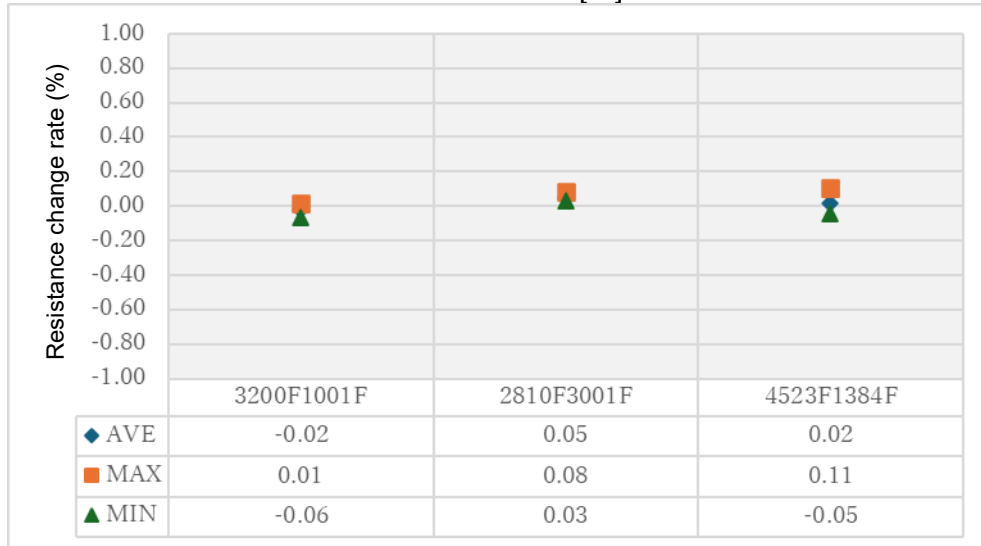
[Low-temperature storage n=230]
Conditions: -65 °C for 3 hours, R₂₅ change rate: ±1%

Low-temperature storage



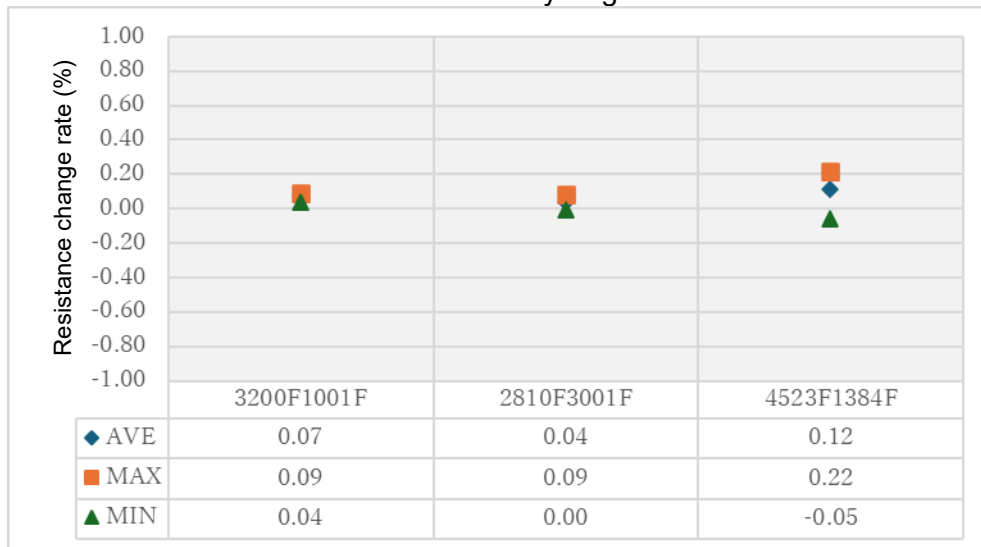
[Thermal shock [IV] n=20] Conditions: -55 °C for 15 minutes to +125 °C for 15 minutes, 1,000 cycles R₂₅ change rate: ±1%

Thermal shock [IV]



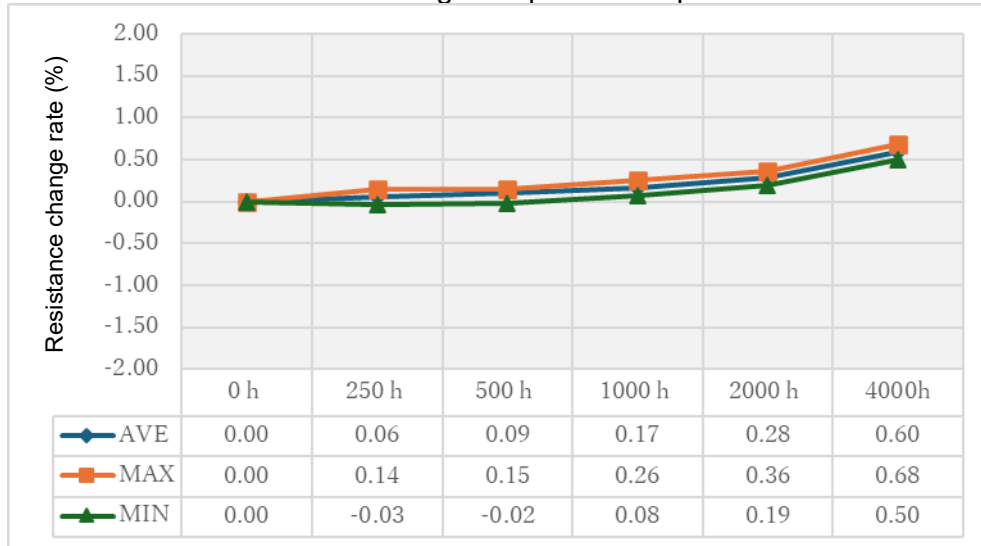
[Immersion cycling n=20] Conditions: +65 °C for 15 minutes to +25 °C for 15 minutes, 2 cycles R₂₅ change rate: ±1%

Immersion cycling

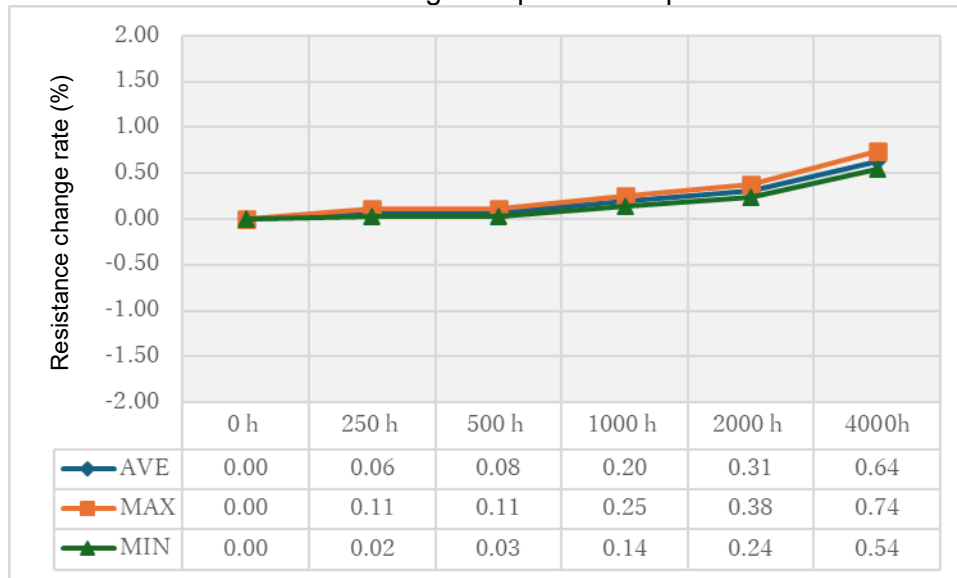


[High-temperature exposure n=230] Conditions: 125 °C for 4,000 hours
R₂₅ change rate: ±2%

3200F1001F High-temperature exposure

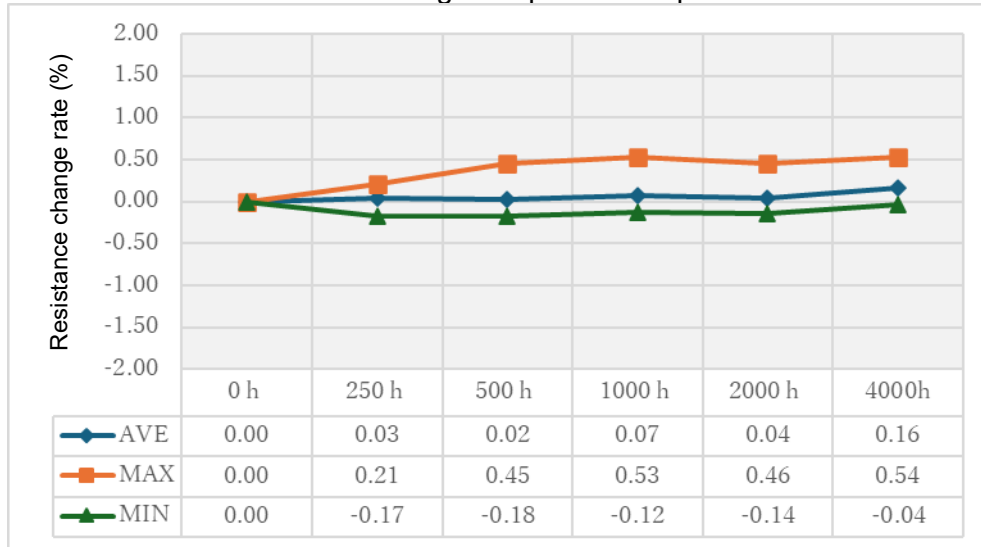


2810F3001F High-temperature exposure



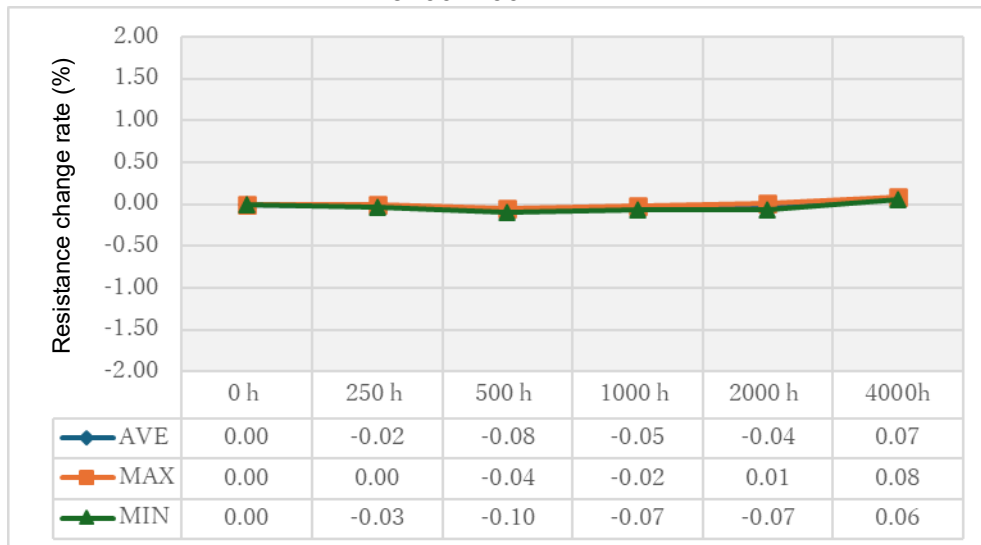
S3SU-2602

4523F1384F High-temperature exposure



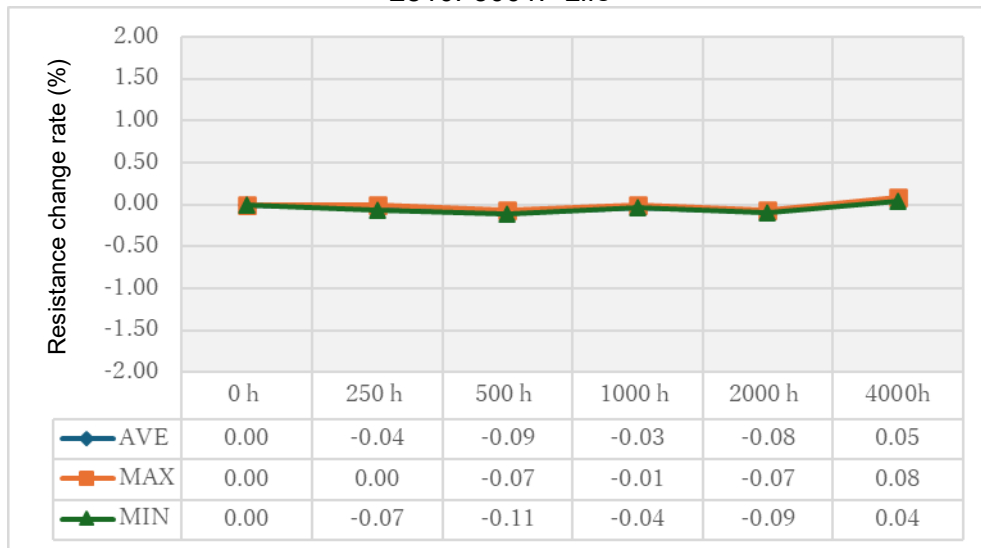
[Life n=30] Conditions: 25 °C, rated voltage ON for 90 minutes, OFF for 30 minutes, 4,000 hours, R_{25} change rate: $\pm 2\%$

3200F1001F Life

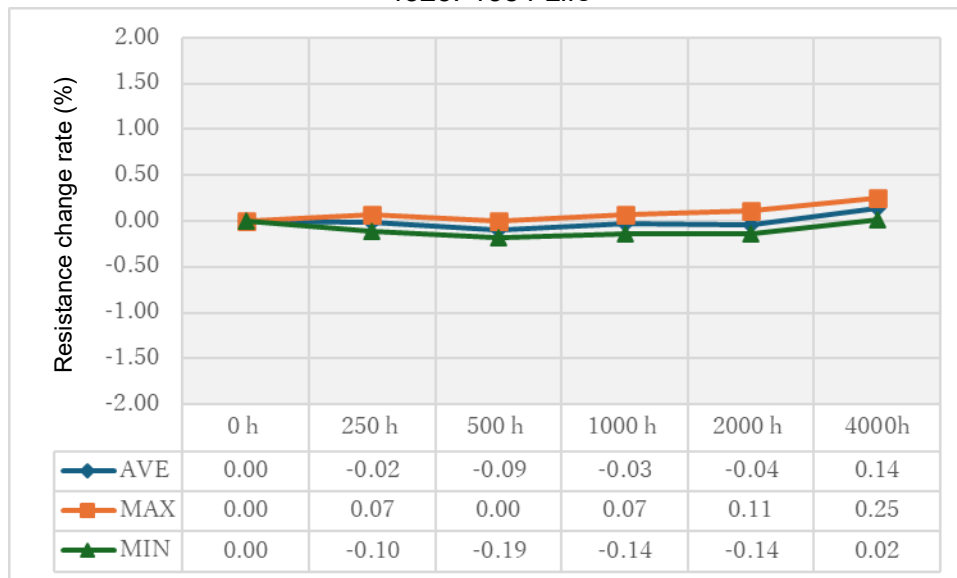


S3SU-2602

2810F3001F Life



4523F1384 Life



5. RELIABILITY

5.1 Failure Rate

5.1.1 JAXA Qualified Parts

The failure rate calculated using all data obtained during the high-temperature exposure test (for 4,000 hours) performed at the qualification test is shown below.

Product	Total test hour (hour)	No. of defects (piece)	Failure rate ⁽¹⁾	Failure rate level ⁽²⁾
JAXA 2160/A101 2012	2,760,000	0	0.033%/1,000h	P level

(1) Failure rate calculation

The failure rate with zero failures is calculated as follows:

$$\lambda = 0.917 / T \text{ when } \lambda: \text{failure rate, } T: \text{total test hour}$$

Reliability level: 60%

Samples: 3 items (total 690 pieces)

⁽²⁾ Compatible with JIS C 5003 failure rate levels.

5.1.2 Commercial Parts with the Same Construction and Design

The failure rates based on field data for commercial parts with the same construction and design as the products are shown below. However, commercial parts are Ni-Sn plated.

Product	Component hour (hour)	No. of defects (piece)	Failure rate ⁽¹⁾ (FIT)
TCT 2012	1.52 x 10 ¹²	0	0.000603

(1) Failure rate calculation

The failure rate is calculated as follows:

$$\lambda_{60} = X2 \{2(r+1), \alpha\} / \{2(n \times T)\} \times 10^9 \text{ (FIT)}$$

Reliability level: 60%

Number of products (n): Quantity of actually sold products between 2020 and 2025.

Operating time (T): Calculated on assumption that the product operated 6 hours a day and that a year consists of 365 days.

Number of failures (r): The number of failures due to the product deficiency is 0.

5.2 Possible Failure Modes

Failure mode	Occurrence rate
Burnout and resistance increase	30%
Short-circuit and resistance decrease	70%

6. STORAGE

The products shall be stored in the package provided by the manufacturer at room temperature (15 to 35 °C), the normal humidity (25 to 85% RH) and shall be placed in an environment free of harmful gases such as hydrochloric gas, hydrogen sulfide and sulfurous acid gas.

7. NOTES

Use special caution not to apply excessive forces to the protective film of the product surface that is made of glass. Excessive forces may cause cracks of the protective film.

8. OTHER

The contact information on this data sheet is as follows:

Manufacturer : TATEYAMA KAGAKU DEVICE TECHNOLOGY CO., LTD
Address : 3-6 Tsukioka-cho, Toyama-city, Toyama Pref. 939-8132 Japan
Telephone : +81-76-429-3588
Fax : +81-76-429-6630

Tokyo branch:

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Nihonbashi, Chuo-ku, Tokyo 103-0021, Japan
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Osaka Sales Office:

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Telephone : +81-66-346-1236
Fax : +81-66-346-1237