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

Part Description	FUSES, SUBMINIATURE, CURRENT-LIMITING, HIGH RELIABILITY, SPACE USE
Part Number and Type	JAXA 2210/101-A 72V JAXA 2210/101-A 126V
Applicable Specification	JAXA-QTS-2210 JAXA-QTS-2210/101

27 February 2020

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 specification: January 17, 2022

Revision Log		
Rev.	Date	Description
NC	7 June 2011	Original.
A	29 August 2011	Paragraph 4.3: Characteristics under Various Operating Conditions • Added data from 2,000 cycles of thermal shock [II] test. • Added data for overload interrupt after 2,000 cycles of thermal shock [II] test. Paragraph 4.4: Environmental Limits • Added data from 4,000 hours of steady load life test. • Added data for overload interrupt after 4,000 hours of steady load life test. • Added data from pulse test.
B	15 March 2012	1) Paragraph 2.1: Changed the sample picture. 2) Paragraph 3.1: Absolute Maximum Ratings Corrected the nominal resistance of JAXA2210/101-A72V1.5AL from 97.0 – 163mΩ to 70.0 – 163mΩ.
C	27 Feb. 2020	1) Cover: Changed corporate name. 2) Paragraph 2.1 Changed the external image due to resin material change. Corrected error on the tolerance of J2 F dimension in External dimension table from ±0.05 to ±0.1. 3) Paragraph 2.2 Changed the mass due to the resin material change 4) Paragraph 3.1 Absolute maximum rating Changed note(3) from “Table 2” to “External dimension” 5) Paragraph 4.1 Electrical characteristics Changed current-carrying capacity, dielectric withstanding voltage, overload interrupt, interruption performance, insulation resistance after overload interrupt, resistance-temperature characteristics. 6) Paragraph 4.2 Mechanical and thermal characteristics Changed resistance to soldering heat and outgassing. 7) Paragraph 5 Characteristics under various operating conditions Changed high frequency vibration, random vibration, shock, thermal shock[II] (resistance change rate/overload interrupt), moisture resistance, low temperature operation. 8) Paragraph 6 Environmental limit Changed steady-state life (resistance change rate/overload interrupt), pulse test. 9) Paragraph 7 Reliability Paragraph 7.1 Changed failure rate 10) Paragraph 10 Changed telephone number (to direct number)
		Remainder intentionally left blank.

Contents

1. GENERAL 1
1.1 Scope 1
1.2 Applicable Documents 1
1.3 Reference Documents 1
2. SUMMARY OF PRODUCT 1
2.1 Externals and Dimensions 1
2.2 Weight 2
2.3 Construction 2
3. USAGE 3
3.1 Absolute Maximum Ratings 3
3.2 Recommended Operating Conditions 4
3.3 Notes for Circuit Design 4
3.4 Recommended Mounting Method 4
4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS 5
4.1 Electrical Characteristics 5
4.2 Mechanical and Thermal Characteristics 15
5. CHARACTERISTICS UNDER VARIOUS OPERATING CONDITIONS 17
6. ENVIRONMENTAL LIMITS 22
7. RELIABILITY 26
7.1 Failure Rate 26
7.2 Failure Modes 26
8. STORAGE 27
9. NOTES 27
10. OTHER 27

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-2210	Fuses, High Reliability, Space Use, General Specification For
JAXA -QTS-2210/101	Fuses, Subminiature, Current-Limiting, High Reliability, Space Use, Detail Specification For

1.3 Reference Documents

None.

2. SUMMARY OF PRODUCT

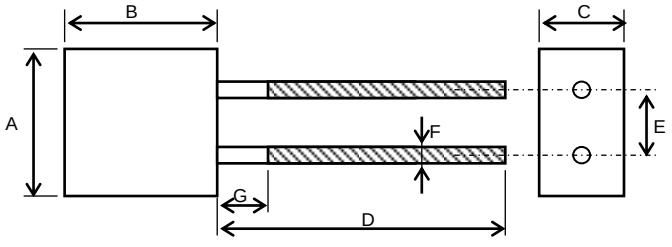
Fuses described in this data sheet are high quality and high reliability, subminiature, current-limiting fuses for direct current to be used for electronic equipment installed on spacecrafts such as satellites.

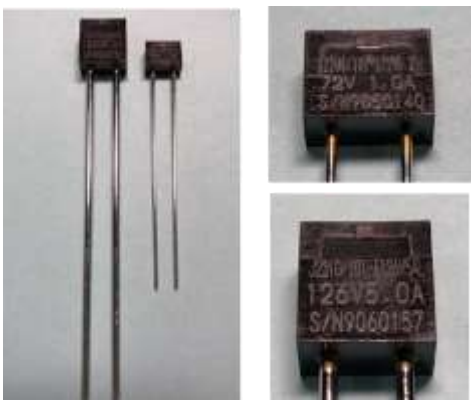
2.1 Externals and Dimensions

External Dimensions

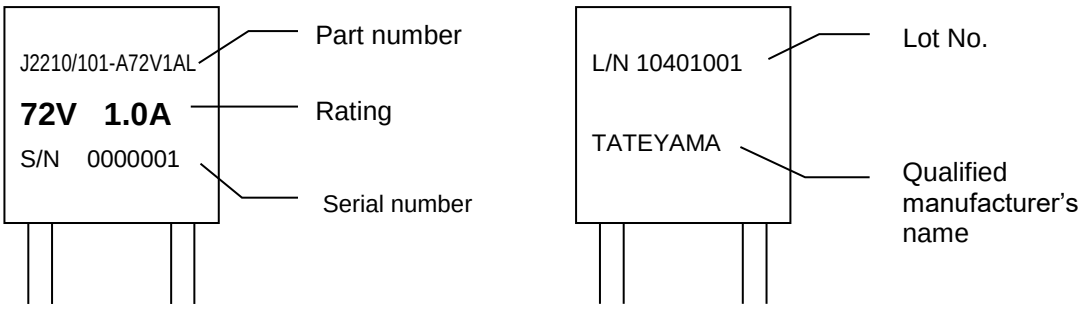
Style	Dimension (mm)						
	A	B	C	D (Min)	E	F(1)	G (Max) (2)
J1	$7.00^{+0.1}_{-0.3}$	$5.40^{+0.1}_{-0.3}$	$3.50^{+0.1}_{-0.3}$	40.0	4.0±0.05	0.60±0.05	5.00
J2	$9.00^{+0.1}_{-0.3}$	$9.30^{+0.1}_{-0.3}$	$5.00^{+0.1}_{-0.3}$	57.0	5.0±0.05	1.20±0.1	5.00

Notes: (1) Dimensions after solder coating.
(2) Length of uncoated part of the lead from fuse body.





Marking example

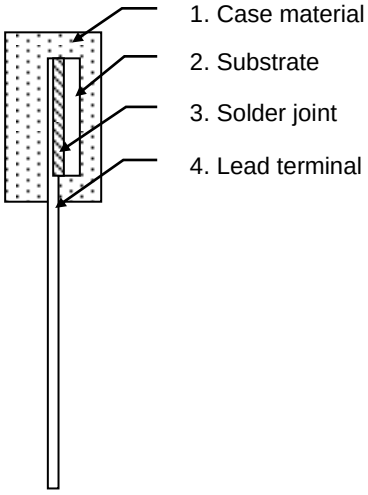


2.2 Weight

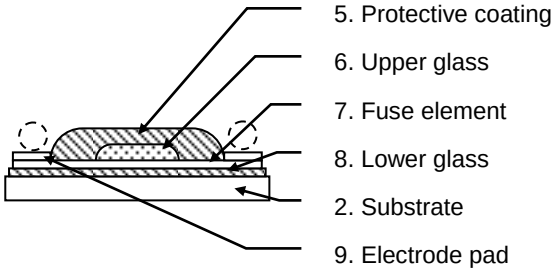
Standard value (g)	Size J1	Size J2
	0.46 to 0.50	2.00 to 2.20

2.3 Construction

Cross-section of entire fuse



Cross-section of internal chip



3. USAGE

3.1 Absolute Maximum Ratings

Ratings

Part number	rating			Pre-arching time (msec) ([3]) and I^2t value (A^2s)				Operating temperature range([5])	Rated breaking capacity	Style ([4])
	Voltage (V)	Current([1]) (A)	Nominal resistance([2]) (mΩ)	Pre-arching time / I^2t value	Test current 250%	Test current 400%	Test current 600%			
JAXA 2210/101 -A72V1AL	72	1.0	110-220	msec	10.0-300	1.00-15.0	0.15-3.00	-55°C to +125°C	1,000A	J1
				A^2s	0.0625 -1.875	0.0160 -0.240	0.0054 -0.1080			
JAXA 2210/101 -A72V1.5AL	72	1.5	70.0-163	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	0.1406 -4.219	0.0360 -0.540	0.0122 -0.2430			
JAXA 2210/101 -A72V2AL	72	2.0	45.0-75.0	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	0.2500 -7.500	0.0640 -0.960	0.0216 -0.4320			
JAXA 2210/101 -A72V3AL	72	3.0	20.0-43.8	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	0.5625 -16.88	0.1440 -2.160	0.0486 -0.9720			
JAXA 2210/101 -A72V5AL	72	5.0	12.0-22.5	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	1.563 -46.88	0.4000 -6.000	0.1350 -2.700			
JAXA 2210/101 -A72V7.5AL	72	7.5	8.20-13.8	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	3.516 -105.5	0.9000 -13.50	0.3038 -6.075			
JAXA 2210/101 -A72V10AL	72	10.0	6.30-10.7	msec	10.0-300	1.00-15.0	0.15-3.00			J2
				A^2s	6.250 -187.5	1.600 -24.00	0.5400 -10.80			
JAXA 2210/101 -A72V15AL	72	15.0	4.00-7.00	msec	10.0-300	1.00-15.0	0.15-3.00			
				A^2s	14.063 -421.9	3.600 -54.00	1.2150 -24.30			
JAXA 2210/101 -A126V1AL	126	1.0	90.0-270	msec	10.0-300	0.75-15.0	0.10-3.00			
				A^2s	0.0625 -1.875	0.0120 -0.2400	0.0036 -0.1080			
JAXA 2210/101 -A126V3AL	126	3.0	20.0-95.0	msec	10.0-300	0.75-15.0	0.10-3.00			
				A^2s	0.5625 -16.88	0.1080 -2.160	0.0324 -0.9720			
JAXA 2210/101 -A126V5AL	126	5.0	12.0-40.0	msec	10.0-300	0.75-15.0	0.10-3.00			
				A^2s	1.5625 -46.88	0.3000 -6.000	0.0900 -2.700			

Notes:

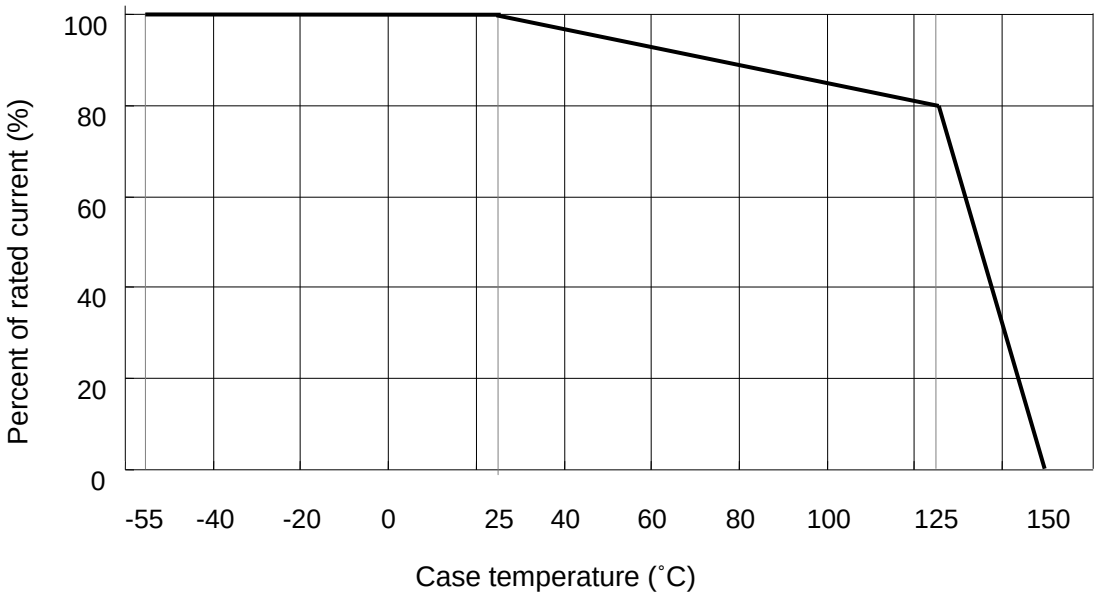
(1) Loads shall be derated in accordance with the derating curve when the case temperature exceeds +25˚C.

(2) Resistance at 25°C.

(3) The maximum pre-arching time at -55°C with 250% loads shall be as specified below.
1.0A: 10 sec., 1.5A: 10 sec., 2.0A: 10 sec., 3.0A or more: 5 sec.

(4) Refer to paragraph 2.1 Table for External dimentions.

(5) Case temperature range that ensures fusing.



Derating Curve

3.2 Recommended Operating Conditions

It is recommended to operate the fuses at 50% or less of the rated current specified in the derating curve.

3.3 Notes for Circuit Design

- The load shall be set at 250% or more of the rated current in order to achieve proper fusing when overcurrent flows.
- The circuit voltage shall not exceed the rated voltage of the fuses.
- The product temperature (case temperature) may change due to the usage environment or installation conditions. Loads shall be derated in accordance with the derating curve when the case temperature exceeds +25˚C.
- The maximum current flowing at the time of short circuit shall not exceed the rated breaking capacity (current rise is less than 3.25×10^{-6}A/s).
- Short time fusing depends on the joule integral I^2t as it is less influenced by heat dissipation. It shall be confirmed that the overcurrent generated in the circuit falls within the range of the rated I^2t.

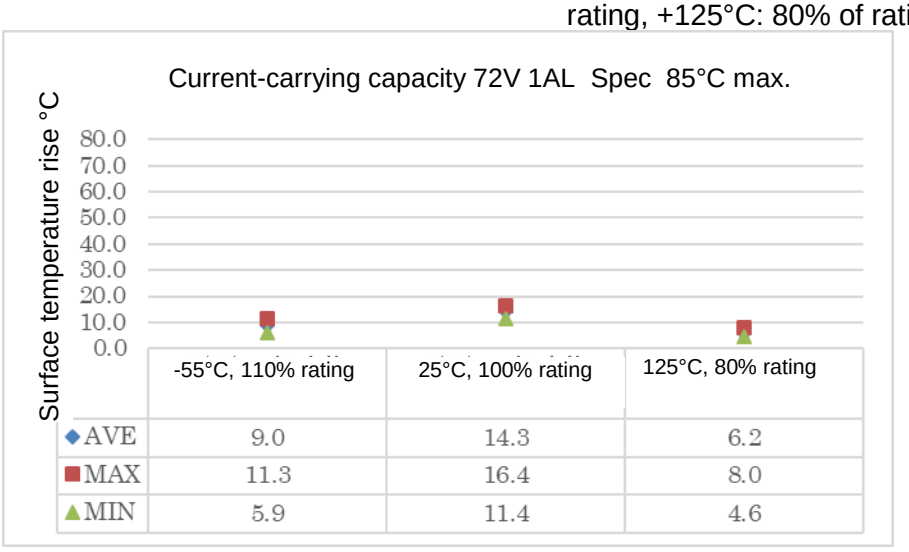
3.4 Recommended Mounting Method

- Take caution not to apply direct force to the terminal during the lead bending.
- Soldering of leads shall be performed at 350°C for 5 seconds as a maximum.

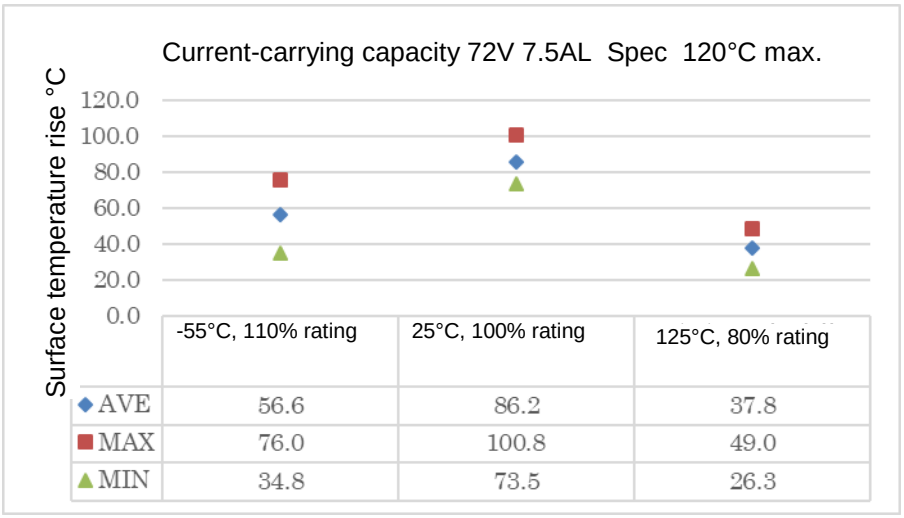
4. CHARACTERISTICS UNDER NORMAL OPERATING CONDITIONS

4.1 Electrical Characteristics

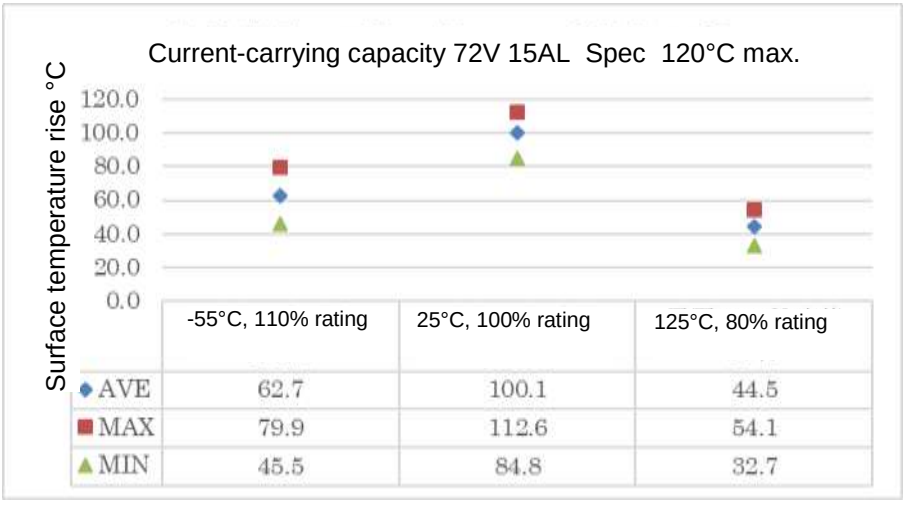
[Current-carrying capacity (temperature rise)] -55°C: 110% of rating, +25°C: 100% of rating, +125°C: 80% of rating, n=85



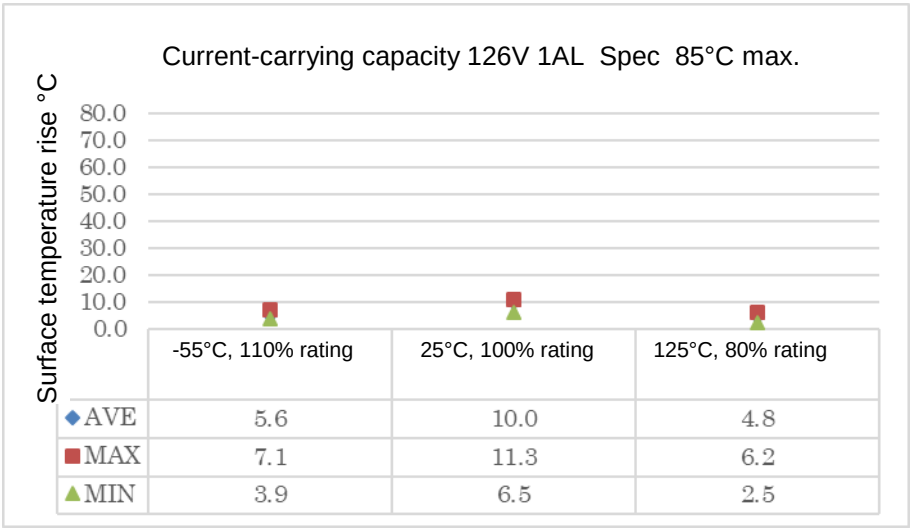
	-55°C, 110% rating	25°C, 100% rating	125°C, 80% rating
AVE	9.0	14.3	6.2
MAX	11.3	16.4	8.0
MIN	5.9	11.4	4.6



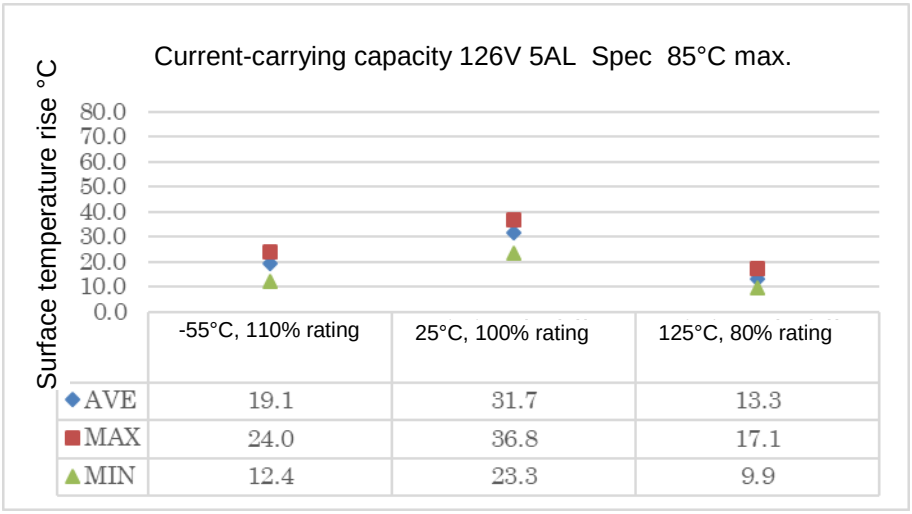
	-55°C, 110% rating	25°C, 100% rating	125°C, 80% rating
AVE	56.6	86.2	37.8
MAX	76.0	100.8	49.0
MIN	34.8	73.5	26.3



	-55°C, 110% rating	25°C, 100% rating	125°C, 80% rating
AVE	62.7	100.1	44.5
MAX	79.9	112.6	54.1
MIN	45.5	84.8	32.7

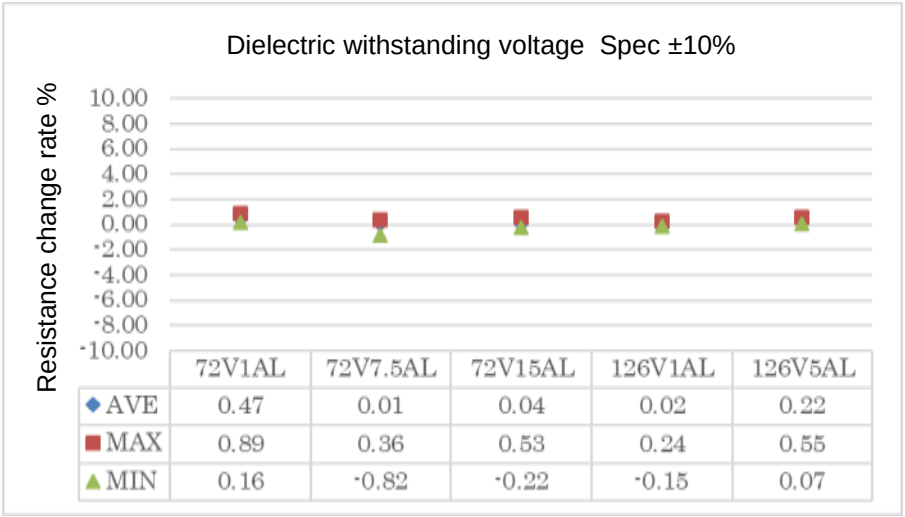


	-55°C, 110% rating	25°C, 100% rating	125°C, 80% rating
AVE	5.6	10.0	4.8
MAX	7.1	11.3	6.2
MIN	3.9	6.5	2.5



	-55°C, 110% rating	25°C, 100% rating	125°C, 80% rating
AVE	19.1	31.7	13.3
MAX	24.0	36.8	17.1
MIN	12.4	23.3	9.9

[Dielectric withstanding voltage] 500Vrms–60 seconds, n=85

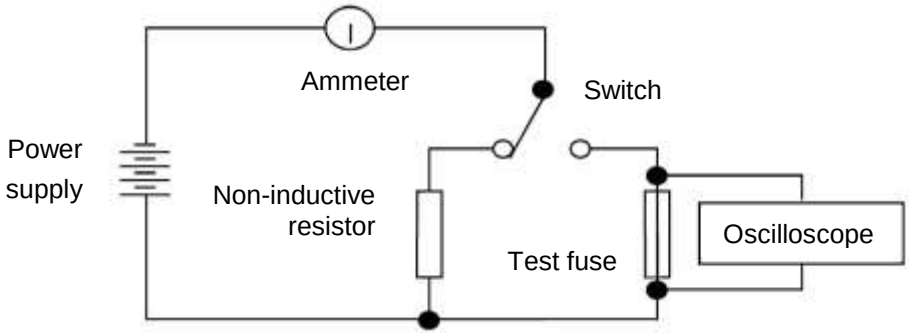


	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
AVE	0.47	0.01	0.04	0.02	0.22
MAX	0.89	0.36	0.53	0.24	0.55
MIN	0.16	-0.82	-0.22	-0.15	0.07

[Overload interrupt]

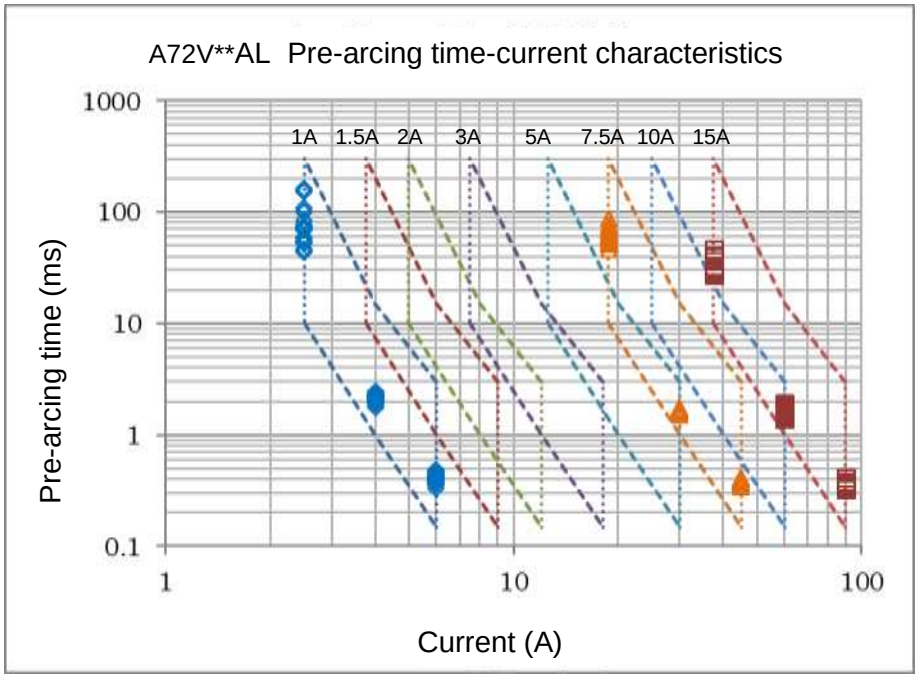
Test circuit and waveform of overload interrupt (test circuit for qualification test)

1.1) Test circuit: 250%, 400% and 600% of rated current shall be applied using the following circuit.



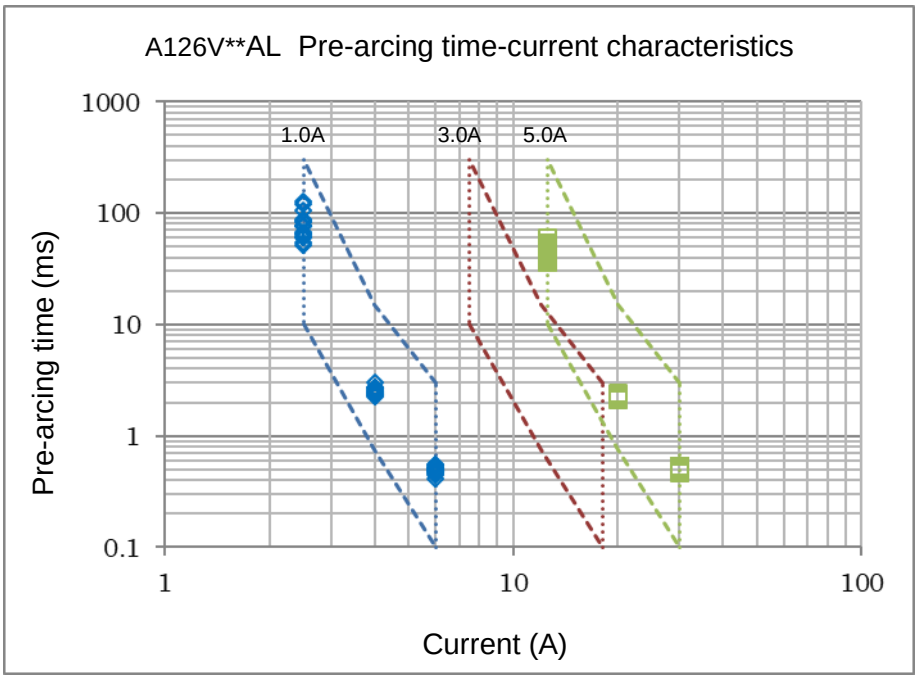
1.2) Pre-arcing time-current characteristics

72V-☐AL, ambient temperature 25°C: 1A, 7.5A, 15A (result of requalification test)



Dotted lines indicate Max /Min std. values

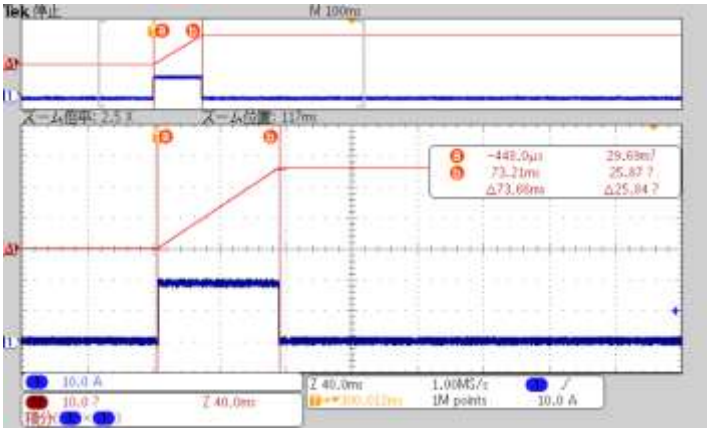
126V-□AL, ambient temperature 25°C: 1.0A, 5.0A, (result of requalification test)



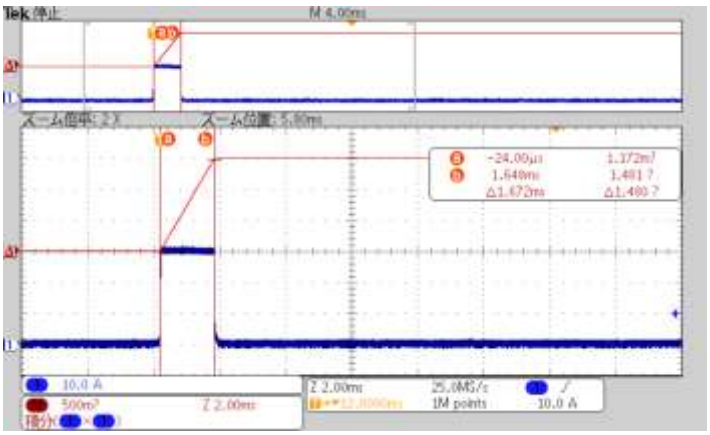
Dotted lines indicate Max /Min std. values

1.3) Waveform of overload interrupt (record from requalification test)
72V-7.5AL

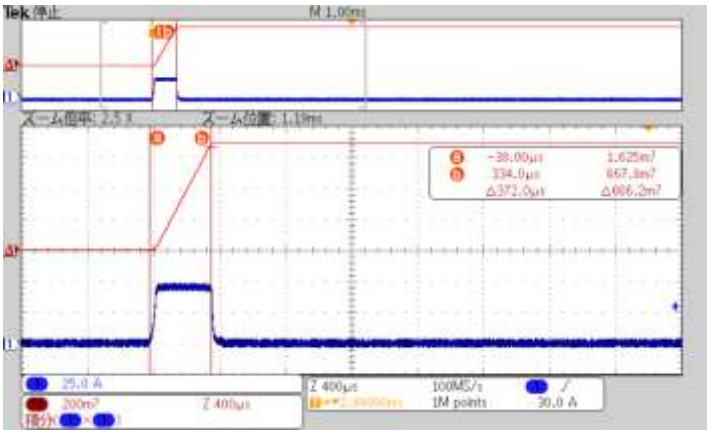
250% interrupt, pre-arcing time =73.66(ms), I^2t=25.84(A^2s)



400% interrupt, pre-arcing time =1.67(ms), I^2t=1.48(A^2s)

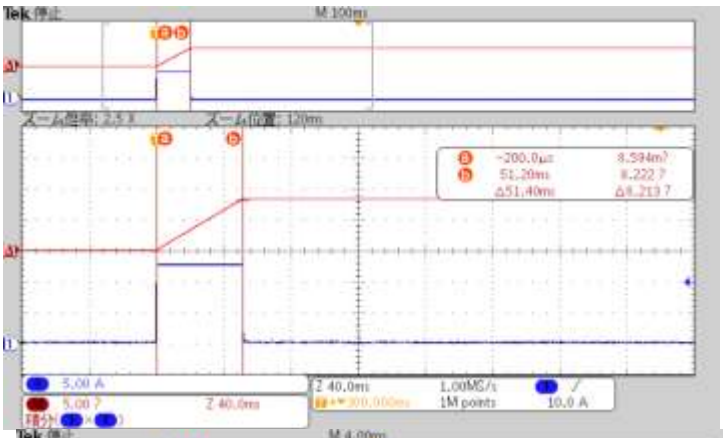


600% interrupt,
pre-arcing time
=372(μs),
I^2t=0.666(A^2s)

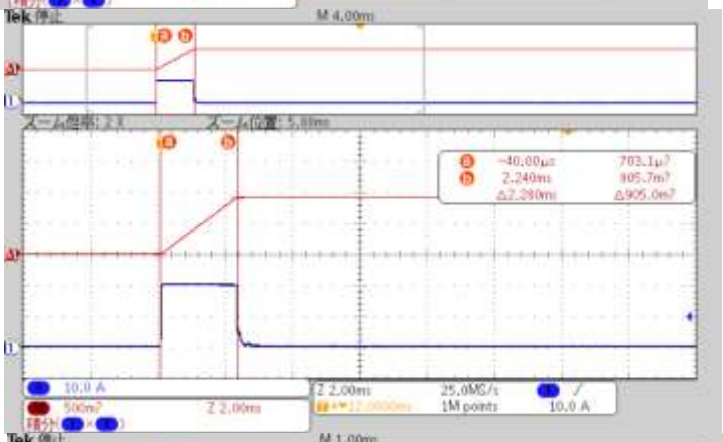


126V-5AL

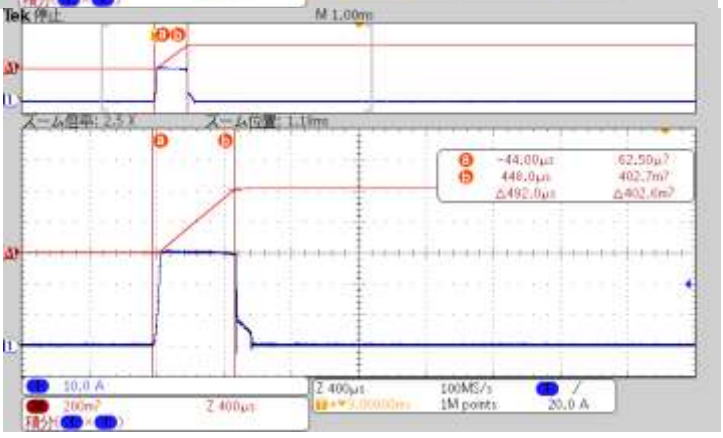
250% interrupt,
pre-arcing time
=51.4(ms),
I^2t=8.213(A^2s)



400% interrupt,
pre-arcing time
=2.28(ms),
I^2t=0.905(A^2s)

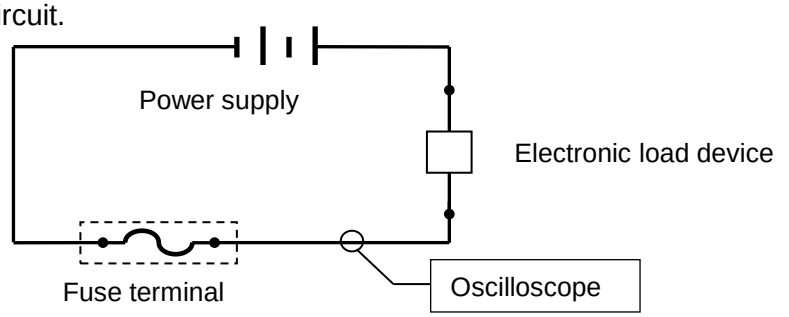


600% interrupt,
pre-arcing time
=492(μs),
I^2t=0.402(A^2s)



2) Test circuit and waveform of overload interrupt (test circuit for quality conformance inspection)

2.1) Test circuit: 250%, 400% and 600% of rated current shall be applied using the following circuit.



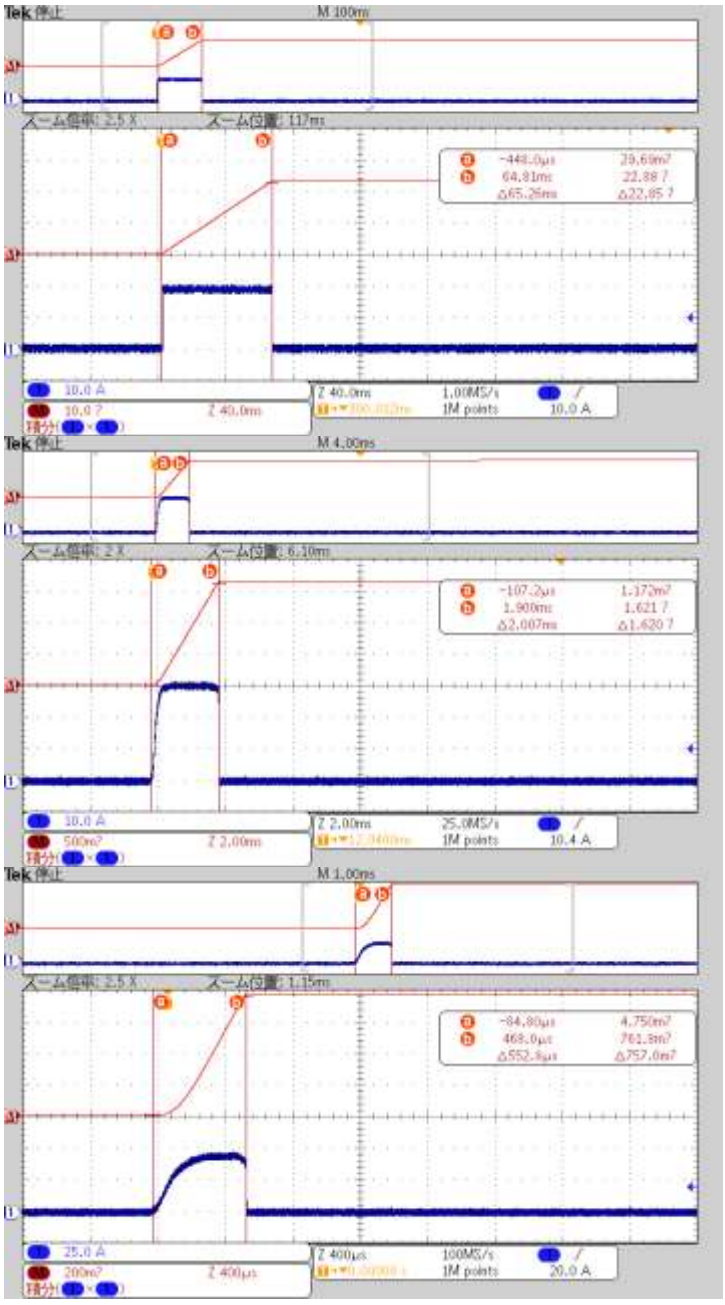
2.2) Waveform of overload interrupt

72V-7.5AL

250% interrupt, pre-arcing time =65.26(ms), I^2t=22.85(A^2s)

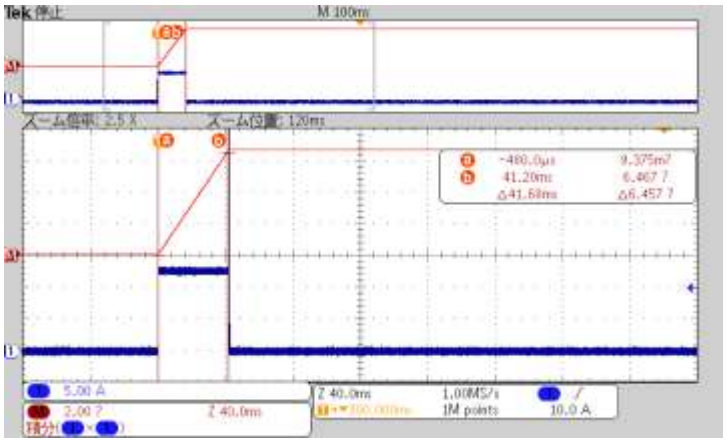
400% interrupt, pre-arcing time =2.007(ms), I^2t=1.62(A^2s)

600% interrupt, pre-arcing time =552.8(μs), I^2t=0.757(A^2s)

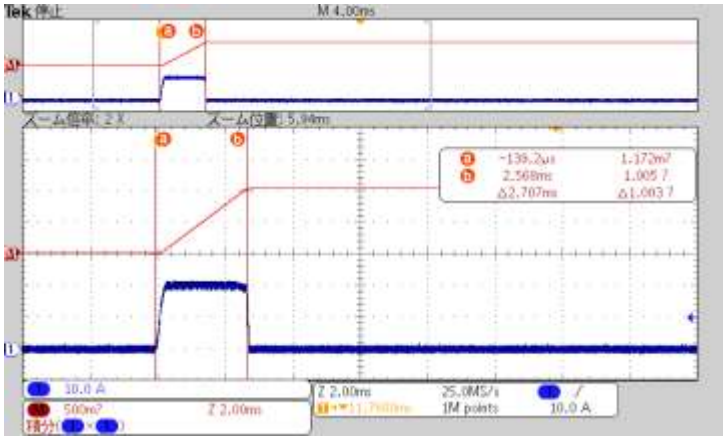


126V-5AL

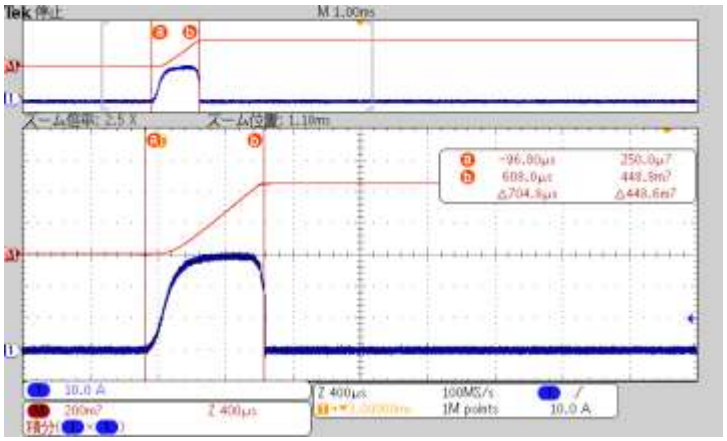
250% interrupt,
pre-arcing time
=41.68(ms),
I^2t=6.457(A^2s)



400% interrupt,
pre-arcing time
=2.707(ms),
I^2t=1.003(A^2s)



600% interrupt,
pre-arcing time
=704.8(μs),
I^2t=0.4486(A^2s)



[Interruption performance] Voltage: rated voltage, current rise: 3.25x10^6A/sec min. n=4

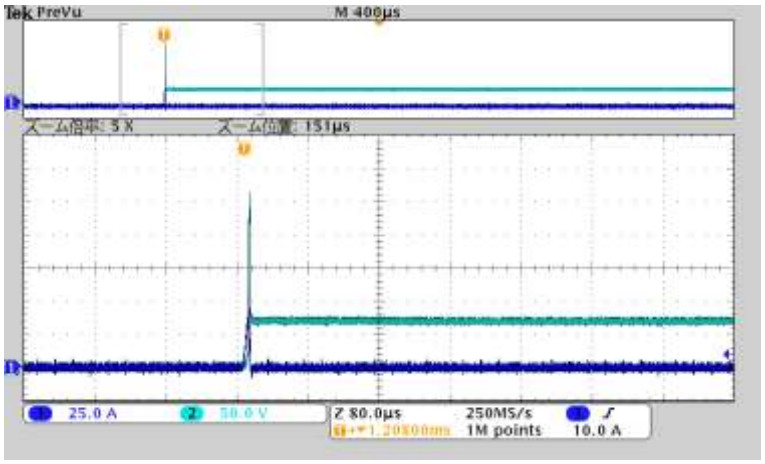
1) Insulation resistance after test

Insulation resistance after test spec 1MΩ (1.0E+6 Ω) min. (Ω)

	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
Ave	7.7E+13	8.1E+13	5.8E+13	7.3E+13	6.0E+13
Max	9.1E+13	9.1E+13	9.9E+13	1.1E+14	8.9E+13
Min	5.8E+13	6.8E+13	2.6E+09	2.5E+13	3.8E+13

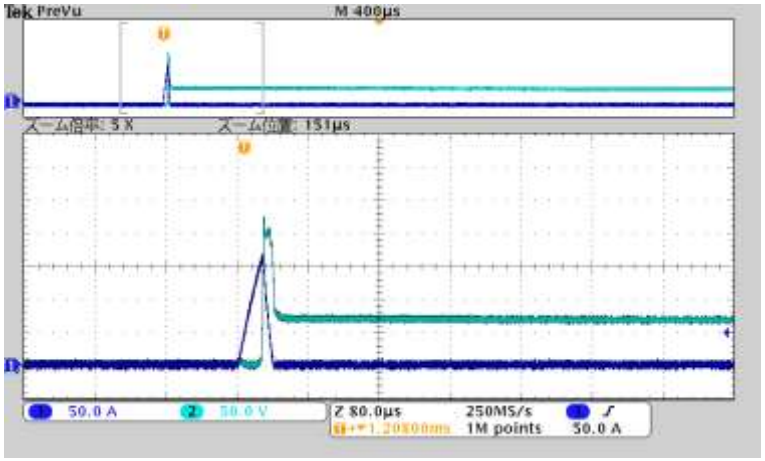
2) Interrupt waveform

72V-1AL



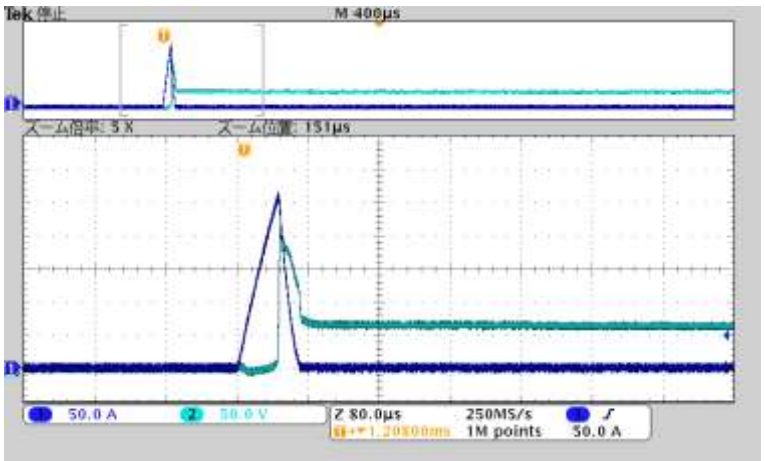
$I^2t=5.17\times10^{-3}$ (A^2s)

72V-7.5AL



$I^2t=0.371$ (A^2s)

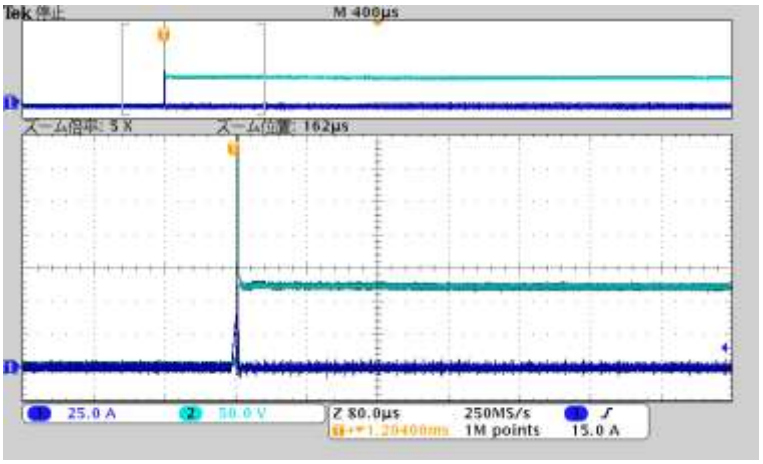
72V-15AL



$I^2t=1.528$ (A^2s)

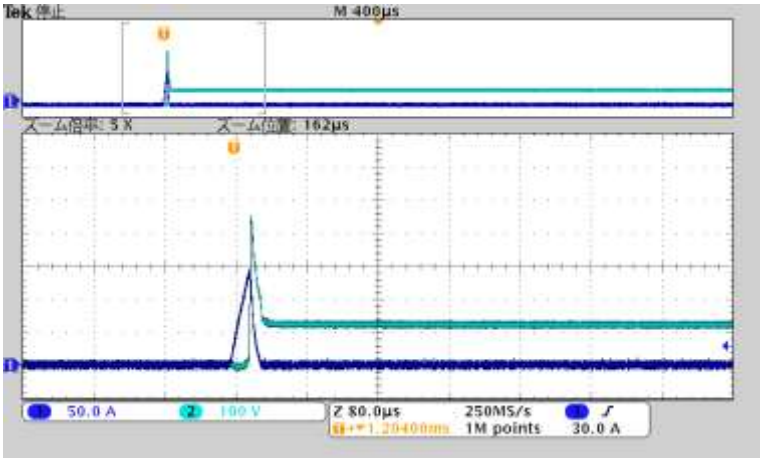
126V-1AL

$I^2t=5.21\times10^{-3}$ (A^2s)



126V-5AL

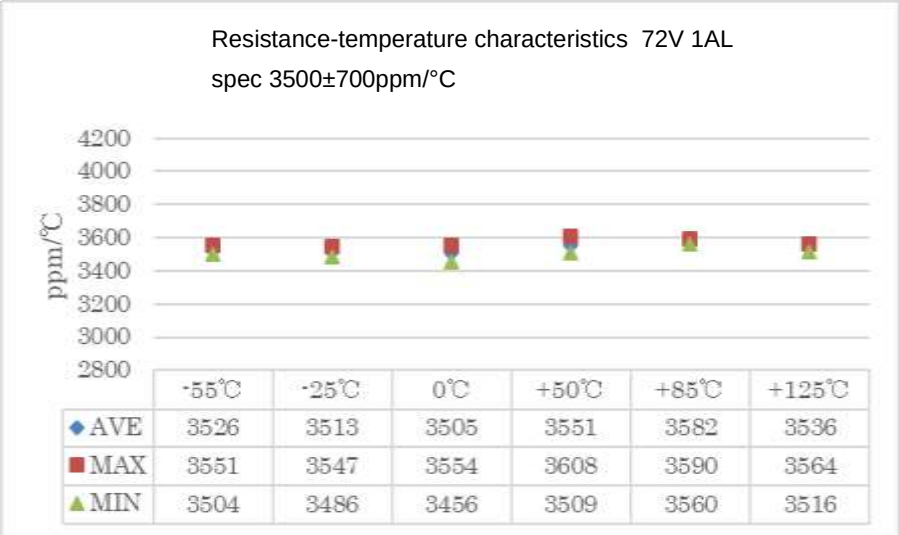
$I^2t=0.217$ (A^2s)



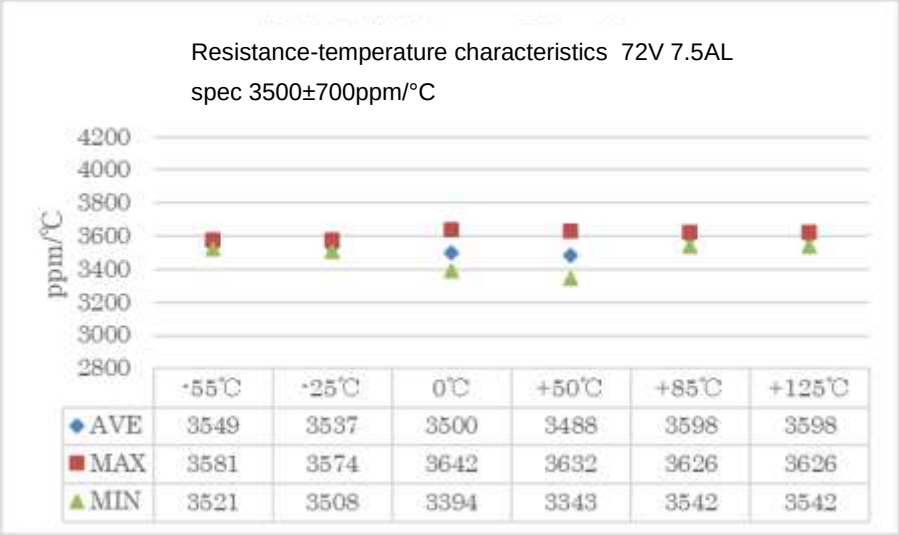
[Insulation resistance after overload interrupt] Measurement voltage: rated voltage

	250% after interruption spec	400% after interruption spec	600% after interruption spec
Rated current 5A max.	10MΩ min.	10MΩ min.	10MΩ min.
Rated current 5A min.	100kΩ min.	1MΩ min.	1MΩ min.

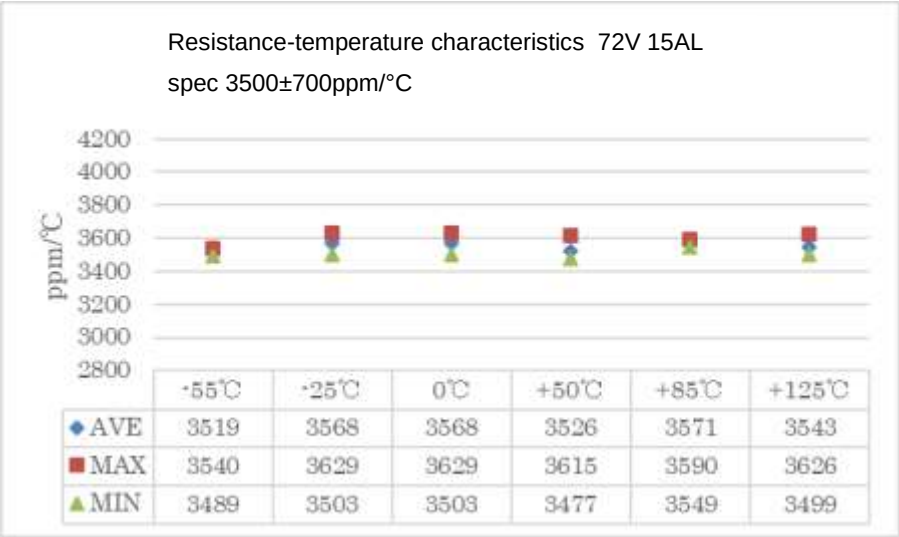
[Resistance-temperature characteristics] +25°C→0°C→-25°C→-55°C,
+25°C→+50°C→+85°C→+125°C n=18



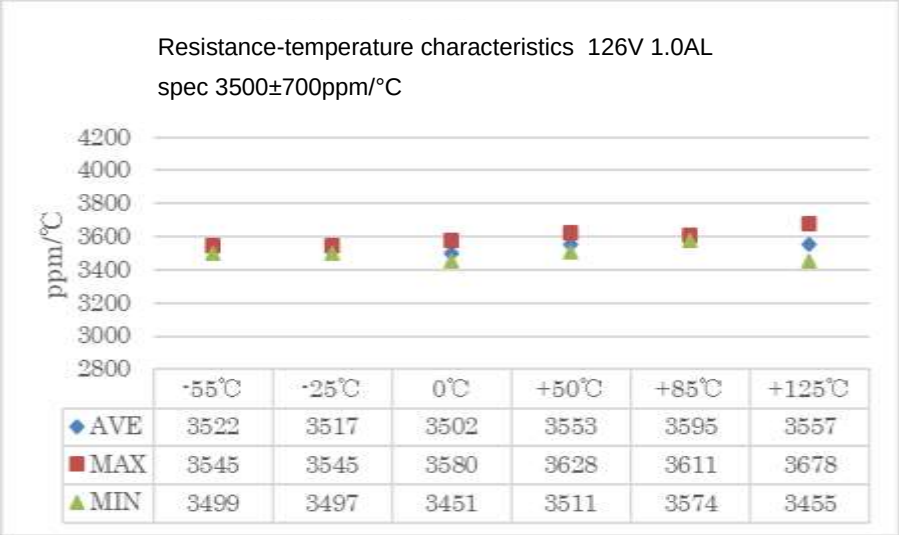
	-55℃	-25℃	0℃	+50℃	+85℃	+125℃
AVE	3526	3513	3505	3551	3582	3536
MAX	3551	3547	3554	3608	3590	3564
MIN	3504	3486	3456	3509	3560	3516



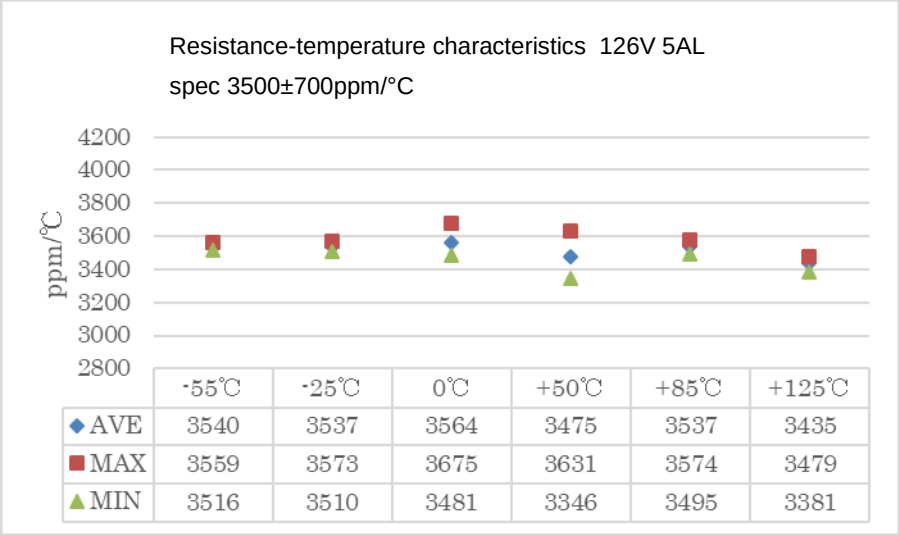
	-55℃	-25℃	0℃	+50℃	+85℃	+125℃
AVE	3549	3537	3500	3488	3598	3598
MAX	3581	3574	3642	3632	3626	3626
MIN	3521	3508	3394	3343	3542	3542



	-55℃	-25℃	0℃	+50℃	+85℃	+125℃
AVE	3519	3568	3568	3526	3571	3543
MAX	3540	3629	3629	3615	3590	3626
MIN	3489	3503	3503	3477	3549	3499



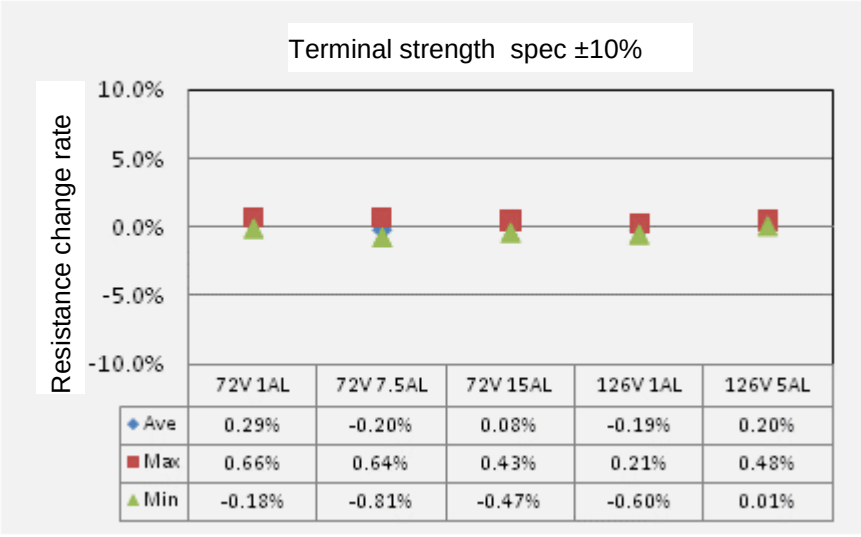
	-55℃	-25℃	0℃	+50℃	+85℃	+125℃
AVE	3522	3517	3502	3553	3595	3557
MAX	3545	3545	3580	3628	3611	3678
MIN	3499	3497	3451	3511	3574	3455



	-55℃	-25℃	0℃	+50℃	+85℃	+125℃
AVE	3540	3537	3564	3475	3537	3435
MAX	3559	3573	3675	3631	3574	3479
MIN	3516	3510	3481	3346	3495	3381

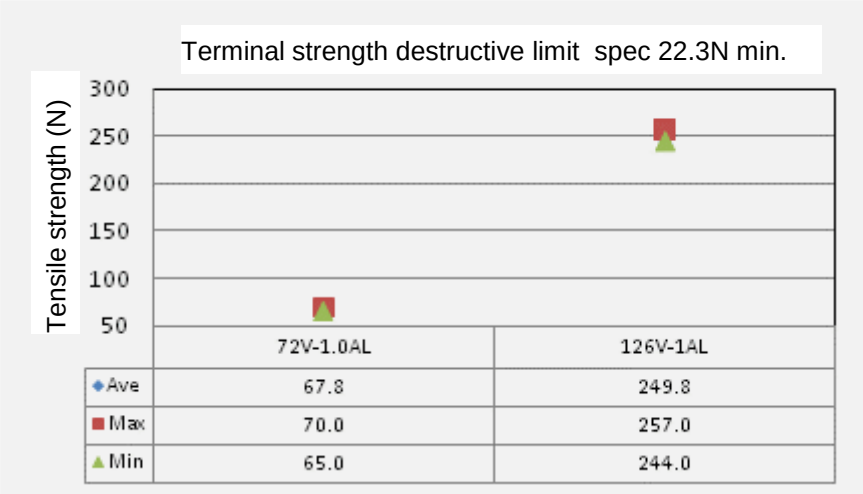
4.2 Mechanical and Thermal Characteristics

[Terminal strength] Pull: 22.3N, Bend: 4.5N for 3 times n=18



	72V 1AL	72V 7.5AL	72V 15AL	126V 1AL	126V 5AL
Ave	0.29%	-0.20%	0.08%	-0.19%	0.20%
Max	0.66%	0.64%	0.43%	0.21%	0.48%
Min	-0.18%	-0.81%	-0.47%	-0.60%	0.01%

[Terminal strength / limit test] Tensile breaking strength n=5

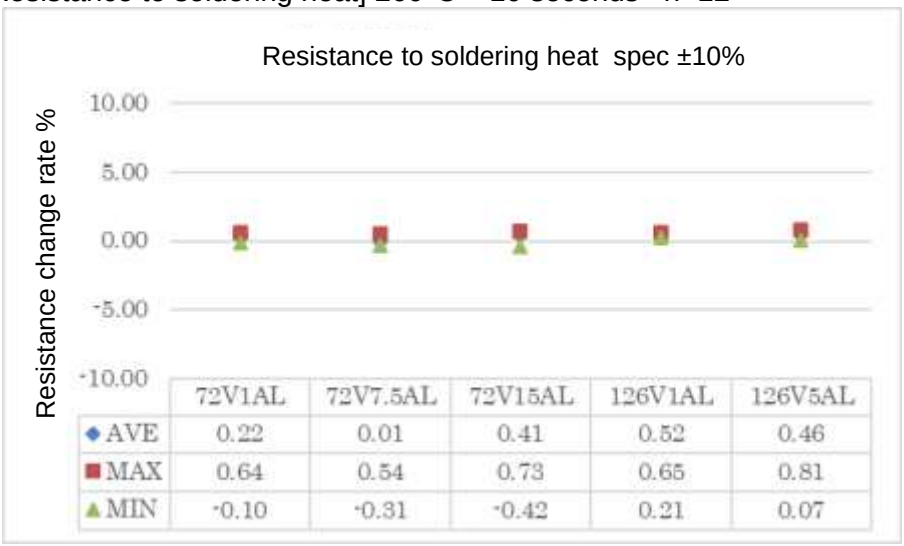


(72V-1.0 destructive mode: lead breakage, lead falling out)
(126V-1.0 destructive mode: lead falling out)

[Solderability] Eutectic solder 245°C – 5 seconds n=18

	Wettability spec
Style J1	95% min.
Style J2	95% min.

[Resistance to soldering heat] 260°C – 10 seconds n=12

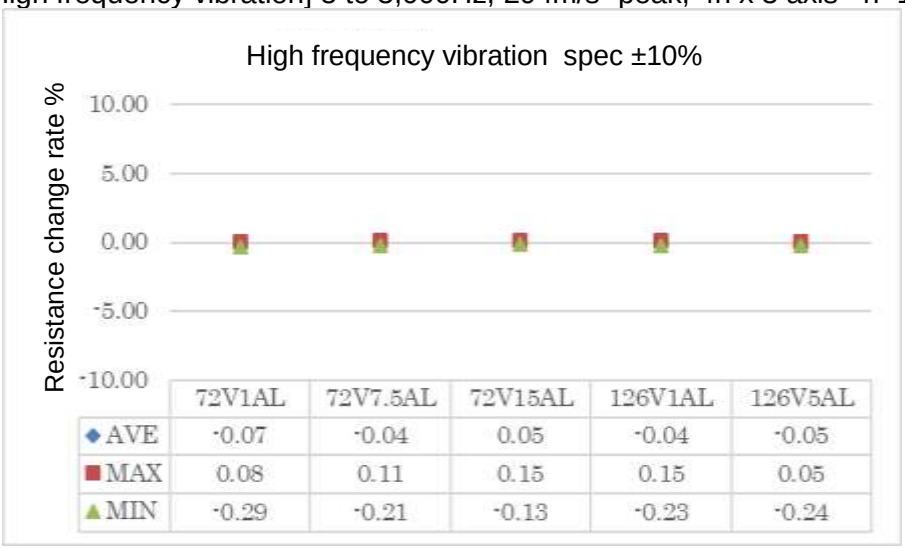


[Outgassing]
Outgassing of the mold material (PPS resin) is as specified below.
(7 x 10^{-3}Pa max. – 125°C – 24h)

Item	Specification	Measurement result
Total Mass Loss (TML)	1% max.	0.075%
Collectable Volatile Condensable Materials (CVCM)	0.1% max.	0.000%

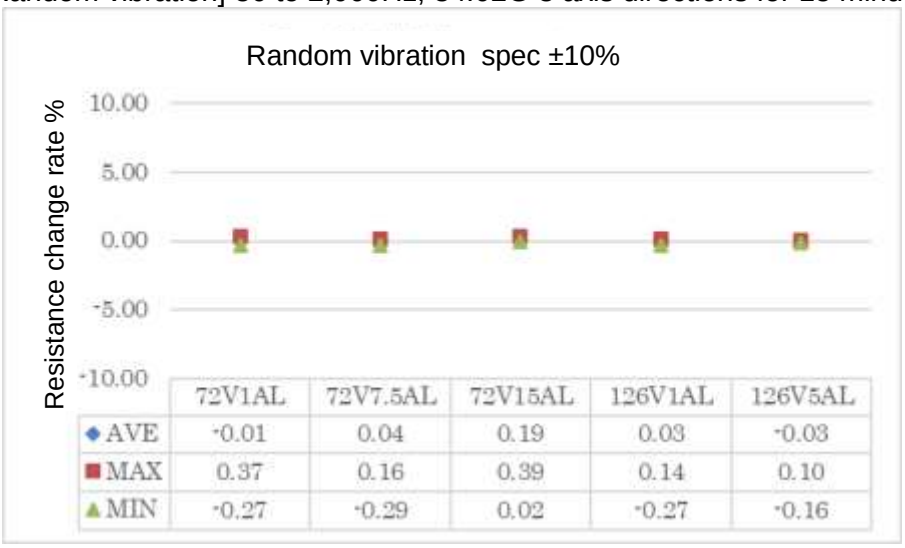
5. CHARACTERISTICS UNDER VARIOUS OPERATING CONDITIONS

[High frequency vibration] 5 to 3,000Hz, 294m/s^2 peak, 4h x 3 axis n=12



	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
◆AVE	-0.07	-0.04	0.05	-0.04	-0.05
■MAX	0.08	0.11	0.15	0.15	0.05
▲MIN	-0.29	-0.21	-0.13	-0.23	-0.24

[Random vibration] 50 to 2,000Hz, 34.02G 3 axis directions for 15 minutes each n=12

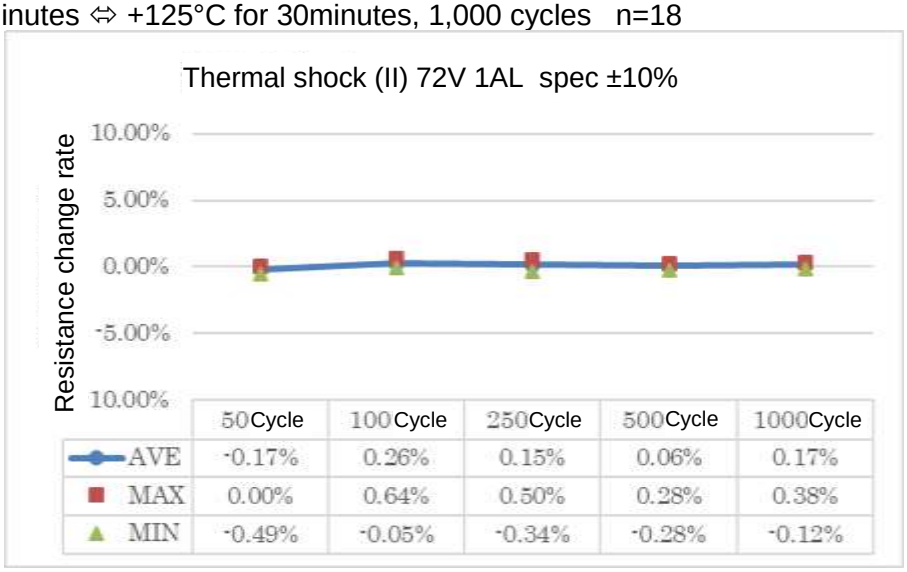


	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
◆AVE	-0.01	0.04	0.19	0.03	-0.03
■MAX	0.37	0.16	0.39	0.14	0.10
▲MIN	-0.27	-0.29	0.02	-0.27	-0.16

[Shock] 14.71km/s^2, 0.5ms, half-wave sinusoidal wave 3 axis directions for 3 times n=12

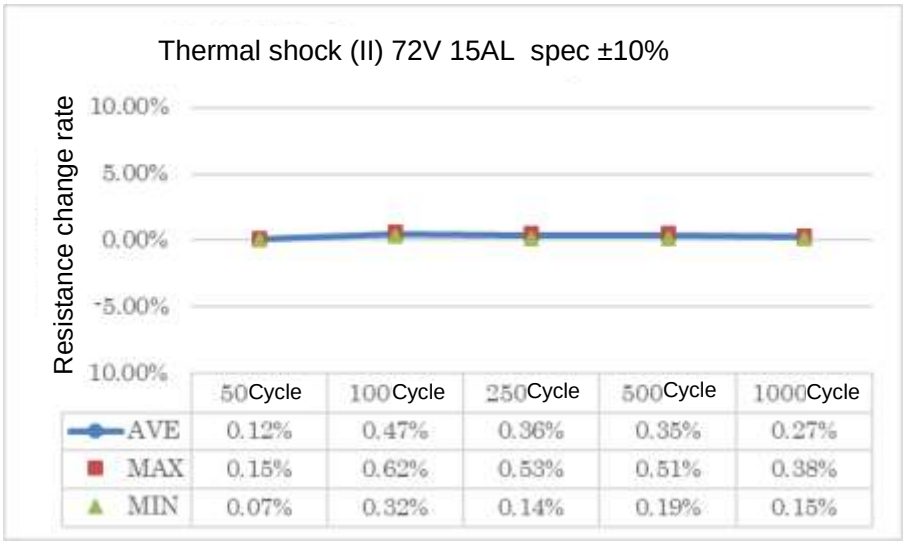
	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
◆AVE	-0.10	-0.08	-0.24	-0.08	-0.03
■MAX	0.15	0.17	0.25	0.10	0.24
▲MIN	-0.27	-0.27	-0.58	-0.22	-0.15

[Resistance change rate after 50 to 1,000 cycles of Thermal shock (II)] -55°C for 30 minutes ⇔ +125°C for 30minutes, 1,000 cycles n=18

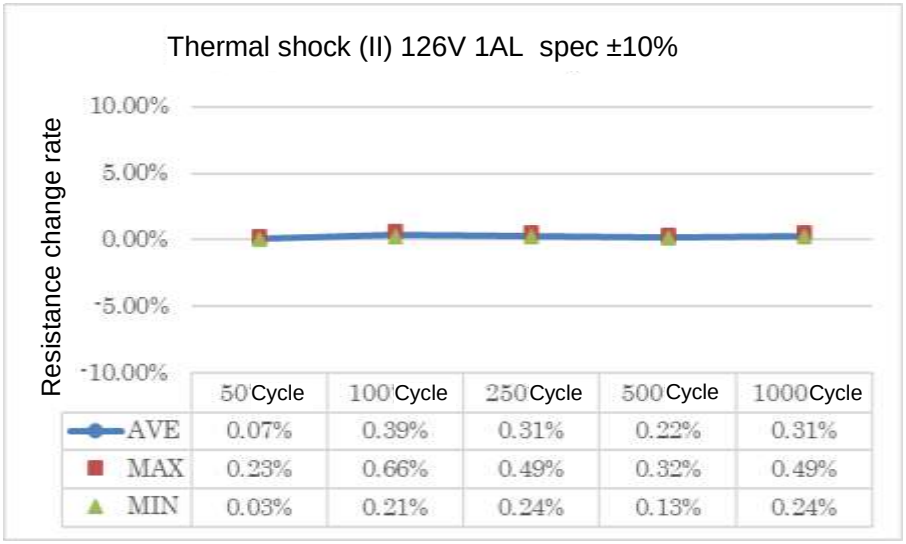


	50Cycle	100Cycle	250Cycle	500Cycle	1000Cycle
AVE	-0.17%	0.26%	0.15%	0.06%	0.17%
MAX	0.00%	0.64%	0.50%	0.28%	0.38%
MIN	-0.49%	-0.05%	-0.34%	-0.28%	-0.12%

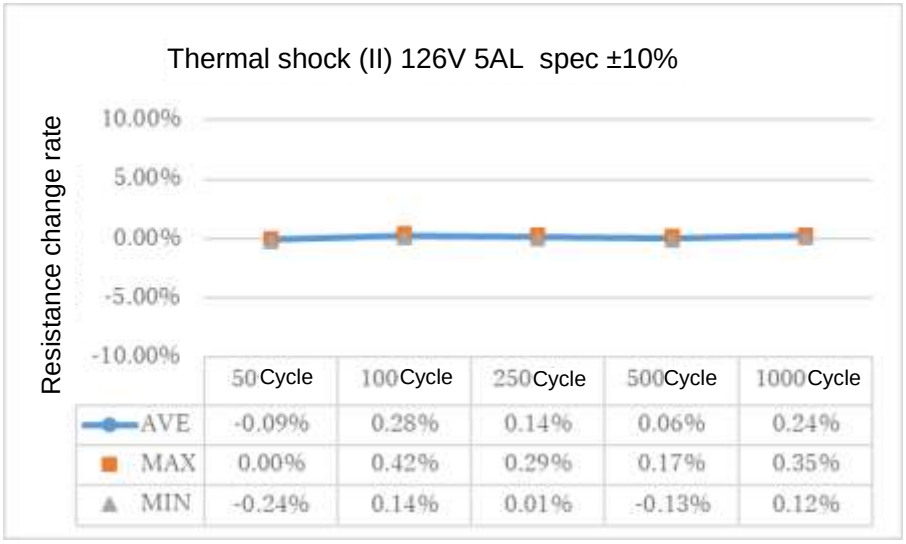
	50Cycle	100Cycle	250Cycle	500Cycle	1000Cycle
AVE	-0.09%	0.27%	0.15%	0.21%	0.35%
MAX	0.05%	0.68%	0.51%	0.57%	0.69%
MIN	-0.30%	-0.20%	-0.15%	-0.10%	0.16%



	50Cycle	100Cycle	250Cycle	500Cycle	1000Cycle
AVE	0.12%	0.47%	0.36%	0.35%	0.27%
MAX	0.15%	0.62%	0.53%	0.51%	0.38%
MIN	0.07%	0.32%	0.14%	0.19%	0.15%

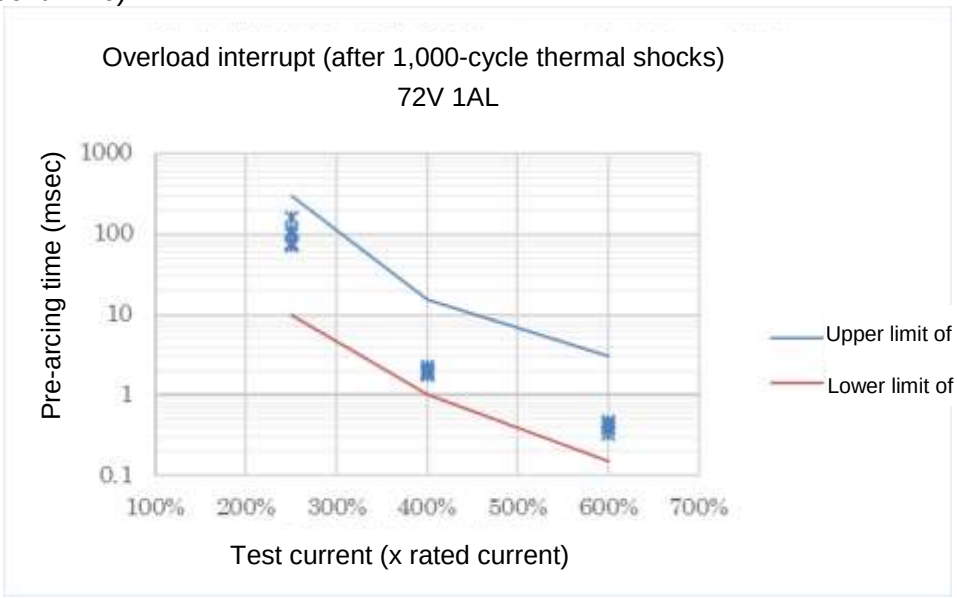


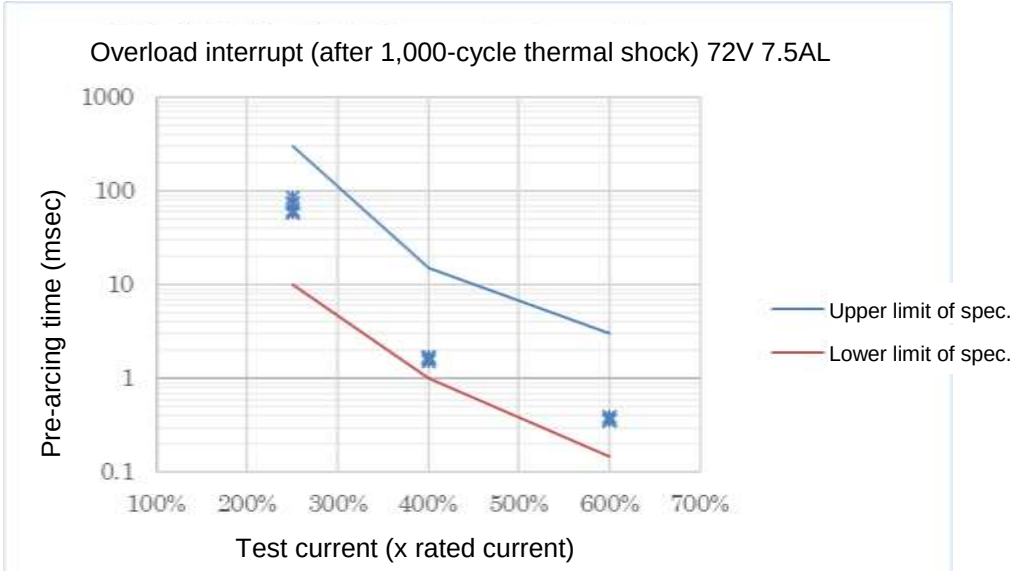
	50 Cycle	100 Cycle	250 Cycle	500 Cycle	1000 Cycle
AVE	0.07%	0.39%	0.31%	0.22%	0.31%
MAX	0.23%	0.66%	0.49%	0.32%	0.49%
MIN	0.03%	0.21%	0.24%	0.13%	0.24%

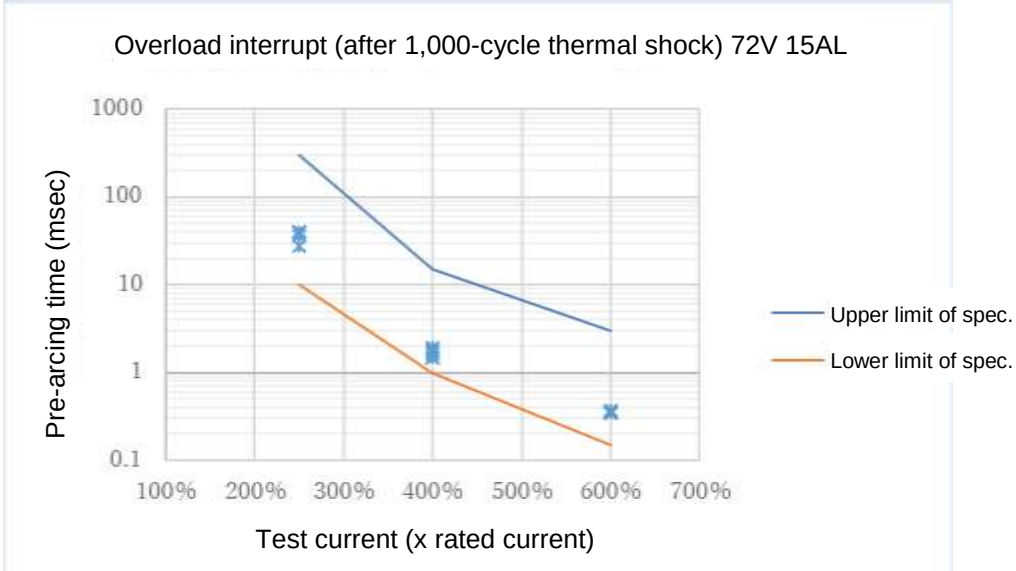


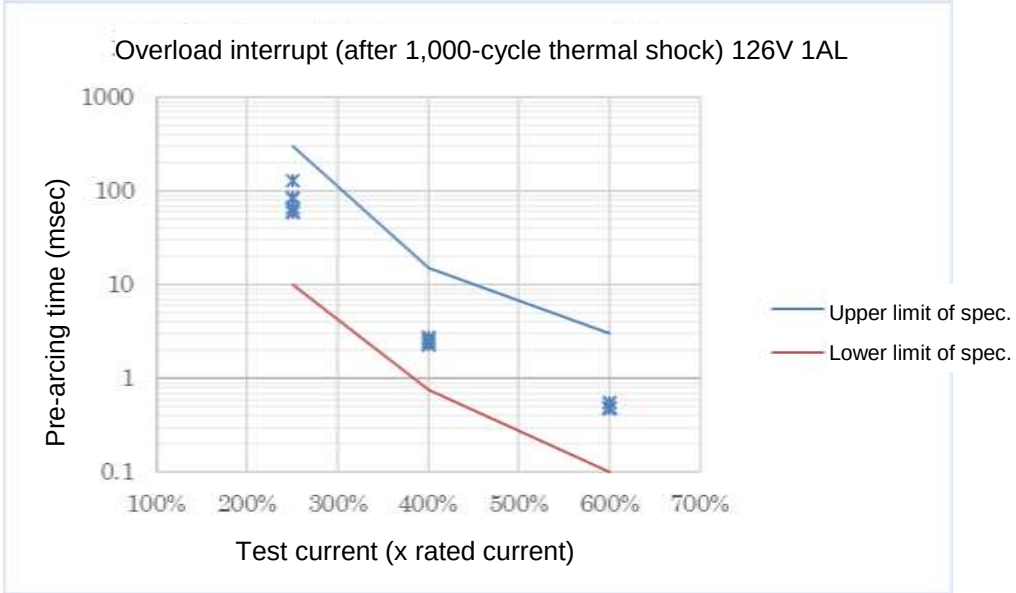
	50 Cycle	100 Cycle	250 Cycle	500 Cycle	1000 Cycle
AVE	-0.09%	0.28%	0.14%	0.06%	0.24%
MAX	0.00%	0.42%	0.29%	0.17%	0.35%
MIN	-0.24%	0.14%	0.01%	-0.13%	0.12%

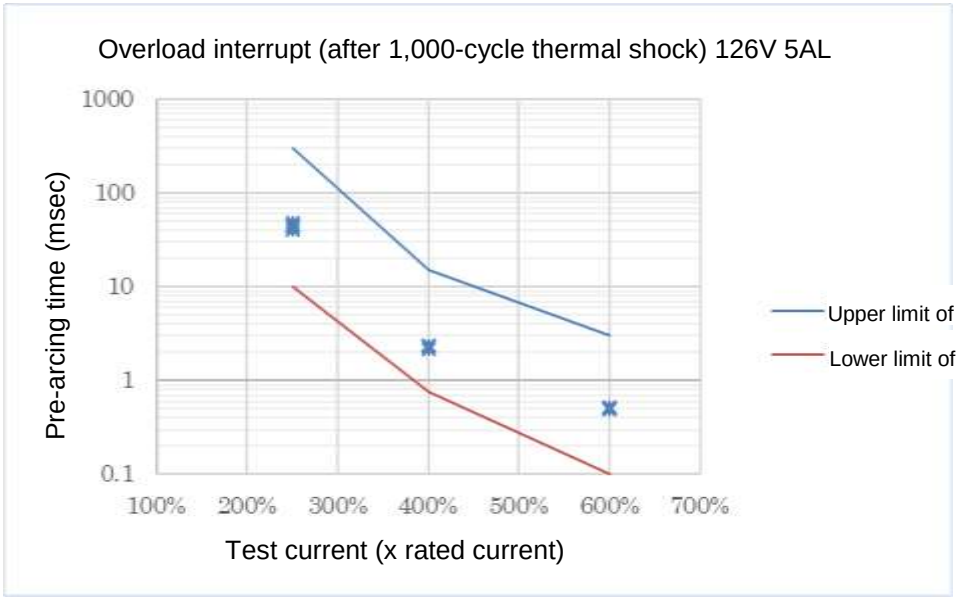
[Overload interrupt after 1,000 cycles of thermal shock (II)] n=18 (250%:n=6, 400%:n=6, 600%: n=6)



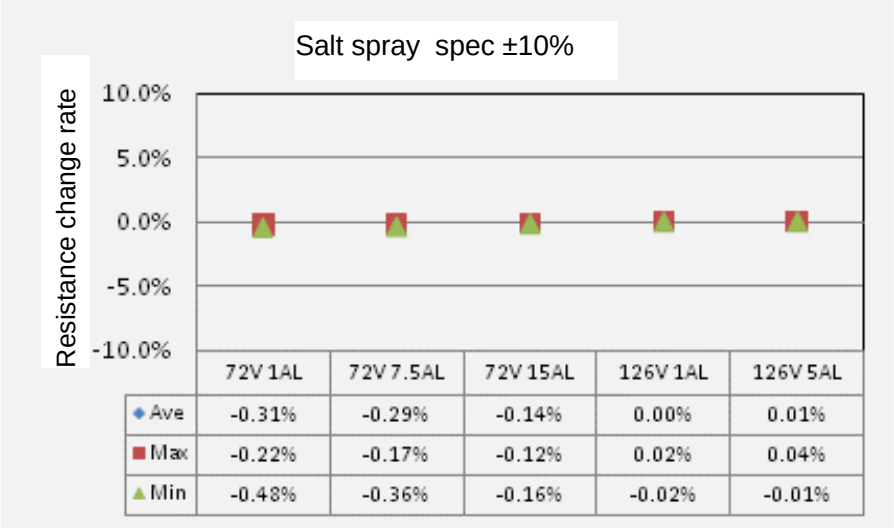

Overload interrupt (after 1,000-cycle thermal shock) 72V 7.5AL
Pre-arcing time (msec)
1000
100
10
1
0.1
100%
200%
300%
400%
500%
600%
700%
Test current (x rated current)
Upper limit of spec.
Lower limit of spec.


Overload interrupt (after 1,000-cycle thermal shock) 72V 15AL
Pre-arcing time (msec)
1000
100
10
1
0.1
100%
200%
300%
400%
500%
600%
700%
Test current (x rated current)
Upper limit of spec.
Lower limit of spec.


Overload interrupt (after 1,000-cycle thermal shock) 126V 1AL
Pre-arcing time (msec)
1000
100
10
1
0.1
100%
200%
300%
400%
500%
600%
700%
Test current (x rated current)
Upper limit of spec.
Lower limit of spec.

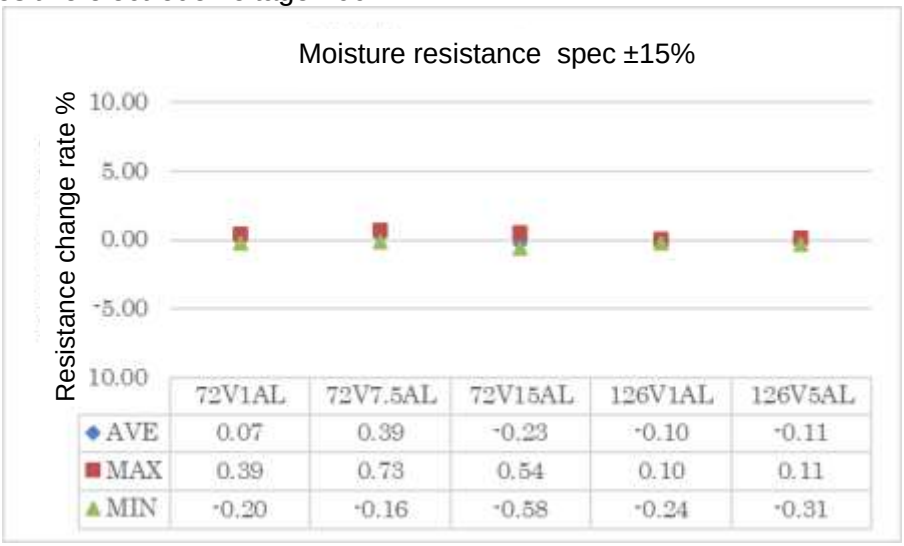


[Salt spray (corrosion)] 48h, 1h of rated current application after drying n=4



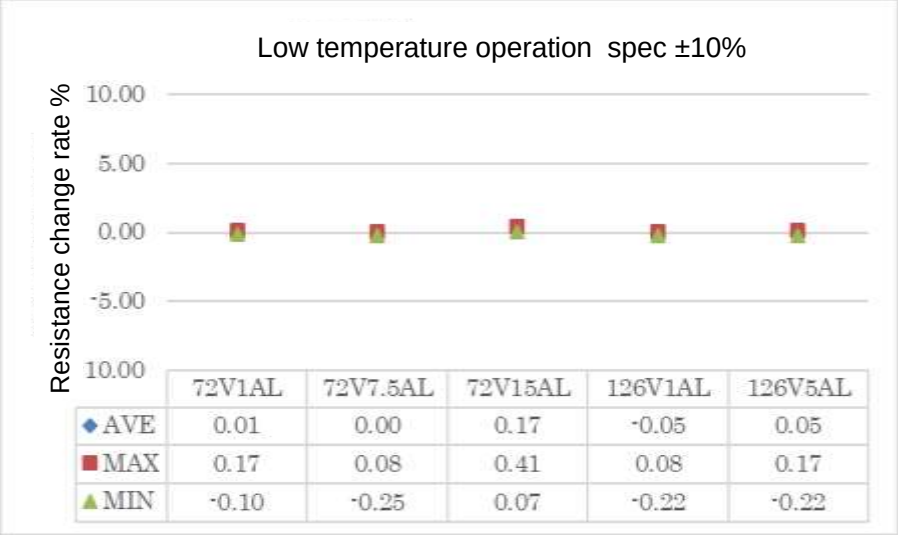
	72V 1AL	72V 7.5AL	72V 15AL	126V 1AL	126V 5AL
Ave	-0.31%	-0.29%	-0.14%	0.00%	0.01%
Max	-0.22%	-0.17%	-0.12%	0.02%	0.04%
Min	-0.48%	-0.36%	-0.16%	-0.02%	-0.01%

[Moisture resistance] 25°C ⇔ 65°C (3h), 90 to 100%RH 10 cycles, positive electrode voltage 100V n=12



	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
AVE	0.07	0.39	-0.23	-0.10	-0.11
MAX	0.39	0.73	0.54	0.10	0.11
MIN	-0.20	-0.16	-0.58	-0.24	-0.31

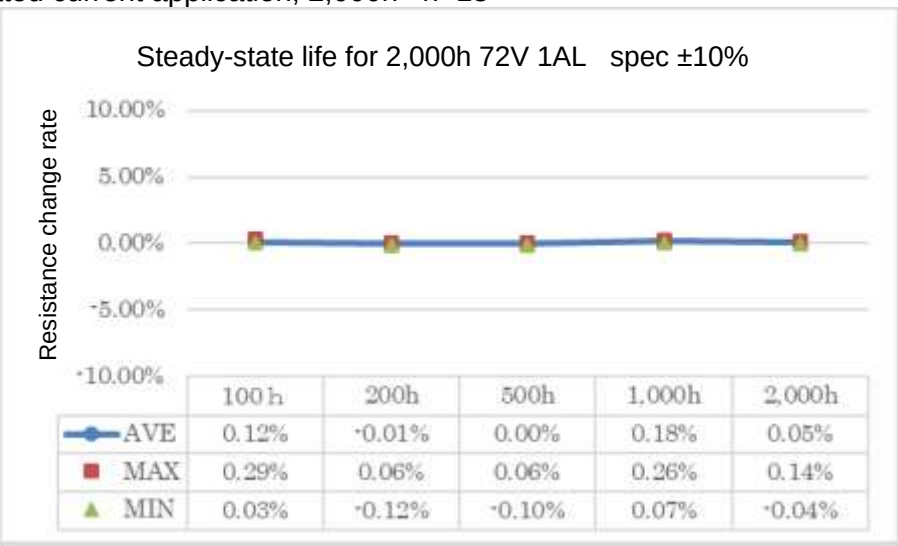
[Low temperature operation] -55°C, rated current application for 4h n=18



	72V1AL	72V7.5AL	72V15AL	126V1AL	126V5AL
AVE	0.01	0.00	0.17	-0.05	0.05
MAX	0.17	0.08	0.41	0.08	0.17
MIN	-0.10	-0.25	0.07	-0.22	-0.22

6. ENVIRONMENTAL LIMITS

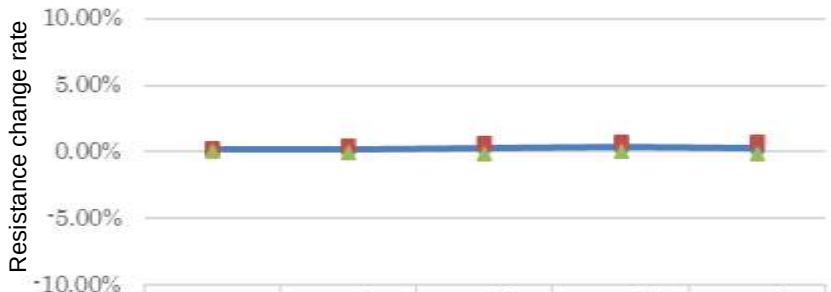
[Resistance change rate after 100 to 2,000 hours of steady-state life] 125°C 64% of rated current application, 2,000h n=18



	100 h	200h	500h	1,000h	2,000h
AVE	0.12%	-0.01%	0.00%	0.18%	0.05%
MAX	0.29%	0.06%	0.06%	0.26%	0.14%
MIN	0.03%	-0.12%	-0.10%	0.07%	-0.04%

	100 h	200h	500h	1,000h	2,000h
AVE	0.14%	0.05%	0.15%	0.23%	0.10%
MAX	0.27%	0.21%	0.32%	0.32%	0.39%
MIN	0.07%	-0.06%	0.01%	0.12%	-0.03%

Steady-state life for 2,000h 72V 15AL spec ±10%



	100 h	200h	500h	1,000h	2,000h
AVE	0.15%	0.18%	0.31%	0.37%	0.28%
MAX	0.28%	0.39%	0.65%	0.73%	0.67%
MIN	0.07%	-0.07%	-0.13%	0.02%	-0.13%

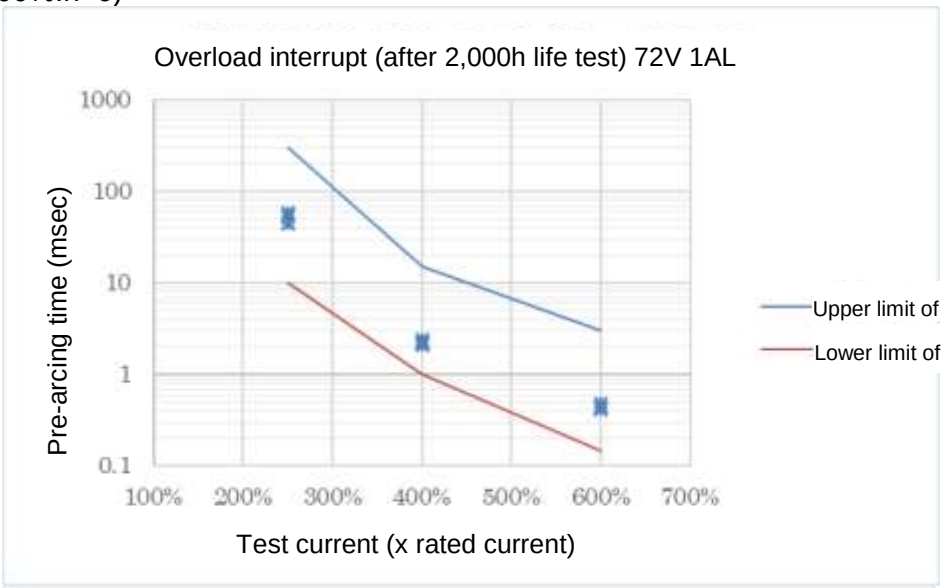
Steady-state life for 2,000h 126V 1AL spec ±10%

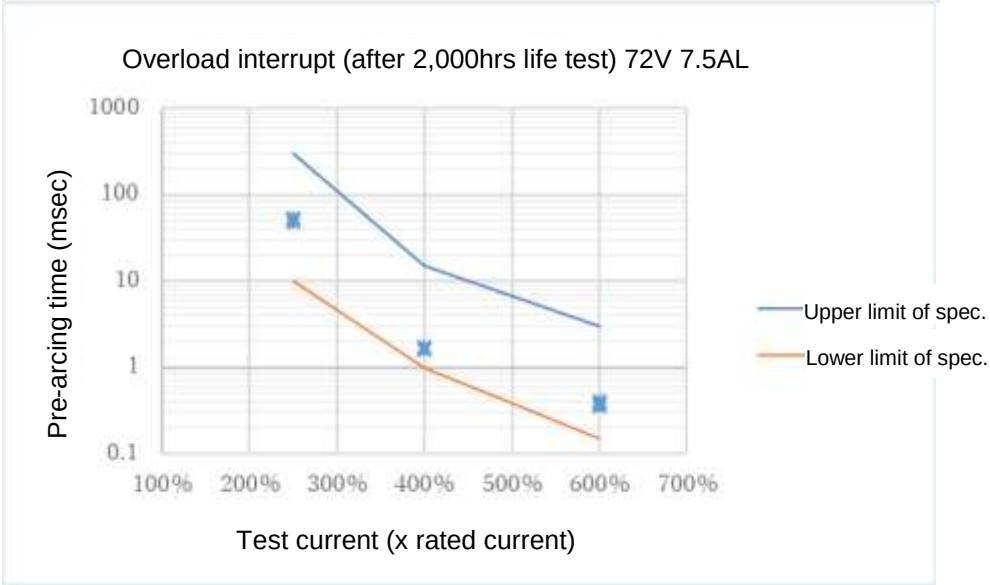
	100 h	200h	500h	1,000h	2,000h
AVE	0.24%	0.09%	0.17%	0.28%	0.18%
MAX	0.47%	0.31%	0.34%	0.48%	0.45%
MIN	0.10%	-0.03%	0.02%	0.18%	0.07%

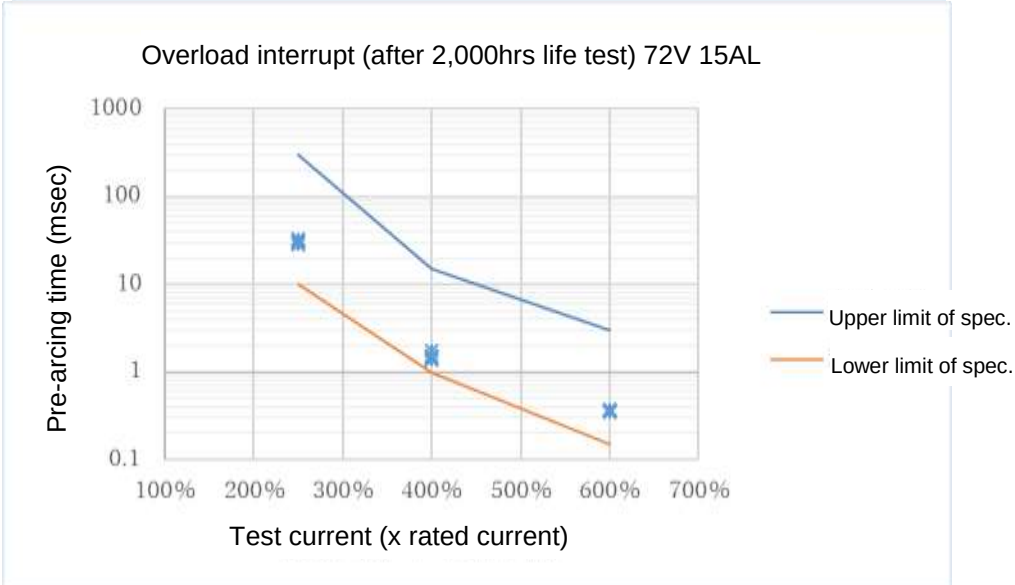
Steady-state life for 2,000h 126V 5AL spec ±10%

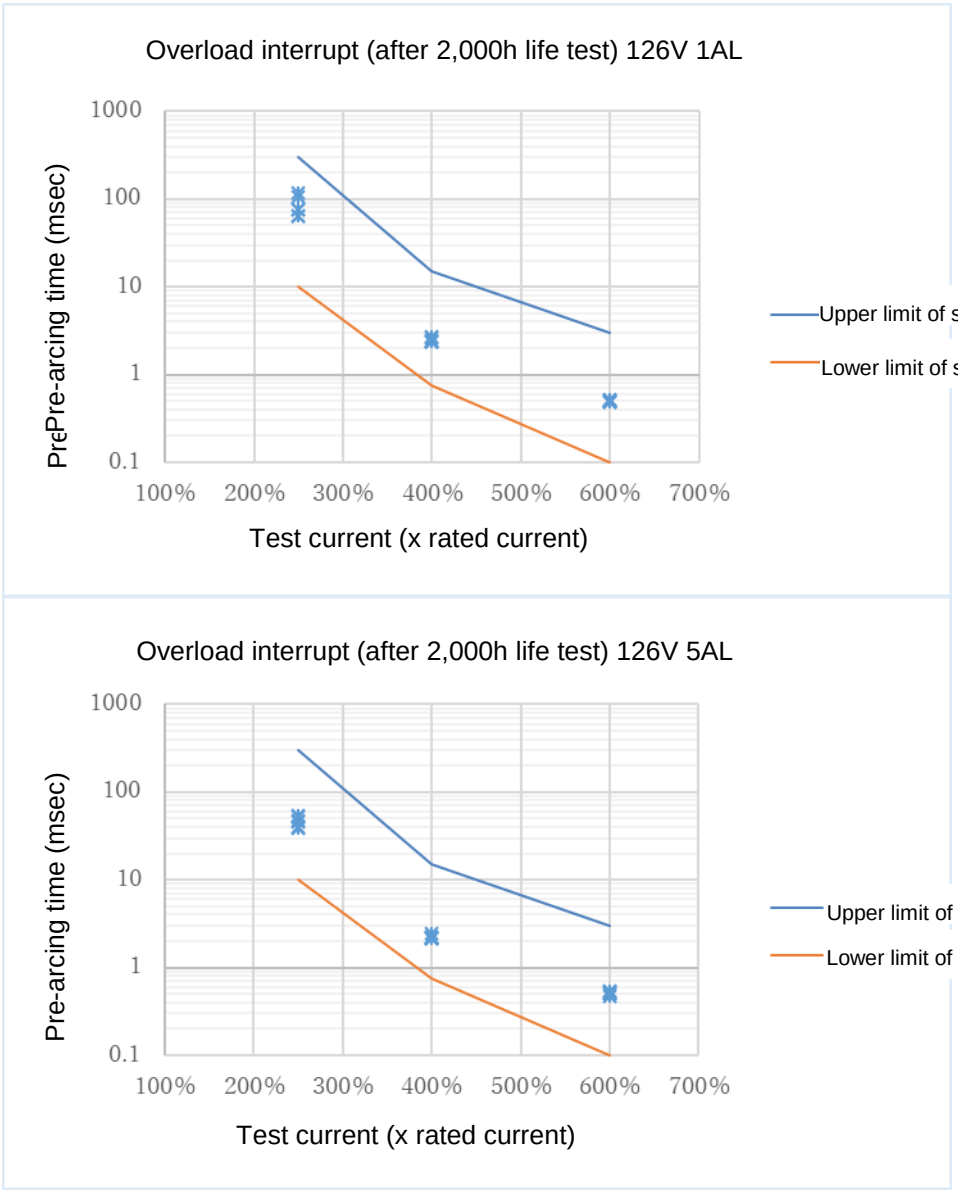
	100 h	200h	500h	1,000h	2,000h
AVE	0.10%	-0.01%	0.09%	0.11%	0.00%
MAX	0.26%	0.23%	0.34%	0.30%	0.26%
MIN	-0.01%	-0.15%	-0.09%	0.01%	-0.11%

[Overload interrupt after 2,000h of steady-state life test] n=18 (250%:n=6, 400%:n=6, 600%:n=6)

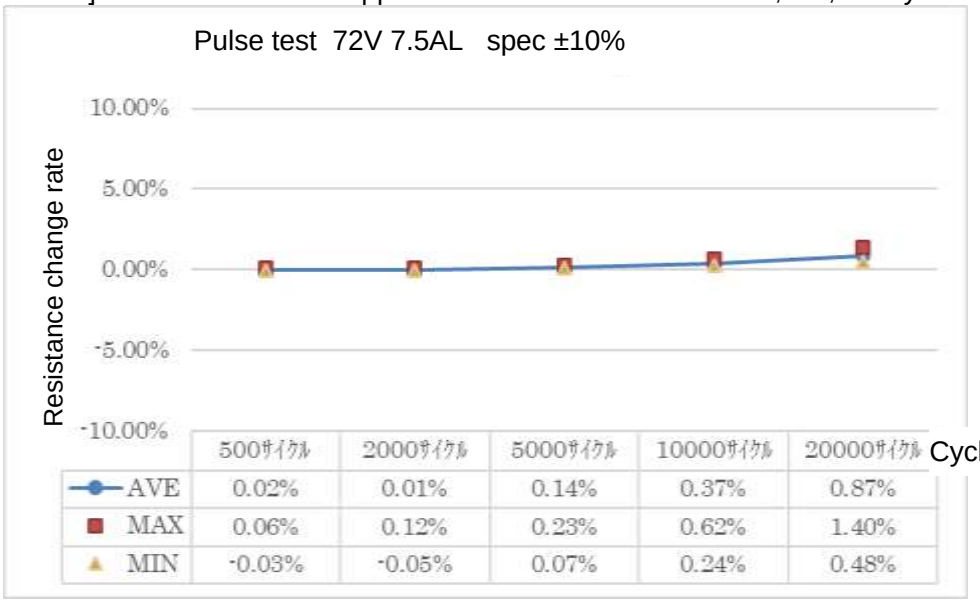




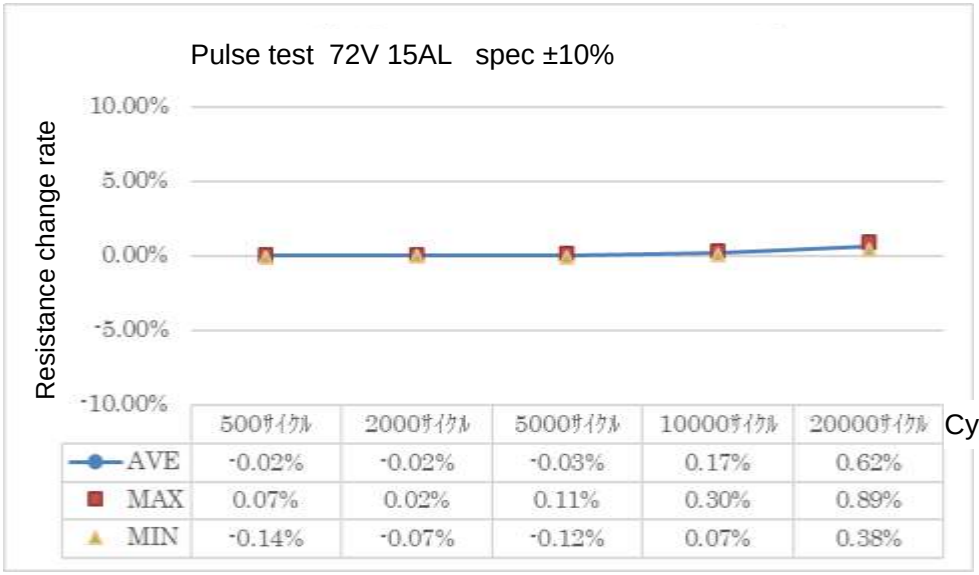




[Pulse test] 25°C rated current application 2 min ON – 2 min OFF, 20,000 cycles n=10



	500ｻｲｸﾙ	2000ｻｲｸﾙ	5000ｻｲｸﾙ	10000ｻｲｸﾙ	20000ｻｲｸﾙ
AVE	0.02%	0.01%	0.14%	0.37%	0.87%
MAX	0.06%	0.12%	0.23%	0.62%	1.40%
MIN	-0.03%	-0.05%	0.07%	0.24%	0.48%



	500ｻｲｸﾙ	2000ｻｲｸﾙ	5000ｻｲｸﾙ	10000ｻｲｸﾙ	20000ｻｲｸﾙ
AVE	-0.02%	-0.02%	-0.03%	0.17%	0.62%
MAX	0.07%	0.02%	0.11%	0.30%	0.89%
MIN	-0.14%	-0.07%	-0.12%	0.07%	0.38%

7. RELIABILITY

7.1 Failure Rate

The failure rate of this product is calculated as follows. These tests were performed at the ambient temperature of 125°C with 64% of rated current (steady-state life) at 25°C and the results from qualification test (2,000h) and evaluation verification (2,000h) were used to calculate the failure rate..

Product	Component hour (h)	No. of defects	Failure rate (fit)
JAXA 2210/101-A	220,000	0	4168

Failure rate calculation
The failure rate is calculated as follows for zero defect:
$\lambda_{60} = 0.917/T$
where
λ: Failure rate
T: Component hour
Reliability level: 60%

7.2 Failure Modes

Possible failure modes are as follows:

- ·Poor electrical continuity (increase in resistance, disconnection)
- ·Pre-arcing time-current characteristics (current - time, insulation resistance)
- ·Reconnection after fusing
- ·Breaking during fusing (case breakage or scattering)

8. 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%) and shall be placed in an environment free of harmful gases such as hydrochloric gas, hydrogen sulfide and sulfurous acid gas.

9. NOTES

When bending lead for use, the lead shall be fixed with longnose pliers or other tools at the part close to fuse body and bend beyond the point.

10. 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: +81-50-5535-5725
Fax: +81-76-429-6630