Self Control Protector (SCP)
- SFJ series Datasheet -

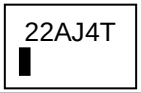
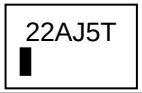
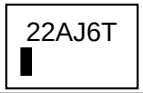
Dexerials Corporation

2024/12/10

Table of Contents

SFJ-xx22T Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells LFP	3 cells	4 cells	5 cells	6 cells
Product	**SFJ-0422T**	**SFJ-0822T**	**SFJ-1022T**	**SFJ-1222T**	**SFJ-1422T**	**SFJ-2022T**	**SFJ-2422T**
Rated Current	22 A						
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm						
Fuse Resistance (Typical)	0.9 m-ohm						
Operating Voltage	3.5 – 5.0 V	6.0 - 9.8 V	7.5 – 11.4 V	9.0 – 15.2 V	12.0 – 19.6 V	15.9 - 24.5 V	20.0 - 27.5 V
Heater Resistance	0.68 – 1.00 ohm	2.29 - 3.30 ohm	3.38 – 5.16 ohm	5.30 – 7.50 ohm	9.75 - 13.25 ohm	16.10 - 23.10 ohm	21.60 - 31.90 ohm
Marking							

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Lead Free		1000ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 300 A at 25 VDC , 80 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	80 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.（MAX）		260 °C

*Notice: The specification may be subject to change without prior notice in the future.

SFJ-xx22U Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells	5 cells
Product	**SFJ-0422U**	**SFJ-0822U**	**SFJ-1222U**	**SFJ-1422U**	**SFJ-2022U**
Rated Current	22 A				
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm				
Fuse Resistance (Typical)	0.9 m-ohm				
Operating Voltage	3.5 - 4.7 V	6.0 - 9.2 V	9.0 - 13.8 V	12.0 - 18.5 V	15.9 - 23.1 V
Heater Resistance	0.68 – 1.00 ohm	2.29 - 3.30 ohm	5.30 - 7.50 ohm	9.75 - 13.25 ohm	16.10 - 23.10 ohm
Marking	22AJ1U	22AJ2U	22AJ3U	22AJ4U	22AJ5U

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 300 A at 25 VDC , 80 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	80 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.（MAX）		260 °C

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SFJ-xx15T Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells	5 cells	6-7cells	8 cells	9-10 cells	11-12 cells	13-14 cells
Product	**SFJ-0415T**	**SFJ-0815T**	**SFJ-1215T**	**SFJ-1415T**	**SFJ-2015T**	**SFJ-2815T**	**SFJ-3215T**	**SFJ-4015T**	**SFJ-4815T**	**SFJ-5615T**
Rated Current	15 A									
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm									
Fuse Resistance (Typical)	1.5 m-ohm									
Operating Voltage	3.0-5.0 V	5.0 - 9.8 V	7.4 - 14.6 V	10.5 – 19.6 V	12.5 - 24.0 V	19.8 - 32.9 V	24.0 - 37.6 V	32.0 - 47.0 V	35.0 - 52.8 V	41.0 - 61.6 V
Heater Resistance	0.53-0.90 ohm	2.01 – 2.94 ohm	4.45 - 6.44 ohm	8.10 – 12.90 ohm	12.00 – 18.30 ohm	31.00 – 46.10 ohm	44.20 – 67.70 ohm	76.20 – 120.0 ohm	96.20 – 144.0 ohm	136.0 – 210.0 ohm
Marking	15AJ1T	15AJ2T	15AJ3T	15AJ4T	15AJ5T	15AJ7T	15AJ8T	15AJ10T	15AJ12T	15AJ14T

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Lead Free		1000 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC ,70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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SFJ-xx15U Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells	5 cells
Product	**-**	**SFJ-0815U**	**SFJ-1215U**	**SFJ-1415U**	**SFJ-2015U**
Rated Current	-	15 A			
Size	-	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm			
Fuse Resistance (Typical)	-	1.5 m-ohm			
Operating Voltage	-	5.0 – 9.0 V	7.4 - 13.8 V	10.5 - 19.6 V	14.4 - 23.5 V
Heater Resistance	-	2.20 – 3.30 ohm	5.50 – 8.40 ohm	10.40 – 15.80 ohm	17.90 - 29.10 ohm
Marking	-	15AJ2U	15AJ3U	15AJ4U	15AJ5U

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC , 70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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SFJ-xx15W Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells	5 cells	6 cells	7 cells	8 cells	9-10 cells	11-12 cells	13-14 cells
Product	**SFJ-0415W**	**SFJ-0815W**	**SFJ-1215W**	**SFJ-1415W**	**SFJ-2015W**	**SFJ-2415W**	**SFJ-2815W**	**SFJ-3215W**	**SFJ-4015W**	**SFJ-4815W**	**SFJ-5615W**
Rated Current	15 A										
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm										
Fuse Resistance (Typical)	2.0 m-ohm										
Operating Voltage	3.0 – 5.0 V	5.0 - 9.0 V	7.4 - 13.8 V	10.5 - 19.6 V	13.0 - 23.5 V	14.1 – 28.0 V	16.5 - 31.5 V	18.8 - 36.0 V	25.0 - 47.0 V	32.0 - 56.4 V	35.0 - 62.0 V
Heater Resistance	0.77 - 1.29 ohm	2.38 - 3.58 ohm	5.44 – 8.16 ohm	11.00 – 16.50 ohm	16.00– 24.00 ohm	22.50 – 30.50 ohm	28.40 - 40.80 ohm	37.10 - 53.30 ohm	74.00 - 105.0 ohm	106.0 - 170.0 ohm	129.0 - 202.0 ohm
Marking	15AJ1W	15AJ2W	15AJ3W	15AJ4W	15AJ5W	15AJ6W	15AJ7W	15AJ8W	15AJ10W	15AJ12W	15AJ14W

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC ,70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	70 A at 62 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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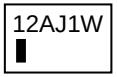
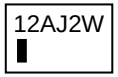
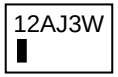
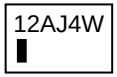
SFJ-xx12W Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells
Product	**SFJ-0412W**	**SFJ-0812W**	**SFJ-1212W**	**SFJ-1412W**
Rated Current	12 A			
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm			
Fuse Resistance (Typical)	2.4 m-ohm			
Operating Voltage	3.0 - 5.5 V	4.0 - 9.0 V	7.4 - 13.8 V	10.5 - 19.6 V
Heater Resistance	1.00 - 1.50 ohm	2.00 - 3.20 ohm	5.70 - 9.90 ohm	11.20 - 20.00 ohm
Marking				

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	50 A at 36 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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SFJ-xx12Y Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells
Product	**—**	**SFJ-0812Y**	**SFJ-1212Y**	**—**
Rated Current	—	12 A		—
Size	—	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm		—
Fuse Resistance (Typical)	—	2.4 m-ohm		—
Operating Voltage	—	5.0 – 10.0 V	7.4 – 15.0 V	—
Heater Resistance	—	2.90 – 5.00 ohm	6.50 – 10.10 ohm	—
Marking	—	12AJ2Y	12AJ3Y	—

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Antimony Free		700 ppm or less
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	50 A at 36 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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SFJ-xx12U Series Specification

Products Lineup

Applicable Cells in series	1 cell	2 cells	3 cells	4 cells
Product	**SFJ-0412U**	**SFJ-0812U**	**SFJ-1212U**	**SFJ-1412U**
Rated Current	12 A			
Size	$4.0^{+0.3/-0.2}$ x $3.0^{+0.3/-0.2}$ x $0.85^{\pm 0.1}$ mm			
Fuse Resistance (Typical)	2.4 m-ohm			
Operating Voltage	3.0 - 4.5 V	4.0 - 9.0 V	7.4 - 13.8 V	10.5 - 19.6 V
Heater Resistance	0.60 - 1.50 ohm	2.00 - 3.20 ohm	5.70 - 9.90 ohm	11.20 - 20.00 ohm
Marking	12AJ1U	12AJ2U	12AJ3U	12AJ4U

Items		General Specification
Environmental Compliance		Compliance with RoHS
Halogen Free		Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br+Cl=1500 ppm or less (By weight)
Certification		UL248-14 (File No. E167588), TUV (Certificate No. J9650637)
Rated Breaking Capacity Rated Voltage	UL	50 A at 36 VDC , 200 A at 48 VDC , 250 A at 25 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
	TUV	50 A at 36 VDC This value is the maximum voltage can be cut off by fuse. It doesn't represent the operational voltage of the heater.
Reflow Temp.(MAX)		260 °C

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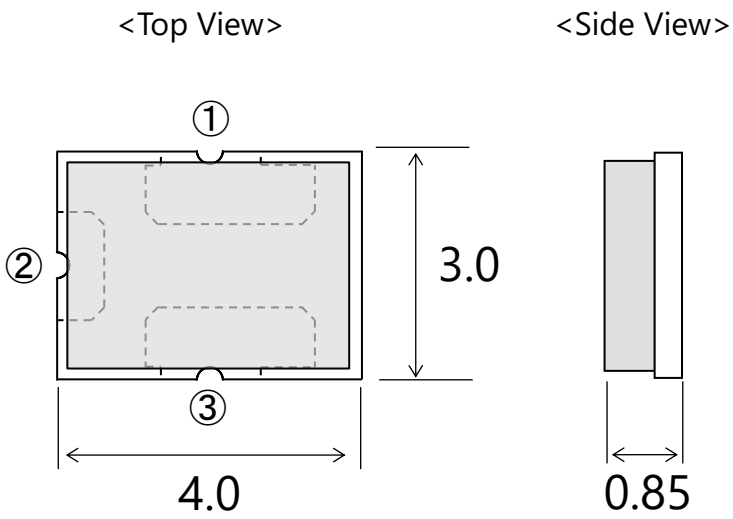
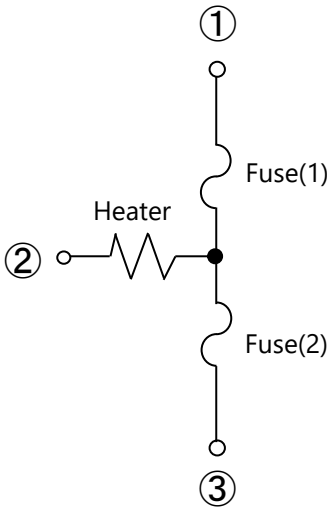
External View & Equivalent Circuit

Series Name	Dimensions	Equivalent Circuit
SFJ Series		

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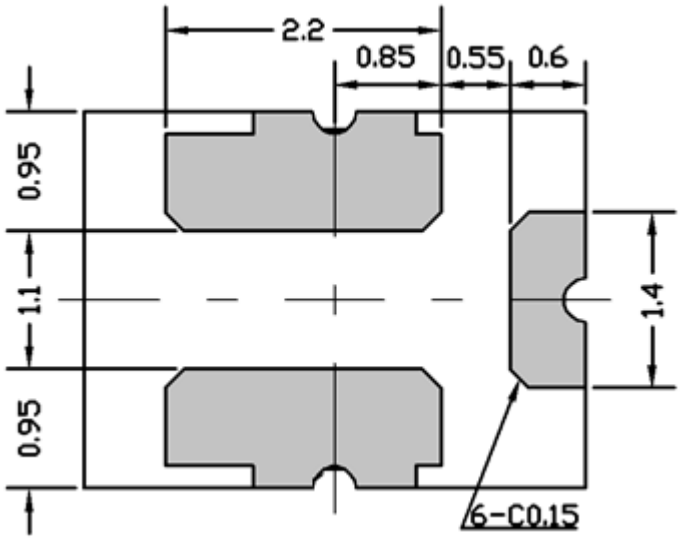
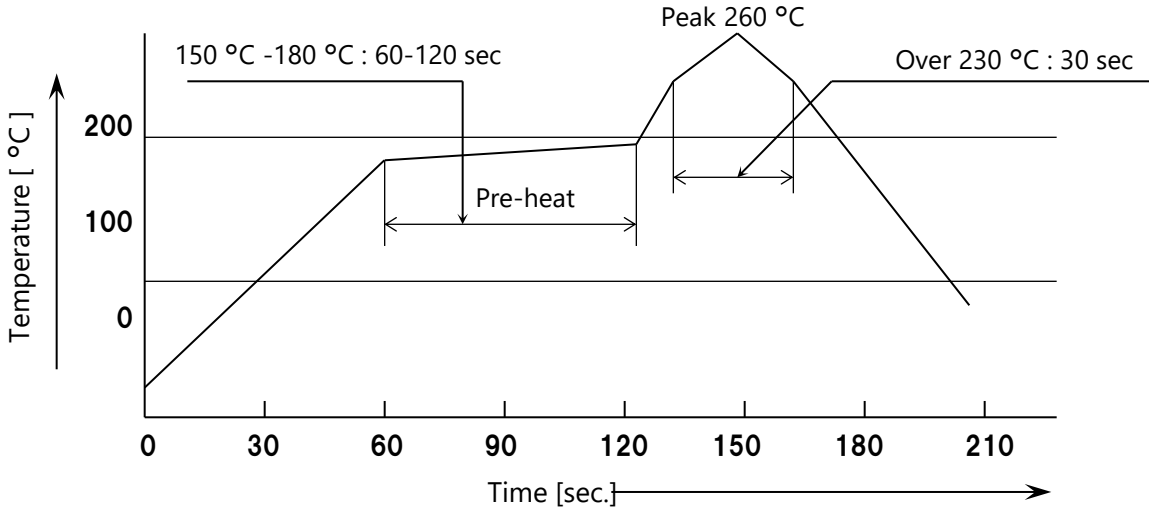
Terminal Size & Reflow Soldering

Terminal Size (Unit: mm. Not in scale.)



Reflow Soldering Profile (Temperature shown below is measured at the electrode portion of SCP.)



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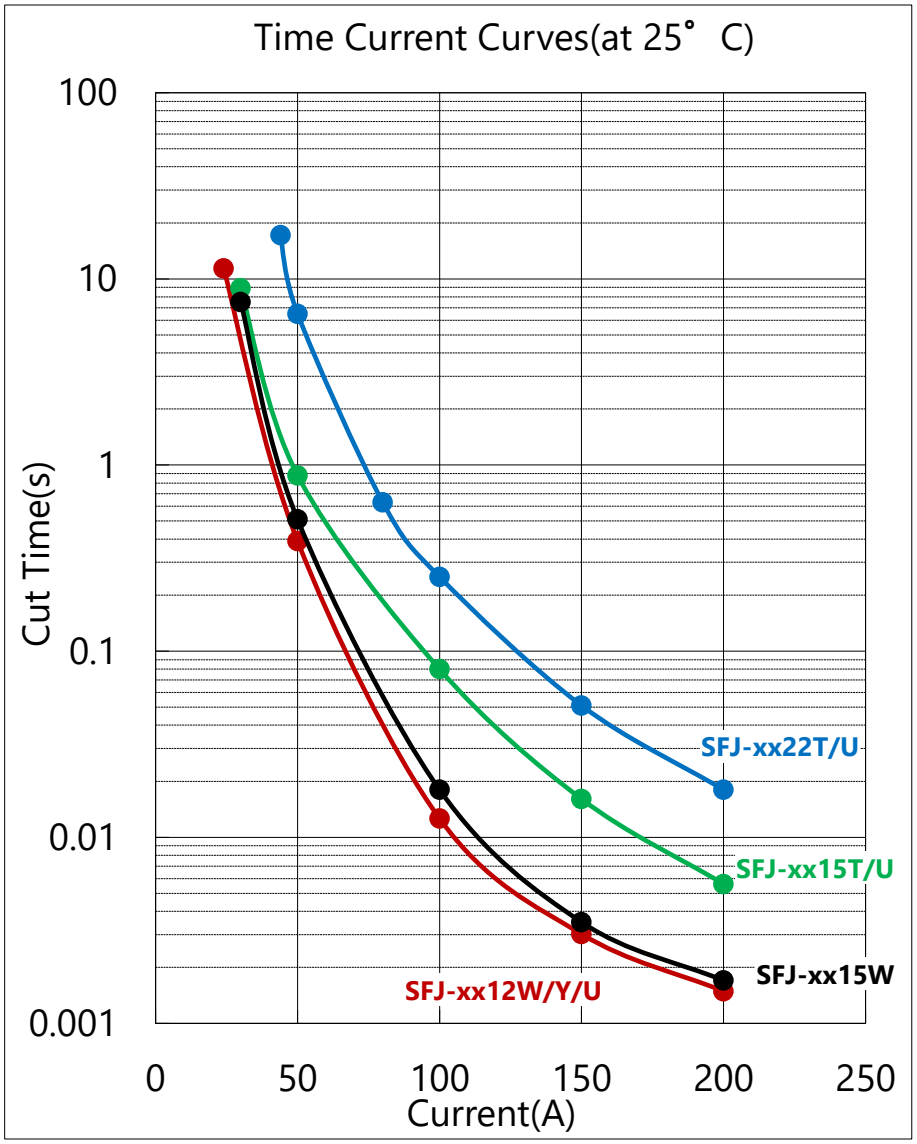
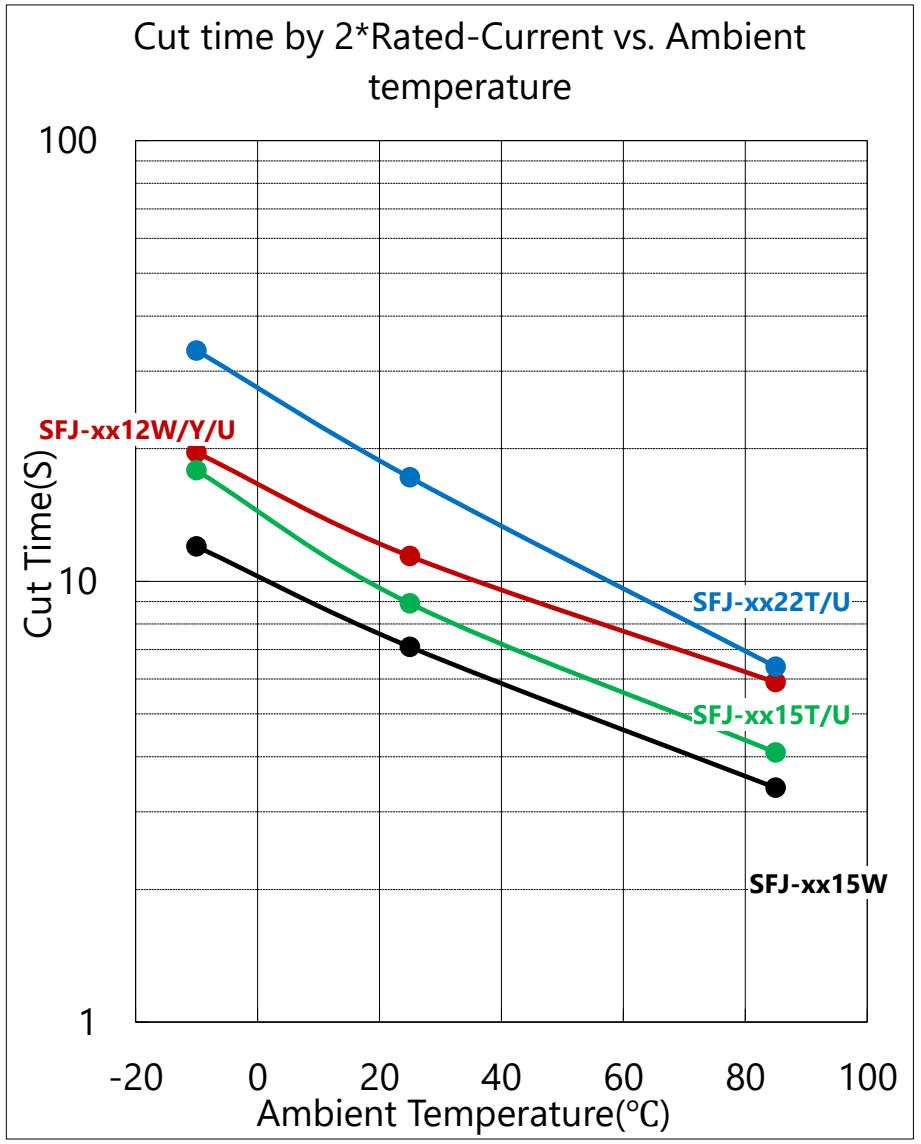
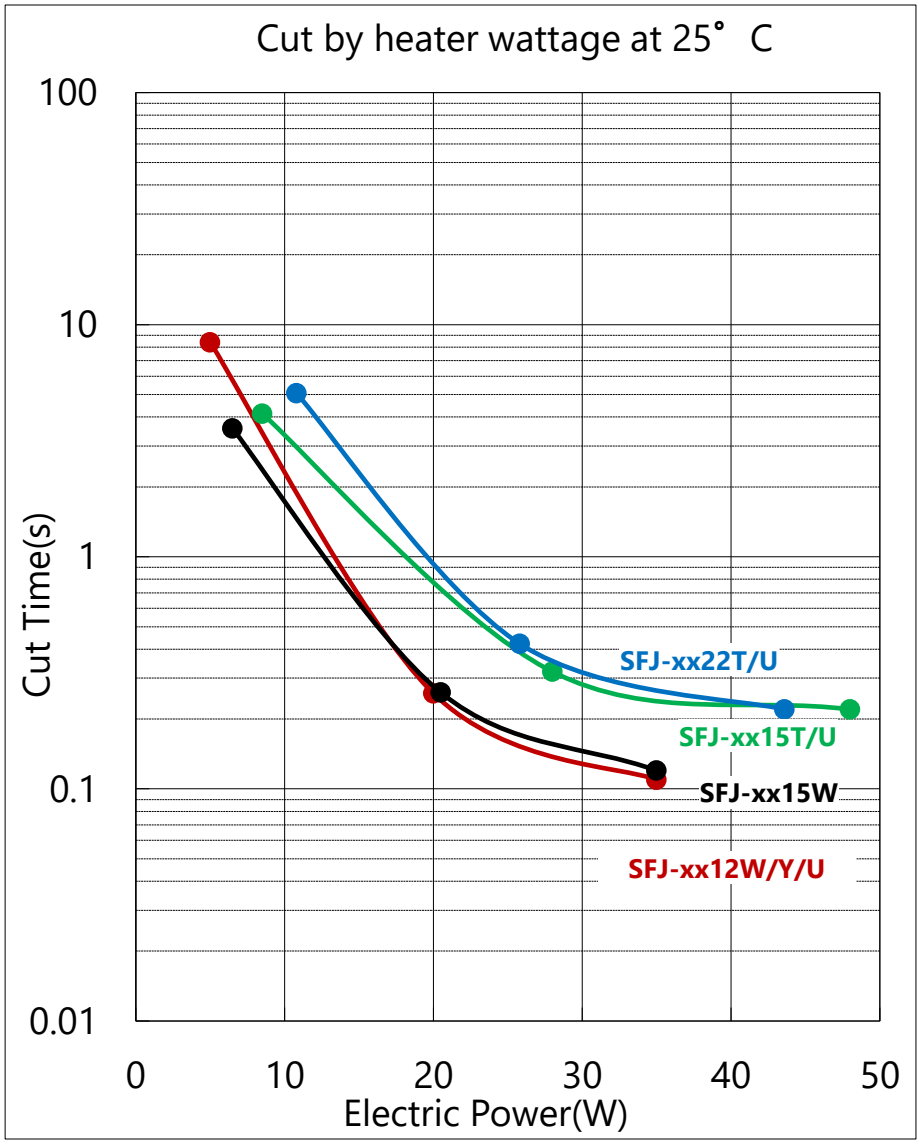
Current Operation

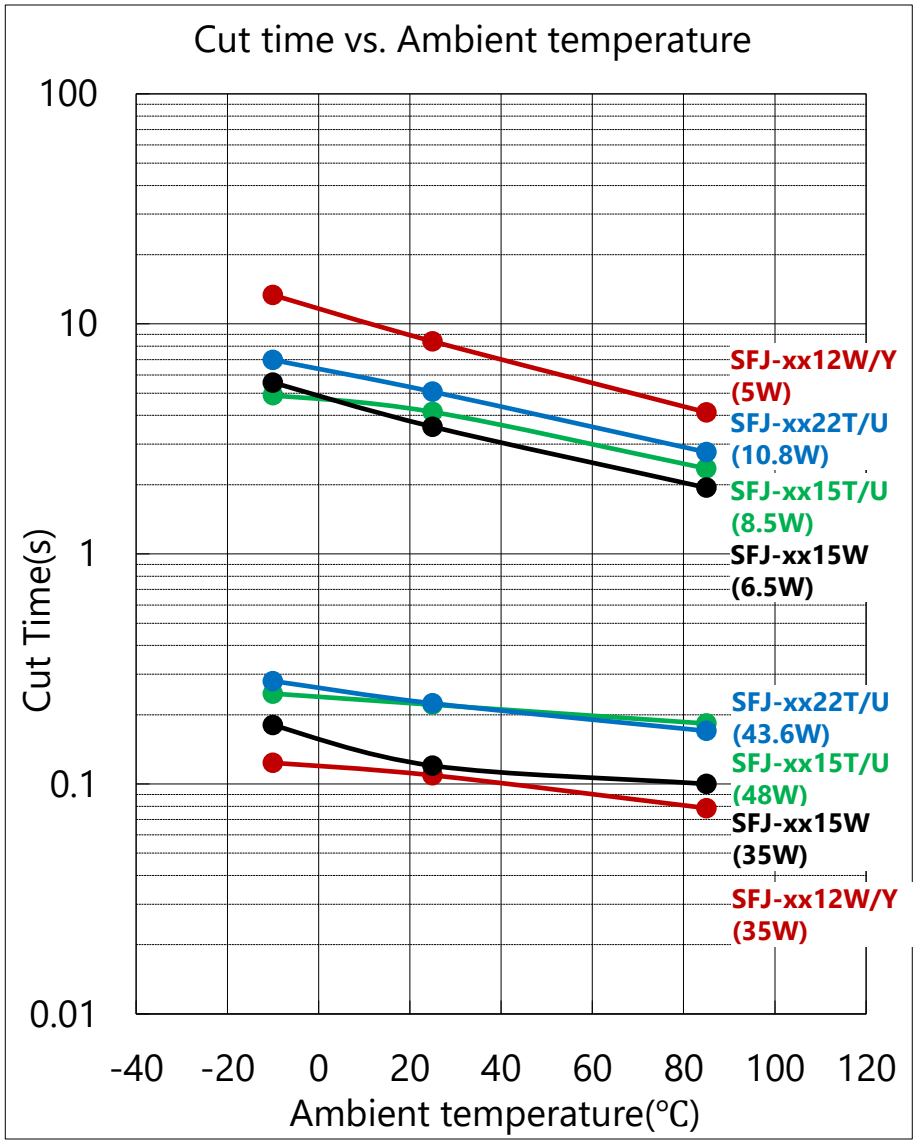




(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).

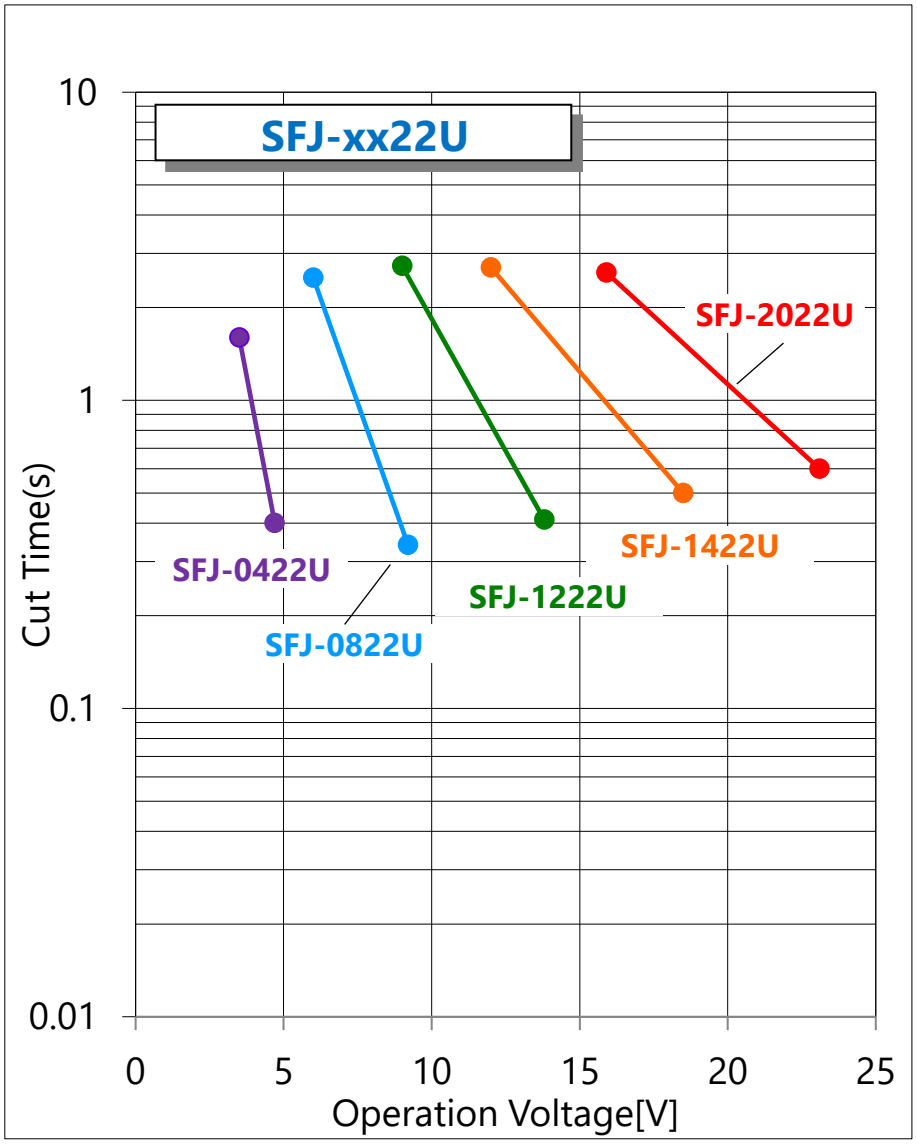
Heater Operation

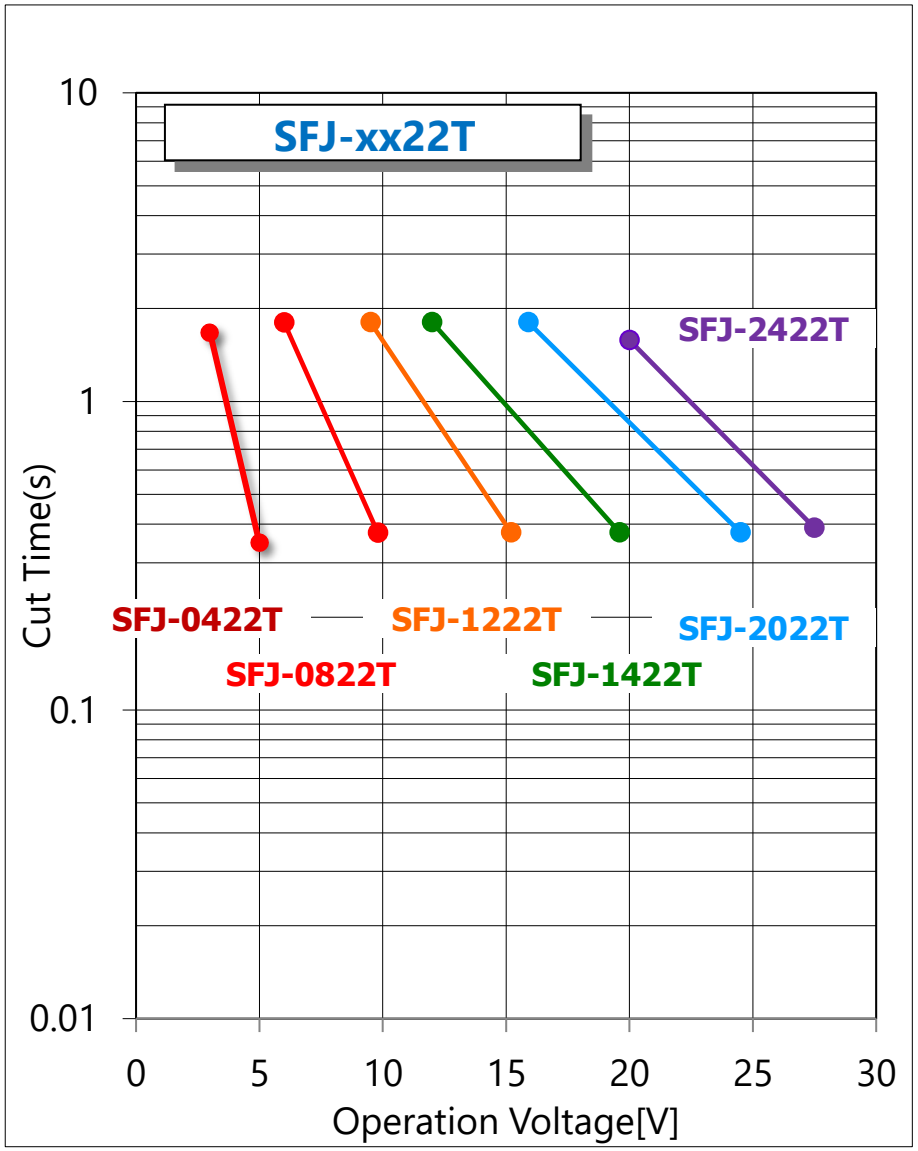




(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).

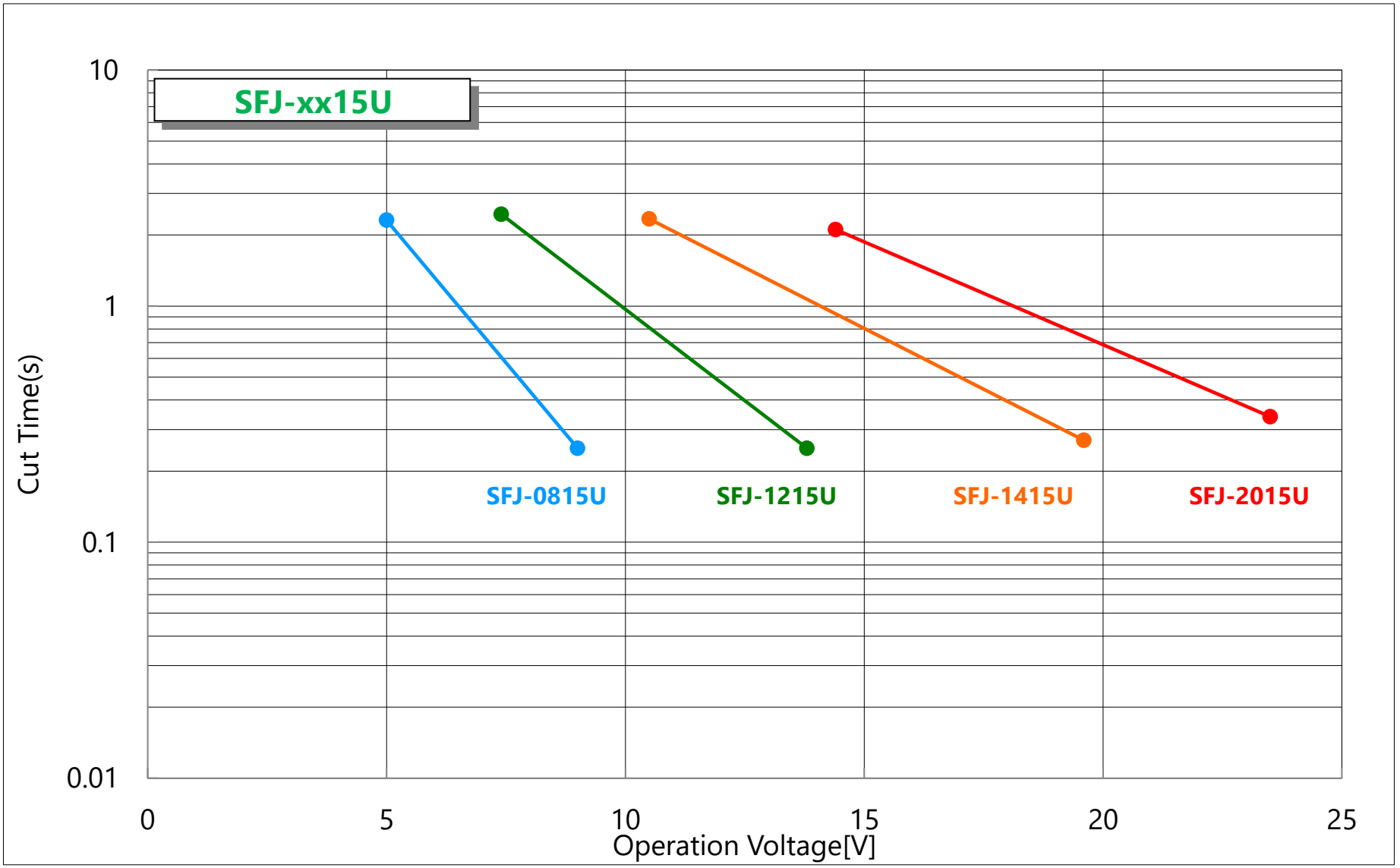
Cut By Heater Voltage at 25°C





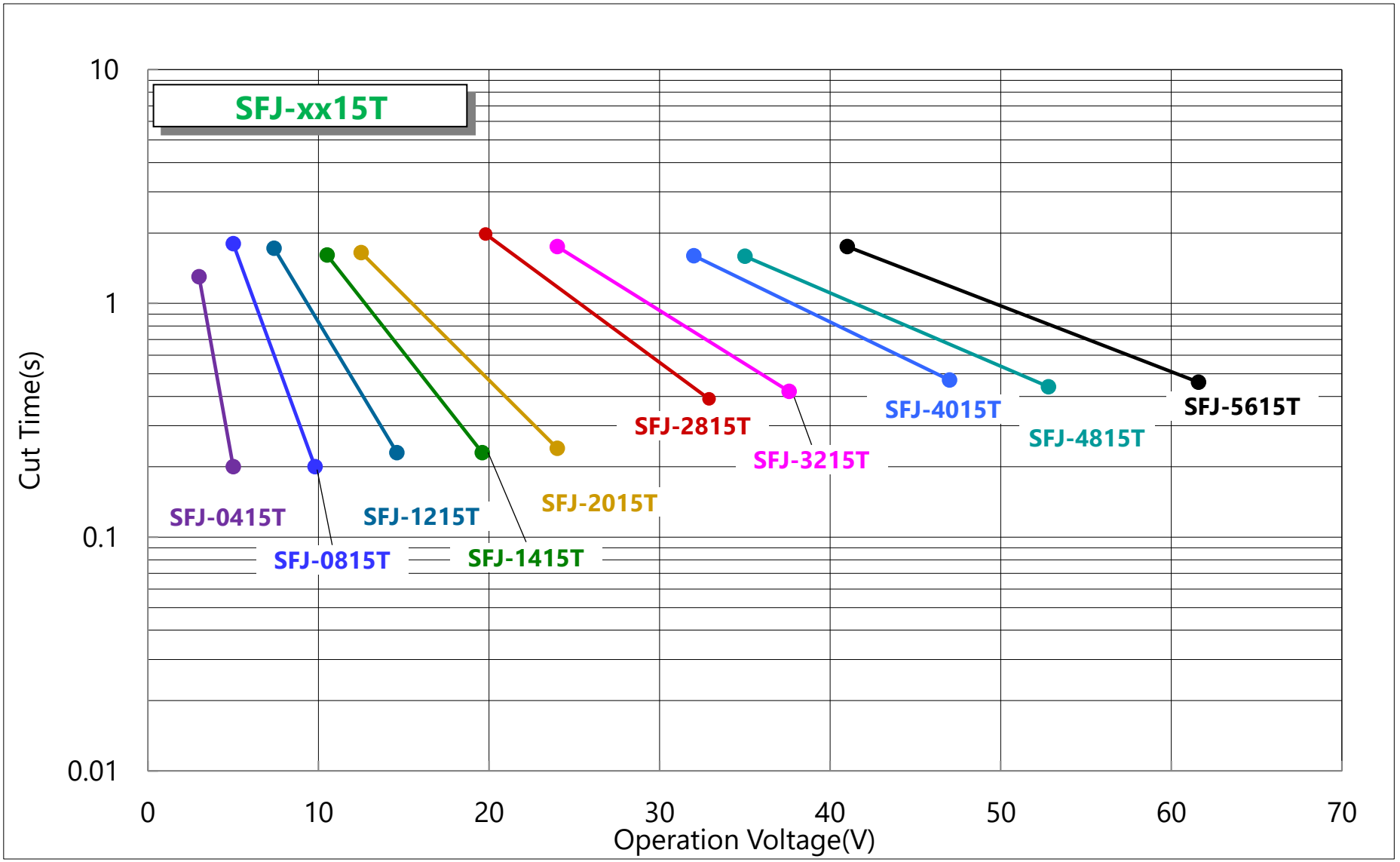
(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).
(*Caution)The specification may be subject to change without prior notice in the future.

Cut By Heater Voltage at 25°C



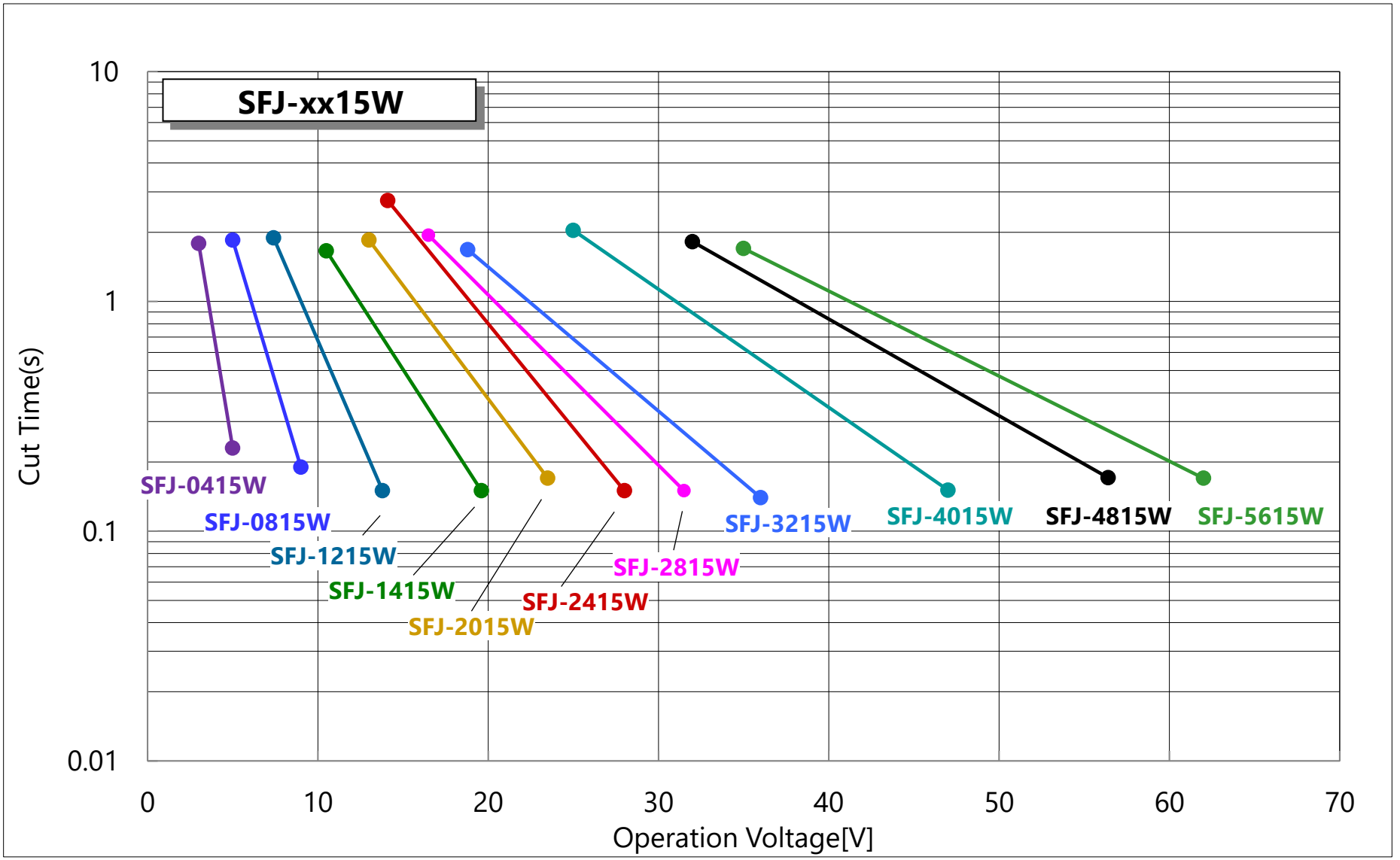
(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).
(*Caution)The specification may be subject to change without prior notice in the future.

Cut By Heater Voltage at 25°C



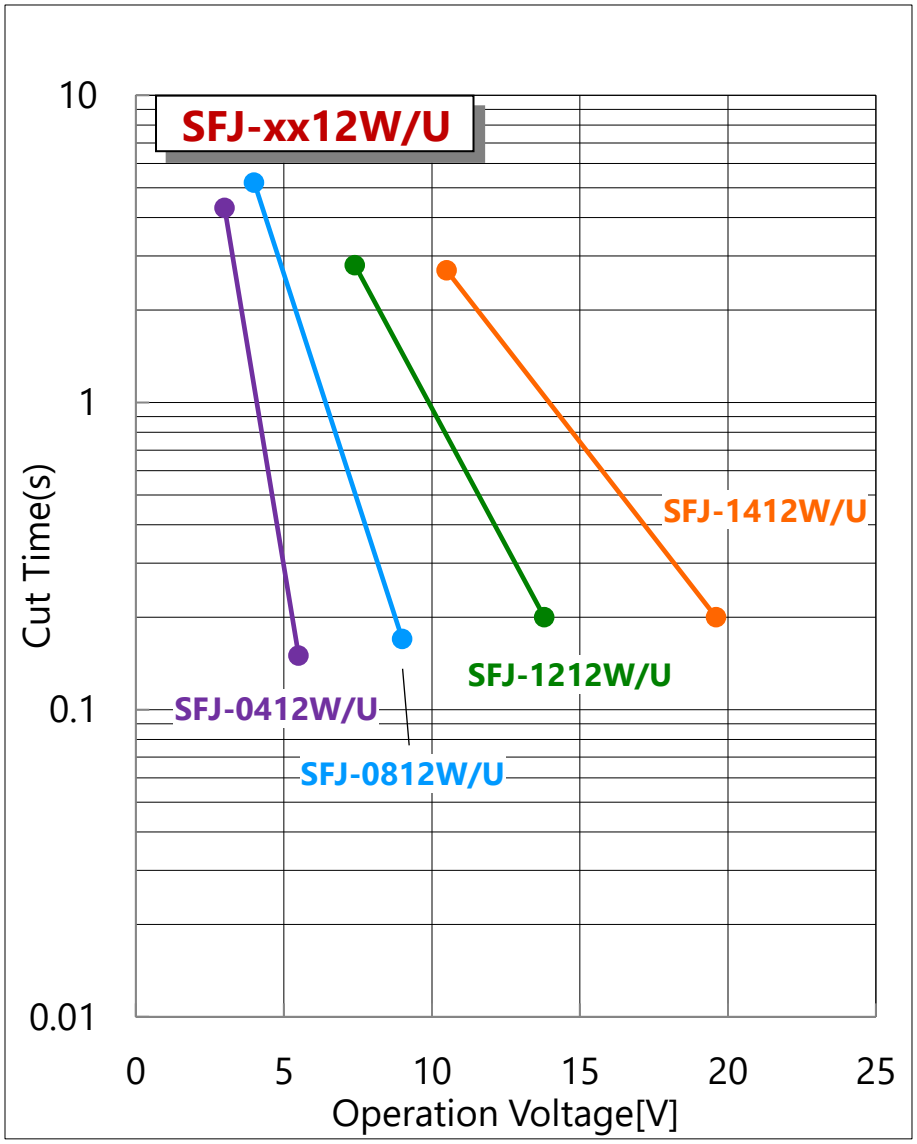
(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).
(*Caution)The specification may be subject to change without prior notice in the future.

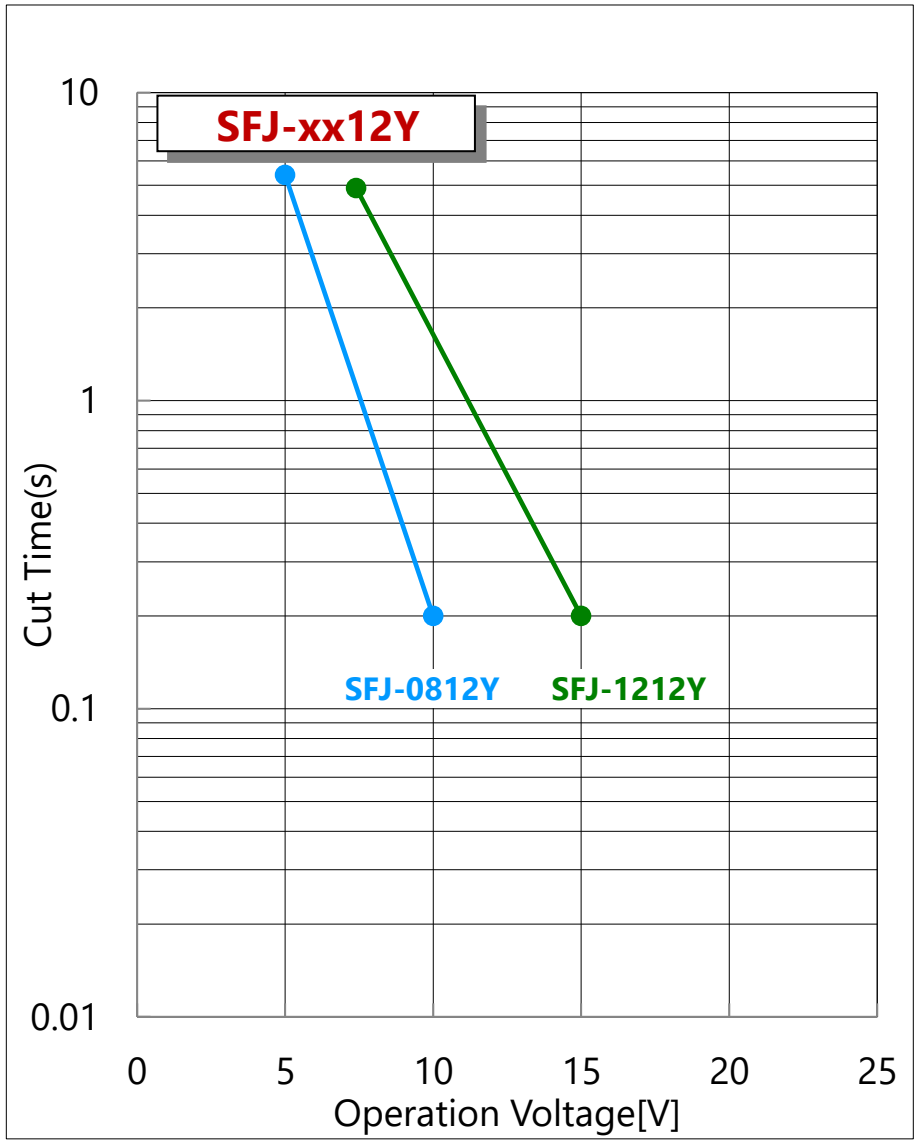
Cut By Heater Voltage at 25°C



(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).
(*Caution)The specification may be subject to change without prior notice in the future.

Cut By Heater Voltage at 25°C





(*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).
(*Caution)The specification may be subject to change without prior notice in the future.

Current Carrying Capacity

Product Name	Nominal Rated current	Current-Carrying Capacity (*1)			Current Rush Withstand (*2)
		25 °C	40 °C	60 °C	
SFJ-xx22T/U	22 A	27.0 A	24.0 A	20.0 A	145 A-10 ms
SFJ-xx15T/U	15 A	18.0 A	16.0 A	13.5 A	100 A-10 ms
SFJ-xx15W	15 A	18.0 A	16.0 A	13.5 A	80 A-10 ms
SFJ-xx12W/Y/U	12 A	13.0 A	11.5 A	9.5 A	80 A-10 ms

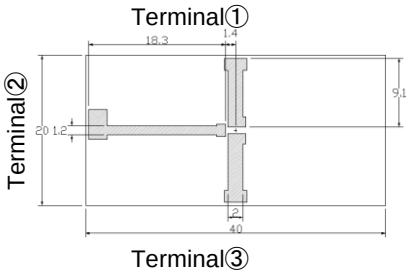
(*Note)

1. This is the standard value derived from a temperature of 100 degrees Celsius, a temperature at which we have verified the reliability using our company's standard PCB (0.6 t Glass Epoxy single-sided copper-clad laminates). The thermal capacity of the PCB can affect it, so we recommend verifying it with your specific PCB.
   -> 25 °C, 40 °C and 60 °C are ambient temperature.
   -> The temperature at which we verified reliability is not a critical condition. SCP fusing-off temperature is 200 °C or more.
   -> The current-carrying capacity is measured under thermal equilibrium conditions. Therefore, if the duration of current-carrying is short, the current-carrying capacity will increase.
2. Reliability was confirmed under the test conditions (10 ms-On, 9990 ms-Off, 500 cycle). However, this does not mean critical conditions for SCP.

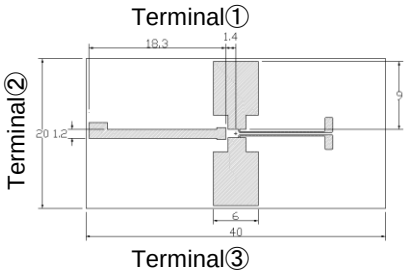
Handling of data in this document

Dexerials PCB

For SFJ-12A/15A(Cu:70um)



For SFJ-22A (Cu:70um)



- 1. Please confirm the latest product information before a design.
  - You can confirm the latest information about SCP on the following website.
  - http://www.dexerials.jp/en/products/c3/
- 2. SCP complies with following environmental regulation.
  - 1) RoHS.
  - 2) General requirement for Halogen Free.
- 3. These data are typical values.
  - 1) These data is not a guaranteed value.
  - 2) These data is measured with our company's standard PCB (0.6t Glass Epoxy single-sided copper-clad laminates). The characteristics are influenced by thermal capacity of PCB. Generally, as the thermal capacity of the PCB increases, the current-carrying capacity will also increase, and the clearing time will be longer.
- 4. Please select the product on the basis of [Current-carrying capacity] and [Heater operation characteristics].
  - 1) Nominal rated current is provided on the basis of UL standard (The maximum temperature rise on body or contact that is passed the current shall not exceed 75 °C) and so it is not Current-carrying capacity. Therefore, please select a product on the basis of Current-carrying capacity instead of Nominal rated current.
  - 2) [Current-carrying capacity] and [Heater operation characteristics] are influenced by thermal capacity of PCB and so on. Therefore, we recommend checking it on your PCB.
  - 3) We can perform tests using your printed circuit boards (current-carrying characteristics, clearing characteristics, etc.).Please feel free to contact us.
- 5. Current-carrying capacity
  - 1) The current-carrying capacity is the value at which SCP reaches the temperature that we have verified for reliability within our company.
  - 2) The temperature at which we have confirmed reliability is 100 degrees Celsius. However, this is not a critical condition for SCP. For instance, if SCP's temperature exceeds this, it does not immediately fuse off like a typical thermal fuse. SCP's fusing-off temperature is 200 degrees Celsius or higher, indicating that it has a significant capacity to withstand temperature increases.
  - 3) The current-carrying capacity is measured under thermal equilibrium conditions. Therefore, if the duration of current-carrying is short, the current-carrying capacity will increase.
- 6. Precautions regarding handling
  - 1) Make sure that the terminals of this product are connected on the lands of the circuit board, and that the heater resistance is rated value.
  - 2) Ultrasonic cleaning, immersion cleaning, and similar methods should not be applied to SCP either before or after mounting. If cleaning is performed, the flux on the element could flow, potentially causing it to fail to meet its specifications. Additionally, similar influence can occur when the product comes into contact with a cleaning solution. Any products cleaned in this manner will not be guaranteed.
  - 3) Please avoid contacting SCP and resin-mold. The resin might infiltrate into the product, and it doesn't meet the specification when the resin-mold is done to this product. These products after resin-mold will not be guaranteed.
  - 4) Please do not re-use of the SCP removed by the solder correction.
  - 5) SCP should be stored in a shaded, low-dust area with a temperature of 40℃ or lower, without sudden temperature changes. The relative humidity should be 60% or less, and the air should be free of corrosive gases. Under these conditions, the maximum storage period is 1 year from the delivery date.

Notice

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