

# Self Control Protector (SCP) - SFJ series Datasheet -

Dexerials Corporation

2024/9/13

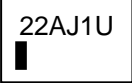
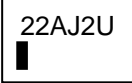
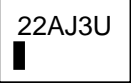
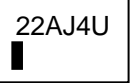
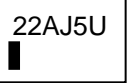


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# SFJ-xx22U Series Specification

## ● 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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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					

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	

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

# 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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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	-				

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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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											

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-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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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										

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-xx12W Series Specification

## ● Products Lineup

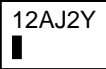
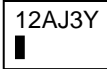
Applicable Cells in series	1 cell	2 cells	3 cells	4 cells
Product	SFJ-0412W	SFJ-0812W	SFJ-1212W	SFJ-1412W
Rated Current	12 A			
Size	4.0 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> mm			
Fuse Resistance (Typical)	2.4 m-ohm			
Operating Voltage	3.0 - 5.5 V	4.0 - 9.0 V	7.4 - 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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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	—			—

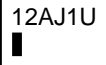
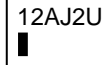

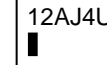
Items	General Specification	
Environmental Compliance	Compliance with RoHS	
Halogen Free	Bromine (Br)=900 ppm or less, Chlorine (Cl)=900 ppm or less, Br + Cl=1500 ppm or less (By weight)	
Antimony Free	700 ppm or less	
Certification	UL248-14 (File No. E167588), TUV (Certificate No. J9650637)	
Rated Breaking 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

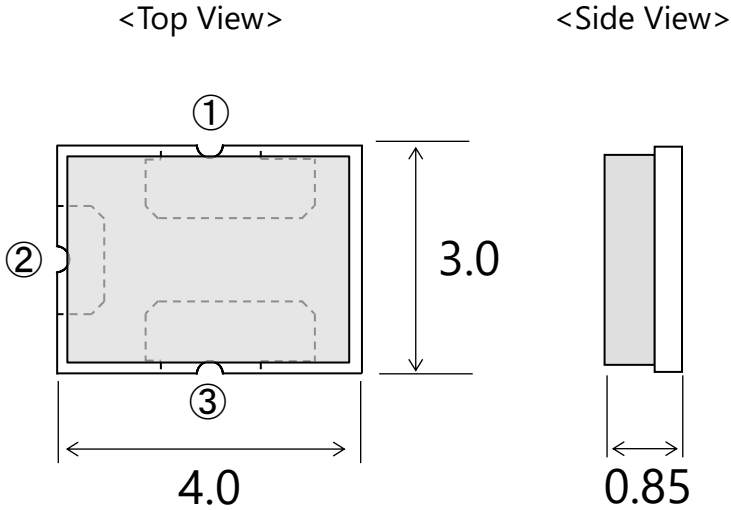
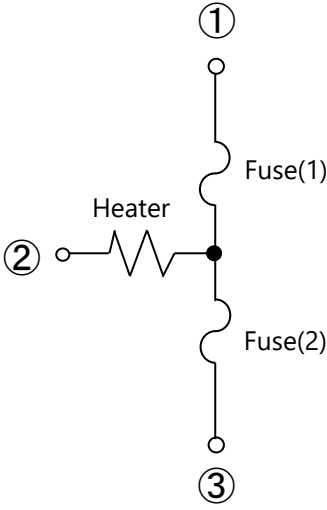
## ● Products Lineup

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 <sup>+0.3/-0.2</sup> x 3.0 <sup>+0.3/-0.2</sup> x 0.85 <sup>±0.1</sup> 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				

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	

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

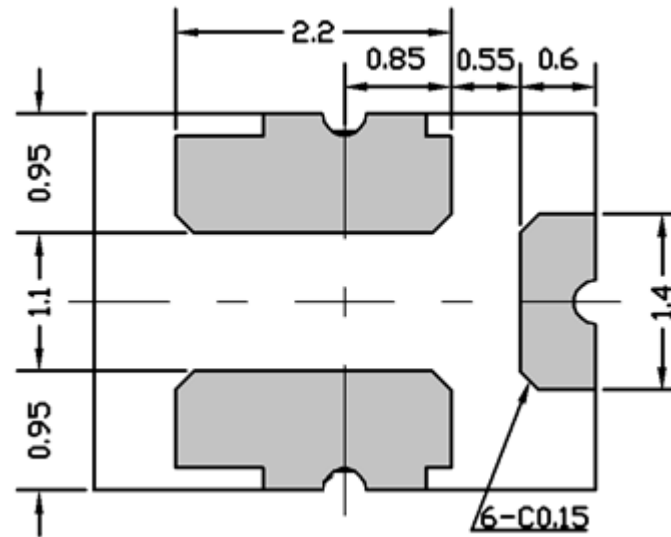
# External View & Equivalent Circuit

Series Name	Dimensions	Equivalent Circuit
<p><b>SFJ Series</b></p>	<p style="text-align: center;">&lt;Top View&gt;                      &lt;Side View&gt;</p>  <p style="text-align: center;">Unit : mm</p>	

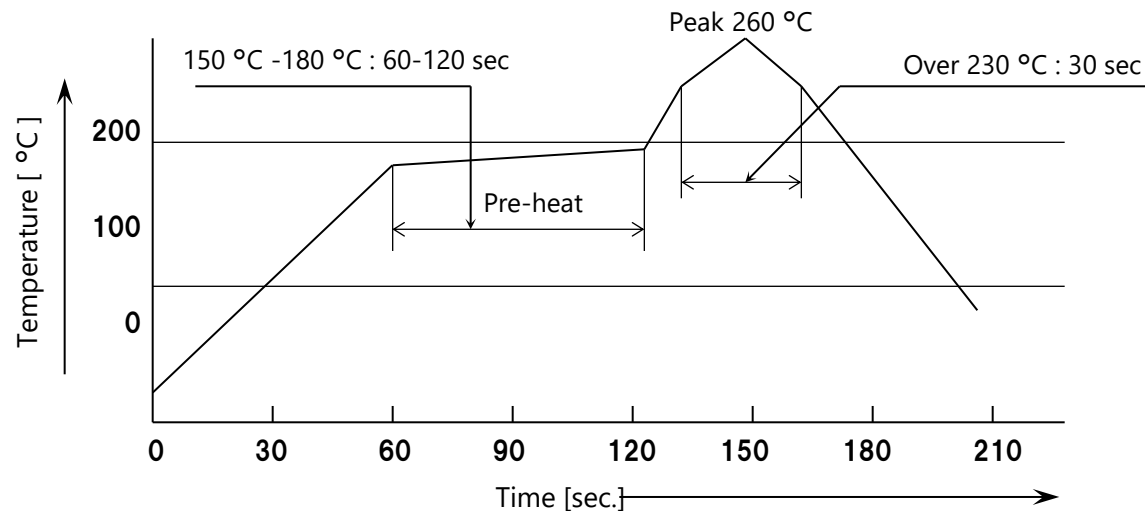
\*Notice: The specification may be subject to change without prior notice in the future.

# Terminal Size & Reflow Soldering

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

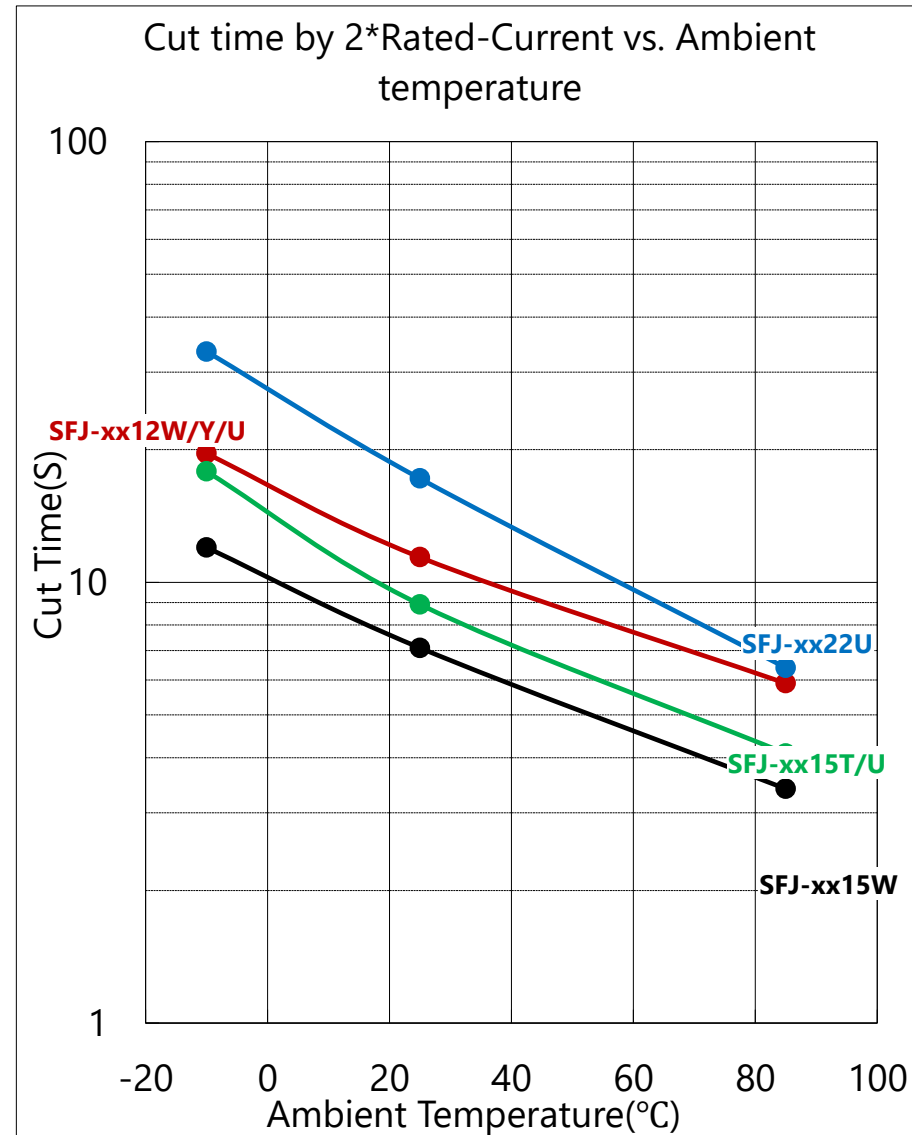
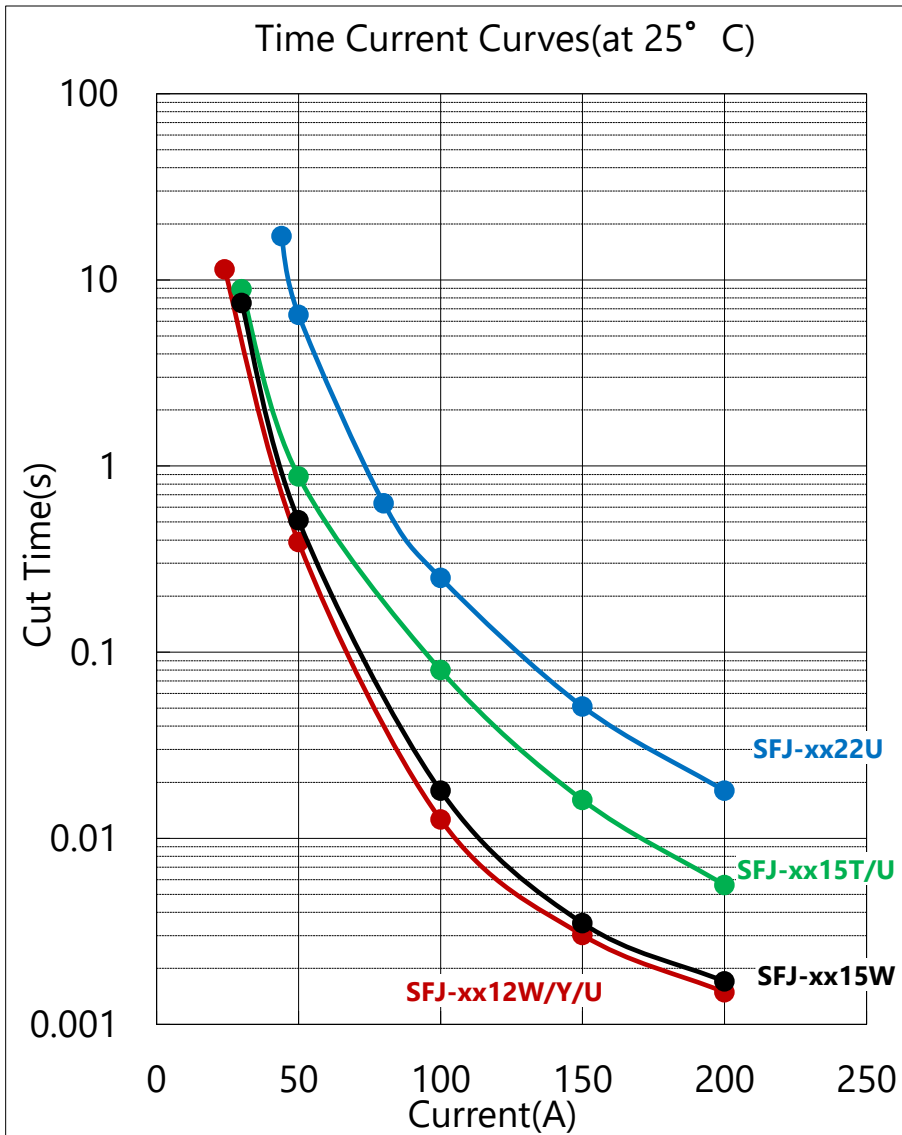


## ● Reflow Soldering Profile (Temperature shown below is measured at the electrode portion of SCP.)



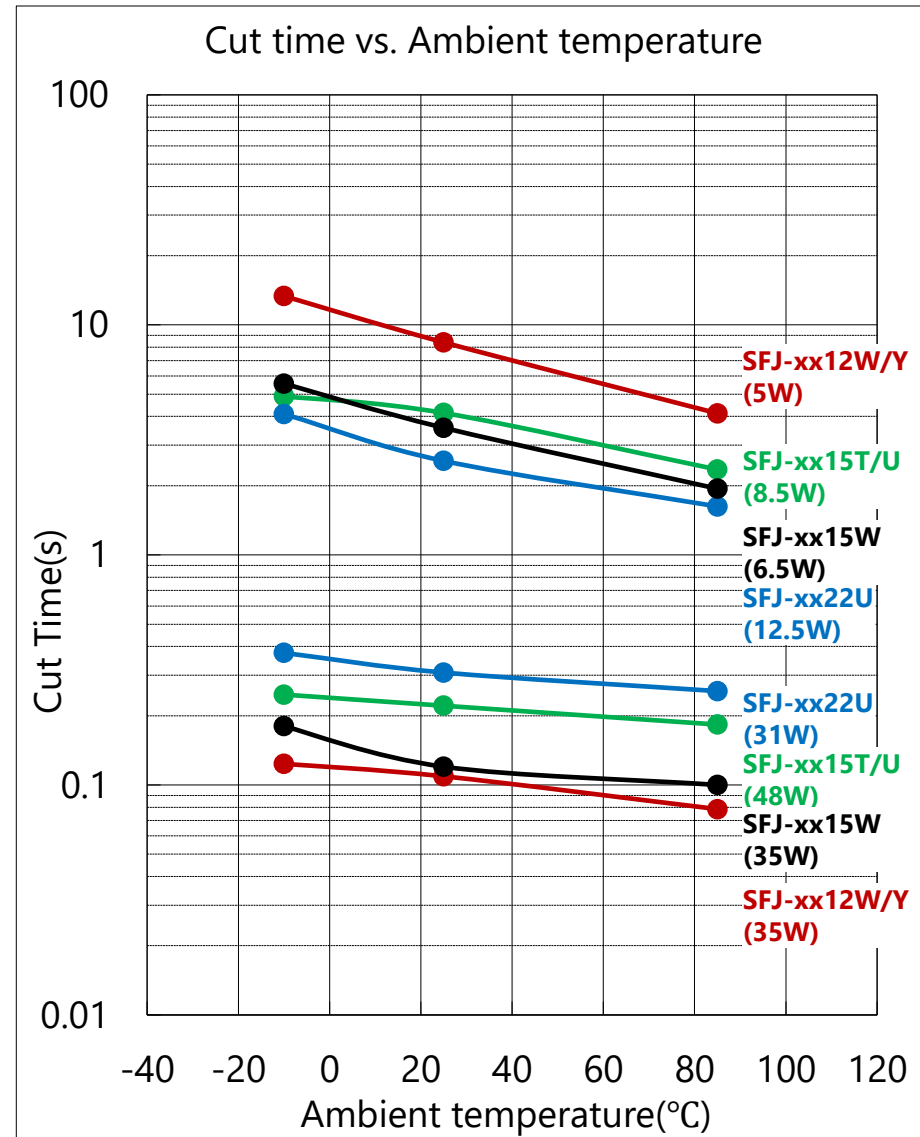
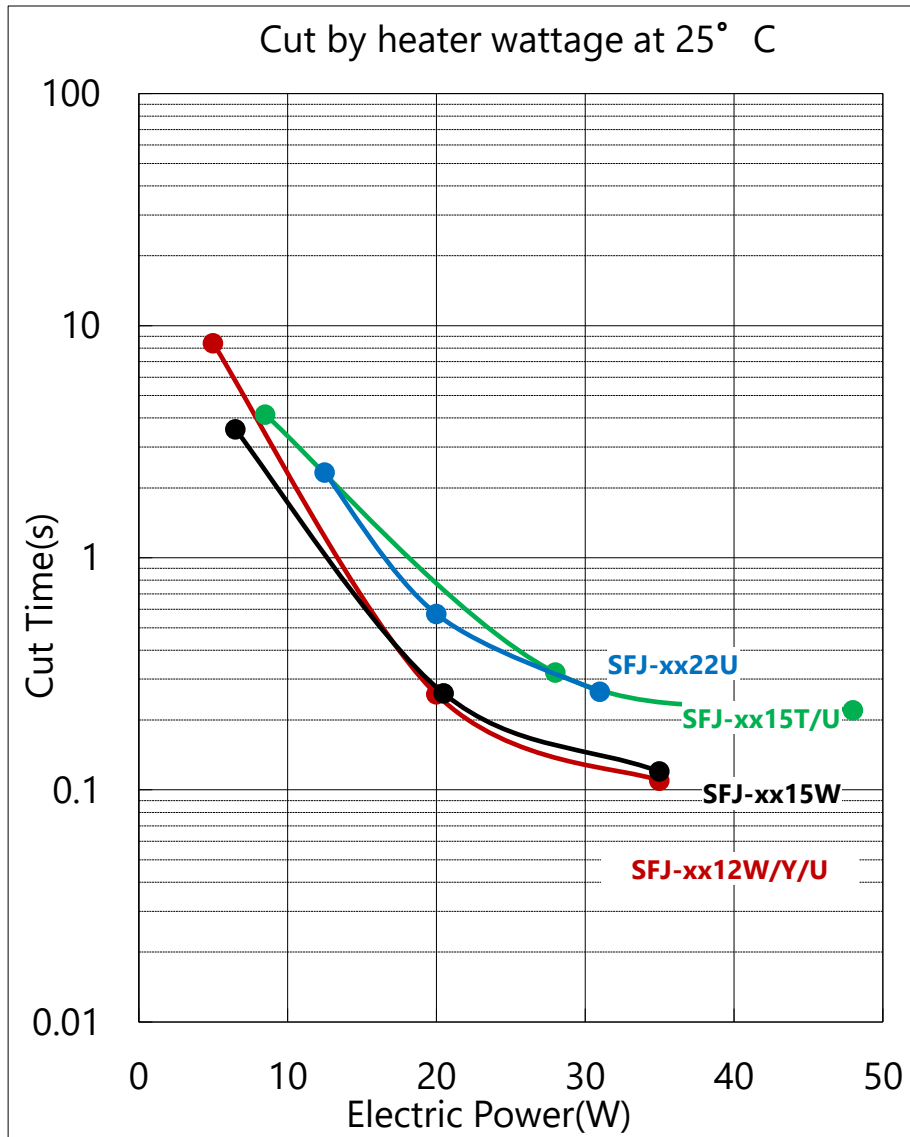
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# Current Operation



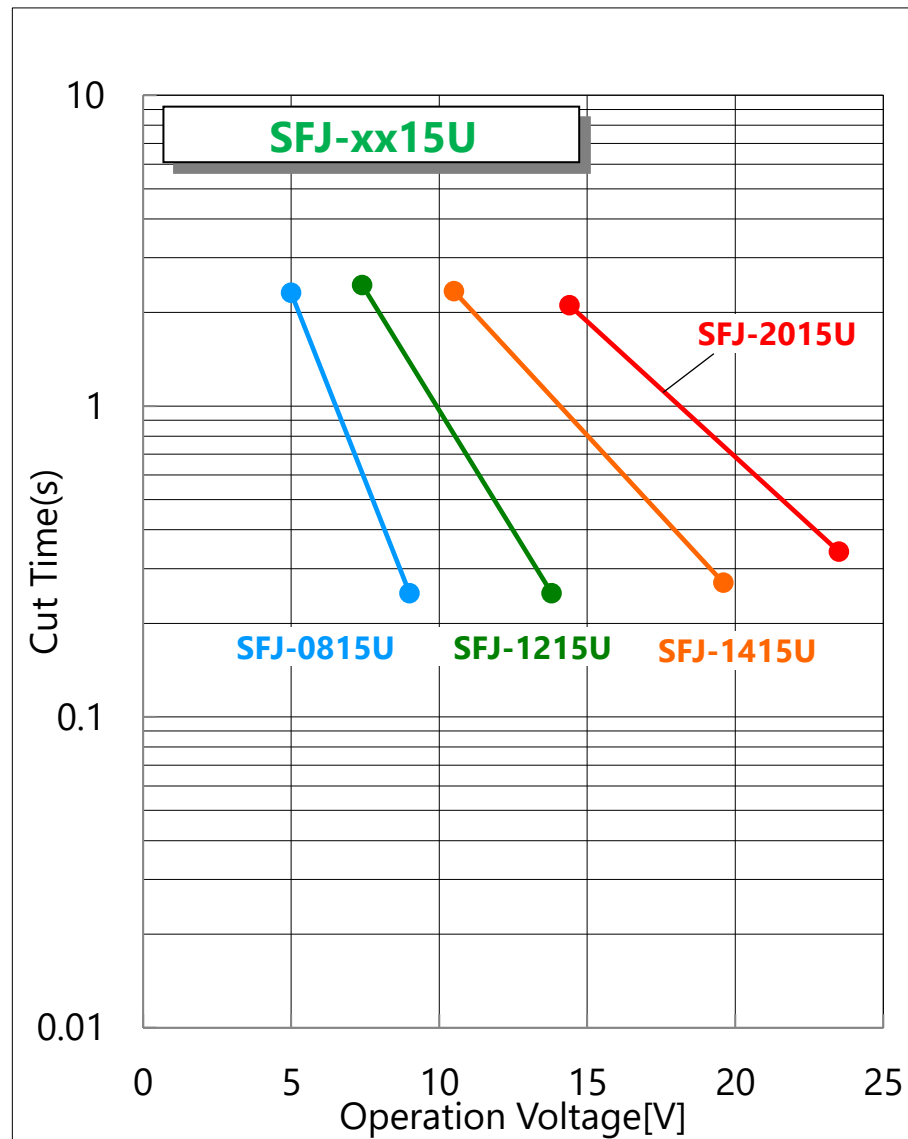
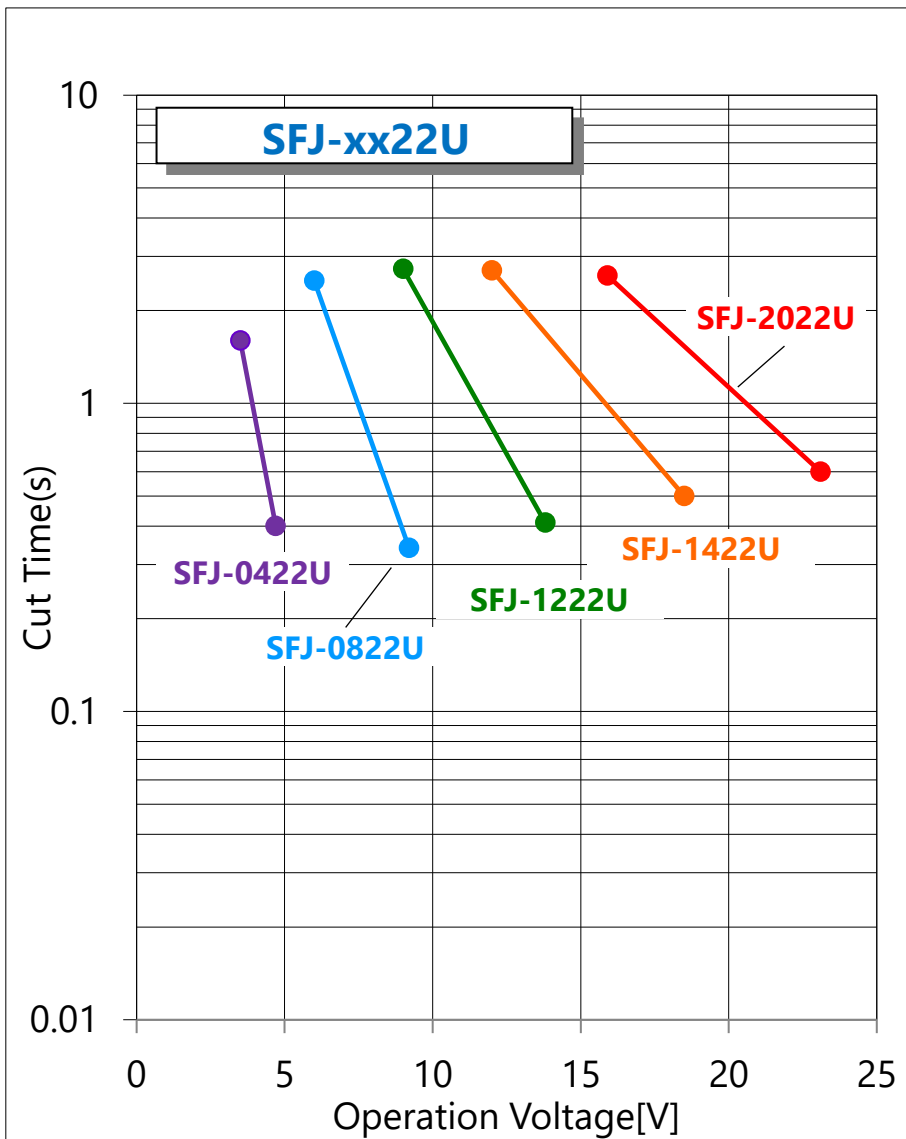
(\*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).

# Heater Operation



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

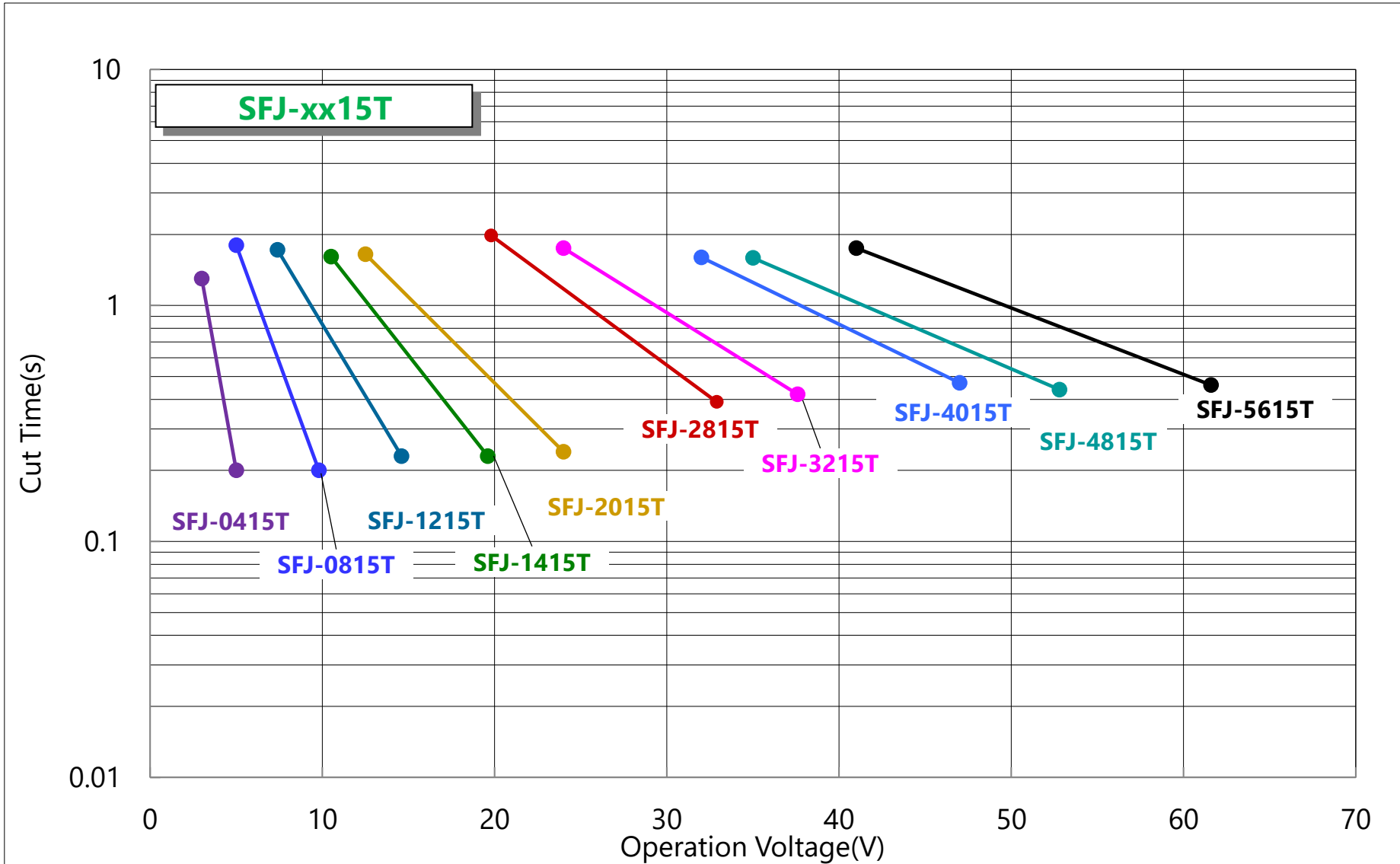
# Cut By Heater Voltage at 25°C



(\*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.

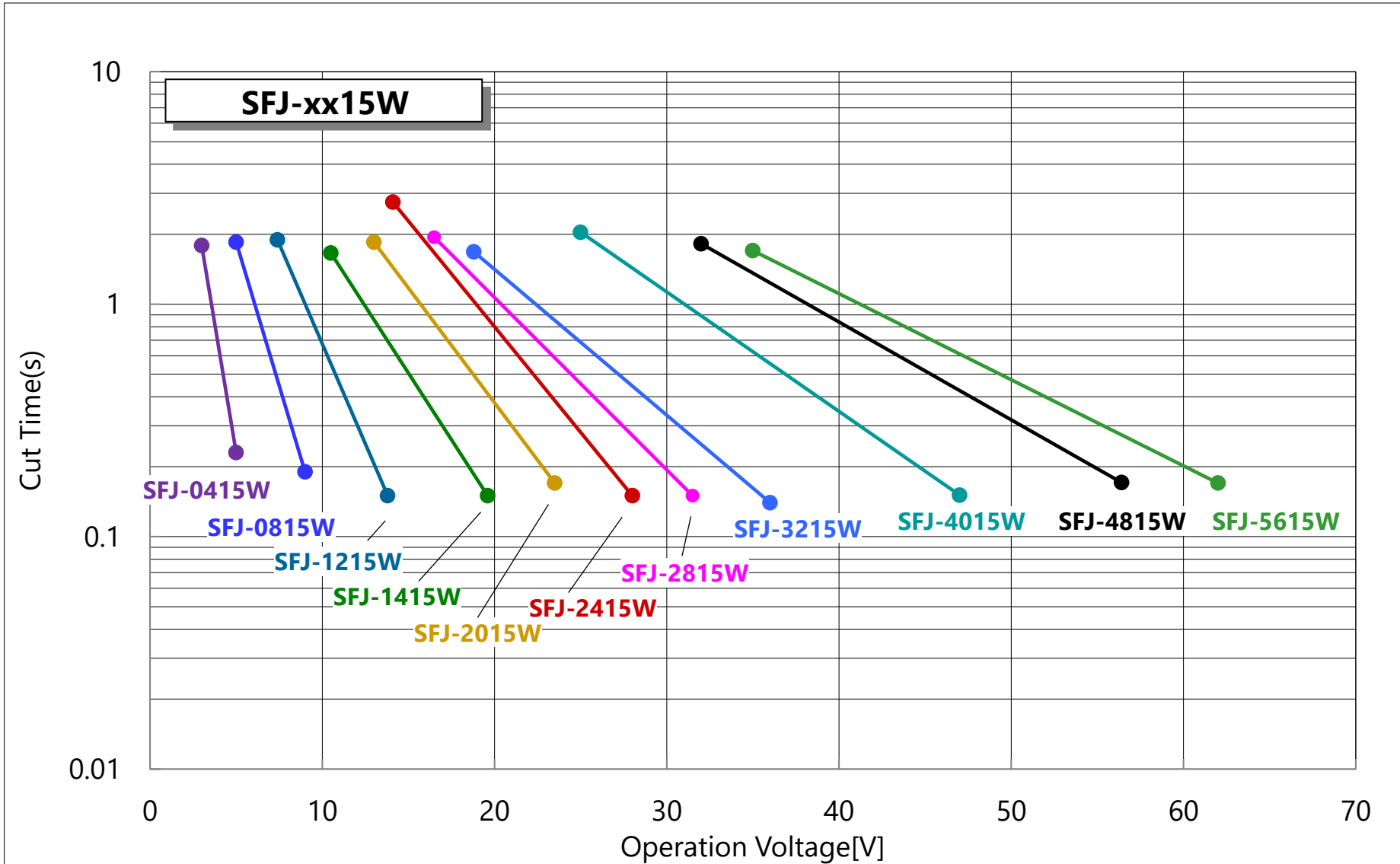
# Cut By Heater Voltage at 25°C



(\*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

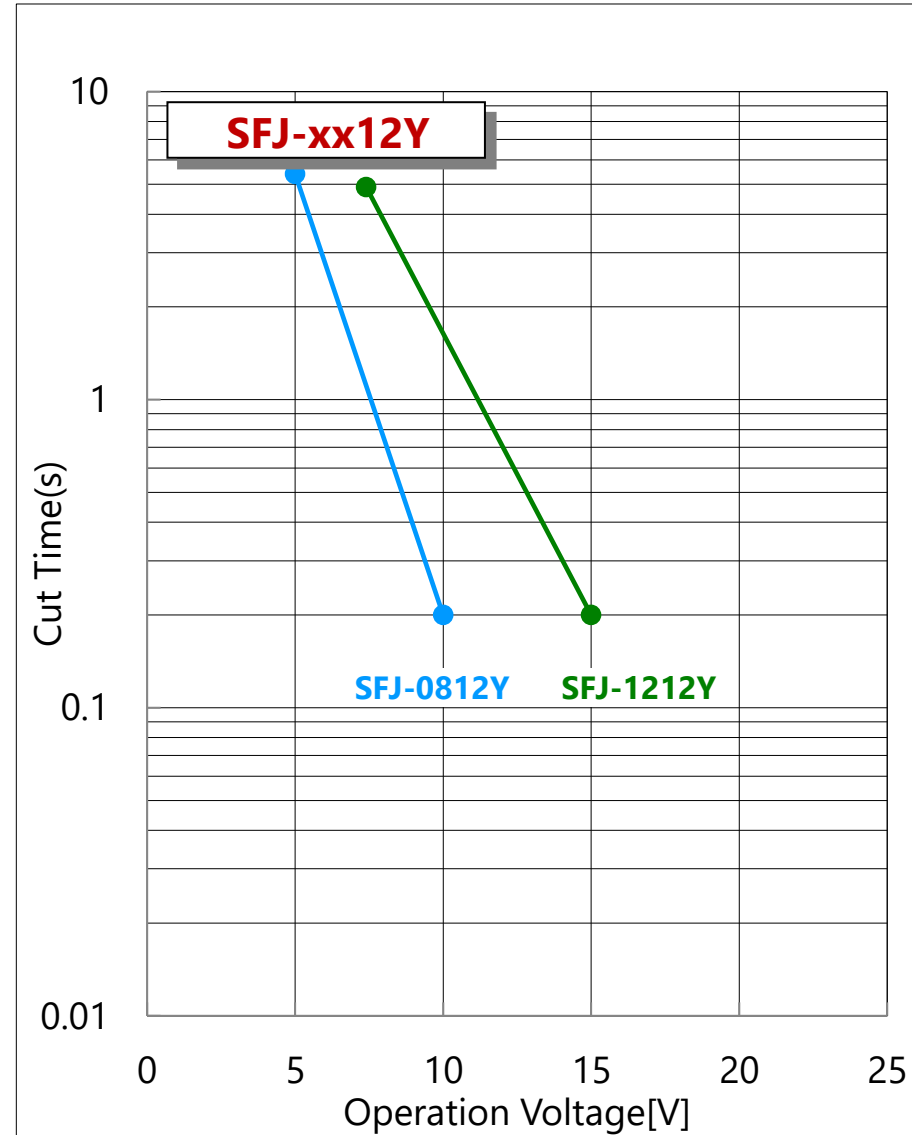
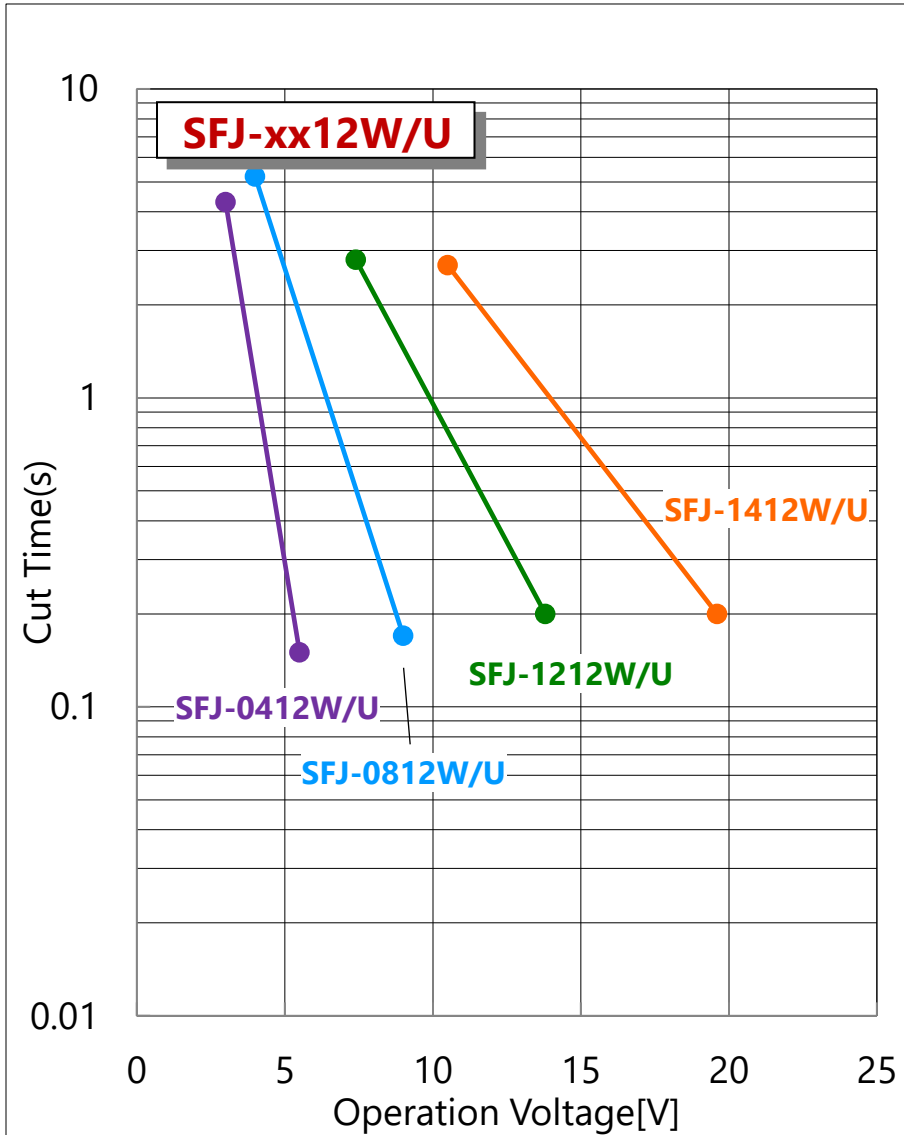


(\*Note) This is the typical evaluation value with our PCB (0.6 mm thickness glass-epoxy single-sided copper-clad laminates).

(\*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.

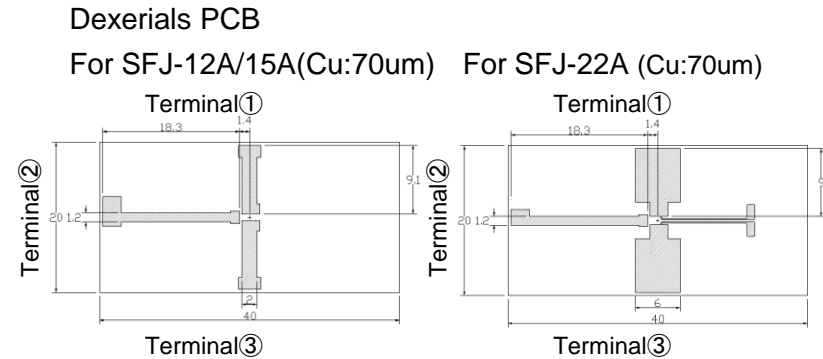
# Current Carrying Capacity

Product Name	Nominal Rated current	Current-Carrying Capacity <sup>(*1)</sup>			Current Rush Withstand <sup>(*2)</sup>
		25 °C	40 °C	60 °C	
<b>SFJ-xx22U</b>	22 A	27.0 A	24.0 A	20.0 A	145 A-10 ms
<b>SFJ-xx15T/U</b>	15 A	18.0 A	16.0 A	13.5 A	100 A-10 ms
<b>SFJ-xx15W</b>	15 A	18.0 A	16.0 A	13.5 A	80 A-10 ms
<b>SFJ-xx12W/Y/U</b>	12 A	13.0 A	11.5 A	9.5 A	80 A-10 ms

- (\*Note)
- 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.
  - 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

- 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 based on [Current-carrying capacity] and [Heater operation characteristics].
  - 1) Nominal rated current is provided based on 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 based on 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 that removed by the solder correction.
  - 5) SCP should be stored in a shaded, low-dust area with a temperature of 40°C 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

The test fixtures and test results described in this document are reference information provided by Dexerials Corporation for the benefit of customers purchasing this product.

Dexerials Corporation does not warrant to the Customer or any third party that the test results, etc. are error-free. Dexerials Corporation shall not be liable for any loss or damage incurred by customer or any third party due to errors in the test results, etc., unless such errors are caused by Dexerials Corporation's willful misconduct or gross negligence.

If you require a delivery specification sheet describing the shipping inspection data of this product, please contact Dexerials Corporation.

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When considering the use of the product in equipment or devices (medical equipment, transportation equipment, traffic equipment, aerospace equipment, nuclear power control equipment, fuel control, various safety devices, etc.) that require extremely high reliability and whose failure or malfunction could result in danger or damage to human life or body, or other serious damage, the product should be fully verified through prior evaluation and considered for implementation at the customer's own risk.

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