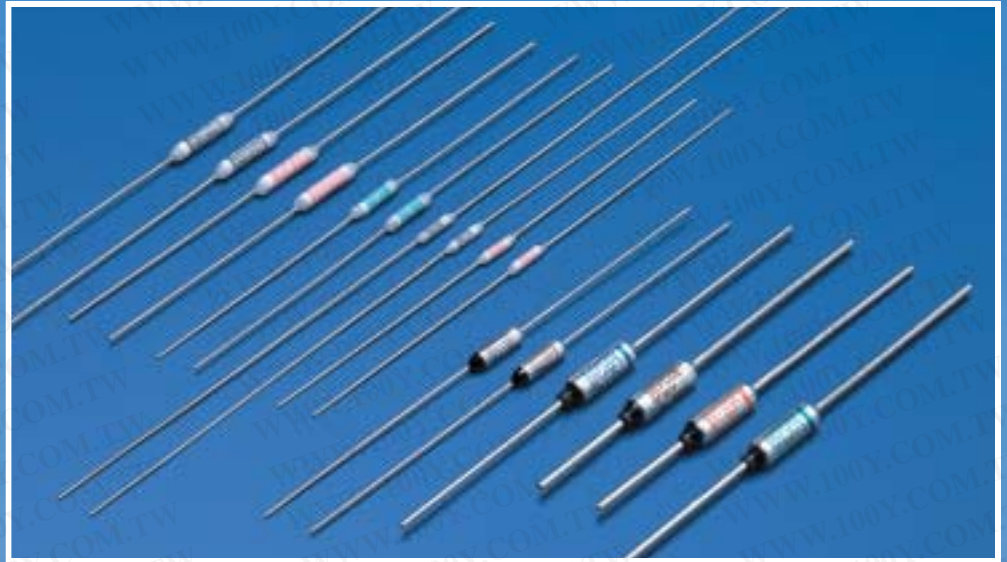


NEC/SCHOTT

# SEFUSE™ THERMAL CUTOFF

勝特力材料 886-3-5753170  
勝特力电子(上海) 86-21-34970699  
勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)



# SEFUSE™

- Introduction, Features, Application ..... 2
- Construction ..... 3
- Standard Ratings ..... 5
- Performance Data ..... 11
- Definition of Terms ..... 15
- Lead Cutting and Taping ..... 16
- Cautions ..... 17

**Please be sure to read the "Cautions" on pages 17 through 20 before using.**

Series	Rated Current(AC)	Rated Functioning Temperature	Page
SF/E	15/10A	73°C ~ 240°C	5
SF/K	6A	73°C ~ 216°C	7
SF/Y	15A	73°C ~ 240°C	7
SM/A	2A	76°C ~ 187°C	9
SM/B	1A	87°C ~ 151°C	9
SM/G	0.5A	100°C ~ 151°C	9

Select optimum series according to temperature and electrical ratings.

## ■ Safety standards



PSE (Japan)



UL (USA)



CSA (Canada)



VDE (Germany)



BEAB (UK)



CCC (China)



# SEFUSE

## Thermal Cutoff

SEFUSE™ is a compact and reliable thermal cutoff designed to protect domestic electrical appliances and industrial electrical equipment from fire. Cutoff occurs and an electrical circuit opens when ambient temperature increases to an abnormal level.

Two SEFUSE types are available. The SF type uses an organic thermosensitive material as the thermal pellet and its operating temperature range is 73 °C to 240 °C.

The SM type uses a fusible alloy and has an operating range of 76 °C to 187 °C.

SEFUSE is manufactured in Japan and Thailand, and both factories are certified by the International Standards Organization (ISO) for the ISO9001 quality standard.

### ■ Features

- Excellently sensitive to ambient temperature.
- Stable and precise operation.
- One shot operation.
- Wide choice of types to suite the application. (SF or SM)
- SF types has ceramic pipe to protect sealing resin from the stress when bending the leads. (excluding SF/K type)
- Meets many safety standards.
- Eco-friendly products, meeting the Directive on **WEEE(RoHS)**, are available.
  - For the SF types, the **AgCuO** is used as the material of sliding contact, and its patent has been registered in worldwide countries, such as USA and Europe.

### ■ Applications

- Irons, hair dryers, heaters,
- Refrigerators, rice cookers, water pots, coffee makers
- Air conditioners, ventilation fans, electric fans, gas boilers
- Transformers, power suppliers, adaptors, solenoids
- Chargers, battery packs, Air conditioner for Automobile
- Copiers, laser beam printers, power taps



● Iron



● LCD Television



● Rice cooker

For the purpose of photography, the insulation tube of the thermal cutoff has been removed. In reality, the thermal cutoff is covered by the insulation tube.



● Inverter



● Transformer

**Application  
Examples**

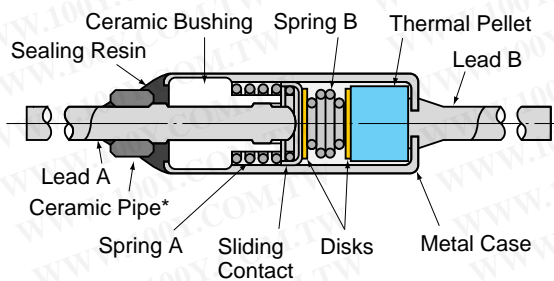
# SEFUSE™

## Construction

**SF**  
type

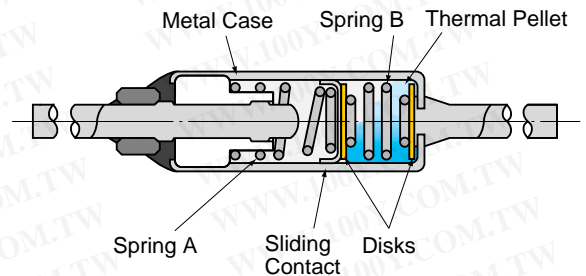
The SF type uses an organic thermosensitive pellet inside a metal case. It features a large cutoff (rated) current of 6 A to 15 A (AC).

### Before Operation



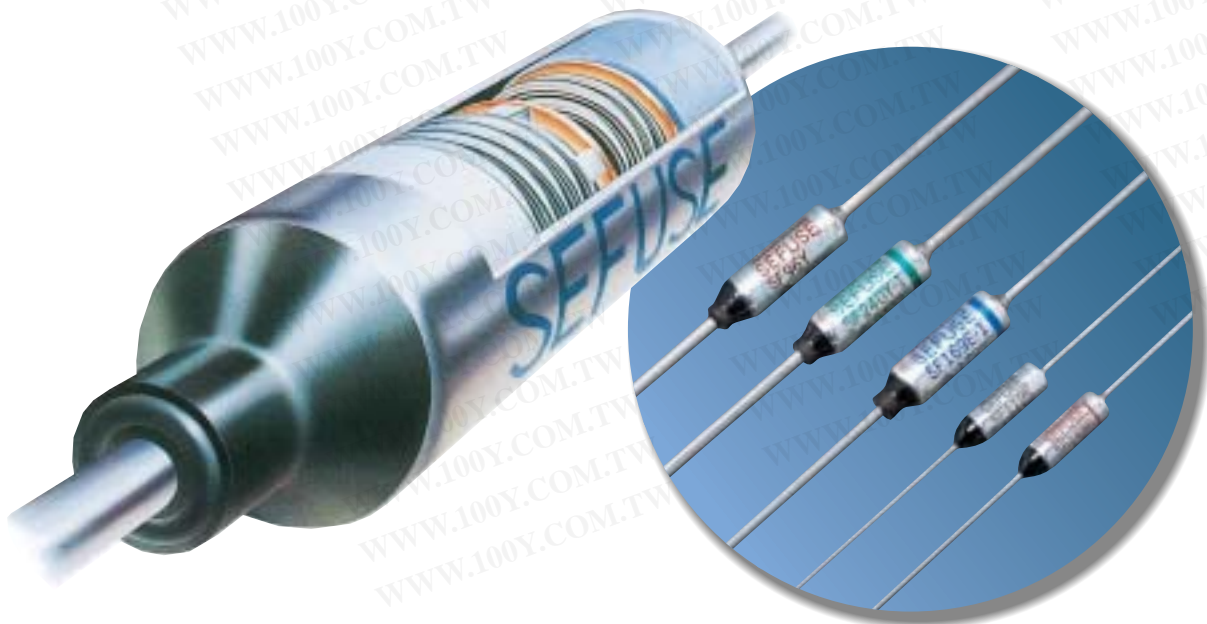
The SF type contains a sliding contact, springs, and a thermal pellet inside a metal case. When spring B is compressed, firm contact between lead A and the sliding contact occurs. At normal temperatures, current flows from lead A to the sliding contact and then through the metal case to lead B.

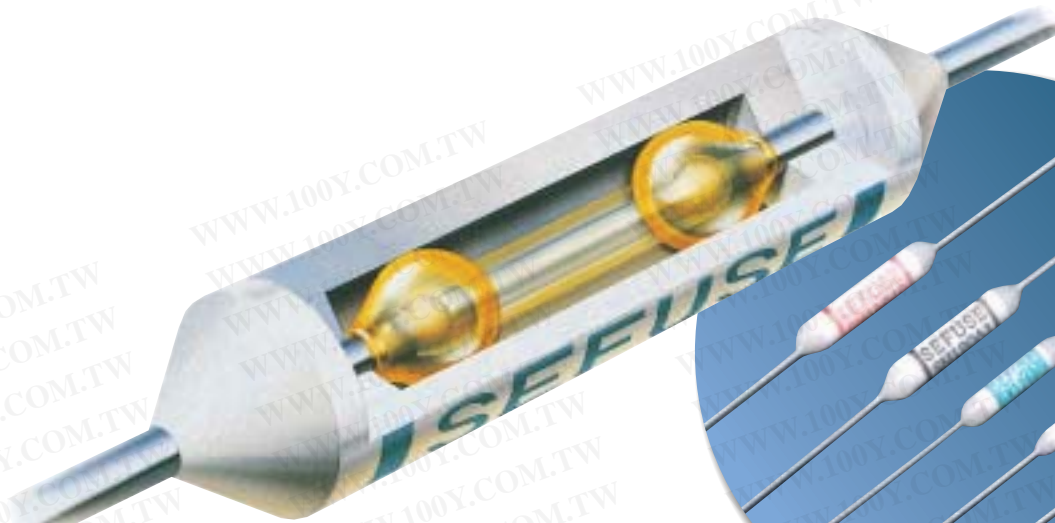
### After Operation



When the ambient temperature rises to the SEFUSE operating temperature, the heat transferred through the metal case melts the thermal pellet. When the thermal pellet melts, springs A and B expand, moving the sliding contact away from lead A. The electrical circuit is opened by breaking contact between the sliding contact and lead A.

\*Not using for SF/K series.

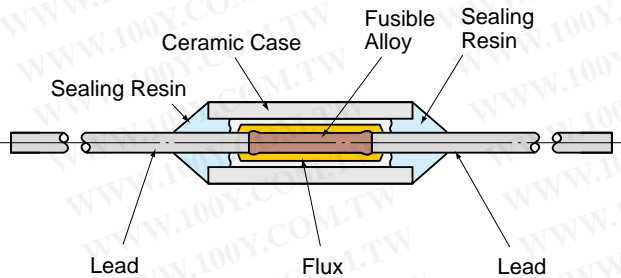




**SM  
type**

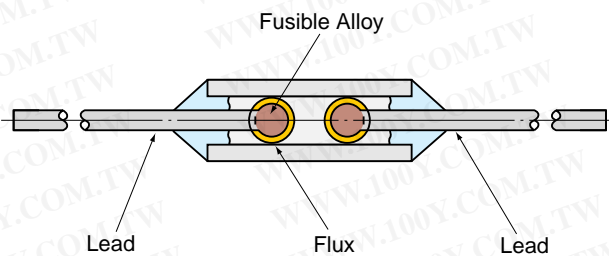
The SM type uses a fusible alloy inside a ceramic case. It has a cutoff (rated) current of 0.5 A to 2.0 A (AC). Because of its insulated case, the SM type can be attached directly where temperature detection is required.

**Before Operation**



In the SM type, leads are connected by a fusible alloy. The current flows directly from one lead to the other. The fusible alloy is coated with a special flux.

**After Operation**

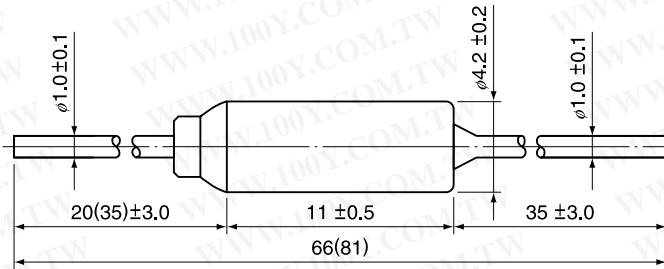


When ambient temperature rises to the SEFUSE operating temperature, the fusible alloy melts and condenses into a drop around the end of each lead because of surface tension and the coating of special flux. The electrical circuit then opens.





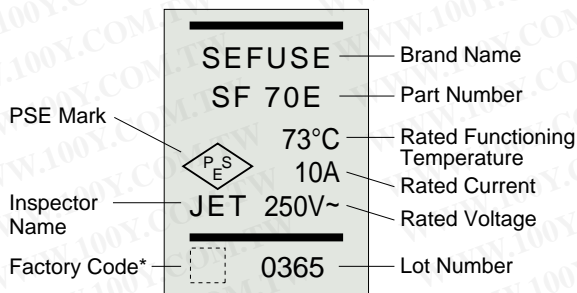
#### ■ Dimension (Unit:mm)



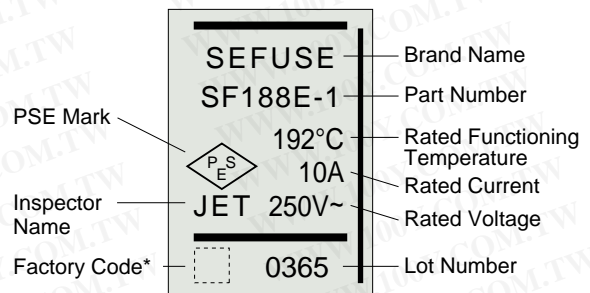
**Note:** The dimensions for long lead devices are in parentheses.



#### ■ Marking 1 (SF70E~SF129E)



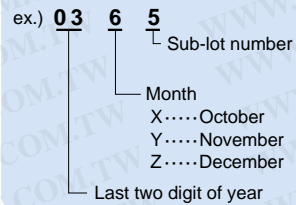
#### ■ Marking 2 (SF139E~SF240E)



\* Factory Code represents the factory location as shown below

Japan : none  
Thailand : C

How to read a lot number



## Ratings

1) Meet for WEEE (RoHS)	2) Part Number	Rated Functioning Temperature Tf (°C)	Operating Temperature (°C)	Th Tc (°C)	Tm (°C)	Rated Current	Rated Voltage	UL		CSA		VDE		BEAB		CCC		PSE 7)	
								Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan (JET1975- 32001-XXXX)	Made in Thailand (JET1974- 32001-XXXX)
○	SF 70E	73	70 ± 2	58	150	4) 15A / 10A (Resistive)	4) AC250V	E71747		6) 172780 (LR52330)	677802 -1171 -0002	C1060	*1	*2			1008	1003	
○	SF 76E	77	76 ± 2	62													1010	1002	
○	SF 91E	94	91 ± 2	79													1011	1001	
○	SF 96E	99	96 ± 2	84													1012	1004	
○	SF113E	113	110 ± 2	98											160				
○	SF119E	121	119 ± 2	106											150				
○	SF129E	133	129 ± 2	118											159				
○	SF139E	142	139 ± 2	127															
○	SF152E	157	152 ± 2	142											172				
○	SF169E	172	169 ± 2	157											189				
○	SF184E	184	182 ± 2	174	210														
○	SF188E	192	188 ± 2	177															
○	SF214E	216	214 ± 2		3)														
○	SF226E	227	226 ± 2	200														*3	1008
○	SF240E	240	237 ± 2															*4	1009

Note: 1) ○: No use the hazardous substances prescribed by WEEE(RoHS).

2) Part numbers are for standard lead devices. For long leads, add the number "-1" at the end of part number.

3) Tm of SF188E, SF214E, SF226E, SF240E are as follows.

Tm	UL	CSA	VDE	BEAB	CCC
SF188E	375°C	300°C	375°C	300°C	
SF214E		350°C		350°C	
SF226E	240°C	330°C	300°C		
SF240E	375°C	350°C	375°C	350°C	

4) The electrical ratings by safety standards are as follows.

Rated Voltage	UL	CSA	VDE	BEAB	CCC	PSE
AC120V	15A (Inductive) 20A (Resistive)					
AC240V	15A (Resistive)					
AC250V	10A (Resistive)	15A (Inductive) (Resistive)	10A	10A	10A	10A
	15A (Resistive)		15A	15A	15A	
	17A (Resistive)					
AC277V	15A (Resistive)					

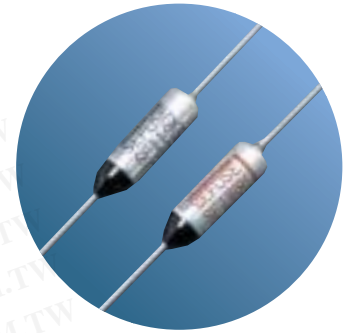
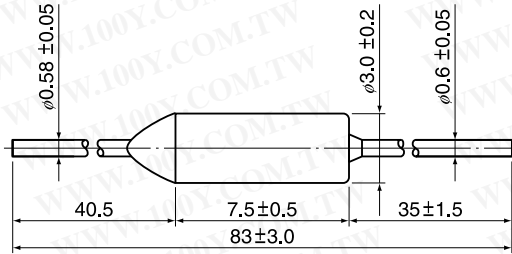
5) SF169E, SF184E, SF188E, SF214E, SF226E and SF240E has a recognition of CH rating by UL.

6) The number in parentheses are previous number. Both number can be inquired.

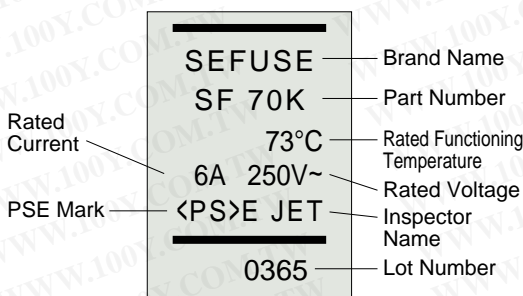
7) The products indicated in \*3 and \*4 mention a certified number by the former law, the Electrical Appliance Material Control Law, as a transitional measure to the current law, the Electrical Appliance and Material Safety Law of Japan.

\*1: 2002010205023072 (10A)  
2004010205121099 (15A)  
\*2: 2002010205023074 (10A)  
2004010205120822 (15A)  
\*3: 33-549  
\*4: 33-354

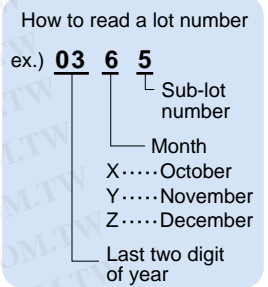
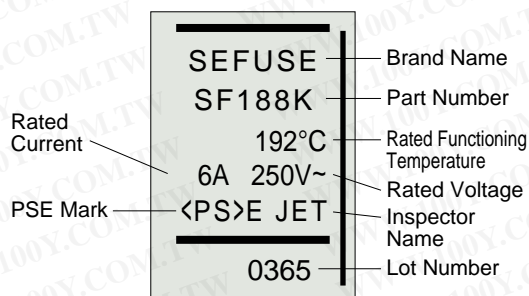
#### Dimension (Unit:mm)



#### Marking 1 (SF70K~SF119K)

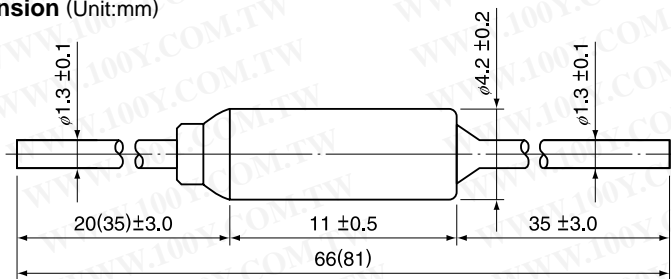


#### Marking 2 (SF188K,SF214K)



### SF/Y Series

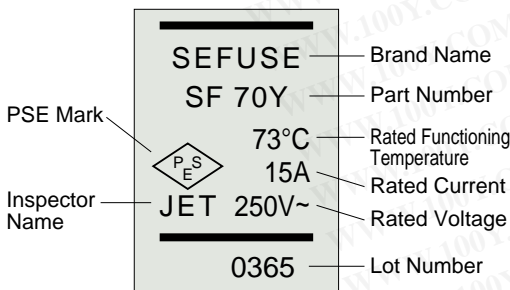
#### Dimension (Unit:mm)



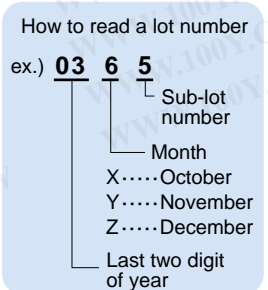
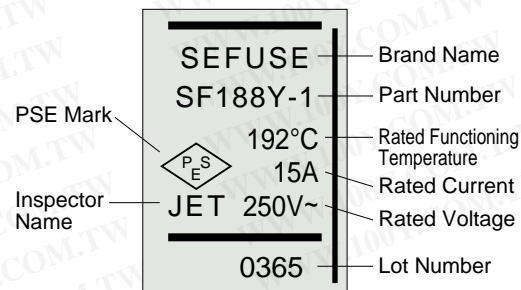
Note: The dimensions for long lead devices are in parentheses.



#### Marking 1 (SF70Y~SF129Y)



#### Marking 2 (SF139Y~SF240Y)





## ■ Ratings

1) Meet for WEEE (RoHS)	Part Number	Rated Functioning Temperature Tf (°C)	Operating Temperature (°C)	Th (°C)	Tm (°C)	Rated Current	Rated Voltage	U L cUL	VDE	BEAB	PSE 4) (JET1975- 32001-XXXX)
○	SF 70K	73	70 ± 2	45	150	2) 6A (Resistive)	AC250V	E71747	677802 -1171 -0006	C1057	1008
○	SF 76K	77	76 ± 2	51							1010
○	SF 91K	94	91 ± 2	66							1012
○	SF 96K	99	96 ± 2	71							1015
○	SF119K	121	119 ± 2	94							*1
○	SF188K	192	188 ± 2	164	300		3)				
○	SF214K	216	214 ± 2	198							

Note: 1) ○ : No use the hazardous substances prescribed by WEEE(RoHS).

2) The following recognition is approved by UL and VDE.

10A(Resistive)/AC250V

3) SF188K and SF214K has a recognition of CH rating by UL.

4) The products indicated in \*1 mention a certified number by the former law, the Electrical Appliance Material Control Law, as a transitional measure to the current law, the Electrical Appliance and Material Safety Law of Japan.

\*1: 33-549

● This series are made only in Japan.

## ■ Ratings

1) Meet for WEEE (RoHS)	2) Part Number	Rated Functioning Temperature	Operating Temperature	Rated Current	Rated Voltage	U L	CCC	PSE 3) (JET1975- 32001-XXXX)
○	SF 70Y	73°C	70 ± 2°C	15A	AC250V	E71747	*1	1008
○	SF 76Y	77°C	76 ± 2°C					1010
○	SF 91Y	94°C	91 ± 2°C					1011
○	SF 96Y	99°C	96 ± 2°C					1012
○	SF113Y	113°C	110 ± 2°C					1013
○	SF119Y	121°C	119 ± 2°C					1014
○	SF129Y	133°C	129 ± 2°C					1015
○	SF139Y	142°C	139 ± 2°C					*2
○	SF152Y	157°C	152 ± 2°C					*3
○	SF169Y	172°C	169 ± 2°C					
○	SF184Y	184°C	182 ± 2°C					
○	SF188Y	192°C	188 ± 2°C					
○	SF214Y	216°C	214 ± 2°C					
○	SF226Y	227°C	226 ± 2°C					
○	SF240Y	240°C	237 ± 2°C					

Note: 1) ○ : No use the hazardous substances prescribed by WEEE(RoHS).

2) Part numbers are for standard lead devices. For long leads, add the number "-1" at the end of part number.

3) The products indicated in \*2 and \*3 mention a certified number by the former law, the Electrical Appliance Material Control Law, as a transitional measure to the current law, the Electrical Appliance and Material Safety Law of Japan.

\*1: 2004010205122568

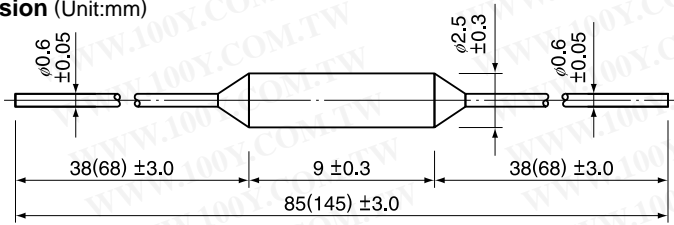
\*2: 33-549

\*3: 33-354

● This series are made only in Japan.

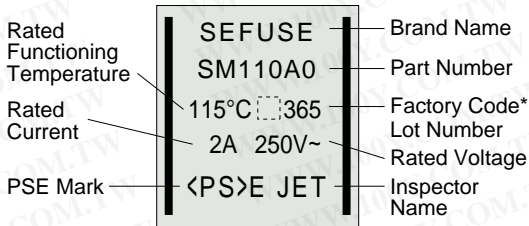
## SM/A Series

### Dimension (Unit:mm)

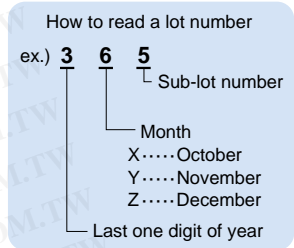


Note: The dimensions for long lead devices are in parentheses.

### Marking

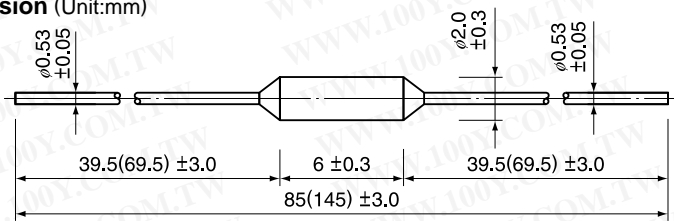


\* Factory Code represents the factory location as shown below  
Japan : none  
Thailand : C



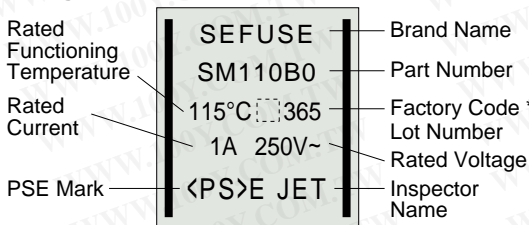
## SM/B Series

### Dimension (Unit:mm)

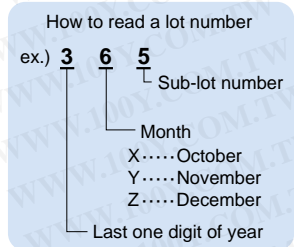


Note: The dimensions for long lead devices are in parentheses.

### Marking

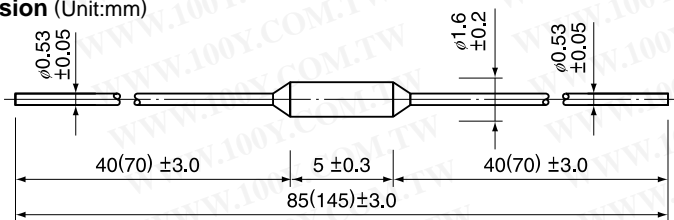


\* Factory Code represents the factory location as shown below  
Japan : none  
Thailand : C



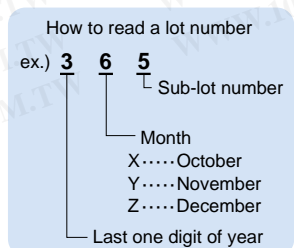
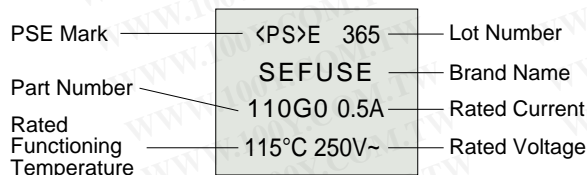
## SM/G Series

### Dimension (Unit:mm)



Note: The dimensions for long lead devices are in parentheses.

### Marking



## ■ Ratings

1) Meet for WEEE (RoHS)	2) Part Number	Rated Functioning Temperature Tf (°C)	Operating Temperature (°C)	Th Tc (°C)	Tm (°C)	Electrical Ratings		UL		CSA		VDE		BEAB		CCC		PSE 6)																	
						AC	DC 3)	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan (JET1975- 32001-XXXX)	Made in Thailand (JET1974- 32001-XXXX)																		
○	SM072A0	76	72 ± 3	46	100	2 A (Resistive) AC250V	3A/DC50V (UL 4A/DC50V/VDE)	E71747	4)	172780 (LR52330)	677802 -1171 -0001	C1054	*1	*2					1007	1017															
○	SM082A0	87	82 ± 3	52	200														1004	1016															
○	SM092A0	97	92 ± 3	62	100														1001	1010															
○	SM095A0	100	95 ± 5	65	115														1006	1011															
○	SM110A0	115	110 ± 2	80	125														Under Application	C1054															
○	SM125A0	131	126 ± 3	96	200																												1002	1012	
○	SM126A0		126 ± 2	140	200														C1054																
○	SM130A0	135	130 ± 2	100	145																												1003	1013	
○	SM134A0	139	134 ± 2	104	200														4)	172780 (LR52330)															
○	SM137A0	142	137 ± 3	107																														1005	1014
○	SM146A0	151	146 ± 3	116	200														7 A DC50V																
○	SM150A0	150	146 ± 3	116																														1003	1013
○	SM164A0	169	164 ± 3	133																														180	1005
○	SM182A0	187	182 ± 2	152	195																														

Note: 1) ○: No use the hazardous substances prescribed by WEEE(RoHS).

2) Part numbers are for standard devices. For long leads, change the last number from 0 to 1.

3) DC rating are approved by UL and VDE.

4) SM072A0 and SM134A0 have c-UL recognition.

5) The number in parentheses are previous number. Both number can be inquired.

6) The products indicated in \*3 mention a certified number by the former law, the Electrical Appliance Material Control Law, as a transitional measure to the current law, the Electrical Appliance and Material Safety Law of Japan.

\*1: 2002010205002641

\*2: 2002010205023067

\*3: 33-556

## ■ Ratings

1) Meet for WEEE (RoHS)	2) Part Number	Rated Functioning Temperature Tf (°C)	Operating Temperature (°C)	Th Tc (°C)	Tm (°C)	Electrical Ratings		UL		CSA		VDE		BEAB		CCC		PSE																		
						AC	DC 3)	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan	Made in Thailand	Made in Japan (JET1975- 32001-XXXX)	Made in Thailand (JET1974- 32001-XXXX)																			
○	SM082B0	87	82 ± 3	52	200	1 A (Resistive) AC250V	3A/DC50V	E71747	4)	172780 (LR52330)	677802 -1171 -0004	C1030	*1	*2																						
○	SM092B0	97	92 ± 3	62	200																1004	1016														
○	SM095B0	100	95 ± 5	65	115																1001	1010														
○	SM110B0	115	110 ± 2	80	125																1006	1011														
○	SM125B0	131	126 ± 3	96	200																Under Application	C1030														
○	SM126B0		126 ± 2	140	200																														1002	1012
○	SM130B0	135	130 ± 2	100	145																5)	172780 (LR52330)														
○	SM134B0	139	134 ± 3	104	200																														1003	1013
○	SM137B0	142	137 ± 3	107	200																6 A DC50V															
○	SM146B0	151	146 ± 3	116																															1003	1013
○	SM150B0	150	146 ± 3	116																																

Note: 1) ○: No use the hazardous substances prescribed by WEEE(RoHS).

2) Part numbers are for standard devices. For long leads, change the last number from 0 to 1.

3) DC rating are approved by UL and VDE.

4) The number in parentheses are previous number. Both number can be inquired.

5) SM134B0 has c-UL recognition.

\*1: 2002010205002645

\*2: 2002010205023066

## ■ Ratings

● This series are made only in Japan.

1) Meet for WEEE (RoHS)	2) Part Number	Rated Functioning Temperature Tf (°C)	Operating Temperature (°C)	Th Tc (°C)	Tm (°C)	Electrical Ratings		UL	CSA	VDE	BEAB	CCC	PSE (JET1975-32001-XXXX)
						AC	DC 3)						
○	SM095G0	100	95 ± 5	65	115	0.5 A (Resistive) AC250V	3A/DC50V	E71747	172780 (LR52330)	677802 -1171 -0003	C1090	*1	1001
○	SM110G0	115	110 ± 2	80	125								1006
○	SM126G0	131	126 ± 2	96	140								1002
○	SM130G0	135	130 ± 2	100	145								
○	SM134G0	139	134 ± 3	104	200								1003
○	SM137G0	142	137 ± 3	107									
○	SM146G0	151	146 ± 3	116									

Note: 1) ○: No use the hazardous substances prescribed by WEEE(RoHS).

2) Part numbers are for standard devices. For long leads, change the last number from 0 to 1.

3) DC rating are approved by UL and VDE.

4) The number in parentheses are previous number. Both number can be inquired.

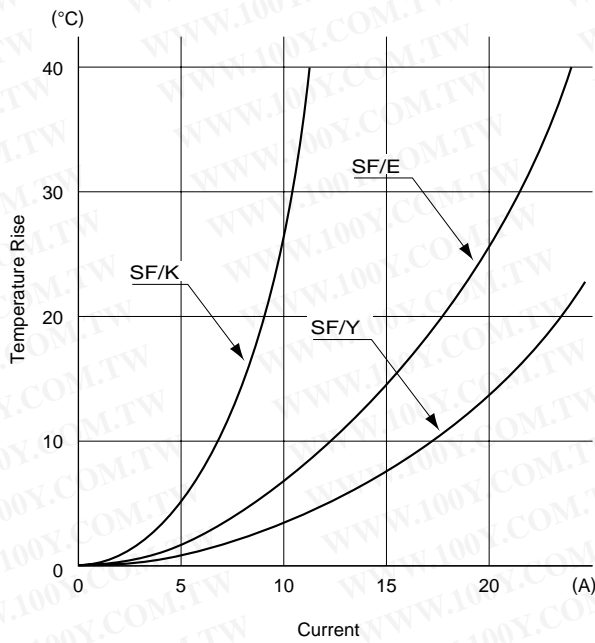
\*1: 2002010205023071



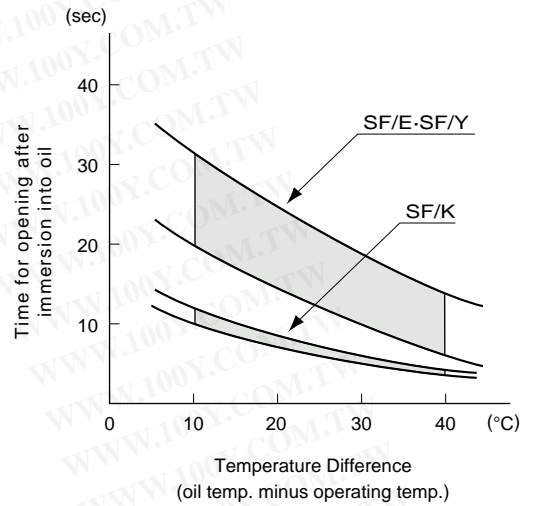
# Performance Data

## SF/E Series-SF/K Series-SF/Y Series

### Temperature Rise

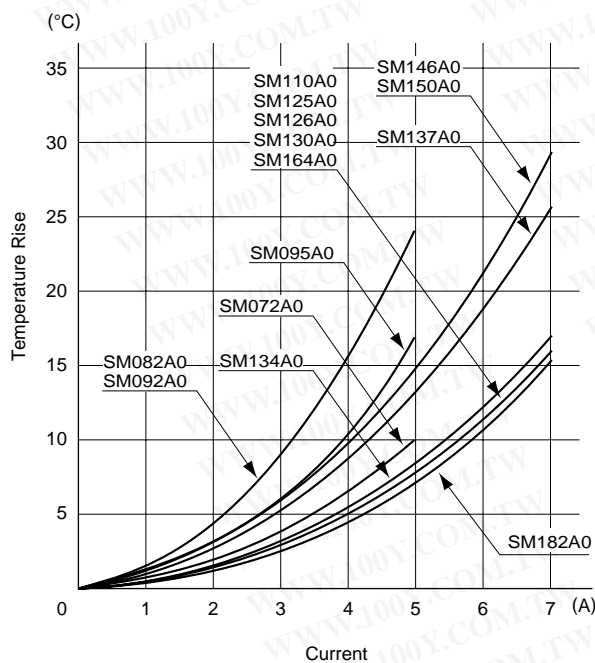


### Response Time

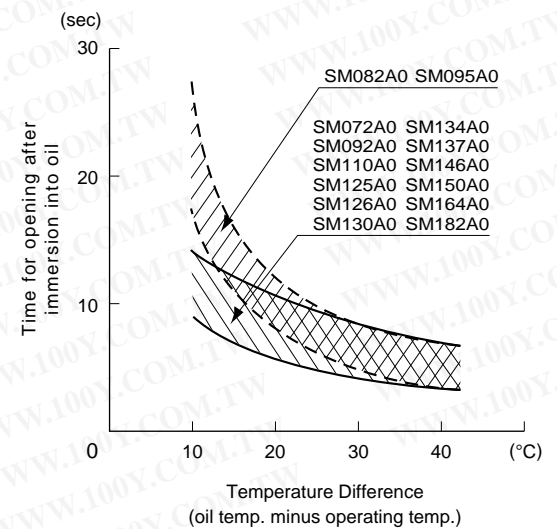


## SM/A Series

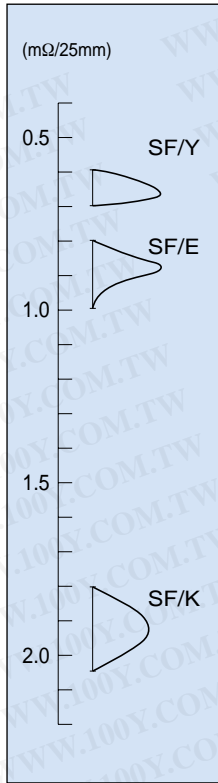
### Temperature Rise



### Response Time



## Internal Resistance



## initial operating temperature

Part Number	Operating Temperature (°C)	Part Number	Operating Temperature (°C)	Part Number	Operating Temperature (°C)
SF70E/K/Y	69 70 71	SF119E/K/Y	118 119 120	SF184E/Y	180 182 184
SF76E/K/Y	73 74 75	SF129E/Y	129 130 131	SF188E/K/Y	189 190 191
SF91E/K/Y	91 92 93	SF139E/Y	138 139 140	SF214E/K/Y	212 213 214
SF96E/K/Y	95 96 97	SF152E/Y	152 153 154	SF226E/Y	224 225 226
SF113E/Y	108 109 110	SF169E/Y	167 168 169	SF240E/Y	235 236 237

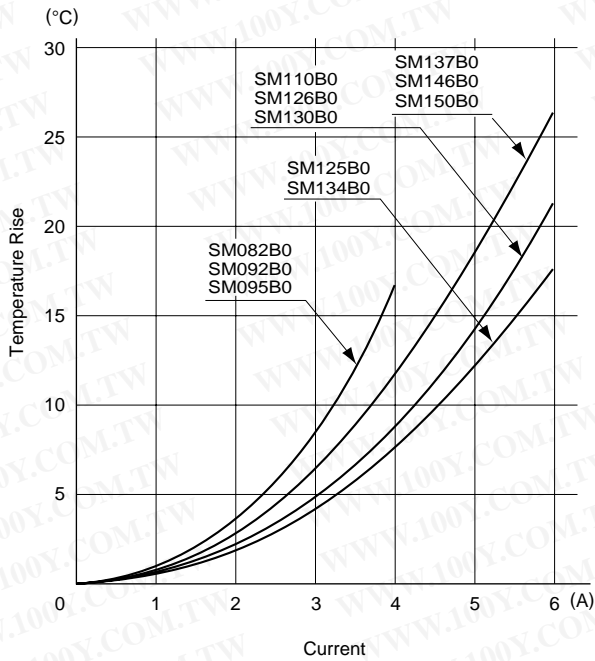
## Internal Resistance and initial operating temperature

Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)	Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)
SM072A0	3.7 3.9 4.1	72 73 74	SM130A0	2.7 2.9 3.1	128 129 130
SM082A0	5.8 6.3 6.8	81.5 82.5 83.5	SM134A0	3.0 3.2 3.4	132 133 134
SM092A0	5.8 6.3 6.8	90.6 91.6 92.6	SM137A0	3.8 4.3 4.8	137 138 139
SM095A0	5.2 5.4 5.6	96 97 98	SM146A0 SM150A0	4.4 4.7 5.0	145 146 147
SM110A0	2.8 3.0 3.2	110 111 112	SM164A0	2.7 2.9 3.1	163 164 165
SM125A0	2.7 2.9 3.1	124.4 125.4 126.4	SM182A0	2.2 2.4 2.6	181 182 183
SM126A0	2.7 2.9 3.1	125 126 127			

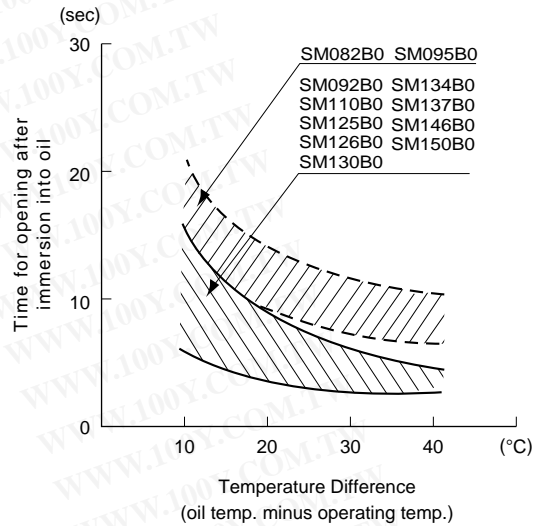
# Performance Data

## SM/B Series

### Temperature Rise

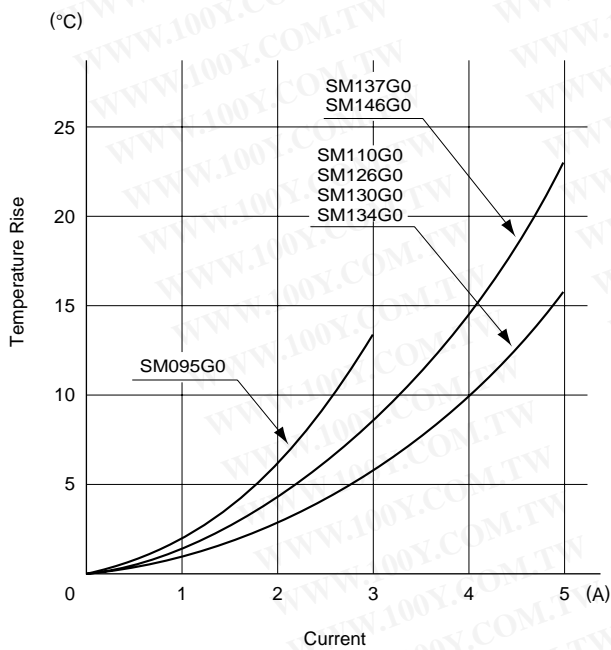


### Response Time

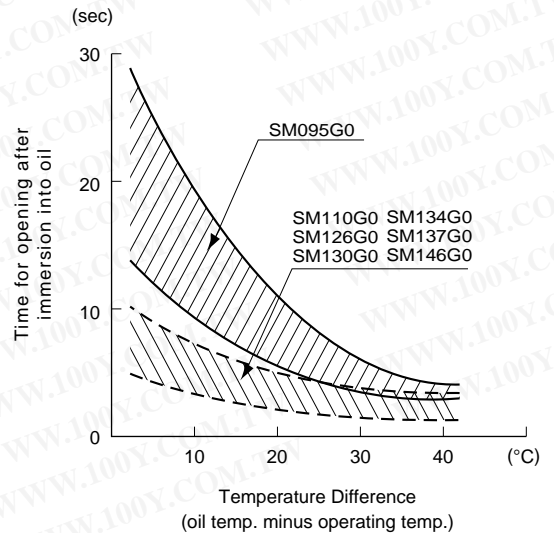


## SM/G Series

### Temperature Rise



### Response Time





## Internal Resistance and initial operating temperature

Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)	Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)
SM082B0	7.2 8.2 9.2	81 82 83	SM126B0	4.4 4.6 4.8	125 126 127
SM092B0	8 9 10	90.6 91.6 92.6	SM130B0	4.4 4.6 4.8	128 129 130
SM095B0	8 9 10	96 97 98	SM134B0	4.1 4.4 4.7	132.5 133.5 134.5
SM110B0	4.4 4.6 4.8	110 111 112	SM137B0	5.6 6.1 6.6	137 138 139
SM125B0	3.8 4.2 4.6	125 126 127	SM146B0 SM150B0	5.7 6.2 6.7	145.5 146.5 147.5

## Internal Resistance and initial operating temperature

Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)	Part Number	Internal Resistance (mΩ/25mm)	Operating Temperature (°C)
SM095G0	10 11 12	96 97 98	SM134G0	4.5 5.5 6.5	134 135 136
SM110G0	5 6 7	110 111 112	SM137G0	6.8 7.6 8.4	136 137 138
SM126G0	4 5 6	125 126 127	SM146G0	6.4 7.2 8.0	145.5 146.5 147.5
SM130G0	4.0 5.0 6.0	128 129 130			

# Definition of Terms

## ● Rated Functioning Temperature

Rated functioning temperature is the operating temperature of thermal cutoffs, measured using the method specified in the safety standard. In present PSE (Electrical Appliance and Material safety Law) of Japan, the operation should be within the specified operating temperature range of  $\pm 7$  °C. In various standards such as UL, CSA, VDE, BEAB and CCC which comply with the IEC standard, it is called the rated functioning temperature, and should operate within the prescribed temperature range of +0 / -10 °C.

It is represented by the symbol Tf in the UL, CSA, VDE, BEAB and CCC standards.

In SEFUSE, a temperature that complies with both standards is set as the rated functioning temperature, and is indicated on the body of the thermal cutoff.

## ● Operating Temperature

Operating temperature is the actual operating temperature range when the thermal cutoff is made to operate inside a constant temperature oven whose temperature is raised at the rate of 0.5 to 1 °C/min. while a detection current of 10 mA or lower is applied.

The operating temperature is a standard set by ourself and is not specified by a safety standard.

## ● Th, Tc (Holding Temperature)

Holding temperature is the maximum temperature at which, when applying a rated current to the thermal cutoff, the state of conductivity is not changed during specified time not less than 168 hours (1 week).

It is represented by the symbol Th in the UL and CSA standard, Tc in the VDE, BEAB and CCC standard as an option.

## ● Tm (Maximum Temperature Limit)

Maximum temperature limit is the temperature up to which thermal cutoffs will not change its state of cutoff without impairing.

It is represented by the symbol Tm in the UL, CSA, VDE, BEAB and CCC standards.

## Lead Cutting and Taping

SEFUSE™

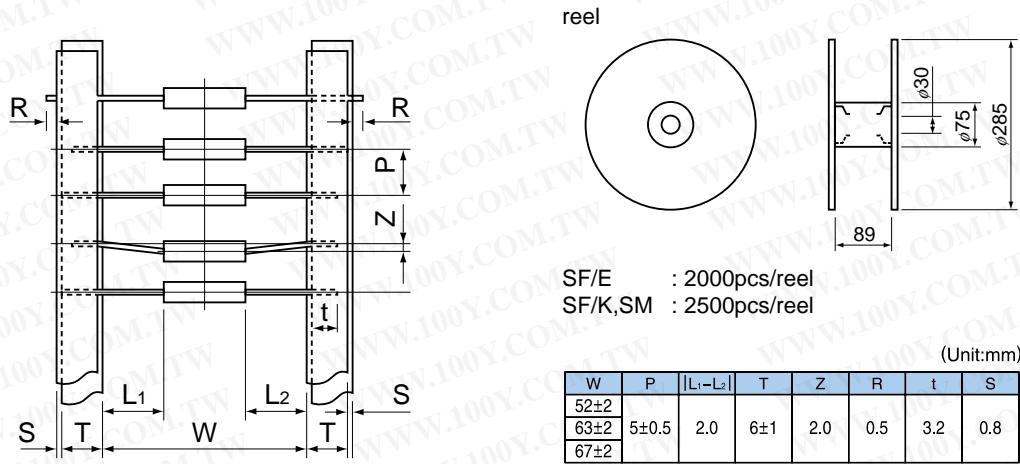
勝特力材料 886-3-5753170  
 勝特力电子(上海) 86-21-34970699  
 勝特力电子(深圳) 86-755-83298787  
[Http://www.100y.com.tw](http://www.100y.com.tw)

The following lead cutting and taping are available as your request.

### ■ Applicable Products

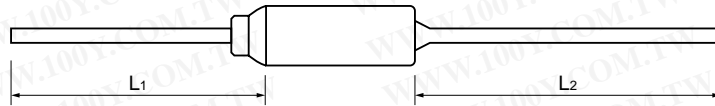
	Standard lead type						Long lead type				
	SF/E	SF/K	SF/Y	SM/A0	SM/B0	SM/G0	SF/E-1	SF/Y-1	SM/A1	SM/B1	SM/G1
Taping	—	○	—	○	○	○	○	—	—	—	—
Lead Cutting	○	○	—	○	○	○	○	—	—	—	—
Lead Forming	○	—	—	—	—	—	○	—	—	—	—

### ■ Taping



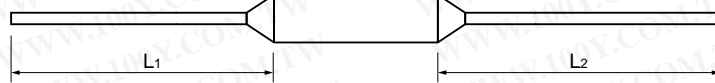
### ■ Lead Cutting

#### ● SF Type



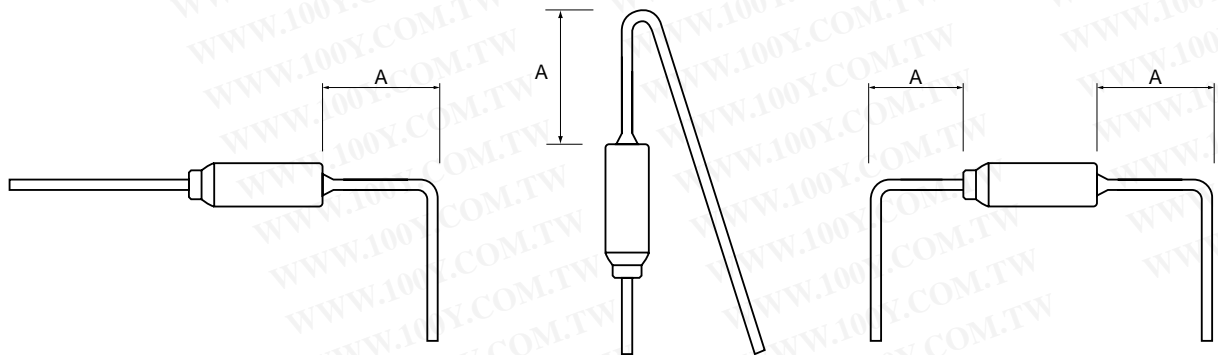
L1 : 9~32  
 L2 : 7~33 (mm)

#### ● SM Type



L1, L2 : 9~35 (mm)

### ■ Lead Forming



A: Should be over 5 mm

● For more information on dimensions not described in diagrams above, please contact us.