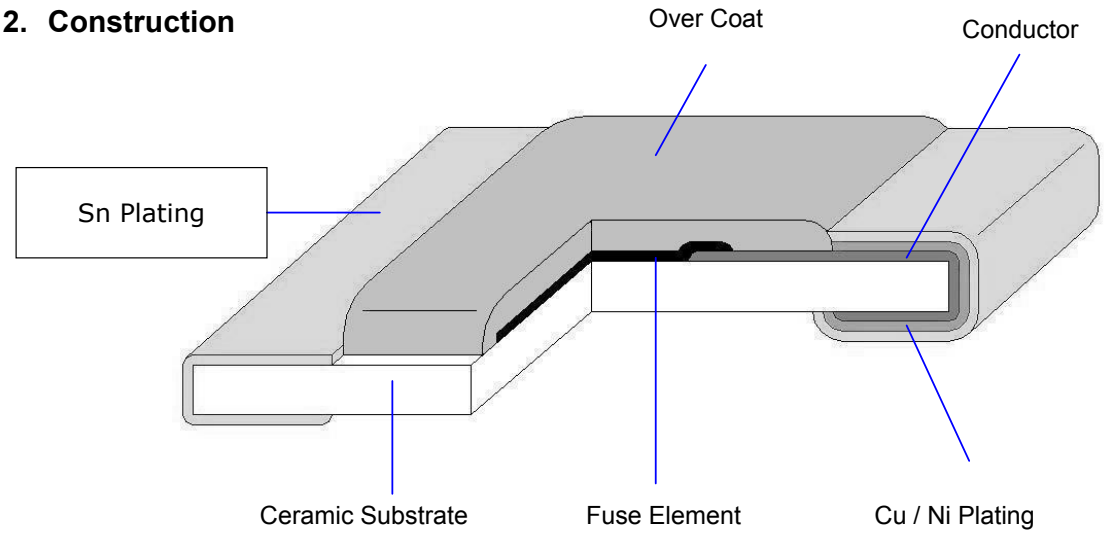
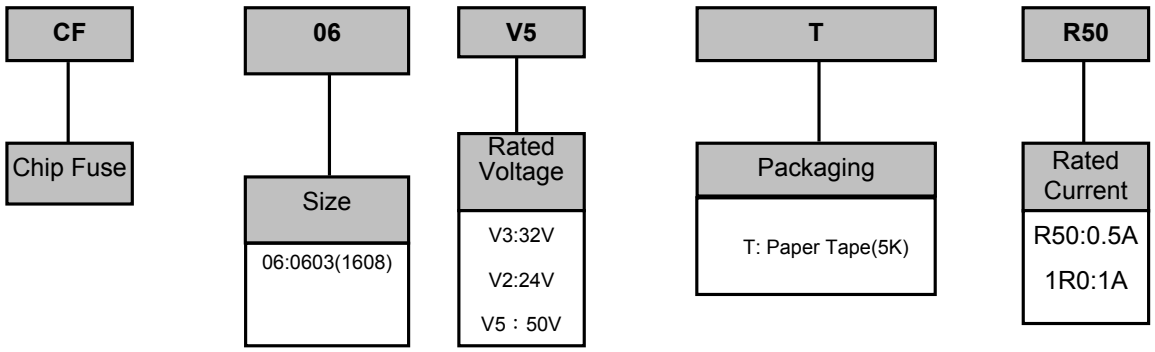
1. Scope

This specification applies for the Lead-Free fuse series of thin film chip fuse made by TA-I.

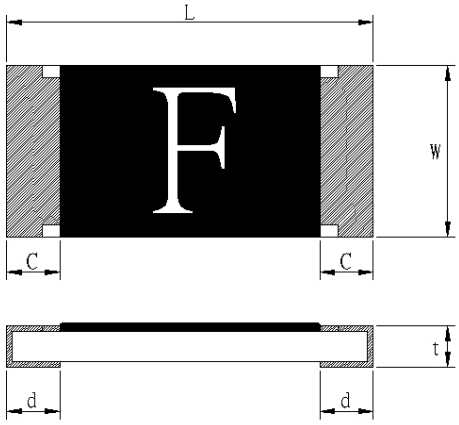
2. Construction



3. Type Designation



4. Dimensions



Unit: mm

Type (Inch Size code)	Dimensions (mm)				
	L	W	C	d	t
CF06V (0603)	1.6±0.1	0.8±0.1	0.3±0.2	0.35±0.2	0.45±0.1

5. Applications and ratings

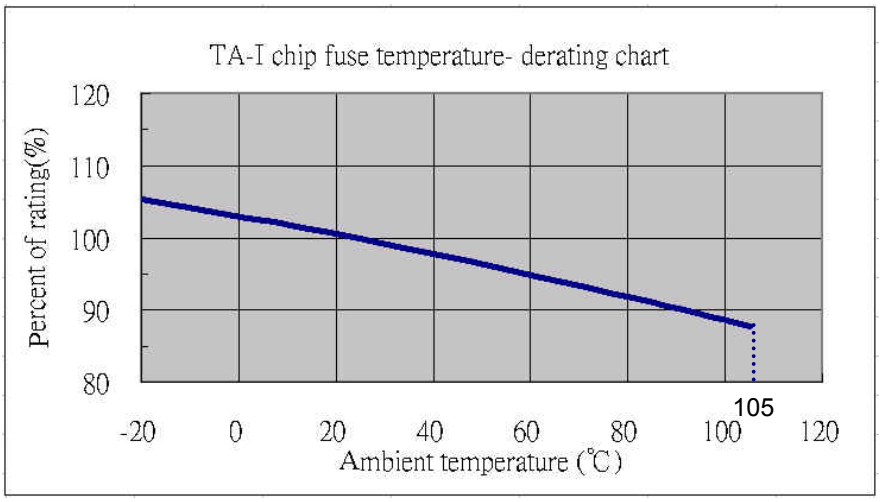
Part Designation	Marking	Rated Current	Fusing Time	Resistance (mΩ) Typ.*	Rated Voltage	Breaking Capacity	Body Temperature rising
CF06V5TR50	F	0.50A	Open within 1min.at 200% rated current	250	DC 50V	DC50V 50A	<75℃at 100% rated current
CF06V3TR63	I	0.63A		173	DC 32V	DC32V 50A	
CF06V3TR80	K	0.80A		115			
CF06V3T1R0	L	1.00A		88			
CF06V3T1R25	M	1.25A		63			
CF06V3T1R50	P	1.50A		45			
CF06V3T1R60	N	1.60A		42			
CF06V3T2R0	S	2.00A		33			
CF06V2T2R50	T	2.50A		24	DC 24V	DC24V 50A	
CF06V2T3R00	3	3.00A		21			
CF06V2T3R15	U	3.15A		19			
CF06V3T4R0	W	4.00A		15	DC 32V	DC32V 50A	
CF06V3T5R0	Y	5.00A		12			

*Resistance valve was measured with less than 10% of rated current

6.Temperatuer Derating Curve

6.1 Normal Ambient Temperature: 25℃

6.2 Operating Temperature: -20℃~105℃,whit proper Derating factor as below:



7.Reliability Tests

Parameter	Requirement	Test Method
Carrying capacity	No fusing	Rated current, 4hr
Fusing Time	Within 1 minute	200% of its rated current
Interrupting Ability	No mechanical damages	After the fuse is interrupted ,rated voltage applied for 30sec again
Bending Test	No mechanical damages	Distance between holding points: 90mm, Bending:3mm,1time ,30sec
Resistance to solder Heat	±20%	260℃±5℃,10seconds ±1second
Solderability	95% coverage minimum	235℃±5℃, 2±0.5second 245℃±5℃, 2±0.5second (Lead Free)
Temperature Rise	<75℃	100% of its rated current, Measure of surface temperature
Resistance to Dry Heat	±20%	105℃±5℃,1000 hrs
Resistance to Solvent	No evident damages on protective coating and marking	23℃±5℃of Isopropyl alcohol 90second
Residual Resistance	10kΩ and more	Measure DC resistance after fusing
Thermal Shock	△R< 10 %	-20℃/ +25℃/+125℃/+25℃ , 10 cycles

8.Marking

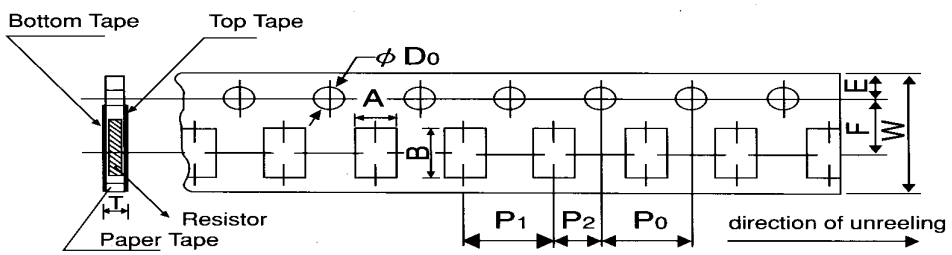
Symbol for Rating Current

Symbol	F	I	K	L	M	P	N	S	T	3	U	W	Y
Rating Current(A)	0.5	0.63	0.8	1	1.25	1.5	1.6	2	2.5	3	3.15	4	5

9.Taping & Reel

9.1 Taping Dimensions

4mm pitch paper

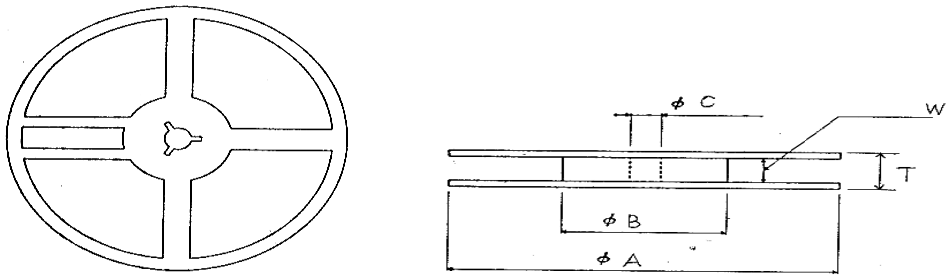


Packing	Type	A	B	W	F	E	P_1	P_2	P_0	D_0	T
Paper Tape	CF06V	1.1±0.1	1.9±0.1	8.0±0.2	3.5±0.05	1.75±0.1	4.0±0.1	2.0±0.05	4.0±0.1	ϕ 1.5 $^{+0.1}_{-0}$	0.64±0.1

Unit: mm

Type series		Paper Tape
		4 mm pitch
		180mm/R
CF	06V	5000

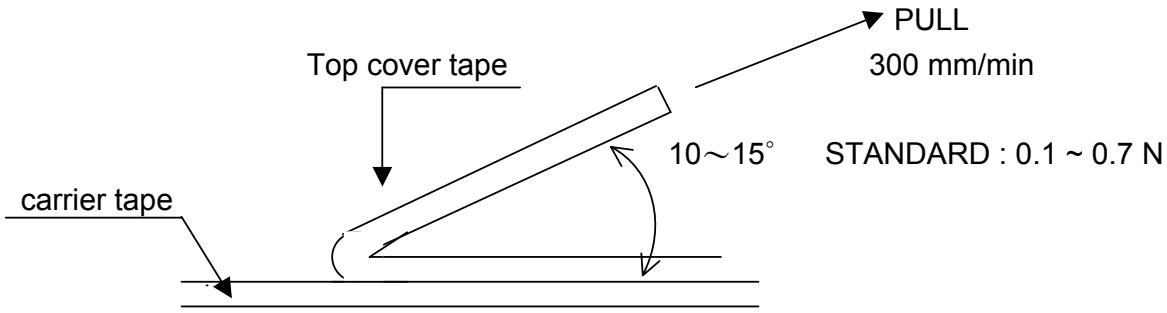
9.2 Reel Specifications



Unit: mm

Series	φ A	φ B	φ C	W	T
CF06V	180^{+0}_{-3}	60 min	13.0±1.0	9.0±1.0	11.4±2.0

9.3 Peel –off force :



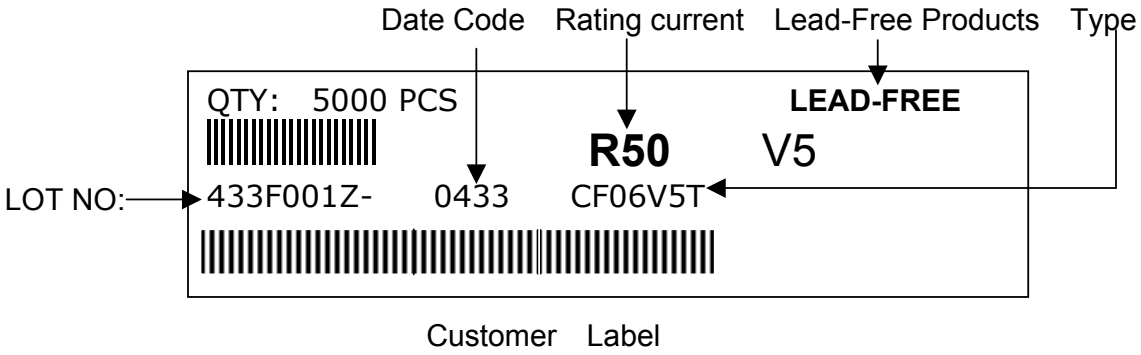
10. Storage Conditions:

Temperature: 5℃~35℃,Humidity:40%~75%

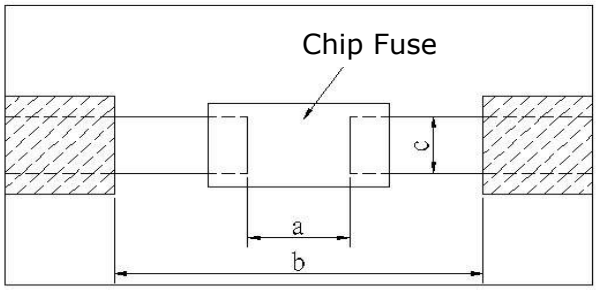
11. Shelf Life:

2 years from manufacturing date

12. Label

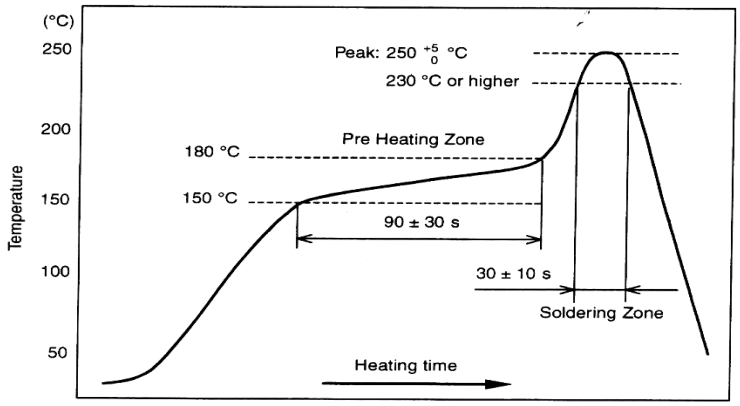


13. Recommended land patterns



Type \ Land pattern Size		Dimension		
		a	b	c
CF	06 (0603)	0.7~0.9	2.0~2.2	0.8~1.0

14. Recommend IR – Reflow profile : (solder : Sn96.5 / Ag3 / Cu0.5)



Peak : 250 $^{+5}_{-0}$ ℃ , 5 sec

Pre – heat Zone : 150 to 180 ℃, 90±30 sec

Soldering Zone : 230℃ or higher , 30±10 sec

15. Approval by UL248-14

The fuses have been approved by UL.

File No. of UL Recognition is E241710

16. ECN

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

17. Manufacturing Country & City :

TA-I TECHNOLOGY CO., LTD. (Taiwan – Tao Yuan)

Tel: 886-3-3246169 Fax : 886-3-3247410

Associated companies :

(1) FORTUNE TASK RESISTOR FACTORY (China – Dong Guan)

Tel : 86-769-83394790 Fax : 86-769-83394794

(2) TA-I TECHNOLOGY (SU ZHOU) CO., LTD. (China – Su Zhou)

Tel :86- 512-63457879 Fax : 86-512-63457869

(3) TAI OHM ELECTRONICS (M) SDN. BHD. (Malaysia – Pulaupinang)

Tel :604- 3900480 Fax : 604-3901481

(4) P.T.TAI ELECTRONICS Indonesia (Indonesia – Jakarta)

Tel :002-62-21-44820254 Fax : 002-62-21-44820256

★ Selection Guideline of Fuse:

■Checklist of selection factors

◎Normal operating current

◎Normal operating voltage (AC or DC)

◎Ambient Temperature

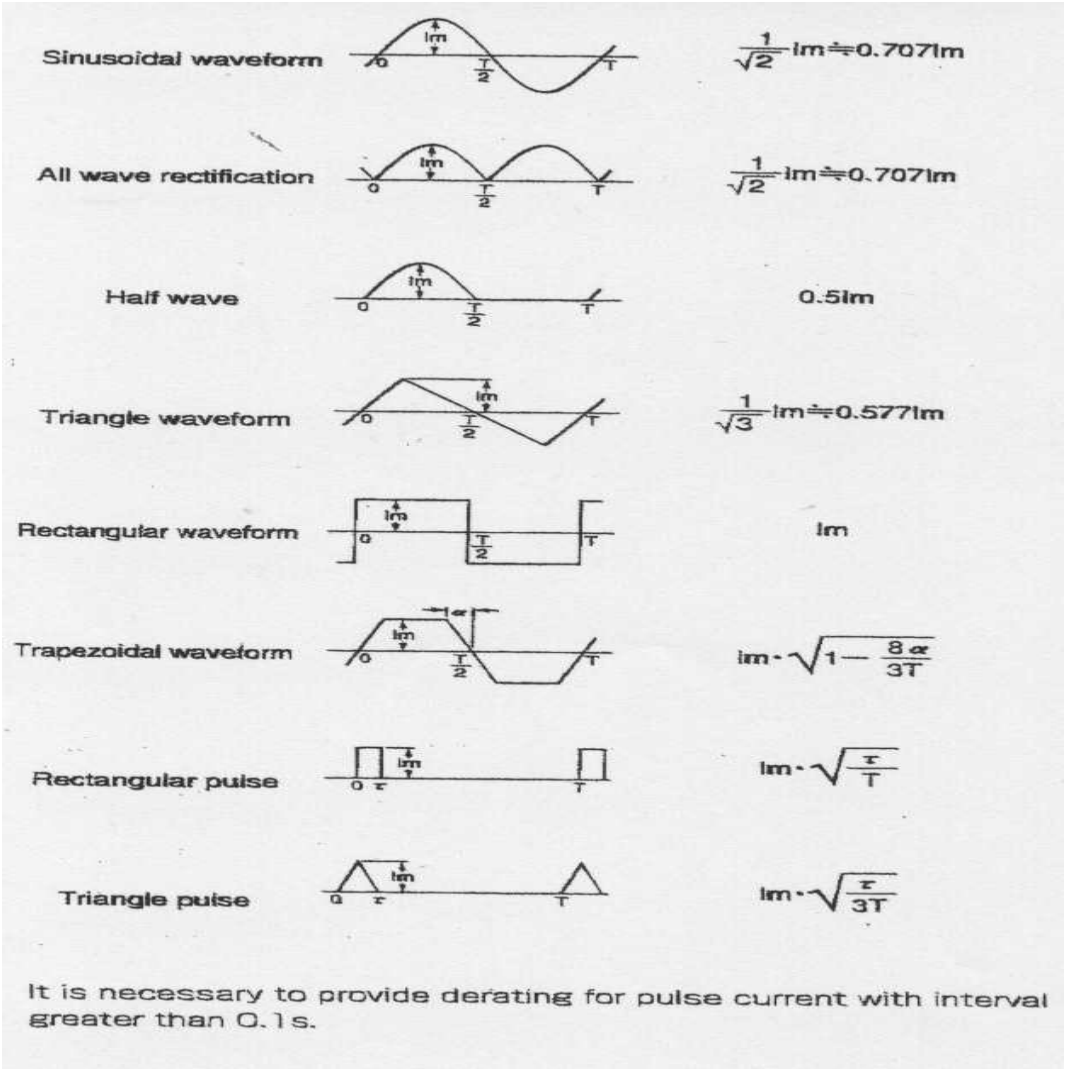
◎Overload current and length of time in which the fuse must open .

◎Type of fuse (SMD or Tube) and physical size limitation (0603 or 1206)

◎Agency Approval required (e.g., UL248-14)

■ Normal operating current

e.g., Rectangular Wave , If I p = 1.5 A , Normal operating current = 1.5 A



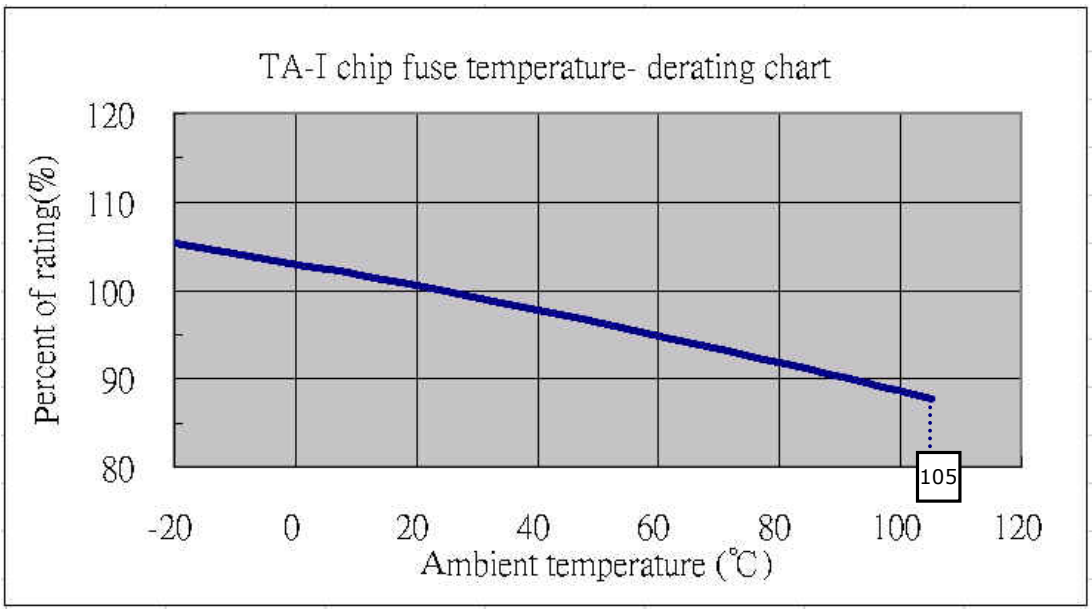
It is necessary to provide derating for pulse current with interval greater than 0.1s.

■ Derating ratio for different ambient Temperature

◎ Referring to bottom figure and select the appropriate derating ratio :

e.g., Ambient temperature is 60 degree C

the derating ratio ≒ 0.95



■ Calculating the required rating of fuse needed .

◎ Safety coefficient : 70 % is safety coefficient from practical experience

◎ $\dfrac{\text{Normal Operating Current}}{0.7 \times \text{derating ratio}}$ < rating current of fuse

Ambient temperature

Safety coefficient

e.g.,

Condition : Normal operating current =1.5 A

Ambient temperature 40 ℃ : Derating ratio ≒ 0.95

$$\frac{1.5}{0.7 \times 0.95} < \text{rating current of fuse}$$

2.255 < rating current of fuse

■ Determination of the type of fuse

e.g.,

Condition :

- ◆ Calculating value =2.255 A , 2.255A < rating current of fuse
- ◆ Normal operating voltage : DC 12 V
- ◆ Following bottom index-table :

Suggesting use CF06V2T2R50 .

Part Designation	Marking	Rated Current	Rated Voltage
CF06V5TR50	F	0.5A	50V
CF06V3TR63	I	0.63A	32V
CF06V3TR80	K	0.80A	32V
CF06V3T1R0	L	1.00A	32V
CF06V3T1R25	M	1.25A	32V
CF06V3T1R50	P	1.50A	32V
CF06V3T1R60	N	1.60A	32V
CF06V3T2R0	S	2.00A	32V
CF06V2T2R50	T	2.50A	24V
CF06V2T3R00	3	3.00A	24V
CF06V2T3R15	U	3.15A	24V
CF06V3T4R0	W	4.00A	32V
CF06V3T5R0	Y	5.00A	32V

■ Inrush current :

- ◆ Considering inrush waveform & calculate I^2t *(A^2s)* value
- ◆ Choosing fuse's I^2t *(A^2s)* value > calculate I^2t *(A^2s)* value
- ◆ Considering Ratio of I^2t repeat numbers to blowing
- ◆ Confrim with us

e.g., choosing 0603 Fuse

Condition :

1. Rectangular Wave , Ip = 4 A , t = 1 (ms) ,

   Calculate $Ip^2t = 4^2 \times 1 \times 10^{-3}$ (A) = 0.016 *(A^2s)*

2. Choosing CF06V2T2R5 (I^2t = 0.055 *(A^2s)*) ⟹ **Page 12 index-table**

3. Inrush shock : 100,000 times (≒0.35) ⟹ **Inrush derating ratio**

   Inrush 100,000 times

Calculating :

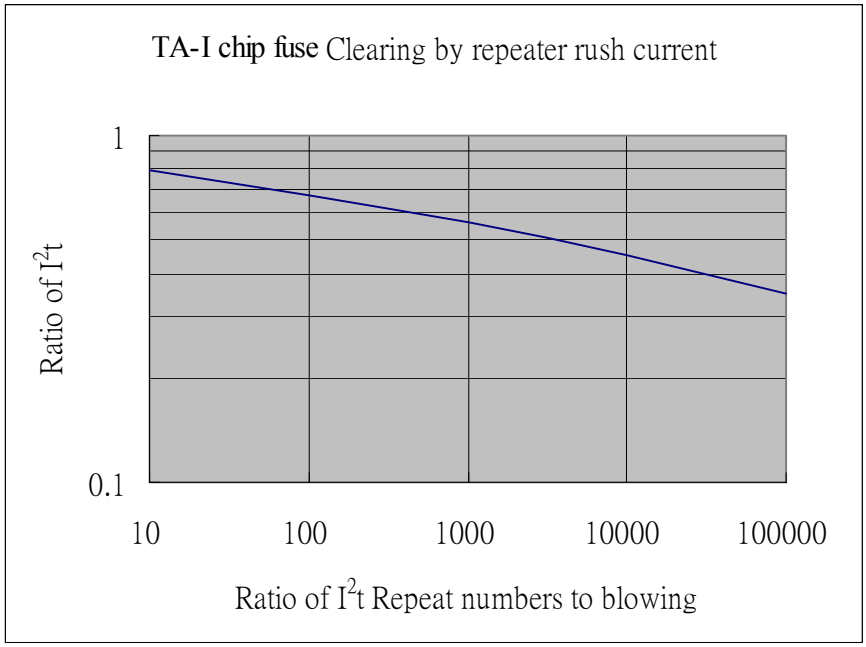
1. Choosing fuse's I^2t *(A^2s)* value X Derating ratio > calculate I^2t *(A^2s)* value
2. 0.055 x 0.35 = 0.01925 *(A^2s)*

4. 0.01925 > 0.016

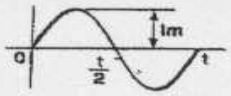
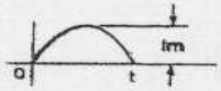
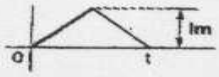
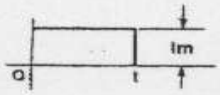
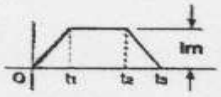
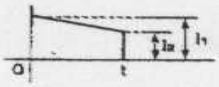
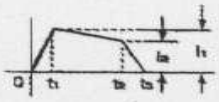
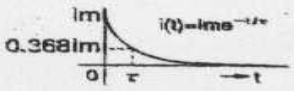
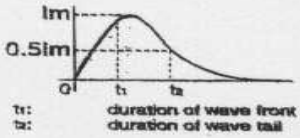
The fuse is able to meet circuit 's application

TA-I FUSE I^2t (A2s)	
Part Number	Typical I^2t (A^2s)
CF06V5TR50	0.005
CF06V3TR63	0.007
CF06V3TR80	0.014
CF06V3T1R0	0.016
CF06V3T1R25	0.027
CF06V3T1R50	0.037
CF06V3T1R60	0.041
CF06V3T2R0	0.044
CF06V2T2R50	0.055
CF06V2T3R00	0.082
CF06V2T3R15	0.089
CF06V3T4R0	0.239
CF06V3T5R0	0.433

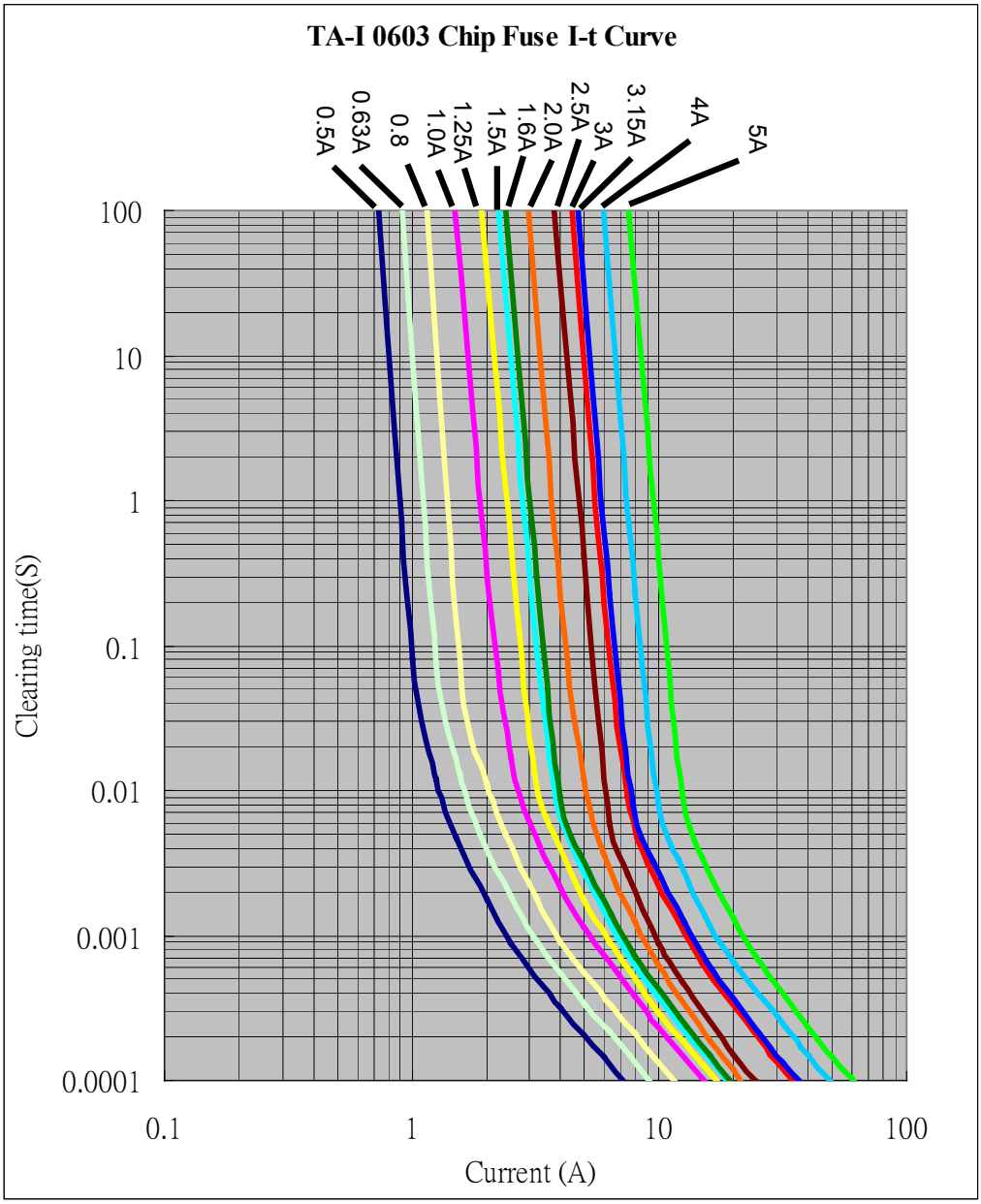
Note*: Typical I^2t value is measured at 10x-rated current, Application with surge over 10x-rated current. Please confrim with us.

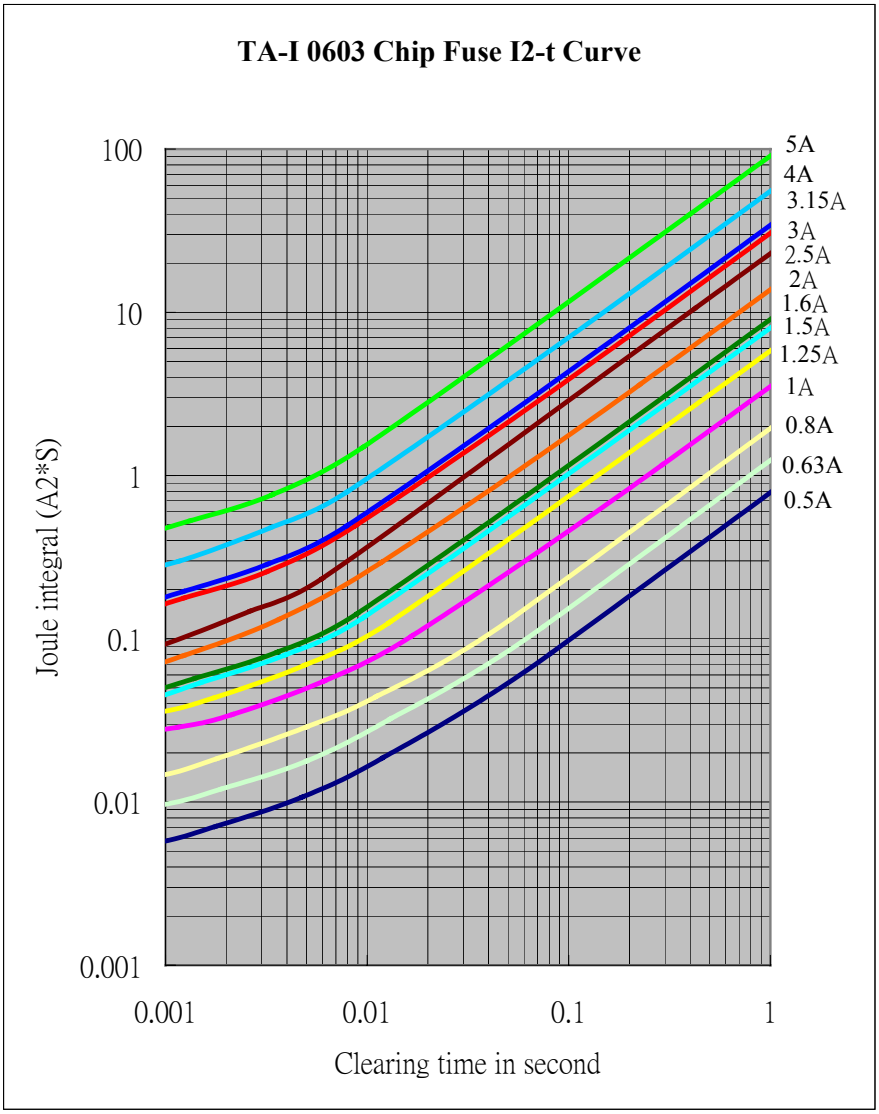


Inrush Waveform

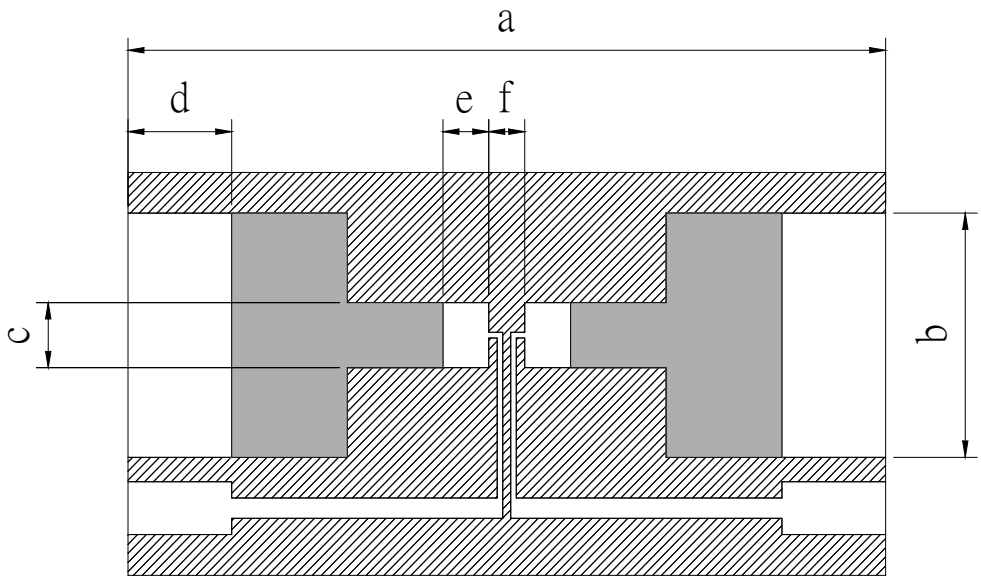
Sinusoidal waveform (1cycle)		$\frac{1}{2}Im^2t$
Sinusoidal waveform (1/2cyle)		$\frac{1}{2}Im^2t$
Triangle waveform		$\frac{1}{3}Im^2t$
Rectangular waveform		Im^2t
Trapezoidal waveform		$\frac{1}{3}Im^2t_1+Im^2(t_2-t_1)+\frac{1}{3}Im^2(t_3-t_2)$
Various waveform 1		$I_1I_2t+\frac{1}{3}(I_1-I_2)^2t$
Various waveform 2		$\frac{1}{3}I_1^2t_1+\{I_1I_2+\frac{1}{3}(I_1-I_2)^2\}(t_2-t_1)+\frac{1}{3}I_2^2(t_3-t_2)$
Charge/Discharge waveform		$\frac{1}{2}Im^2\tau$
Lightning surge waveform		$Im^2\{t_1/3+0.721(t_2-t_1)\}$

t_1: duration of wave front
t_2: duration of wave tail





Tset Circuit Borad



Type	a	b	c	d	e	f
CF0603	19	6	1.6	2.6	1.15	0.9

Unit:mm

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Surface Mount Fuses ***category:***

Click to view products by TA-I Tech ***manufacturer:***

Other Similar products are found below :

FHC20402ADTP NFVC6125S0R50TRF SFT-125MA TF16SN2.00TTD FCC16501ABTP FCC16102ABTP FHC16322ADTP 0308.250UR 0308.375UR 0308.750UR 0308001.UR 030801.5UR F0603G0R03FNTR SKY87604-12 SKY87604-11 SKY87604-13 R451003.L R451.500L R451001.L 3-103-119 3-103-123 ABB-A 25A 500V SGB401 SGB075 0154002.DRL 0154008.DRL 0154.500DRL 189140.1,25 189140.0,4 189140.0,63 189140.0,25 0402FA-R200 0402SFF150F/24-2 0435.250KRHFS 0468003.WR 0494001.NRHF 0494002.NRHF 0494003.NRHF 049402.5NRHF 049403.5NRHF 0494.250NRHF 0494.375NRHF 0494.500NRHF CF06V3T1R60 CF06V3T2R50 06H1300D JFC0603-1200FS CP06V3T2R0 06F-0200L1 06T-050L1