



## **Engineering Product Specification**

### **C310T-SC Series**

**Ceramic tube, Time delay**

**2015-04-21**

EATON, Electronics Division  
Shanghai DCC  
ISSUED

Title : Engineering Product Specification, C310T-SC Series	Revision: F
Printed on: 4/14/2015	Page 2 of 14

### Technical Specification Approvals

Functional Area	Signature(s) – See Master Printed Copy
Engineering Manager	
Product Manger	

### Revision Log

Rev. #	Revision Description	ECN	Date	Author	Appr.
A	Initial Release	SE13007	2013/01/14	DC.Feng	Duren.Huang
B	Update certification information	SE13151	12/17/2013	Luffy.Ding	Duren.Huang
C	Update KC certificated information and drawing	SE14028	03/18/2014	Luffy.Ding	Duren.Huang
D	Add package code: TR2; Update I-T curve	SE14132	10/30/2014	Luffy.Ding	Duren.Huang
E	Add 8A information	SE15033	02/02/2015	Luffy.Ding	Duren.Huang
F	Update item 7.3 & 7.4	SE15053	04/14/2015	Linda.Ding	Duren.Huang

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## 1. Scope

This Engineering Product Specification (EPS) is intended to provide end customers with information regarding Bussmann's RoHS compliant & Lead-Free C310T-SC fuses.

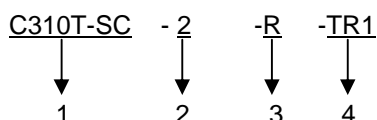
## 2. General Information

- Time delay
- 3.6x10mm physical size
- Ceramic tube, Nickel plated brass cap construction
- Tinned copper axial leads.
- Designed to IEC60127-3 sheet 4.
- RoHS complaint(-R code)
- Axial leaded
- One cap on each of terminal end

## 3. Catalog Symbol and Part Numbering System

### 3.1. Catalog Symbol

C310T-SC-2-R-TR1



- |    |                              |          |
|----|------------------------------|----------|
| 1) | Series Name:                 | C310T-SC |
| 2) | Ampere Rating:               | 2        |
| 3) | RoHS Compliance Option code: | R        |
| 4) | Packaging Code:              | TR1      |

### 3.2. Part Numbering System

#### 3.2.1. Packaging Code

Catalog	Designation
TR1	1500 pieces in a reel and 5 reels in 1 carton, with tape width 60mm
TR2	1500 pieces in a reel and 5 reels in 1 carton, with tape width 52mm

#### 3.2.2. Electrical Characteristic

Catalog Symbol	Characteristic
C310T-SC	Time Delay

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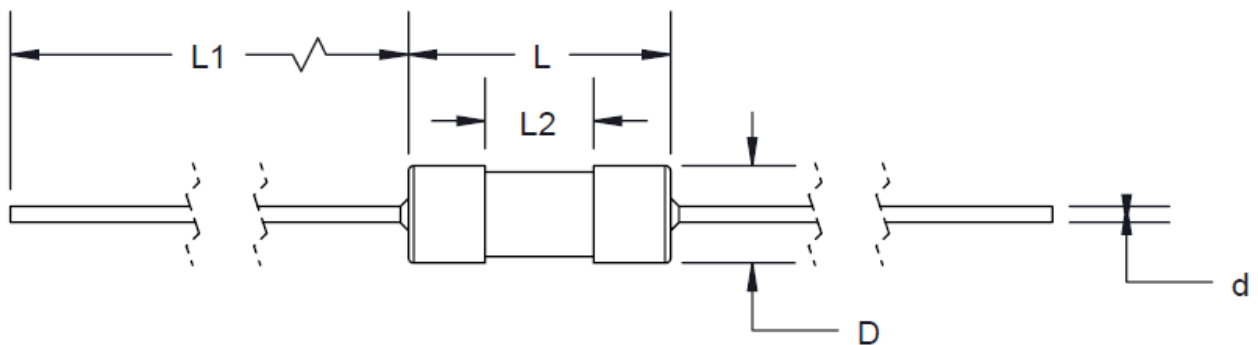
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### 3.2.3. Ampere Rating

Catalog Symbol	Description
C310T-SC-2-R	2A fuse
C310T-SC-2.5-R	2.5A fuse
C310T-SC-3.15-R	3.15A fuse
C310T-SC-4-R	4A fuse
C310T-SC-5-R	5A fuse
C310T-SC-6.3-R	6.3A fuse
C310T-SC-8-R	8A fuse

## 4. MECHANICAL SPECIFICATIONS

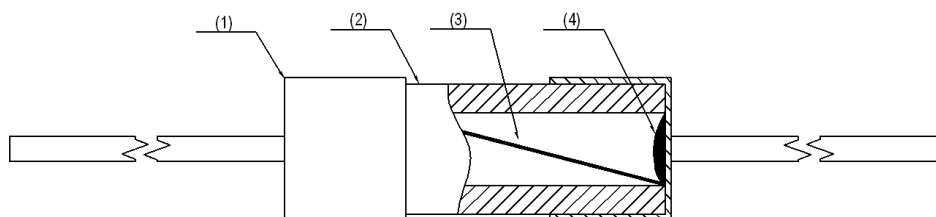
### 4.1. Dimension



Unit: mm

	L1	L	L2	D	d
-TR1	26+/-1	10 Max	3 Min.	3.6+/-0.2	0.6±0.05 (for 2 - 5A) 0.8±0.05 (for 6.3A)

### 4.2. Construction



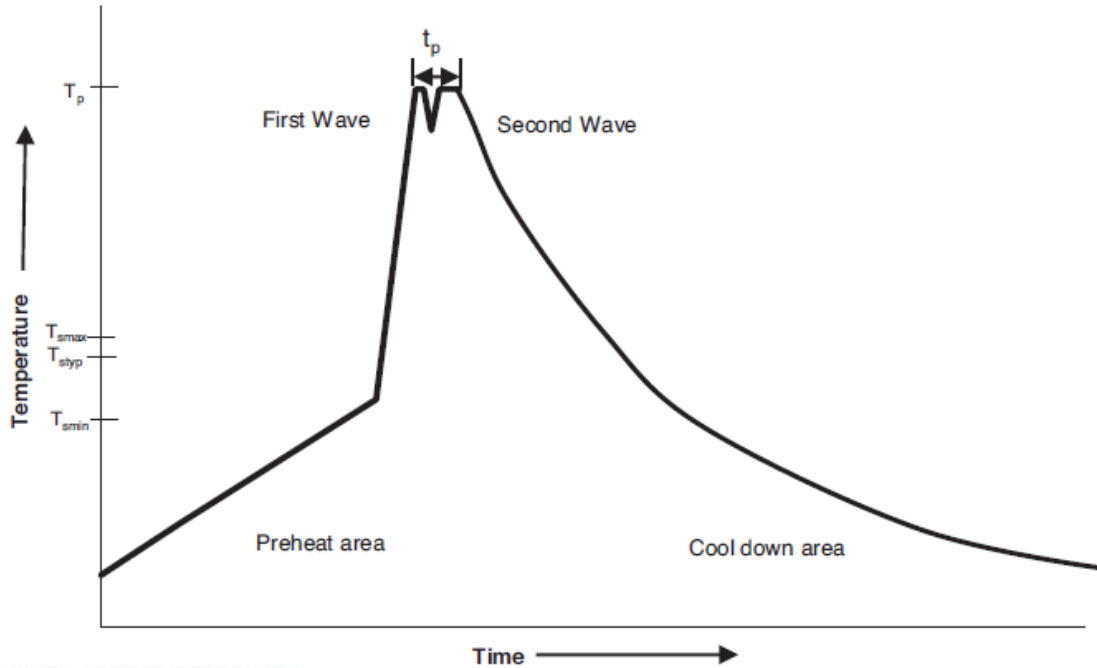
Item	1	2	3	4
Name	Lead Cap	Ceramic Body	Fuse Wire	Solder

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## 5. Soldering Method

### 5.1. Wave Solder



Reference EN 61760-1:2006

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
<b>Preheat</b>		
Temperature min. ( $T_{smin}$ )	100°C	100°C
Temperature typ. ( $T_{styp}$ )	120°C	120°C
Temperature max. ( $T_{smax}$ )	130°C	130°C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	70 seconds	70 seconds
$\Delta$ preheat to max Temperature	150°C max.	150°C max.
Peak temperature ( $T_p$ )	235°C - 260°C	250°C - 260°C
Time at peak temperature ( $t_p$ )	10 seconds max 5 seconds max each wave	10 seconds max 5 seconds max each wave
Ramp-down rate	~ 2 K/s min ~3.5 K/s typ ~5 K/s max	~ 2 K/s min ~3.5 K/s typ ~5 K/s max
Time 25°C to 25°C	4 minutes	4 minutes

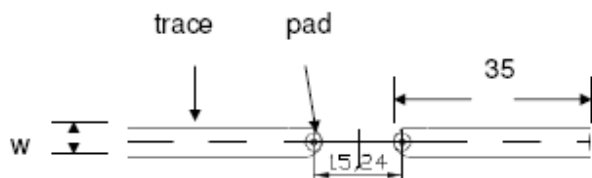
### 5.2. Manual Solder

350°C, 4-5Sec. (by Soldering Iron), generally Hand Soldering is not recommended.

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## 6. Land Pattern



$\Phi 1$ : external diameter of pad

$\Phi 2$ : internal diameter of pad

W: width of trace

For  $\leq 5A$  fuse:  $\Phi 1=2.54mm$ ,  $\Phi 2=1mm$ ,  $w=2.54mm$ . The PCB copper thickness is  $35\mu m$

For = 6.3A fuse:  $\Phi 1=2.54mm$ ,  $\Phi 2=1mm$ ,  $w=5mm$ . The PCB copper thickness is  $70\mu m$

## 7. ELECTRICAL SPECIFICATIONS

### 7.1. Electrical Specification.

PN	Rated Voltage AC	Typical resistance (mohm)	Maximum VD(mV)	Interrupting rating	Typical Melt $I^2t$ ( $A^2sec$ )
C310T-SC-2-R	250V	26.5	100	35A	12.0
C310T-SC-2.5-R	250V	19.5	100	35A	18.5
C310T-SC-3.15-R	250V	14.68	100	35A	37.8
C310T-SC-4-R	250V	10.6	100	40A	58
C310T-SC-5-R	250V	7.3	100	50A	57.5
C310T-SC-6.3-R	250V	7.1	100	63A	123
C310T-SC-8-R	250V	3.7	80	80A	200

### 7.2. Electrical character:

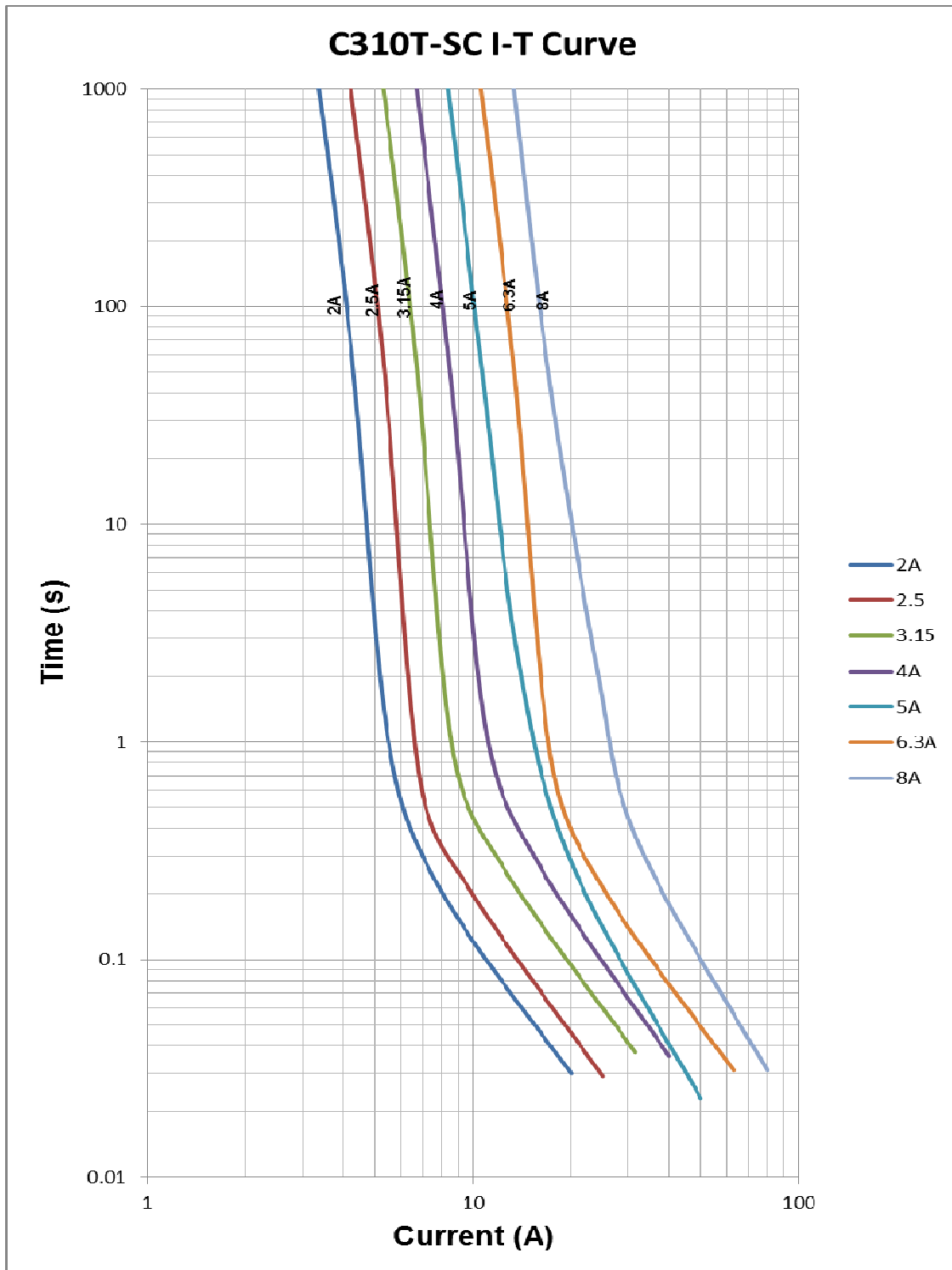
Ampere rating	1.5In	2.1In	2.75n		4In		10In	
	Min	Max	Min	Max	Min	Max	Min	Max
2A~6.3A	1hour	120sec	400ms	10sec	150ms	3sec	20ms	150ms

Ampere rating	1.5In	3In		10In	
	Min	Min	Max	Min	Max
8A	1hour	400ms	10sec	20ms	150ms

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### 7.3. Time Current characteristic curve



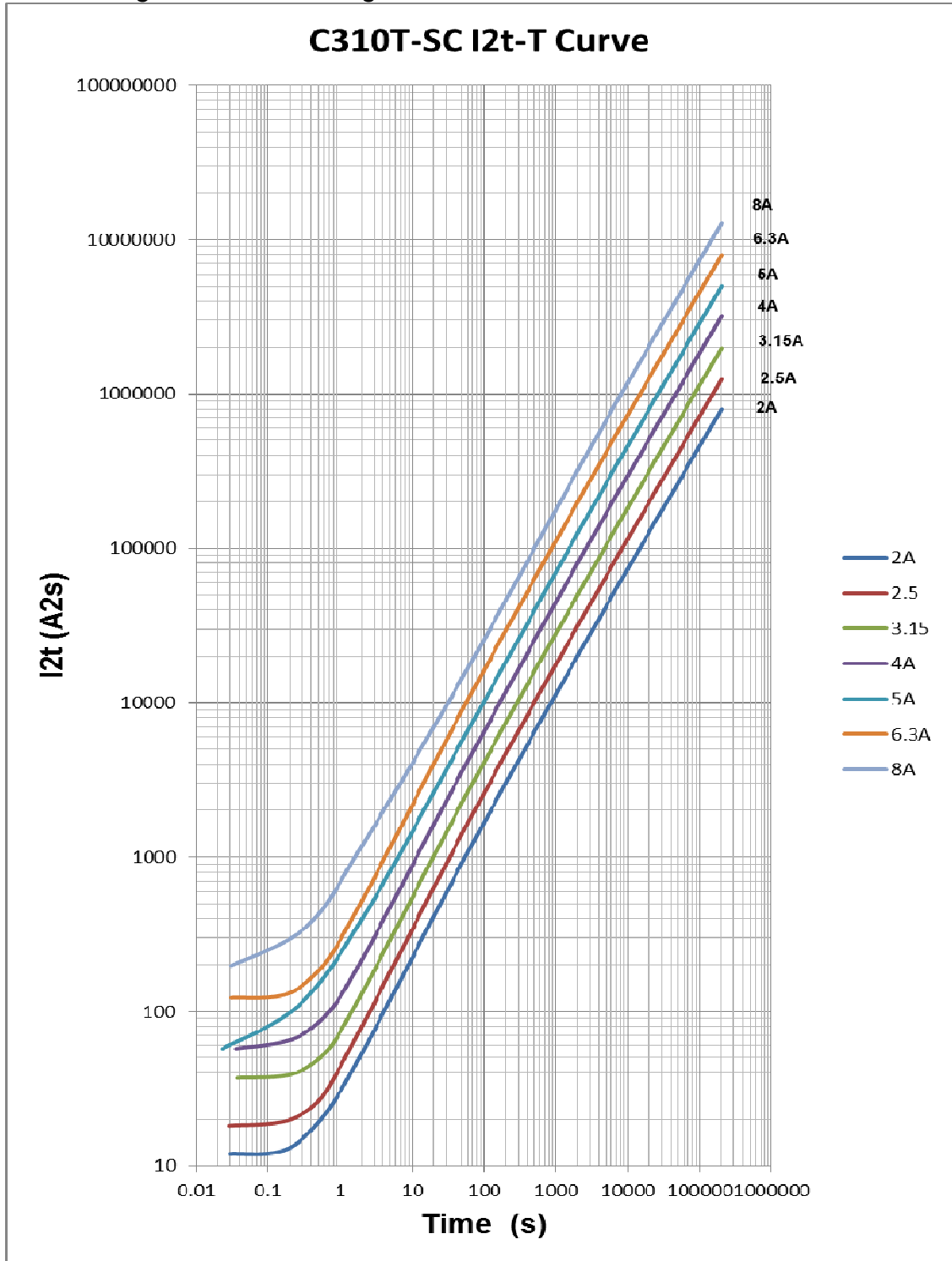
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## 7.4. Melting I2T Curve

### 7.4.1. Pre-Acting I2T vs Pre-Acting Time curve

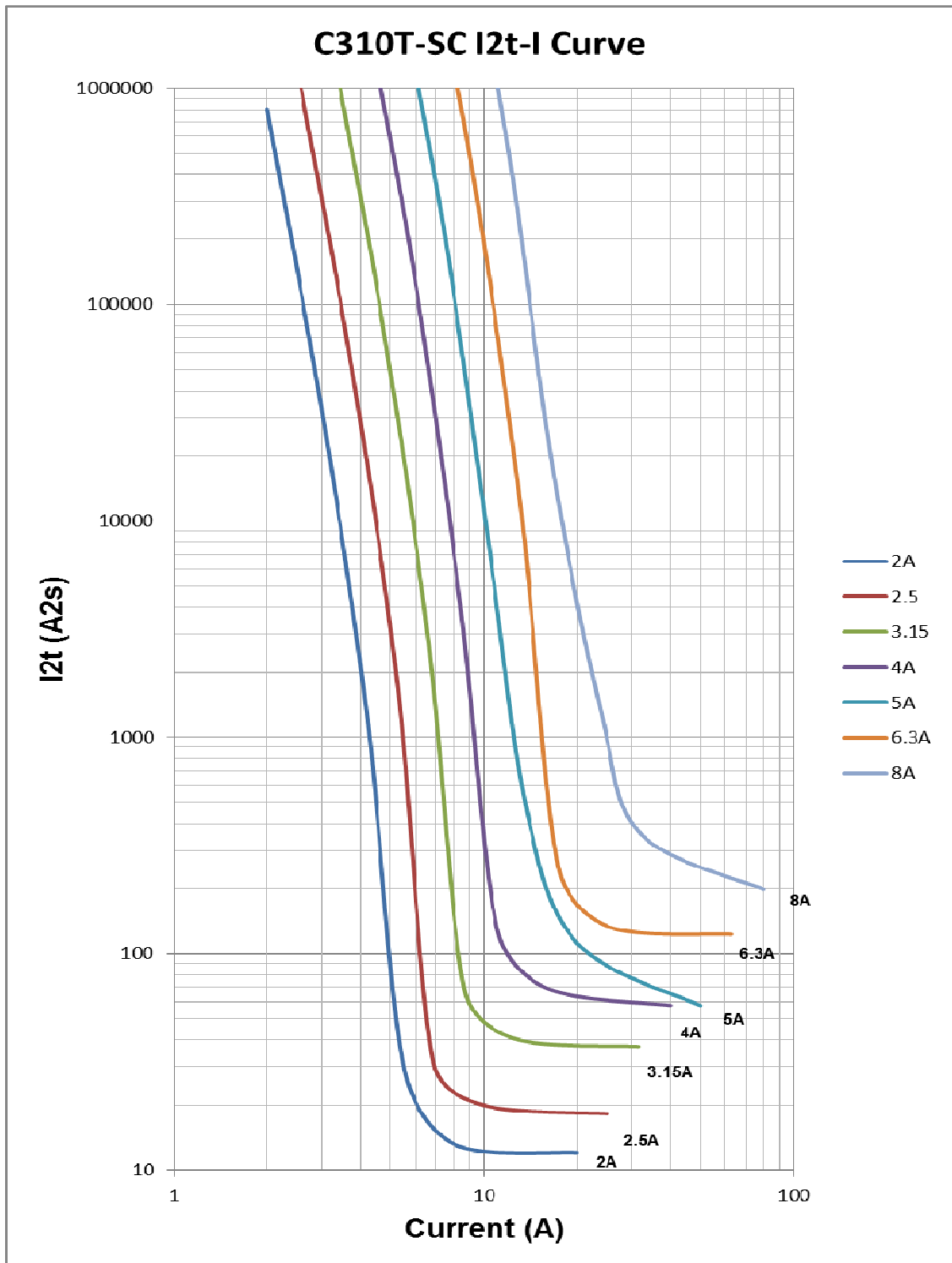


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### 7.4.2. Pre-Acting I2T vs Current Curve



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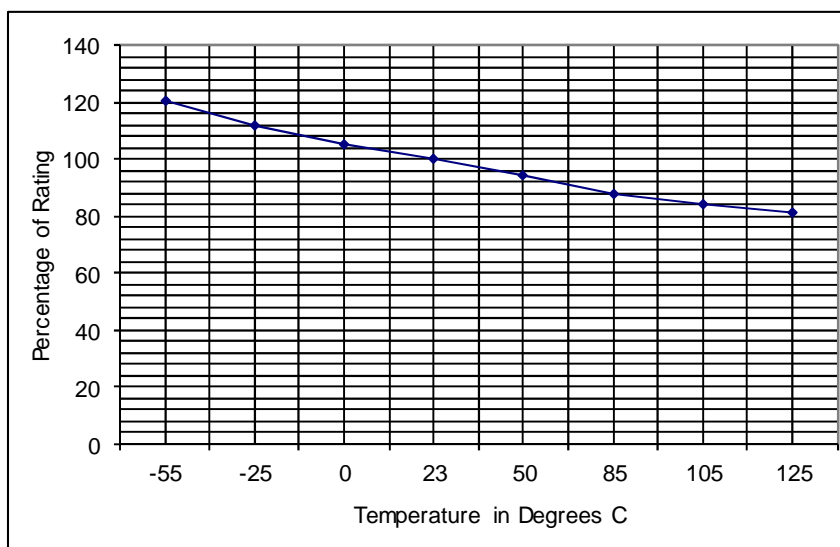
## 8. AGENCY CERTIFICATION AND APPROVAL INFORMATION

PN	Certification	Fuse Marking	
		1 <sup>st</sup> End	2 <sup>nd</sup> End
C310T-SC-2-R	VDE, cURus, CQC, TUV ,KC	T2A L 250V	BUSS C310T-SC
C310T-SC-2.5-R	VDE, cURus, CQC, TUV ,KC	T2.5A L 250V	BUSS C310T-SC
C310T-SC-3.15-R	VDE, cURus, CQC, TUV ,KC	T3.15A L 250V	BUSS C310T-SC
C310T-SC-4-R	VDE, cURus, CQC, TUV ,KC	T4A L 250V	BUSS C310T-SC
C310T-SC-5-R	VDE, cURus, CQC, TUV ,KC	T5A L 250V	BUSS C310T-SC
C310T-SC-6.3-R	VDE, cURus, CQC, TUV ,KC	T6.3A L 250V	BUSS C310T-SC
C310T-SC-8-R	cURus	T8A L 250V	BUSS C310T-SC

## 9. Temperature De-rating Curve

Normal ambient temperature: 23+/-3°C;

Operation temperature:-55°C~125 °C with proper correction factor, and the de-rating curve is showed as below.



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## 10. Reliability Test and Design Consideration

### 10.1. Reliability requirement

- Thermal shock Thermal Shock: MIL-STD-202G, Method 107G, Test Condition B (5 cycles, - 65°C to +125°C)
- Vibration: MIL-STD-202G, Method 201A
- Humidity: MIL-STD-202G, Method 103B, Testing Condition A (High RH (95%) and elevated Temp. (65°C) for 240h
- Salt Spray: MIL-STD-202G, Method 101D, Test Condition B
- Termination Pull out: >10N

### 10.2. Design Consideration

- Follow the recommend soldering conditions to avoid product deforming
- Do not use high temperature /high humidity and corrosive atmosphere like sulfide , chloride gas which could damage the solder-ability
- MSL(Moisture Sensitivity Levels) level according to J-STD-020 standard: Level 1 (Floor Life unlimited under condition <30°C/85%RH)
- Solder-ability requirement according to IPC/JEDEC J-STD-002C, Test D, test B1 and G1, use Sn/Ag/Cu (96.5/3.0/0.5) or equivalent solder and use activated flux #5 or equivalent flux.
- Use product within 6 months , if over 6 months , check solder-ability before use

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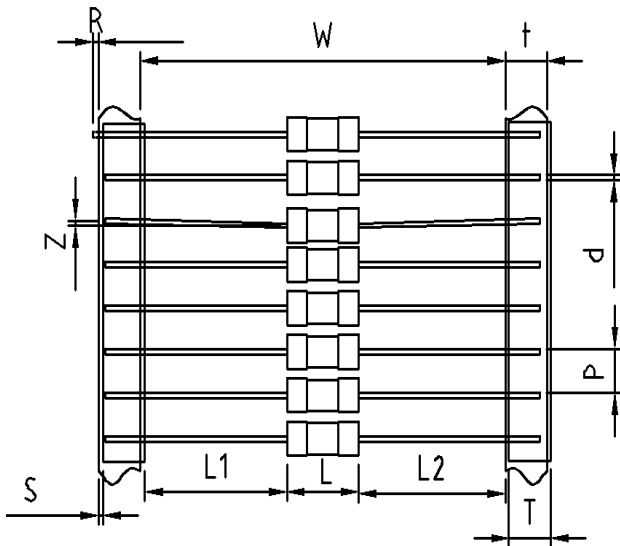
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## 11. Package Spec.

### 11.1.TR1 package spec.

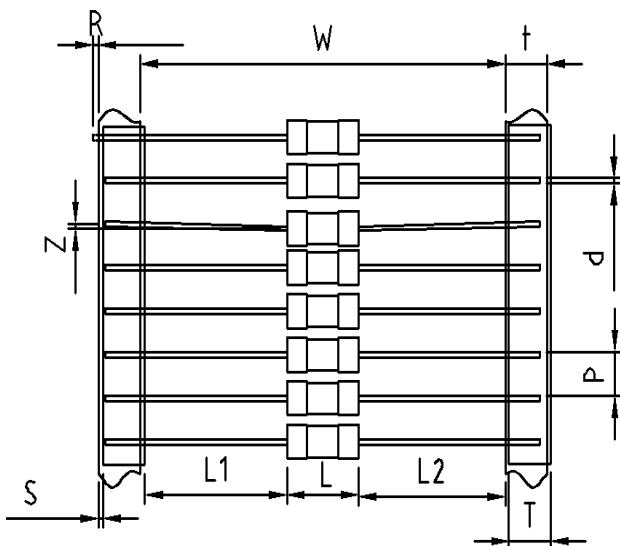
1500 pcs fuses in one reel with one Bussmann label and ROHS label on it. The reel is sealed in a bag. 5 bags in one cartoon, a Bussmann label and ROHS label on it.



Symbol	Dimension(mm)
W	60+/-1
P	5+/-0.5
L1-L2	1 Max
T	6.0+/-0.4
Z	1.2 Max
R	0.8 Max
S	0.8Max
t	6+/-0.4
d	0.6+/-0.05
L	10

### 11.2.TR2 package spec.

1500 pcs fuses in one reel with one Bussmann label and ROHS label on it. The reel is sealed in a bag. 5 bags in one cartoon, a Bussmann label and ROHS label on it.



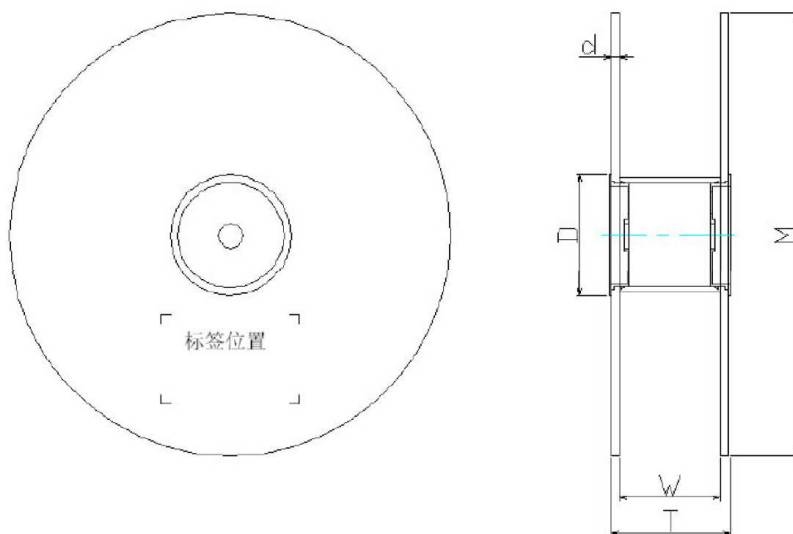
Symbol	Dimension(mm)
W	52+/-1
P	5+/-0.5
L1-L2	1 Max
T	6.0+/-0.4
Z	1.2 Max
R	0.8 Max
S	0.8Max
t	6+/-0.4
d	0.6+/-0.05
L	11

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### 11.3.Reel Spec.



Unit: mm

M	W	T	D	d
250+/-1.0	67+/-1	72+/-1	70.5+/-0.5	2.2+/-0.15

## 12. Agency Certification and Approval Information

CQC: 13012103410, 12012086705

TUV: J 50247281, J 50235242

VDE: 40036716

cURus: E19180

KC: SU05011-13001, SU05030-13006

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