

ASJ

DATA SHEET

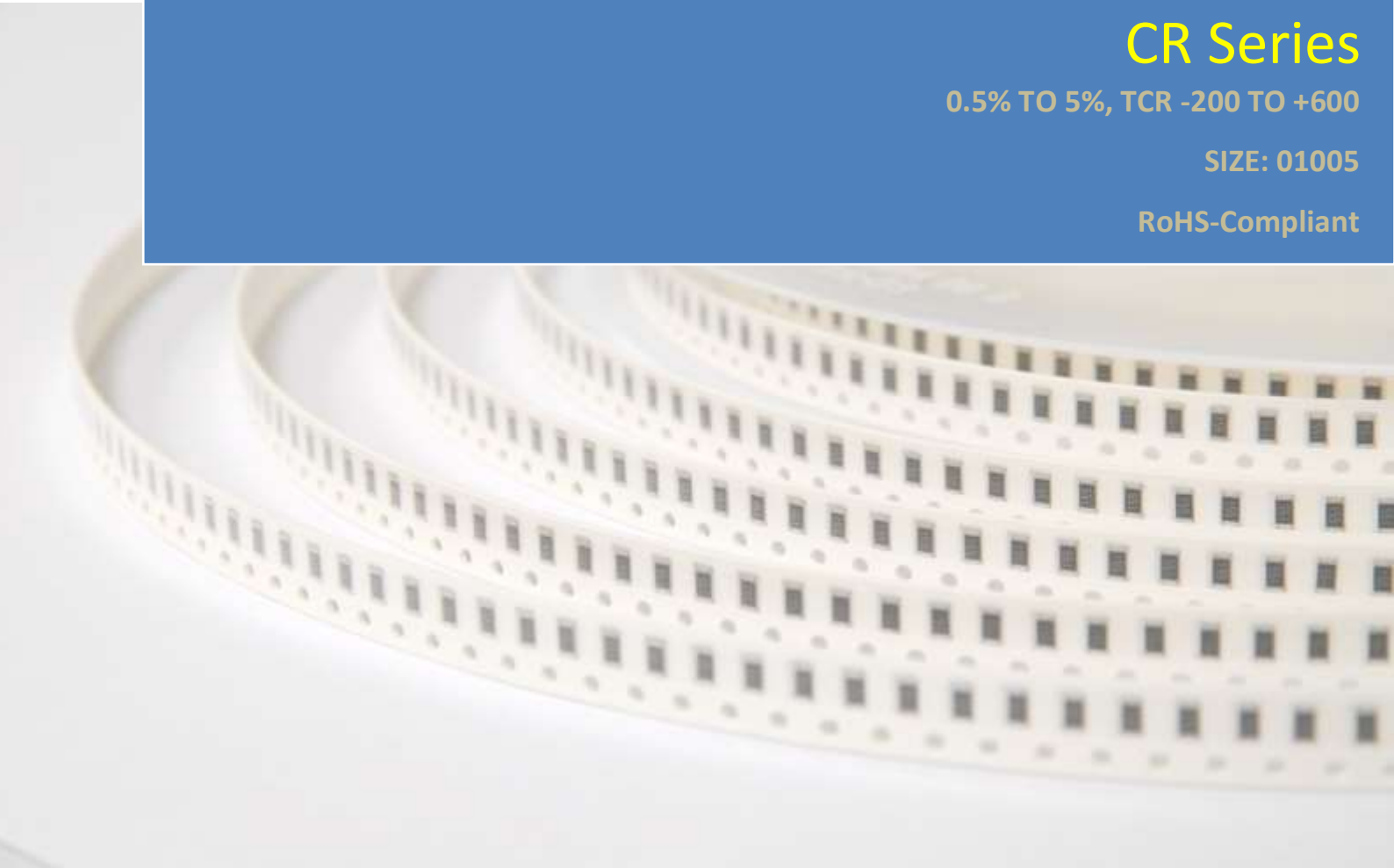
01005 Thick Film Chip Resistor

CR Series

0.5% TO 5%, TCR -200 TO +600

SIZE: 01005

RoHS-Compliant



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CR Series

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1. SCOPE

- 1.1 This specification is applicable to Lead-free and Halogen-free of RoHS Directive for 01005 thick film chip resistors.
- 1.2 The products is for general electronic purpose

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

CR	03	-	1002		-	F	Y
Type	Size	Nominal Resistance				Resistance Tolerance	Packaging
Lead Free Thick Film Chip Resistors	03(01005)	5% (3 Digit)	EX. 10Ω=100 4.7Ω=4R7		D=±0.5% F=±1% J=±5% Z=Zero	Y=20,000 pcs Lead Free	
		0.5%, 1% (4 Digit)	EX. 10.2Ω=10R2 10KΩ=1002				
		Jumper	000				

3. RATING

- 3.1 Rated Power
- 3.1.1 Zero Ohm Jumper Rated Power

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage
CR03 (01005)	$\frac{1}{32}$ W	15V	30V

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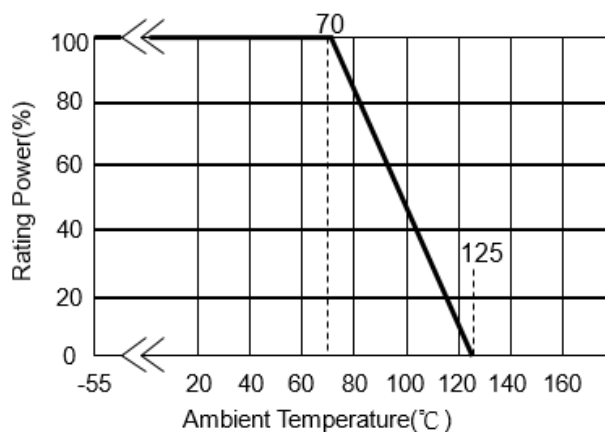
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3.2 Power Derating Curve

Operating Temperature Range : $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$

For resistors operated in ambient temperatures above 70°C , power rating shall be derated in accordance with figure below.



3.3 Standard Atmospheric Condition

Unless otherwise specified, the standard range of atmospheric conditions for making measurements and tests is as follows:

Ambient Temperature = $+5^{\circ}\text{C}$ to $+35^{\circ}\text{C}$

Relative Humidity = $< 85\% \text{ RH}$

Air Pressure = 86 kPa to 106 kPa

If there may be any doubt about the results, measurement shall be made within the following limits:

Ambient Temperature = $20 \pm 2^{\circ}\text{C}$

Relative Humidity = 60 to $70\% \text{ RH}$

Air Pressure = 86 kPa to 106 kPa

3.4 Operating Temperature Range -55°C to $+125^{\circ}\text{C}$

3.5 Storage Temperature Range -5°C to $+40^{\circ}\text{C}$ / $< 85\% \text{ RH}$

3.6 Flammability Rating Tested in accordance to UL-94, V-0

3.7 Moisture Sensitivity Level Rating: Level 1

3.8 Product Assurance

ASJ resistor shall warranty 24 months from manufacturing date with control conditions.

3.9 ASJ resistors are RoHS-compliant in accordance to RoHS Directive.

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3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	TCR (ppm/°C)	Resistance Range			Jumper Rated Current	Jumper Resistance Value
					D(±0.5%) E-24、E-96	F(±1%) E-24、E-96	J(±5%) E-24		
CR03 (01005)	$\frac{1}{32}$ W	15V	30V	-200 +600	$1\Omega \leq R < 10\Omega$			0.5A	50mΩ MAX
				±250	$10\Omega \leq R \leq 10M\Omega$				
Operating Temperature Range					-55°C ~ +125°C				

3.11 Voltage Rating

Rated Voltage: The resistor shall have a DC continuous working voltage or a rms AC continuous working voltage at commercial-line frequency and wave form corresponding to the power rating, as determined from the following:

$$E = \sqrt{R \times P}$$

E= Rated voltage (v)

P= Power rating (w)

R= Nominal resistance(Ω)

3.12 All product, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

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4. MARKING ON PRODUCT

The nominal resistance shall be marked on the surface of each resistor

Part Number	Color	Marking on Product
CR03 (01005)	-	No marking

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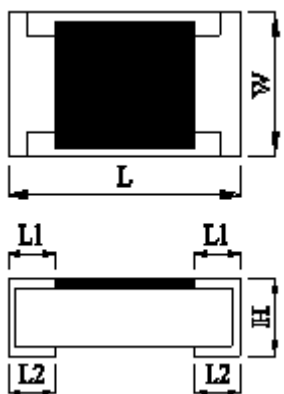
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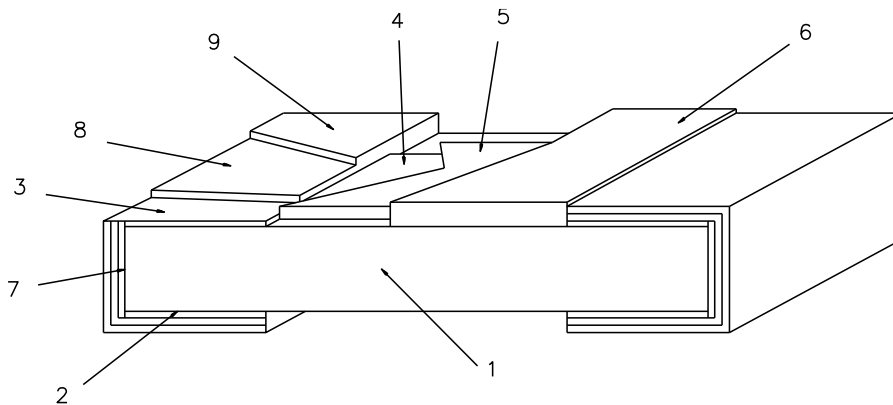
5. DIMENSION, CONSTRUCTION AND MATERIAL

5.1 Dimension



Dimension		Unit:mm				
Type	Size Code	L	W	H	L1	L2
CR03	01005	0.40±0.02	0.20±0.02	0.13±0.02	0.10±0.03	0.10±0.03

5.2 Structure Graph



1	Ceramic substrate	6	2nd Protective coating
2	Bottom inner electrode	7	Terminal inner electrode
3	Top inner electrode	8	Ni plating
4	Resistive layer	9	Sn plating
5	1st Protective coating		

5.3 Plating Thickness

Ni : $\geq 1 \mu\text{m}$

Sn (Tin) : $\geq 3 \mu\text{m}$

Sn (Tin) : Matte Sn

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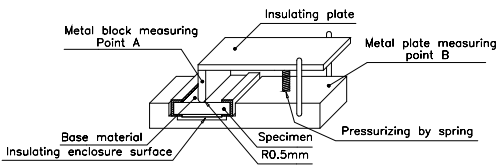
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6. RELIABILITY TEST

6.1 Electrical Performance Test

Item	Conditions	Specifications	
		Resistors	Jumper
Temperature Coefficient of Resistance	$TCR(ppm/^{\circ}C) = \frac{(R1 - R2)}{R1(T1 - T2)} \times 10^6$ R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C Refer to JIS-C5201-1 4.8	Refer to item 3.10	NA
Short Time Overload	Applied 2.5 times rated voltage for 5 seconds and release the load for about 30 minutes, then measure its resistance variance rate. (Rated voltage refer to item 3.10 general specifications) Refer to JIS-C5201-1 4.13	$\Delta R = \pm 2.0\%$	Refer to item 3.10
Insulation Resistance	Put the resistor in the fixture, add 100 VDC in +, - terminal for 60 sec then measured the insulation resistance between electrodes and insulating enclosure or between electrodes and base material. Refer to JIS-C5201-1 4.6 	$\geq 10^9 \Omega$	

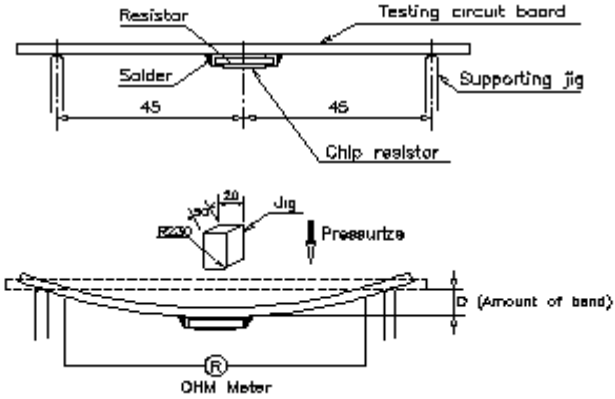
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6.2 Mechanical Performance Test

Item	Conditions	Specifications	
		Resistors	Jumper
Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25°C for 5 minutes, then the resistor is left in the room for 48 hrs, and measure its resistance variance rate. Refer to JIS-C5201-1 4.29	No evidence of mechanical damage, no G2 over coating and Sn layer by leaching.	
Solderability	Add flux into tested resistors, immersion into solder bath in temperature 235±3°C for 2±0.5 seconds. Refer to JIS-C5201-1 4.17	1.Test item 1: Solder coverage over 95% 2.Test item 2: Zero cross time within 3 seconds.	
Resistance to Soldering Heat	The tested resistor be immersed into molten solder of 260±5°C for 10 seconds, then the tested resistor is left in the room for 1 hour, and measure its resistance variance rate. Refer to JIS-C5201-1 4.18	ΔR=±2.0%	Refer to item 3.10
Bending Strength	Solder tested resistor on to PC board. add force in the middle down, and under load measured its resistance variance rate. D:3mm  Refer to JIS-C5201-1 4.33	ΔR=±1.0%	Refer to item 3.10

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6.3 Environmental Test

Item	Conditions	Specifications									
		Resistors	Jumper								
Resistance to Dry Heat	Put tested resistor in chamber under temperature $125\pm 5^{\circ}\text{C}$ for 1000_{-0}^{+48} hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\Delta R = \pm 2.0\%$	Refer to item 3.10								
Thermal Shock	Put the tested resistor in the chamber under the temperature cycle which shown in the following table shall be repeated 300 times consecutively. Then leaving the tested resistor in the room temperature for 1 hours, and measure its resistance variance rate <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Test Condition</th> </tr> </thead> <tbody> <tr> <td>Lowest Temperature</td> <td>$-55\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Highest Temperature</td> <td>$125\pm 5^{\circ}\text{C}$</td> </tr> <tr> <td>Temperature-retaining time</td> <td>15 minutes each</td> </tr> </tbody> </table> Refer to MIL-STD 202 Method 107	Test Condition		Lowest Temperature	$-55\pm 5^{\circ}\text{C}$	Highest Temperature	$125\pm 5^{\circ}\text{C}$	Temperature-retaining time	15 minutes each	$\Delta R = \pm 2.0\%$	Refer to item 3.10
Test Condition											
Lowest Temperature	$-55\pm 5^{\circ}\text{C}$										
Highest Temperature	$125\pm 5^{\circ}\text{C}$										
Temperature-retaining time	15 minutes each										
Loading Life in Moisture	Put the tested resistor in the chamber under temperature $40\pm 2^{\circ}\text{C}$, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	$\Delta R = \pm 5.0\%$	Refer to item 3.10s								
Load Life	Put the tested resistor in chamber under temperature $70\pm 2^{\circ}\text{C}$ and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hours. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	$\Delta R = \pm 5.0\%$	Refer to item 3.10								

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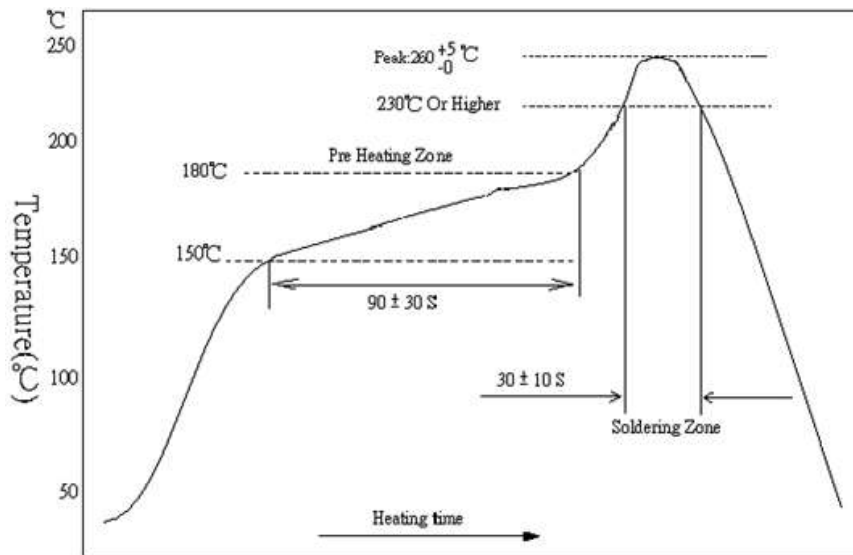
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6.4 Recommended Soldering Profile

Technical application notes: This is for recommendation, customer please perform adjustment according to actual application.

6.1.1 Lead-Free Reflow Soldering Profile



Remark: The peak temperature of soldering heat is 260^{+5}_{-0} °C for 10 seconds

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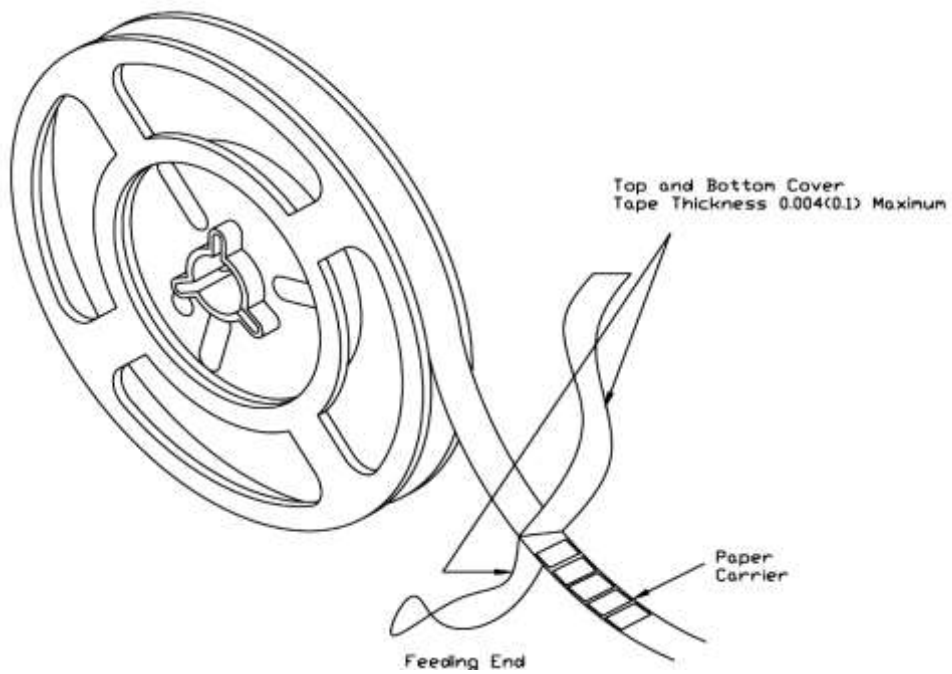
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7. TAPING

7.1 Structure of Taping

Paper Carrier



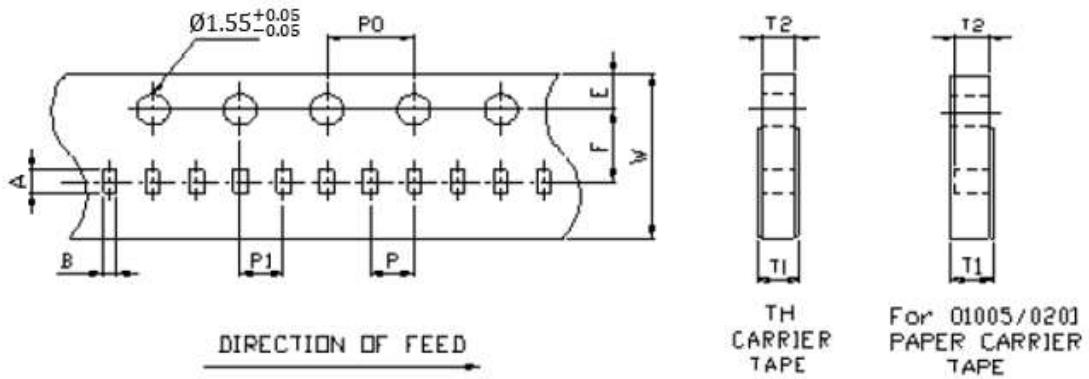
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7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System (CR03)



Remark: Pitch tolerance over any 10 pitches of P_0 is ± 0.2 mm

Dimension of Punched Paper Tape Carrier System (CR03)

(unit : mm)

Code	A	B	W	E	F	T1
CR03	0.43 ± 0.03	0.23 ± 0.03	8.00 ± 0.30	1.75 ± 0.10	3.50 ± 0.05	0.31 ± 0.03

Code	T2	P	P0	10xP0	P1
CR03	0.17 ± 0.03	2.00 ± 0.05	4.00 ± 0.05	40.0 ± 0.20	2.00 ± 0.05

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7.3 Packaging

7.3.1 Taping

Quantity – Tape and Reels

Code	Quantity	Model	Remarks
CR03	20,000 pcs	7" Reel	2mm pitch

7.3.2 Identification

Production label that indicates the 10 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



7.3.3 Packaging Reel Box

Dimension	Reel Box	Number of Reels
185 × 60 × 186 mm	25K Box	5
185 × 120 × 186 mm	50K Box	10



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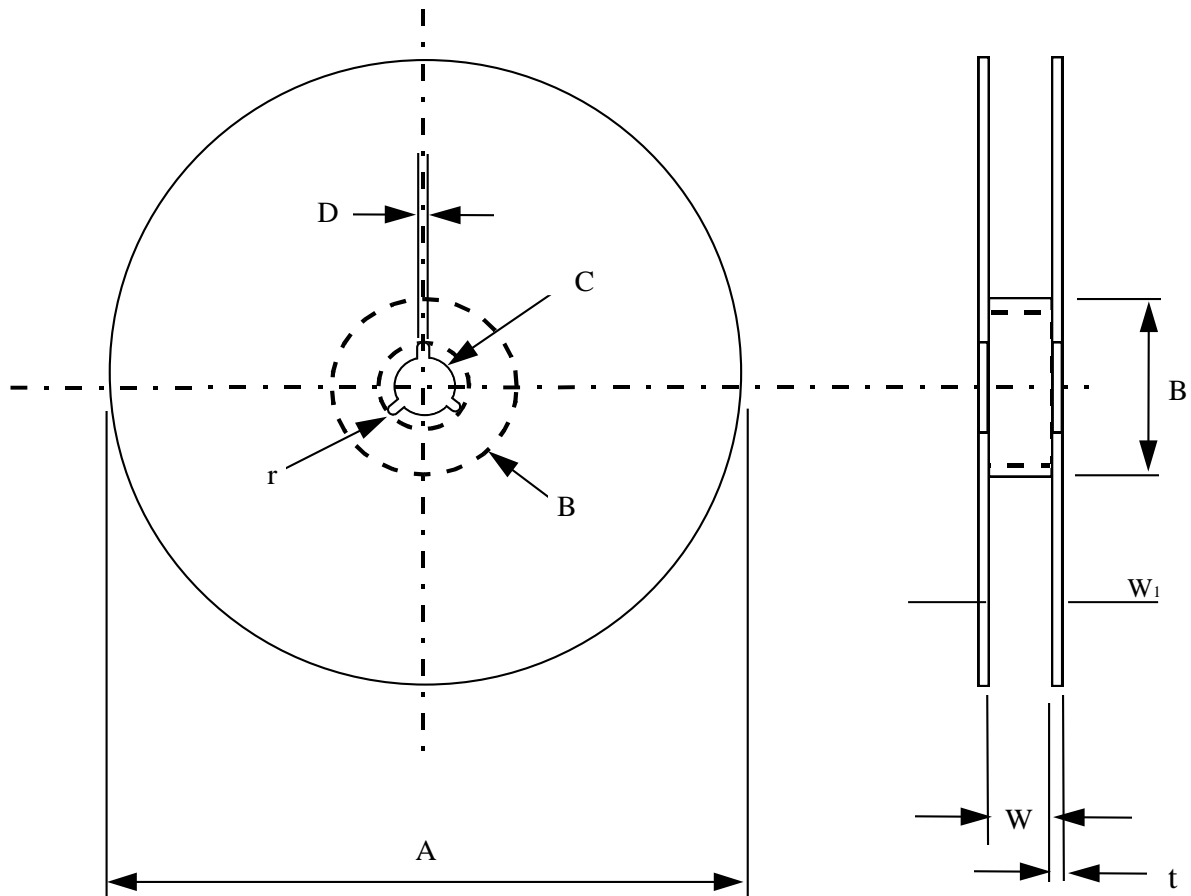
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7.3.4 Reel Dimensions



Model	A	B	C	D	W	W ₁	t	r
7" Reel (5K) (except 0402 10K)	$\phi 178 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 0.1	14.4 max	1.0 ± 0.1	1.0
7" Reel (4K)	$\phi 178 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	13 ± 1.0	14.4 max	1.2 ± 0.1	1.0
7" Reel (10K)	$\phi 178 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 0.1	14.4 max	1.0 ± 0.1	1.0
10" Reel (10K)	$\phi 254 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	1.5 ± 0.1	1.0
13" Reel (20K, 50K)	$\phi 330 \pm 2.0$	$\phi 60 \text{min}$	13 ± 0.2	$\phi 2.0 \pm 0.5$	11 ± 1.0	14.4 max	2.1 ± 0.1	-
13" Reel (20K)	$\phi 330 \pm 1.0$	$\phi 100 \pm 1$	13.5 ± 0.5	$2 \sim 3 \pm 0.5$	10 ± 0.5	-	-	-

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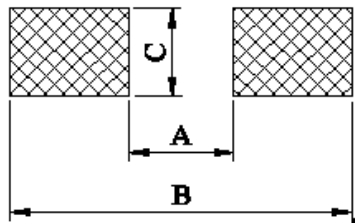
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8. SURFACE MOUNT LAND PATTERNS DESIGN (FOR REFLOW SOLDERING)

When a component is soldered, the resistance after soldering changes slightly depending on the size of the soldering area and the amount of soldering. When designing a circuit, it is necessary to consider the effect of a decrease or increase in its resistance.

Unit:mm



DIM TYPE	A	B	C
CR03	0.20	0.50	0.20

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9. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	19.02.2019		Initial Release
Version.2	06.03.2019		Update clause 3.10 table
Version.3	10.10.2019		Revise clause 3.9
Version.4	05.12.2019		Revise clause 3.5
Version.5	02.11.2020		Revise clause 2 Part numbering system Revise clause 3.10 TCR table
Version.6	09.04.2021		Revise clause 1.2 typo error
Version.7	01.09.2022		Revise clause 3.8 Product Assurance
Version 8	13.03.2024		Revise clause 7.3.2 Identification.



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