

ASJ

DATA SHEET

Thin Film Chip Resistor

CT Series

0.01% TO 1.0%, TCR ± 5 TO ± 50

SIZE: 0201/0402/0603/0805/1206/1210/2010/2512

RoHs Compliant

THIN FILM CHIP RESISTOR

CT Series

DS-ENG-004

Page: 2 of 17

1. SCOPE

- 1.1 This specification is applicable to lead and halogen free CT series thin film chip resistors.
- 1.2 Lead free products mean lead free termination meets RoHS requirement.

2. PART NUMBERING SYSTEM

Part Numbering is made in accordance with the following system:

CT	10	-	1002			-	B	K	-	D
Type	Size (Inch/mm)	Nominal Resistance			Resistance Tolerance	Packaging			T.C.R	
Thin Film Chip Resistors	05(0201/0603)	Resistors	4-Digit	Ex. 10.2Ω=10R2 10KΩ=1002	T = 0.01%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free	A = ±5ppm/°C B = ±10ppm/°C C = ±15ppm/°C D = ±25ppm/°C E = ±50ppm/°C			
	10(0402/1005)				Q = 0.02%					
	16(0603/1608)				A = 0.05%					
	21(0805/2012)				B = ±0.1%					
	32(1206/3216)				C = ±0.25%					
	40(1210/3225)				D = ±0.5%					
	50(2010/5025)				F = ±1.0%					
	63(2512/6432)									

3. RATING

3.1 Rated Power

3.1.1 Resistor Rated Power

Type	Rated Power	Max. Working Voltage	Max. Overload Voltage
CT05	$\frac{1}{20}$ W	25V	50V
CT10	$\frac{1}{16}$ W	50V	100V
CT16	$\frac{1}{10}$ W	75V	150V
CT21	$\frac{1}{8}$ W	150V	300V
CT32	$\frac{1}{4}$ W	200V	400V
CT40	$\frac{1}{4}$ W	200V	400V
CT50	$\frac{1}{2}$ W	200V	400V
CT63	$\frac{3}{4}$ W	200V	400V
	1W	200V	400V



Product Specification

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THIN FILM CHIP RESISTOR

CT Series

DS-ENG-004

Page: 3 of 17

3.2 Power Derating Characteristics

Type	CT05/CT40/CT50/CT63	CT10/CT16/CT21/CT32
Operating Temperature Range	- 55°C ~ + 125°C	- 55°C ~ + 155°C
Explain	For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below.	For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below.
Figure	<p>A line graph showing the power derating characteristics for CT05/CT40/CT50/CT63 resistors. The y-axis is 'Rating Power (%)' from 0 to 100 in increments of 20. The x-axis is 'Ambient Temperature (°C)' from -55 to 160 in increments of 20. The graph shows a horizontal line at 100% rating power from -55°C to 70°C. At 70°C, the rating power begins to decrease linearly, reaching 0% at 125°C. Dashed vertical lines indicate the 70°C and 125°C points.</p>	<p>A line graph showing the power derating characteristics for CT10/CT16/CT21/CT32 resistors. The y-axis is 'Rating Power (%)' from 0 to 100 in increments of 20. The x-axis is 'Ambient Temperature (°C)' from -55 to 160 in increments of 20. The graph shows a horizontal line at 100% rating power from -55°C to 70°C. At 70°C, the rating power begins to decrease linearly, reaching 0% at 155°C. Dashed vertical lines indicate the 70°C and 155°C points.</p>

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°C to +35°C

Relative Humidity = < 85% RH

Air Pressure = 86 kPa to 106kPa

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

Ambient Temperature = 20 ± 2°C

Relative Humidity = 60 to 70% RH

Air Pressure = 86 kPa to 106kPa

3.4 Operating Temperature Range -55°C to +155°C (CT05/CT40/CT50/CT63: -55°C to +125°C)

3.5 Storage Temperature Range -5°C to + 40°C

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 the date of shipment.

3.9 ASJ resistors are RoHS compliance in accordance to RoHS Directive.



Product Specification

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3.10 Resistance, Resistance Tolerance and Temperature Coefficient of Resistance.

Type	Rated Power	Max. Working Voltage	Max. Overload Voltage	T.C.R. (ppm°C)	Resistance Range						
					L(±0.01%)	P(±0.02%)	W(±0.05%)	B(±0.1%)	C(±0.25%)	D(±0.5%)	F(±1%)
					E-96、E-24	E-96、E-24	E-96、E-24	E-96、E-24	E-96、E-24	E-96、E-24	E-96、E-24
CT05	1/20 W	25V	50V	±50、±25	---	---	---	22Ω~75KΩ			
				±15、±10	---	---	---	22Ω~5KΩ	---	---	
CT10	1/16 W	50V	100V	±50、±25	50.1Ω~12KΩ		20Ω~12KΩ	4.7Ω~240KΩ			
				±15、±10	20Ω~12KΩ		20Ω~200KΩ	---	---		
				±5	20Ω~10KΩ		---	---			
CT16	1/10 W	75V	150V	±50、±25	50.1Ω~30KΩ		4.7Ω~100KΩ	1Ω~1MΩ			
				±15、±10	50.1Ω~100KΩ		4.7Ω~100KΩ	4.7Ω~680KΩ		---	---
				±5	20Ω~30KΩ		---	---			
CT21	1/8 W	150V	300V	±50、±25	50.1Ω~30KΩ		4.7Ω~200KΩ	1Ω~1.5MΩ			
				±15、±10	50.1Ω~200KΩ		4.7Ω~200KΩ	4.7Ω~1MΩ		---	---
				±5	20Ω~50KΩ		---	---			
CT32	1/4 W	200V	400V	±50、±25	50.1Ω~30KΩ		5.6Ω~500KΩ	1Ω~1.5MΩ			
				±15、±10	50.1Ω~500KΩ		5.6Ω~500KΩ	5.6Ω~1.5MΩ		---	---
				±5	20Ω~100KΩ		---	---			
CT40	1/4 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ				
				±15、±10	---	---	100Ω~100KΩ	4.7Ω~100KΩ		---	---
CT50	1/2 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ				
				±15、±10	---	---	100Ω~100KΩ	4.7Ω~100KΩ		---	---
CT63	3/4 W	200V	400V	±50、±25	---	---	4.7Ω~1MΩ				
				±15、±10	---	---	100Ω~100KΩ	4.7Ω~100KΩ		---	---
	1W	200V	400V	±50、±25	---	---	10Ω~1MΩ				
Operating Temperature Range				CT05/40/50/63:-55°C~ +125°C CT10/16/21/32:-55°C~ +155°C							

3.11 Rated Voltage

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)

4. MARKING ON PRODUCT

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

Type		Resistance Range	Tolerance $\leq 1\%$	Tolerance $> 1\%$
Single	Sizes: 0402	All	No Marking	
		Jumper=0 Ω		
	Size: 0603	$< 1\Omega$	4-digits Marking	4-digits Marking
		$\geq 1\Omega$	3-digits Marking	3-digits Marking
		Jumper=0 Ω	3-digits Marking	1-digit Marking
	Sizes: 0805 \ ` 1206	$< 1\Omega$	4-digits Marking	4-digits Marking
		$\geq 1\Omega$	4-digits Marking	3-digits Marking
Jumper=0 Ω		3-digits Marking	1-digit Marking	

4.1 Numeric Numbering

4.1.1 $\leq 1\%$ Tolerance : **Four Numerals Marking**

First 3 digits are significant figures; fourth digit is number of zeros.

Examples:

Nominal Resistance	Marking	Remarks
1 Ω	1R00	$1 \times 10^0 = 1$
10 Ω	10R0	$10 \times 10^0 = 10$
100 Ω	1000	$100 \times 10^0 = 100$
4.7K Ω	4701	$470 \times 10^1 = 4700$
47K Ω	4702	$470 \times 10^2 = 47000$
470K Ω	4703	$470 \times 10^3 = 470000$
1M Ω	1004	$100 \times 10^4 = 1000000$

0603 $\leq 1\%$ Tolerance: Three character E-96 Marking standard.

The first 2 digits for the 3 digits E-96 part marking standard, (Refer Table 2 & 3).

The third character is a letter multiplier:

Nominal resistance	Marking	Remark
33.2 Ω	51 X	$332 \times 10^{-1} \Omega$
150 Ω	18 A	$150 \times 10^0 \Omega$
4.99K Ω	68 B	$499 \times 10^1 \Omega$
10.2K Ω	02 C	$102 \times 10^2 \Omega$
100K Ω	01 D	$100 \times 10^3 \Omega$

4.1.3 EIA-96 Marking Scheme

Table 2 Significant figures

Significant Figures	Symbol	Significant Figures	Symbol	Significant Figures	Symbol	Significant Figures	Symbol
100	01	178	25	316	49	562	73
102	02	182	26	324	50	576	74
105	03	187	27	332	51	590	75
107	04	191	28	340	52	604	76
110	05	196	29	348	53	619	77
113	06	200	30	357	54	634	78
115	07	205	31	365	55	649	79
118	08	210	32	374	56	665	80
121	09	215	33	383	57	681	81
124	10	221	34	392	58	698	82
127	11	226	35	402	59	715	83
130	12	232	36	412	60	732	84
133	13	237	37	422	61	750	85
137	14	243	38	432	62	768	86
140	15	249	39	442	63	787	87
143	16	255	40	453	64	806	88
147	17	261	41	464	65	825	89
150	18	267	42	475	66	845	90
154	19	274	43	487	67	866	91
158	20	280	44	499	68	887	92
162	21	287	45	511	69	909	93
165	22	294	46	523	70	931	94
169	23	301	47	536	71	953	95
174	24	309	48	549	72	976	96

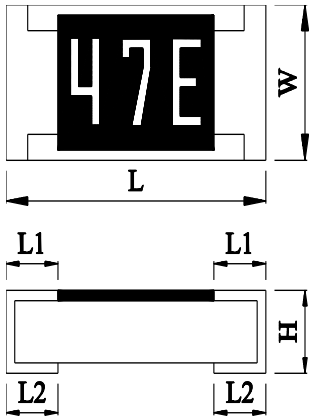
Table 3 Multiplier

Symbol	Multiplier	Symbol	Multiplier
A	10 ⁰	G	10 ⁶
B	10 ¹	H	10 ⁷
C	10 ²	X	10 ⁻¹
D	10 ³	Y	10 ⁻²
E	10 ⁴		
F	10 ⁵		

5. DIMENSIONS, CONSTRUCTIONS AND MATERIALS

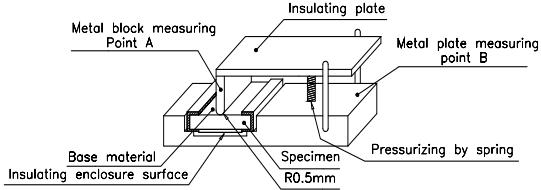
5.1 Dimensions

Dimension		Unit:mm				
Type	Size Code	L	W	H	L1	L2
CT05	0201	0.60±0.03	0.30±0.03	0.23±0.03	0.10±0.05	0.15±0.05
CT10	0402	1.00±0.10	0.50±0.05	0.30±0.05	0.20±0.10	0.25±0.10
CT16	0603	1.60±0.10	0.80±0.10	0.45±0.10	0.25±0.15	0.25±0.15
CT21	0805	2.00±0.10	1.25±0.10	0.50±0.10	0.35±0.20	0.35±0.20
CT32	1206	3.10±0.10	1.60±0.10	0.55±0.10	0.45±0.20	0.40±0.20
CT40	1210	3.10±0.10	2.60±0.15	0.55±0.10	0.50±0.20	0.50±0.20
CT50	2010	5.00±0.10	2.50±0.15	0.55±0.10	0.60±0.20	0.50±0.20
CT63	2512	6.35±0.10	3.20±0.15	0.55±0.10	0.60±0.20	0.50±0.20

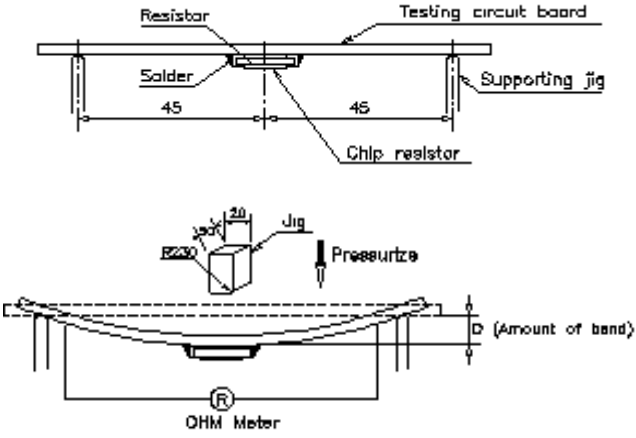


6. Reliability Test

6.1 Electrical Performance Test

Item	Conditions	Specifications
		Resistors
Temperature Coefficient of Resistance	<p>Refer to JIS-C5201-1 4.8</p> $TCR(ppm/^{\circ}C) = \frac{(R2 - R1)}{R1(T2 - T1)} \times 10^6$ <p>R1: Resistance at room temperature R2: Resistance at -55°C or +125°C T1: Room temperature T2: Temperature -55°C or +125°C</p>	Refer to item 3.10
Short Time Overload	<p>Refer to JIS-C5201-1 4.13</p> <p>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 310. general specifications)</p>	±(0.5%+0.05Ω)
		No evidence of mechanical damage. No short or burned on the appearance.
Insulation Resistance	<p>Refer to JIS-C5201-1 4.6</p> <p>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.</p> 	≥10 ⁹ Ω
Dielectric Withstand Voltage	<p>Refer to JIS-C5201-1 4.7</p> <p>Put the resistor in the fixture, add VAC (see spec. below) in +,- terminal for 1 minute</p>	No short or burned on the appearance.

6.2 Mechanical Performance Test

Item	Conditions	Specifications
		Resistors
Solderability	<p>Refer to J-STD-002 B</p> <p>Preconditioning: At a temperature of 155°C, aging duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more.</p> <p>Test method: The resistor be immersed into solder pot in temperature 245±3°C for 3±0.5 sec, then the resistor is left as placed under microscope to observed its solder area.</p>	Solder coverage over 95%
Resistance to Soldering Heat	<p>Refer to JIS-C5201-1 4.18</p> <p>©Test method (Solder pot test): The tested resistor be immersed into molten solder of 260⁺⁵₋₀ °C for 10 seconds. Then the resistor is left in the room for 1 hour.</p>	<p>(1).Variance rate on resistance $\Delta R\% = \pm(1.0\% + 0.05\Omega)$</p> <p>(2).No evidence of electrode damage. No side conductive peeling off.</p>
Joint Strength of Solder	<p>©Test item (Bending Strength): Solder tested resistor on to PC board add force in the middle down, and under load measured its resistance variance rate.</p> <p>Amount of Bend(D)CT10,16,21:5mm CT05,32,40:3mm CT50,63:1mm</p>  <p>Refer to JIS-C5201-1 4.33</p>	<p>(1).Variance rate on resistance : $\pm(0.25\% + 0.05\Omega)$</p> <p>(2).No evidence of mechanical damage. No terminal peeling off and core body cracked.</p>

THIN FILM CHIP RESISTOR

CT Series

DS-ENG-004

Page: 10 of 17

6.3 Environmental Test

Item	Conditions	Specifications								
		Resistors								
Resistance to Dry Heat	Refer to JIS-C5201-1 4.25 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.	$\pm(0.5\%+0.05\Omega)$								
Thermal Shock	Refer to MIL-STD 202 Method 107 Put the tested resistor in the thermal shock 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: 10px auto;"> <thead> <tr> <th colspan="2">Testing 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>	Testing Condition		Lowest Temperature	$-55\pm 5^{\circ}\text{C}$	Highest Temperature	$125\pm 5^{\circ}\text{C}$	Temperature-retaining time	15 minutes each	$\pm(0.5\%+0.05\Omega)$
Testing 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	Refer to JIS-C5201-1 4.24 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.	$\pm(0.5\%+0.05\Omega)$								
Load Life	Refer to JIS-C5201-1 4.25 Put the tested resistor in chamber under temperature $70\pm 5^{\circ}\text{C}$ 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.	$\pm(0.5\%+0.05\Omega)$								



Product Specification

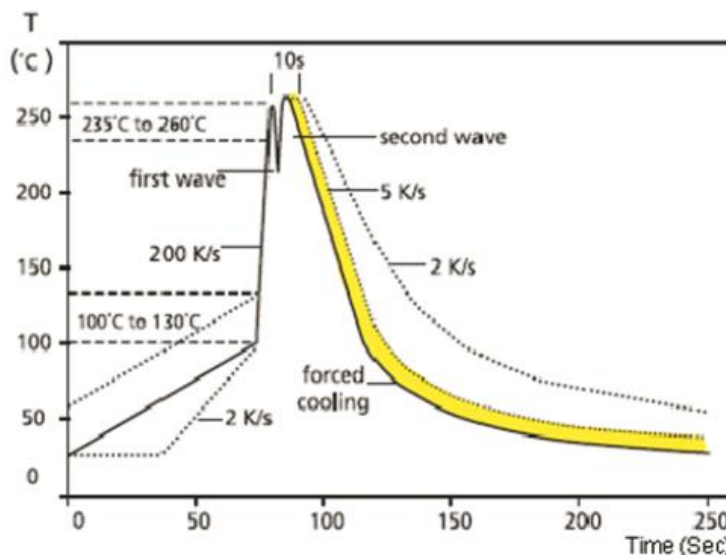
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6.4 Technical application notes: (This is for recommendation, customer are please to perform adjustment according to actual application)

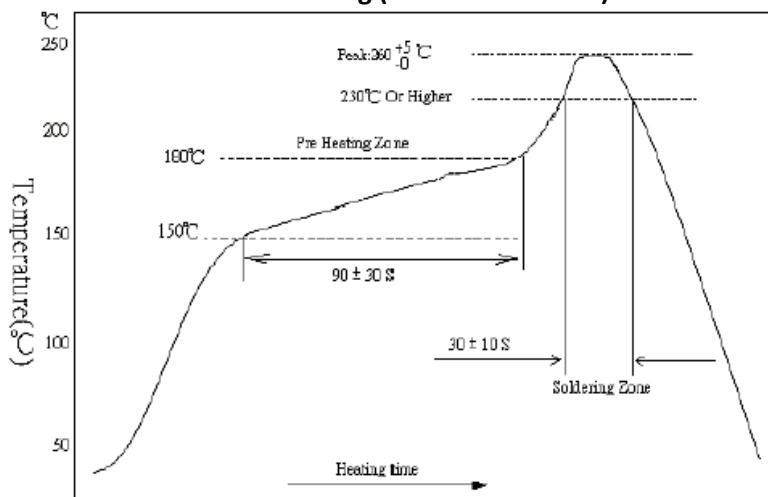
Soldering Profile

Surface-mount components are tested for solderability at a temperature of 245 °C for 3 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below:

6.4.1 Lead Free Double Wave Soldering Profile (This applies to 0603 size inclusive above products)



6.4.2 Lead Free IR Reflow Soldering (MEET J-STD-020D)



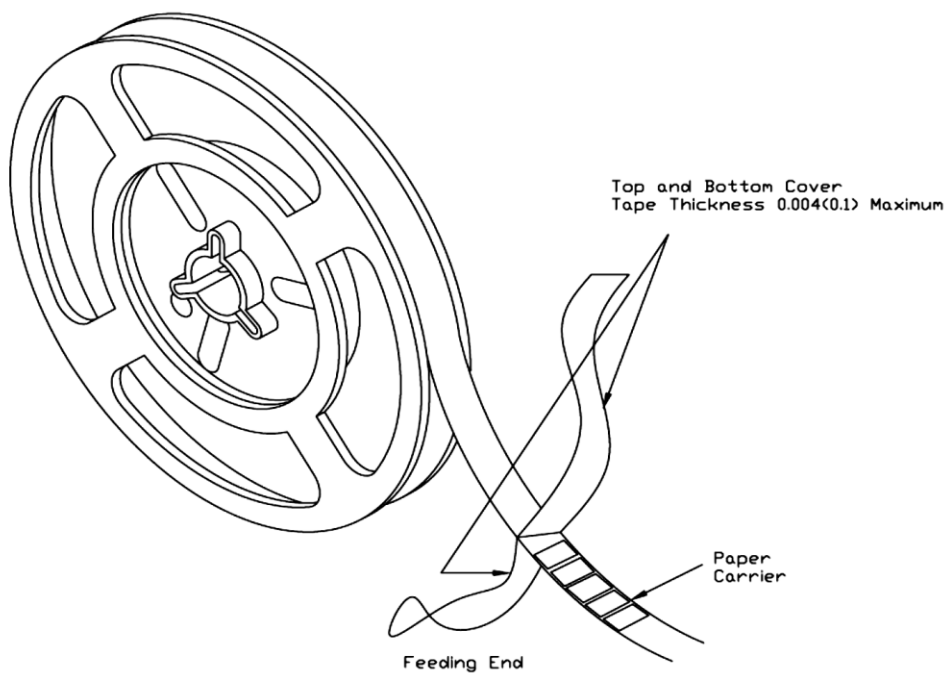
Remark : The peak temperature of soldering heat is 260⁺⁵₋₀ °C for 10 second

6.4.3 : Soldering Iron temperature 350°C±10°C, dwell time shall be less than 3 sec.

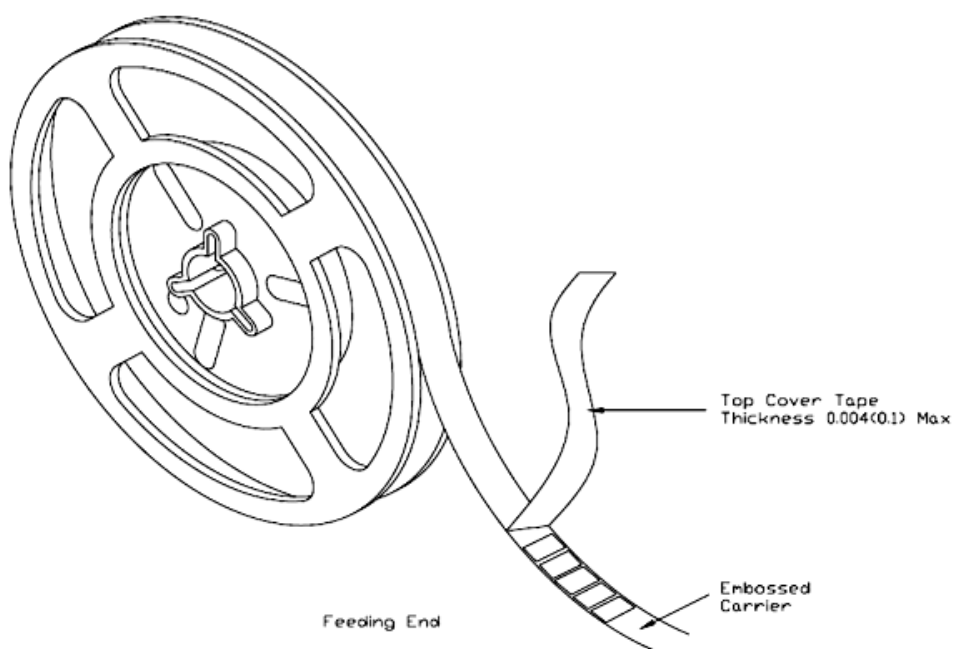
7 TAPING

7.1 Structure of Taping

Paper Carrier

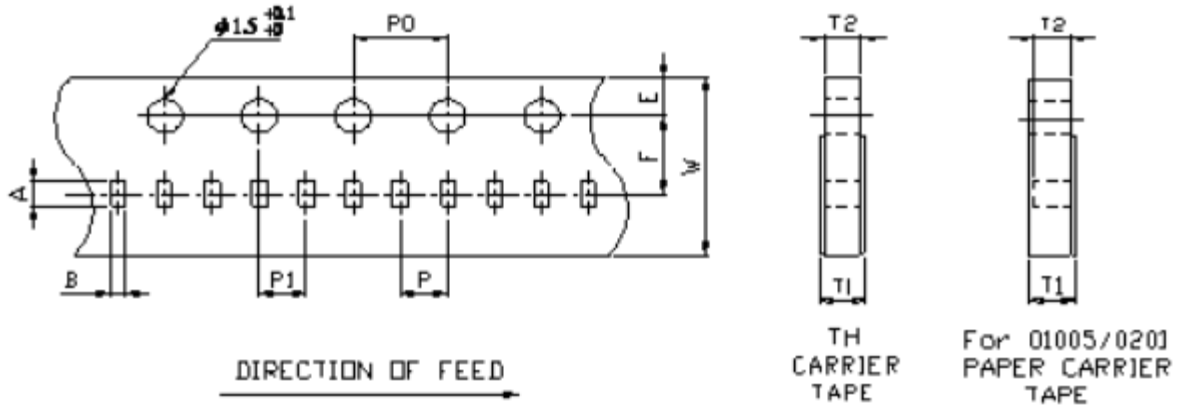


Embossed Plastic Carrier



7.2 Dimension

7.2.1 Dimension of Punched Paper Tape Carrier System (CT05,10)



Remark : Pitch tolerance over any 10 pitches of P0 is ± 0.2 mm

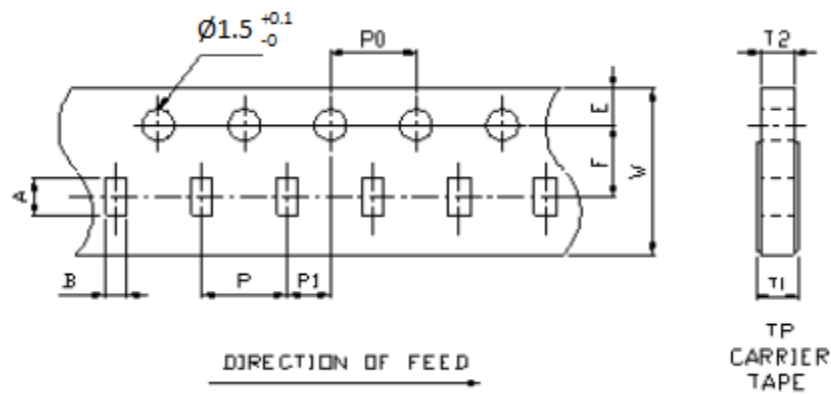
Dimension of Punched Paper Tape Carrier System (CT05, 10)

(unit : mm)

Code	A	B	W	E	F	T1
CT05	0.68 ± 0.05	0.38 ± 0.03	8.00 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	$0.42^{+0.1}_{-0}$
CT10	1.15 ± 0.05	0.65 ± 0.05	8.00 ± 0.20	1.75 ± 0.10	3.50 ± 0.05	$0.42^{+0.2}_{-0}$

Code	T2	P	P0	10xP0	P1
CT05	0.28 ± 0.02	2.00 ± 0.05	4.00 ± 0.05	40.0 ± 0.20	2.00 ± 0.05
CT10	0.40 ± 0.05	2.00 ± 0.10	4.00 ± 0.05	40.0 ± 0.20	2.00 ± 0.05

7.2.2 Dimension of Punched Paper Tape Carrier System /Plastic Embossed Carrier System (CT16, 21, 32, 40)

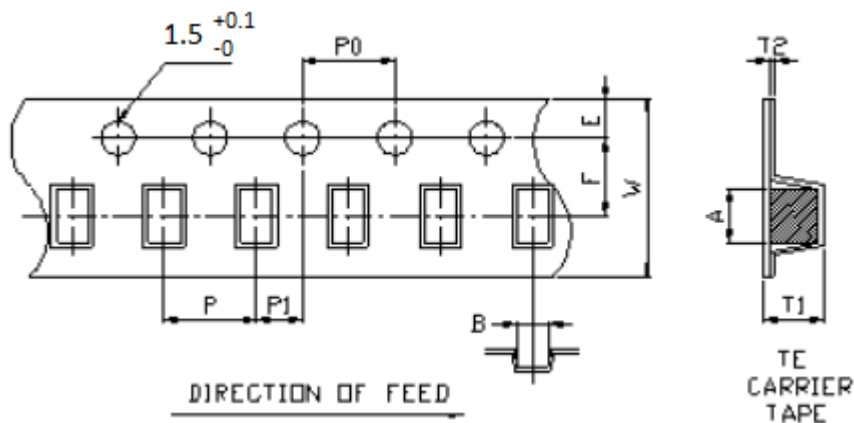


Remark: Pitch tolerance over any 10 pitches of P_0 is ± 0.2 mm

Dimension of Punched Paper Tape Carrier System (CT - 16, 21, 32, 40)

Code	A	B	W	E	F	T1	T2	P	P0	P1
CT16	1.8±0.10	1.0±0.10	8.0±0.20	1.75±0.10	3.50±0.05	0.60 ^{+0.2} ₋₀	0.60±0.10	4.0±0.10	4.0±0.05	2.0±0.05
CT21	2.3±0.10	1.55±0.1	8.0±0.20	1.75±0.10	3.50±0.05	0.75 ^{+0.2} ₋₀	0.75±0.10	4.0±0.10	4.0±0.05	2.0±0.05
CT32	3.5±0.20	1.9±0.20	8.0±0.20	1.75±0.10	3.50±0.05	0.75 ^{+0.2} ₋₀	0.75±0.10	4.0±0.10	4.0±0.05	2.0±0.05
CT40	3.5±0.20	2.8±0.20	8.0±0.20	1.75±0.10	3.50±0.05	0.75 ^{+0.2} ₋₀	0.75±0.10	4.0±0.10	4.0±0.05	2.0±0.05

Dimension of Plastic Embossed Carrier System (CR -50, 63)



Code	A	B	W	E	F	T1	T2	P	P0	P1
CT50	5.5±0.20	2.8±0.20	12.0±0.20	1.75±0.10	5.50±0.05	1.10±0.15	0.23±0.15	4.0±0.10	4.0±0.05	2.0±0.05
CT63	6.7±0.20	3.4±0.20	12.0±0.20	1.75±0.10	5.50±0.05	1.10±0.15	0.23±0.15	4.0±0.10	4.0±0.05	2.0±0.05

7.3 Packaging

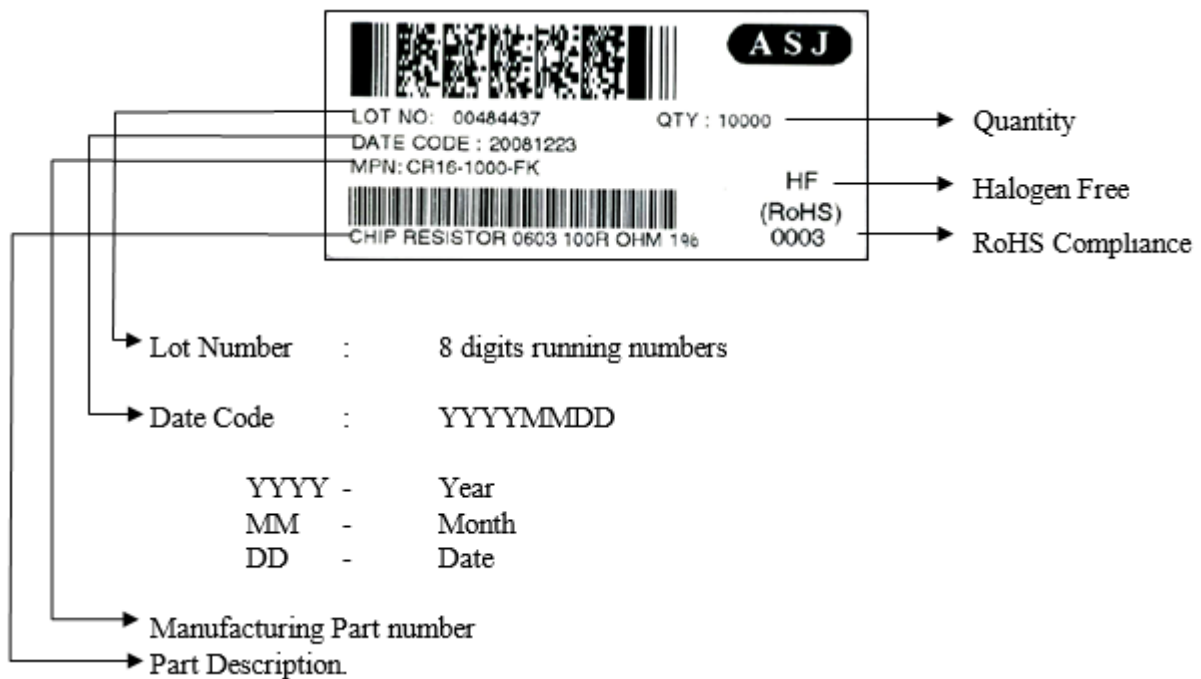
7.3.1 Taping

7.3.1.1 Quantity – Tape and Reels

Code	Quantity	Reel	Remarks
CT05 CT10	10000 pcs	7"	2mm pitch
	20000 pcs	7"	2mm pitch
	50000 pcs	13"	2mm pitch
CT16 CT21 CT32 CT40	5000 pcs	7"	4mm pitch
	10000 pcs	10"	4mm pitch
	20000 pcs	13"	4mm pitch
CT50 CT63	4000 pcs	7"	4mm pitch

7.3.2 Identification

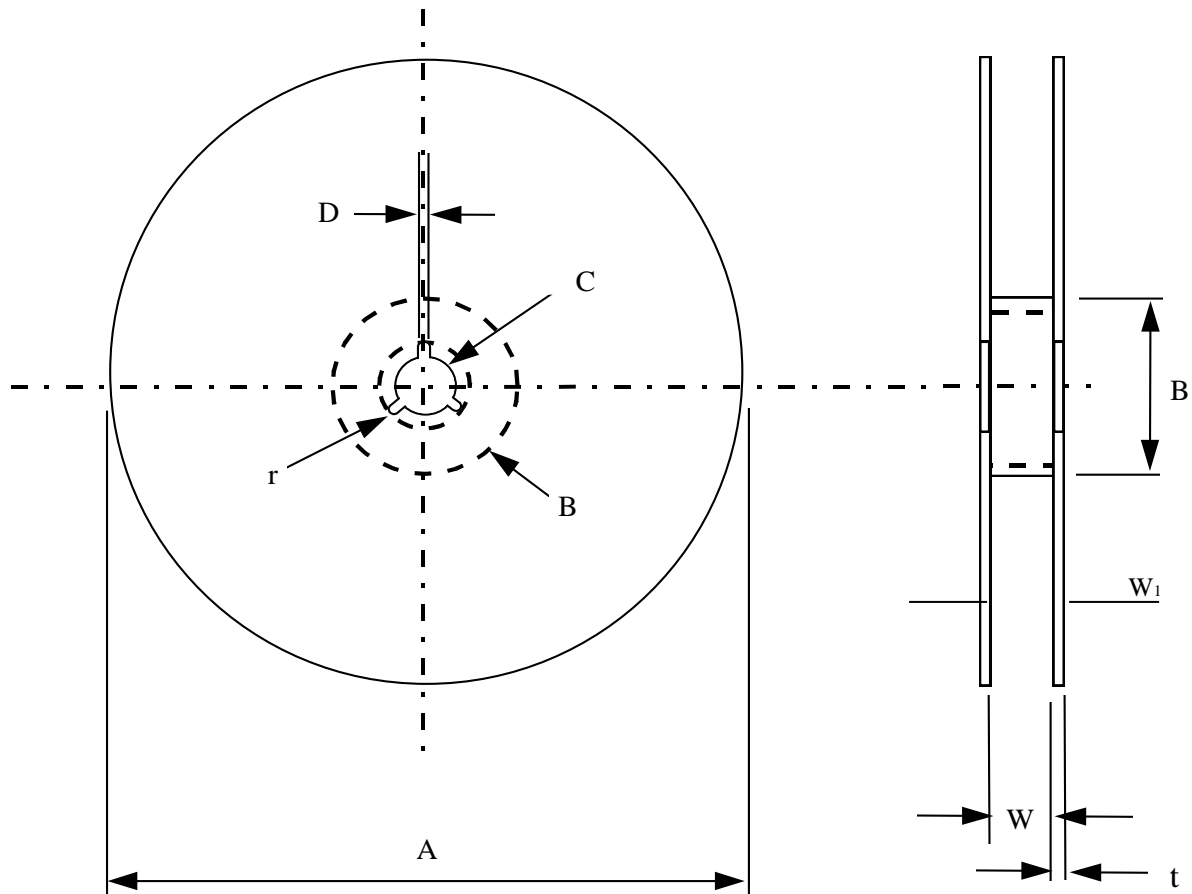
Production label that indicates the 8 digits lot number, product type, resistance value and tolerance shall be pasted on the surface of each reel.



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

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
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	$\phi 330 \pm 1.0$	$\phi 100 \pm 1$	13.5 ± 0.5	$2 \sim 3 \pm 0.5$	10 ± 0.5	-	-	-

8. REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version.1	13.02.2015		Initial Release
Version.2	15.12.2015		Operating Temperature Range and Resistance range review
Version.3	28.04.2017	Refer to PCN-ECO 01/2016	Review clause 2, insert CT05 and update Part Numbering System Insert CT05 to clause 3.1.1 and update information Insert CT05 to clause 3.10 and update information Insert CT05 to clause 4 and update information Insert CT05 to clause 5.1 and update dimension information Update clause 6.4.1&6.4.2 soldering profile Insert CT05 to clause 7.2.1 and update tape dimension information Insert CT05 to 7.3.1.1 and update information Insert 7.3.4 13" reel Insert CT05 to clause 8, and update information Insert Clause 9, add in Plating Thickness Insert clause 10, add in Measurement Point
Version.4	28.01.2019		Datasheet update
Version.5	13.08.2019		1, Undate operating temperature range for CT10, CT16, CT21, CT32
Version.6	15.03.2021		Revise clause 3.10, TCR table Revise clause 5.1 dimension Delete clause 5.2 Structure graph Delete clause 6.2 item Terminal strength, Vibration Revise clause 6.2 item Joint Strength of Solder Revise clause 6.4 add Technical application notes
Version.7	14.10.2021		Revise clause 2 part numbering system Revise clause 3.1.1 Resistor rated power Revise clause 3.10 TCR table Revise clause 4 Marking on product Revise clause 5.1 dimension Revise clause 6 reliability test Revise clause 6.4.2 Reflow soldering profile Delete clause 8 surface mount land pattern Delete clause 9 Plating thickness Delete clause 10 measurement point