




<b>SPECIFICATION SHEET NO.</b>	S0228- CR0603FB49K9S1	
<b>ORIGINAL MFG/PART NO.</b>	Aillen Capacitors/CR03FB49K9	
<b>NEXTGEN PART CODE</b>	CR0603FB49K9S1	Indicate This Code For <a href="#">RFQ</a> /Order
<b>DATE</b>	Feb. 28, 2025	
<b>REVISION</b>	A1	Updated With Most Recent Data
<b>DESCRIPTION AND MAIN PARAMETRICS</b>	<p>Thick Film Chip Resistors, 0603 (1608 Metric), CR03 Series,            Dimension L1.60*W0.80*H0.45mm, 2 Terminations, Tolerance: <math>\pm 1.0\%</math>,            Resistance Range 49.9Kohm, Dissipation Max. 1/10W @ 70°C,            Temperature Coefficient Rate (TCR) Max. <math>\pm 100\text{ppm}/^\circ\text{C}</math>            Operating Temp. Range <math>-55^\circ\text{C} \sim +155^\circ\text{C}</math>            Package in Tape/Reel, 5,000pcs/Reel            REACH/RoHS/RoHS III Compliant and HF</p>	
<b>CUSTOMER</b>		
<b>CUSTOMER PART NUMBER</b>		
<b>CROSS REF. PART NUMBER</b>		
<b>MEMO</b>		

<b>VENDOR APPROVE</b>		
Issued/Checked/Approved		
		
Effective Date: Feb. 28, 2025		

<b>CUSTOMER APPROVE</b>
DATE:

## DESCRIPTION

The resistors are constructed in a high grade ceramic body (aluminum oxide). Internal metal electrodes are added at each end and connected by a resistive paste that is applied to the top surface of the substrate. The composition of the paste is adjusted to give the approximate resistance required and the value is trimmed to within tolerance by laser cutting of this resistive layer. The resistive layer is covered with a protective coat. Finally, the two external end terminations are added. For ease of soldering the outer layer of these end terminations is a Tin (lead free) alloy.



*Image shown is a representation only. Exact specifications should be obtained from the product dimension.*

## MAIN FEATURE

- High Reliability And Stability
- Reduced Size Of Final Equipment
- Lower Assembly Costs
- Higher Component And Equipment Reliability
- REACH/RoHS/RoHS III Compliant And Halogen Free Products



## APPLICATION

- Consumer Electrical Equipment
- EDP, Computer Application
- Telecom Application

## ELECTRICAL CHARACTERISTICS

- See Page 5 ~page 8
- All Products Parameters are Subject To NextGen Components' Final Confirmation.

**HOW TO ORDER**

- Please Follow Up Part Code Guide And Indicate Part Code CR0603FB49K9S1 For RFQ/Order.

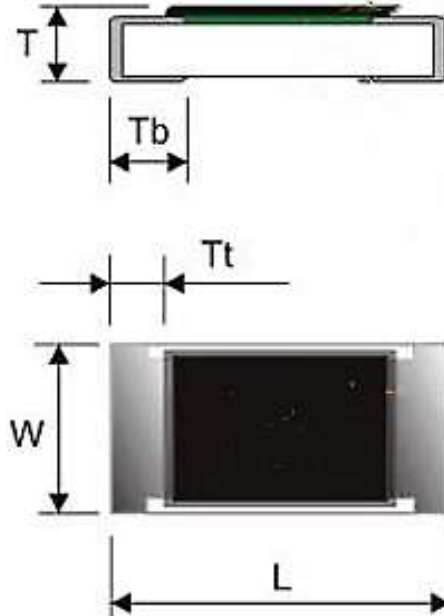
**PART CODE GUIDE**

**RFQ**  
Request For Quotation

CODE	NAME	KEY SPECIFICATION OPTION
CR	Product code	Thick Film Chip Resistors
0603	Size Code	0402 (1005): L1.00*W0.50mm; 0603 (1608): L1.60*W0.80mm; 0805 (2012): L2.00*W1.25mm; 1206 (3216:) L3.20*W1.60mm;
F	Resistance Range  Tolerance Code	P: Jumper; B: +/-0.1%; D: +/-0.5%; F: +/-1%; J: +/-5%
B	Package Code	A: 4Kpcs/7" Reel; B:5kpcs/7" Reel; C:10kpcs/7" Reel; M:15kpcs/7" Reel; D:10kpcs/10" Reel; E:20kpcs/10" Reel
49K9	Resistance Value Code	0R: 0ohm; 1R2: 1.2ohm; 15R: 15ohm; 20R: 20ohm; 68R: 68ohm; 120R: 120ohm; 510R: 510ohm; 1K:1Kohm; 3K: 3Kohm; 9K31: 9.31Kohm; 20K: 12Kohm; 49K9: 49.9Kohm; 100K: 100Kohm; 118K: 118Kohm; 1M: 1.0Mohm; 2M: 2Mohm
S1	Internal Control Code	Custom letter A~Z, a-z or digits (0-9)

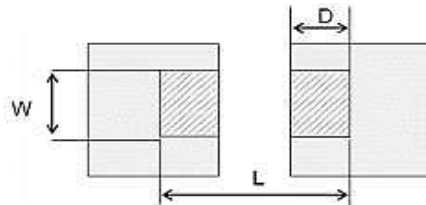
**DIMENSION** (Unit: mm)

Case Size:0603 (1608 metric)  
L1.60\*W0.80\*H0.45mm



ITEM	DIMENSION
L	1.60±0.10
W	0.80±0.10
T	0.45±0.15
T b	0.30±0.15
T t	0.30±0.10

Recommended  
Solder Pad



ITEM	DIMENSION
W	0.70~0.90
L	2.00~2.20
D	0.80~1.00

Construction For  
Reference



**TEST CONDITIONS - FOR JUMPER (0 ohm)**

ITEM	UNIT	SYMBOL	CHARACTERISTIC	CONDITION
Power Rating	W		1/10	@ 70°C
Max. Resistance	mRΩ		50	
Rated Current	A		1.0	
Peak Current	A		3.0	

**GENERAL CONDITIONS - FOR DIFFERENT PART CODE**

ITEM	UNIT	SYMBOL	CHARACTERISTIC	CONDITION
Operating Temperature Range	°C		-55 ~+155	
Storage Temperature Range	°C		5~+40	

Note

- 1) This is the maximum voltage that may be continuously supplied to the resistor element, see “IEC publication 60115-8”
- 2) Max. Operation Voltage : So called RCWV (Rated Continuous Working Voltage) is determined by  

$$RCWV = \sqrt{\text{Rated Power} \times \text{Resistance Value}}$$
or Max. RCWV listed above, whichever is lower.
- 3) Test condition for jumper (0 Ω)

**ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE**

NextGen Part Code	Original Part Number	Resistance Tolerance	Resistance Range	Temp. Coefficient Rate (TRC)	Max. Dissipation @Tamb 70°C	Max. Operation Voltage (DC or RMS)	Max. Overload Voltage (DC or RMS)
		%	Ω	ppm/°C	W	V	V
CR0603PB0RS001	CR03PB0R	Jumper	0	-200~+400	1/10	75	150
CR0603JB2RS001	CR03JB2R	±5.0	2	-200~+400	1/10	75	150
CR0603JB10RS01	CR03JB10R	±5.0	10	-200~+400	1/10	75	150
CR0603JB24RS01	CR03JB24R	±5.0	24	±100	1/10	75	150
CR0603JB33RS01	CR03JB33R	±5.0	33	±100	1/10	75	150
CR0603FB100RS1	CR03FB100R	±1.0	100	±100	1/10	75	150
CR0603JB100RS1	CR03JB100R	±5.0	100	±100	1/10	75	150
CR0603JB120RS1	CR03JB120R	±5.0	120	±100	1/10	75	150
CR0603JB330RS1	CR03JB330R	±5.0	330	±100	1/10	75	150
CR0603JB390RS1	CR03JB390R	±5.0	390	±100	1/10	75	150
CR0603FB499RS1	CR03FB499R	±1.0	499	±100	1/10	75	150
CR0603FB510RS1	CR03FB510R	±1.0	510	±100	1/10	75	150
CR0603FB1KS001	CR03FB1K	±1.0	1K	±100	1/10	75	150
CR0603JB1KS001	CR03JB1K	±5.0	1K	±100	1/10	75	150
CR0603FB1K21S1	CR03FB1K21	±1.0	1.21K	±100	1/10	75	150
CR0603FB1K87S1	CR03FB1K87	±1.0	1.87K	±100	1/10	75	150
CR0603FB2KS001	CR03FB2K	±1.0	2K	±100	1/10	75	150
CR0603FB2K1S01	CR03FB2K1	±1.0	2.1K	±100	1/10	75	150
CR0603FB2K2S01	CR03FB2K2	±1.0	2.2K	±100	1/10	75	150
CR0603FB2K55S1	CR03FB2K55	±1.0	2.55K	±100	1/10	75	150

**ELECTRICAL CHARACTERISTICS - Ta = 25°C, FOR DIFFERENT PART CODE**

NextGen Part Code	Original Part Number	Resistance Tolerance	Resistance Range	Temp. Coefficient Rate (TRC)	Max. Dissipation @Tamb 70°C	Max. Operation Voltage (DC or RMS)	Max. Overload Voltage (DC or RMS)
		%	Ω	ppm/°C	W	V	V
CR0603JB2K7S01	CR03JB2K7	±5.0	2.7K	±100	1/10	75	150
CR0603JB3KS001	CR03JB3K	±5.0	3K	±100	1/10	75	150
CR0603FB3K4S01	CR03FB3K4	±1.0	3.4K	±100	1/10	75	150
CR0603FB4K64S1	CR03FB4K64	±1.0	4.64K	±100	1/10	75	150
CR0603JB4K7S01	CR03JB4K7	±5.0	4.7K	±100	1/10	75	150
CR0603FB4K71S1	CR03FB4K7	±1.0	4.71K	±100	1/10	75	150
CR0603FB4K75S1	CR03FB4K75	±1.0	4.75K	±100	1/10	75	150
CR0603JB5K1S01	CR03JB5K1	±5.0	5.1K	±100	1/10	75	150
CR0603FB5K11S1	CR03FB5K1	±1.0	5.11K	±100	1/10	75	150
CR0603FB5K62S1	CR03FB5K62	±1.0	5.62K	±100	1/10	75	150
CR0603FB5K76S1	CR03FB5K76	±1.0	5.76K	±100	1/10	75	150
CR0603FB5K9S01	CR03FB5K9	±1.0	5.9K	±100	1/10	75	150
CR0603FB6K19S1	CR03FB6K19	±1.0	6.19K	±100	1/10	75	150
CR0603FB7K32S1	CR03FB7K32	±1.0	7.32K	±100	1/10	75	150
CR0603FB7K87S1	CR03FB7K87	±1.0	7.87K	±100	1/10	75	150
CR0603FB8K66S1	CR03FB8K66	±1.0	8.66K	±100	1/10	75	150
CR0603FB9K31S1	CR03FB9K31	±1.0	9.31K	±100	1/10	75	150
CR0603FB10KS01	CR03FB10K	±1.0	10K	±100	1/10	75	150
CR0603JB10KS01	CR03JB10K	±5.0	10K	±100	1/10	75	150
CR0603FB12KS01	CR03FB12K	±1.0	12K	±100	1/10	75	150

**ELECTRICAL CHARACTERISTICS** - Ta = 25°C, FOR DIFFERENT PART CODE

NextGen Part Code	Original Part Number	Resistance Tolerance	Resistance Range	Temp. Coefficient Rate (TRC)	Max. Dissipation @Tamb 70°C	Max. Operation Voltage (DC or RMS)	Max. Overload Voltage (DC or RMS)
		%	Ω	ppm/°C	W	V	V
CR0603JB20KS01	CR03JB20K	±5.0	20K	±100	1/10	75	150
CR0603FB43K2S1	CR03FB43K2	±1.0	43.2K	±100	1/10	75	150
CR0603JB47KS01	CR03JB47K	±5.0	47K	±100	1/10	75	150
<a href="#">CR0603FB49K9S1</a>	CR03FB49K9	±1.0	49.9K	±100	1/10	75	150
CR0603FB68KS01	CR03FB68K	±1.0	68K	±100	1/10	75	150
CR0603FB100KS1	CR03FB100K	±1.0	100K	±100	1/10	75	150
CR0603JB100KS1	CR03JB100K	±5.0	100K	±100	1/10	75	150
CR0603JB120KS1	CR03JB120K	±5.0	120K	±100	1/10	75	150
CR0603FB150KS1	CR03FB150K	±1.0	150K	±100	1/10	75	150
CR0603FB215KS1	CR03FB215K	±1.0	215K	±100	1/10	75	150
CR0603FB226KS1	CR03FB226K	±1.0	226K	±100	1/10	75	150
CR0603JB270KS1	CR03JB270K	±5.0	270K	±100	1/10	75	150
CR0603FB470KS1	CR03FB470K	±1.0	470K	±100	1/10	75	150
CR0603JB510KS1	CR03JB510K	±5.0	510K	±100	1/10	75	150
CR0603FB1MS001	CR03FB1M	±1.0	1M	±100	1/10	75	150
CR0603JB10MS01	CR03JB10M	±5.0	10M	±100	1/10	75	150

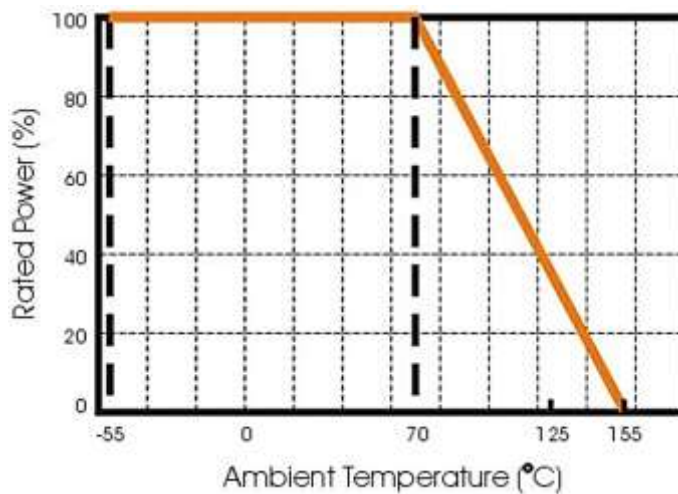


## PRODUCT CHARACTERIZATION

Standard values of nominal resistance are taken from the E24 & E96 series for resistors with a tolerance of  $\pm 0.1\%$ ,  $\pm 0.5\%$ ,  $\pm 1\%$  &  $\pm 5\%$ , The values of the E24/E96 series are in accordance with “IEC publication 60063”

## DERATING

The power that the resistor can dissipate depends on the operating temperature; see the figure below:



Maximum dissipation in percentage of rated power as a function of the ambient temperature for CR06 ,CR05, CR03, CR02

## MOUNTING

Due to their rectangular shapes and small tolerances, Surface Mountable Resistors are suitable for handling by automatic placement systems. Chip placement can be on ceramic substrates and printed-circuit boards (PCBs).

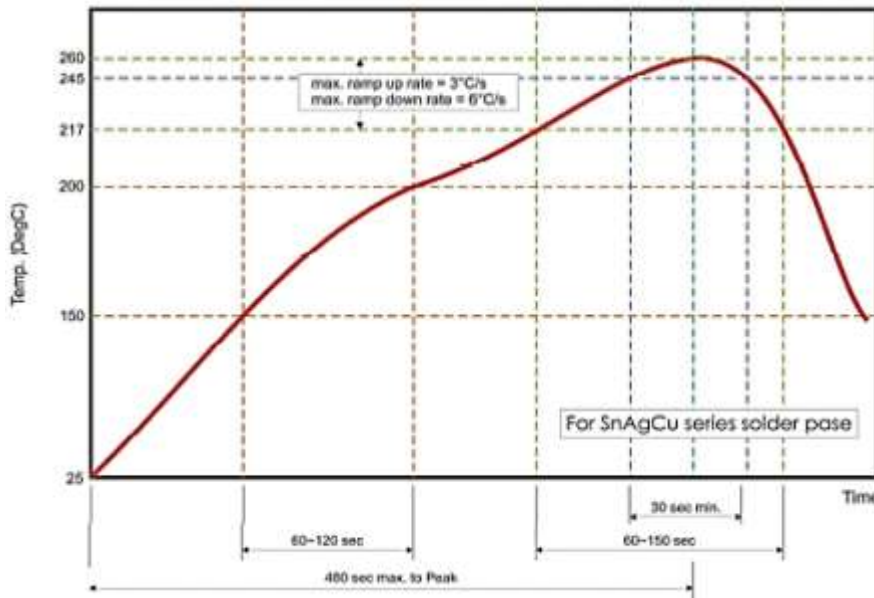
Electrical connection to the circuit is by individual soldering condition. The end terminations guarantee a reliable contact.

## STORAGE AND HANDLING CONDITIONS

- 1) Products are recommended to be used up within two years since operation date as ensured shelf life. Check solderability in case shelf life extension is needed.
- 2) To store products with following condition: Temperature : 5 to 40°C Humidity: 20 to 70% relative humidity
- 3) Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering b.To store products on the shelf and avoid exposure to moisture. Don't expose products to excessive shock, vibration, direct sunlight and so on.

## REFLOW SOLDERING CONDITION

The robust construction of chip resistors allows them to be completely immersed in a solder bath of 260 °C for 10 seconds. Therefore, it is possible to mount Surface Mount Resistors on one side of a PCB and other discrete components on the reverse (mixed PCBs). Surface Mount Resistors are tested for solderability at 235 °C during 2 seconds. The test condition for no leaching is 260°C for 30 seconds. Typical examples of soldering processes that provide reliable joints without any damage are given in below.



Infrared soldering profile for Chip Resistors

## TEST AND REQUIREMENTS

Essentially all tests are carried out according to the schedule of IEC publication 115-8, category LCT/UCT/56 (rated temperature range: Lower Category Temperature, Upper Category Temperature; damp heat, long term, 56 days). The testing also meets the requirements specified by EIA, EIAJ and JIS. The tests are carried out in accordance with IEC publication 68, "Recommended basic climatic and mechanical robustness testing procedure for electronic components" and under standard atmospheric conditions according to IEC 60068-1, subclause 5.3. Unless otherwise specified, the following value supplied

Temperature: 15 °C to 35 °C ; Relative humidity: 45% to 75%.

Air pressure: 86kPa to 106 kPa (860 mbar to 1060 mbar).

All soldering tests are performed with mildly activated flux

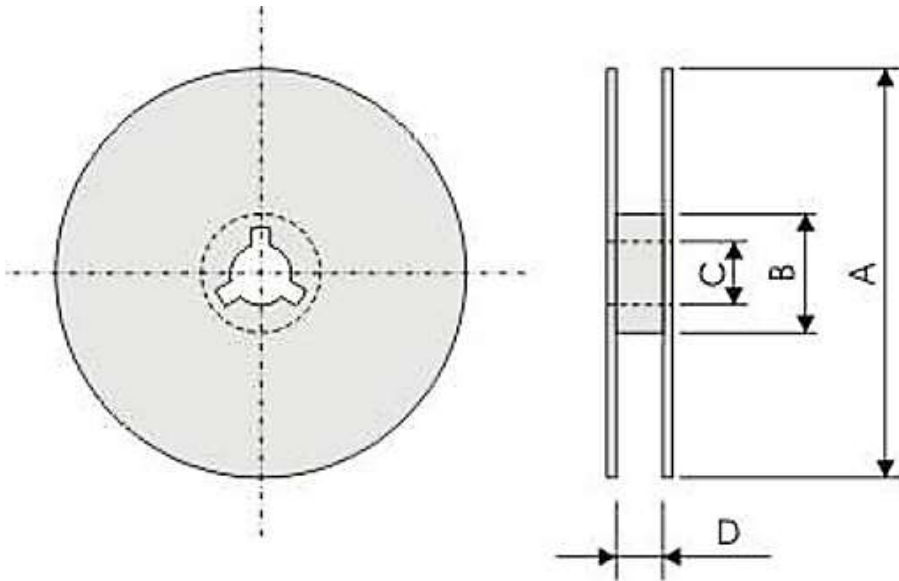
**TEST AND REQUIREMENT** (JIS C 5201-1 : 1998)

TEST	PROCEDURE / TEST METHOD	REQUIREMENT	
		Resistor	Ω
Electrical Characteristics JISC5201-1: 1998 Clause 4.8	- DC resistance values measurement - Temperature Coefficient of Resistance (T.C.R) Natural resistance change per change in degree centigrade. $\frac{R_2 - R_1}{R_1(t_2 - t_1)} \times 10^6 \text{ (ppm/}^\circ\text{C)}$ t1 : 20°C+5°C-1°C; t2 : -55°C or +155°C R1 : Resistance at reference temperature (20°C+5°C/- 1°C) R2: Resistance at test temperature (-55°C or +155°C)	Within the specified tolerance Refer to “QUICK REFERENCE DATA”	<50mΩ
Resistance To Soldering Heat(R.S.H) JISC5201-1:1998 Clause 4.18	Un-mounted chips completely immersed for 10±1 second in a SAC solder bath at 260°C±5°C	±5%: ΔR/R max. ±(1%+0.05Ω); ±1%: ΔR/R max. ±(0.5%+0.05Ω) no visible damage	<50mΩ
Solderability JISC5201-1: 1998 Clause 4.17	Un-mounted chips completely immersed for 2±0.5 second in a SAC solder bath at 235°C±5°C	95% coverage min., good tinning and no visible damage	
Temperature cycling JISC5201-1: 1998 Clause 4.19	30 minutes at -55°C±3°C, 2~3 minutes at 20°C+5°C-1°C, 30 minutes at +125°C±3°C, 2~3 minutes at 20°C+5°C-1°C, total 5 continuous cycles	±5%: ΔR/R max. ±(1%+0.05Ω); ±1%: ΔR/R max. ±(0.5%+0.05Ω) no visible damage	<50mΩ
High Temperature Exposure MIL-STD-202 method 108	1000+48/-0 hours; without load in a temperature chamber controlled 155 ± 3 C	±5%: ΔR/R max. ±(2%+0.1Ω); ±1%: ΔR/R max. ±(1%+0.1Ω) no visible damage	<50mΩ

**TEST AND REQUIREMENT** (JIS C 5201-1 : 1998)

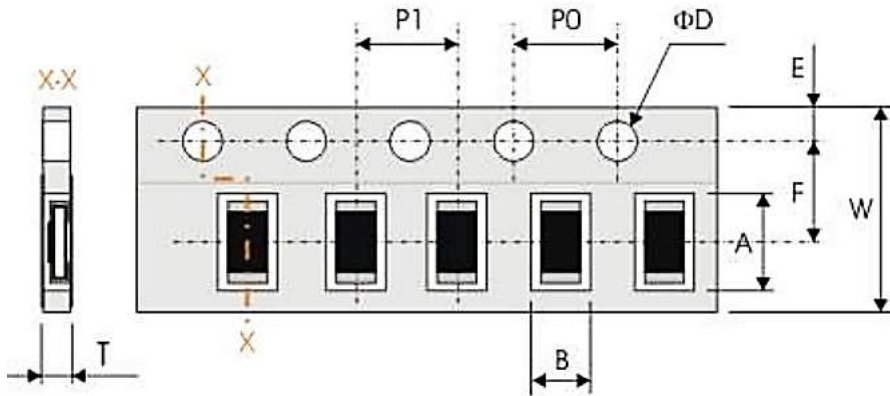
TEST	PROCEDURE / TEST METHOD	REQUIREMENT	
		Resistor	Ω
Bending strength JISC5201-1: 1998 Clause 4.33	Resistors mounted on a 90mm glass epoxy resin PCB(FR4), bending once 3mm for 10sec, 5mm for CR02	±5%: ΔR/R max. ±(1%+0.05Ω); ±1%: ΔR/R max. ±(1%+0.05Ω) no visible damage	<50mΩ
Adhesion JISC5201-1: 1998 Clause 4.32	Pressurizing force: 5N, Test time: 10±1sec	No remarkable damage or removal of the terminations	
Short Time Overload (STOL) JISC5201-1: 1998 Clause 4.13	2.5 times RCWV or max. overload voltage, for 5seconds	±5%: ΔR/R max. ±(2%+0.05Ω); ±1%: ΔR/R max. ±(1%+0.05Ω) no visible damage	<50mΩ
Load life in Humidity JISC5201-1: 1998 Clause 4.24	1000 +48/-0 hours, loaded with RCWV or Vmax in humidity chamber controller at 40 C 2 C and 90~95% relative humidity, 1.5hours on and 0.5 hours off	±5%: ΔR/R max. ±(2%+0.1Ω); ±1%: ΔR/R max. ±(1%+0.1Ω) no visible damage	<50mΩ
Load life (endurance) JISC5201-1: 1998 Clause 4.25	1000 +48/-0 hours, loaded with RCWV or Vmax in chamber controller 70±2°C, 1.5 hours on and 0.5 Hours off	±5%: ΔR/R max. ±(3%+0.1Ω); ±1%: ΔR/R max. ±(1%+0.1Ω) no visible damage	<50mΩ
Insulation Resistance JISC5201-1: 1998 Clause 4.6	Apply the maximum overload voltage (DC) for 1minute	R ≥ 10GΩ	
Dielectric Withstand Voltage JISC5201-1: 1998 Clause 4.7	Apply the maximum overload voltage (AC) for 1 minute	No breakdown or flashover	

**REEL DIMENSION** (Unit: mm)



CODE	DIMENSION 7" Reel	DIMENSION 10" Reel	DIMENSION 13" Reel
A	$\varnothing 178.0 \pm 2.0$	$\varnothing 254.0 \pm 2.0$	$\varnothing 330.0 \pm 2.0$
B	$\varnothing 60.0 \pm 1.0$	$\varnothing 100 \pm 1.0$	$\varnothing 100 \pm 1.0$
C	$13.0 \pm 0.20$	$13.0 \pm 0.20$	$13.0 \pm 0.20$
D	$9.0 \pm 0.50$	$9.0 \pm 0.50$	$9.0 \pm 0.50$

**TAPE DIMENSION** (Unit: mm)



CODE	DIMENSION
A	1.90±0.20
B	1.10±0.20
W	8.00±0.30
F	3.50±0.20
E	1.75±0.10
P 1	4.00±0.10
P0	4.00±0.10
ΦD	1.50+0.10/-0.0
P0	0.65±0.05

**TAPING QUANTITY**

TAPE	PAPER TAPE						EMBOSSSED TAPE	BULK CASSETTE
	4 mm Pitch			2 mm Pitch			4 mm Pitch	
Reel Size	7"	10"	13"	7"	10"	13"	7"	
CR03	5000	10000	20000				-	20000

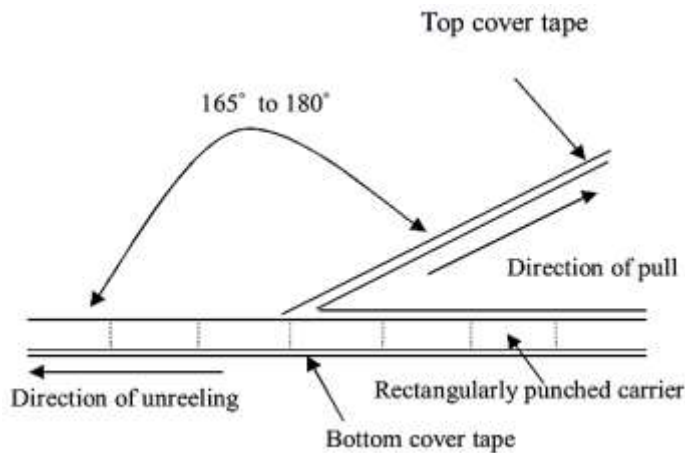
## PERFORMANCE OF TAPING

Strength of Carrier Tape and Top Cover Tape

Carrier Tape: When a tensile force 1.02kgf is applied in the direction of unreeling the tape, the tape shall withstand this force. Top cover Tape: When a tensile force 1.02kgf is applied to the tape, the tape shall withstand this force.

Peel Force of Top Cover Tape

Unless otherwise specified, the peel force of top cover tape shall be 10.2 to 71.4 g f when the top cover tape is pulled at a speed of 300mm/min with the angle between the taped during peel and the direction of unreeling maintained at 165 to 180° as illustrated in Fig.



## CAUTION

- Don't apply excess mechanical stress to the component and terminals at soldering. Do not use this product with bend.
- Do not clean or wash the component for it is not hermetically sealed.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in flow soldering.
- Don't be close to fire.
- This specification mentions the quality of the component as a single unit. Please insure the component is thoroughly evaluated in your application circuit
- Expire date (Shelf life) of the products is 12 months after delivery under the conditions of a sealed and an unopened package. Please use the products within 12 months after delivery. If you store the products for a long time (more than 12 months), use carefully because the products may be degraded in the solder-ability or rusty. Please confirm solder-ability and characteristics for the products regularly.
- Exposure components under soldering condition that is exceeding our recommendation will increase the failure dangerous.
- Please contact us before using the product as automobile electronic component.
- Please return one of these specifications after your signature of acceptance.
- When something gets doubtful with this specifications, we shall jointly work to get an agreement.
- For questions on technology, prices and delivery, please contact our sales offices or e-mail:  
[sales@NextGenComponent.com](mailto:sales@NextGenComponent.com) .



## IMPORTANT NOTES AND DISCLAIMER

1. **ROHS COMPLIANCE:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained at Download Center.
2. **REACH COMPLIANCE:** REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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