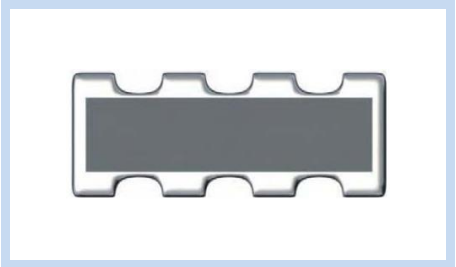
Thick Film Chip Resistors Array

RTA series

MERITEK

FEATURE

- High reliability and stability
- Efficiency, Space saving
- Convex and concave terminals
- 2, 4 or 8 isolated elements available



PART NUMBERING SYSTEM

RoHS

RTA	03	4	D	101	J	TP
(1)	(2)	(3)	(4)	(5)	(6)	(7)

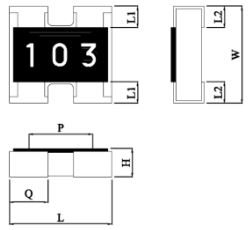
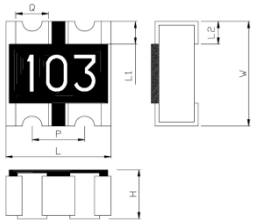
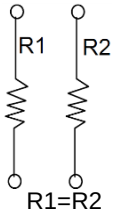
No	Item	Digit	Description	Reference
(1)	**Meritek Series**	RTA	Chip Resistors Array	Thick Film Type
(2)	**Size Code**	03	03: 0603	01: 0201, 02: 0402
(3)	**Circuits Number**	4	4: 4 circuits	2: 2 circuits. 8: 8 circuits
(4)	**Terminal Type**	D	D: Convex	C: Concave
(5)	**Nominal Resistance**	101	101: 100Ω	100: 10Ω, 4R7: 4.7Ω, 10R2: 10.2Ω
(6)	**Tolerance**	J	J: ±5%	D: ±0.5%, F: ±1%, G: ±2%
(7)	**Packaging**	TP	TP: 4mm Pitch Paper(Taping) 5000pcs	TH: 2mm Pitch Paper(Taping) 10000pcs

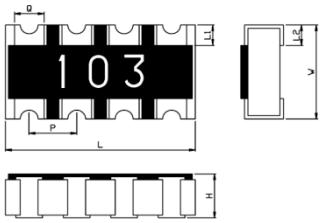
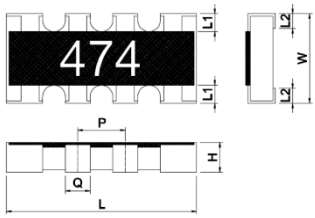
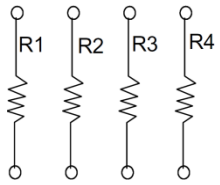
SPECIFICATIONS

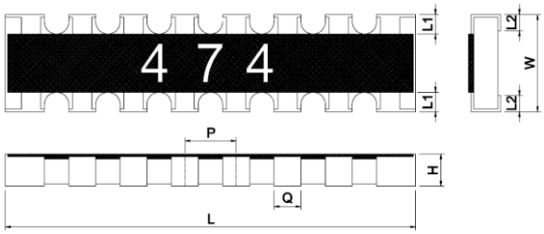
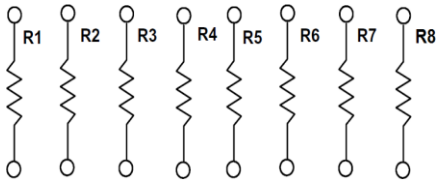
Type	Rated Power at 70°C	Max. Working Voltage	Max. Overload Voltage	T.C.R (ppm/°C)	Resistance Range (Ω)			Numbers of Terminals	Numbers of Resistors	JUMPER (0Ω) Rated Current (A)	JUMPER (0Ω) Resistance Value (mΩMax.)
					D (±0.5%) E-24, E-96	F (±1%) E-24, E-96	G (±2%) J (±5%) E-24				
RTA01-2D (0201)	1/32W	12.5V	25V	±500	-----	-----	3≤R≤10	4	2	0.5	50
				±300	-----	-----	10≤R≤1K				
				±200	-----	-----	1K≤R≤1M				
RTA02-2D (0402)	1/16W	25V	50V	±300	-----	1≤R≤10	1≤R≤10	4	2	1	50
				±200	-----	10≤R≤1M	10≤R≤1M				
RTA03-2D (0603)	1/16W	50V	100V	±200	-----	10≤R≤1M	1≤R≤10M	4	2	1	50
RTA02-4D (0420)	1/16W	25V	50V	±300	-----	1≤R≤10	1≤R≤10	8	4	1	50
				±200	-----	10≤R≤1M	10≤R≤1M				
RTA02-4C (0420)	1/16W	25V	50V	±400	-----	1≤R≤10	1≤R≤10	8	4	1	50
				±200	-----	10≤R≤1M	10≤R≤1M				
RTA03-4D (0603)	1/16W	50V	100V	±200	22≤R≤470K	1≤R≤10M	1≤R≤10M	8	4	1	50
RTA03-4C (0603)	1/16W	50V	100V	±200	-----	1≤R≤1M	1≤R≤10M	8	4	1	50
RTA02-8D (0402)	1/16W	25V	50V	±250	-----	10≤R≤1M	1≤R≤1M	16	8	1	50
RTA03-2C (0603)	1/16W	50V	100V	±200	-----	1≤R≤1M	1≤R≤10M	4	2	1	50
RTA02-2C (0603)	1/16W	25V	50V	±650	-----	3≤R≤10	3≤R≤10	4	2	1	50
				±250	-----	10≤R≤1M	10≤R≤1M				
Operating Temperature Range				-55°C ~ +155°C							

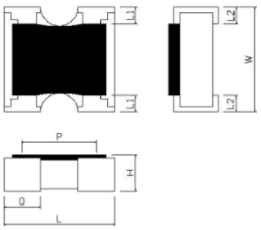
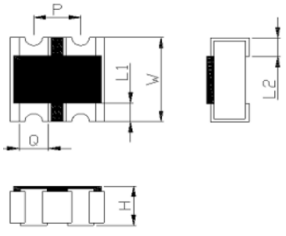
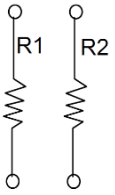
DIMENSION

Item	L	W	H	L1	L2	P	Q
RTA01-2D (0201)	0.08±0.10	0.60±0.10	0.30±0.05	0.15±0.10	0.15±0.05	0.05	0.35±0.10
RTA02-2D (0402)	1.00±0.10	1.00±0.10	0.30±0.05	0.15±0.10	0.25±0.10	0.67	0.33±0.10
RTA03-2D (0603)	1.60±0.15	1.60±0.15	0.45±0.10	0.30±0.15	0.30±0.15	0.80	0.60±0.10
RTA02-4D (0420)	2.00±0.10	1.00±0.10	0.40±0.10	0.20±0.10	0.25±0.10	0.50	0.30±0.10
RTA02-4C (0420)	2.00±0.10	1.00±0.10	0.40±0.10	0.15±0.10	0.25±0.10	0.50	0.30±0.10
RTA03-4D (0603)	3.20±0.20	1.60±0.15	0.50±0.10	0.30±0.15	0.30±0.15	0.80	0.50±0.10
RTA03-4C (0603)	3.20±0.15	1.60±0.15	0.55±0.10	0.35±0.15	0.45±0.15	0.80	0.50±0.10
RTA02-8D (0402)	4.00±0.20	1.60±0.10	0.40±0.10	0.30±0.15	0.30±0.10	0.5	0.25±0.15
RTA03-2C (0603)	1.60±0.15	1.60±0.15	0.55±0.10	0.30±0.15	0.40±0.15	0.80	0.50±0.10
RTA02-2C (0603)	1.00±0.10	1.00±0.10	0.30±0.10	0.18±0.10	0.25±0.10	0.50	0.30±0.10

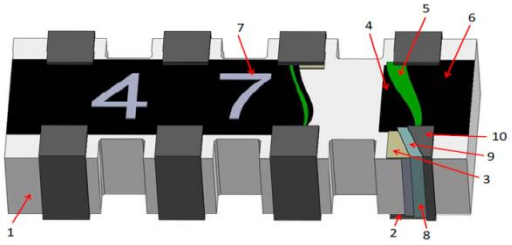
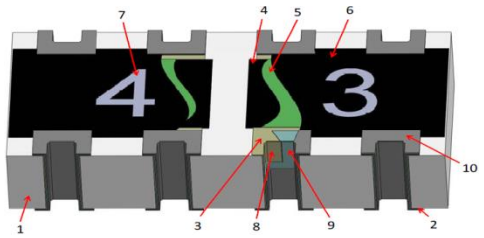
RTA03-2D	RTA03-2C	Circuits
		 R1=R2

RTA02-4C / RTA03-4C	RTA02-4D / RTA03-4D	Circuits
		 R1=R2=R3=R4

RTA02-8D	Circuits
	 R1=R2=R3=R4=R5=R6=R7=R8

RTA01-2D / RTA02-2D	RTA02-2C	Circuits
		 R1=R2

STRUCTURE GRAPH

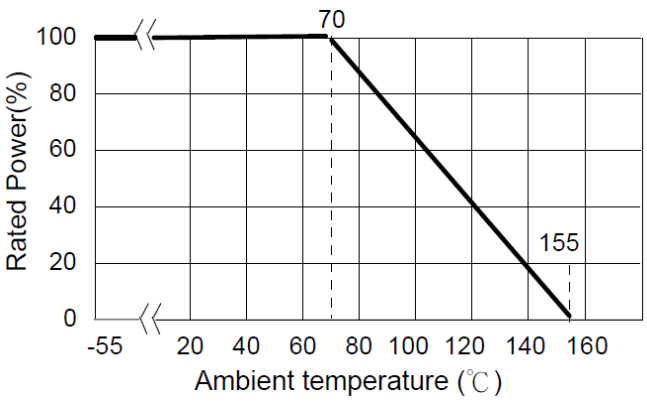
D (Convex Type)	C (Concave Type)
	

1	Ceramic substrate	6	2nd Protective coating
2	Bottom inner electrode	7	Marking
3	Top inner electrode	8	Terminal inner electrode
4	Resistive layer	9	Ni plating
5	1st Protective coating	10	Sn plating

VOLTAGE RATING OR CURRENT RATING

Item	Specification
Rated Voltage **At Resistance Range: ≧1Ω**	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: $E = \sqrt{RXP}$ E= Rated voltage (V) P= power rating (W) R= Nominal resistance(Ω)
Rated Current **At Resistance Range: (0Ω)**	The resistor shall have a DC continuous working current or a rms. AC continuous working current at commercial-line frequency and wave form corresponding to the power rating, as determined from the following: $I = \sqrt{P/R}$ I= Rated current (A) P= Power rating (W) R= Nominal resistance(Ω)

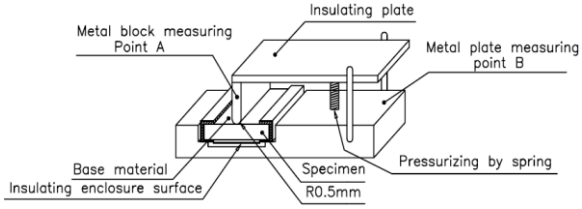
POWER DERATING CURVE



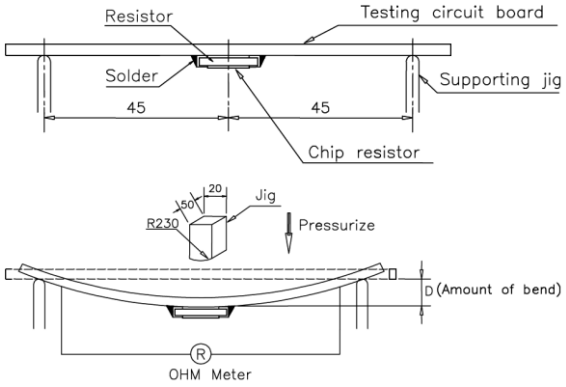
Notes:

Operating Temperature Range: -55~+155°C
For resistors operated in ambient temperatures above 70°C, power rating shall be derated in accordance with figure below.

RELIABILITY

Item	Conditions	Specifications
Temperature Coefficient of Resistance (TCR)	TCR（ppm/℃）$=\frac{(R2-R1)}{R1(T2-T1)}$ X 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	General Electrical Specifications
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. general specifications) Refer to JIS-C5201-1 4.13	0.5%~1%:±(1.0%+0.05Ω) 2%~5% :±(2.0%+0.10Ω) No evidence of mechanical damage. No short or burned on the appearance.
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 	IR≥10^9Ω
Dielectric Withstand Voltage	Put the resistor in the fixture, add 300 VAC in +,- terminal for 60 sec. Refer to JIS-C5201-1 4.7	No short or burned on the appearance.
Intermittent Overload	Put the tested resistor in chamber under temperature 25±2℃ and load 2.5 times rated DC voltage for 1 sec on , 25 sec off ,10000 +4000 test cycles, then it be left at no-load for 1 hour , then measure its resistance variance rate. Refer to JIS-C5201-1 4.13	±(5.0%+0.10Ω) No evidence of mechanical damage. No short or burned on the appearance.
Noise Level	Refer to JIS-C5201-1 4.12	Resistance / Noise R＜100Ω / ≦-10db (0.32 μV/V) 100Ω≦R＜1KΩ / ≦0db(0.32 μV/V) 1KΩ≦R＜10KΩ / ≦10db(0.32 μV/V) 10KΩ≦R＜100KΩ / ≦15db(0.32 μV/V) 100KΩ≦R＜1MΩ / ≦20db(0.32 μV/V) 1MΩ≦R / ≦30db(0.32 μV/V)
Resistance to Solvent	The tested resistor be immersed into isopropyl alcohol of 20~25℃ for 5 minutes, then the resistor is left in the room for 48 hrs , then measure its resistance variance rate. Refer to JIS-C5201-1 4.29	01-2D:±(1.0%+0.05Ω) Other:±(0.5%+0.05Ω) No evidence of mechanical damage. No G2 over coating and Sn layer by leaching.
Solderability	Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105℃, humidity of 100% RH, and pressure of 1.22×105 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more. Test method: The resistor be immersed into solder pot in temperature 235±5℃ for 2 sec, then the resistor is left as placed under microscope to observed its solder area. Refer to JIS-C5201-1 4.17	Solder coverage over 95%

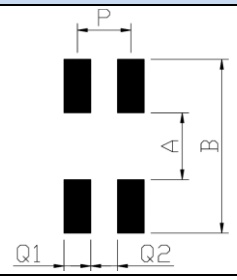
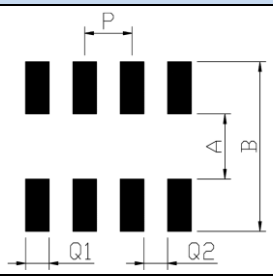
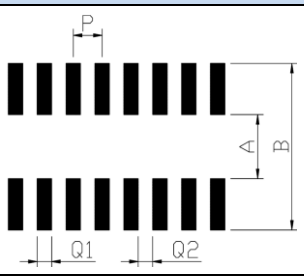
RELIABILITY (CONTINUED)

Item	Conditions	Specifications
Resistance to Soldering Heat	∗ Test method 1 (solder pot test): The tested resistor is immersed into molten solder of 260+5/-0℃ for 10 seconds. Then the resistor is left in the room for 1 hour. ∗ Test method 2 (solder pot test): The tested resistor is immersed into molten solder of 260+5/-0℃ for 30 seconds. Then the resistor is left as placed under microscope to observe its solder area. Refer to JIS-C5201-1 4.18	Test item 1: (1). Vaviance rate on resistance △R%=±(1.0%+0.05Ω) (2).No evidence of electrode damage. No side conductive peeling off. Test item 2: (1).Solder coverage over 95%. (2).The underlying material (such as ceramic) shall not be visible at the crest corner area of the electrode.
Joint Strength of Solder	Preconditioning: Put the tested resistor in the apparatus of PCT, at a temperature of 105℃, humidity of 100% RH, and pressure of 1.22×10^5 Pa for a duration of 4 hours. Then after left the tested resistor in room temperature for 2 hours or more. Test method: ∗ Test item 1 (Adhesion): A static load using a R0.5 scratch tool shall be applied on the core of the component and in the direction of the arrow and held for 10 seconds and under load measure its resistance variance rate. 1.02-2C=10N load 2.Other=20N load 3.01-2D=5Nload Refer to JIS-C5201-1 4.32 ∗ Test item 2 (Bending Strength): Solder tested resistor on the PC board, add force in the middle down, and under load measure its resistance variance rate D=(1)01-2D=3mm (2)Other=5mm Refer to JIS-C5201-1 4.33  	Test item 1: (1).Vaviance rate on resistance △R%=±(1.0%+0.05Ω) (2).No evidence of mechanical damage. No terminal peeling off. Test item 2: (1).Vaviance rate on resistance △R%=±(1.0%+0.05Ω) (2).No evidence of mechanical damage. No terminal peeling
Resistance to Dry Heat	Put tested resistors in chamber under temperature 155±5°C for 1,000±4 hours. Then leaving in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.5%~1%: ±(1.0%+0.05Ω) 2%~5%: ±(2.0%+0.10Ω) No evidence of mechanical damage. No short or burned on the appearance.
Thermal Shock	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 hrs, and measure its resistance variance rate. Refer to MIL-STD 202 Method 107 Lowest Temperature: -55°C±5°C Highest Temperature: 125°C±5°C Temperature-retaining time: 15 minutes each	±(1.0%+0.05Ω) No evidence of mechanical damage. No short or burned on the appearance.

RELIABILITY (CONTINUED)

Item	Conditions	Specifications
Loading life In Moisture	Put the tested resistor in the chamber under temperature 40±2°C, relative humidity 90~95% and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hrs. Then leaving the tested resistor in room temperature for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.24	0.5%~1%: ±(2.0%+0.10Ω) 2%~5%: ±(3.0%+0.10Ω) No evidence of mechanical damage. No short or burned on the appearance.
Load life	Put the tested resistor in chamber under temperature 70±2°C and load the rated voltage for 90 minutes on, 30 minutes off, total 1000 hrs. Then leaving the tested resistor in room temp. for 60 minutes, and measure its resistance variance rate. Refer to JIS-C5201-1 4.25	0.5%~1%: ±(2.0%+0.10Ω) 2%~5%: ±(3.0%+0.10Ω) No evidence of mechanical damage. No short or burned on the appearance.
Low Temperature Operation	Put the tested resistor in the chamber at room temperature 25°C. Decreasing the temperature to -55°C and keep the temperature at -55°C for 1 hour. Then load the rated voltage for 45 minutes on, and 15 minutes off. Then leaving the tested resistor in room temperature for 8±1 hrs, and measure its resistance variance rate. Refer to MIL-R-55342D 4.7.4	0.5%~1%: ±(0.5%+0.05Ω) 2%~5%: ±(1.0%+0.05Ω) No evidence of mechanical damage. No short or burned on the appearance.
Whisker Test	Test item (Thermal Shock Test): Minimum storage temp. -55°C+0/-10°C Maximum Storage temp. 85°C+10°C/-0 Temperature-retaining time 10 minutes Number of temp. cycles 1500 Inspection: Inspect for whisker formation on specimens that underwent the acceleration test specified in subciause 4.2, with a magnifier (stereo microscope) of about 40 or higher magnification. If judgment is hard in this method, use a scanning electron microscope (SEM) of about 1,000 or higher magnification. By JEDEC Standard NO.22A121 class 2.	Max. 50µm

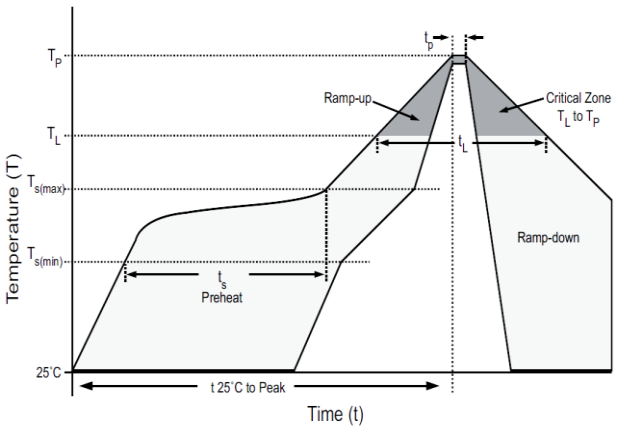
Land Pattern RCOMMENDATION

RTA01-2D / RTA02-2D / RTA02-2C / RTA03-2D / RTA03-2C	RTA02-4D / RTA02-4C / RTA03-4D / RTA03-4C	RTA02-8D
		

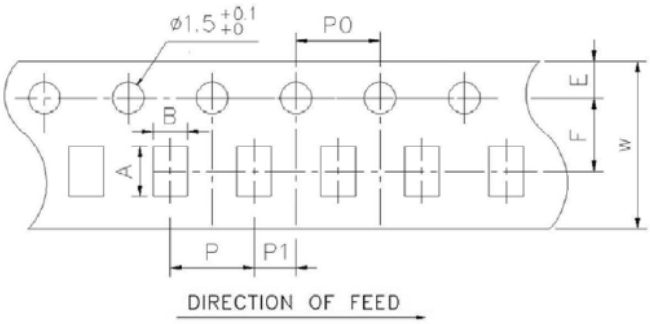
Part Number	A	B	P	Q1	Q2
RTA01-2D	0.30	0.90	0.50	0.30	0.20
RTA02-2D	0.50	2.00	0.67	0.33	0.34
RTA03-2D	1.00	2.60	0.80	0.40	0.40
RTA02-4D	0.50	2.00	0.50	0.28	0.22
RTA02-4C	0.50	2.00	0.50	0.28	0.22
RTA03-4D	1.00	2.60	0.80	0.40	0.40
RTA03-4C	1.00	2.60	0.80	0.40	0.40
RTA03-2C	1.00	2.60	0.80	0.40	0.40
RTA02-8D	1.00	2.60	0.50	0.25	0.25
RTA02-2C	0.50	2.00	0.50	0.28	0.22

SOLDERING RECOMMENDATION

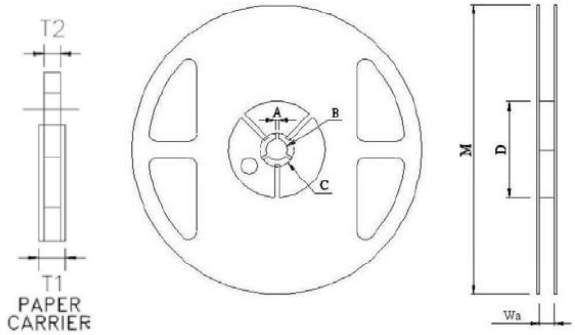
Reflow Condition		
Pre Heat	Min Temp. $T_{s(min)}$	150°C
	Max Temp. $T_{s(max)}$	180°C
	Time- min. to max. t_s	90-120 seconds
Average ramp up rate: T_L to T_P		3°C/second max.
Reflow	Temp. T_L	230°C
	Time- min. to max. t_s	40 second max.
Peak Temperature T_P		260±0.5°C
Time within 5°C of actual peak Temp. (t_p)		10 seconds
Ramp-down Rate: T_P to T_L		6°C/second max.
Do not exceed		260°C



PACKAGING SPECIFICATION



Paper Tape



Reel

Part No.	A	B	W	E	F	T1	T2	P	P0	10XP0	P1
RTA01-2D	0.90±0.1	0.70±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.45+0.2	0.43±0.1	2.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA02-2D	1.20±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.45+0.2	0.43±0.1	2.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA03-2D	1.90±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.60+0.2	0.60±0.1	4.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA02-4D	2.20±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.60+0.2	0.60±0.1	2.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA02-4C	2.20±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.60+0.2	0.60±0.1	2.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA03-4D	3.45±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.75+0.2	0.75±0.1	4.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA03-4C	3.45±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.75+0.2	0.75±0.1	4.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA02-8D	4.30±0.2	1.90±0.1	12.0±0.2	1.75±0.1	5.5±0.05	0.60+0.2	0.60±0.1	4.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA03-2C	1.90±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.75+0.2	0.75±0.1	4.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05
RTA02-2C	1.20±0.1	1.20±0.1	8.0±0.2	1.75±0.1	3.5±0.05	0.45+0.2	0.43±0.1	2.0±0.1	4.0±0.05	40.0±0.2	2.0±0.05

Unit: mm

Reel Type / Tape	Wa	M	A	B	C	D
7" Reel for 8mm Tape	9.0±0.5	178±2.0	2.0±0.5	13.5±0.5	21.0±0.5	60.0±1.0
7" Reel for 12mm Tape	13.8±0.5	178±2.0				80.0±1.0
10" Reel for 8mm Tape	10.0±0.5	254±2.0				100.0±1.0
13" Reel for 8mm Tape	10.0±0.5	330±2.0				100.0±1.0

Unit: mm