

High Voltage Thick Film Chip Resistor

Features

- Highly reliable multilayer electrode construction
- High component and equipment reliability
- Excellent performance at high voltage
- Reduced size of final equipment
- Moisture Sensitive Level 1
- RoHS Compliant



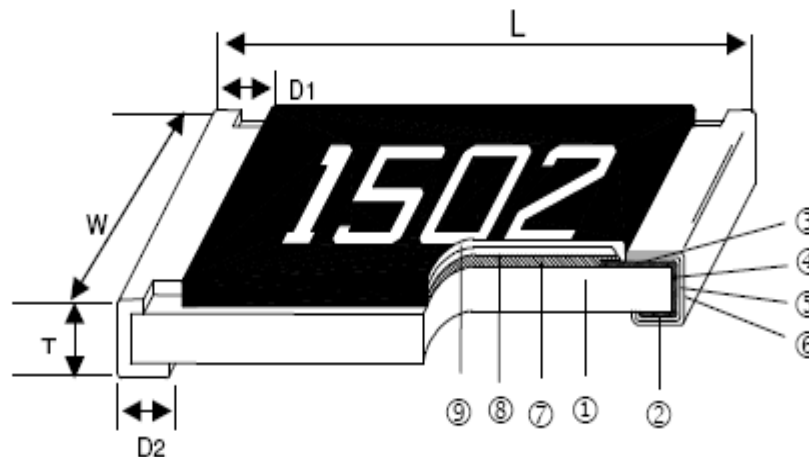
Applications

- Inverter
- Outdoor equipment
- Converter
- Automotive industry
- High pulse equipment



**HALOGEN
FREE**

Construction



① Alumina Substrate	④ Edge Electrode (NiCr)	⑦ Resistor Layer (RuO ₂ /Ag)
② Bottom Electrode (Ag)	⑤ Barrier Layer (Ni)	⑧ Primary Overcoat (Glass)
③ Top Electrode (Ag-Pd)	⑥ External Electrode (Sn)	⑨ Secondary Overcoat (Epoxy)

High Voltage Thick Film Chip Resistor

RCV Series

Dimensions

Unit: mm

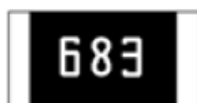
Type	Size Inch (mm)	L	W	T	D1	D2	Average Weight(mg)
RCV0402	0402(1005)	1.00 ± 0.05	0.50± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10	0.620
RCV0603	0603(1608)	1.60 ± 0.10	0.80± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	2.042
RCV0805	0805(2012)	2.00 ± 0.10	1.25± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.40 ± 0.20	4.368
RCV1206	1206(3216)	3.10 ± 0.10	1.55± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20	8.947
RCV2010	2010(5025)	5.00 ± 0.20	2.50± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	24.241
RCV2512	2512(6432)	6.35 ± 0.20	3.10± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	39.448

Marking Information

1. RCV0402 is without marking due to too small size.
2. RCV0603~RCV2512:
 - 2.1. E-24 series, 3 digits Code, the first two digits are significant figures; the third digit is number of zeros to follow. Letter "R" is as decimal point;
 - 2.2. E-96 series, 4 digits Code (except 0603 size), the first three digits are significant figures; the fourth digit is number of zeros. Letter "R" is as decimal point;
 - 2.3. E-96 series with special marking code for 0603 size, see below marking table.



No Marking
Item 1



683 = $68 \times 10^3 \Omega$
= 68K Ω
Item 2.1



6812 = 681×10^2
= 68.1K Ω
Item 2.2



49X = 316×10^{-1}
= 31.6 Ω
Item 2.3

Marking Table

Code	E96	Code	E96	Code	E96	Code	E96
01	100	25	178	49	316	73	562
02	102	26	182	50	324	74	576
03	105	27	187	51	332	75	590
04	107	28	191	52	340	76	604
05	110	29	196	53	348	77	619
06	113	30	200	54	357	78	634

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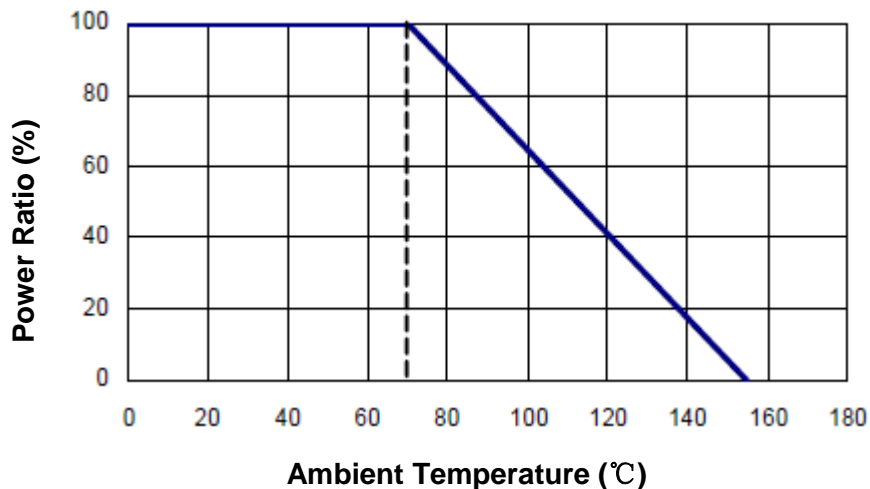
RCV Series

Code	E96	Code	E96	Code	E96	Code	E96
07	115	31	205	55	365	79	649
08	118	32	210	56	374	80	665
09	121	33	215	57	383	81	681
10	124	34	221	58	392	82	698
11	127	35	226	59	402	83	715
12	130	36	232	60	412	84	732
13	133	37	237	61	422	85	750
14	137	38	243	62	432	86	768
15	140	39	249	63	442	87	787
16	143	40	255	64	453	88	806
17	147	41	261	65	464	89	825
18	150	42	267	66	475	90	845
19	154	43	274	67	487	91	866
20	158	44	280	68	499	92	887
21	162	45	287	69	511	93	909
22	165	46	294	70	523	94	931
23	169	47	301	71	536	95	953
24	174	48	309	72	549	96	976

Code	A	B	C	D	E	F	X	Y
Multiplier	10 ⁰	10 ¹	10 ²	10 ³	10 ⁴	10 ⁵	10 ⁻¹	10 ⁻²

Power Derating Curve

For resistors operate in the ambient temperature over 70°C, loading power ratio will derate in accordance with following curve.



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RCV Series

Absolute Maximum Ratings & Electrical Characteristics

Type	Size Inch	Tolerance (E-24 & E-96)		Power Rating @70°C	MAX. Working Voltage	MAX. Overload Voltage	TCR (PPM/°C)		Resistance Range	Operating Temperature Range
RCV0402	0402	F	±1%	1/16W	100V	200V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	
RCV0603	0603	F	±1%	1/10W	200V	400V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	
RCV0805	0805	F	±1%	1/8W	400V	800V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	
RCV1206	1206	F	±1%	1/4W	500V	1000V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	
RCV2010	2010	F	±1%	1/2W	2000V	3000V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	
RCV2512	2512	F	±1%	1W	3000V	4000V	F	±100	10Ω ~ 1MΩ	-55°C~+155°C
							G	±200	1.02MΩ ~ 10MΩ	
		J	±5%				F	±100	10Ω ~ 1MΩ	
							G	±200	1.1MΩ ~ 20MΩ	
							K	±400	22MΩ ~ 100MΩ	

Note: Operating Voltage= $\sqrt{P \cdot R}$ or Max. Operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. Overload voltage listed above, whichever is lower.

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Environmental Characteristics

Test Item	Requirement		Test Method
	±1%	±5%	
Temperature Coefficient of Resistance(T.C.R.)	As spec		JIS C 5201-1 4.8 IEC 60115-1 4.8 -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	JIS C 5201-1 4.13 IEC 60115-1 4.13 RCWV * 2.5 or Max. overload voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G		JIS C 5201-1 4.6 IEC 60115-1 4.6 Max. overload voltage for 1 minute
Endurance	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	JIS C 5201-1 4.25 IEC 60115-1 4.25.1 70±2°C, RCWV for 1000 hrs with 1.5 hrs ON” and 0.5 hrs “OFF”
Damp Heat with Load	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)	JIS 5201-1 4.24 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5hrs “ON” and 0.5 hrs “OFF”
Dry Heat	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	JIS C 5201-1 4.23.2 IEC 60115-1 4.23.2 At +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	JIS C 5201-1 4.33 IEC 60115-1 4.33 Bending once for 5 seconds with 3 mm 2010, 2512 sizes: 2 mm
Solderability	>95% coverage		JIS C 5201 4.17 IEC 60115-1 4.17 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	JIS C 5201-1 4.18 IEC 60115-1 4.18 260±5°C for 10 seconds
Voltage Proof	no breakdown or flashover		JIS C 5201 4.7 IEC 60115-1 4.7 1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%		JIS C 5201-1 4.18 IEC 60115-1 4.18 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)	JIS C 5201-1 4.19 IEC 60115-1 4.19 -55°C to +155°C, 5 cycles

RCWV (Rated Continuous Working Voltage) = $\sqrt{P \cdot R}$ or Max. operating voltage whichever is lower.

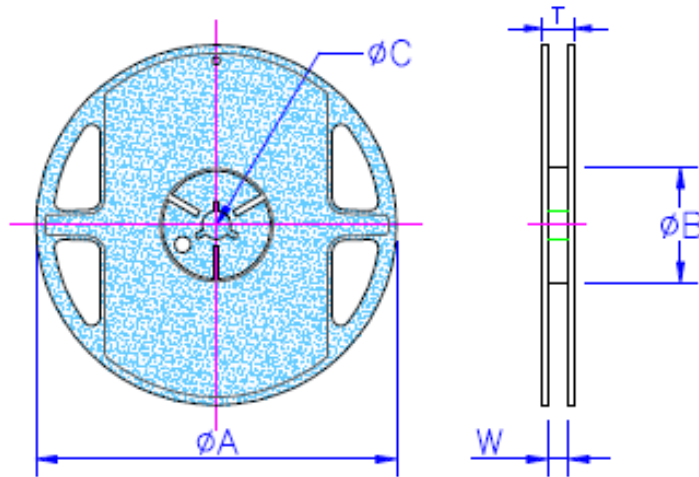
Note: Storage Temperature: 25±3°C; Humidity < 80%RH.

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RCV Series

Packing Information:

Packaging Quantity & Reel Specifications



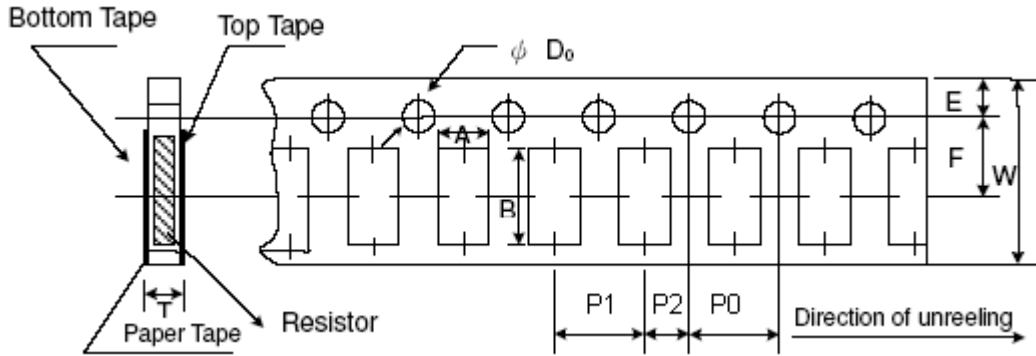
Unit: mm

Type	Packaging Qty.	Tape Width	Reel Diameter	ΦA	ΦB	ΦC	W	T
RCV0402	10K	8mm	7inch	178.5 ± 1.5	$60.0 + 1.0$	13.0 ± 0.2	9.0 ± 0.5	12.5 ± 0.5
	20K		10inch	254.0 ± 1.0	100.0 ± 0.5	13.0 ± 0.2	9.5 ± 0.5	13.5 ± 0.5
	40K		13inch	330.0 ± 1.0	100.0 ± 0.5	13.0 ± 0.2	9.5 ± 0.5	13.5 ± 0.5
RCV0603	5K		7inch	178.5 ± 1.5	$60.0 + 1.0$	13.0 ± 0.2	9.0 ± 0.5	12.5 ± 0.5
RCV0805	10K		10inch	254.0 ± 1.0	100.0 ± 0.5	13.0 ± 0.2	9.5 ± 0.5	13.5 ± 0.5
RCV1206	20K		13inch	330.0 ± 1.0	100.0 ± 0.5	13.0 ± 0.2	9.5 ± 0.5	13.5 ± 0.5
RCV2010 RCV2512	4K	12mm	7inch	178.5 ± 1.5	$60.0 + 1.0$	13.0 ± 0.5	13.0 ± 0.5	15.5 ± 0.5
	8K		10inch	250.0 ± 1.0	62.0 ± 0.5	13.0 ± 0.5	12.5 ± 0.5	16.5 ± 0.5

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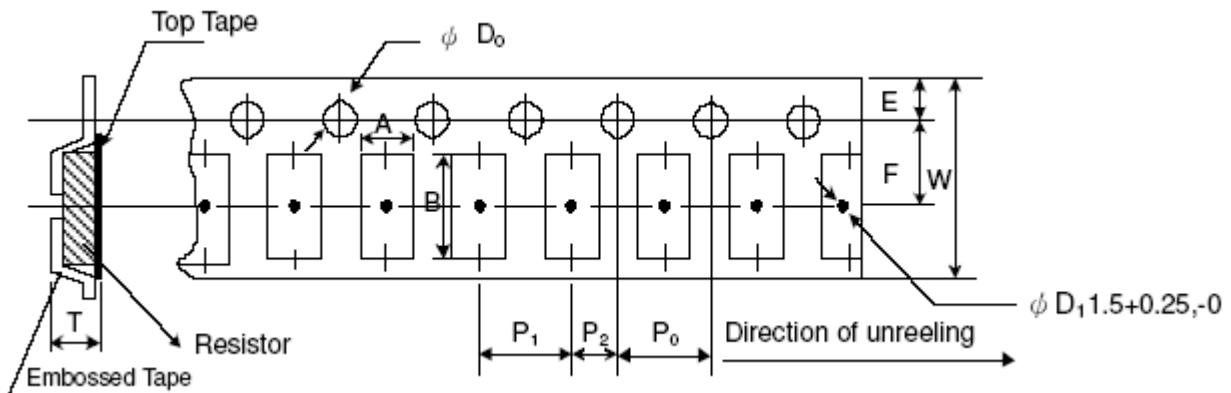
Paper Tape Dimensions



Unit: mm

Type	A	B	W	E	F	P0	P1	P2	$\psi D0$	T
RCV0402	0.65±0.1	1.15±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.5+0.1/-0	0.45±0.1
RCV0603	1.10±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1/-0	0.70±0.1
RCV0805	1.60±0.1	2.40±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1/-0	0.85±0.1
RCV1206	1.90±0.1	3.50±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1/-0	0.85±0.1

Embossed Plastic Tape Specification



Unit: mm

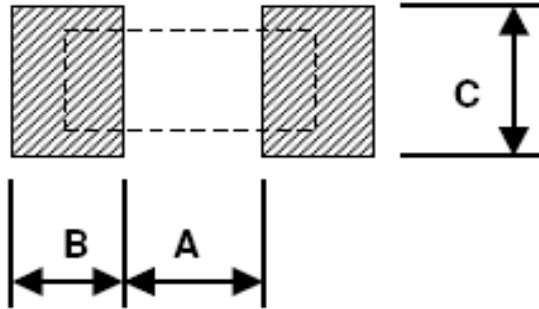
Type	A	B	W	E	F	P0	P1	P2	$\psi D0$	T
RCV2010	2.80±0.1	5.50±0.1	12.0±0.3	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	1.2+0
RCV2512	3.50±0.1	6.70±0.1	12.0±0.3	1.75±0.1	5.5±0.05	4.0±0.1	4.0±0.1	2.0±0.05	1.5+0.1/-0	1.2+0

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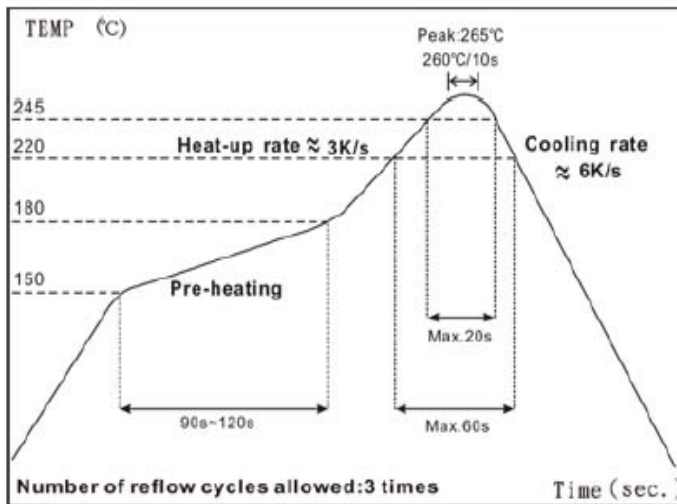
Recommend Soldering PAD

Unit: mm

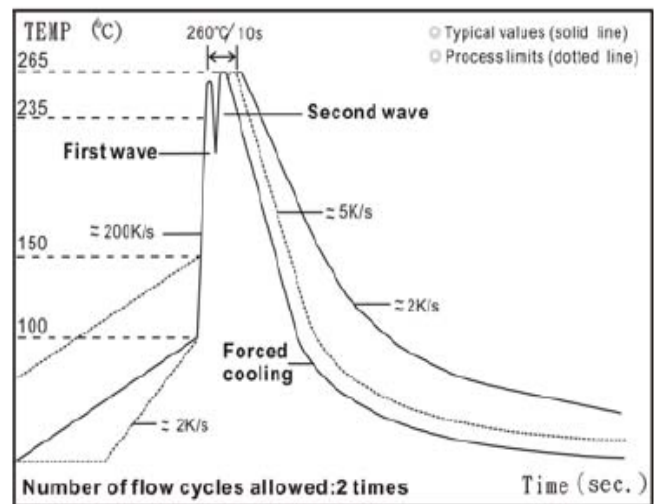


Type	A	B	C
RCV0402	0.50	0.45	0.60
RCV0603	0.90	0.60	0.90
RCV0805	1.20	0.70	1.30
RCV1206	2.00	0.90	1.60
RCV2010	3.80	0.90	2.80
RCV2512	3.80	1.60	3.50

Soldering Condition



IR Reflow Soldering



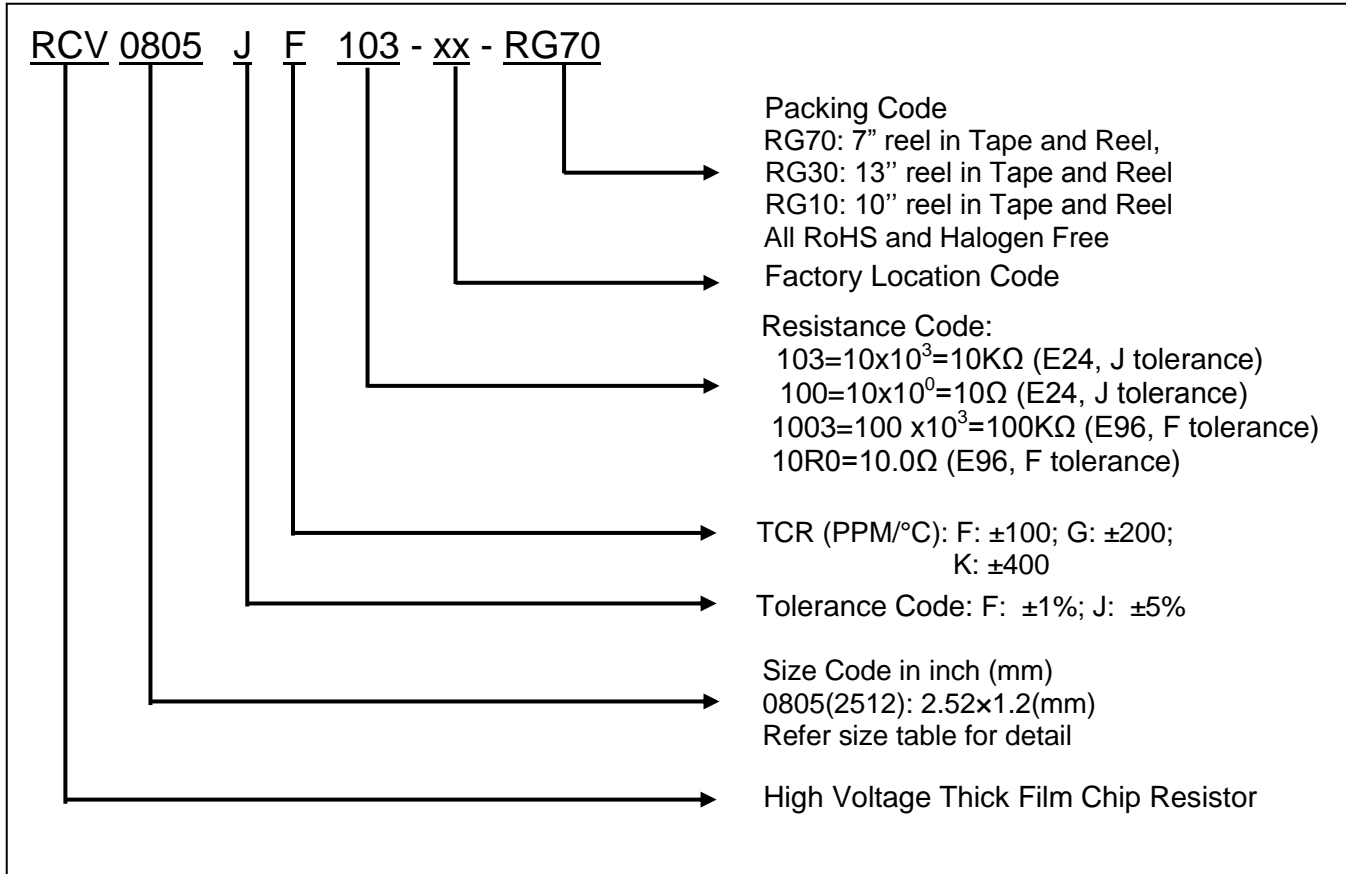
Wave Soldering (Flow Soldering)

- (1) Time of IR reflow soldering at maximum temperature point 260°C : 10s
- (2) Time of wave soldering at maximum temperature point 260°C : 10s
- (3) Time of soldering iron at maximum temperature point 410°C : 5s

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How to Order



High Voltage Thick Film Chip Resistor

RCV Series

How to contact us

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