Thick Film Chip Resistor – High Power

Features

- Small Size and light weight
- Highly reliable multilayer electrode construction
- Excellent performance at high Power
- Suitable size and packing for surface mount assembly
- Suitable for all soldering process
- RoHS Compliant and Halogen Free

RoHS Compliant

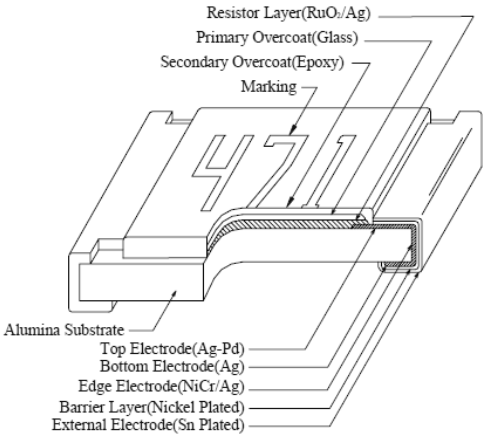
HALOGEN FREE

Applications

- Switching power supply, Converter
- Battery Charger
- LCD/LCD-TV,Laptop,Computer
- Automotive industry
- High pulse equipment

Constructions

- The resistor is constructed on the alumina substrate body.
- Top electrodes are added to each end and connected with resistive paste on top surface of the alumina substrate.
- The resistive layer is made by resistive paste that is prepared to approach the nominal value.
- Laser trimming process makes the resistance meet the Nominal value
- The resistive layer is protected by primary overcoat and secondary overcoat.
- The barrier layer is added to edge electrodes for platting with external electrode,making the resistor easily mounted on the PCB



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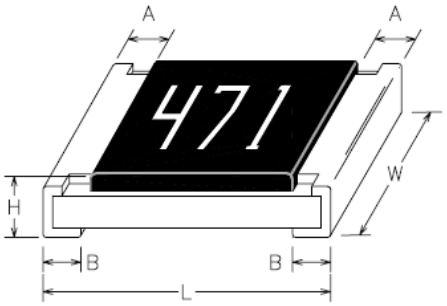
Dimensions (in mm)



Type	Size Inch (mm)	L	W	H	A	B	Average Weight
RCW0402	0402(1005)	1.00 ± 0.05	0.50± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.20 ± 0.10	0.620 mg
RCW0603	0603(1608)	1.60 ± 0.10	0.80± 0.10	0.45 ± 0.10	0.30 ± 0.20	0.30 ± 0.20	2.042 mg
RCW0805	0805(2012)	2.00 ± 0.10	1.25± 0.10	0.50 ± 0.10	0.35 ± 0.20	0.40 ± 0.20	4.368 mg
RCW1206	1206(3216)	3.10 ± 0.10	1.55± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20	8.947 mg
RCW1210	1210(3225)	3.2 ± 0.10	1.55± 0.10	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.20	15.969 mg
RCW2010	2010(5025)	5.00 ± 0.20	2.50± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	24.241 mg
RCW2512	2512(6432)	6.35 ± 0.20	3.20± 0.15	0.55 ± 0.10	0.60 ± 0.25	0.50 ± 0.20	39.448 mg

Marking Information

1. RCW0402 is without marking due to the size is too small.
2. RCW0603~RCW2512:
   2.1.E24 series:±5% (J), 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. E96 series,±1% (F),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.E96 series with special marking code for 0603 Size, ±1%,see below table (Page 8).

No Marking
Item1

683 = 68x10^3 Ω
= 68KΩ
Item2.1

6812 = 681x10^2
= 68.1KΩ
Item2.2

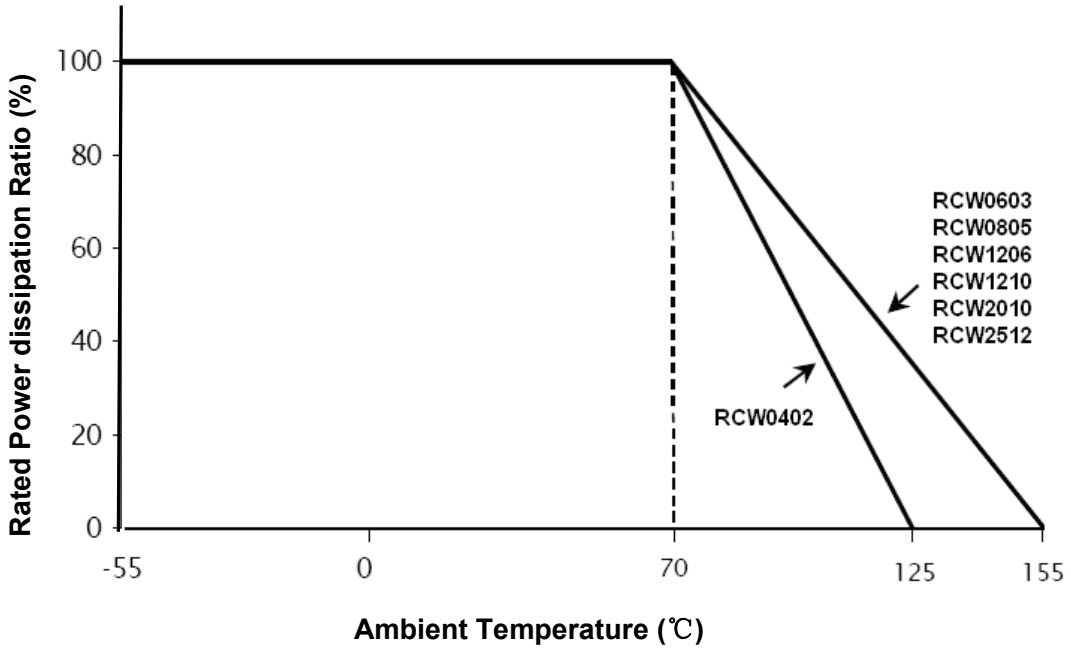
49X=316 x10^{-1}
=31.6Ω
Item 2.3

Absolute Maximum Ratings & Electrical Characteristics

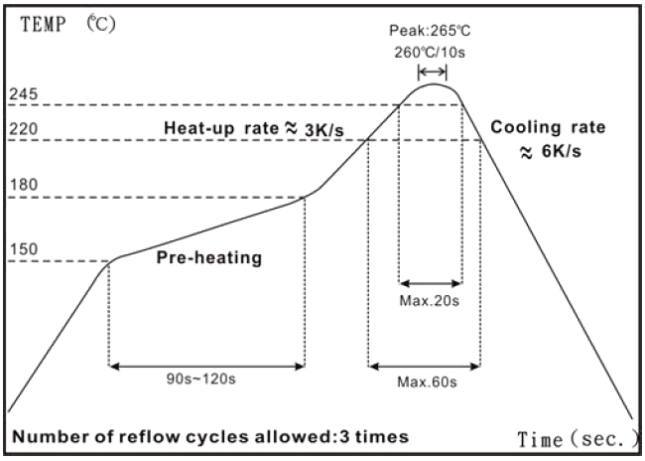
Type	Size Inch (mm)	Tolerance (E24&E96)	Power Rating @70˚C	MAX. Working Voltage	MAX. Overload Voltage	TCR (ppm/℃)		Resistance Range	Operating Temperature Range
RCW0402	0402(1005)	J: ±5% F: ±1%	1/10W	50V	100V	±1500 ±1200 ±800 ±500 ±200 ±100 ±200	0.01Ω ~ 0.018Ω 0.02Ω ~ 0.047Ω 0.05Ω ~ 0.099Ω 0.1Ω ~ 0.499Ω 0.5Ω ~ 9.76Ω 10Ω ~ 1MΩ 1.02MΩ ~ 10MΩ	0.05Ω~10MΩ	-55℃~+125℃
RCW0603	0603(1608)		1/8W	50V	100V			0.02Ω~10MΩ	-55℃~+155℃
RCW0805	0805(2012)		1/4W	150V	300V			0.01Ω~10MΩ	
RCW1206	1206(3216)		1/3W	200V	400V				
RCW1210	1210(3225)		1/2W	200V	400V	±1500 ±800 ±200 ±100 ±200	0.01Ω ~ 0.018Ω 0.02Ω ~ 0.099Ω 0.1Ω ~ 9.76Ω 10Ω ~ 1MΩ 1.02MΩ ~ 10MΩ		
RCW2010	2010(5025)		1W	200V	400V				
RCW2512	2512(6432)		2W	250V	500V				

Power Derating Curve

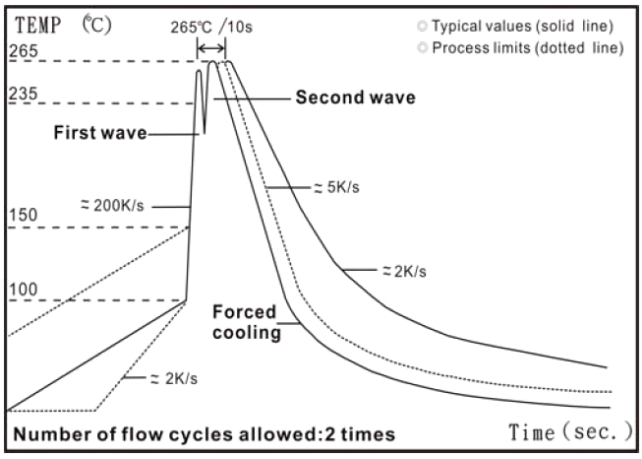
For resistors operate in the ambient temperature over 70˚C, loading power ratio will derate in accordance with following curve.



Soldering Condition



IR Reflow soldering



Wave soldering (flow soldering)

Test and Requirements

Test Item	Test Method	Test Condition	Requirement	
			±1%	±5%
Temperature Coefficient of Resistance(T.C.R.)	JIS C 5201 4.8 IEC 60115-1 4.8	-55°C~+155°C,20°C is the reference temperature	Within the specification	
Short Time Overload	JIS C 5201 4.13 IEC 60115-1 4.13	2.5 times Vw or max. overload voltage for 5 seconds	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)
Insulation Resistance	JIS C 5201 4.6 IEC 60115-1 4.6	Max. overload voltage for 1 minute	≥10G	
Voltage Proof	JIS C 5201 4.7 IEC 60115-1 4.7	1.42 times Vw (RMS) for 1 minute	no breakdown or flashover	
Substrate Bending Test	JIS C 5201 4.33 IEC 60115-1 4.33	Bending once for 5 seconds 2010,2512 size :2 mm;other size:3mm	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)
Resistance to soldering heat	JIS C 5201 4.18 IEC 60115 4.18	260±5°C for 10 seconds	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)
Leaching	JIS C 5201 4.18 IEC 60115 4.18	260±5°C for 30 seconds	Individual Learning area <=5% and total learning area<=10%	
Solderability	JIS C 5201 4.17 IEC 60115-1 4.17	245±3°C for 2 seconds.	>95% coverage	
Endurance at upper category temperature	JIS C 5201 4.23 IEC 60115-1 2.23.2	at +125°C /+155°C for 1000 hrs	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)
Rapid change of temperature	JIS C 5201 4.19 IEC 60115-1 4.19	-55°C to +125°C/+155°C, 5 cycles	±(0.5%+0.05Ω)	±(1.0%+0.05Ω)

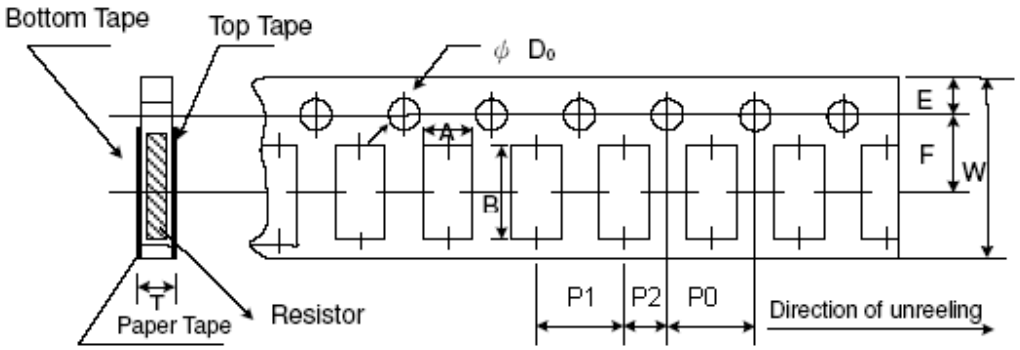
Damp heat with load	JIS 5201 4.24	40±2°C, 90~95% R.H. or max. working voltage for 1000 hrs with 1.5hrs "ON" and 0.5 hrs "OFF"	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)
Endurance	JIS C 5201 4.25 IEC 60115-1 4.25.1	70±2°C, Vw or Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"	±(2.0%+0.10Ω)	±(3.0%+0.10Ω)

Note: Vw：Rated Continuous Working Voltage.

$Vw = \sqrt{\text{Rated power (P)} \times \text{Resistance value (R)}}$

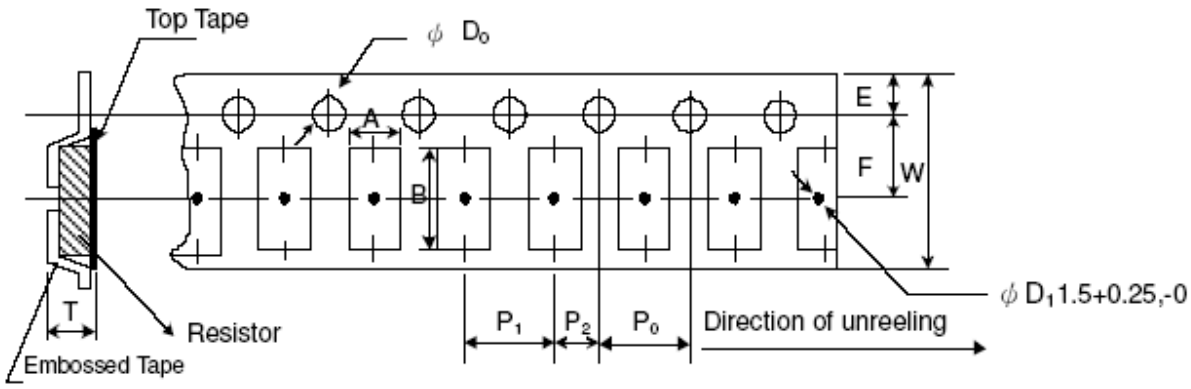
Packing Information:

Carrier Tape Dimensions (in mm)



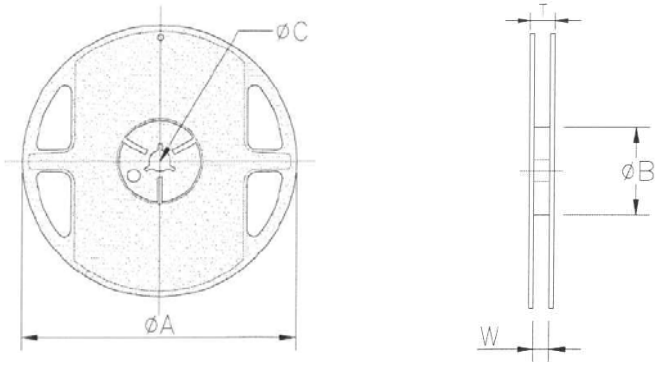
Type	A	B	W	E	F	P0	P1	P2	ψD0	T
RCW0402	0.65±0.1	1.15±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	2.0±0.05	2.0±0.05	1.5+0.1/-0	0.45±0.1
RCW0603	1.10±0.1	1.90±0.1	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1/-0	0.70±0.1
RCW0805	1.60±0.1	2.40±0.2	8.0±0.2	1.75±0.1	3.5±0.05	4.0±0.1	4.0±0.05	2.0±0.05	1.5+0.1/-0	0.85±0.1
RCW1206	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
RCW1210	2.80±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 Dimensions (in mm)



Type	A	B	W	E	F	P0	P1	P2	ψD0	T
RCW2010	2.80±0.2	5.50±0.2	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	Max1.2
RCW2512	3.50±0.2	6.70±0.2	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	Max1.2

Reel Dimensions (in mm)



Type	Reel Diameter	Reel Quantity	ψA	ψB	ψC	W	T
RCW0402	7”	10000	180+0/-3	60+1/-0	13.0±0.2	9.0±0.5	12.5±0.5
RCW0603		5000					
RCW0805							
RCW1206							
RCW1210							
RCW2010		4000	180+0/-3	60+1/-0	13.0±0.5	13.0±0.5	15.5±0.5
RCW2512							

Carton Information

Type	PCS per Carton	Carton Size
RCW0402	600,000	400X400X200 (in mm)
RCW0603 RCW0805 RCW1206 RCW1210	300,000	
RCW2010 RCW2512	192,000	

Recommend Soldering PAD (in mm)

Type	A	B	C	I
RCW0402	1.40	0.60	0.45	0.50
RCW0603	2.10	0.90	0.60	0.90
RCW0805	2.60	1.30	0.70	1.20
RCW1206	3.80	1.60	0.90	2.00
RCW1210	3.80	2.80	0.90	2.00
RCW2010	5.60	2.80	0.90	3.80
RCW2512	7.00	3.50	1.60	3.80

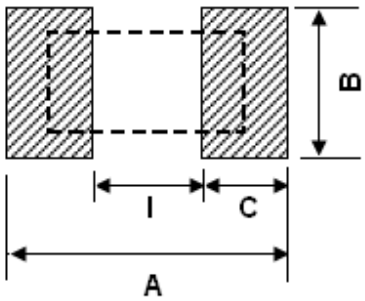


Table - E-96 series Special marking code (±1% ,0603 Size)

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

This table shows the first two digits for the three-digit EIA-96 part marking scheme.
The third character is the letter of multiplier: Y=10^{-2} X=10^{-1} A=10^{0} B=10^{1} C=10^{2} D=10^{3} E=10^{4} F=10^{5}

How to Order

RCW 0805 J 103 - xx - RG70

- RG70 → Packing Code: RG70: 7"reel in Tape and Reel, RoHS and Halogen Free
- xx → Factory Location Code
- 103 → Resistance Code: 103=10x10^{3}=10KΩ (E24); 1242=124x10^{2}=12.4KΩ (E96)
- J → Tolerance Code: J: ±5%; F: ±1%
- 0805 → Size Code in inch(mm): 0805(2512): 2.52×1.2(mm) Refer Size table for detail
- RCW → Thick Film Chip Resistor – High Power

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