No.: RGC-K-HTS-0001 /13

Date: 2022. 12. 31

Data sheet

Title: FIXED THICK FILM CHIP RESISTORS; RECTANGULAR TYPE &

PRECISION

Style: RGC1/20,1/16S,1/16,1/10,1/8

RoHS COMPLIANCE ITEM Halogen and Antimony Free

Note: •Stock conditions

Temperature: $+5^{\circ}\text{C} \sim +35^{\circ}\text{C}$ Relative humidity: $25\% \sim 75\%$

The period of guarantee: Within 2 year from shipment by the company.

Solderability shall be satisfied.

- Product specification contained in this data sheet are subject to change at any time without notice.
- •If you have any questions or a Purchasing Specification for any quality agreement is necessary, please contact our sales staff.



Hokkaido Research Center Approval by: T. Sannomiya Drawing by: M. Shibuya

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FIXED THICK FILM CHIP RESISTORS; RECTANGULAR TYPE & PRECISION

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1. Scope

1.1 This data sheet covers the detail requirements for fixed thick film chip resistors; rectangular type & precision, style of RGC1/20,1/16S,1/16,1/10,1/8.

1.2 Applicable documents

JIS C 5201-1: 2011, JIS C 5201-8: 2014, JIS C 5201-8-1: 2014 IEC60115-1: 2008, IEC60115-8: 2009, IEC60115-8-1: 2014 EIAJ RC-2134C-2010

2. Classification

Type designation shall be the following form.

(Example)

RGC	1/8	C	123	D	TP
1	2	3	4	5	6
Sty	/le				

- 1 Fixed thick film chip resistors; rectangular type & precision
- Style 2 Rated dissipation and / or dimension
- 3 Temperature coefficient of resistance

K	±100×10 ⁶ / °C
С	±50×10∜°C

4 Rated resistance

123	E24 Series, 3 digit,	Ex. 123> 12kΩ,
1000	E96 Series, 4 digit,	Ex. 1000>100Ω
		1022> 10.2kΩ

5 Tolerance on rated resistance

В	±0.1%
D	±0.5%
F	±1%

6 Packaging form

В	Bulk (loose package)	
PA	Press pocket taping	
TH	Don ou tonin u	
TP	Paper taping	

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3. Rating

3.1 The ratings shall be in accordance with Table-1.

Table-1

Chilo	Rated	Temperatur	e coefficient of	Rated resistance	Preferred number	Tolerance on rated
Style	dissipation (W)	resistano	e (10⁴ / °C)	$range(\Omega)$	series for resistors	resistance
DCC1/20	0.05	С	±50	1k~1M	E24.06	B(±0.1%),
RGC1/20	0.05	K	±100	51~976	E24,96	D(±0.5%)
		С	±50	100~1M		B(±0.1%),
RGC1/16S	0.063	K	.100	1.02M~3.3M	E24,96	D(±0.5%)
		N.	±100	10~97.6		F(±1%)
		С	± 50	100~1M		B(±0.1%),
DCC1/16	0.1			1.02M~3.3M	E24.06	D(±0.5%)
RGC1/16	0.1	K	±100	10~97.6	E24,96	F(±1%)
				3.3~9.76		D(±0.5%)F(±1%)
						B(±0.1%),
RGC1/10	0.125	С	± 50	10~3.3M	E24,96	D(±0.5%)
INGC 1/10	0.123	C	± 30		L24,30	F(±1%)
				3.3~9.76		D(±0.5%)F(±1%)
						B(±0.1%),
RGC1/8	0.25	С	± 50	10~4.7M	E24,96	D(±0.5%)
1.001/0	0.20		± 50		L24,90	F(±1%)
				3.3~9.76		F(±1%)

Style	Limiting element voltage (V)	Insulation voltage (V)	Category temperature range(°C)
RGC1/20	25	50	• , ,
RGC1/16S	F0		
RGC1/16	50	100	<i>–</i> 55~+155
RGC1/10	150	100	
RGC1/8	200		

3.2 Climatic category

55/155/56 Lower category temperature -55 °C

> +155 °C Upper category temperature Duration of the damp heat, steady state test 56days

3.3 Stability class

2% Limits for change of resistance:

> -for long-term tests $\pm (2\% + 0.1\Omega)$

> > *RGC1/20: ±(3%+0.1Ω)

-for short-term tests $\pm (0.5\% + 0.05\Omega)$

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3.4 Derating

The derated values of dissipation at temperature in excess of 70 °C shall be as indicated by the following curve.

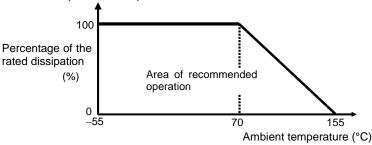


Figure-1 Derating curve

3.5 Rated voltage

d.c.or a.c.r.m.s.voltage calculated from the square root of the product of the rated resistance and the rated dissipation.

$$E = \sqrt{P \cdot R}$$

E: Rated voltage (V)

P: Rated dissipation (W)

R: Rated resistance (Ω)

Limiting element voltage can only be applied to resistors when the resistance value is equal to or higher than the critical resistance value.

At high value of resistance, the rated voltage may not be applicable.

4. Packaging form

The standard packaging form shall be in accordance with Table-2.

Table-2

Symbol	Packaging form		Standard packaging quantity / units	Application
В	Bulk (loose package)		1,000 pcs.	RGC1/20,1/16S,1/16,1/10,1/8
PA	Press pocket taping (paper taping)	8mm width, 2mm pitches	15,000 pcs.	RGC1/20
TH	Paper taping	8mm width, 2mm pitches	10,000 pcs.	RGC1/16S
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.	RGC1/16, 1/10, 1/8

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5. Dimensions

5.1 The resistor shall be of the design and physical dimensions in accordance with Figure–2 and Table–3.

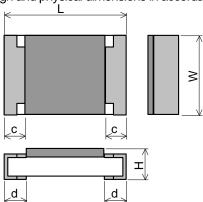


Figure-2

Table-3 Unit: mm

Style	L	W	Н	С	d
RGC1/20	0.6±0.03	0.3±0.03	0.23±0.03	0.1±0.05	0.15±0.05
RGC1/16S	1.0±0.05	0.5±0.05	0.35±0.05	0.2±0.1	$0.25^{+0.05}_{-0.10}$
RGC1/16	1.6±0.1	$0.8^{+0.15}_{-0.05}$	0.45±0.10	0.25±0.10	0.3±0.1
RGC1/10	2.0±0.1	1.25±0.10	0.6±0.1	0.4±0.2	0.4±0.2
RGC1/8	3.1±0.1	1.6±0.15	0.6±0.1	0.5±0.25	0.5±0.25

5.2 Net weight (Reference)

Style	Net weight(mg)
RGC1/20	0.16
RGC1/16S	0.6
RGC1/16	2
RGC1/10	5
RGC1/8	9

6. Marking

The Rated resistance shall be marked in 3 digits (E24) or 4 digits (E96) and marked on over coat side.

• E24 series: 3 digits, E96 series: 4 digits

In case of the resistance value that E96 overlaps with E24, It is marked by either.

The Rated resistance of RGC1/16 should not be marked in 4 digits.

The Rated resistance of RGC1/20.1/16S should not be marked.

Marking example	Contents	Application				
123	12×10 ³ $[\Omega] \rightarrow$ 12 $[k\Omega]$	RGC1/16,1/10,1/8				
3R3	3.3 [Ω]	Less than 10Ω of RGC1/16,1/10,1/8				
5623	$562\times10^{3} [\Omega] \rightarrow 562[k\Omega]$	RGC1/10,1/8				
12R7	12.7 [Ω]	RGC1/10,1/8				

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7. Performance

7.1 The standard condition for tests shall be in accordance with Sub-clause 4.2, JIS C 5201–1: 2011.

7.2 The performance shall be satisfied in Table-4.

Table 4(1)

1 Visual examination Sub-clause 4.4.1 As in 4.4.1	e requirements
	all be legible, as
checked by visual	
	Table-3 of this
Resistance Sub-clause 4.5 specification. As in 4.5.2	
Resistance Sub-clause 4.5 As in 4.5.2 The resistance	e value shall
	he rated resistance
	ount the specified
tolerance.	Jank uno opcomou
3 Voltage proof Sub-clause 4.7 No breakdown or f	flash over
Method: 4.6.1.4(See Figure–5)	
Test voltage: Alternating voltage with a peak	
value of 1.42 times the insulation voltage.	
Duration: 60 s ± 5 s	
Insulation resistance $R \ge 1 G \Omega$	
Test voltage: Insulation voltage	
Duration: 1 min.	
4 Solderability Sub-clause 4.17 As in 4.17.4.5	ما المطاه
	shall be covered and bright solder
non-activated soldering flux for 2s. coating.	and bright solder
Bath temperature: 235 °C ± 5 °C	
Immersion time: 2 s ± 0.5 s	
5 Mounting Sub-clause 4.31	
Substrate material: Epoxide woven glass	
Test substrate: Figure–3	
Overload Sub-clause 4.13	
(in the mounted state) The applied voltage shall be 2.5 times the	
rated voltage or twice the limiting element	
voltage, whichever is the less severe.	
Duration: 2 s	
Visual examination No visible damage	a a
Resistance Sub-clause 4.30 \triangle R \leq ± (1%+0.05)	
Solvent resistance of the Solvent: 2-propanol Legible marking	<i>322,</i>
marking Solvent temperature: 23 °C ± 5 °C	
Method 1	
Rubbing material: cotton wool	
Without recovery	

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Table-4(2)

No	Test items	Condition of test (JIS C 5201–1)	Performance requirements	
6	Mounting	Sub-clause 4.31	·	
		Substrate material: Epoxide woven glass		
		Test substrate: Figure 4		
	Bound strength of the end	Sub-clause 4.33		
	face plating	Bent value: 3 mm		
		Resistance	$\Delta R \le \pm (0.5\% + 0.05\Omega)$	
	Final measurements	Sub-clause 4.33.6		
		Visual examination	No visible damage	
7	Resistance to soldering heat	Sub-clause 4.18		
		Solder temperature: 260 °C ± 5 °C		
		Immersion time: 10 s ± 0.5 s		
		Visual examination	As in 4.18.3.4	
			No sign of damage such as cracks.	
		Resistance	$\Delta R \leq \pm (0.5\% + 0.05\Omega)$	
	Component solvent	Sub-clause 4.29		
	resistance	Solvent: 2-propanol		
		Solvent temperature: 23 °C ± 5 °C		
		Method 2		
		Recovery: 48 h		
		Visual examination	No visible damage	
		Resistance	$\Delta R \le \pm (0.5\% + 0.05\Omega)$	
8	Mounting	Sub-clause 4.31		
		Substrate material: Epoxide woven glass		
	A III. a a ta a	Test substrate: Figure–3		
	Adhesion	Sub-clause 4.32		
		Force: 5 N(RGC1/20: 3N)		
		Duration: $10 \text{ s} \pm 1 \text{ s}$	No visible demose	
	Danid change temperature	Visual examination	No visible damage	
	Rapid change temperature	Sub-clause 4.19		
		Lower category temperature: -55 °C		
		Upper category temperature: +155 °C		
		Duration of exposure at each temperature: 30		
		min.		
		Number of cycles: 5 cycles.	No visible damage	
		Visual examination	$\Delta R \le \pm (0.5\% + 0.05\Omega)$	
		Resistance	△1 (□ □(0.0 / 0 0.00 ≤ 2)	

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Table-4(3)

No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
9	Climatic sequence	Sub-clause 4.23	
	-Dry heat	Test temperature: +155 °C	
	-	Duration: 16 h	
	-Damp heat, cycle	Sub-clause 4.23.3	
	(12+12hour cycle)	Test method: 2	
	First cycle	Test temperature: 55 °C	
		[Severity(2)]	
	-Cold	Sub-clause 4.23.4	
		Test temperature –55 °C	
		Duration: 2h	
	–Damp heat, cycle	Sub-clause 4.23.6	
	(12+12hour cycle)	Test method: 2	
	Remaining cycle	Test temperature: 55 °C	
		[Severity (2)]	
		Number of cycles: 5 cycles	
	–D.C. load	Sub-clause 4.23.7	
		The applied voltage shall be the rated voltage	
		or the limiting element voltage whichever is the	
		smaller.	
		Duration: 1 min.	No visible damage
		Visual examination	RGC1/20: $\Delta R \le \pm (3\% + 0.1\Omega)$
		Resistance	Others: $\Delta R \le \pm (3\%10.132)$
10	Mounting	Sub-clause 4.31	Ou 1013. Δ1 (Σ ± (Σ / 0 1 0 . 152)
'	Wodrang	Substrate material: Epoxide woven glass	
		Test substrate: Figure—3	
	Endurance at 70 °C	Sub-clause 4.25.1	
		Ambient temperature: 70 °C ± 2 °C	
		Duration: 1000 h	
		The voltage shall be applied in cycles of 1.5 h	
		on and 0.5 h.	
		The applied voltage shall be the rated voltage	
		or the limiting element voltage whichever is the	
		smaller.	
		Examination at 48 h, 500 h and	
		1000 h:	
		Visual examination	No visible damage
		Resistance	RGC1/20: Δ R ≤ ± (3%+0.1 Ω)
			Others: $\Delta R \le \pm (2\% + 0.1\Omega)$

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Table-4(4)

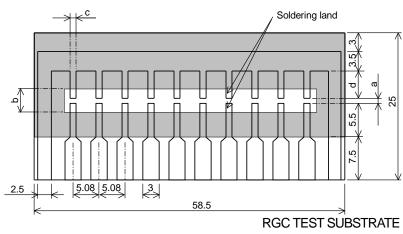
No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
11	Mounting Variation of resistance with temperature	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure–3 Sub-clause 4.8 +20 °C / +155°C	As in Table-1
12	Mounting Damp heat, steady state	Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure–3 Sub-clause 4.24 Ambient temperature: 40 °C ± 2 °C Relative humidity: 93+2/3 % a) 1st group: without voltage applied. b) 2nd group: The d.c.voltage shall be applied continuously. The voltage shall be accordance with Sub-clause 4.24.2.1 b). without polarizing voltage [4.24.2.1, c)] Visual examination Resistance	No visible damage Legible marking RGC1/20: $\Delta R \le \pm (3\%+0.1\Omega)$ Others: $\Delta R \le \pm (2\%+0.1\Omega)$
13	Dimensions (detail) Mounting Endurance at upper category temperature	Sub-clause 4.4.3 Sub-clause 4.31 Substrate material: Epoxide woven glass Test substrate: Figure-3 Sub-clause 4.25.3 Ambient temperature:155 °C ± 2 °C Duration: 1000 h Examination at 48 h, 500 h and 1000 h: Visual examination Resistance	As in Table–3 No visible damage RGC1/20: $\Delta R \le \pm (3\%+0.1\Omega)$ Others: $\Delta R \le \pm (2\%+0.1\Omega)$

:Copper clad

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8. Test substrate



:Solder resist Style b С d RGC1/20 0.3 1.5 0.45 5.2 **RGC1/16S** 0.6 1.9 0.7 4.9 RGC1/16 1.0 3.6 1.0 4.5

4.0

3.9

1.5

1.7

4.3

3.4

1.2

2.1

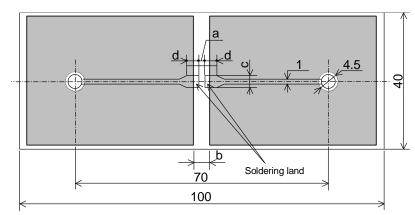
Unit: mm

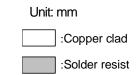
Figure-3

Remark 1). Material: Epoxide woven glass

Thickness: 1.6mm Thickness of copper clad: 0.035mm

2). In the case of connection by connector, the connecting terminals are gold plated. However, the plating is not necessary when the connection is made by soldering.





RGC1/10

RGC1/8

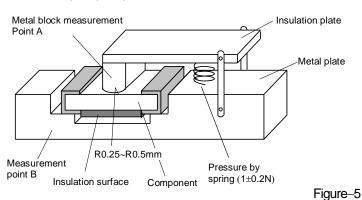
Style	а	b	С	d
RGC1/20	0.3	1.1	0.45	2.15
RGC1/16S	0.6	1.9	0.7	2.0
RGC1/16	1.0	3.6	1.2	3.0
RGC1/10	1.2	4.0	1.65	3.0
RGC1/8	2.5	5.0	2.0	2.5

RGC BOUND STRENGTH OF THE END FACE PLATING TEST SUBSTRATE Figure-4

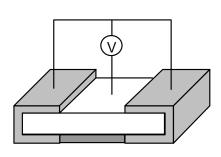
Remark 1). Material: Epoxide woven glass

Thickness: 1.6mm Thickness of copper clad: 0.035mm

• RGC1/16S,1/16,1/10,1/8



•RGC1/20



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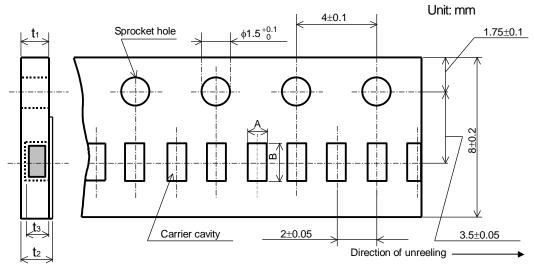
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9. Taping

- 9.1 Applicable documents JIS C 0806-3: 2014, EIAJ ET-7200C: 2010
- 9.2 Taping dimensions
- 9.2.1 Press pocket taping (Paper taping, 8mm width, 2mm pitches)

Taping dimensions shall be in accordance with Figure-6 and Table-5.



Figure—6					
Table-5					Unit: mm
Style	А	В	t ₁	t ₂	t ₃
RGC1/20	0.37±0.05	0.67±0.05	0.42±0.03	0.45±0.05	0.27±0.02

9.2.2 Paper taping (8mm width, 2mm pitches)

Taping dimensions shall be in accordance with Figure-7 and Table-6.

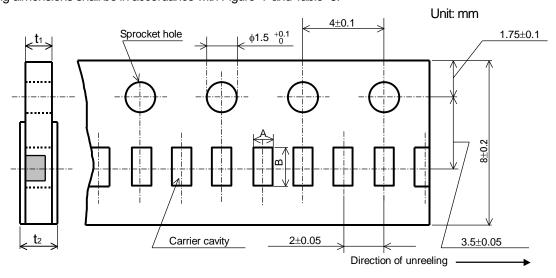


Figure-7 Table-6 Unit: mm Α В Style t 1 **RGC1/16S** $0.65^{+0.05}_{-0.10}$ $1.15^{+0.05}_{-0.10}$ 0.4 ± 0.05 0.5max.

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9.2.3 Paper taping (8mm width, 4mm pitches)

Taping dimensions shall be in accordance with Figure-8 and Table-7.

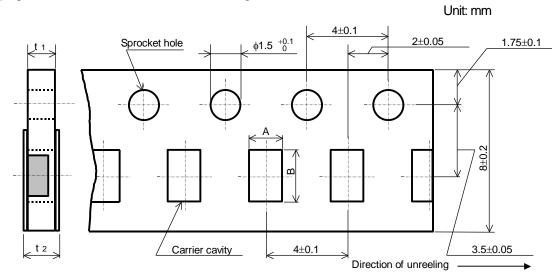
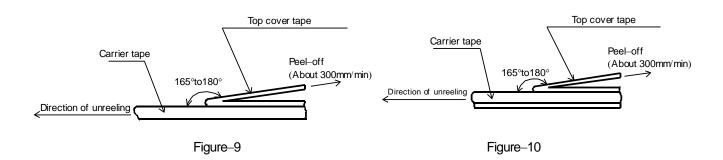


Figure-8

	Unit: mm			
Style	Α	В	t 1	t 2
RGC1/16	1.15 ± 0.15	1.9 ± 0.2	0.6 ± 0.1	0.8max.
RGC1/10	1.65 ± 0.15	2.5 ± 0.2	00.01	1.0mov
RGC1/8	2.00 ± 0.15	3.6 ± 0.2	0.8 ± 0.1	1.0max.

- 1). The cover tapes shall not cover the sprocket holes.
- 2). Tapes in adjacent layers shall not stick together in the packing.
- 3). Components shall not stick to the carrier tape or to the cover tape.
- 4). Pitch tolerance over any 10 pitches ±0.2mm.
- 5). The peel strength of the top cover tape shall be with in 0.1N to 0.5N on the test method as shown in the following RGC1/20: Figure–9, RGC1/16S, 1/16, 1/10, 1/8: Figure–10.
- 6). When the tape is bent with the minimum radius for 25 mm, the tape shall not be damaged and the components shall maintain their position and orientation in the tape.
- 7). In no case shall there be two or more consecutive components missing.

 The maximum number of missing components shall be one or 0.1%, whichever is greater.
- 8). The resistors shall be faced to upward at the over coating side in the carrier cavity.



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9.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-11 and Table-8.

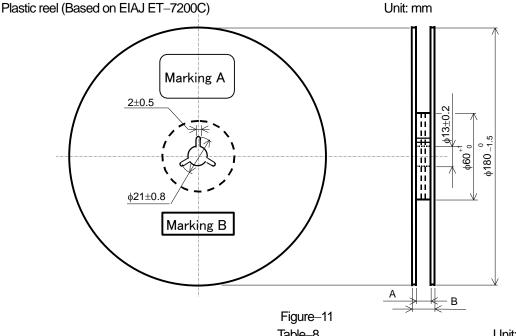


Table-8 Unit: mm В Note Α 11.4±1.0 Injection molding 9 +1.0 RGC1/20,1/16S,1/16,1/10,1/8 13±1.0 Vacuum forming

Note: Marking label shall be marked on a place of Marking A or two place of marking A and B.

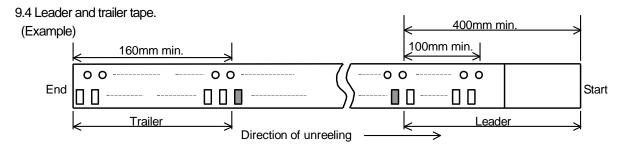


Figure-12

10. Marking on package

The label of a minimum package shall be legibly marked with follows.

Style

10.1 Marking A

(1) Classification

(Style, Temperature coefficient of resistance, Rated resistance, Tolerance on rated resistance, Packaging form)

(2) Quantity (3) Lot number (4) Manufacturer's name or trade mark

10.2 Marking B (KAMAYA control label)

单击下面可查看定价,库存,交付和生命周期等信息

>>Kamaya(釜屋电机)