No.: RPCH-K-HTS-0001 /2

Date: 2017.4.21

Data sheet

Title: FIXED THICK FILM CHIP RESISTORS; RECTANGULAR

TYPE AND HIGH POWER - ANTI SURGE

Style: RPCH16,20,32,35

AEC-Q200 qualified

RoHS COMPLIANCE ITEM Halogen and Antimony Free

Note: • Stock conditions

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

The period of guarantee: Within 2 year from shipmen t 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 No: RPCH-K-HTS-0001 /2

Title: FIXED THICK FILM CHIP RESISTORS; RECTANGULAR TYPE AND HIGH POWER · ANTI SURGE RPCH16,20,32,35 Page:

1. Scope

1.1 This data sheet covers the detail requirements for fixed thick film chip resistors; rectangular type & high power · anti surge, style of RPCH16,20,32,35.

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

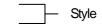
2. Classification

Type designation shall be the following form.

(Example)

RPCH	32	K	123	J	TP
1	2	3	4	5	6
Style	9				

1 Fixed thick film chip resistors; rectangular type & & high power · anti surge



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2 Rated dissipation and / or dimension

3 Temperature coefficient of resistance

K	±100×10 ⁻⁶ / °C
-(Dash)	Standard

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

D	±0.5%
F	±1%
J	±5%

6 Packaging form

В	Bulk (loose package)
TP	Paper taping
TE	Embossed taping

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3. Rating

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

Table-1

Style	Rated dissipation (W)		ture coefficient of nce (10°/°C)	Rated resistance range (Ω)	Preferred number series for resistors	Tolerance on rated resistance
			±100	10~1M	E24, 96	D(±0.5%),
RPCH16	0.33	Standard	±200	1.0~9.76	L2 4 , 90	F(±1%)
RECHIO	0.33	K	±100	10~1M	E24	I/± E 0/\
		Standard	±200	1.0~9.1	C24	J(±5%)
		K	±100	10~1M	E24, 96	D(±0.5%),
DDCH30	0.5	Standard	±200	1.0~9.76	E24, 90	F(±1%)
RPCH20	RPCH20 0.5	K	±100	10~1M	E24	I/±E0/\
	Standard	±200	1.0~9.1	E24	J(±5%)	
		K	±100	10~1M	E24, 96	D(±0.5%),
RPCH32	0.66	Standard	±200	1.0~9.76	⊏24, 90	F(±1%)
RPCH32	0.66	K	±100	10~1M	F24	1/150/
		Standard ±200	1.0~9.1	E24	J(±5%)	
DDCI los		K	±100	10~1M	E24, 96	D(±0.5%),
	0.75	Standard	±200	1.0~9.76		F(±1%)
RPCH35	0.75	K	±100	10~1M	F04	1/+50/)
		Standard	±200	1.0~9.1	E24	J(±5%)

Style	Limiting element voltage (V)	Isolation voltage (V)	Category temperature range(°C)
RPCH16	150	150	
RPCH20			FE .4FE
RPCH32	200	500	<i>–</i> 55∼+155
RPCH35			

3.2 Climatic category

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

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

3.3 Stability class

5% Limits for change of resistance:

> -for long-term tests $\pm (5\% + 0.1\Omega)$ $\pm (1\% + 0.05\Omega)$ -for short-term tests

3.4 Derating

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

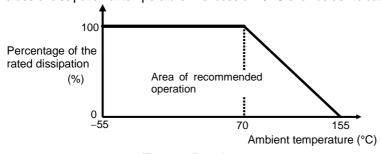


Figure-1 Derating curve

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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	ol Packaging form		Standard packaging quantity / units	Application
В	Bulk (loose package)		1,000 pcs.	RPCH16,20,32,35
TP	Paper taping	8mm width, 4mm pitches	5,000 pcs.	RPCH16,20,32
TE	Embossed taping	8mm width, 4mm pitches	4,000 pcs.	RPCH35

5. Dimensions

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

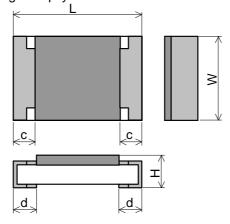


Figure-2

Table-3

Unit: mm

Style	L	W	Н	С	d
RPCH16	1.6±0.1	0.8 +0.15 -0.05	0.45±0.10	0.3±0.2	0.3±0.1
RPCH20	2.0±0.1	1.25±0.10	0.55±0.10	0.3±0.2	0.4±0.2
RPCH32	3.1±0.1	1.6±0.15	0.55±0.10	0.4±0.25	0.5±0.25
RPCH35	3.1±0.15	2.5±0.15	0.55±0.15	0.4±0.25	0.5±0.25

5.2 Net weight (Reference)

Style	Net weight(mg)
RPCH16	2
RPCH20	5
RPCH32	9
RPCH35	16

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6. Marking

Resistor

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 RPCH16 should not be marked in 4 digits(E96)

Marking example	Contents	Application
123	$12\times10^3 \ [\Omega] \rightarrow 12 \ [k\Omega]$	E24(RPCH16,20,32,35)
2R2	2.2 [Ω]	E24(RPCH 16,20,32,35)
5623	$562 \times 10^3 \ [\Omega] \rightarrow 562 \ [k\Omega]$	E96(RPCH 20,32,35)
12R7	12.7 [Ω]	E96(RPCH 20,32,35)

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)

		Table—4(T)	
No.	Test items	Condition of test (JIS C 5201–1)	Performance requirements
1	Visual examination	Sub-clause 4.4.1	As in 4.4.1
		Checked by visual examination.	The marking shall be legible, as
			checked by visual examination.
2	Dimension	Sub-clause 4.4.2	As specified in Table-3 of this
			specification.
	Resistance	Sub-clause 4.5	As in 4.5.2
			The resistance value shall
			correspond with the rated resistance
			taking into account the specified
			tolerance.
3	Voltage proof	Sub-clause 4.7	
		Method: 4.6.1.4	No breakdown or flash over
		Test voltage: Alternating voltage with a peak	
		value of 1.42 times the insulation	
		voltage.	
		Duration: 60 s ± 5 s	D: 100
		Insulation resistance	R≥1GΩ
		Test voltage: Insulation voltage	
	Oaldanal W	Duration: 1 min.	A
4	Solderability	Sub-clause 4.17	As in 4.17.4.5
		Without ageing	The terminations shall be covered
		Flux: The resistors shall be immersed in a	with a smooth and bright solder
		non–activated soldering flux for 2s.	coating.
		Bath temperature: 235 °C ± 5 °C	
		Immersion time: 2 s ± 0.5 s	

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Table-4(2)

No	Test items	Condition of test (JIS C 5201–1) Performance requi		
5	Mounting	Sub-clause 4.31	·	
		Substrate material: Epoxide woven glass		
		Sub-clause 4.13		
	Overload	The applied voltage shall be 2.5 times the rated		
	(in the mounted state)	voltage or twice the limiting element voltage,		
		whichever is the less severe.		
		Duration: 2 s		
		Visual examination	No visible damage	
		Resistance	$\Delta R \le \pm (1\% + 0.05\Omega)$	
	Solvent resistance of the	Sub-clause 4.30	Legible marking	
	marking	Solvent: 2-propanol		
		Solvent temperature: 23 °C ± 5 °C		
		Method 1		
		Rubbing material: cotton wool		
		Without recovery		
6	Mounting	Sub-clause 4.31		
		Substrate material: Epoxide woven glass		
	Bound strength of the end	Sub-clause 4.33		
	face plating	Bent value: 3 mm		
		Resistance	$\Delta R \leq \pm (1\% + 0.05\Omega)$	
	Final measurements	Sub-clause 4.33.6	No visible damage	
		Visual examination	G	
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	$\Delta R \le \pm (1\% + 0.05\Omega)$	
	Component solvent resistance	Sub-clause 4.29		
		Solvent: 2-propanol		
		Solvent temperature: 23 °C ± 5 °C		
		Method 2		
		Recovery: 48 h		
		Visual examination	No visible damage	
		Resistance	$\Delta R \le \pm (1\% + 0.05\Omega)$	

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Table-4(3)

NI-	Took !to	1able -4(3)	Doubourson as an ilusius and
No	Test items	Condition of test (JIS C 5201–1)	Performance requirements
8	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Adhesion	Sub-clause 4.32	
		Force: 5 N	
		Duration: 10 s ± 1 s	
		Visual examination	
	Rapid change temperature	Sub-clause 4.19	No visible damage
		Lower category temperature:-55 °C	
		Upper category temperature:+155 °C	
		Duration of exposure at each temperature:	
		30 min.	
		Number of cycles: 5 cycles.	
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (1\% + 0.05\Omega)$
9	Climatic sequence	Sub-clause 4.23	
	-Dry heat	Sub-clause 4.23.2	
		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)]	
		Sub-clause 4.23.4	
	-Cold	Test temperature –55 °C	
		Duration: 2h	
		Sub-clause 4.23.6	
	-Damp heat, cycle	Test method: 2	
	(12+12hour cycle)	Test temperature: 55 °C	
	Remaining cycle	[Severity (2)]	
	3 ,	Number of cycles: 5 cycles	
		Sub-clause 4.23.7	
	–D.C. load	The applied voltage shall be the rated voltage	
	2.0	or the limiting element voltage whichever is the	
		smaller.	
		Duration: 1 min.	
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$
10	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
		Sub-clause 4.25.1	
	Endurance at 70 °C	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	$\Delta R \le \pm (5\% + 0.1\Omega)$
	•		

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Table-4(4)

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No	Test items	Condition of test (JIS C 5201–1) Performance requiremen	
11	Mounting	Sub-clause 4.31 Substrate material: Epoxide woven glass	
	Variation of resistance with	Sub-clause 4.8	As in Table-1
	temperature	–55 °C / +20 °C	
		+20 °C / +155°C	
12	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Damp heat, steady state	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	No visible damage
		Visual examination	Legible marking
		Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$
13	Dimensions (detail)	Sub-clause 4.4.3	As in Table–3
	Mounting	Sub-clause 4.31	
		Substrate material: Epoxide woven glass	
	Endurance at upper category	Sub-clause 4.25.3	
	temperature	Ambient temperature:155 °C ± 2 °C	
	Duration: 1000 h		
		Examination at 48 h, 500 h and	
		1000 h:	
		Visual examination	No visible damage
		Resistance	$\Delta R \le \pm (5\% + 0.1\Omega)$

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8. Taping

- 8.1 Applicable documents JIS C 0806-3: 2014, EIAJ ET-7200C: 2010
- 8.2 Taping dimensions
- 8.2.1 Taping dimensions shall be in accordance with Figure-3 and Table-5.

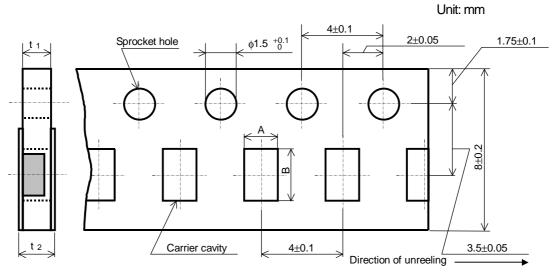
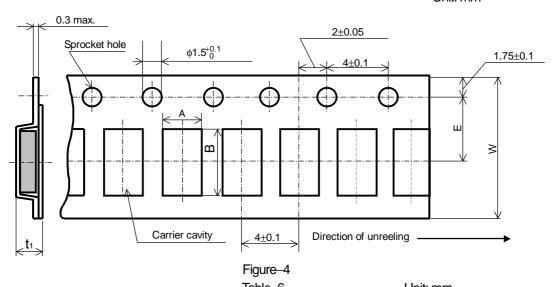


Figure-3

lable-5				Unit: mm
Style	Α	В	t 1	t 2
RPCH16	1.15±0.15	1.9±0.2	0.6±0.1	0.8max.
RPCH20	1.65±0.15	2.5±0.2	0.8±0.1	1.0max.
RPCH32	2.00±0.15	3.6±0.2	0.8±0.1	1.0max.

8.2.2 Embossed taping dimensions shall be in accordance with Figure-4 and Table-6.

Unit: mm



	iabie-6				JNIII. ITIITI
Style	Α	В	W	Е	t 1
RPCH35	2.85±0.20	3.5±0.2	8.0±0.3	3.5±0.05	1.0±0.2

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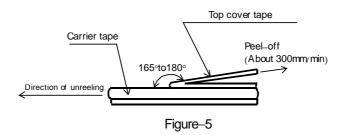
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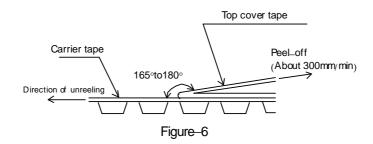
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- 1). The cover tapes shall not cover the sprocket holes.
- 2). Tapes in adjacent layers shall not stick together in the packing.
- 3). Components shall not stick to the carrier tape or to the cover tape.
- 4). Pitch tolerance over any 10 pitches ±0.2mm.
- 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 RPCH16,20,32:Figure-4,RPCH35:Figure-5.
- 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.

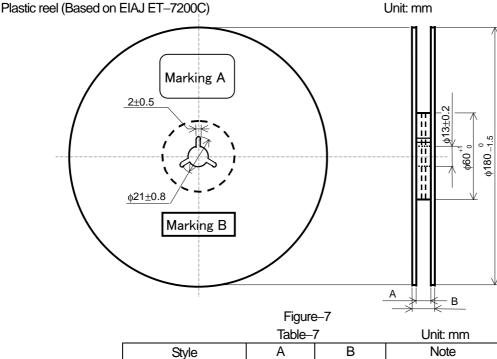




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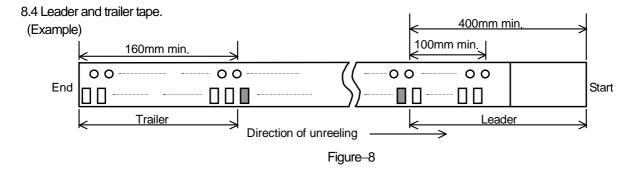
8.3 Reel dimension

Reel dimensions shall be in accordance with the following Figure-7 and Table-7.



RPCH16,20,32,35 $9 \stackrel{+1.0}{0} \frac{11.4\pm1.0}{13\pm1.0}$ Injection molding

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



9. Marking on package

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

9.1 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 (5) Others
- 9.2 Marking B (KAMAYA control label)