FLAT-OHM

チップ形金属薄膜ネットワーク抵抗器

Thin Film Chip Type Network Resistors

■概　要 Outline

チップ形金属薄膜ネットワーク抵抗器（RFCN型）はスパッタリング技術とエッチング技術を利用して、高純度アルミナ基板表面にNi-Cr系抵抗薄膜を形成し、レーザートリミング技術により微細加工した高精度、高信頼性のチップ形金属薄膜ネットワーク抵抗器です。

また電極構造は新たにU型を加え従来のチップ抵抗器でも実績を誇るはんだ強度を持ち、蒸着着膜とニッケルメッキ、スズメッキ、又は金メッキにより構成されています。フロー、リフロー、ディップ等のはんだ付け性及びワイヤーボンティング性に優れています。

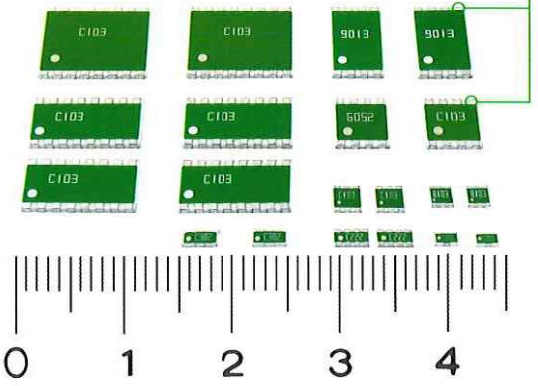
徹底した品質管理のもとに製造され高い信頼性を持ち、計測器、半導体試験装置、医療機器、産業機器及び自動車用電装品など広くご使用戴いて多くの実績をもっております。

Sputtering technology and etching technology have been used to form Ni-Cr resistance thin films on the surface of high-purity alumina substrates on our thin film chip network resistors (RFCN type). In addition, laser trimming technology has been utilized to achieve delicate fabrication for realizing thin film chip network resistors with high accuracy and reliability.

New "U-type" electrodes offering excellent durability as proven in our previous chip resistor models have been added, consisting of evaporated films and nickel plating, tin plating, or gold plating. This structure ensures superb durability for flow soldering, reflow soldering, or dip soldering, and is also very beneficial for the durability of bonding with wires.

Our resistors are produced under comprehensive product management to achieve high reliability. These products offer proven performance as evidenced by their use in a wide variety of products including measuring instruments, test equipment for semiconductors, medical equipment, industrial equipment, and the electric components of automobiles.

電極構造U型品
ー溝入加工品ー
U-shape product
with electrode structure
- Processed product with grooves -



チップ形金属薄膜ネットワーク抵抗器
Thin Film Chip Network Resistor

■特　長 Characteristics

1.高性能　High performance

素子間の相対的な抵抗温度係数（1ppm/℃以下）と経年変化（抵抗比について10ppm/年以下）が非常に小さく安定しております。

Our thin film chip network resistor ensures stable high performance as indicated by the excellent relative resistance temperature coefficient between elements (1 ppm/℃ or less) and minimum aged change (100 ppm/year or less in terms of resistance ratio).

2.小型及び実装性　Small size with superb implementability

面実装基板の取り付け面積が小さくスペース効率を高め、自動搭載により工数低減が期待できます。

The small area necessary for implementing our resistor enables automatic installation and thus reduces installation time.

3.経済性　Economically efficient

- 従来のSOP形、SIP形、DIP形のネットワーク抵抗器を置き換えますとVA効果が期待できます。
- VA effects can be expected by replacing such conventional network resistors such as SOP, SIP, or DIP types.
- 小型、価格が安い、実装性が良く、又は相対精度について比較した場合、箔抵抗器と同等の性能を持っています。
- In addition to the resistor's advantages of small size, low price, and superb implementability, it offers performance equivalent to that of foil resistors in terms of relative accuracy.

4.完全鉛フリー & RoHS対応です。

Completely lead-free product & RoHS

■構 造 図 Construction drawing

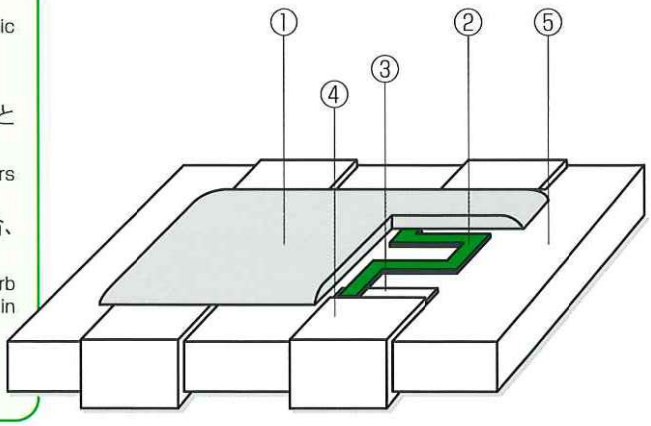
① エポキシ系保護膜
Epoxy protective film

② Ni-Cr系抵抗体
Ni-Cr resistive element

③ Cu電極体又はAu電極体
Cu electrode or Au electrode

④ Niメッキ+スズメッキ
Ni plating + tin plating

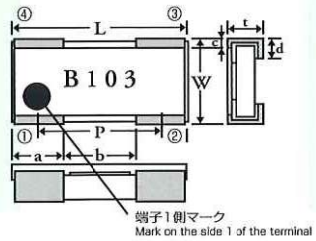
⑤ 高純度アルミナ基板
High-purity alumina substrate



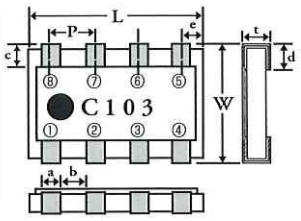
株式会社フラット電子
Flat Electronics Co., Ltd.

■種類と形状寸法 Types, shapes, and measurements

RFCN-1D



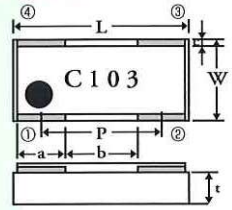
RFCN-S8D



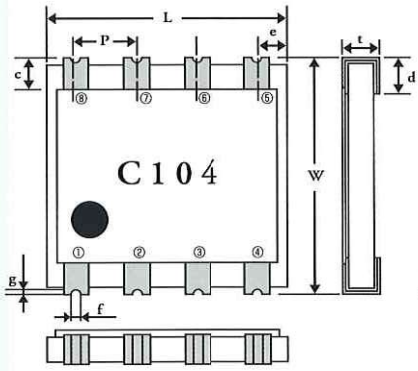
電極構造U型品
ー溝入加工品ー

U-shape product
with electrode structure
- Processed product with grooves -

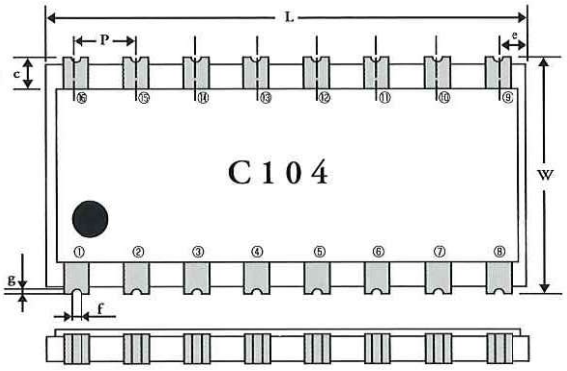
RFCN-1A



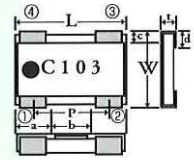
RFCN-8U



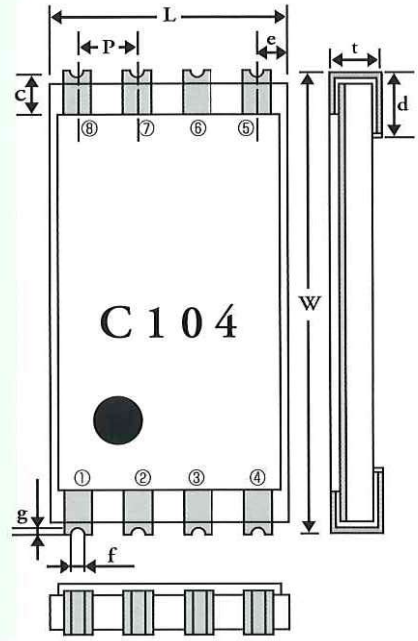
RFCN-M16U



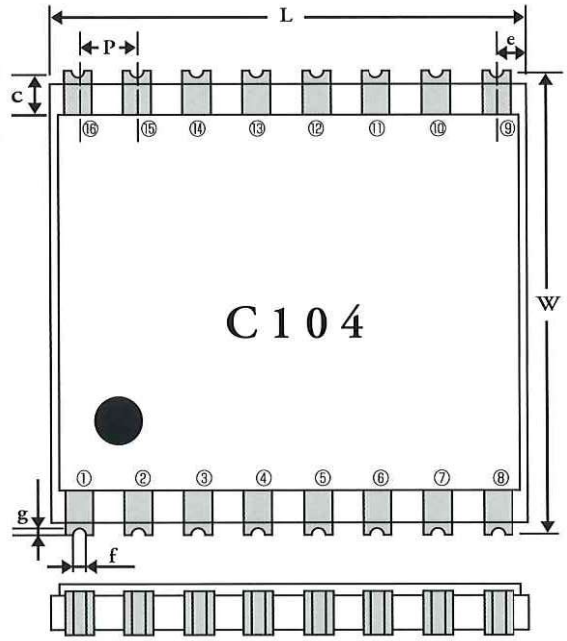
RFCN-2D



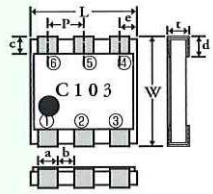
RFCN-W8U



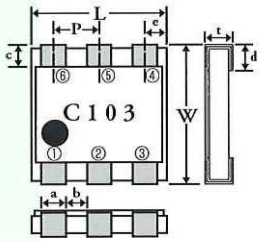
RFCN-16U



RFCN-S6D

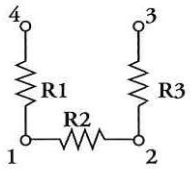
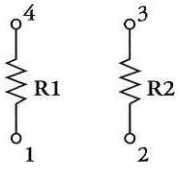
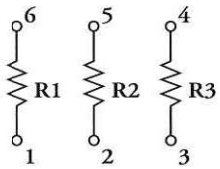
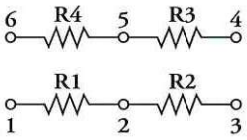
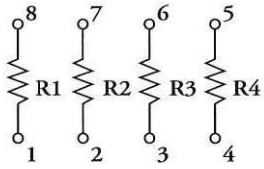
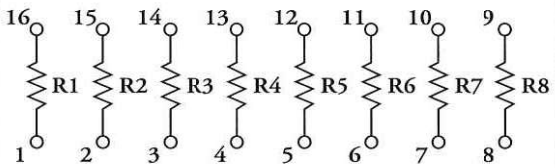


RFCN-6D



型名 Model name	L	W	P	a	b	c	d	e	f	g	t
RFCN-1A	3.2±0.2	1.6±0.2	2.0±0.1	1.0±0.1	1.0±0.1	0.15±0.05	——	——	——	——	MAX0.55
RFCN-1D							0.4±0.1	——	——	——	
RFCN-2D	2.0±0.2	1.25±0.2	1.3±0.2	0.7±0.2	0.6±0.2	0.1±0.05	0.25±0.1	——	——	——	MAX0.55
RFCN-6D	2.54±0.1	2.54±0.1	0.86±0.1	0.43±0.1	0.43±0.1	0.41±0.2	0.5±0.2	0.41±0.1	——	——	MAX0.55
RFCN-S6D	2.0±0.1	2.0±0.1	0.72±0.1	0.36±0.1	0.36±0.1	0.28±0.2	0.4±0.2	0.28±0.1	——	——	MAX0.55
RFCN-W8U	5.08±0.2	8±0.2	1.27±0.1	0.635±0.1	0.635±0.1	0.6±0.2	0.8±0.2	0.635±0.1	(0.2)	(0.1)	MAX0.9
RFCN-8U		5.1±0.2							(0.2)	(0.1)	
RFCN-S8D	3.2±0.2	1.6±0.2	0.8±0.1	0.4±0.1	0.4±0.1	0.4±0.2	0.4±0.2	0.3±0.1	——	——	MAX0.55
RFCN-M16U	10.16±0.2	5.1±0.2	1.27±0.2	0.635±0.1	0.635±0.1	0.6±0.2	0.8±0.2	0.635±0.1	(0.2)	(0.1)	MAX0.9
RFCN-16U		8±0.2				0.6±0.2			(0.2)	(0.1)	

■標準仕様 Standard specifications

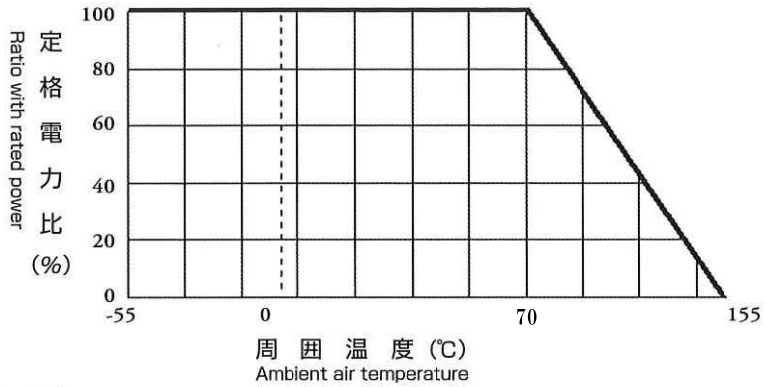
形 名 Model name	定格電力 Power rating	回路記号 Circuit symbols	標準回路 Standard circuit	抵抗値範囲(Ω) Range of resistance values
RFCN-1A RFCN-1D	1D=0.125W/ TOTAL	B		1D(10～50k) 2D(10～25k)
RFCN-2D	2D=0.1W/TOTAL	C		1D(10～100k) 2D(10～100k)
RFCN-S6D	S6D=0.15W/ TOTAL	C		S6D(10Ω～50k) 6D(10Ω～120k)
RFCN-6D	6D=0.25W/ TOTAL	2B		S6D(10Ω～10k) 6D(10Ω～100k)
RFCN-S8D	0.125W/TOTAL	C		10～50k
RFCN-W8U	0.75W/TOTAL			10～1M (5M/TOTAL)
RFCN-8U	0.5W/TOTAL			10～250k (1M～TOTAL)
RFCN-M16U	1W/TOTAL	C		10～250k (2M/TOTAL)
RFCN-16U	1.5W/TOTAL			10～1M (10M/TOTAL)

■抵抗温度係数 及び 抵抗値許容差の絶対値と相対値

Resistance temperature coefficient, absolute and relative values for allowable tolerance of resistance

抵抗値許容差(%) Tolerance of resistance		抵抗温度係数(ppm/℃) Resistance temperature coefficient	
絶対値 Absolute values	相対値 Relative values	絶対値 Absolute values	相対値 Relative values
±0.05 (A)	0.01 (T)	±5 (P)	1 (L)
±0.1 (B)	0.02 (Q)		2 (M)
±0.25 (C)	0.05 (A)	±10 (Q)	3 (N)
±0.5 (D)	0.1 (B)		5 (P)
±1 (F)	0.25 (C)	±25 (R)	10 (Q)
	0.5 (D)		

■定格電力軽減曲線　Power derating curve



■特　性　Characteristics

試験項目 Test items	試験条件 Test conditions	製品規格値 Product specifications
短時間過負荷 Overload in a short period	定格の2.5倍の電圧を5秒間印加する。 Application of 2.5 times the rated voltage for 5 seconds	±(0.1%+0.05Ω)
はんだ耐熱性 Heat resistance during soldering	260±5℃のはんだに10±1秒間浸漬する。 Dipping in soldering of 260 ± 5℃ for 10 ± 1 seconds	±(0.05%+0.05Ω)
温度サイクル Temperature cycles	−55℃～125℃を100サイクル 100 cycle between −55℃ to 125℃	±(0.1%+0.05Ω)
負荷寿命 Service life under heavy load	70℃定格電圧,間けつ負荷を1,000時間 1000 hours at 70℃ rated voltage with intermittent load	±(0.1%+0.05Ω)
耐湿負荷寿命 Longevity under heavy humidity load	40℃,95%定格電圧,間けつ負荷を1,000時間 1000 hours at 40℃ and 95% humidity with intermittent load	±(0.1%+0.05Ω)
経年変化絶対値 Absolute value indicating secular change	常温常湿無負荷放置　1年 One year at ambient temperature, normal humidity without load	±50ppm/年以内 Within ±50ppm/year
経年変化相対値 Relative value indicating secular change	常温常湿無負荷放置　1年 One year at ambient temperature, normal humidity without load	±10ppm/年以内 Within ±10ppm/year

■御注文の方法　How to order

RFCN - 8 U C 100kΩ P B A M -e

- RFCN：品名 Product name
- 8：型名 Model name
- U：電極構造記号 Electrode structure symbol
- C：回路記号 Circuit symbol
- 100kΩ：公称抵抗値 Nominal resistance
- P：温度係数絶対値 Temperature coefficient absolute value
- B：抵抗値許容差絶対値 Absolute value for allowable tolerance of resistance
- A：抵抗値許容差相対値 Relative value for allowable tolerance of resistance
- M：温度係数相対値 Temperature coefficient relative value
- -e：鉛フリー識別 Lead-free product

■荷姿　Packaging

テーピングによります。テーピング仕様書をご請求下さい。

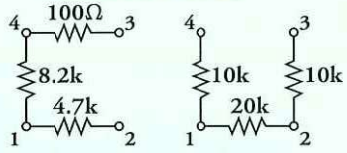
Packaging varies depending on your required taping method. Please request our taping specifications in advance.

■カスタム仕様品の紹介　Introduction of custom-made products

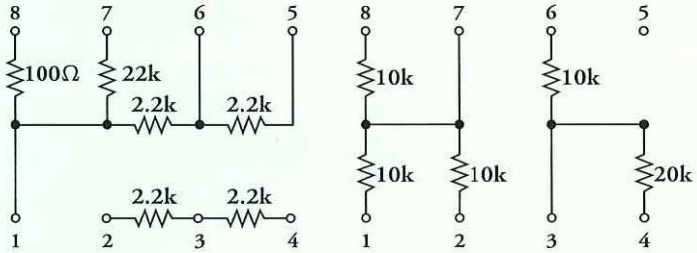
カスタム仕様品として自由な設計によるご希望の回路構成、抵抗値を製作いたします。チップ形金属薄膜ネットワーク抵抗器の特性を最大限に活用できます。

We can produce custom-made products based on your request with regard to circuit structures and resistance values. Our custom-made production allows you to fully utilize the characteristics of our thin film chip network resistors.

(1) RFCN-1D型の場合 For the RFCN-1D type



(2) RFCN-8U型の場合 For the RFCN-8U type



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