ALTERNATION HISTORY RECORDS 变更记录

Date 日期	Version 版本	Mark 标记	Page 页码	Description 描述	Drafter 制定者	Approver 审批者
2024-09-18	A	/	/	First release 首次发行	Doris Chang	/

1. Description

Wire wound thermal fuse resistors (RFKN Series) is an unique type of Power Resistor, with Over Temp. and Over Current Protections.It is a customization product according to the customer's requirements.

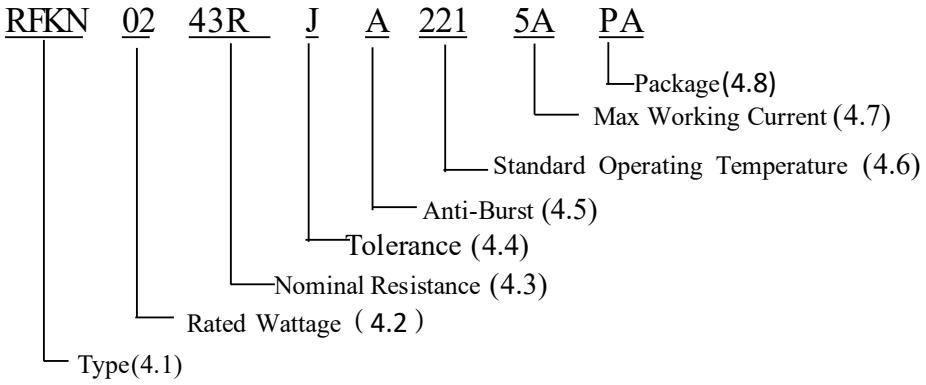
2. Features

-Over Temp. Protection
-Over Current Protection
-Small Fault Current Protection
-Surge Protection
-Inrush Current Protection
-RoHS & REACH Compliant
-Operating Temperature Range: -40℃~168℃
-The resistor is recognized by UL 1412 UL (List No.: E535667)

3. Applications

-Security & Protection
-Adapters
-Switched-Mode Power Supplies
-Small Power Home Appliances

4. Part Number System



4.1 **Product Type**

Code	RFKN
Type	Wire wound thermal fuse resistors

4.2 **Rated Wattage:**

Code	02	01
Rated Wattage	2W	1W

4.3 **Nominal Resistance:**

Code	1R5	43R	1K0
Resistance (Ω)	1.5	43	1K

Remark:Ω is its unit, which be in accordance with JIS-C6409 article 6 (EIARS- 196A) series.
Letter "43R" indicates resistance value 43Ω

4.4 **Resistance tolerance:**

Code	J	K
Tolerance Range	±5%	±10%

4.5 **Anti-Burst**

Code	A
Anti-Burst	Anti-burst

4.6 **Standard Operating Temperature**

Code	221
Operating Temperature	221℃

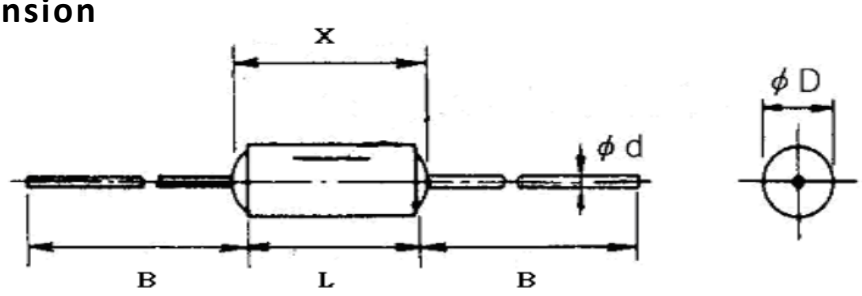
4.7 **Max Working Current**

Code	5A
Max Working Current	Max Working Current 5A

4.8 **Package**

Code	Packing
PA	Radial type lead taping
T/B	Ammo taping
T/R	Reel taping
	Bulk

5.Dimension

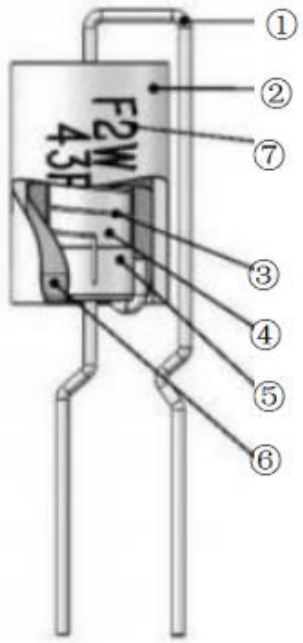


TYPE / RFKN	ΦD ±0.5	L ±0.5	X ±1	B ±2	Φd ±0.1	Resistance Value	Dielectric Withstanding Voltage
2W	6.0	10.5	12.0	26.0	0.60	0.1Ω~ 1000Ω	1000V

6. Specification:

Item	Parameter
Power Type (***P***)	2 W
Rated Resistance (***R***)	0.10 Ω ~ 1,000 Ω
Resistance Tolerance	5% , 10%
Derating Factor (***f***)	See Rated Power Derating Curve
Actual Power (P_0)	$P_0 = P \times f$
Rated Current (I_N)	$I_N = \sqrt{P_0 / R}$
Rated Voltage (U_N)	$U_N = \sqrt{P_0 \times R}$
Fusing Time (less than 60 seconds)	T_f = 221 °C: 3 × Power
Rated Functioning Temp. (T_f)	221 °C
Fusing Temp. (T_f)	T_f = 221 °C: 211~221 °C
Surge(For Reference) Note:Combination Wave	3KV

7. Structure



①： Lead Wire:
It is made of hot-dipped tin coated copper wire.

②Ceramic Tube：
It is made of alumina ceramic with high dielectric withstanding voltage up to 1kV.

③Resistance Wire:
It is made of suitable Ni-Cr alloy with fusing performance.

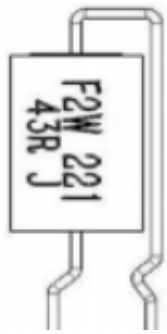
④Thermal fuse:

Rated Temperature(℃)	CUT-OFF Temperature(℃)	Max. Working Current
221	221+0/-10	5A

⑤Iron Cap:
It is made of tin plated iron base.

⑥Coating:
Coating is done by green flameproof paint or Silicon Resin which is solid enough to be free from looseness, crack and easy breakage. It is also resistant to cleaning and industrial solvents, and the paint shall be limited within 2mm of lead

⑦ Marking:
Marking is made on resistors surface based on the following alphanumeric characters:



F2W: indicates RFKN 2W.

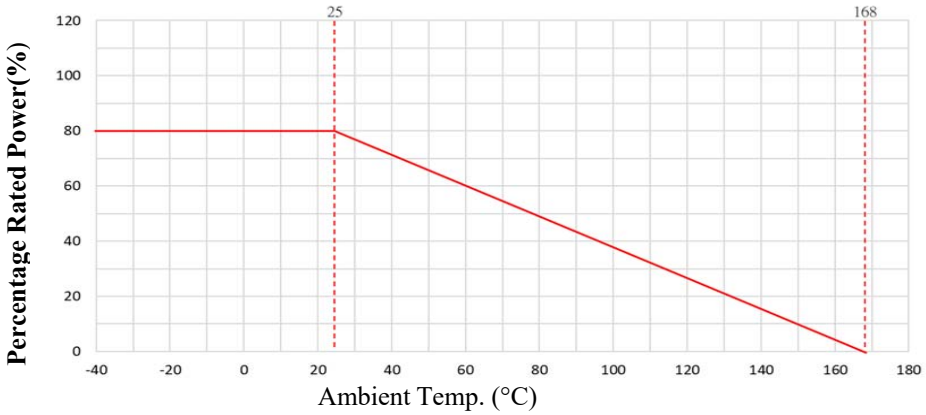
221: indicates Standard Operating Temperature.

43R:is resistance value 43Ω.

J ：is capital letter of tolerance(±5%).

8. Rated Power(For Reference Only):

Rated power is the value of Max load power specified at the ambient temperature of 20℃, and shall meet the functions of electrical and mechanical performance. When the ambient temperature surpasses above mentioned temperature, the value declines as per following DERATING CURVE.



8.1 Rated Voltage:

It is calculated through the following formula:

$$E = \sqrt{PxR}$$

where E: rated voltage (V)
P: rated power (W)
R: total nominal resistance (Ω)

9.Mechanical Performance:

9.1 Terminal tensile:

To fix the resistor body, a static load of 1kg.is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

9.2 Twist withstand:

To bend the lead wire at the point of about 6mm from resistor body to 90°, then catch the wire at 1.2 ±0.4mm apart from the bent point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of 10 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn 2 times without causing any break and looseness.

10. Electrical Performance:

10.1 Resistance Temperature Coefficient:

It shall be within ±300ppm/℃.

T.C (ppm/℃) = 〔(R2－R1)÷R1〕×〔1÷(T2－T1)〕×10^6

where R1: resistance value at reference temperature
R2: resistance value attest temp.
T1: reference temp.
T2: test temp.

10.2 Temperature Cycle:

Following temp. cycles are to be made 5 times and then put at room temp. for one hour, the resistance value change rate between pre-and-post test shall be within ±1%.

Steps	Temperature(℃)	Time (minutes)
1st step	-40 ±3	30
2nd step	Room temp.	3
3rd step	168 ±3	30
4th step	Room temp.	3

10.3 Short Time Over Load:

When the resistors are applied 5 times as much as rated power for 5 seconds continuously, it shows no evidence of arc,flame...etc. Removing the voltage and place the resistors to the normal condition for 30 minutes, the resistance value change rate between pre-and-post test shall be within ±2%.

10.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC 500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over 1000MΩ .

10.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying 1000VAC for one minute and should find no physical damage to the resistors.

10.6 Load Life:

The resistors arrayed are sent into the 70℃ oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000+-048 hours in total. Then, after removing the voltage, take the resistors out of the oven and left under normal temp. For one hour cooling. The resistance value change rate between pre-and-post test shall be within ±3%.

10.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of 40 ±2℃ and the humidity of 90~95%, then 1/10 DC rated power is applied for 1.5 hours and cutoff for 0.5 hour. The similar cycle will be repeated for 1000+-048 hours in total (including cut-off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within ±3%. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

10.8 Solder-ability:

The leads with flux are dipped in a melted solder of 235 ±5℃ for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

10.9 Resistance to Soldering Heat:

Two leads are together dipped in a melted solder of 270 ±5℃ for 10 ±1 seconds, Then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within ±1%.

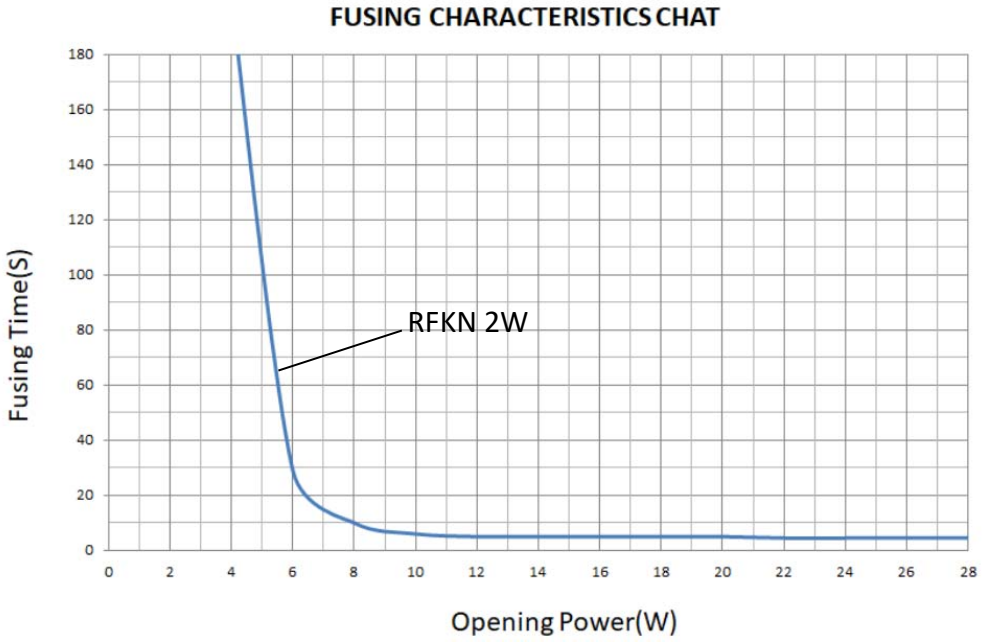
10.10 Non flammability:

The resistors are applied the power of 16 times the rated wattage for 5 min. and shall not get flame.

10.11 Fusing Characteristics:

1）The resistors will fuse when mains voltage of 132 VAC 60Hz is directly applied for 3 seconds maximum. No flames,no explosion, no sound and no arc happened.

2） The resistors are applied the power of 6W the rated wattage and shall be fusing within 60 sec.



Remark:The above curves are for Reference Only

10.12 Surge Withstanding:

The resistors are designed to withstand 3kV, 1.2/50μs pulse according to IEC61000-4-5, 10 pulses per voltage,60 seconds between each pulse.The resistance value change rate between pre-and-post test shall be within ±5%.

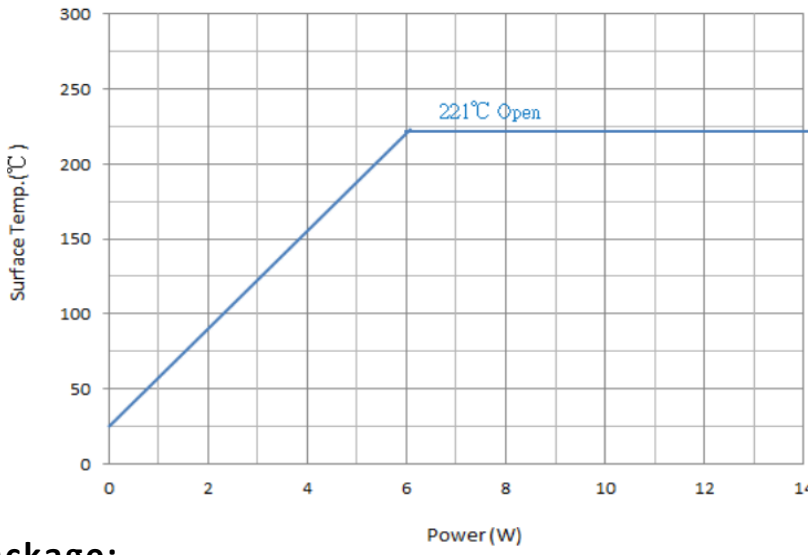
10.13 Storage Conditions:

The resistors with appropriate package would have a preservative duration of 1 year, under the following conditions.

T=5℃ ~ 35℃

H=40% ~ 75%

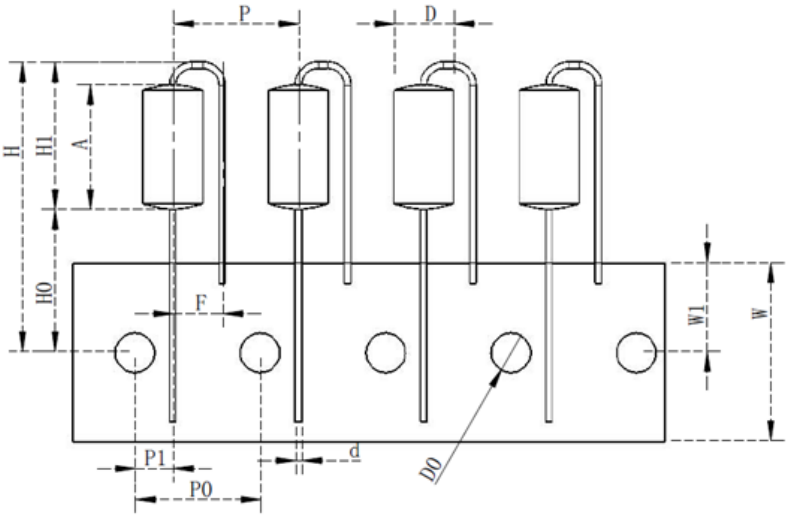
10.14 Surface Temp. Curve:



11.Package:

Radial type lead taping(PA):

Unit: mm



F±0.5	P±1	P0±0.3	P1±0.7	HMax	H1Max	H0±1	A±1	W±0.5	W1±0.5	D±0.5	D0±0.2	d±0.1
5.0	12.7	12.7	3.85	34	15.5	17.5	12.0	18.0	9.0	6.0	4.0	0.6

Attention:

Cold Resistance Test

1. If product TCR is not less than 350 (10^{-6}/°C), the measured resistance value shall be corrected as the relative resistance value under 25 °C according to TCR formula.
2. Resistance Measurement (4-terminal test)

Replacement

As RFKN is a non-resettable product, for safety sake, please use the same type of RFKN for replacement.

Usage

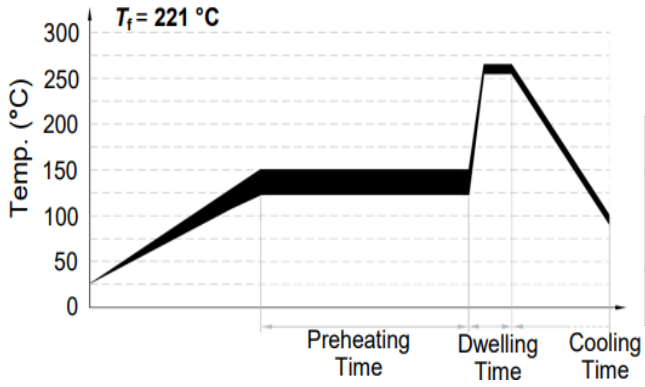
1. Do not touch the resistor body or pins directly when power is on, to avoid burn or electric shock.
2. When air pressure is from 80 kPa to 106 kPa, the relative altitude shall be +2000 m to - 500 m.

Storage

1. Please store TRXF with ambient temp. 10 °C ~ 30 °C and relative humidity 30% ~ 75%.
2. Do not store the TRXF at the high temp., high humidity or corrosive gas environment, avoid influencing the solderability of the pins, please use them up within 1 year

Soldering Parameters

Wave Soldering Parameters (For Reference Only)



Item	Temp. (°C)	Time (s)
Preheating	T_f =221 °C	60 ~ 100
	120 ~ 150	
Dwelling	260 ± 5	4 ~ 5

Hand-Soldering Parameters

Solder Iron Temp. : (350 ± 5) °C

Soldering Time : 3 s (T_f = 221 °C)