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
2022-09-04	B	/	/	First release 首次发行	Doris Chang	/

1. Applicable Scope:

This standard specification is for use in consumer electronics, computers, telecommunications, control instruments...etc.

2. Part Number:

It is composed by Type, Rated Wattage, Nominal Resistance , Tolerance and Package. e.g.

FKN	1WS	10R	J	T/B
Type	Rated Wattage	Nominal Resistance	Tolerance	Package

2.1 Type :

Fusible Wire Wound Resistors, Flameproof are called "FKN".

2.2 Rated Wattage:

Shown by "W", such as 1WS, 2WS, 3WS, 5WS.

2.3 Nominal Resistance:

Ω is its unit, which be in accordance with JIS-C6409 article 6 (EIA RS-196A) series.

Letter "10R" indicates resistance value 10Ω.

2.4 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.
G＝±2%; J＝±5%.

2.5 Package:

T/B＝Standard tape in box; T/R＝Standard tape & reel; Nil＝Bulk.

T76＝76 mm width special tape in box.

MG form; M form; MB form; F1~F4 forms.

Letter "PA" indicates radial type lead taping.

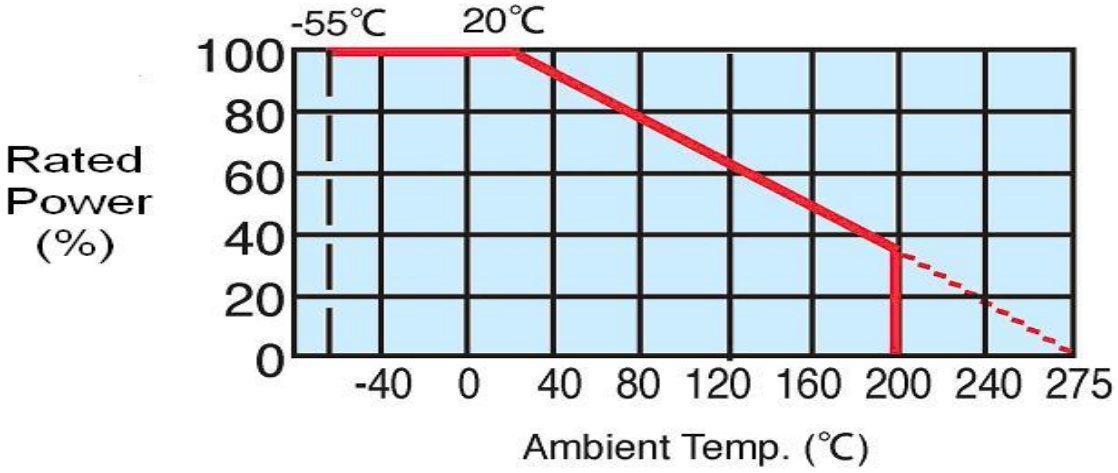
Remark: 1. FKN Series Resistors are RoHS & Halogen Free Compliant.

2. The resistor is recognized by UL 1412. (File No E326227)(FKN 1WS, 2WS, 3WS)

3. The resistor is recognized by UL 1412. (File No E329886)(FKN 5WS)

3. Rated Power:

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.



3.1 Rated Voltage:

It is calculated through the following formula:

$V = \sqrt{P \times R}$

where V: rated voltage
P: rated power
R: total nominal resistance

4. Dimension and structure:

4.1 Dimension:



Unit: mm

TYPE / FKN	D ± 1	L ± 1	H ± 3	d ± 0.1	Resistance Range	Dielectric Withstanding Voltage
1WS	2.6 ± 0.5	6.8	28	0.65	0.1Ω ~ 200Ω	250V
2WS	3	9	28	0.65	0.1Ω ~ 300Ω	350V
3WS	5	11	28	0.8	0.1Ω ~ 800Ω	500V
5WS	6.5	17	38 ±3 (Package:T/B) >32 (Package:T76)	0.8	0.1Ω ~ 800Ω	500V

4.2 STRUCTURE:

4.2.1 Terminal:

Terminal is to be firmly connected with resistors element, both electrically and mechanically, and allow easy soldering.

4.2.2 Coating:

Coating is done by light green flameproof paint (resistant to 800℃)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 wires from resistor body.

4.2.3 Marking:

Marking is made on resistors surface by color coding.
1st, 2nd, 3rd : nominal resistance.
4th: tolerance.
5th: black color band for fusible wire wound resistors, flameproof.

5. Operating Temperature Range: -55℃～200℃

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body, a static load of 1kg.(3WS, 5WS:2.5kgs.) is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

6.2 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.

7. Electrical Performance:

7.1 Resistance Temperature Coefficient:

It shall be within ±300ppm/℃.(under 1Ω shell be within ±500ppm/℃)

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

where R1: resistance value at room temperature

R2: resistance value at test temp.

T1: room temp.

T2: test temp.

7.2 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	-55 ± 3	30
2nd step	Room temp.	3
3rd step	200 ± 3	30
4th step	Room temp.	3

7.3 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%.

7.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC 100V or 500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over 1000MΩ.

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying suitable voltage listed on DIMENSION for one minute and should find no physical damage to the resistors, such as arc, char...etc.

7.6 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^{+48}_{-0} 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 ±5%.

7.7 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 cut off for 0.5 hour. The similar cycle will be repeated for 1000^{+48}_{-0} 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 ±5%. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

7.8 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.

7.9 Resistance to Soldering Heat:

Two leads are together dipped in a melted solder of 270 ±5℃ for 10 ±1 seconds, or 350 ±10℃ for 3.5 ±0.5 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%.

7.10 Nonflammability:

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

7.11 Fusing Characteristics:

7.11.1 The resistors are applied the power of 16 times the rated wattage and shall be fusing within 60 sec.

7.11.2 The resistance value will be as high as 100 times the original value after fusing.

7.12 Storage Conditions:

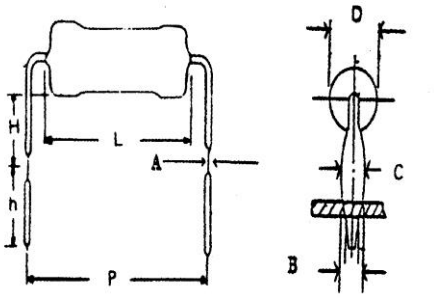
The resistors with appropriate package would have a preservative duration of 1 year, under the following conditions.

T=5℃ ~ 35℃

H=40% ~ 75%

8. Others:

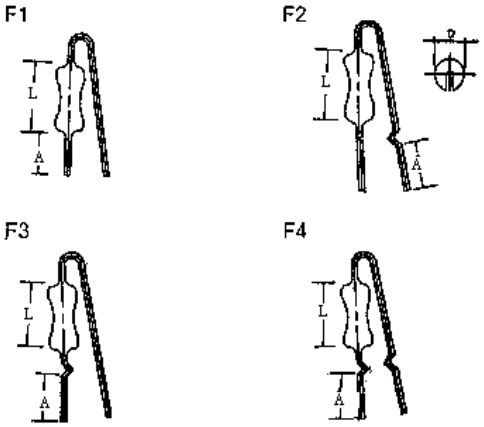
8.1 MG Form:



Unit: mm

FKN	L ± 1	D ± 1	P	H	h±1	A±0.1	B±0.05	C±0.2
2WS	9	3	12.5±1.5	7±1	4.5	0.23	0.8	1.2
3WS	11	5	15±1.5	7±1	4.5	0.3	1	1.4

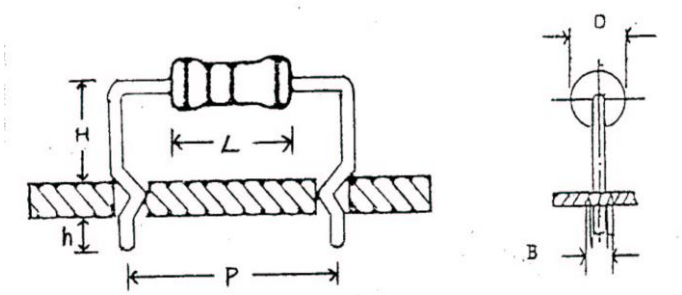
8.2 F Form:



Unit: mm

FKN	L ± 1	D ± 1	A+1/-0.5	APPLICABLE
2WS	9	3	3.5	F1~F4
3WS	11	5	3.5	F1~F4

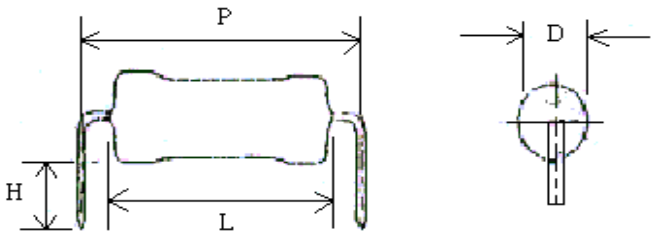
8.3 MB Form:



Unit: mm

FKN	D±1	L±1	P	H±0.5	h+1/−0.5	B±0.05
2WS	3	9	15±1.5	6.5	2	1
3WS	5	11	15±1.5	6.5	2	1

8.4 M Form:

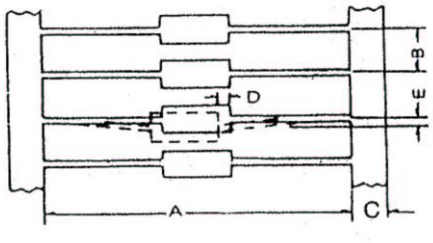


Unit: mm

FKN	L±1	D±1	P	H±0.5
3WS	11	5	15±1.5	3.5

9. Package:

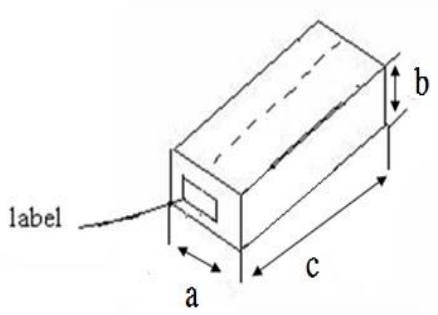
9.1 Taping Specifications:



Unit : mm

FKN	Size / Package	A	B	C±1	D Max	E Max
1WS	T/B, T/R	52±1	5±0.5	6	0.6	1.2
2WS	T/B, T/R	52±1	5±0.5	6	0.6	1.2
3WS	T/B, T/R	63±1	5±0.5	6	0.6	1.2
5WS	T/B	83±1.5	10±1	6	0.6	1.2
	T76	76±1.5	10±1	6	0.6	1.2

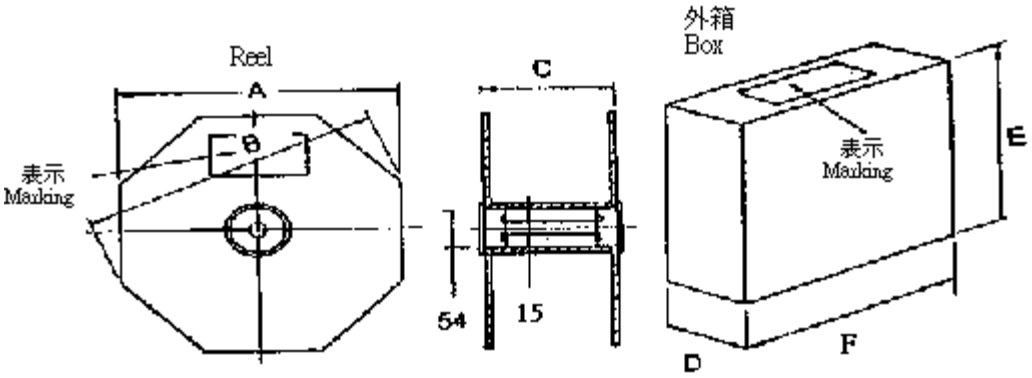
9.2 Tape in Box:



Unit : mm

FKN	Package	QTY PER BOX	a	b	c
1WS	T/B	5,000	144	84	272
2WS	T/B	1,000	75	55	255
3WS	T/B	1,000	85	105	260
5WS	T/B	500	98	95	270
	T76	500	102	114	264

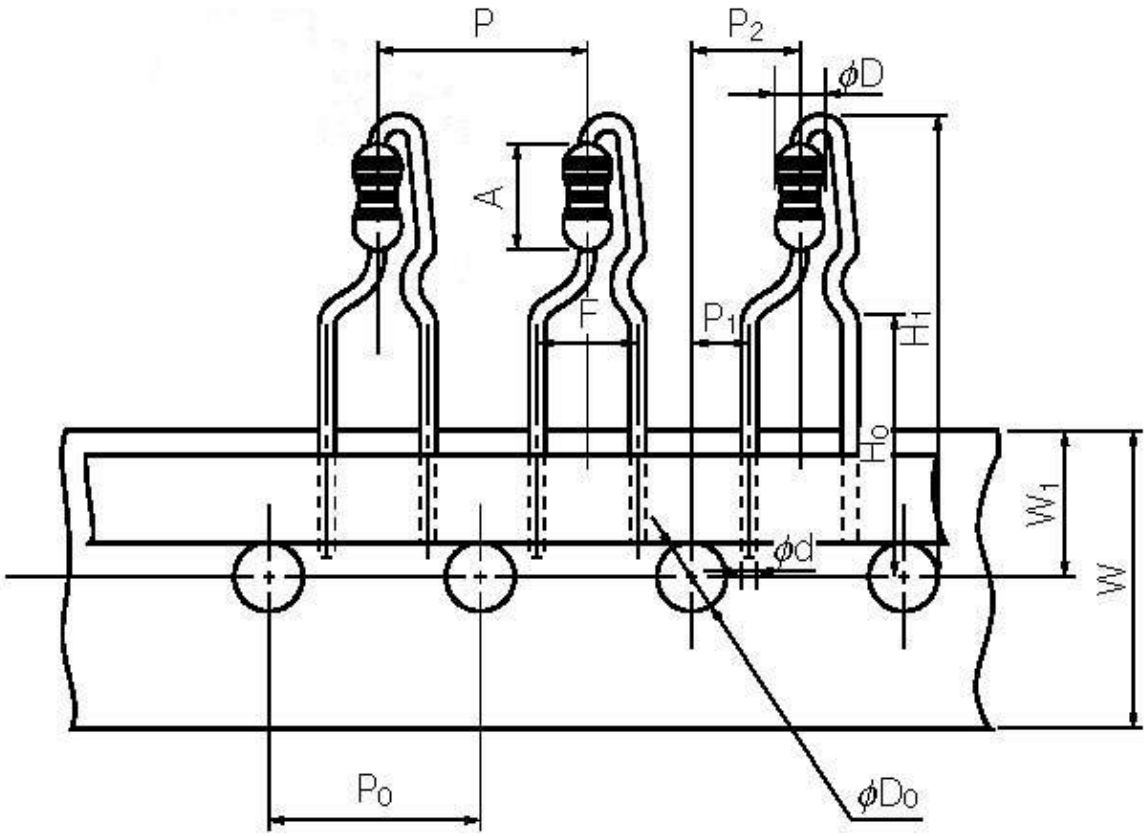
9.3 Tape & Reel:



Unit: mm

FKN	Package	QTY PER REEL	A	B	C	D	E	F
1WS	T/R	5,000	285	310	75	80	295	295
2WS	T/R	5,000	305	330	75	90	310	310
3WS	T/R	2,000	285	310	75	80	295	295

9.4 Radial type lead taping(PA):



Unit: mm

FKN	P ±1	P_0 ±0.3	P_1 ±0.7	P_2 ±1	F ±0.8	W ±0.5	W_1 ±0.5	H_1 max	H_0 ±0.5	φ D_0 ±0.2	A ±1	φ d ±0.1	φ D ±1	REMARK
3WS	12.7	12.7	3.85	6.35	5	18	9	38	16	4	11	0.8.	5	
5WS	12.7	12.7	3.85	6.35	5	18	9	50	16	4	17	0.8.	6.5	