ALTERATION HISTORY RECORDS变更记录

Date	Version	Mark	Page	Description	Drafter	Approver
2025-12-15	B	/	/	Revised edition release	Doris Chang	/

1. Features:

Performs function of resistor and series fuse and provides predictable fusing times

Complete welded construction

No flaming or distortion or explosion of unit under sufficient fusing

Ideal for squib circuit applications and protection of semi-conductor devices

Negligible noise and voltage coefficient

The resistor is recognized by UL 1412 UL (List No.: E535667 1W, 2W, 3W)

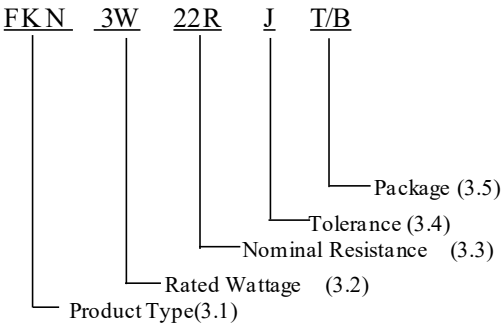


2. Applicable Scope:

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

3. Part Number System:

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



3.1 Product Type

Code	FKN
Product Type	Fusible Wire Wound Resistors,Flameproof

3.2 Rated Wattage code

Code	1W	2W	3W	5W
Wattage (W)	Rated Power:1W	Rated Power:2W	Rated Power:3W	Rated Power:5W

3.3 Nominal Resistance

Code	22R	10K	100K
Resistance	22Ω	10KΩ	100KΩ

Remark:Ω is its unit which be in accordance with JIS-C6409 article 6 (EIARS-196A) series.

3.4 Resistance tolerance

Code	J	K
Tolerance Range	±5%	±10%

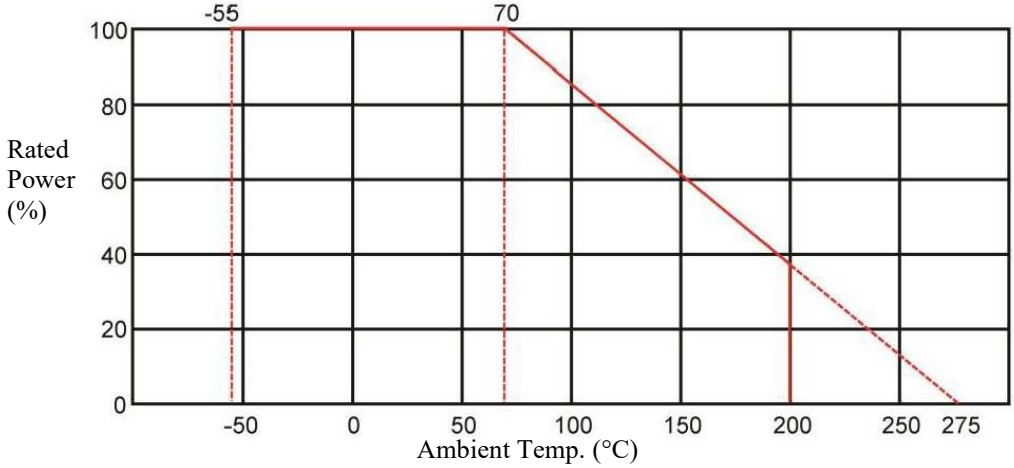
3.5 Package

Code	T/B	T/R	T52	R52	Nil
Inner Code	Standard Tape in box	Standard Tape in reel	52 mm width special tape in box	52 mm width special tape in reel	Bulk

Remark: FKN Series Resistors are RoHS Compliant.

4. Rated Power:

Rated power is the value of Max load power specified at the ambient temperature of 70℃, 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.



4.1 Rated Voltage:

It is calculated through the following formula:

$$E = \sqrt{PxR}$$

Where E: rated voltage (V)

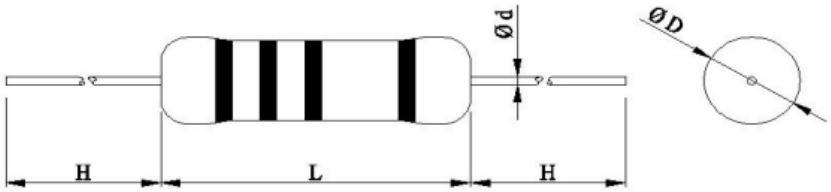
P: rated power (W)

R: total nominal resistance (Ω)

Remark: However, in case the voltage calculated exceeds the maximum load voltage, such the maximum load voltage shall be regarded as its rated voltage, means whichever less.

5.Dimension and Structure:

5.1 Dimension:



Unit: mm

Type / FKN	φD± 1	L± 1	H± 3	φd± 0.1	Resistance Value(Ω)	Dielectric Withstanding Voltage
1W	4.0	9	28	0.65	0.1~500	350V
2W	5.0	11	28	0.80	0.1~800	500V
3W	5.5	13	38	0.80	0.1~800	500V
5W	6.5	19	38	0.80	0.1~800	500V

5.2 Structure:

5.2.1 Terminal:

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

5.2.2 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.

5.2.3 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.

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

7.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%

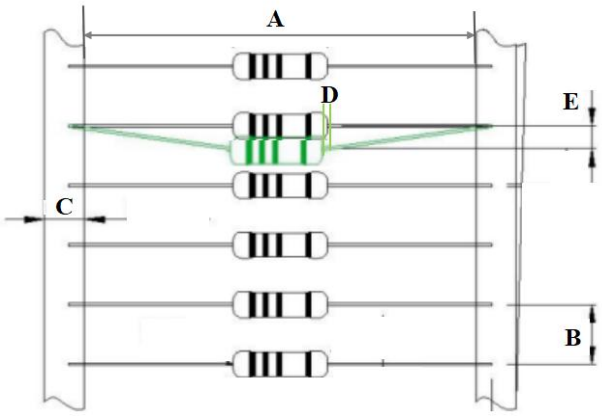
8.Test And Requirements:

<table>
<tr><th colspan="2">Test</th><th>Test Method</th><th>Condition</th><th>Criteria</th></tr>
<tr><td rowspan="2">Mechanical Performance</td><td>Terminal tensile</td><td rowspan="2">IEC 60115-14.16</td><td>To fix the resistor body, a static load of 2.5kg.（FKN 1W:1kg) is to be gradually applied into the terminal for 10 seconds</td><td>Without causing any looseness and fall.</td></tr>
<tr><td>Twist withstand</td><td>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 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn 2 times</td><td>Without causing any break and looseness.</td></tr>
<tr><td colspan="2">Resistance Temperature Coefficient:</td><td>IEC 60115-1 4.8</td><td>T.C (ppm/℃) =〔(R2－R1) ÷R1〕 ×〔1÷(T2－T1)〕×10^6
where
R1: resistance value at reference temperature
R2: resistance value at test temp.
T1: reference temp. (usu. 25℃)
T2: test temp. (about 75℃)</td><td>It shall be within ±200ppm/℃.</td></tr>
<tr><td colspan="2">Temperature Cycle</td><td>IEC 60115-1 4.19</td><td>Following temp. cycles are to be made 5 times and then put at room temp. for one hour
<table>
<tr><th>Steps</th><th>Temperature (℃)</th><th>Time (minutes)</th></tr>
<tr><td>1st step</td><td>-55 ± 3</td><td>30</td></tr>
<tr><td>2nd step</td><td>Room temp.</td><td>3</td></tr>
<tr><td>3rd step</td><td>200 ± 3</td><td>30</td></tr>
<tr><td>4th step</td><td>Room temp.</td><td>3</td></tr>
</table></td><td>The resistance value change rate between pre-and-post test shall be within ±1%</td></tr>
<tr><td colspan="2">Voltage Withstanding</td><td>IEC 60115-1 4.7</td><td>Resistors are located in a V-shaped metal trough. Applying AC 500V (FKN 1W: 350V) for one minute</td><td>The resistance should find no physical damage to the resistors, such as arc, char...etc.</td></tr>
</table>

Test	Test Method	Condition	Criteria
Short Time Over Load	IEC 60115-14.13	When the resistors are applied 2.5 times as much as rated voltage 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%.
Insulation Character	IEC 60115-1 4.6	Resistors are located in a V-shaped metal trough. Using the DC 500V(FKN 1W:100V) megger instrument 2 poles to clutch either side of lead wires and metal trough	Measuring the Insulation Resistance which shall be over 1000MΩ
Load Life	IEC 60115-14.25	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%.
Moisture-proof Load Life	IEC 60115-14.24	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.
Solder-ability	IEC 60115-1 4.17	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.
Resistance to Soldering Heat	IEC 60115-1 4.18	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%.
Nonflammability	JIS - C 5201-4.26	The resistors are applied the power of 16 times the rated wattage for 5 min.	The resistance shall not get flame.
Fusing Characteristics:	/	The resistors are applied the power of 25 times the rated wattage	The resistance shall be fusing within 60 sec The resistance value will be as high as 100 times the original value after fusing.

9. Package:

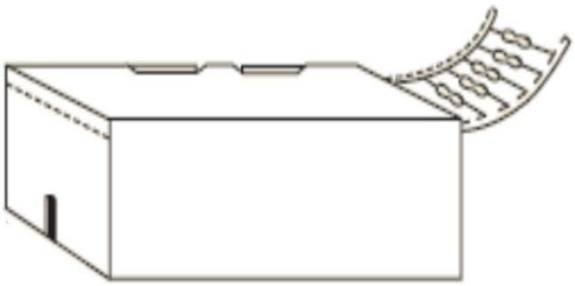
9.1 Taping Specifications:



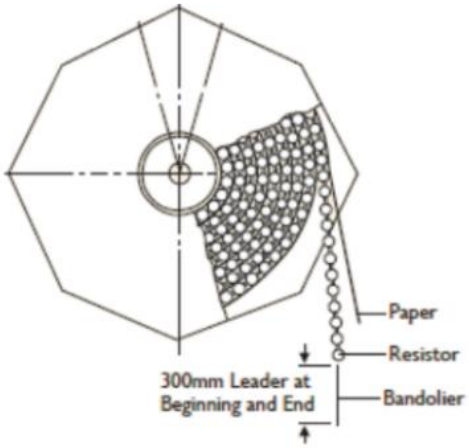
Unit: mm

FKN	Size / Package	A±1.5	B±1.0	C±1.0	D Max	E Max
1W	T/B T/R	52	5.0	6.0	0.6	1.2
2W	T52 R52	52	5.0	6.0	0.6	1.2
2W	T/B T/R	63	5.0	6.0	0.6	1.2
3W	T63 R63	63	10	6.0	0.6	1.2
3WL	T/B T/R	76	10	6.0	0.6	1.2
5W	T/B	82	10	6.0	0.6	1.2

Tape in box

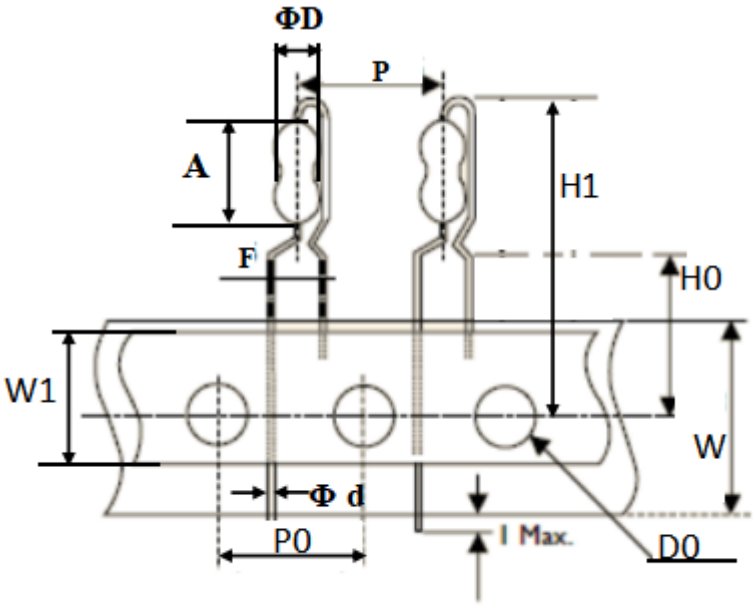


Tape in reel



9.2 Radial type lead taping(PA*)

PA

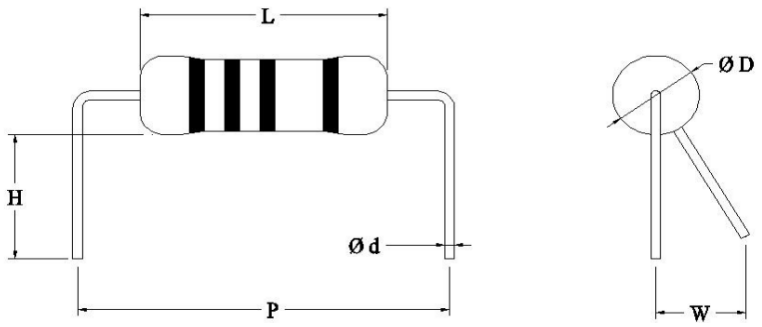


Unit: mm

FKN	P ±1	P0 ±0.3	P1 ±0.7	P2 ±1	F ±0.8	W ±0.5	W1 ±0.5	H1 Max	H0 ±0.5	Φ D0 ±0.2	A ±1	Φ d±0.1	D ±1
1W	12.7	12.7	3.85	6.35	5.0	18	9	32	16	4.0	9	0.65	4.0
2W	12.7	12.7	3.85	6.35	5.0	18	9	38	16	4.0	11	0.80	5.0
3W	12.7	12.7	3.85	6.35	5.0	18	9	38	16	4.0	13	0.80	5.5

9.3 Forming

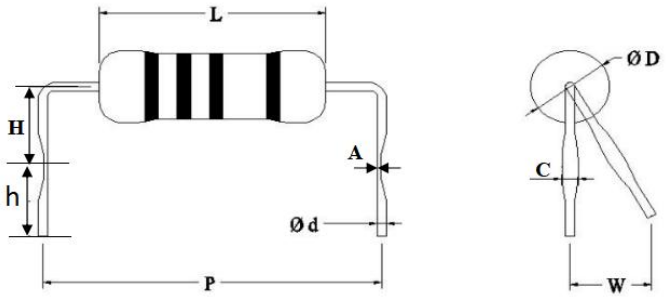
1) M Forming



Unit: mm

FKN	L±1.0	P±2.0	H±0.5	Φ D± 1	Φ d± 0.1	W Max
1W	9	15	3.5	3.5	0.65	3.0
2W	11	15	3.5	4.5	0.80	3.0
3W	13	20	3.5	5.5	0.80	3.0
5W	19	20	3.5	6.5	0.80	3.0

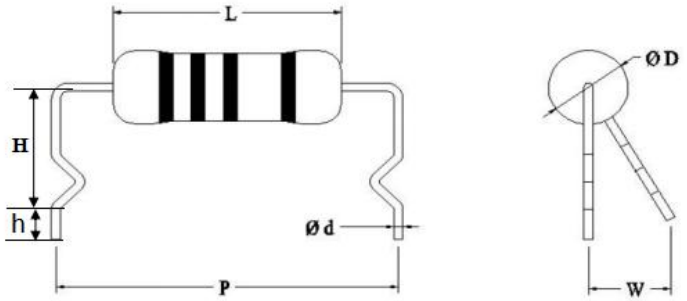
2) MG Forming



Unit: mm

FKN	L±1.0	P	H	Φ D± 1.0	h± 1.0	A± 0.10	Φ d± 0.1	C± 0.20	W Max
1W	9	15±1.5	7.0±1.0	4.0	4.5	0.23	0.65	1.2	3.0
2W	11	15±1.5	7.0±1.0	5.0	4.5	0.30	0.80	1.4	3.0
3W	13	20±2.0	10±2.0	5.5	4.5	0.30	0.80	1.4	3.0

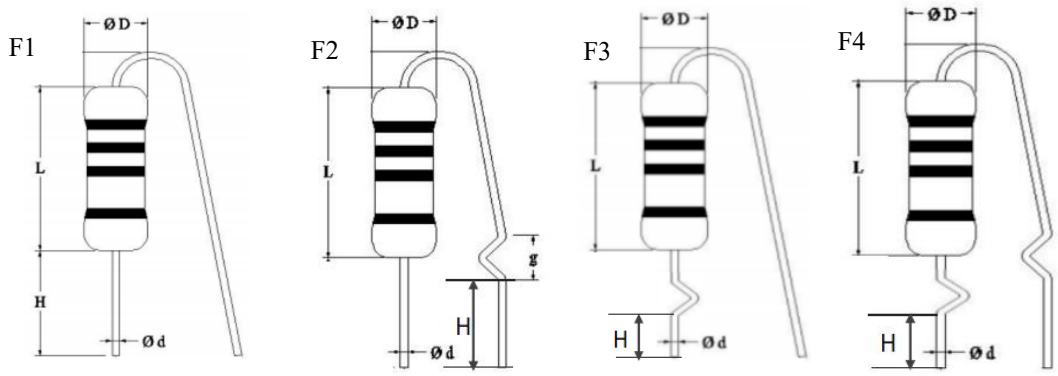
3）MB Form:



Unit: mm

FKN	L±1.0	P	H±0.5	Φ D± 1.0	h± 1.0	Φ d± 0.1	W Max
1W	9	15±1.5	6.5	4.0	2.0	0.65	3.0
2W	11	15±1.5	6.5	5.0	2.0	0.80	3.0
3W	13	20±2.0	6.5	5.5	2.0	0.80	3.0
5W	19	25±2.0	6.5	6.5	2.0	0.80	3.0

4）F Form:



Unit: mm

FKN	L±1.0	Φ D± 1.0	H±1.0	Φ d± 0.1
1W	9.0	4.0	3.5	0.65
2W	11	5.0	3.5	0.80
3W	13	5.5	3.5	0.80