

# Approval Sheet

for

**Fusible Wire Wound Resistors  
Flame-Proof Type**

**FKN series**

**$\pm 1\%$  &  $\pm 5\%$**

**YAGEO CORPORATION**

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**1. PRODUCT:**

FUSIBLE WIRE WOUND RESISTORS

(Normal & Miniature Style)

The resistors are coated with a green lacquer of flameproof silicone (UL94V-0), the 5<sup>th</sup> colour band is white to represent fusible wire wound resistors.

**2. PART NUMBER:**

Part number of the fusible wire wound resistor is identified by the name, power, tolerance, packing, temperature coefficient, special type and resistance value.

Example :

<b>FKN</b>	<b>100</b>	<b>J</b>	<b>T</b>	<b>-</b>	<b>73-</b>	<b>100R</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>
Series Name	Power Rating	Resistance Tolerance	Packing Style	Temperature Coefficient of Resistance	Special Type	Resistance Value

(1) Style: FKN SERIES

(2) Power Rating : -25=1/4W 、 50S=1/2W 、 -50=1/2W 、 1WS=1W 、 100=1W 、 2WS=2W 、 200=2W 、 3WS=3W 、 300=3W 、 400=4W 、 5WS=5W 、 500=5W 、 7WS=7W

(3) Tolerance: F=±1% J=±5%

(4) Packaging Type: R=Paper Taping Reel  
T= Tape on Box Packing  
B= Bulk Packing

(5) Temperature Coefficient : 350ppm/°C

(6) Special Type : 52- = 52mm  
73- = 73mm  
91- = 91mm  
M = M-Type Forming for Bulk  
MB = MB-Type Forming  
F = F-Type Forming for Bulk  
FK = FK-Type Forming  
FFK = FFK-Type Forming  
FKK = FKK-Type Forming

(7) Resistance Value : E24 Series

Example : 0R1 、 1R 、 10R 、 100R

### 3. BAND-CODE:

COLOR	1ST BAND	2ND BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	1Ω	
BROWN	1	1	10Ω	± 1 % (F)
RED	2	2	100Ω	± 2 % (G)
ORANGE	3	3	1KΩ	
YELLOW	4	4		
GREEN	5	5		
BLUE	6	6		
VIOLET	7	7		
GREY	8	8		
WHITE	9	9		FKN series
GOLD			0.1Ω	± 5 % (J)
SILVER			0.01Ω	

### 4. ELECTRICAL CHARACTERISTICS

Normal Style

STYLE	FKN-25	FKN-50	FKN100	FKN200	FKN300	FKN400	FKN500
Power Rating at 70 °C	1/4W	1/2W	1 W	2 W	3W	4 W	5 W
Dielectric Withstanding Voltage	200V	300V					
Resistance Range	1Ω~22Ω	0.1Ω~47Ω	0.1Ω~100Ω	0.1Ω~150Ω	0.1Ω~330Ω		0.1Ω~390Ω
Operating Temp. Range	- 40 °C to + 155 °C						
Temperature Coefficient	± 350 ppm /						

Miniature Style

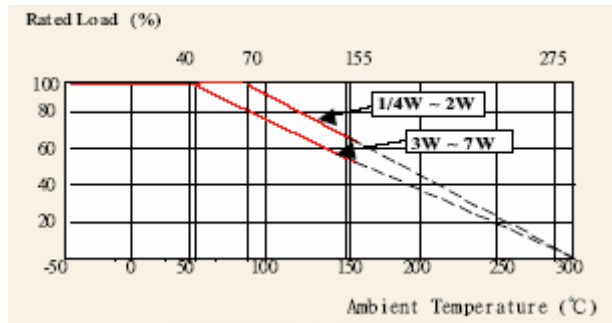
STYLE	FKN50S	FKN1WS	FKN2WS	FKN3WS	FKN5WS	FKN7WS
Power Rating at 70 °C	1/2W	1 W	2 W	3W	5 W	7 W
Dielectric Withstanding Voltage	200V	300V				
Resistance Range	1Ω~22Ω	0.1Ω~47Ω	0.1Ω~100Ω	0.1Ω~150Ω	0.1Ω~330Ω	0.1Ω~390Ω
Operating Temp. Range	- 40 °C to + 155 °C					
Temperature Coefficient	± 350 ppm /					

\* Below or over this resistance range on request.

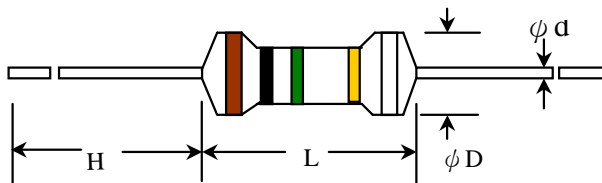
### 5. FUSING CHARACTERISTICS

The fusing time is within 30 seconds at 16 times of rated power and the fusing residual resistive value is at least 100 times of rated resistance.

## 6. DERATING CURVE



## 7. DIMENSIONS



STYLE		DIMENSION			
Normal	Miniature	L	$\phi D$	H	$\phi d$
FKN-25	FKN50S	6.3±0.5	2.4±0.2	28±2.0	0.55±0.05
FKN-50	FKN1WS	9.0±0.5	3.3±0.3	26±2.0	0.55±0.05
FKN100	FKN2WS	11.5±1.0	4.5±0.5	35±2.0	0.8±0.05
FKN200	FKN3WS	15.5±1.0	5.0±0.5	33±2.0	0.8±0.05
FKN300	FKN5WS	17.5±1.0	6.5±0.5	32±2.0	0.8±0.05
FKN400					
FKN500	FKN7WS	24.5±1.0	8.0±0.5	38±2.0	0.8±0.05

\* FKN1WS ( for MB Type )  $\phi d = 0.8\pm 0.05$  mm

## 8. ENVIRONMENTAL CHARACTERISTICS

### (1) Short Time Over Load Test

At 2.5 times of the rated voltage applied for 5 seconds, the resistor should be free from defects after the resistor is released from load for about 30 minutes

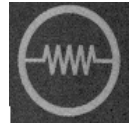
$$\text{Short Time Overload Voltage} = 2.5 * \sqrt{\text{Power Rating} \times \text{Resistance Value}}$$

The change of the resistance value should be within  $\pm 2.0 \% + 0.05\Omega$

### (2) Dielectric Withstanding Voltage

The resistor is placed on the metal V Block. Apply a Table I dielectric withstanding between the terminals connected together with the block for about 60 seconds.

The resistor shall be able to withstand without breakdown or flashover.



(3) Temperature Coefficient Test

Test of resistors above room temperature  $100^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( Testing Temperature  $115^{\circ}\text{C}$  to  $130^{\circ}\text{C}$  ) at the constant temperature silicon plate for over 5 minutes. Then measure the resistance value. The Temperature Coefficient is calculated by the following equation and its value should be within the range of requested.

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

**R** = Resistance value under the testing temperature

**R<sub>0</sub>** = Resistance value at the room temperature

**t** = The testing temperature

**t<sub>0</sub>** = Room temperature

(4) Insulation Resistance

Apply test terminal on lead and resistor body.

The test resistance should be high than 100M ohm.

(5) Solderability

Immerse the specimen into the solder pot at  $260 \pm 5^{\circ}\text{C}$  for  $5 \pm 0.5$  seconds.

At least 95% solder coverage on the termination.

(6) Resistance to Solvent

The specimen into the appropriate solvent of IPA condition of ultrasonic machine for 1 minutes.

The specimen is no deterioration of coatings and color code.

(7) Terminal Strength

Direct Load – Resistors shall be held by one terminal and the load shall be gradually applied in the direction of the longitudinal axis of the resistor unit the applied load reached 5 pounds ◦

The load shall be held for 10 seconds. The load of weight shall be  $\geq 2.5$  kg ( 24.5N ).

(8) Load Life in Humidity

Place the specimen in a test chamber at  $40 \pm 2^{\circ}\text{C}$  and 90 ~ 95 % relative humidity. Apply the rated voltage to the specimen at the 1.5 hours on and 0.5 hour off cycle. The total length of test is 1,000 hours

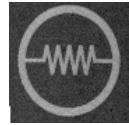
The change of the resistance value shall be within  $\pm 5\% + 0.05 \Omega$

(9) Load Life Test

Placed in the constant temperature chamber of  $70 \pm 3^{\circ}\text{C}$  the resistor shall be connected to the lead wire at the point of 25mm. Length with each terminal, the resistors shall be arranged not much effected mutually by the temperature of the resistors and the excessive ventilation shall not be performed, for 90 minutes on and 30 minutes off under this condition the rated D.C. voltage is applied continuously for 1000+48/-0 hours then left at no-load for 1hour, measured at this time the resistance value ◦

The change of the resistance value shall be within  $\pm 5\% + 0.05 \Omega$ .

There shall be no remarkable change in the appearance and the color code shall be legible after the test.



(10) Temperature Cycling Test

The temperature cycle shown in the following table shall be repeated 5 times consecutively. The measurement of the resistance value is done before the first cycle and after ending the fifth cycle, leaving in the room temperature for about 1 hour ◦

Temperature Cycling Conditions:

Step	Temperature(°C)	Time (minute)
1	-55 ± 3	30
2	25 ± 3	2 ~ 3
3	155 ± 3	30
4	25 ± 3	2 ~ 3

The change of the resistance value shall be within ± 1.0 % + 0.05 Ω

After the test the resistor shall be free from the electrical or mechanical damage.

(11) Resistance to Soldering Heat

The terminal lead shall be dipped into the solder pot at 350 ± 10 °C for 3 ± 0.5 seconds up to 2 ~ 2.5 mm.

The change of the resistance value shall be within ± 1.0 % + 0.05 Ω

(12) Overload Flame Retardant

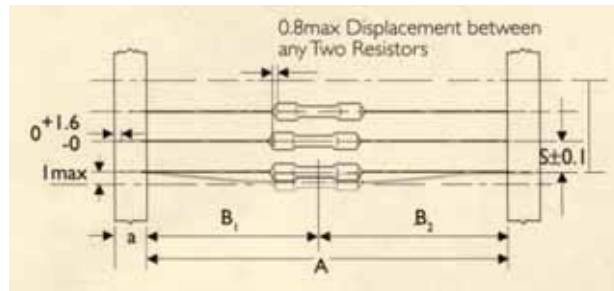
At 4 times of the rated voltage applied for 1 minute

$$\text{Overload Test Voltage} = 4 * \sqrt{\text{Power Rating} \times \text{Resistance Value}}$$

The resistor shall be able to no evidence of flaming arcing.

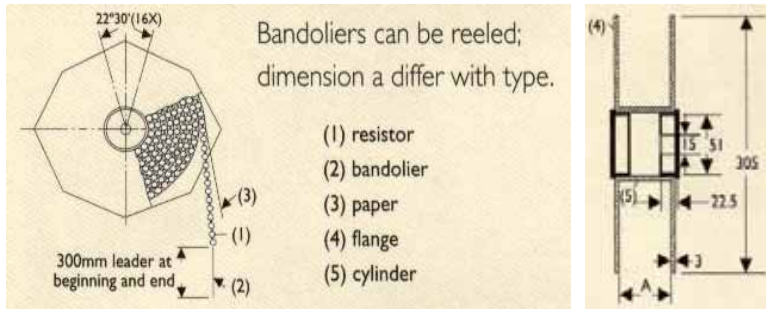
**9. PACKING METHODS**

Bandolier for Axial leads



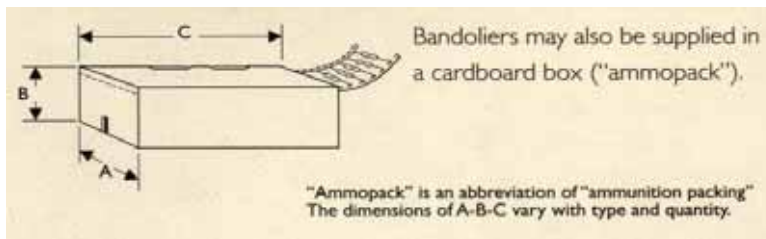
STYLE		DIMENSIONS			Unit: : mm	
Normal	Miniature	a	A	B1-B2	S(spacing)	T (max. deviation of spacing)
FKN-25	FKN50S	6 ± 0.5	52.4 ± 1.0 26.0 ± 1.0	1.2 1.0	5	
FKN-50	FKN1WS	6 ± 0.5	52.4 ± 1.0	1.2	5	
FKN100	FKN2WS	6 ± 0.5	73.0 ± 1.5 52.4 ± 1.5	1.5 1.2	5	1 mm per 10 spacing 0.5 mm per 5 spacing
FKN200	FKN3WS		73.0 ± 1.5	1.5		
FKN300	FKN5WS	6 ± 0.5	52.4 ± 1.5	1.2	10	
FKN400						
FKN500	FKN7WS	6 ± 0.5	91.0 ± 1.5 73.0 ± 1.5	1.5 1.5	10	

**10. TAPE ON REEL PACKING**



STYLE		TAPE ON REEL	
Normal	Miniature	ACROSS FLANGE (A)	Qty per reel
FKN-25	FKN50S	72	5,000
FKN-50	FKN1WS	72	2,500
FKN100	FKN2WS	95	2,000
FKN200	FKN3WS	95	1,000
FKN300 FKN400	FKN5WS	95	1,000
FKNP500	FKN7WS	95	250

**11. TAPE ON BOX PACKING**

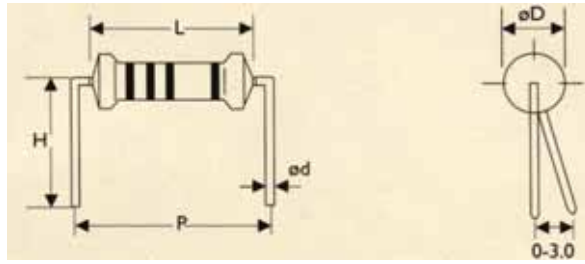


STYLE		Standard Lead Length			Short Lead Length			Qty per box
Normal	Miniature	W ( A )	H ( B )	L ( C )	W ( A )	H ( B )	L ( C )	
FKN-25	FKN50S	81	104	260	48	102	255	5,000
FKN-50	FKN1WS	73	45	258	—	—	—	1,000
FKN100	FKN2WS	103	78	260	81	91	260	1,000
FKN200	FKN3WS	103	94	260	81	91	260	1,000
FKN300 FKN400	FKN5WS	103	78	260	81	91	260	500
FKN500	FKN7WS	116	79	255	103	78	260	250



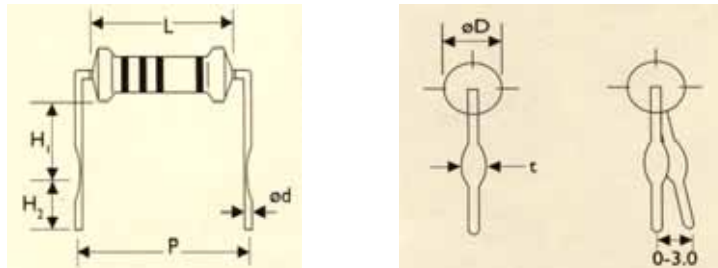
**12. SPECIAL TYPE ( FORMING DIMENSIONS )**

M TYPE



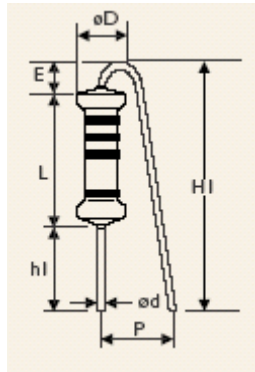
STYLE		DIMENSIONS					UNIT : mm
Normal	Miniature	L	$\phi D$	$\phi d$	P	H	
FKN-25	FKN50S	$6.3 \pm 0.5$	$2.4 \pm 0.2$	$0.55 \pm 0.05$	$10.0 \pm 1$	$10.0 \pm 1$	
FKN-50	FKN1WS	$9.0 \pm 0.5$	$3.3 \pm 0.3$	$0.55 \pm 0.05$	$12.5 \pm 1$	$10.0 \pm 1$	
FKN100	FKN2WS	$11.5 \pm 1.0$	$4.5 \pm 0.5$	$0.8 \pm 0.05$	$15.0 \pm 1$	$12.5 \pm 1$	
FKN200	FKN3WS	$15.5 \pm 1.0$	$5.0 \pm 0.5$	$0.8 \pm 0.05$	$20.0 \pm 1$	$15.0 \pm 1$	
FKN300 FKN400	FKN5WS	$17.5 \pm 1.0$	$6.5 \pm 0.5$	$0.8 \pm 0.05$	$25.0 \pm 1$	$15.0 \pm 1$	
FKN500	FKN7WS	$24.5 \pm 1.0$	$8.0 \pm 0.5$	$0.8 \pm 0.05$	$30.0 \pm 1$	$15.0 \pm 1$	

MB TYPE



STYLE		DIMENSIONS							UNIT : mm
Normal	Miniature	L	$\phi D$	$\phi d$	P	H 1	H 2	t	
FKN-25	FKN50S	$6.3 \pm 0.5$	$2.4 \pm 0.2$	$0.55 \pm 0.05$	$10.0 \pm 1$	$6.0 \pm 1$	$5.0 \pm 1$	$1.2 \pm 0.2$	
FKN-50	-	$9.0 \pm 0.5$	$3.3 \pm 0.3$	$0.55 \pm 0.05$	$12.5 \pm 1$	$6.0 \pm 1$	$5.0 \pm 1$	$1.2 \pm 0.2$	
-	FKN1WS	$9.0 \pm 0.5$	$3.3 \pm 0.3$	$0.8 \pm 0.05$	$12.5 \pm 1$	$6.0 \pm 1$	$5.0 \pm 1$	$1.4 \pm 0.2$	
FKN100	FKN2WS	$11.5 \pm 1.0$	$4.5 \pm 0.5$	$0.8 \pm 0.05$	$15.0 \pm 1$	$6.0 \pm 1$	$5.0 \pm 1$	$1.4 \pm 0.2$	
FKN200	FKN3WS	$15.5 \pm 1.0$	$5.0 \pm 0.5$	$0.8 \pm 0.05$	$20.0 \pm 1$	$10.0 \pm 1$	$5.0 \pm 1$	$1.4 \pm 0.2$	
FKN300 FKN400	FKN5WS	$17.5 \pm 1.0$	$6.5 \pm 0.5$	$0.8 \pm 0.05$	$25.0 \pm 1$	$10.0 \pm 1$	$5.0 \pm 1$	$1.4 \pm 0.2$	
FKN500	FKN7WS	$24.5 \pm 1.0$	$8.0 \pm 0.5$	$0.8 \pm 0.05$	$30.0 \pm 1$	$15.0 \pm 1$	$5.0 \pm 1$	$1.4 \pm 0.2$	

F TYPE

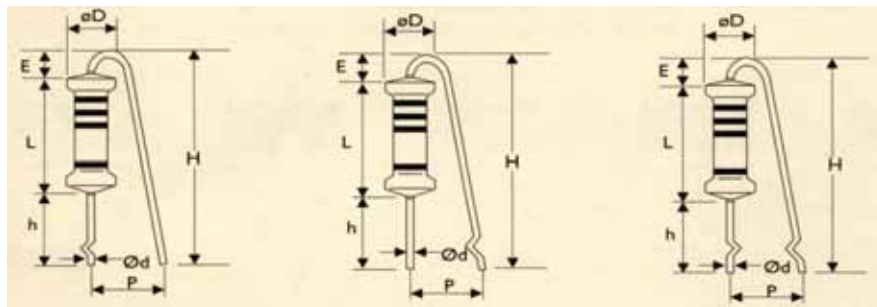


STYLE		DIMENSIONS					UNIT : mm	
Normal	Miniature	L	$\phi D$	$\phi d$	P	h1	H1 max	E max
FKN100	FKN2WS	$11.5 \pm 1.0$	$4.5 \pm 0.5$	$0.8 \pm 0.05$	$6.0 \pm 1$	$5.0 \pm 1$	20	3.5
FKN200	FKN3WS	$15.5 \pm 1.0$	$5.0 \pm 0.5$	$0.8 \pm 0.05$	$6.0 \pm 1$	$5.0 \pm 1$	25	3.5

FK TYPE

FFK TYPE

FKK TYPE



STYLE		DIMENSIONS					UNIT : mm	
Normal	Miniature	L	$\phi D$	$\phi d$	P	h	H max	E max
FKN100	FKN2WS	$11.5 \pm 1.0$	$4.5 \pm 0.5$	$0.8 \pm 0.05$	$6.0 \pm 1$	$10.0 \pm 1$	25	3.5
FKN200	FKN3WS	$15.5 \pm 1.0$	$5.0 \pm 0.5$	$0.8 \pm 0.05$	$6.0 \pm 1$	$10.0 \pm 1$	30	3.5

**13. Plant Address**

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