

# DATA SHEET

## WIREWOUND RESISTORS

Fusible, Anti-Explosion

FAE Series

$\pm 1\%$ ,  $\pm 5\%$

1/2W to 5W

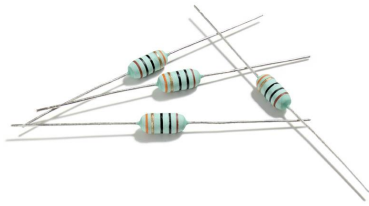
RoHS compliant & Halogen Free



**YAGEO**

Product specification – August 13, 2021 V.0





**APPLICATIONS**

- Chargers & adapters
- Home appliance
- Lighting
- Safety application

**FEATURES**

- UL1412 qualified
- Safety, anti-explosion
- Fusing time <60S for 25 times rated power
- Excellent surge performance
- Flameproof coating equivalent to UL-94V-0
- RoHS compliant & halogen-free

**ORDERING INFORMATION**

Part number of the fusible anti-explosion wirewound resistor are identified by the series, power rating, tolerance, packing, temperature coefficient, forming and resistance value and suffix.

**PART NUMBER**

<u>FAE</u> (1)	<u>2WS</u> (2)	<u>F</u> (3)	<u>T</u> (4)	<u>-</u> (5)	<u>73-</u> (6)	<u>10R</u> (7)	<u>CM</u> (8)
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**(1) SERIES**

FAE Series

**(2) POWER RATING**

50S = 1/2W	1WV = 1W,	3WS = 3W	5WS = 5W
-50 = 1/2W	2SS = 2W	300 = 3W,	500 = 5W
1SS = 1W	2WS = 2W	3WV = 3W	5WV = 5W
1WS = 1W	200 = 2W	4SS = 4W	
100 = 1W	3SS = 3W	4WV = 4W	

**(3) TOLERANCE**

F = ±1%	J = ±5%
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**(4) PACKAGING**

R = Reel Pack	B = Bulk
T = Box Pack	

**(5) TEMPERATURE COEFFICIENT OF RESISTANCE**

- = Based on spec.

**(6) FORMING**

52- = 52.4mm	M = M-Type Forming
73- = 73mm	MB = M-form W/flat
91- = 91mm	
52E = 52.4mm, Φd=0.7±0.02mm	
52Z = 52.4mm, S =10±0.1 mm for FAE3WV, 100, 2WS, 3SS	
73Z = 73mm, S=10±0.1 mm for FAE3WV, 100, 2WS, 3SS	

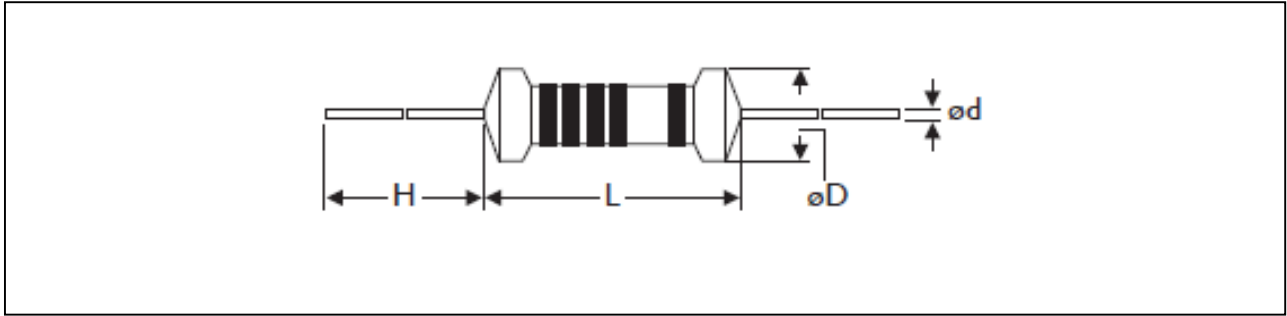
**(7) RESISTANCE VALUE**

E24 & E96 Series  
 Example:  
 1R = 1Ω, 10R = 10Ω, 100R = 100Ω

**(8) Suffix**

Optional code. required only when resistor is with particular pulse/surge specification.  
 Example : CA, CE, CM, CN, FB, FC and etc.

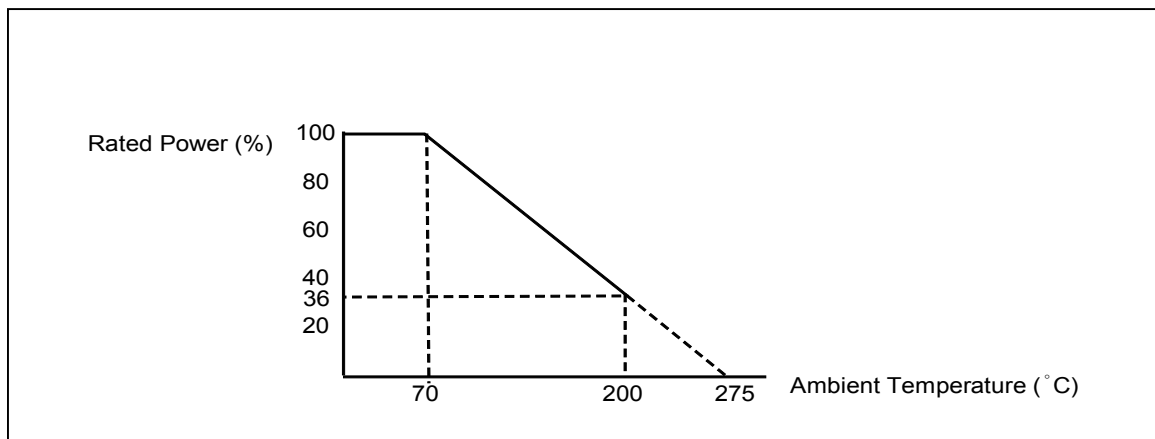
**DIMENSIONS**



Unit: mm

Special	Normal	Miniature	Ultra Miniature	L	ψD	H	ψd
-	-	FAE50S	FAE1SS	6.3 ± 0.5	3.0 ± 0.5	28 ± 2.0	0.55 ± 0.05
-	FAE-50	FAE1WS	FAE2SS	9.0 ± 0.5	3.8 ± 0.5	26 ± 2.0	0.55 ± 0.05
FAE1WV	-	-	-	10.0 ± 1.0	4.3 <sup>+1.0</sup> <sub>-0.5</sub>	26 ± 2.0	0.8 ± 0.05
-	FAE100	FAE2WS	FAE3SS	11.5 ± 1.0	5.0 ± 0.5	35 ± 2.0	0.8 ± 0.05
FAE3WV	-	-	-	13.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	34 ± 2.0	0.8 ± 0.05
	FAE200	FAE3WS	FAE4SS	15.5 ± 1.0	5.5 ± 0.5	33 ± 2.0	0.8 ± 0.05
FAE4WV	-	-	-	17.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	32 ± 2.0	0.8 ± 0.05
-	FAE300	FAE5WS	-	17.5 ± 1.0	6.7 ± 0.5	32 ± 2.0	0.8 ± 0.05
FAE5WV	-	-	-	17.0 ± 1.0	7.5 <sup>+1.0</sup> <sub>-0.5</sub>	32 ± 2.0	0.8 ± 0.05
-	FAE500	-	-	24.5 ± 1.0	8.7 ± 0.5	38 ± 2.0	0.8 ± 0.05

**DERATING CURVE**



**ELECTRICAL CHARACTERISTICS**

CHARACTERISTICS	FAE -50	FAE 100	FAE 1WV	FAE 200	FAE 300	FAE 3WV	FAE 4WV	FAE 500	FAE 5WV
Power Rating at 70 °C	1/2W	1W	1W	2W	3W	3W	4W	5W	5W
Voltage Proof on Insulation	400V	500V	500V	500V	500V	500V	500V	500V	500V
Maximum Working Voltage	$\sqrt{(P \times R)}$								
Resistance Range	3.3Ω - 100Ω for E24 & E96 series value								
Operating Temp. Range	- 55°C to +200°C								
Temperature Coefficient	±300ppm/°C								

CHARACTERISTICS	FAE 50S	FAE 1SS	FAE 1WS	FAE 2SS	FAE 2WS	FAE 3SS	FAE 3WS	FAE 4SS	FAE 5WS
Power Rating at 70 °C	1/2W	1W	1W	2W	2W	3W	3W	4W	5W
Voltage Proof on Insulation	300V	300V	500V	500V	500V	500V	500V	500V	500V
Maximum Working Voltage	$\sqrt{(P \times R)}$								
Resistance Range	3.3Ω - 100Ω for E24 & E96 series value								
Operating Temp. Range	- 55°C to +200°C								
Temperature Coefficient	±300ppm/°C								

Note: For resistance value out of above range is by request

**FUSING CHARACTERISTICS**

Fusing characteristics

1) The resistors will Fuse within 60 seconds at 25 times of rated power;

Fusing residual resistive value at least 100 times rated resistance.

2) The resistors will fuse when mains voltage of 264VAC (Special test Voltage on request) is directly applied for 5 seconds maximum. No flames, no explosion, no sound and no arc happened. Fusing residual resistive value at least 100 times rated resistance.

**TEST AND REQUIREMENTS**

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	10 times rated power for 5 Sec.	±2.0%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	In V-Block for 60 sec. test voltage as above table	No Breakdown
Temperature Coefficient	IEC 60115-1 4.8	Between -40°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>100MΩ
Solderability	IEC 60115-1 4.17	245±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	No deterioration of coatings and markings
Robustness of Terminations	IEC 60115-1 4.16	Direct load for 10 Sec. in the direction of the terminal leads	≥2.5Kg(24.5N)
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV(or Umax., whichever less) 10,000 cycles (1 Sec. on, 25 Sec.off)	±2.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C,90-95% RH for 56 days, loaded with 0.1 times RCWV (or Umax., whichever less)	±5.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV(or Umax., whichever less) for 1,000 Hr.(1.5 Hr.on,0.5 Hr. off)	±5.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C → Room Temp. → +155°C → Room Temp.(5 cycles)	±2.0%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±1.0%+0.05Ω
Accidental overload test	IEC 60115-1 4.26	4 times RCWV for 1 Min.	No evidence of flaming or arcing

Note:.

**RCWV (Rated Continuous Working Voltage ):**

The DC or AC (rms) continuous working voltage corresponding to the rated power is determined by the following formula:

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

or max. working voltage whichever is less

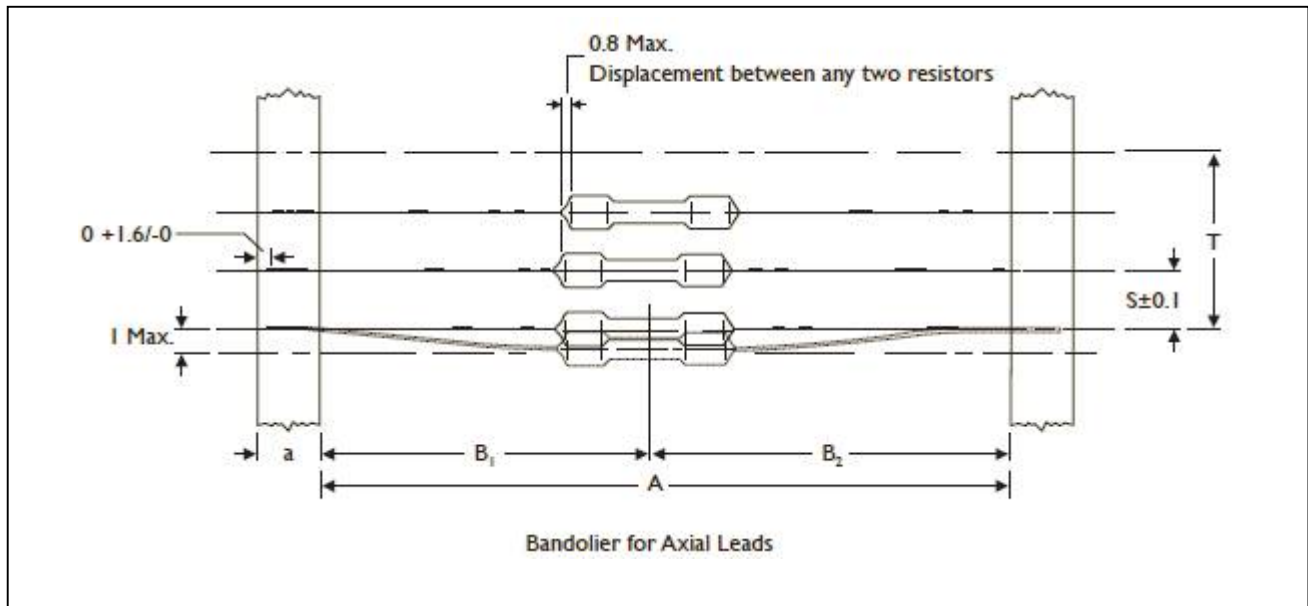
Where

V=Continuous rated DC or  
AC (rms) working voltage (V)

P=Rated power (W)

R=Resistance value (Ω)

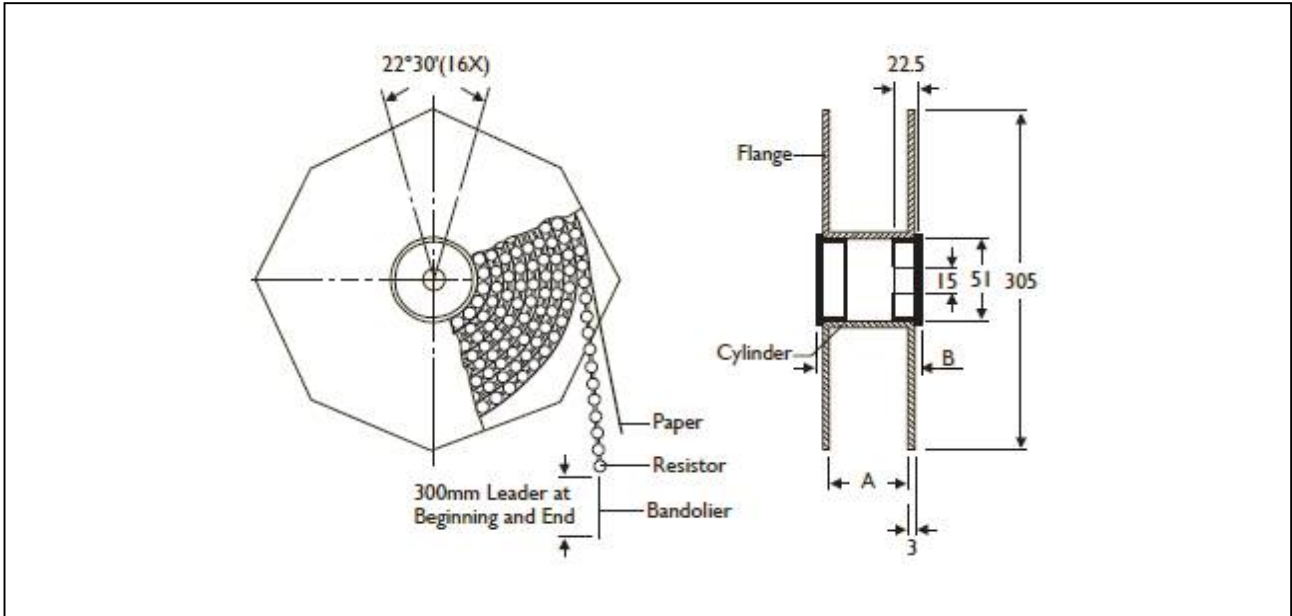
**AXIAL / REEL TAPE SPECIFICATION**



Unit: mm

Special	Normal	Miniature	Ultra Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
FAE1WV	FAE-50	FAE50S FAE1WS	FAE1SS FAE2SS	$6 \pm 0.5$	$52.4 \pm 1.5$	1.2	5	
FAE3WV	FAE100	FAE2WS	FAE3SS	$6 \pm 0.5$	$52.4 \pm 1.5$ $73.0 \pm 1.5$	1.2 1.5	5(52-or 73-) 10(52Zor 73Z)	1 mm per 10 spacing, 0.5 mm per 5 spacing
FAE4WV	FAE200 FAE300	FAE3WS	FAE4SS	$6 \pm 0.5$	$52.4 \pm 1.5$ $73.0 \pm 1.5$	1.2 1.5	10	
FAF5WV	FAE500	FAE5WS	-	$6 \pm 0.5$	$73.0 \pm 1.5$ $91.0 \pm 1.5$	1.5 1.5	10	

**TAPE ON REEL PACKING**

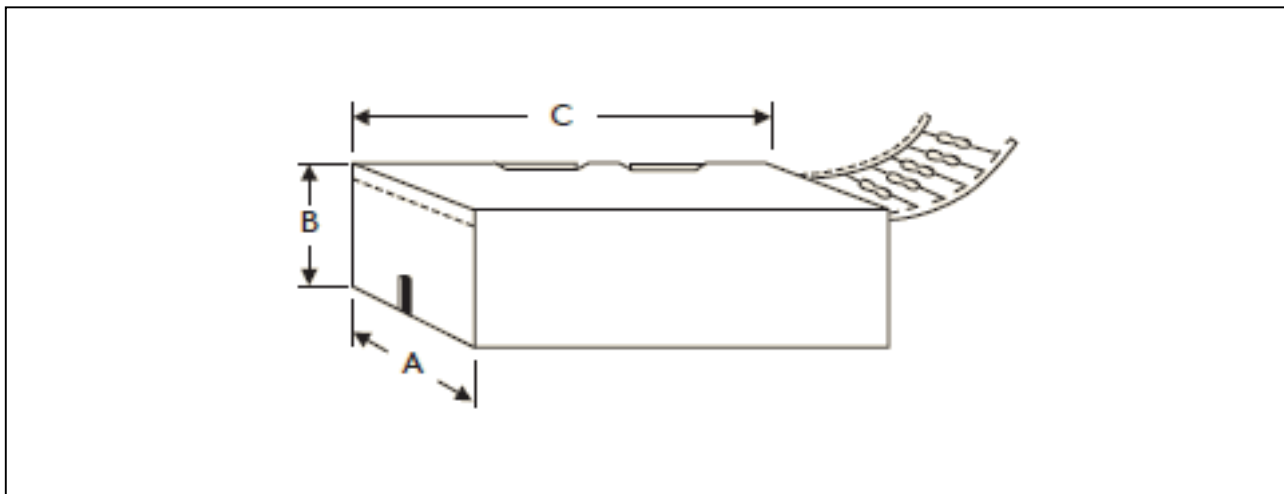


TYPE

Unit: mm/piece

Special	Normal	Miniature	Ultra Miniature	Across Flange(A)	B	Quantity Per Reel
-	-	FAE50S	FAE1SS	66.5	75.5	5,000
FAE1WV	FAE-50	FAE1WS	FAE2SS	66.5	75.5	2,500
-	FAE100	FAE2WS	FAE3SS	87	96	2,000
FAE3WV	FAE200	FAE3WS	FAE4SS	87	96	1,000
FAE4WV	FAE300	FAE5WS	-	87	96	1,000
FAE5WV	-	-	-	87	96	1,000

**TAPE ON BOX PACKING**



TYPE				DIMENSIONS			Unit: mm/piece
Special	Normal	Miniature	Ultra Miniature	A	B	C	Quantity Per Box
-	-	FAE50S	FAE1SS	48	102	255	5,000
-	-	FAE50S	FAE1SS	81	104	260	5,000
FAE1WV	FAE-50	FAE1WS	FAE2SS	73	45	258	1,000
-	FAE100	FAE2WS	FAE3SS	81	91	260	1,000
-	FAE100	FAE2WS	FAE3SS	103	78	260	1,000
FAE3WV	FAE200	FAE3WS	FAE4SS	81	91	260	1,000
FAE3WV	FAE200	FAE3WS	FAE4SS	103	94	260	1,000
FAE4WV	FAE300	FAE5WS	-	81	91	260	500
FAE4WV	FAE300	FAE5WS	-	103	94	260	500
FAE5WV	-	-	-	103	94	260	250

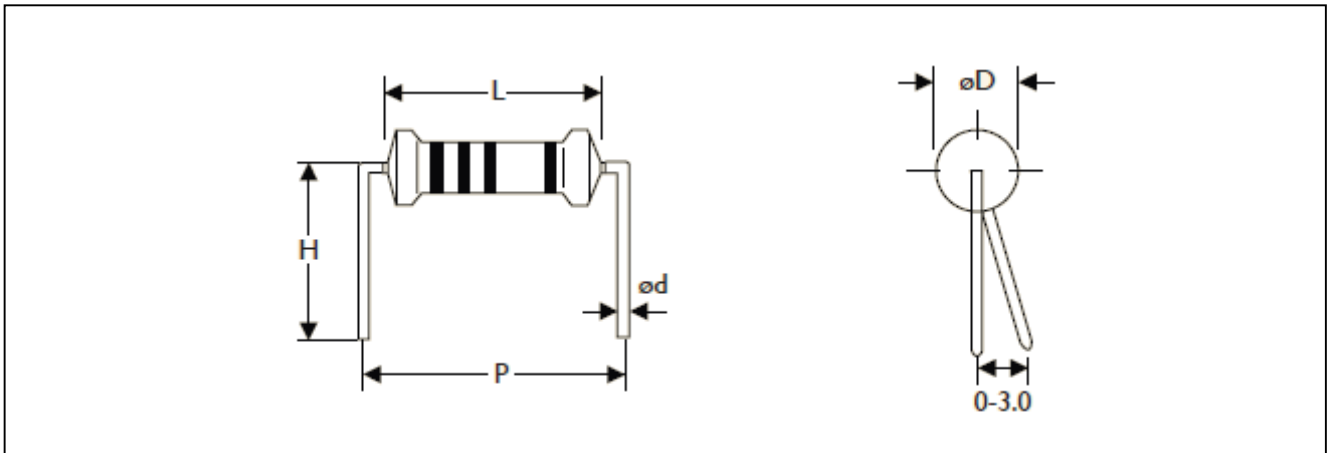
**BULK PACKING**

Special	Normal	Miniature	Ultra Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
-	-	FAE50S	FAE1SS	10,000	10	1,000
FAE1WV	FAE-50	FAE1WS	FAE2SS	5,000	5	1,000
-	FAE100	FAE2WS	FAE3SS	2,000	4	500
FAE3WV	FAE200	FAE3WS	FAE4SS	1,000	2	500
FAE4WV	FAE300	FAE5WS	-	1,000	2	500
FAE5WV	-	-	-	1000	2	500
-	FAE500	-	-	500	10	50



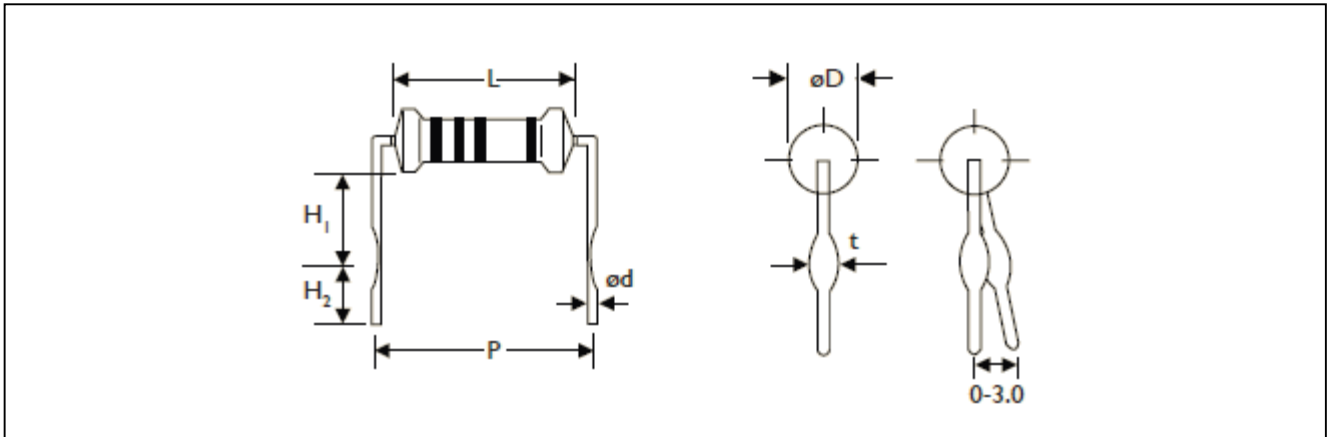
**FORMING**

**M TYPE**



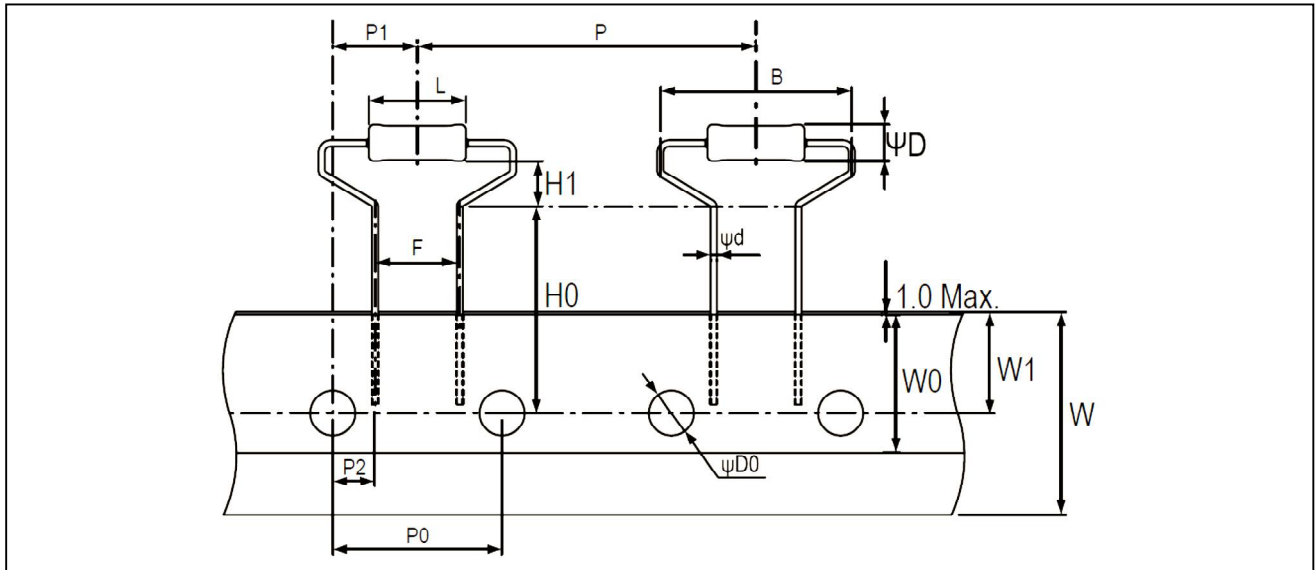
TYPE				DIMENSIONS					Unit: mm
Special	Normal	Miniature	Ultra Miniature	L	ψD	ψd	P	H	
-	-	FAE50A	FAE1SS	6.3 ± 0.5	3.0 ± 0.5	0.55 ± 0.05	10.0 ± 1	10.0 ± 1	
-	FAE-50	FAE1WS	FAE2SS	9.0 ± 0.5	3.8 ± 0.5	0.55 ± 0.05	12.5 ± 1	10.0 ± 1	
FAE1WV	-	-	-	10.0 ± 1.0	4.3 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	12.5 ± 1	10.0 ± 1	
-	FAE100	FAE2WS	FAE3SS	11.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1	
FAE3WV	-	-	-	13.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	15.0 ± 1	12.5 ± 1	
-	FAE200	FAE3WS	FAE4SS	15.5 ± 1.0	5.5 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1	
FAE4WV	-	-	-	17.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	20.0 ± 1	15.0 ± 1	
-	FAE300	FAE25WS	-	17.5 ± 1.0	6.7 ± 0.5	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	
FAE5WV	-	-	-	17.0 ± 1.0	7.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	
-	FAE500	-	-	24.5 ± 1.0	8.7 ± 0.5	0.8 ± 0.05	30.0 ± 1	15.0 ± 1	

**MB TYPE**



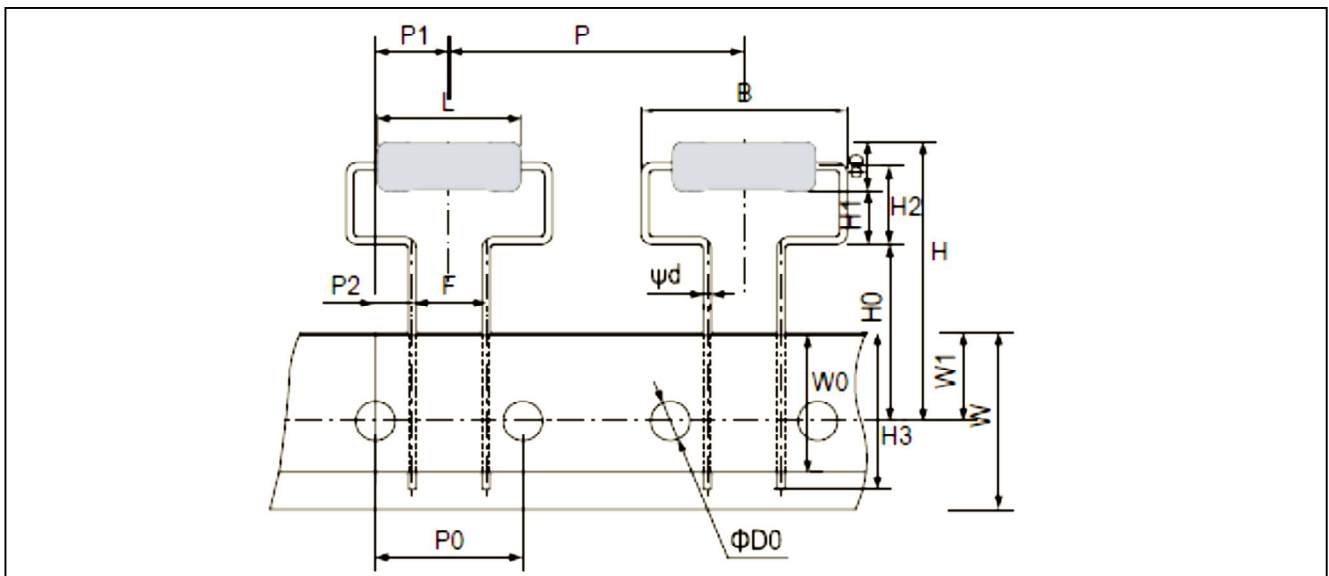
TYPE				DIMENSIONS							Unit: mm
Special	Normal	Miniature	Ultra Miniature	L	ψD	ψd	P	H1	H2	t	
-	-	FAE50A	FAE1SS	6.3 ± 0.5	3.0 ± 0.5	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2	
-	FAE-50	-	-	9.0 ± 0.5	3.8 ± 0.5	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2	
-	-	FAE1WS	FAE2SS	9.0 ± 0.5	3.8 ± 0.5	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FAE1WV	-	-	-	10.0 ± 1.0	4.3 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
-	FAE100	FAE2WS	FAE3SS	11.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FAE3WV	-	-	-	13.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
-	FAE200	FAE3WS	FAE4SS	15.5 ± 1.0	5.5 ± 0.5	0.8 ± 0.05	20.0 ± 1	10.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FAE4WV	-	-	-	17.0 ± 1.0	5.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	20.0 ± 1	10.0 ± 1	5.0 ± 1	1.4 ± 0.2	
-	FAE300	FAE25WS		17.5 ± 1.0	6.7 ± 0.5	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FAE5WV	-	-	-	17.0 ± 1.0	7.5 <sup>+1.0</sup> <sub>-0.5</sub>	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	5.0 ± 1	1.4 ± 0.2	
-	FAE500	-	-	24.5 ± 1.0	8.7 ± 0.5	0.8 ± 0.05	30.0 ± 1	15.0 ± 1	5.0 ± 1	1.4 ± 0.2	

MHA TYPE



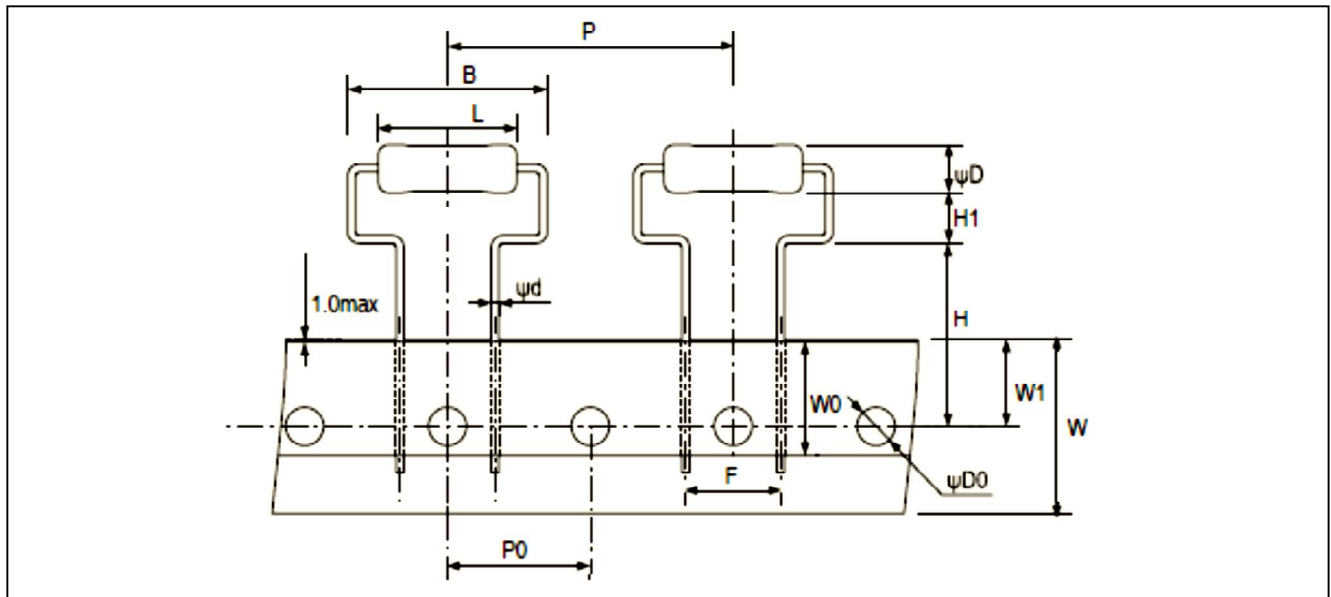
TYPE			DIMENSIONS							Unit: mm	
Normal	Miniature	Ultra Miniature	L	$\psi D$	$\psi d$	B	H0	H1	P	P0	
			9.0±0.5	3.8±0.3	0.55±0.05	17.5Max	19.0±1.0	4.0±1.0	30.0±1.0	15.0±0.3	
FAE-50	FAE1WS	FAE2SS	P1	P2	F	W	W0	W1	$\psi D_0$		
			7.5±1.0	3.75±0.5	7.5±0.5	18.0±0.5	5.0Min	9.0±0.5	4.0±0.2		

MHB TYPE



TYPE			DIMENSIONS							Unit: mm		
Normal	Miniature	Ultra Miniature	L	$\psi D$	$\psi d$	B	H	H0	H1	H2	H3	
			15.5±1.0	5.5±0.5	0.8±0.05	21.0Max	30Max.	18.0±1.0	5.5(Ref.)	8.0±1.5	16Max.	
FAE200	FAE3WS	FAE4SS	P	P0	P1	P2	F	W	W0	W1	$\psi D_0$	
			30.0±1.0	15.0±0.3	7.5±1.0	3.75±0.8	7.5±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.3	

**MHC TYPE**

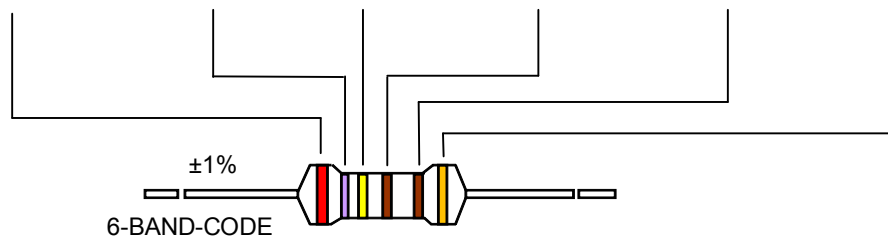


TYPE			DIMENSIONS								Unit: mm
Normal	Miniature	Ultra Miniature	L	$\psi D$	$\psi d$	B	H	H1	P	P0	
			15.5±1.0	5.5±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3	
FAE200	FAE3WS	FAE4SS	F	W	W0	W1	$\psi D0$				
			10.0±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.2				

**MARKING**



COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
BLACK	0	0	0	1Ω	
BROWN	1	1	1	10Ω	± 1 % ( F )
RED	2	2	2	100Ω	
ORANGE	3	3	3	1KΩ	FAE Series
YELLOW	4	4	4	10KΩ	
GREEN	5	5	5	100KΩ	
BLUE	6	6	6	1MΩ	
VIOLET	7	7	7	10MΩ	
GREY	8	8	8		
WHITE	9	9	9		
GOLD				0.1Ω	± 5 % ( J )
SILVER				0.01Ω	



**REVISION HISTORY**

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 0	Aug.2 , 2021	-	- First issue of this specification

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