

DATA SHEET

WIREWOUND RESISTORS

Fusible, Anti-Explosion

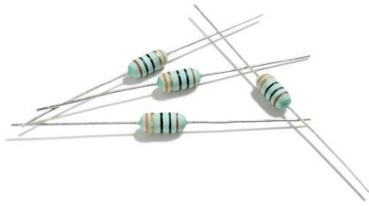
FAE Series

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

1/2W to 5W

RoHS compliant & Halogen Free





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%

(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

Note: 52.4mm, 73mm and 91mm represent dimension A of the axial type, please refer to the category of AXIAL/REEL TAPE SPECIFICATION for the detail

(7) RESISTANCE VALUE

E24 & E96 Series

Example:

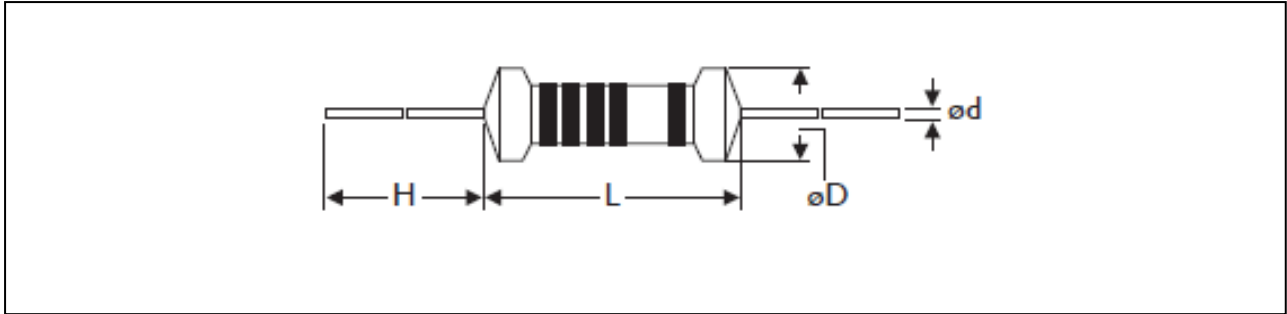
1R = 1Ω, 10R = 10Ω, 100R = 100Ω

(8) Suffix

Optional code. required only when resistor is with particular pulse/surge specification.

Example : CA, CE, CM, CN, FB, FC and etc.

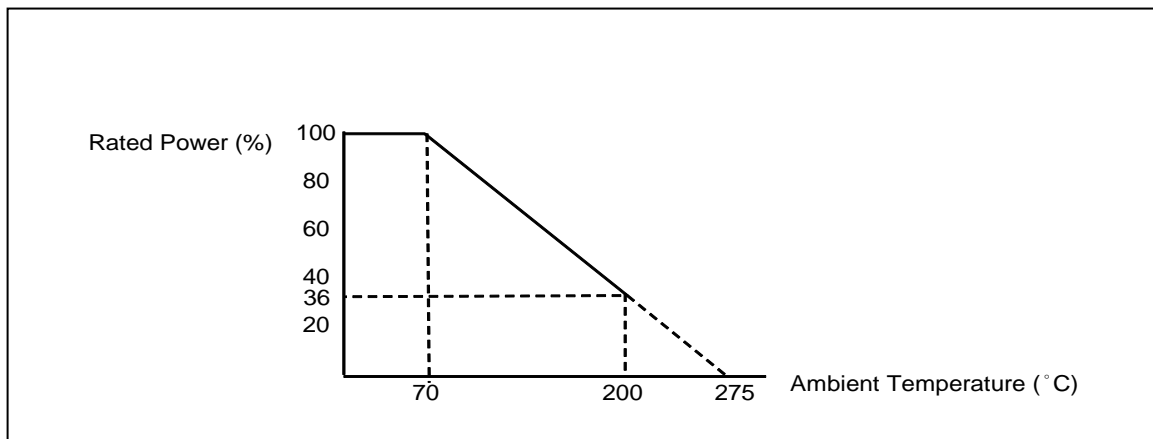
DIMENSIONS



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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 REQUIRMENTS

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

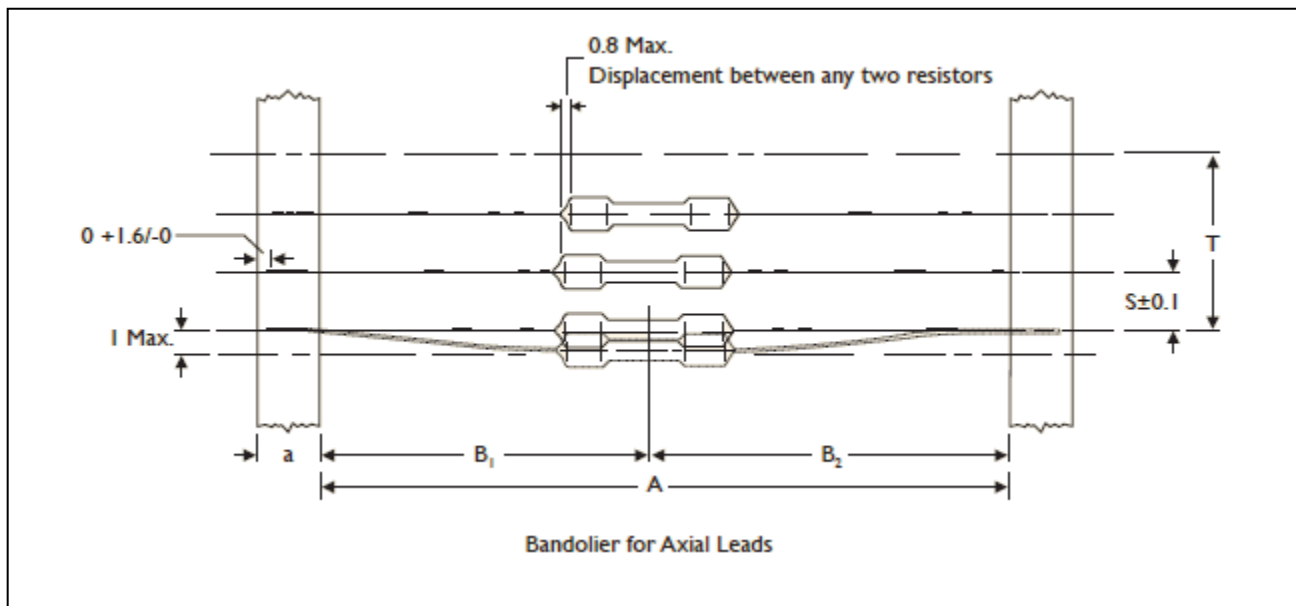
Where

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

P=Rated power (W)

R=Resistance value (Ω)

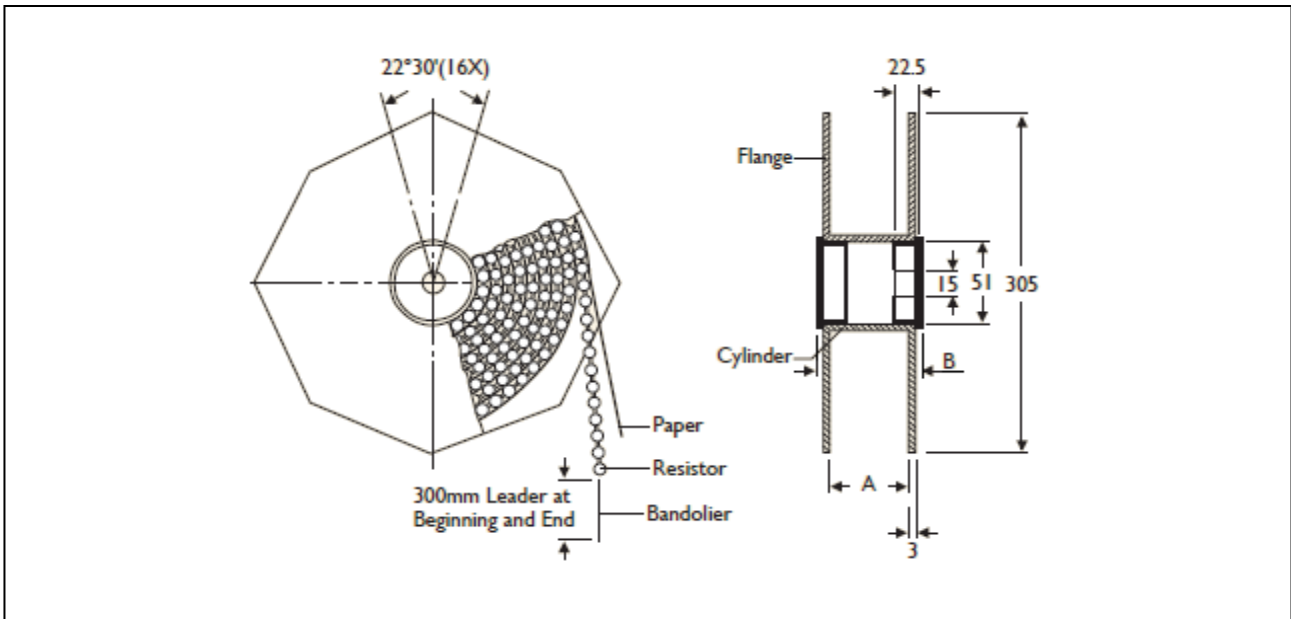
AXIAL / REEL TAPE SPECIFICATION



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 ± 0.5	52.4 ± 1.5	1.2	5	
FAE3WV	FAE100	FAE2WS	FAE3SS	6 ± 0.5	73.0 ± 1.5 52.4 ± 1.5	1.5 1.2	5(52-or 73-) 10(52Zor 73Z)	1 mm per 10 spacing, 0.5 mm per 5 spacing
FAE4WV FAE5WV	FAE200 FAE300	FAE3WS FAE5WS	FAE4SS	6 ± 0.5	73.0 ± 1.5 52.4 ± 1.5	1.5 1.2	10	
-	FAE500	-	-	6 ± 0.5	91.0 ± 1.5	1.5	10	

TAPE ON REEL PACKING

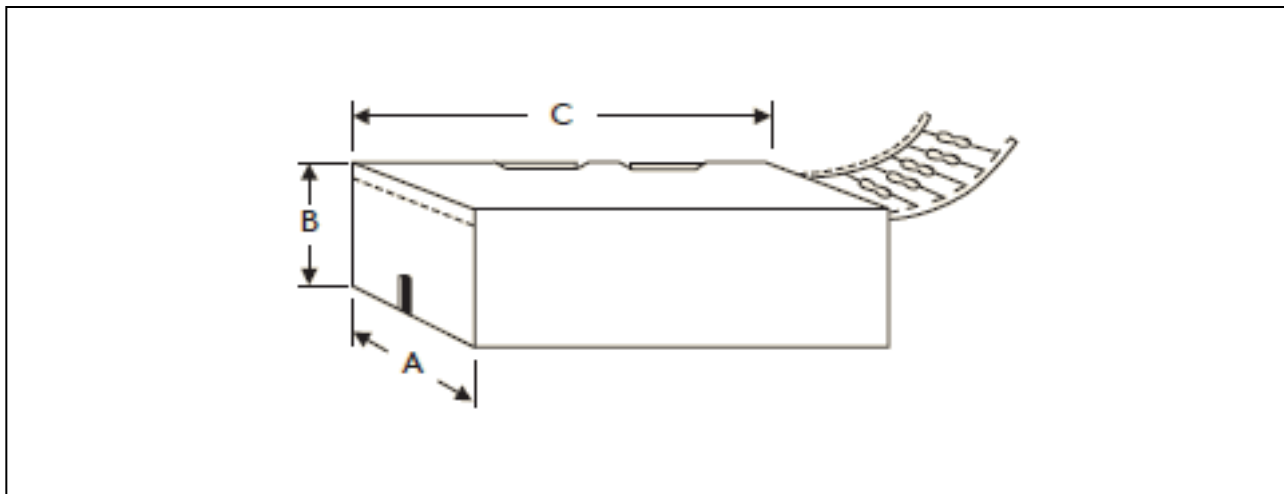


TYPE

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



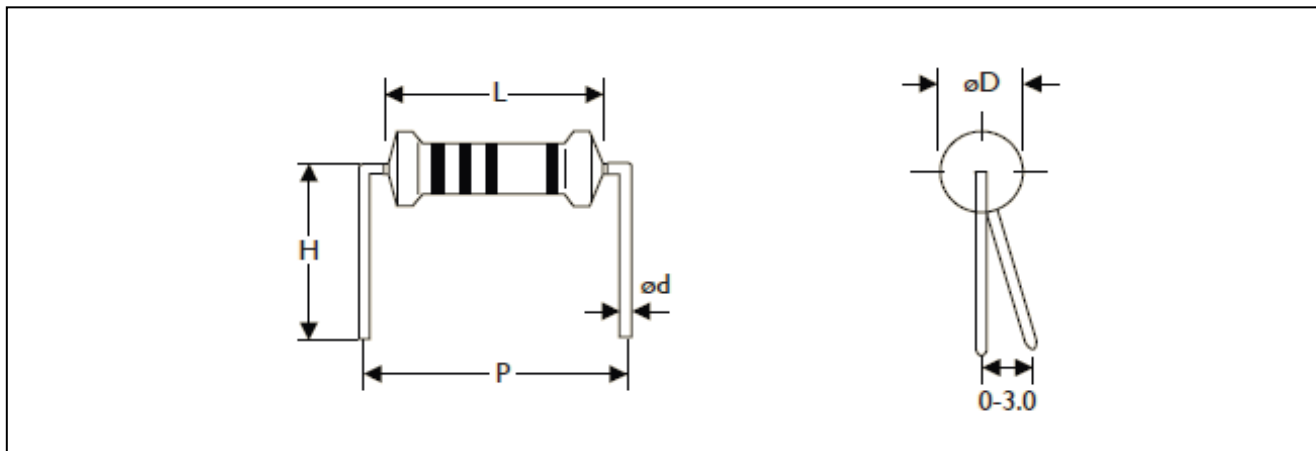
TYPE				DIMENSIONS			Unit: mm/piece	
Special	Normal	Miniature	Ultra Miniature	A	B	C	Quantity Per Box	Per Box
-	-	FAE50S	FAE1SS	48	102	255	5,000	
-	-	FAE50S	FAE1SS	81	104	260	5,000	
FAE1WV	FAE-50	FAE1WS	FAE2SS	73	45	258	1,000	
-	FAE100	FAE2WS	FAE3SS	81	91	260	1,000	
-	FAE100	FAE2WS	FAE3SS	103	78	260	1,000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

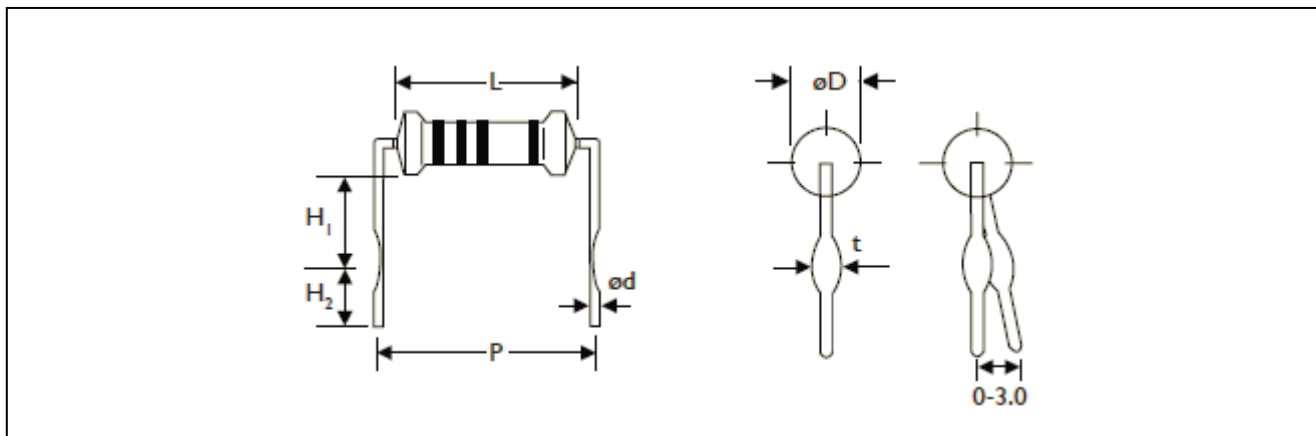
FORMING

M TYPE



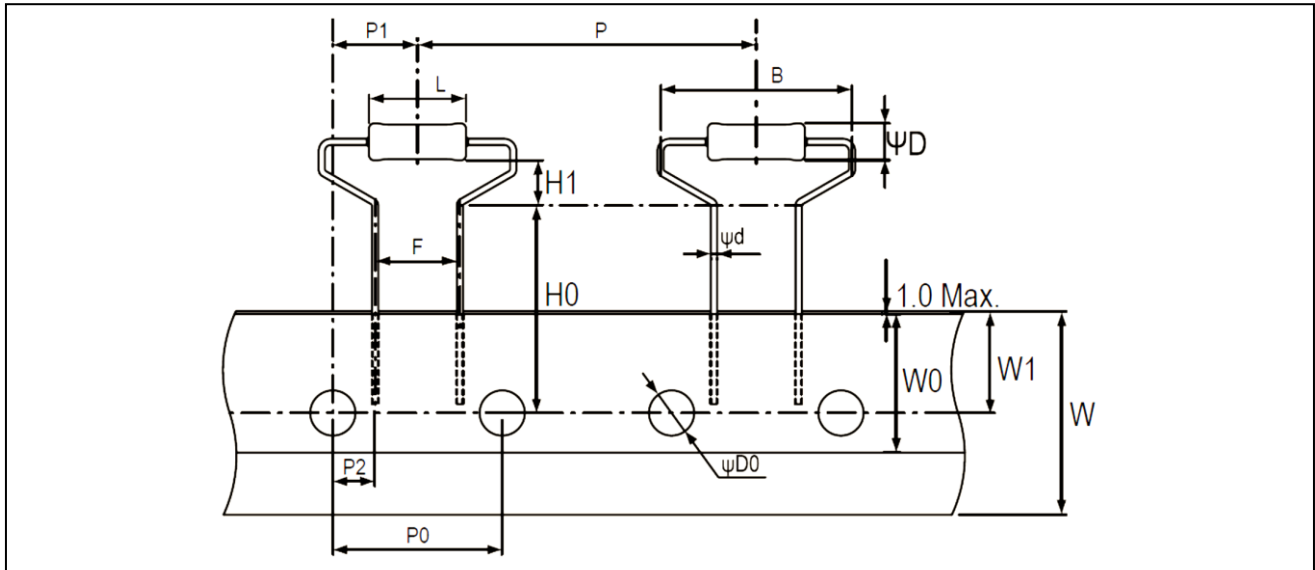
TYPE				DIMENSIONS					Unit: mm
Special	Normal	Miniature	Ultra Miniature	L	ψD	ψd	P	H	
-	-	FAE50A	FAE1SS	6.3 ± 0.5	3.0 ± 0.5	0.55 ± 0.05	10.0 ± 1	10.0 ± 1	
-	FAE-50	FAE1WS	FAE2SS	9.0 ± 0.5	3.8 ± 0.5	0.55 ± 0.05	12.5 ± 1	10.0 ± 1	
FAE1WV	-	-	-	10.0 ± 1.0	4.3 ^{+1.0} _{-0.5}	0.8 ± 0.05	12.5 ± 1	10.0 ± 1	
-	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	

MB TYPE



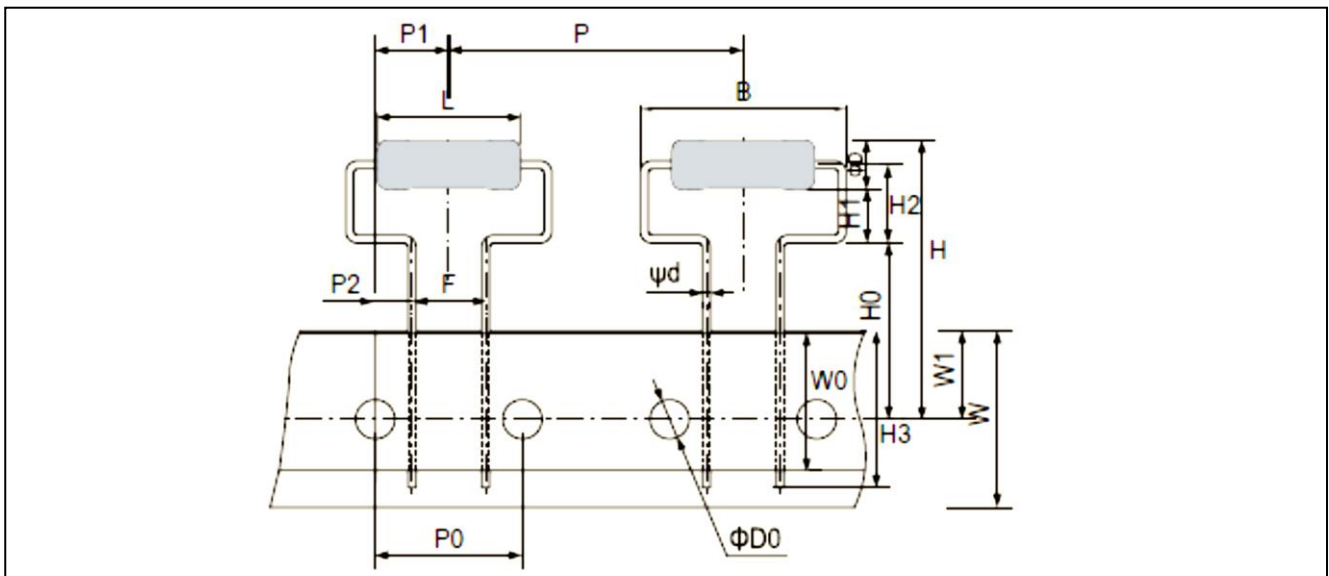
TYPE				DIMENSIONS							Unit: mm
Special	Normal	Miniature	Ultra Miniature	L	ψD	ψd	P	H1	H2	t	
-	-	FAE50A	FAE1SS	6.3 ± 0.5	3.0 ± 0.5	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2	
-	FAE-50	-	-	9.0 ± 0.5	3.8 ± 0.5	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2	
-	-	FAE1WS	FAE2SS	9.0 ± 0.5	3.8 ± 0.5	0.8 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2	
FAE1WV	-	-	-	10.0 ± 1.0	4.3 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	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 ^{+1.0} _{-0.5}	0.8 ± 0.05	25.0 ± 1	15.0 ± 1	5.0 ± 1	1.4 ± 0.2	

MHA TYPE



TYPE			DIMENSIONS							Unit: mm
Normal	Miniature	Ultra Miniature	L	ψD	ψd	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	ψD0	
			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	

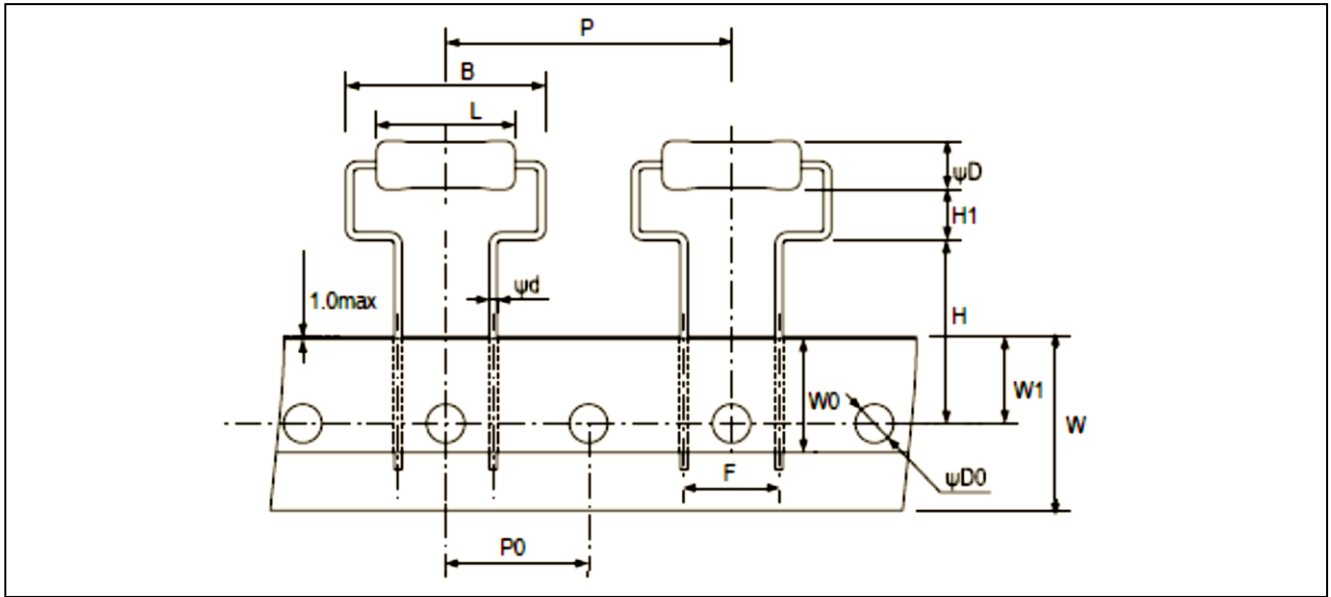
MHB TYPE



TYPE			DIMENSIONS							Unit: mm	
Normal	Miniature	Ultra Miniature	L	ψD	ψd	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	ψD0
			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

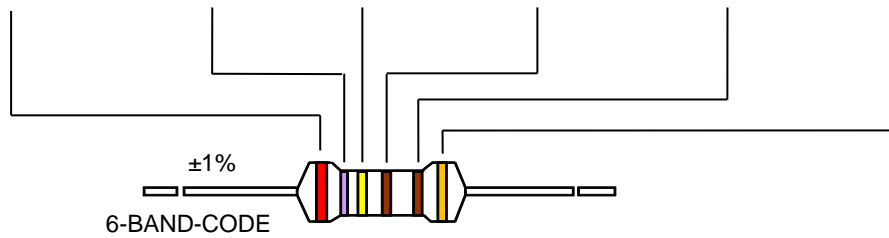


TYPE			DIMENSIONS								Unit: mm
Normal	Miniature	Ultra Miniature	L	ψD	ψd	B	H	H1	P	P0	
			15.5±1.0	5.5±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3	
FAE200	FAE3WS	FAE4SS	F	W	W0	W1	$\Psi D0$				
			10.0±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.2				

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 5	Apr.2 ,2024	-	- Added forming code description for part number
Version 4	Mar.27 ,2024	-	- Remove M type of FAE500
Version 3	Mar.8 ,2024	-	- Update the 73-&52- type for FAE5WV&FAE5WS - Update the 91- type for FAE500
Version 2	Nov.14 ,2023	-	- Remove MB type of FAE500
Version 1	Aug.31 ,2023	-	- Updated legal disclaimer
Version 0	Aug.2 ,2021	-	- First issue of this specification

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