Innovative Service Around the Globe YAGEO

# DATA SHEET

## WIREWOUND RESISTORS

Fusible, Anti-Explosion

FAE Series

±1%, ±5%

**1/2W to 5W**

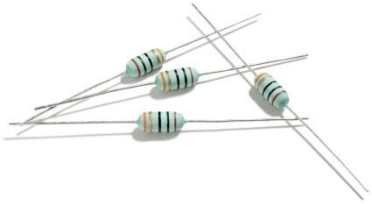
**RoHS compliant & Halogen Free**

YAGEO

Product specification – April 3, 2024 V.5




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## 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

| FAE | 2WS | F | T | - | 73- | 10R | CM |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |

### (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

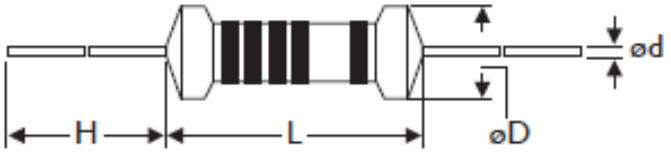
### (8) Suffix

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

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


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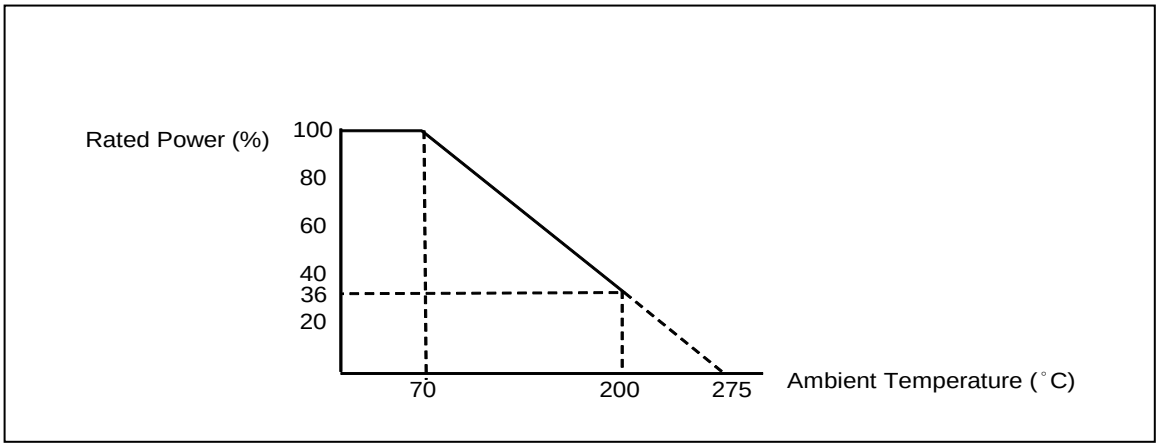
## DIMENSIONS




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






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## 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 | √(P X 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 | √(P X 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.



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## 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)

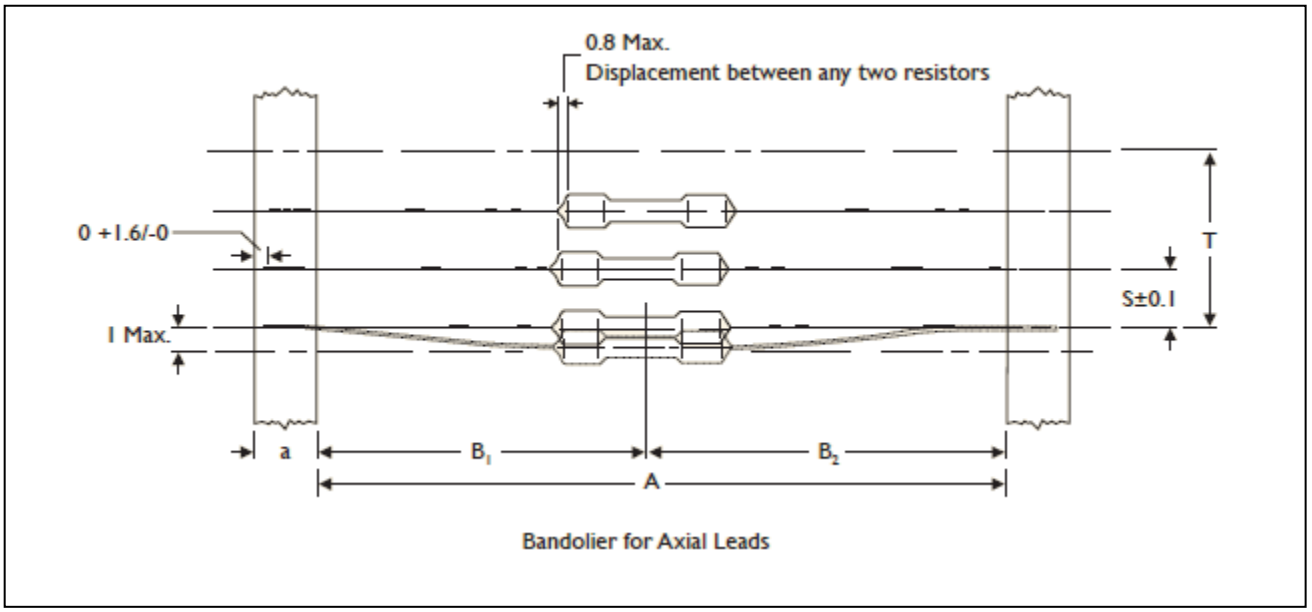
P=Rated power (W)

R=Resistance value (Ω)



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## AXIAL / REEL TAPE SPECIFICATION




Bandolier for Axial Leads

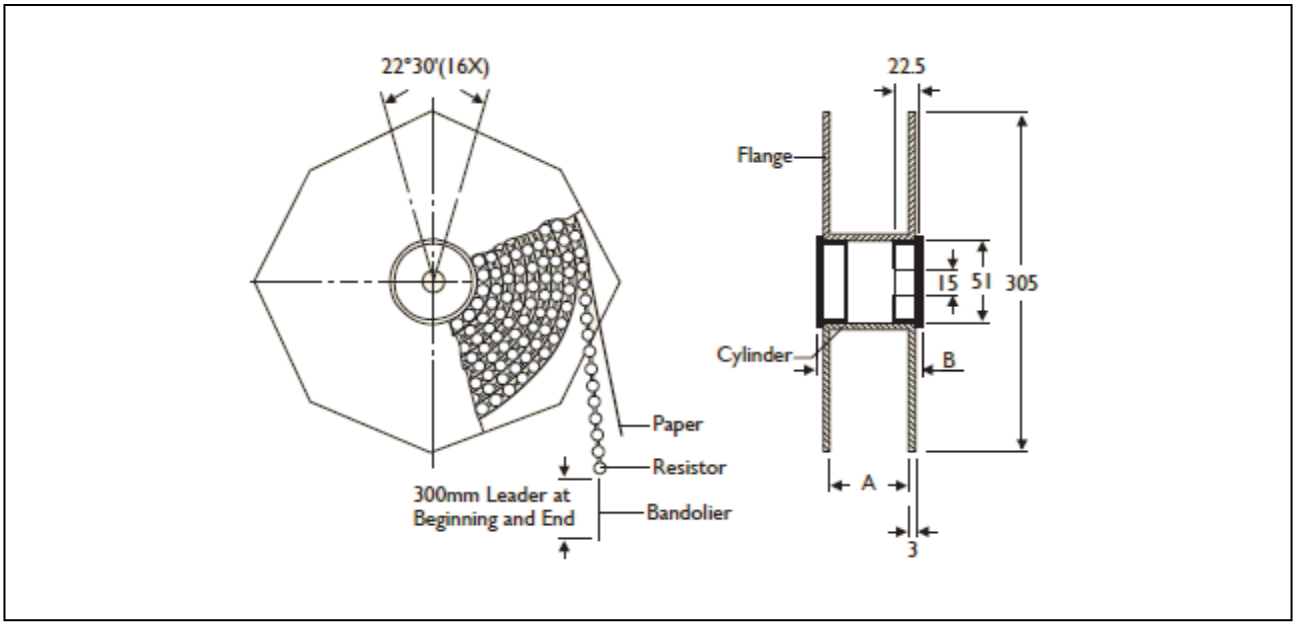
Unit: mm

| Special | Normal | Miniature | Ultra Miniature | a | A | B1-B2 (Max.) | S (spacing) | T (max. deviation of spacing) |
|---|---|---|---|---|---|---|---|---|
| FAE1WV | FAE-50 | FAE50S<br>FAE1WS | FAE1SS<br>FAE2SS | 6 ± 0.5 | 52.4 ± 1.5 | 1.2 | 5 | 1 mm per 10 spacing, 0.5 mm per 5 spacing |
| FAE3WV | FAE100 | FAE2WS | FAE3SS | 6 ± 0.5 | 73.0 ± 1.5 | 1.5 | 5(52-or 73-)<br>10(52Zor 73Z) | |
| | | | | | 52.4 ± 1.5 | 1.2 | | |
| FAE4WV<br>FAE5WV | FAE200<br>FAE300 | FAE3WS<br>FAE5WS | FAE4SS | 6 ± 0.5 | 73.0 ± 1.5 | 1.5 | 10 | |
| | | | | | 52.4 ± 1.5 | 1.2 | | |
| - | FAE500 | - | - | 6 ± 0.5 | 91.0 ± 1.5 | 1.5 | 10 | |



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## TAPE ON REEL PACKING




TYPE

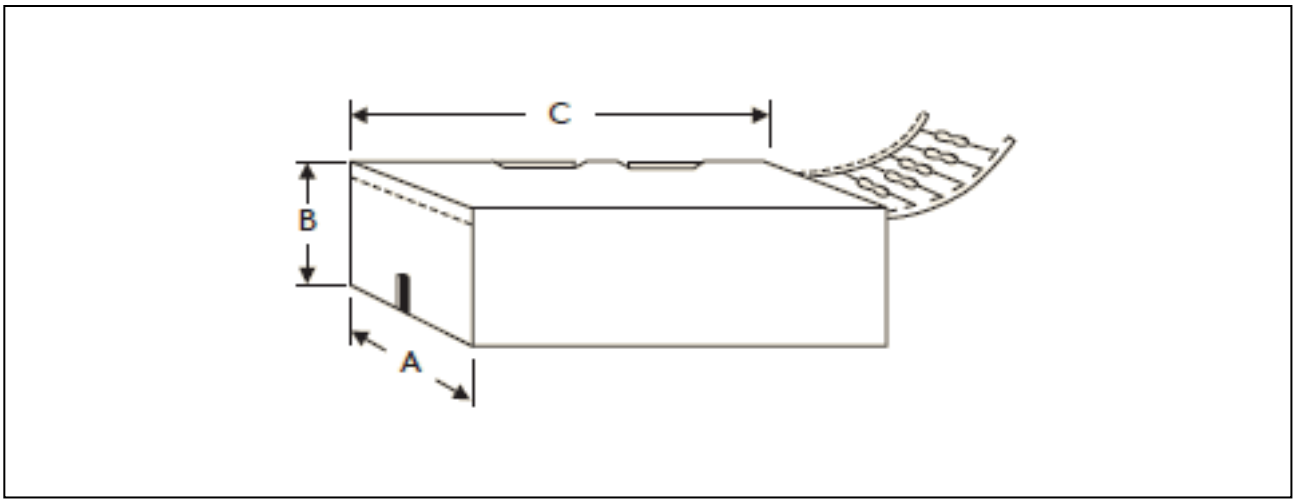
Unit: mm/piece

| 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 |



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## 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

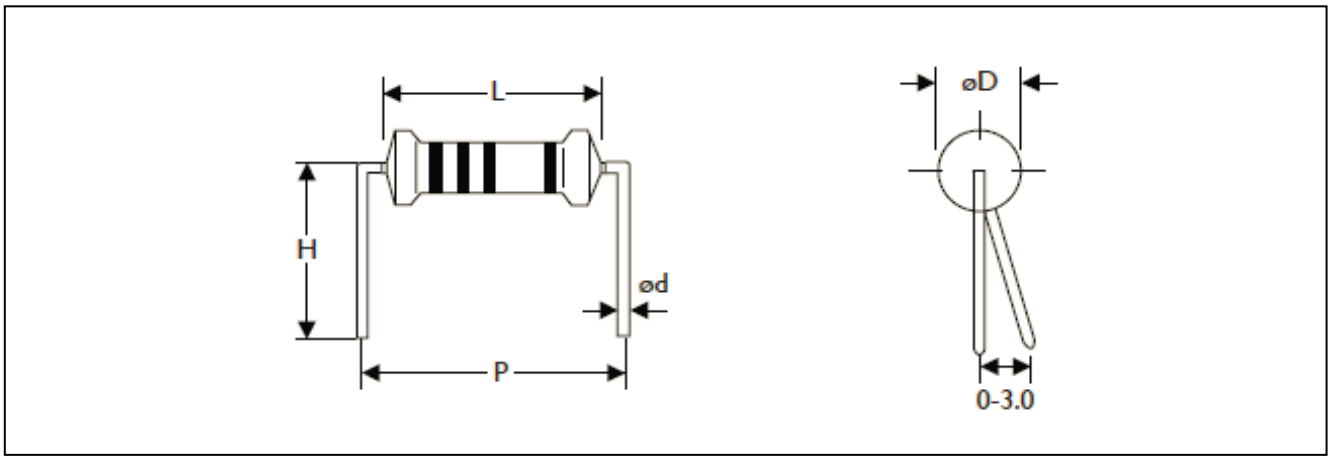
| Special | Normal | Miniature | Ultra Miniature | Piece/Per Inner Box | Bag/Per Inner Box | Piece Per Bag |
|---|---|---|---|---|---|---|
| - | - | FAE50S | FAE1SS | 10,000 | 10 | 1,000 |
| FAE1WV | FAE-50 | FAE1WS | FAE2SS | 5,000 | 5 | 1,000 |
| - | FAE100 | FAE2WS | FAE3SS | 2,000 | 4 | 500 |
| FAE3WV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



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## FORMING

### M TYPE

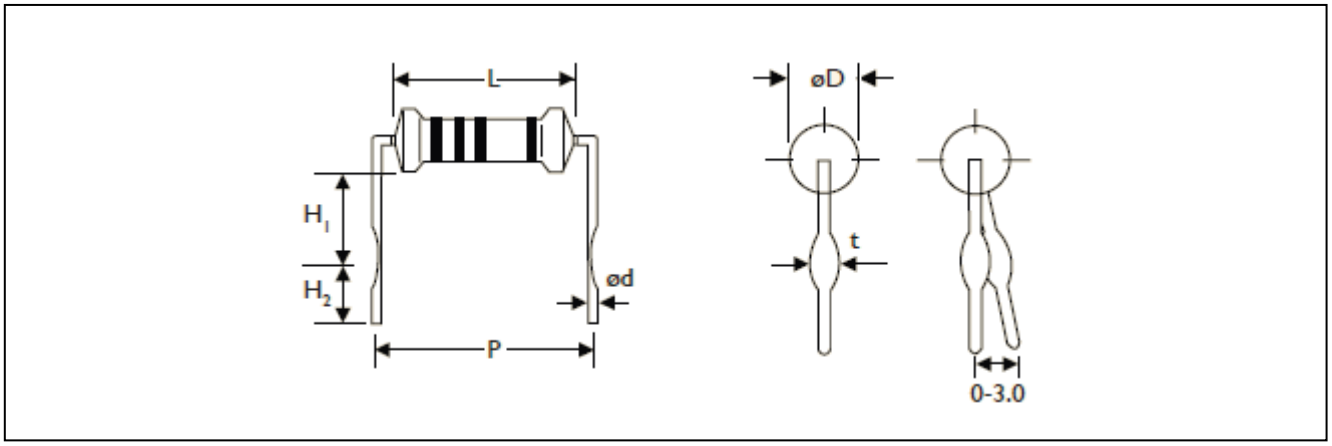



TYPE DIMENSIONS Unit: mm

| 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 |


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## MB TYPE



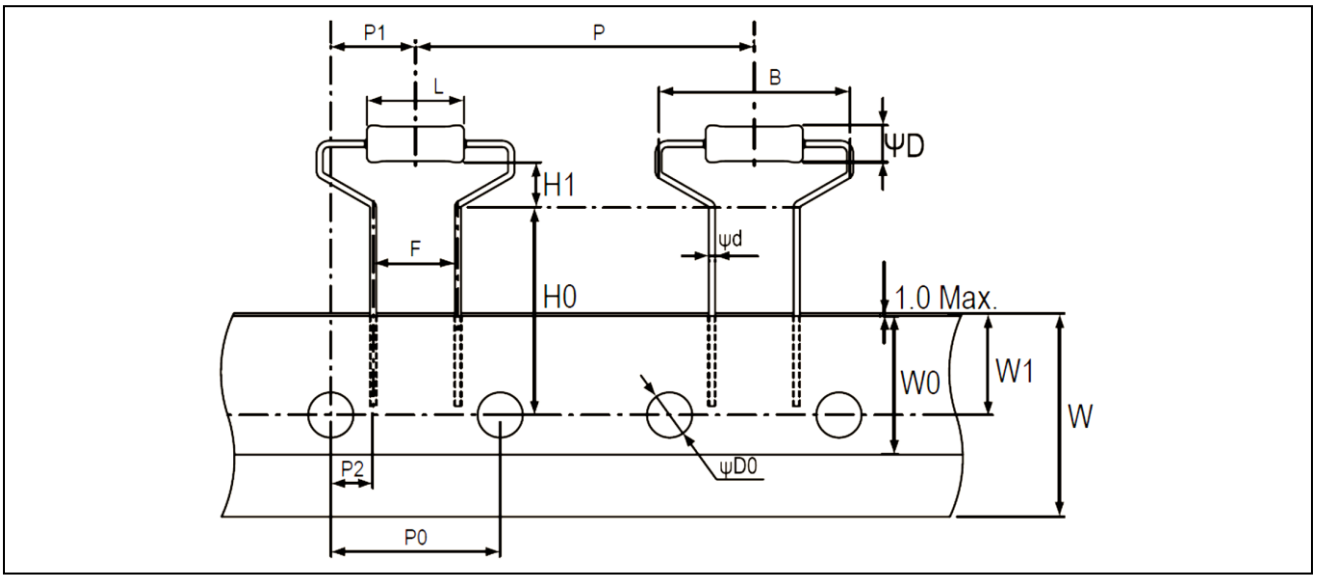

TYPE DIMENSIONS Unit: mm

| 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 |



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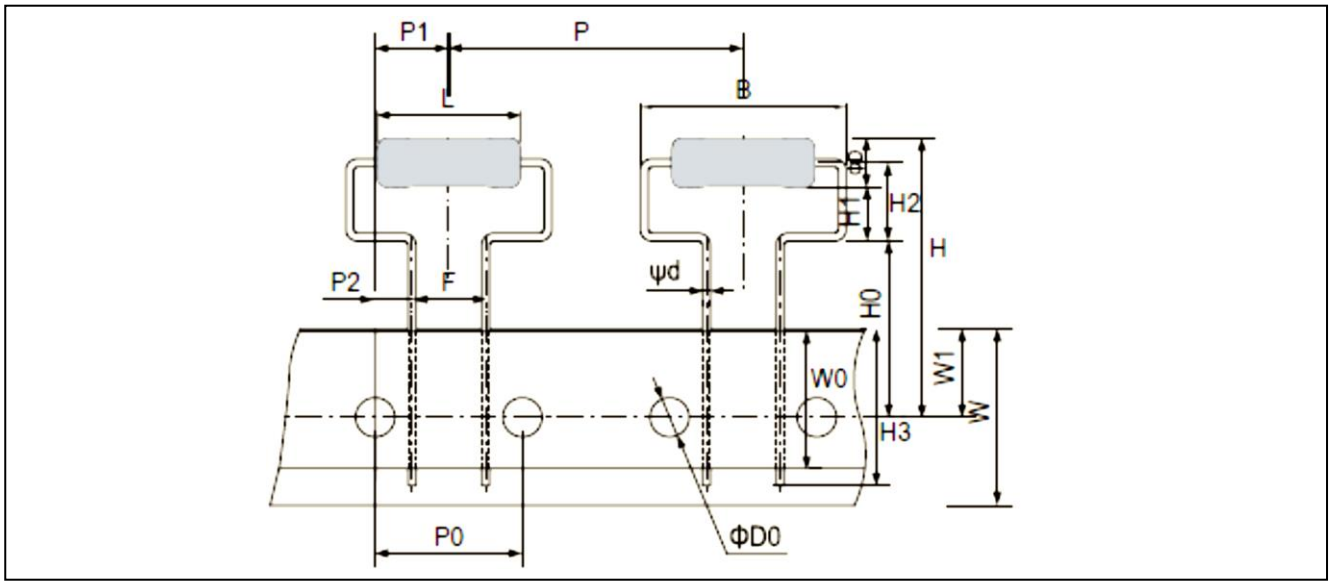
## MHA TYPE




TYPE DIMENSIONS Unit: mm

| Normal | Miniature | Ultra Miniature | L | ψD | ψd | B | H0 | HI | 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



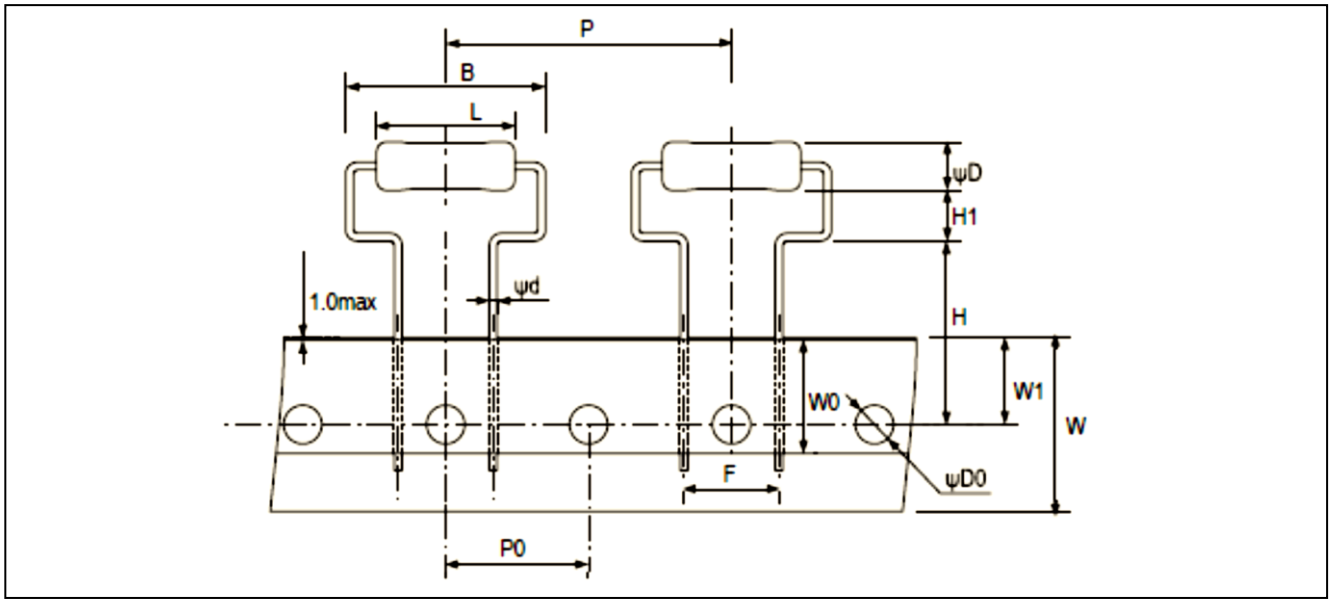

TYPE DIMENSIONS Unit: mm

| Normal | Miniature | Ultra Miniature | L | ψD | ψd | B | H | H0 | HI | 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** | **PI** | **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 |



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## MHC TYPE



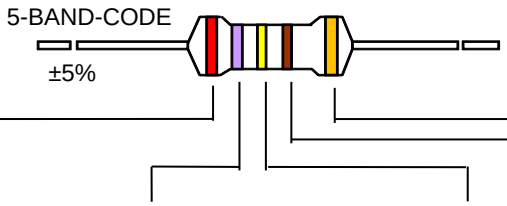

TYPE DIMENSIONS Unit: mm

| Normal | Miniature | Ultra Miniature | L | ψD | ψd | B | H | Hl | 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** | **ΨD0** | | | |
| | | | 10.0±0.5 | 18.0±0.5 | 5.0Min. | 9.0±0.5 | 4.0±0.2 | | | |

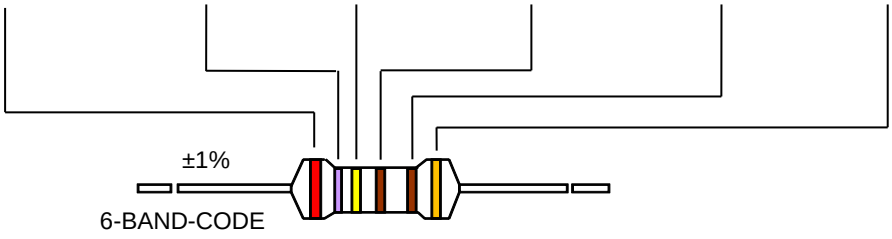


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## MARKING




| 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 | |






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## 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<br>- 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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