Innovative Service Around the Globe YAGEO

DATA SHEET

CARBON FILM RESISTORS

Flameproof

FCR Series

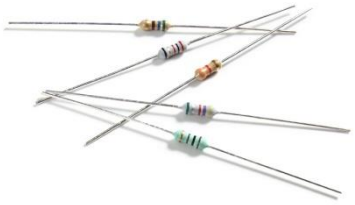
±2%, ±5%

1/4W to 3W

RoHS compliant & Halogen Free

YAGEO

Product specification – October 11, 2023 V.2



APPLICATIONS

- All general purpose applications
- Power applications

FEATURES

- Wide resistance range
- High stability
- Flameproof coating equivalent to UL-94V-0
- RoHS compliant & halogen-free

ORDERING INFORMATION

Part number of the flameproof carbon film resistor are identified by the series, power rating, tolerance, packing, temperature coefficient, forming and resistance value.

PART NUMBER

FCR	200	J	T	-	73-	100R
(1)	(2)	(3)	(4)	(5)	(6)	(7)

(1) SERIES

FCR Series

(2) POWER RATING

-25 = 1/4W	100 = 1W
50S = 1/2W	2WS = 2W
-50 = 1/2W	200 = 2W
1WS = 1W	3WS = 3W

(3) TOLERANCE

G = ±2%	J = ±5%

(4) PACKAGING

R = Reel Pack	B = Bulk
T = Box Pack	

(5) TEMPERATURE COEFFICIENT OF RESISTANCE

- = Based on spec , refer to page 4 Table 2 .

(6) FORMING

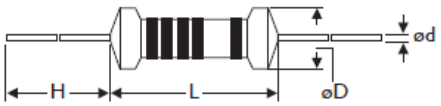
26- = 26mm	FK = FK Type
52- = 52.4mm	FFK = F-form Kink
73- = 73mm	FKK = FKK Type
52C = 52.4mm, Φd =0.5±0.02mm	FT = FT Type Forming
M = M-Type Forming	PN = PANAsert
MB = M-form W/flat	AV = AVIsert
F = F Type	

(7) RESISTANCE VALUE

E24 Series
Example:
100R = 100Ω, 10K = 10,000Ω, 1M = 1,000,000Ω

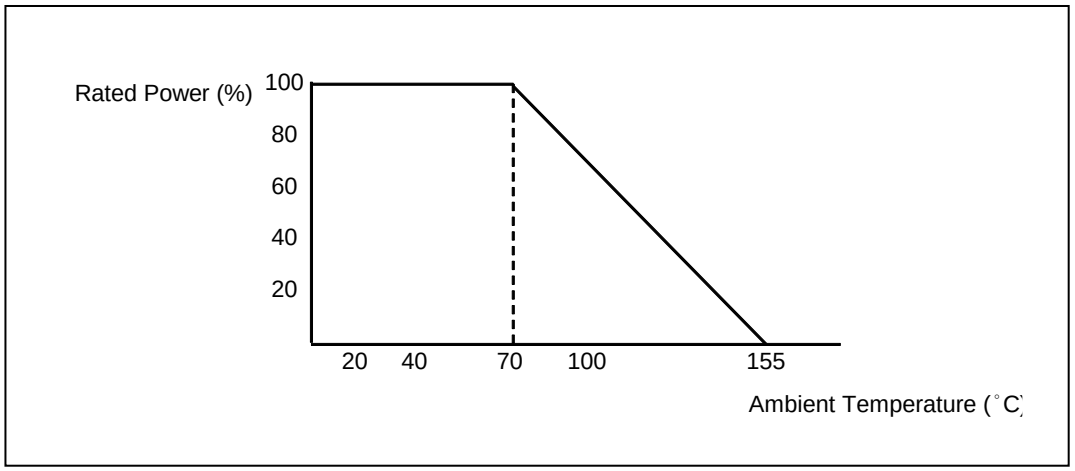
DIMENSIONS

Unit: mm



Normal	Miniature	L	ψD	H	ψd
FCR -25	FCR 50S	6.3 ± 0.5	2.4 ± 0.2	28 ± 2.0	0.55 ± 0.05
FCR -50	FCR 1WS	9.0 ± 0.5	3.3 ± 0.3	26 ± 2.0	0.55 ± 0.05
FCR 100	FCR 2WS	11.5 ± 1.0	4.5 ± 0.5	35 ± 2.0	0.8 ± 0.05
FCR 200	FCR 3WS	15.5 ± 1.0	5.0 ± 0.5	33 ± 2.0	0.8 ± 0.05

DERATING CURVE



ELECTRICAL CHARACTERISTICS

TABLE 1

CHARACTERISTICS	FCR-25	FCR50S	FCR-50	FCR1WS	FCR100	FCR2WS	FCR200	FCR3WS
Power Rating at 70 °C	1/4W	1/2W	1/2W	1W	1W	2W	2W	3W
Maximum Working Voltage	250V	300V	350V	400V	500V	500V	500V	500V
Maximum Overload Voltage	500V	600V	700V	800V	1000V	1000V	1000V	1000V
Voltage Proof on Insulation	400V	400V	500V	500V	500V	500V	500V	500V
Resistance Range	1Ω ~ 10MΩ for E24 series value							
Operating Temp. Range	- 55°C to +155°C							
Temperature Coefficient	See table 2							

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

TABLE 2 TEMPERATURE COEFFICIENT

TYPE	Temp. Coefficient ppm/°C		
	Under 100KΩ	100K ~ 1MΩ	1M ~ 10MΩ
FCR100, FCR200, FCR2WS FCR3WS	± 350	-500~0	-1500~0
FCR-25 , FCR-50,FCR50S , FCR1WS	- 500 ~ + 350	-700~0	-1500~0

TEST AND REQUIRMENTS

TEST	TEST METHOD	PROCEDURE	APPRAISE
Short Time Overload	IEC 60115-1 4.13	2.5 times RCWV for 5 sec.(Not more than maximum overload voltage)	±0.75%+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 -55°C to +155°C	By Type
Insulation Resistance	IEC 60115-1 4.6	In V-Block for 60 sec.	>1,000MΩ
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)	±1.0%+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)	±3.0%+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)	±3.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C ➔ Room Temp. ➔ +155°C ➔ Room Temp.(5 cycles)	±1.0%+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(or Umax., whichever less) 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

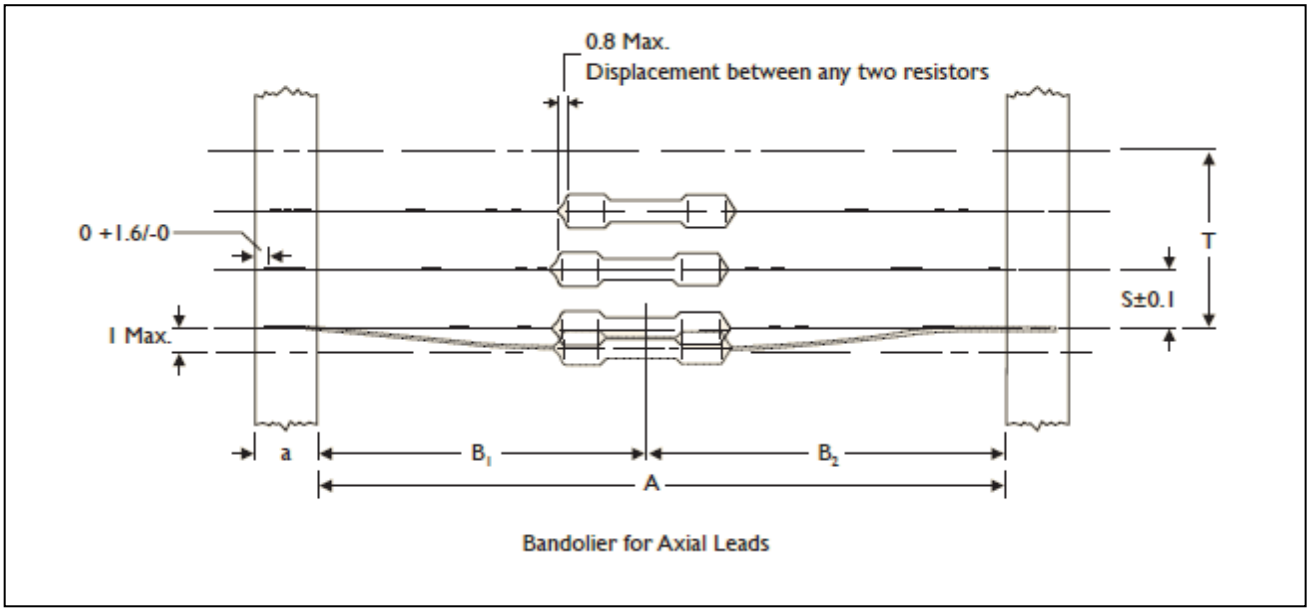
Where

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

P=Rated power (W)

R=Resistance value (Ω)

AXIAL / REEL TAPE SPECIFICATION

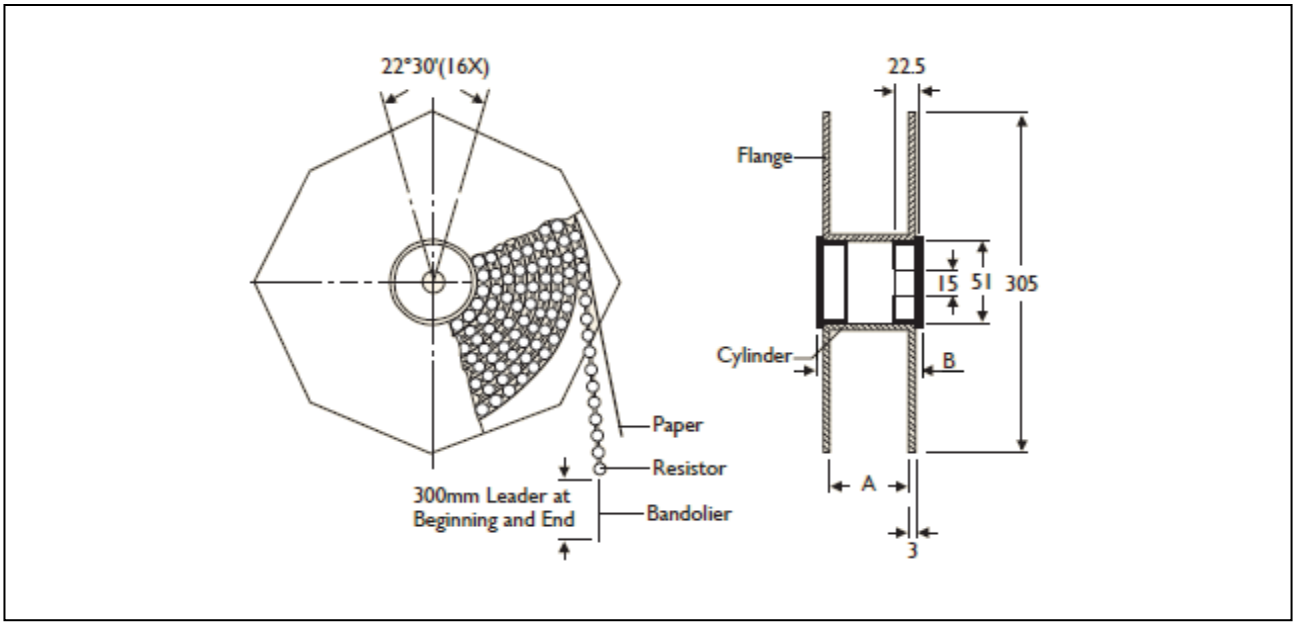


Bandolier for Axial Leads

Unit: mm

Normal	Miniature	a	A	B1-B2 (Max.)	S (spacing)	T (max. deviation of spacing)
FCR-25	FCR50S	6 ± 0.5	52.4 ± 1.5	1.2	5	1 mm per 10 spacing, 0.5 mm per 5 spacing,
			26.0 ± 1.5	1		
FCR-50	FCR1WS	6 ± 0.5	52.4 ± 1.5	1.2	5	
FCR100	FCR2WS	6 ± 0.5	73.0 ± 1.5	1.5	5	
			52.4 ± 1.5	1.2		
FCR200	FCR3WS	6 ± 0.5	73.0 ± 1.5	1.5	10	
			52.4 ± 1.5	1.2		

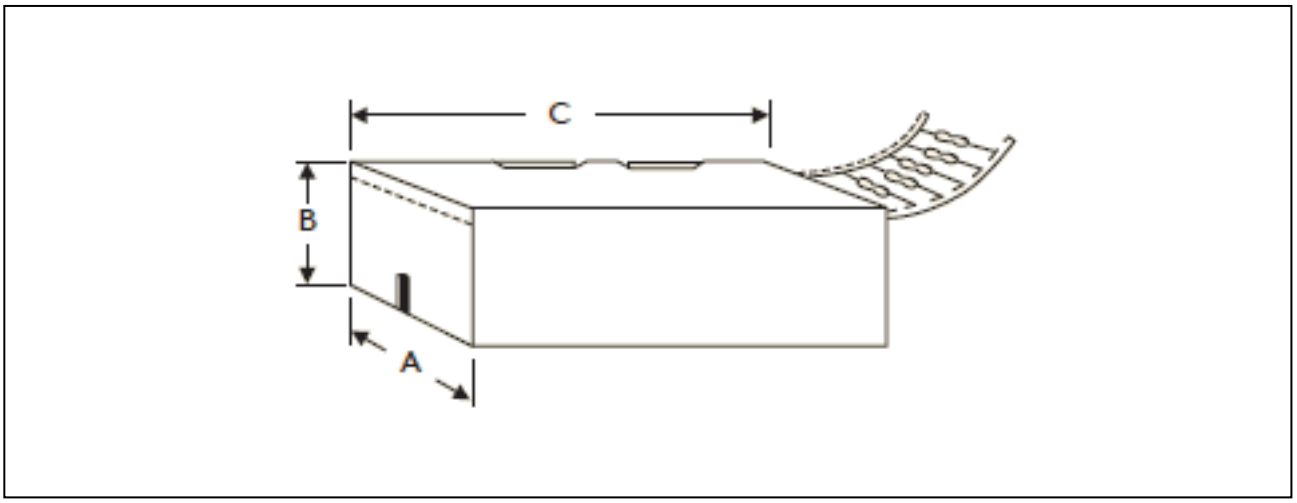
TAPE ON REEL PACKING



TYPE Unit: mm/piece

Normal	Miniature	Across Flange(A)	B	Quantity Per Reel
FCR-25	FCR50S	66.5	75.5	5,000
FCR-50	FCR1WS	66.5	75.5	2,500
FCR100	FCR2WS	87	96	2,000
FCR200	FCR3WS	87	96	1,000

TAPE ON BOX PACKING



TYPE DIMENSIONS Unit: mm/piece

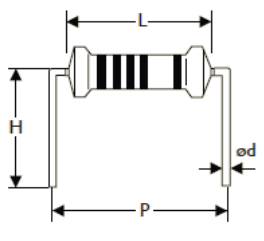
Normal	Miniature	A	B	C	Quantity Per Box
FCR-25	FCR50S	48	102	255	5,000
FCR-25	FCR50S	81	104	260	5,000
FCR-50	FCR1WS	73	45	258	1,000
FCR100	FCR2WS	81	91	260	1,000
FCR100	FCR2WS	103	78	260	1,000
FCR200	FCR3WS	81	91	260	1,000
FCR200	FCR3WS	103	94	260	1,000

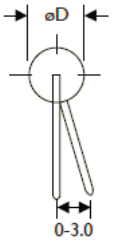
BULK PACKING

Normal	Miniature	Piece/Per Inner Box	Bag/Per Inner Box	Piece Per Bag
CFR-25	CFR50S	10,000	10	1,000
CFR-50	CFR1WS	5,000	5	1,000
CFR-100	CFR2WS	2,000	4	500
CFR200	CFR3WS	1,000	2	500

FORMING

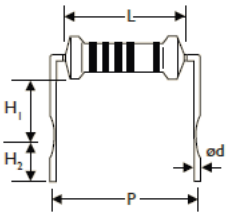
M TYPE

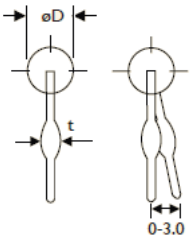




TYPE		DIMENSIONS				Unit: mm
Normal	**Miniature**	**L**	**ψD**	**ψd**	**P**	**H**
FCR-25	FCR50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	10.0 ± 1
FCR-50	FCR1WS	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	10.0 ± 1
FCR100	FCR2WS	11.5 ± 1.0	4.5 ± 0.5	0.8 ± 0.05	15.0 ± 1	12.5 ± 1
FCR200	FCR3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	15.0 ± 1

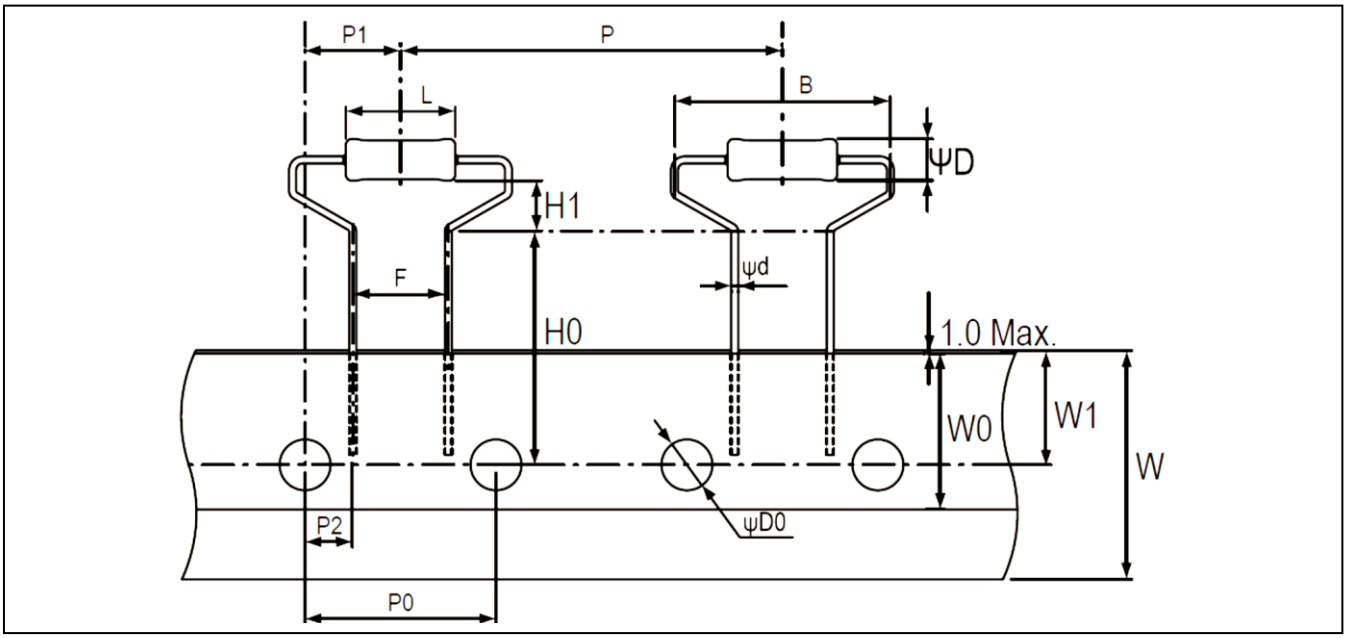
MB TYPE





TYPE		DIMENSIONS						Unit: mm
Normal	**Miniature**	**L**	**ψD**	**ψd**	**P**	**H1**	**H2**	**t**
FCR-25	FCR50S	6.3 ± 0.5	2.4 ± 0.2	0.55 ± 0.05	10.0 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
FCR-50	-	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.2 ± 0.2
-	FCR1WS	9.0 ± 0.5	3.3± 0.3	0.55 ± 0.05	12.5 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
FCR100	FCR2WS	11.5 ± 1.0	4.5± 0.5	0.8 ± 0.05	15.0 ± 1	6.0 ± 1	5.0 ± 1	1.4 ± 0.2
FCR200	FCR3WS	15.5 ± 1.0	5.0 ± 0.5	0.8 ± 0.05	20.0 ± 1	10.0 ± 1	5.0 ± 1	1.4 ± 0.2

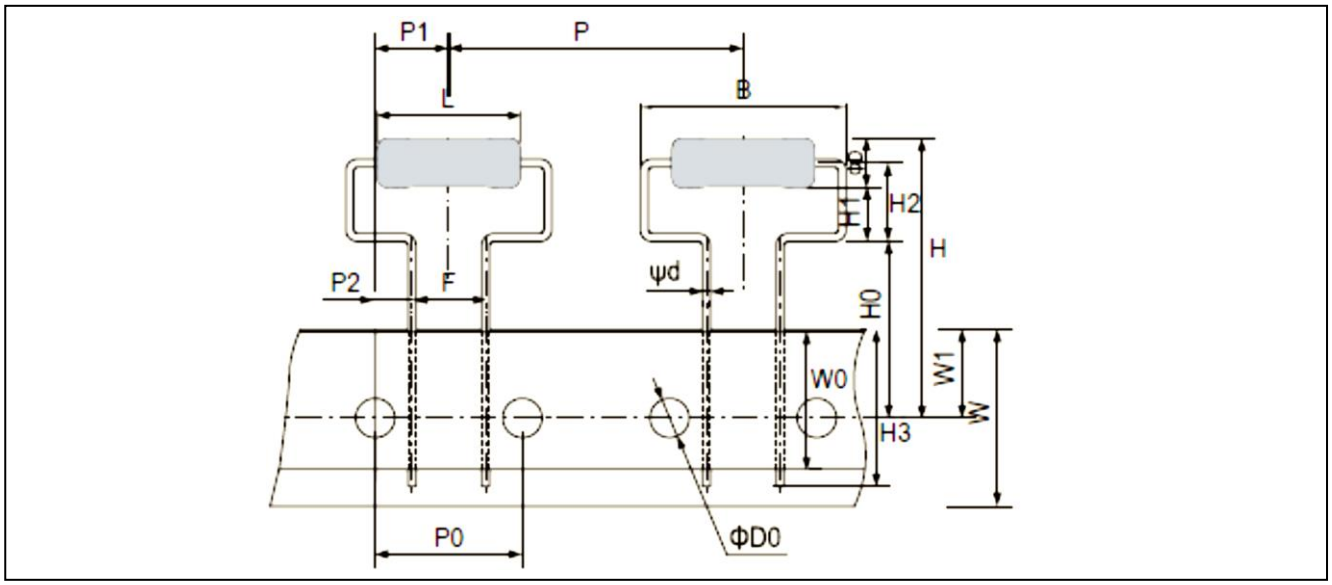
MHA TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	ψD	ψd	B	H0	HI	P	P0
		9.0±0.5	3.3±0.3	0.55±0.05	17.5Max	19.0±1.0	4.0±1.0	30.0±1.0	15.0±0.3
FCR -50	FCR 1WS	**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	

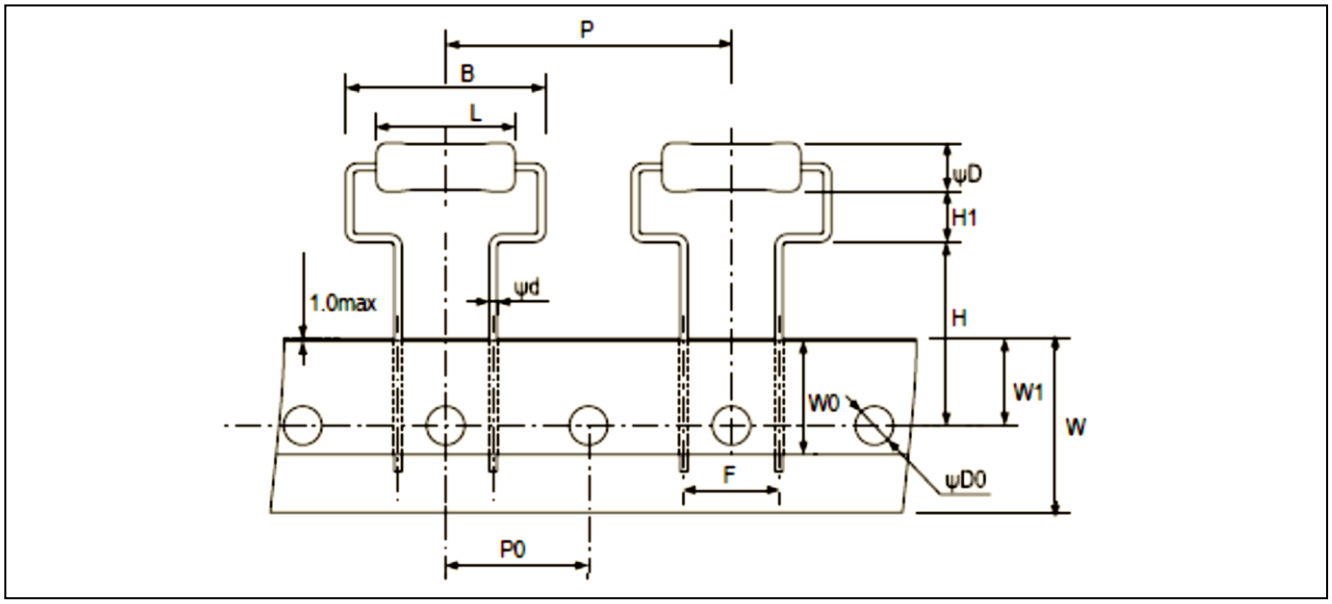
MHB TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	φD	φd	B	H	H0	HI	H2	H3
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	30Max.	18.0±1.0	5.5(Ref.)	8.0±1.5	16Max.
FCR200	FCR3WS	**P**	**P0**	**PI**	**P2**	**F**	**W**	**W0**	**W1**	**ΦD0**
		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

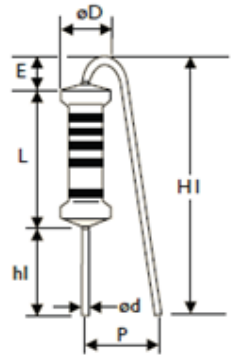
MHC TYPE



TYPE DIMENSIONS Unit: mm

Normal	Miniature	L	φD	φd	B	H	HI	P	P0
		15.5±1.0	5.0±0.5	0.8±0.05	21.0Max.	19.0±1.0	5.25±1.0	30.0±1.0	15.0±0.3
FCR200	FCR3WS	**F**	**W**	**W0**	**W1**	**ΦD0**			
		10.0±0.5	18.0±0.5	5.0Min.	9.0±0.5	4.0±0.2			

F TYPE



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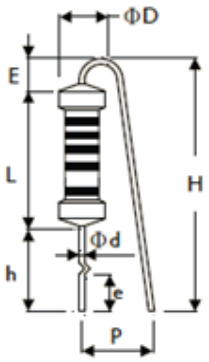

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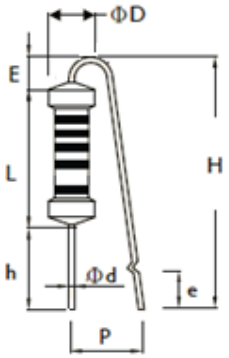

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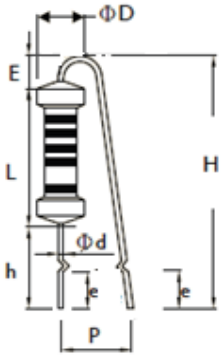
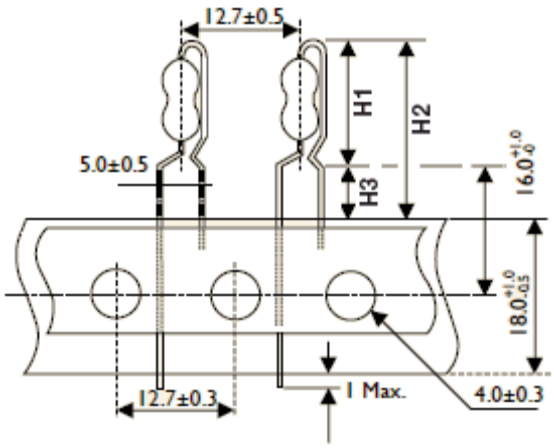


TYPE DIMENSIONS Unit: mm

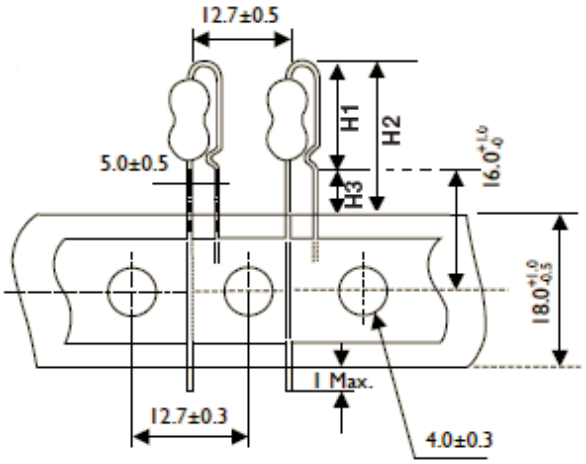
Normal	Miniature	L	ψD	ψd	P	h	H Max.	hI	HI Max.	E Max.	e
FCR-50	FCR1WS	9.0±0.5	3.3±0.3	0.55±0.05	6±1	8±1	22	5±1	18.5	3.5	3.5±1
FCR100	FCR2WS	11.5±1	4.5±0.5	0.8±0.05	6±1	8±1	24	5±1	20	3.5	3.5±1
FCR200	FCR3WS	15.5±1	5.0±0.5	0.8±0.05	8±1	8±1	28	5± 1	25	3.5	3.5±1

PN TYPE (Taping Pack)



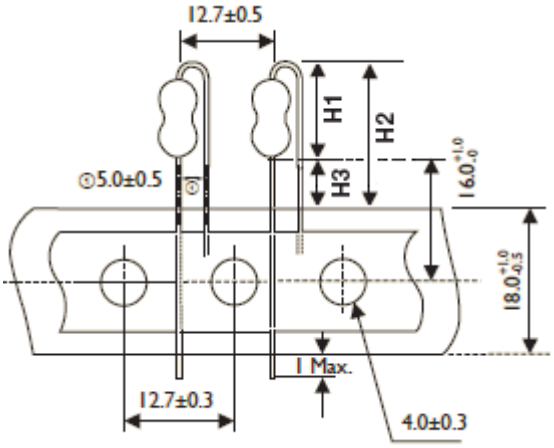
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FCR-25	FCR50S	13	21.5	8.5
FCR-50	FCR1WS	17	25.5	8.5
FCR100	FCR2WS	19	27.5	8.5

AV TYPE (Taping Pack)



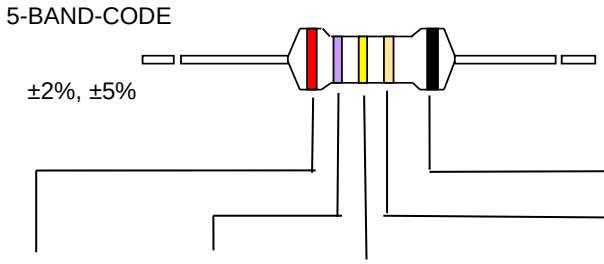
TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FCR-25	FCR50S	11.5	20	8.5
FCR-50	FCR1WS	14.5	23	8.5
FCR100	FCR2WS	17.5	26	8.5

FT TYPE (Taping Pack)



TYPE		DIMENSIONS		Unit: mm
Normal	**Miniature**	**H1 Max.**	**H2 Max.**	**H3 Max.**
FCR-25	FCR50S	10	18.5	8.5
FCR-50	FCR1WS	13	21.5	8.5
FCR100	FCR2WS	16	24.5	8.5

MARKING



COLOR	1st BAND	2nd BAND	MULTIPLIER	TOLERANCE	
BLACK	0	0	1Ω		FCR series
BROWN	1	1	10Ω		
RED	2	2	100Ω	± 2% (G)	
ORANGE	3	3	1KΩ		
YELLOW	4	4	10KΩ		
GREEN	5	5	100K		
BLUE	6	6	1MΩ		
VIOLET	7	7	10MΩ		
GREY	8	8	0.001Ω		
WHITE	9	9	0.0001Ω		
GOLD			0.1Ω	± 5 % (J)	
SILVER			0.01Ω		

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version 2	Oct.11, 2023	-	- Update marking
Version 1	Aug.31, 2023	-	- Update legal disclaimer
Version 0	Aug.2, 2021	-	- First issue of this specification

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Mouser Electronics

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