

Data Sheet

Customer :

Product Type: Metal Film Flame-Proof Resistors

Part No.: FMR Series

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Document No FMR Series REVA3



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Metal Film Flame-Proof Resistors

(FMR Series)

1. Features

- Low Noise
- Low TCR from $\pm 15 \sim 100 \text{PPM}/^\circ\text{C}$
- High Precision from $\pm 0.1\% \sim 1\%$
- Complete Flameproof Construction UL-1412 .
- Coating meets UL94V-0

2. Applications

- Military
- Automotive
- Telecommunication
- Medical equipment.
- Avionics
- Space

3. Dimensions



Unit : mm

Codes	L	D	H	d
0623	6.3±0.5	2.3±0.3	28±2.0	0.55±0.03
0932	9.0±0.5	3.2±0.5	26±2.0	0.65±0.03
1145	11.5±1.0	4.5±0.5	35±2.0	0.78±0.03
1550	15.5±1.0	5.0±0.5	32±2.0	0.78±0.03

4. Product Identification

FMR	0623	B	T	C	V	1001	MA
①	②	③	④	⑤	⑥	⑦	⑧

① Product Type

Product Type	
FMR	Metal Film Flame-Proof Resistors

② Dimensions (L×W)

Codes	Dimensions (LxW)
0623	6.30×2.30mm
0932	9.00×3.20mm
1145	11.5×4.50mm
1550	15.5×5.00mm

③ Resistance Tolerance

Codes	Resistance Tolerance
B	±0.10%
C	±0.25%
D	±0.50%
F	±1.00%

④ Packaging

Codes	Type
A	Ammo
B	Bulk
T	Taping Reel

⑤ TCR

Codes	Type
N	±15 PPM/°C
C	±25 PPM/°C
D	±50 PPM/°C
E	±100 PPM/°C

⑥ Power Rating

Codes	Type
	Standard
R	3W
S	2W
T	1W
U	1/2W
V	1/4W

⑦ Resistance

Codes	Type
R100	0.10Ω
0100	10.0Ω
2201	2200Ω
1002	10000Ω
4992	49900Ω
1003	100000Ω
1004	1000000Ω

⑧ Special

Codes	Type
	Standard
MA	MA-type
MB	MB-type
MC	MC-type
FA	FA-type
FB	FB-type
FC	FC-type
PA	PA-type
PB	PB-type

5. Electrical Characteristics

5-1. Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range $\leq 0.25\%$ E192	Resistance Range $\geq 0.50\%$ E96	TCR (\pm PPM/°C)
0623	1/4W	-55 ~ +155°C	250V	500V	400V	100Ω 100KΩ	10Ω 1MΩ	±15 ±25 ±50 ±100
0932	1/2W		350V	700V	500V			
1145	1W		450V	1000V	750V			
1550	2W		500V	1000V	750V			

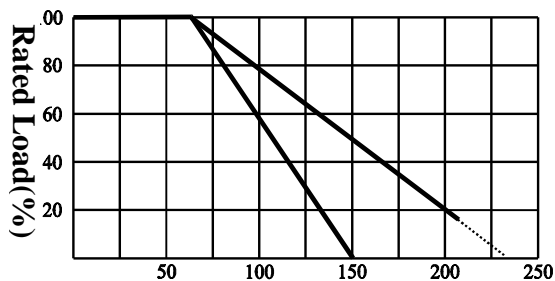
5-2. High Power Rating Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range $\leq 0.25\%$ E192	Resistance Range $\geq 0.50\%$ E96	TCR (\pm PPM/°C)
0623	1/2W	-55 ~ +155°C	300V	500V	400V	100Ω 100KΩ	10Ω 1MΩ	±15 ±25 ±50 ±100
0932	1W		400V	800V	600V			
1145	2W		500V	1000V	750V			
1550	3W		500V	1000V	750V			

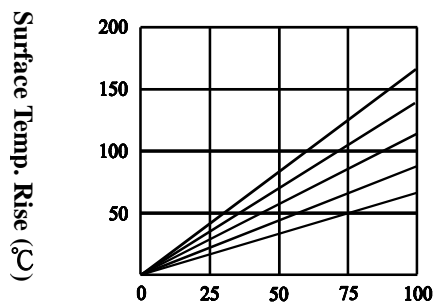
● Resistor body color

1. Standard Power Rating : Grey
2. High Power Rating : Green

5.3 Power Graph



5.4 Hot-spot Temperature



FMR1145 (H)
FMR1550 / FMR0932(H)
FMR1145 / FMR0932
FMR0623

Applied Load % of RCWV

6. Test Procedures and Requirements

Item	Specification	Test Method
Short Time Overload	$\pm(0.25\%+0.05\Omega)$	JIS-C-5202-5.5 RCWV*2.5 or Max Overloading Voltage , 5 seconds
Temperature Coefficient	By Type	Resistance value at room temperature and room temperature+100°C
Dielectric Withstanding Voltage	By Type	JIS-C-5202-5.7 In V-Block for 60 seconds
Pulse Overload	$\pm(0.75\%+0.05\Omega)$	JIS -C5202 5.8 4 times RCWV for10000cycles (1sec.on , 25secs.off)
Insulation Resistance	$> 1000M\Omega$	JIS -C5202 5.6 In V-Block for 60 seconds
Load Life	$\pm(1.5\%+0.05\Omega)$	JIS -C5202 7.10 RCWV , 70°C , 1.5 hours ON , 0.5 hours OFF, total 1000 hours
Humidity (Steady State)	$\pm(1.5\%+0.05\Omega)$	JIS -C5202 7.9 40±2°C , 90~95%RH,RCWV 1.5 hours ON,0.5 hours OFF, total 1000 hours
Solderability	95% Min. Coverage	JIS -C5202 6.5 235°C±5°C , 2±0.5 (sec)
Resistance To Solvent	No deterioration of coatings and markings	JIS -C5202 6.9 Trichroethane for 1 min. with ultrasonic
Terminal Strength	Tensile: $\geq 2.5\text{kg}$	Direct Load for 10 sec. In the direction off the terminal leads.
Shelf Life	$\Delta R = \pm 0.1\%$	12 months at room temperature 25±3°C , 80%RH Max

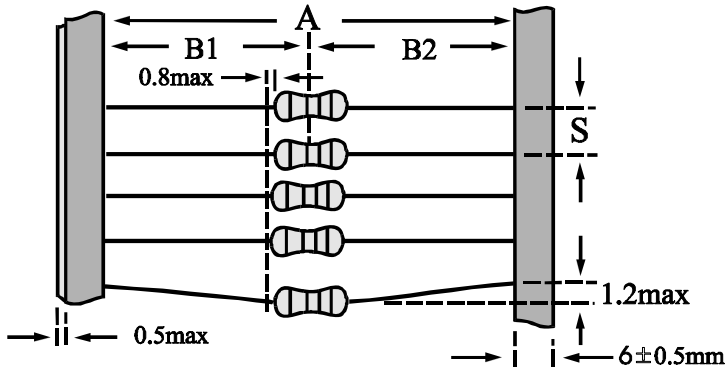
Rated Continuous Working Voltage (RCWV) = $\sqrt{\text{Rower.Rating.} \times \text{Resisance.Value}}$

*** Storage Temperature :25±3°C ; Humidity <80%RH**

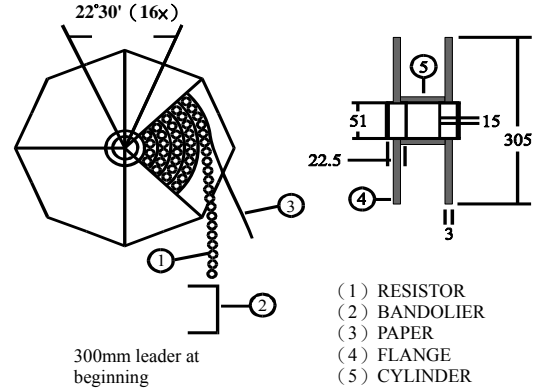
7. Taping/Packing Specifications

7.1 Standard Type (Reel & Ammo)

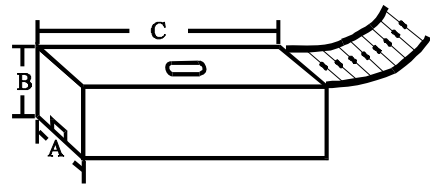
7.1.1 Packing Methods



7.1.2 Reel Packing



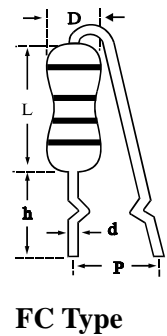
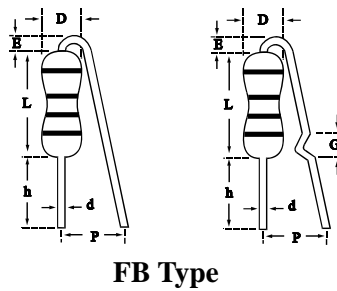
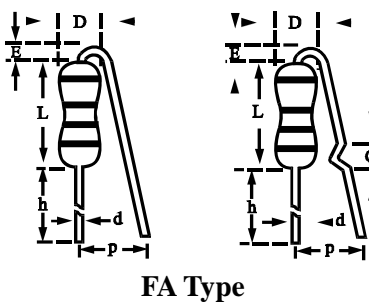
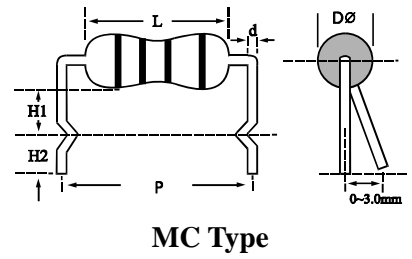
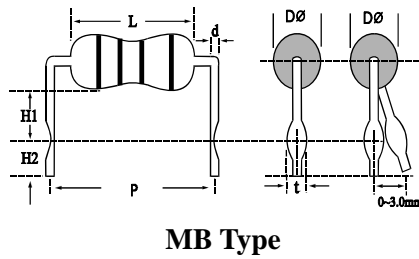
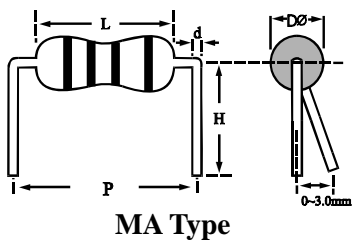
7.1.3 Ammo Packing



Unit: mm

Packaging Codes	Packing Methods			Reel Packing		Ammo Packing			
	A	B1-B2	S	Across Flange (A)	Qty	A	B	C	Qty
0623	52+1/-0	1.2	5	72	5,000	-	-	-	-
0932	52+1/-0	1.2	5	72	2,500	-	-	-	-
1145	52+1/-0	1.5	5	95	2,000	-	-	-	-
1550	52+1/-0	1.5	10	95	1,000	-	-	-	-
0623	26+1/-0	1.0	5	-	-	80	105	264	5,000
0932	52+1/-0	1.2	5	-	-	80	46	264	1,000
1145	73+1/-0	1.5	5	-	-	103	82	265	1,000
1550	73+1/-0	1.5	10	-	-	103	96	265	1,000

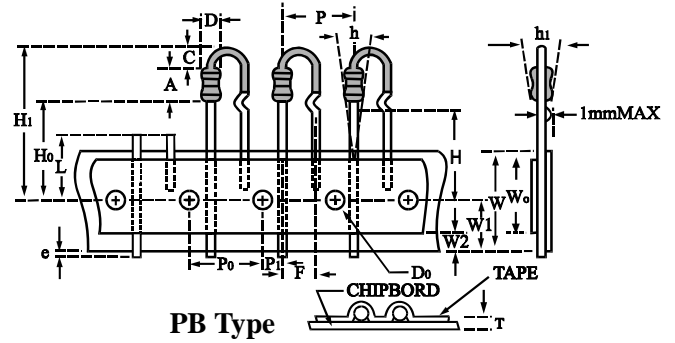
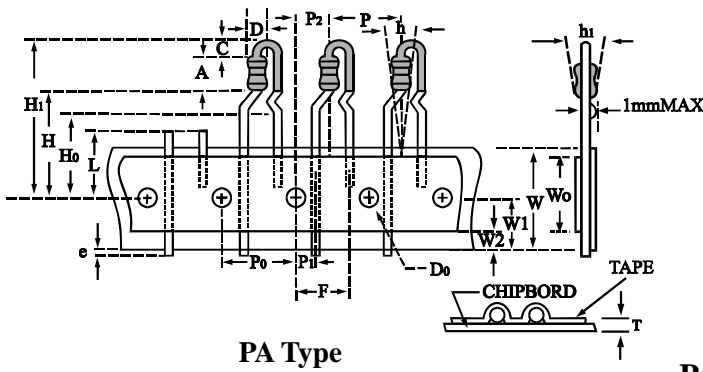
7.2 Special Type (Bulk)



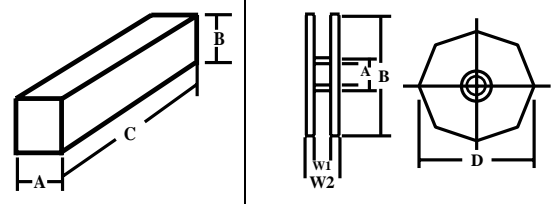
Unit: mm

Codes	Type	P	H /H1/h	H2/G	t	D	L	d	E
0623	MA	10.0±1	10.0±1	-	-	2.3±0.3	6.30±0.5	0.55±0.03	-
	FA	10.0±1	28.0±2	2.00±0.5	-	2.3±0.3	6.30±0.5	0.55±0.03	2.00±0.5
	FB	10.0±1	8.00±1	2.00±0.5	-	2.3±0.3	6.30±0.5	0.55±0.03	2.00±0.5
0932	MA	12.5±1	10.0±1	-	-	3.2±0.5	9.00±0.5	0.65±0.03	-
	FC	6.00±1	10.0±1	-	-	3.2±0.5	9.00±0.5	0.65±0.03	-
1145	MA	15.0±1	12.5±1	-	-	4.5±0.5	11.5±1.0	0.78±0.03	-
	MB	15.0±1	6.00±1	5.00±1.0	1.4±0.2	4.5±0.5	11.5±1.0	0.78±0.03	-
	MC	15.0±1	6.00±1	5.00±1.0	-	4.5±0.5	11.5±1.0	0.78±0.03	-
	FC	6.00±1	10.0±1	-	-	4.5±0.5	11.5±1.0	0.78±0.03	-
1550	MA	20.0±1	15.0±1	-	-	5.0±0.5	15.5±1.0	0.78±0.03	-
	MB	20.0±1	10.0±1	5.00±1.0	1.4±0.2	5.0±0.5	15.5±1.0	0.78±0.03	-
	MC	20.0±1	10.0±1	5.00±1.0	-	5.0±0.5	15.5±1.0	0.78±0.03	-
	FC	6.00±1	10.0±1	-	-	5.0±0.5	15.5±1.0	0.78±0.03	-

7.3 Special Type (Reel & Ammo)



Packing Specification:

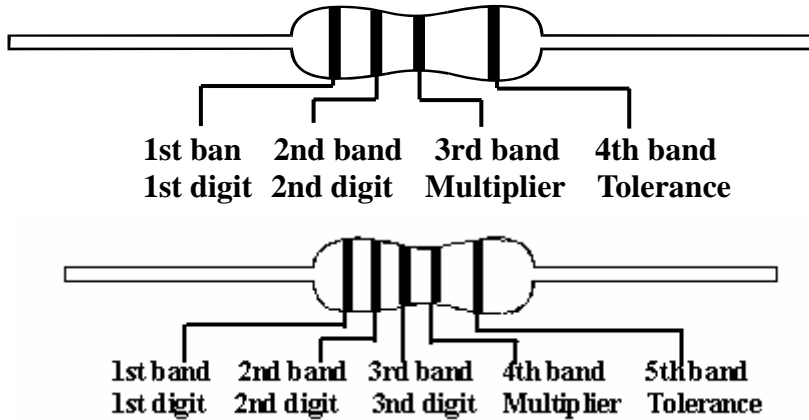
Dimension	AMMO			REEL				
		A	B	C	A	B	C	W1
Unit: mm	53	120	325	31	76	312	44	50
Qty: EA	2000 / 3000			2500 / 3000				

Unit: mm

Type	PA type	PB type
	0623	6323
D	2.3±0.2	2.3±0.2
A	6.5±0.5	6.5±0.5
P	12.7±1.0	12.7±1.0
PO	12.7±0.3	12.7±0.3
P1	3.85±0.7	3.85±0.7
P2	6.35±1.0	6.35±1.3
F	5.0±1.0	5.0+0.8/-0.2
h	0±2.0 [0±5°]	0±2.0 [0±5°]
W	18+1.0/-0.5	18.0+1.0/-0.5
Wo	12.5 min	15.0±1.0
W1	9.0+0.75/-0.5	9.0+0.75/-0.5
W2	3.0 max.	2.75 max.
H	19.0±1.0	16.0+1.0/-0.3
HO	16.0±0.5	16.0±0.5
e	2.0 max.	1.0 max.
DO	4.0±0.3	4.0±0.3
T	0.7±0.2	0.7±0.2
L	11.0 max.	2.0 max.
H1	28.5 max.	27 max.
C	2.5±0.5	3.0+0/-0.039
h1/d	0±2.0 [0±5°]	0±2.0 (0±5°)

※Cumulative Pitch Tolerances Not to Exceed±1.0mm (±0.039 In) Over 20 Consecutive Pitches

8. Marking



Color	Digit	Multiplier	Tolerance	Code
Without	-	-	±20%	M
Silver	-	10 ⁻²	±10%	K
Gold	-	10 ⁻¹	±5.0%	J
Black	0	10 ⁰	-	-
Brown	1	10 ¹	±1.0%	F
Red	2	10 ²	±2.0%	G
Orange	3	10 ³	-	-
Yellow	4	10 ⁴	-	-
Green	5	10 ⁵	±0.50%	D
Blue	6	10 ⁶	±0.25%	C
Violet	7	10 ⁷	±0.10%	B
Grey	8	10 ⁸	±0.05%	A
White	9	10 ⁹	-	-

9. Resistance Tolerance

±10%	E-6	1.0	-	-	-	1.5	-	-	-	2.2	-	-	-	3.3	-	-	-	4.7	-	-	-	6.8	-	-	-
±5.0%	E-12	1.0	-	1.2	-	1.5	-	1.8	-	2.2	-	2.7	-	3.3	-	3.9	-	4.7	-	5.6	-	6.8	-	8.2	-
±2.0%	E-24	1.0	1.1	1.2	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.7	3.0	3.3	3.6	3.9	4.3	4.7	5.1	5.6	6.2	6.8	7.5	8.2	9.1
±2.0% ±1.0%	E-48	1.00	1.05	1.10	1.15	1.21	1.27	1.33	1.40	1.47	1.54	1.62	1.69	1.78	1.87	1.96	2.05	2.15	2.26	2.37	2.37	2.61	2.74	2.87	3.01
		3.16	3.32	3.48	3.65	3.83	4.02	4.22	4.42	4.64	4.87	5.11	5.36	5.62	5.90	6.19	6.49	6.81	7.15	7.50	7.87	8.25	8.66	9.09	9.53
	E-96	1.00	1.02	1.05	1.07	1.10	1.13	1.15	1.18	1.21	1.24	1.27	1.30	1.33	1.37	1.40	1.43	1.47	1.50	1.54	1.58	1.62	1.65	1.69	1.74
		1.78	1.82	1.87	1.91	1.96	2.00	2.05	2.10	2.15	2.21	2.26	2.32	2.37	2.43	2.49	2.55	2.61	2.67	2.74	2.80	2.87	2.94	3.01	3.09
		3.16	3.24	3.32	3.40	3.48	3.57	3.65	3.74	3.83	3.92	4.02	4.12	4.22	4.32	4.42	4.53	4.64	4.75	4.87	4.99	5.11	5.23	5.36	5.49
		5.62	5.76	5.90	6.04	6.19	6.34	6.49	6.65	6.81	6.98	7.15	7.32	7.50	7.68	7.87	8.06	8.25	8.45	8.66	8.87	9.09	9.31	9.53	9.76
±1.00% ±0.50% ±0.25% ±0.10%	E-192	10.0	10.1	10.2	10.4	10.5	10.6	10.7	10.9	11.0	11.1	11.3	11.4	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	13.0	13.2
		13.3	13.5	13.7	13.8	14.0	14.2	14.3	14.5	14.7	14.9	15.0	15.2	15.4	15.6	15.8	16.0	16.2	16.4	16.5	16.7	16.9	17.2	17.4	17.6
		17.8	18.0	18.2	18.4	18.7	18.9	19.1	19.3	19.6	19.8	20.0	20.3	20.5	20.8	21.0	21.3	21.5	21.8	22.1	22.3	22.6	22.9	23.2	23.4
		23.7	24.0	24.3	24.6	24.9	25.2	25.5	25.8	26.1	26.4	26.7	27.1	27.4	27.7	28.0	28.4	28.7	29.1	29.4	29.8	30.1	30.5	30.9	31.2
		31.6	32.0	32.4	32.8	33.2	33.6	34.0	34.4	34.8	35.2	35.7	36.1	36.5	37.0	37.4	37.9	38.3	38.8	39.2	39.7	40.2	40.7	41.2	41.7
		42.2	42.7	43.2	43.7	44.2	44.8	45.3	45.9	46.4	47.0	47.5	48.1	48.7	49.3	49.9	50.5	51.1	51.7	52.3	53.0	53.6	54.2	54.9	55.6
		56.2	56.9	57.6	58.3	59.0	59.7	60.4	61.2	61.9	62.6	63.4	64.2	64.9	65.7	66.5	67.3	68.1	69.0	69.8	70.6	71.5	72.3	73.2	74.1
		75.0	75.9	76.8	77.7	78.7	79.6	80.6	81.6	82.5	83.5	84.5	85.6	86.6	87.6	88.7	89.8	90.9	92.0	93.1	94.2	95.3	96.5	97.6	98.8