Data Sheet

Customer:	
Product:	**Metal Film Flame-Proof Resistors — FMR Series**
Sizes.:	**0623/0932/1145/1550**
Issued Date:	**24-Oct-23**
Edition:	**REV.B**

Pb RoHS Compliant

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24-Oct-23	24-Oct-23	24-Oct-23	24-Oct-23	
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Metal Film Flame-Proof Resistors

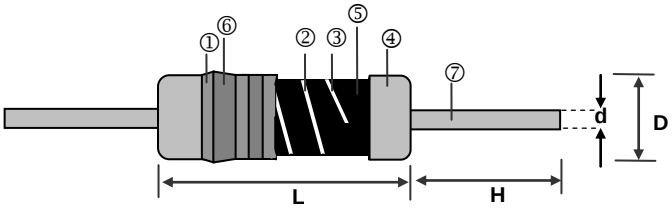
■Features

- Low noise
- Low TCR from ±15～100PPM/℃
- High precision from ±0.1%～1%
- Flameproof Coating equivalent to UL94V-0

■Applications

- Telecommunication
- Medical Equipment
- Consumer Product

■Construction



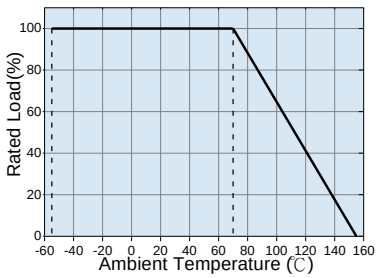
①	Insulation Coating	⑤	Resistor Layer
②	Trimming Line	⑥	Marking
③	Ceramic Core	⑦	Lead Wire
④	Electrode Cap		

■Dimensions

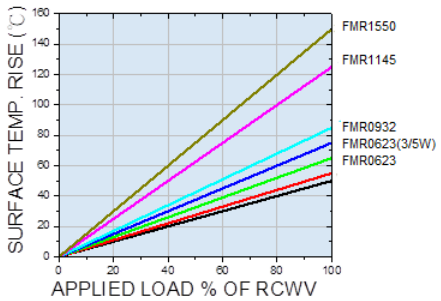
Unit: mm

Type	L	D	H	d
FMR0623	6.3±0.5	2.3±0.3	28±3.0	0.55±0.03
FMR0932	9.0±0.5	3.2±0.5	26±3.0	0.65±0.03
FMR1145	11.5±1.0	4.5±0.5	35±3.0	0.78±0.03
FMR1550	15.5±1.0	5.0±0.5	32±3.0	0.78±0.03

■Derating Curve



■Hot-spot Temperature



Metal Film Flame-Proof Resistors

■Part Numbering

FMR	0318	B	T	N	W	1001	
Product Type	Dimensions (L×D)	Resistance Tolerance	Packaging Code	TCR (PPM/℃)	Power Rating	Resistance	Special
	0623: 6.3x2.3 0932: 9.0x3.2 1145: 11.5x4.5 1550: 15.5x5.0	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1%	A: Ammo B: Bulk T: Taping Reel	B: ±10 N: ±15 C: ±25 D: ±50 E: ±100	R: 3W S: 2W T: 1W F: 3/5W U: 1/2W V: 1/4W	0010: 1Ω 1000: 100Ω 2201: 2200Ω 1001: 1KΩ 1004: 1MΩ	: Standard MA: MA-type MC: MC-type FA: FA-type FB: FB-type FC: FC-type FD: FD-type

■Standard Electrical Specifications

Item / Type	Power Rating at 70℃	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Voltage Proof	Resistance Range ±0.1%	±0.25%	±0.5%	±1%	TCR (±PPM/℃)
0623	1/4W	-55 ~ +155℃	250V	500V	350V	100Ω-22KΩ				±10
						10Ω-499KΩ				±15
						10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-10MΩ	±100
0932	1/2W	-55 ~ +155℃	350V	500V	400V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-10MΩ	±100
1145	1W	-55 ~ +155℃	500V	700V	500V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-10MΩ	±100
1550	2W	-55 ~ +155℃	500V	1000V	750V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-10MΩ	±100

■High Power Rating Electrical Specifications

Item / Type	Power Rating at 70℃	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Voltage Proof	Resistance Range ±0.1%	±0.25%	±0.5%	±1%	TCR (±PPM/℃)
0623	1/2W	-55 ~ +155℃	300V	500V	350V	100Ω-22KΩ				±10
						10Ω-499KΩ				±15
						10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-1MΩ	±100
0623	3/5W	-55 ~ +155℃	350V	500V	350V	100Ω-22KΩ				±10
						10Ω-499KΩ				±15
						10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-1MΩ	±100
0932	1W	-55 ~ +155℃	400V	600V	400V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-1MΩ	±100
1145	2W	-55 ~ +155℃	500V	700V	500V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-1MΩ	±100
1550	3W	-55 ~ +155℃	500V	1000V	750V	10Ω-1MΩ				±25
						10Ω-1MΩ		10Ω-4.99MΩ	10Ω-10MΩ	±50
						-	10Ω-1MΩ		0.1Ω-1MΩ	±100

Operating Voltage=$\sqrt{(P*R)}$ or Max. operating voltage listed above, whichever is lower.
Overload Voltage=2.5*$\sqrt{(P*R)}$ or Max. overload voltage listed above, whichever is lower.

■**Resistor body color : Grey**

■Environmental Characteristics

Item	Specification	Test Method
Resistance Value	1Ω-10MΩ	**IEC-60115-1 4.5** Measure at a distance of 10mm from the cap end
Short Time Overload	±(0.25%+0.05Ω)	**IEC-60115-1 4.13** RCWV*2.5 for 5 seconds
Temperature Coefficient	By Type	**IEC-60115-1 4.8** Resistance value at room temperature and room temperature+100℃
Voltage Proof	By Type	**IEC-60115-1 4.7** In V-Block for 60 seconds
Periodic-Pulse Overload	±(0.75%+0.05Ω)	**IEC-60115-1 4.39** 4 times RCWV (or Umax. whichever less) for 10000 cycles (1sec.on，5secs.off)
Insulation Resistance	>1000MΩ	**IEC-60115-1 4.6** The measure was executed by V-Block methods
Endurance	±(1.5%+0.05Ω)	**IEC-60115-1 4.25** 70±2°C, at RCWV (or Umax., whichever less) for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
Damp Heat (Steady State)	±(1.5%+0.05Ω)	**IEC-60115-1 4.24** 40±2°C, 90~95% R.H., for 56 days , loaded with 0.1 times RCWV (or Umax. whichever less)
Solderability	95% Min. Coverage	**IEC-60115-1 4.17** 245±5°C for 3±0.5 seconds
Resistance to Soldering Heat	0623 / 0932 sizes: ±(0.5%+0.05Ω) 1145 / 1550 sizes: ±(0.25%+0.05Ω)	**IEC-60115-1 4.18** The solder iron heated to 260±5℃ and applied to the termination for a duration of 10±1 seconds
Solvent Resistance of Marking	No obvious deterioration of coatings and markings	**IEC-60115-1 4.30** IPA for 5±0.5 Min. with ultrasonic
Robustness of Terminations	Tensile:≧2.5kg(24.5N)	**IEC-60115-1 4.16** Direct Load for 10 sec. In the direction off the terminal leads.
Temperature Cycling	±(0.75%+0.05Ω)	**IEC-60115-1 4.19** -55°C/155°C with 5 cycles. the duration at each temperature 30 min

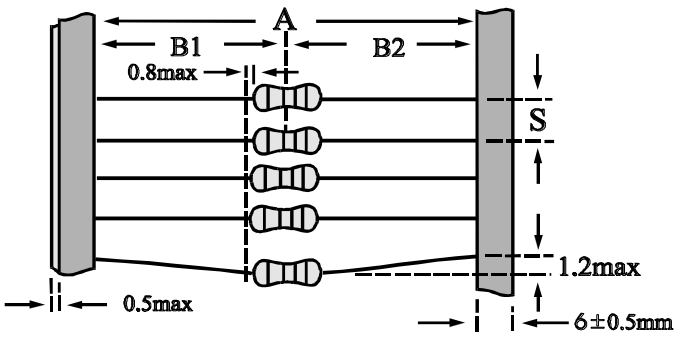
RCWV(Rated continuous working voltage)= $\sqrt{(P*R)}$

■Storage Temperature: 25±10°C; Humidity < 80%RH

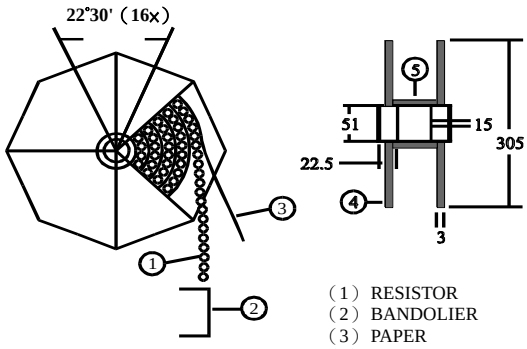
■Taping/Packing Specifications

1. Standard Type (Reel & Ammo)

Packing Methods



Reel Packing



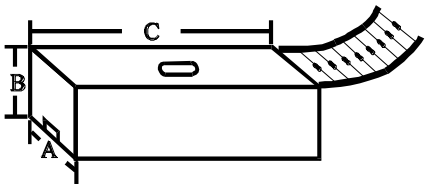
300mm leader at beginning

（1）RESISTOR
（2）BANDOLIER
（3）PAPER
（4）FLANGE
（5）CYLINDER

Unit: mm

Packaging / Type	Packing Methods			Reel Packing	
	A	*B1-B2*	*S*	Across Flange (A)	Qty
0623	52+1/-0	1.2	5±0.3	72	5,000
	26+0.5/-0	1.0			
0932	52+1/-0	1.2	5±0.3	72	2,500
1145	73+1/-0	1.5	5±0.3	95	2,000
	52+1/-0				
1550	73+1/-0	1.5	10±0.8	95	1,000
	52+1/-0				

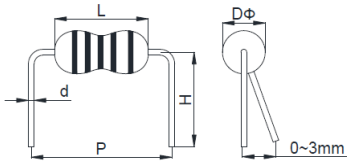
Ammo Packing



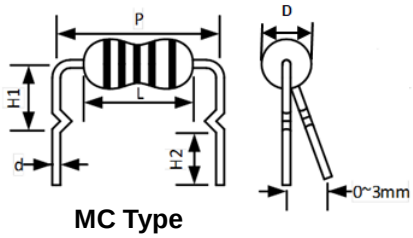
Unit: mm

Packaging / Type	Packing Methods			Ammo Packing			
	A	*B1-B2*	*S*	A	B	C	Qty
0623	52+1/-0	1.2	5±0.3	79±2	100±3	257±5	5,000
	26+0.5/-0	1.0		52±2	109±3	252±5	
0932	52+1/-0	1.2	5±0.3	79±2	58±3	257±5	1,000
1145	73+1/-0	1.5	5±0.3	103±2	82±3	262±5	1,000
	52+1/-0			81±2	85±3	256±5	
1550	73+1/-0	1.5	10±0.8	103±2	96±3	265±5	1,000
	52+1/-0			82±2	108±3	258±5	

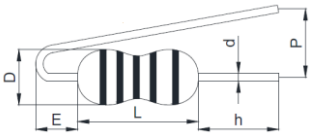
2. Special Type (Bulk)



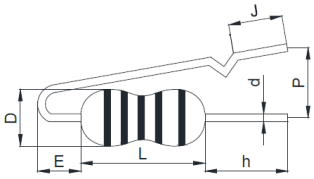
MA Type



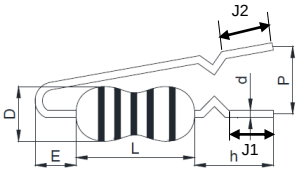
MC Type



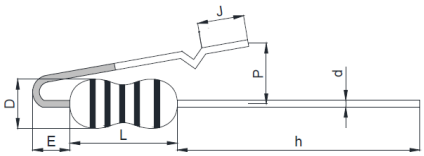
FA Type



FB Type



FC Type

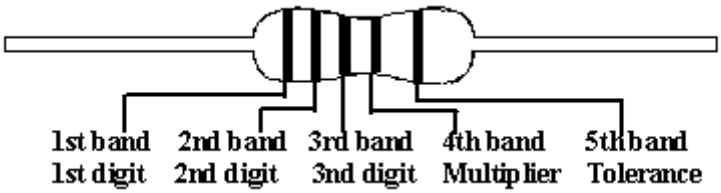


FD Type

Unit: mm

Codes	Type	P	H /H1/h	H2/G	J/J1/J2	D	L	d	E
0623	**MA**	10±1	10.0±1	-	-	2.3±0.3	6.3±0.5	0.55±0.03	-
	FD	5~15	27.0±2	3.0±0.5	3±1	2.3±0.3	6.3±0.5	0.55±0.03	3±1
0932	**MA**	12.5±1	10.0±1	-	-	3.2±0.5	9.0±0.5	0.65±0.03	-
	MC	12.5±1	6.5±2	3.5±2	-	3.2±0.5	9.0±0.5	0.65±0.03	-
	FA	5~15	5.0±2	-	-	3.2±0.5	9.0±0.5	0.65±0.03	3±1
	FB	5~15	4.0±2	-	3±2	3.2±0.5	9.0±0.5	0.65±0.03	3±1
	FC	5~15	10.0±3	-	4±2	3.2±0.5	9.0±0.5	0.65±0.03	3±1
1145	**MA**	15±1	12.5±1	-	-	4.5±0.5	11.5±1.0	0.78±0.03	-
	MC	15±1	9.5±2	4.5±2	-	4.5±0.5	11.5±1.0	0.78±0.03	-
	FA	5~15	5.0±2	-	-	4.5±0.5	11.5±1.0	0.78±0.03	3±1
	FB	5~15	4.0±2		3±2	4.5±0.5	11.5±1.0	0.78±0.03	3±1
	FC	5~15	10.0±3	-	4±2	4.5±0.5	11.5±1.0	0.78±0.03	3±1
1550	**MA**	20±1	15.0±1	-	-	5.0±0.5	15.5±1.0	0.78±0.03	-
	MC	20±1	13.5±2	3.5±2	-	5.0±0.5	15.5±1.0	0.78±0.03	-
	FA	5~15	5.0±2	-	-	5.0±0.5	15.5±1.0	0.78±0.03	3±1
	FB	5~15	4.0±2	-	3±2	5.0±0.5	15.5±1.0	0.78±0.03	3±1
	FC	5~15	10.0±3	-	4±2	5.0±0.5	15.5±1.0	0.78±0.03	3±1

■Marking & Resistance Tolerance



Cold	Digit	Multiplier	Tolerance	
Without	-	-	-	-
Silver	-	10^{-2}	-	-
Gold	-	10^{-1}	-	-
Black	0	10^{0}	-	-
Brown	1	10^{1}	±1.0%	F
Red	2	10^{2}	-	-
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}	-	-
White	9	10^{9}	-	-

±1.00% ±0.50% ±0.25% ±0.10%	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
±1.00% ±0.50%	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
±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