

Data Sheet

Customer:

Product: Carbon Film Leaded Resistor — CFR Series

Sizes.: 0318/0623/0932/1145/1550

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Carbon Film Leaded Resistor

■ Features

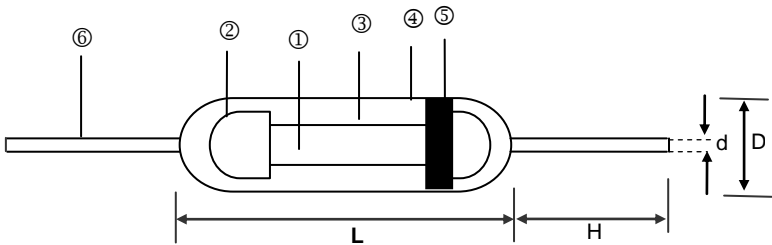
- The most economic industrial investment
- Standard tolerance: +/-5% (available +/-2%)
- Excellent long term stability
- Termination: Standard solder-plated copper lead

■ Applications

- Telecommunication
- Medical Equipment



■ Construction



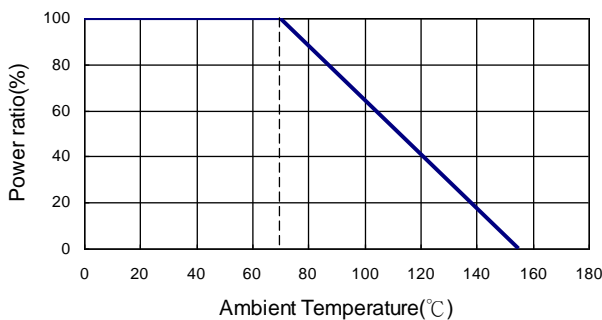
① Ceramic Rod	④ Non-flame Paint With Sol Vent-proof
② Tinned Iron Caps	⑤ Color Code
③ Carbon Film	⑥ Lead Wire

■ Dimensions

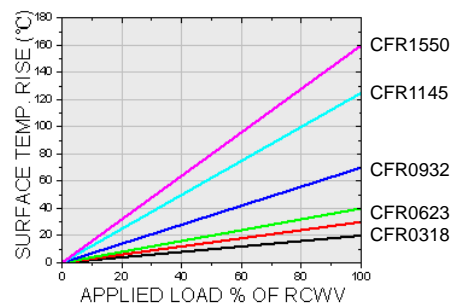
Unit: mm

Type	L	D	H	d	Weight (g) (1000pcs)
CFR0318	3.3±0.4	1.8±0.3	29±2.0	0.41~0.48	92
CFR0623	6.3±0.5	2.3±0.3	28±2.0	0.43~0.58	155
CFR0932	9.0±0.5	3.2±0.5	26±2.0	0.58~0.68	352
CFR1145	11.5±1.0	4.5±0.5	35±2.0	0.68~0.81	775
CFR1550	15.5±1.0	5.0±0.5	32±2.0	0.75~0.81	1042

■ Derating Curve



■ Hot-Spot Temperature



Carbon Film Leaded Resistor

Part Numbering

CFR	0318	J	T	-	W	1001	
Product Type	Dimensions (LxD)	Resistance Tolerance	Packaging Code	TCR (PPM/°C)	Power Rating	Resistance	Special
	0318: 3.3x1.8 0623: 6.3x2.3 0932: 9.0x3.2 1145: 11.5x4.5 1550: 15.5x5.0	G: ±2% J: ±5%	A: Ammo B: Bulk T: Taping Reel	-: No specified	R: 3W S: 2W T: 1W U: 1/2W V: 1/4W W: 1/8W	R500: 0.5Ω 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

Type \ Item	Power Rating at 70°C	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	
						±2%	±5%
0318	1/8W	-55 ~ +155°C	150V	300V	300V	1Ω - 10MΩ	0.1Ω - 22MΩ
0623	1/4W		250V	500V	500V	1Ω - 10MΩ	0.1Ω - 22MΩ
0932	1/2W		350V	700V	700V	1Ω - 10MΩ	0.1Ω - 22MΩ
1145	1W		450V	1000V	1000V	1Ω - 10MΩ	0.1Ω - 22MΩ
1550	2W		500V	1000V	1000V	1Ω - 10MΩ	0.1Ω - 22MΩ

High Power Rating Electrical Specifications

Type \ Item	Power Rating at 70°C	Operating Temp. Range	Max. Working Voltage	Max. Overload Voltage	Dielectric Withstanding Voltage	Resistance Range	
						±2%	±5%
0318	1/4W	-55 ~ +155°C	200V	400V	400V	1Ω - 10MΩ	0.1Ω - 22MΩ
0623	1/2W		300V	500V	500V	1Ω - 10MΩ	0.1Ω - 22MΩ
0932	1W		400V	800V	800V	1Ω - 10MΩ	0.1Ω - 22MΩ
1145	2W		500V	1000V	1000V	1Ω - 10MΩ	0.1Ω - 22MΩ
1550	3W		500V	1000V	1000V	1Ω - 10MΩ	0.1Ω - 22MΩ

Operating Voltage= $\sqrt{P \cdot R}$ or Max. operating voltage listed above, whichever is lower.

Overload Voltage= $2.5 \cdot \sqrt{P \cdot R}$ or Max. overload voltage listed above, whichever is lower

Resistor body color:

Standard power rating: Light Brown

High power rating 0318 size: Light Brown is available only other sizes: Light Brown or Pink are available.

Please specify which color is acceptable else the light brown is a top priority.

■ Environmental Characteristics

Item	Requirement	Test Method
Short Time Overload	$\pm(0.75\%+0.05\Omega)$	IEC-60115-1 4.13 2.5 times RCWV for 5 seconds
Insulation Resistance	$> 10000M\Omega$	IEC-60115-1 4.6 In V-Block
Endurance	$\pm(3\%+0.05\Omega)$	IEC-60115-1 4.25 70 \pm 2 $^{\circ}$ C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	$< 100K\Omega\pm 3\%$ $\geq 100K\Omega\pm 5\%$	IEC-60115-1 4.24 40 \pm 2 $^{\circ}$ C, 90~95% R.H. RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Solderability	95% min. Coverage	IEC-60115-1 4.17 260 \pm 5 $^{\circ}$ C for 2 \pm 0.5 seconds
Dielectric Withstanding Voltage	By Type	In V-Block for 60 seconds
Temperature Coefficient	1145/1550: < 1 Ω \pm 1500ppm 1 Ω ~100K Ω \pm 350ppm 100K Ω ~1M Ω -0ppm-500ppm 1M Ω ~4.7M Ω -0ppm-1000ppm Other sizes: < 1 Ω \pm 1500ppm 1 Ω ~100K Ω +350ppm-500 ppm 100K Ω ~1M Ω -0ppm-700ppm 1M Ω ~4.7M Ω -0ppm-1500ppm	IEC-60115-1 4.8 Resistance value at room temperature and room Temperature+125 $^{\circ}$ C
Pulse Overload	$\pm(1\%+0.05\Omega)$	IEC-60115-1 4.39 4 times RCWV for 10000 cycles with 1 second "ON" and 25 seconds "OFF"
Resistance To Solvent	No deterioration of coatings and markings	IEC-60115-1 4.30 IPA for 5 \pm 0.5 min. with ultrasonic
Terminal Strength	Tensile: ≥ 2.5 kg	IEC-60115-1 4.16 Direct Load for 10 seconds In the direction off the terminal leads

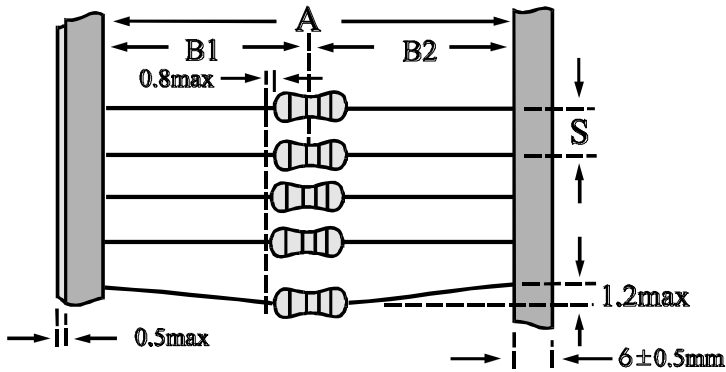
RCWV(Rated continuous working voltage)= $\sqrt{(P \cdot R)}$ or Max. Operating voltage whichever is lower

■ Storage Temperature: 15~28 $^{\circ}$ C; Humidity < 80%RH

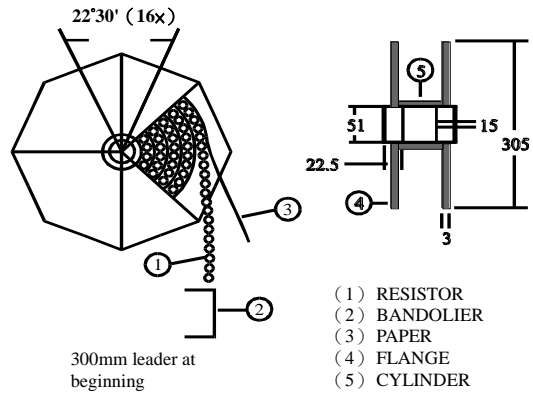
Taping/Packing Specifications

1. Standard Type (Reel & Ammo)

Packing Methods



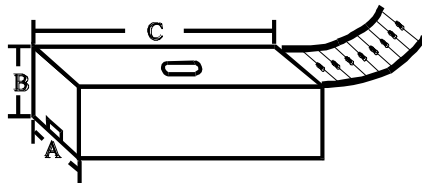
Reel Packing



Unit: mm

Packaging Type	Packing Methods			Reel Packing	
	A	B1-B2 Max	S	Across Flange (A)	Qty
0318	52+1/-0	1.2	5±0.3	72	5,000
	26+0.5/-0	1.0			
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	52+1/-0	1.5	5±0.3	95	2,000
	73+1/-0				
1550	52+1/-0	1.5	10±0.8	95	1,000
	73+1/-0				

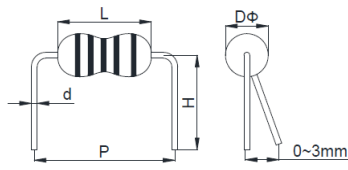
Ammo Packing



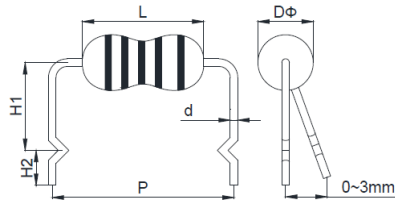
Unit: mm

Packaging Type	Packing Methods			Ammo Packing			
	A	B1-B2 Max	S	A	B	C	Qty
0318	52+1/-0	1.2	5±0.3	79±2	73±3	257±5	5,000
	26+0.5/-0	1.0		52±2	74±3	252±5	
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	52+1/-0	1.5	5±0.3	103±2	82±3	262±5	1,000
	73+1/-0						
1550	52+1/-0	1.5	10±0.8	103±2	96±3	265±5	1,000
	73+1/-0						

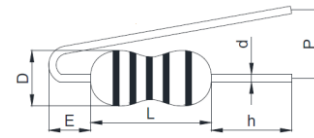
2. Special Type (Bulk)



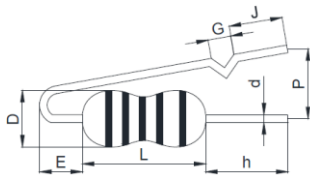
MA Type



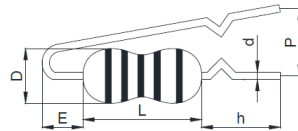
MC Type



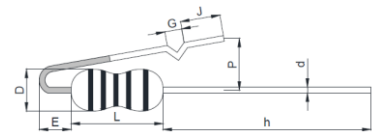
FA Type



FB Type



FC Type

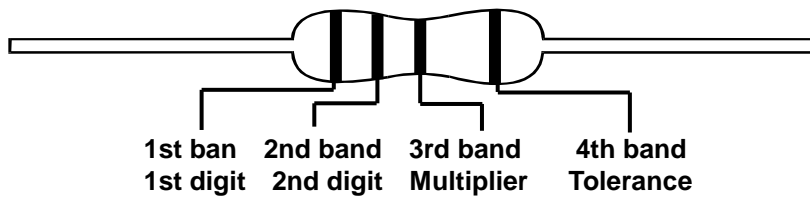


FD Type

Unit: mm

Codes	Type	P	H /H1/h	H2/G	J	D	L	d	E
0318	MA	5±1	8.0±1	-	-	1.8±0.3	3.3±0.4	0.45±0.03	-
0623	MA	10±1	10.0±1	-	-	2.3±0.3	6.3±0.5	0.55±0.03	-
	MC	10±1	5.0±1	6.0±2	-	2.3±0.3	6.3±0.5	0.55±0.03	-
	FA	5~15	5.0±2	-	-	2.3±0.3	6.3±0.5	0.55±0.03	3±1
	FB	5~15	4.0±2	3.0±0.5	3±1	2.3±0.3	6.3±0.5	0.55±0.03	3±1
	FD	5~15	27.0±2	3.0±0.5	12±2	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	5.0±1	4.0±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	3.0±0.5	3±1	3.2±0.5	9.0±0.5	0.65±0.03	3±1
	FC	5~15	10.0±3	-	-	3.2±0.5	9.0±0.5	0.65±0.03	-
1145	MA	15±1	12.5±1	-	-	4.5±0.5	11.5±1.0	0.78±0.03	-
	MC	15±1	8.0±1	6.0±1.0	-	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	3.0±0.5	3±1	4.5±0.5	11.5±1.0	0.78±0.03	3±1
	FC	5~15	10.0±3	-	-	4.5±0.5	11.5±1.0	0.78±0.03	-
1550	MA	20±1	15.0±1	-	-	5.0±0.5	15.5±1.0	0.78±0.03	-
	MC	20±1	12.0±1	5.0±1.0	-	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	3.0±0.5	3±1	5.0±0.5	15.5±1.0	0.78±0.03	3±1
	FC	5~15	10.0±3	-	-	5.0±0.5	15.5±1.0	0.78±0.03	-

■ Marking & Resistance Tolerance



±2%	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
±5%																									

Color	Digit	Multiplier	Tolerance	
Without	-	-	-	-
Silver	-	10 ⁻²	-	-
Gold	-	10 ⁻¹	±5.0%	J
Black	0	10 ⁰	-	-
Brown	1	10 ¹	-	-
Red	2	10 ²	±2.0%	G
Orange	3	10 ³	-	-
Yellow	4	10 ⁴	-	-
Green	5	10 ⁵	-	-
Blue	6	10 ⁶	-	-
Violet	7	10 ⁷	-	-
Grey	8	10 ⁸	-	-
White	9	10 ⁹	-	-