Data Sheet

Customer:	
Product:	Metal Film High Frequency MELF Resistor-CSRF Series
Size:	0102/0204/0207
Issued Date:	05-Sep-23
Edition:	REV.A5

RoHS Compliant

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05-Sep-23	05-Sep-23	05-Sep-23		
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Metal Film High Frequency MELF Resistor



■Features

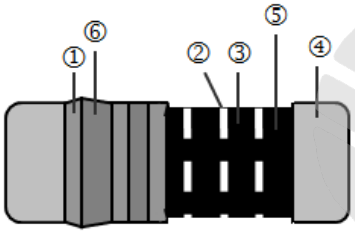
- Thin film technology
- Suitable for RF applications
- Specialty trimmed technology
- Sn termination on Ni barrier layer
- SMD enabled structure
- Lead-free and RoHS compliant

■Applications

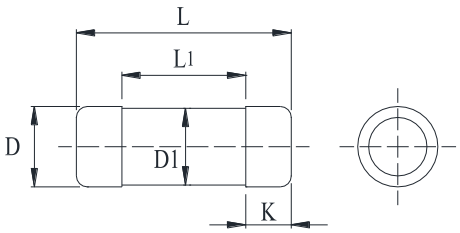
- Industrial
- Telecommunication

TECHNICAL SPECIFICATIONS						
DESCRIPTION	**CSRF0102**		**CSRF0204**		**CSRF0207**	
Resistance range	6.8Ω-100Ω; 50Ω		1.5Ω-220Ω; 50Ω		6.8Ω-220Ω; 50Ω	
Resistance tolerance	±1%					
Temperature coefficient	±50ppm/℃					
Power rating P_{70}	1/5W	0.3W	1/4W	2/5W	1/2W	1W
Operating voltage $U_{max.}$	150V		200V		350V	
Operating temperature range	-55℃~155℃					
Max. resistance change at P70 for resistance range, ΔR/R max., after 1000 h	≦0.5%		≦0.5%		≦0.5%	

■Construction & Dimension



①	Insulation Coating	④	Electrode Cap
②	Trimming Line	⑤	Resistor Layer
③	Ceramic Rod	⑥	Marking



Type	L (mm)	$L_{1\ min.}$ (mm)	ΦD (mm)	$ΦD_1$ (mm)	K (mm)	Weight 1,000EA (g)
CSRF0102	2.20±0.10	1.1	1.10±0.10	D +0/-0.15	0.45±0.05	7.7
CSRF0204	3.50±0.2	1.7	1.40±0.15	D +0/-0.2	0.8±0.1	18.7
CSRF0207	5.90±0.2	2.9	2.20±0.20	D +0/-0.2	1.3±0.1	80.9

■Part Numbering

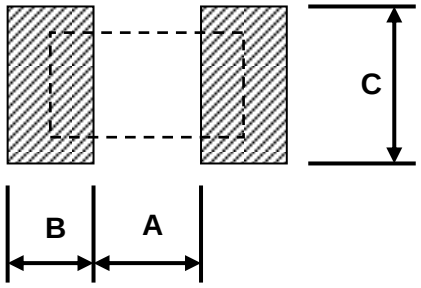
Part Number：CSRF0204FTDV1000

C	S	R	F	0	2	0	4	F	T	D	V	1	0	0	0

Product Type	Dimensions (L×ΦD)	Resistance Tolerance	Packaging Code	TCR (PPM/℃)	Power Rating	Resistance
CSRF	0102: 2.2x1.1 0204: 3.5x1.4 0207: 5.9x2.2	F: ±1%	T: 7" Taping Reel S:7" Taping Reel, **Antistatic Tape**※ W:13" Taping Reel M:13" Taping Reel, **Antistatic Tape**※	D: ±50	T: 1W U: 1/2W V: 1/4W G: 2/5W P: 1/5W L: 0.3W	1R50: 1.5Ω 0100: 10Ω 1000: 100Ω

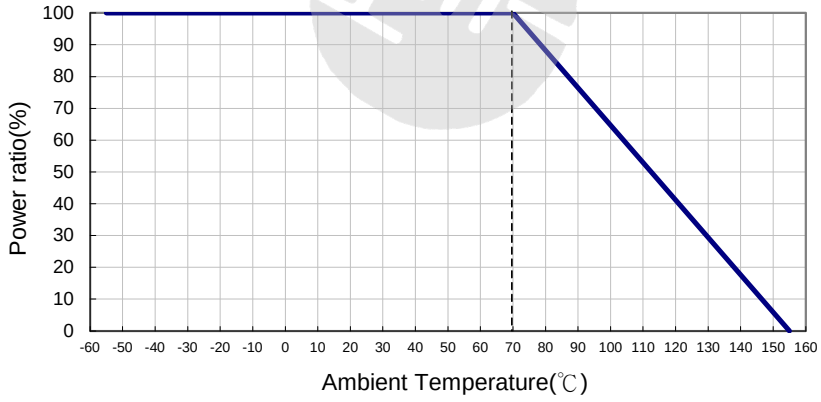
※Packaging Code "S" & "M" only for 0102 & 0204 size products, not include 0207 size product.

■Recommend Land Pattern

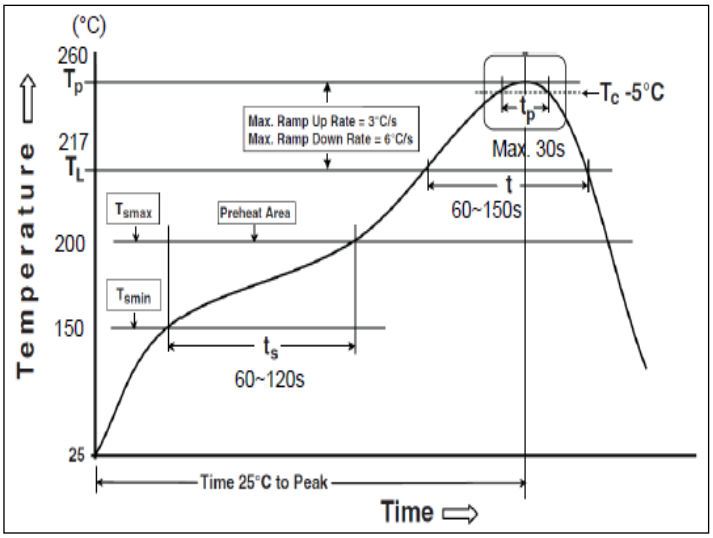


Type	A (mm)	B (mm)	C (mm)
CSRF0102	1.0	0.8	1.5
CSRF0204	1.6	1.2	1.6
CSRF0207	3.0	1.7	2.4

■Derating Curve



■Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	
Profile Feature	**Pb-Free Assembly**
Preheat Min. Temperature (Tsmin) Max Temperature (Tsmax) Preheating time (ts) from (Tsmin to Tsmax)	 150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to Tp)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 60-150 seconds
Min. Peak temperature (Tp min)	235°C
Max. Peak temperature (Tp max)	260°C
Time (tp) within 5 °C of the specified classification temperature (Tc)	30 seconds max.
Ramp-down rate (Tp to T_L)	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

■Standard Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range ±1%(E24)	TCR (PPM/°C)
0102	0.2W	-55 ~ +155°C	150V	50Ω, 6.8Ω-100Ω	±50
0204	1/4W	-55 ~ +155°C	200V	50Ω, 1.5Ω-220Ω	±50
0207	1/2W	-55 ~ +155°C	300V	50Ω, 6.8Ω-220Ω	±50

■High Power Rating Electrical Specifications

Item / Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range ±1%(E24)	TCR (PPM/°C)
0102	0.3W	-55 ~ +155°C	150V	50Ω, 6.8Ω-100Ω	±50
0204	2/5W	-55 ~ +155°C	200V	50Ω, 1.5Ω-220Ω	±50
0207	1W	-55 ~ +155°C	350V	50Ω, 6.8Ω-220Ω	±50

Operating Voltage=$\sqrt{}$(P*R) or Max. Operating Voltage listed above, whichever is lower.
RCWV(Rated Continuous Working Voltage)=$\sqrt{}$(P*R) or Max. Operating Voltage whichever is lower.
■ Viking is capable of manufacturing the optional spec based on customer's requirement.

■Environmental Characteristics

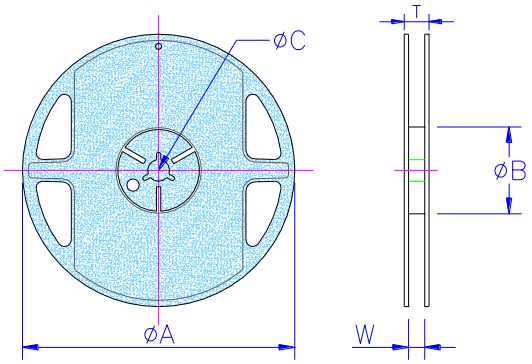
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(0.15%+0.01Ω)	**JIS-C-5201-1 4.13** **IEC-60115-1 4.13** RCWV*2.5 for 5 seconds
Endurance	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.25** **IEC-60115-1 4.25.1** 70±2°C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
Damp Heat with Load	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.24** **IEC-60115-1 4.24** 40±2°C, 90~95% R.H., RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
Dry Heat	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.23** **IEC-60115-1 4.23.2** at +155°C for 1000 hrs
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** **J-STD-002** 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	**JIS-C-5201-1 4.7** **IEC-60115-1 4.7** 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≦5% Total leaching area ≦ 10%	**JIS-C-5201-1 4.18** **IEC-60068-2-58 8.2.1** 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.25%+0.05Ω)	**JIS-C-5201-1 4.19** **IEC-60115-1 4.19** -55°C to +155°C, 5 cycles
ESD	±(0.5%+0.01Ω)	**AEC-Q200-002** Human body, 0102:800V; 0204:1000V; 0207:2000V
Resistance to Solvents	No visible damage on appearance and marking.	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal Strength	No broken	**AEC-Q200-006** Force of 1.8kg for 60 seconds.
Flammability	No ignition of the tissue paper or scorching or the pinewood board	**UL-94** V-0 or V-1 are acceptable. Electrical test not required.

RCWV(Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.

■ **Storage Temperature: 15~28°C; Humidity < 80%RH**

■ **Shelf Life: 2 years from production date.**

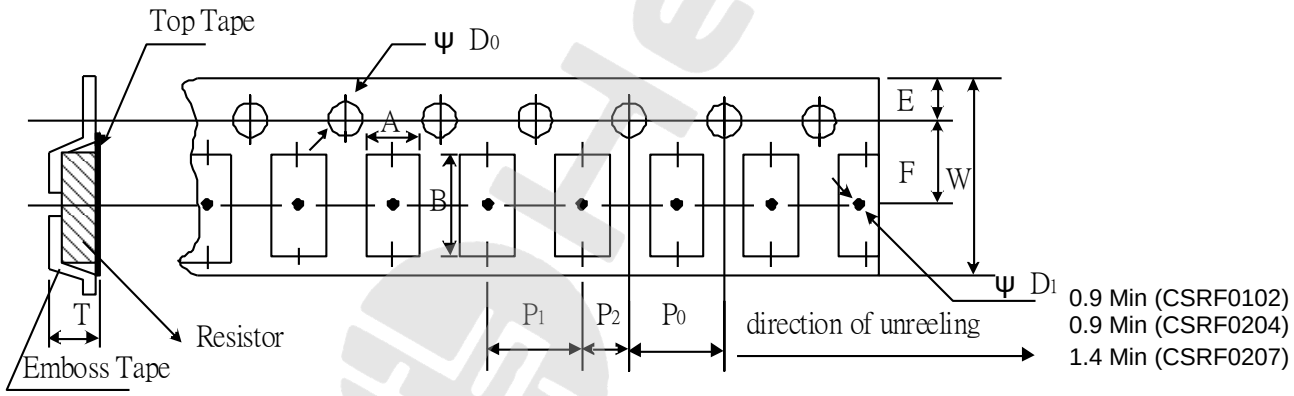
■Packaging



Packaging Quantity & Reel Specifications

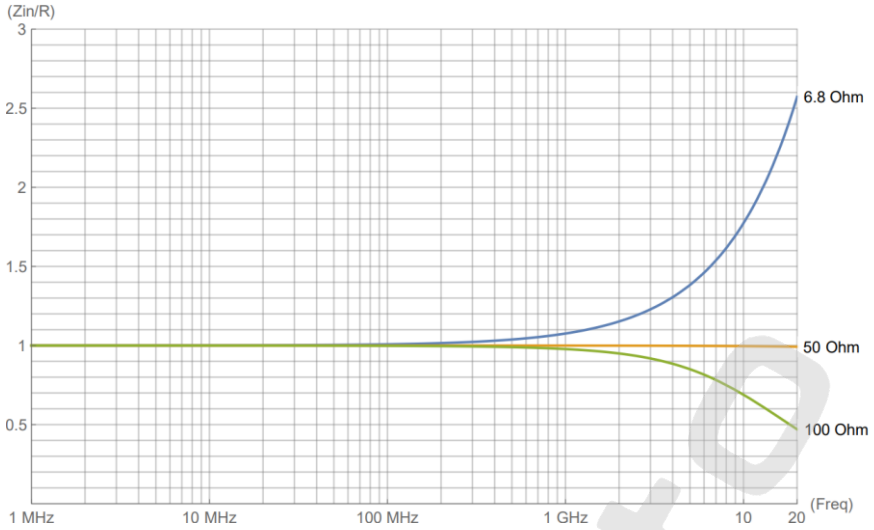
Type	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
CSRF0102	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.5±0.5	3,000
	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000
CSRF0204	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.5±0.5	3,000
	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000
CSRF0207	7 inch	178.5±1.5	60.0+1.0	13.0±0.5	13.0±0.5	15.5±0.5	2,000
	13 inch	330±1.0	99±0.5	13.5±0.5	13.4±1	17.8±1	6,000

Emboss Plastic Tape Specifications

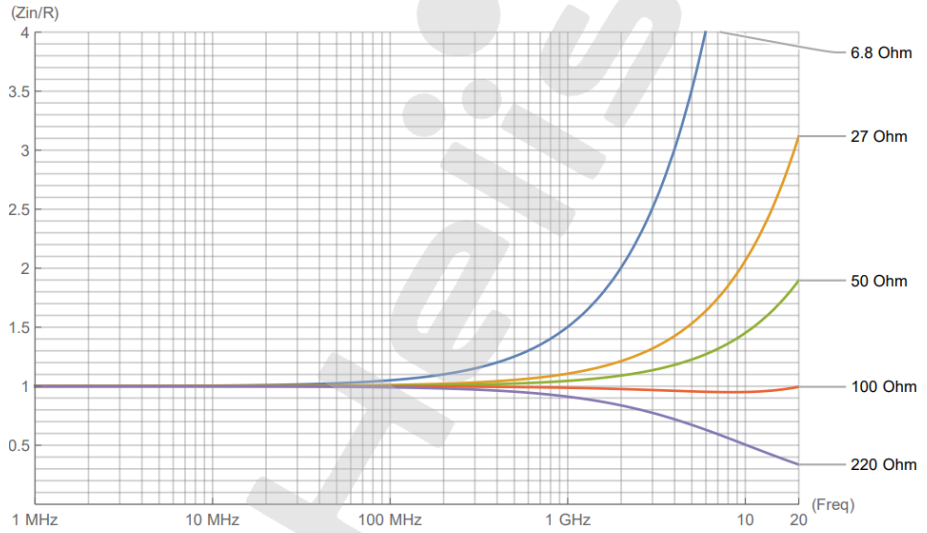


Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P_0 (mm)	P_1 (mm)	P_2 (mm)	$ΦD_0$ (mm)	T (mm)
CSRF0102	1.30±0.20	2.40±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.50±0.10
CSRF0204	1.55±0.20	3.65±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.80±0.10
CSRF0207	2.40±0.10	6.15±0.10	12.0±0.10	1.75±0.10	5.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	2.70±0.10

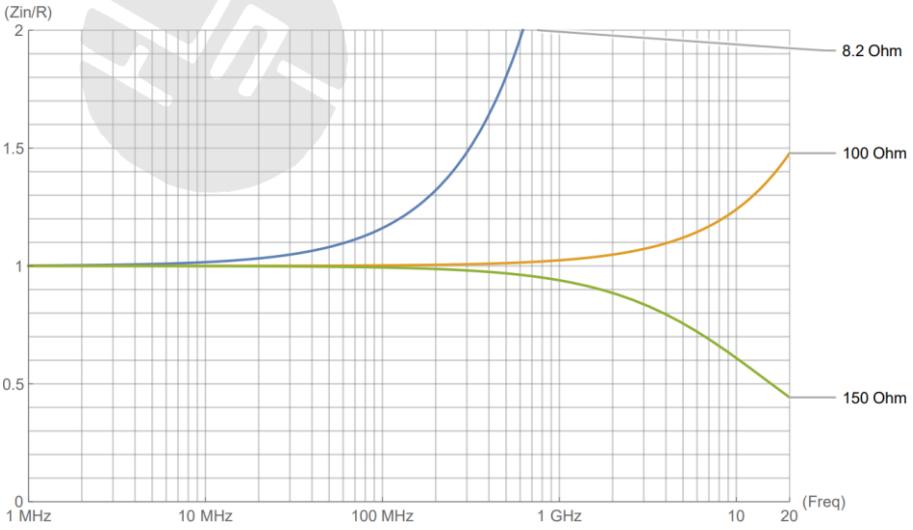
■Frequency behavior



CSRF0102

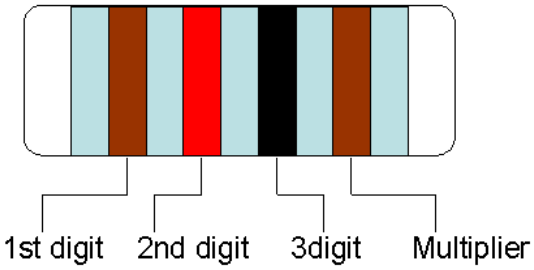


CSRF0204



CSRF0207

■Marking & Resistance Tolerance



E-24	10	11	12	13	15	16	18	20	22	24	27	30	33	36	39	43	47	51	56	62	68	75	82	91

Color	Digit	Multiplier
Silver	-	10^{-2}
Gold	-	10^{-1}
Black	0	10^{0}
Brown	1	10^{1}
Red	2	10^{2}
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}

REVISION HISTORY

REVISION	DATE	CHANGE NOTIFICATION	DESCRIPTION
Version A	Mar 10, 2021	-	- New product release
Version A1	Sep 28, 2021	-	- Add in Shelf Life: 2 years from production date.
Version A2	Jan 05, 2022	-	- Newly added antistatic tape packaging for packaging methods.
Version A3	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version A4	Jun 15, 2022	-	- Modify Soldering Condition
Version A5	Sep 05, 2023	-	- Features added Thin film technology