

Data Sheet

Customer:

Product: Metal Film High Frequency MELF Resistor-CSRFB Series

Size: 0102/0204/0207

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VIKING TECH CORPORATION
光韻科技股份有限公司
No.70 Guangfu N. Rd., Hukou
Township, Hsinchu County 303,
Taiwan

TEL:886-3-5972931
FAX:886-3-5972935•886-3-5973494
E-mail:sales@viking.com.tw

VIKING TECH CORPORATION KAOHSIUNG BRANCH
光韻科技股份有限公司高雄分公司
No.248-3, Sin-Sheng Rd., Cian-Jhen Dist., Kaohsiung,
806, Taiwan

TEL:886-7-8217999
FAX:886-7-8228229
E-mail:sales@viking.com.tw

VIKING ELECTRONICS (WUXI) CO., LTD.
光韻電子(無錫)有限公司
No.22 Xixia Road, Machinery & Industry Park,
National Hi-Tech Industrial Development Zone
of Wuxi, Wuxi, Jiangsu Province, China
Zip Code:214028
TEL:86-510-85203339
FAX:86-510-85203667•86-510-85203977
E-mail:china@viking.com.tw

Produced by (QC)	Checked (QC)	Approved by (QC)	Prepared by (Sales)	Accepted by (Customer)
05-Sep-23	05-Sep-23	05-Sep-23		
Alice Hsiao	Susan Huang	Susan Huang		

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

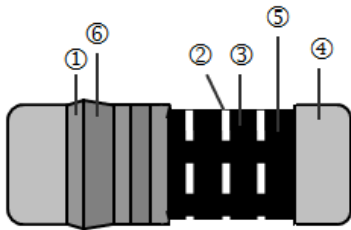


Applications

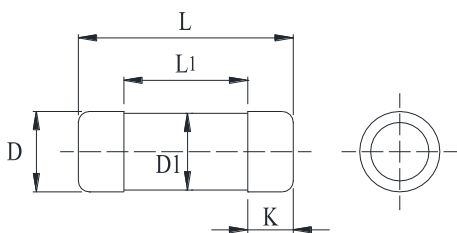
- Industrial
- Telecommunication

TECHNICAL SPECIFICATIONS						
DESCRIPTION	CSR0102		CSR0204		CSR0207	
Resistance range	6.8Ω-100Ω; 50Ω		1.5Ω-220Ω; 50Ω		6.8Ω-220Ω; 50Ω	
Resistance tolerance	±1%					
Temperature coefficient	±50ppm/°C					
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°C~155°C					
Max. resistance change at P70 for resistance range, ΔR/R max., after 1000 h	≤0.5%		≤0.5%		≤0.5%	

Construction & Dimension



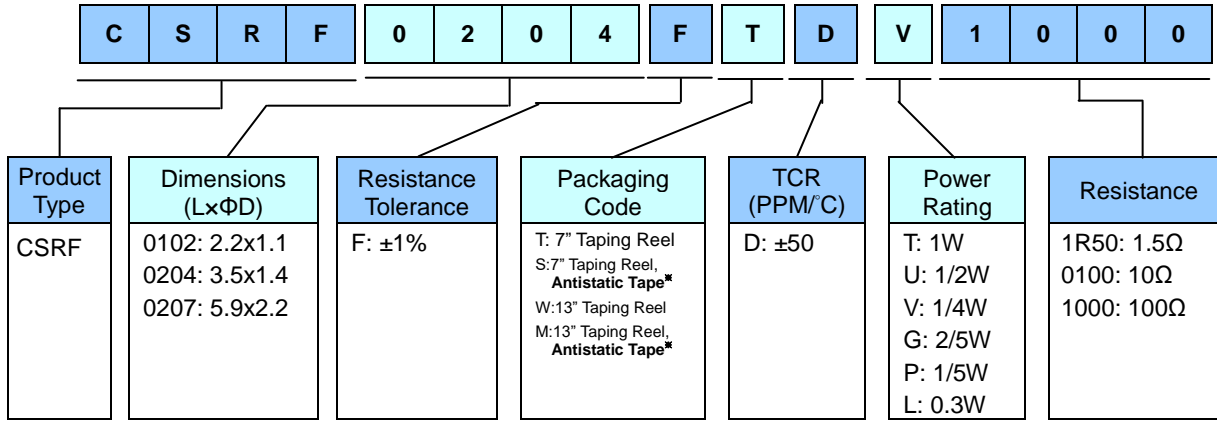
①	Insulation Coating	④	Electrode Cap
②	Trimming Line	⑤	Resistor Layer
③	Ceramic Rod	⑥	Marking



Type	L (mm)	L _{1 min.} (mm)	ΦD (mm)	ΦD ₁ (mm)	K (mm)	Weight 1,000EA (g)
CSR0102	2.20±0.10	1.1	1.10±0.10	D +0/-0.15	0.45±0.05	7.7
CSR0204	3.50±0.2	1.7	1.40±0.15	D +0/-0.2	0.8±0.1	18.7
CSR0207	5.90±0.2	2.9	2.20±0.20	D +0/-0.2	1.3±0.1	80.9

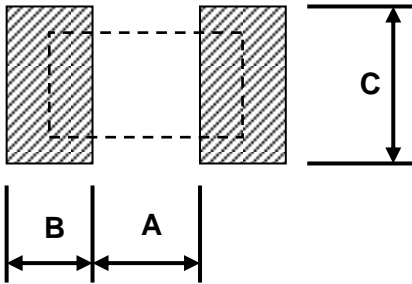
Part Numbering

Part Number : CSRF0204FTDV1000



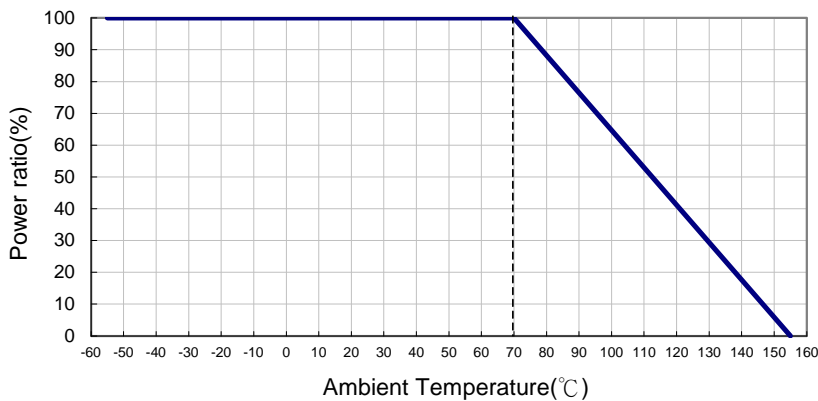
※Packaging Code "S" & "M" only for 0102 & 0204 size products, not include 0207 size product.

Recommend Land Pattern

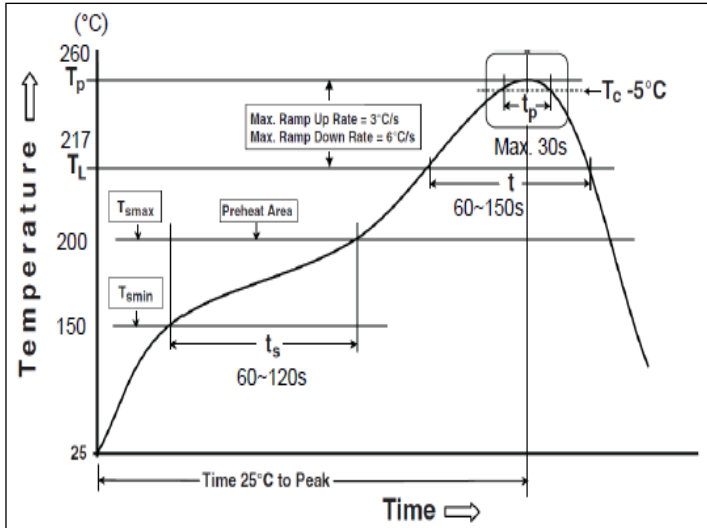


Type	A (mm)	B (mm)	C (mm)
CSRF0102	1.0	0.8	1.5
CSRF0204	1.6	1.2	1.6
CSRF0207	3.0	1.7	2.4

Derating Curve



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



Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat	
Min. Temperature (T _{min})	150 °C
Max Temperature (T _{max})	200 °C
Preheating time (t _s) from (T _{min} to T _{max})	60-120 seconds
Ramp-up rate (T _L to T _p)	3 °C/second max.
Liquidous temperature (T _L)	217 °C
Time (t _L) maintained above T _L	60-150 seconds
Min. Peak temperature (T _p min)	235°C
Max. Peak temperature (T _p max)	260°C
Time (t _p) within 5 °C of the specified classification temperature (T _c)	30 seconds max.
Ramp-down rate (T _p 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	TCR (PPM/°C)
				±1%(E24)	
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	TCR (PPM/°C)
				±1%(E24)	
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= $\sqrt{P \cdot R}$ or Max. Operating Voltage listed above, whichever is lower.

RCWV(Rated Continuous Working Voltage)= $\sqrt{P \cdot R}$ or Max. Operating Voltage whichever is lower.

■ Viking is capable of manufacturing the optional spec based on customer's requirement.

■ Environmental Characteristics

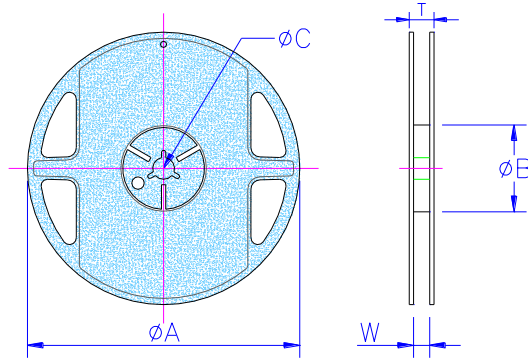
Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec	JIS-C-5201-1 4.8 IEC-60115-1 4.8 At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(0.15%+0.01Ω)	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 for 5 seconds
Endurance	±(0.5%+0.05Ω)	JIS-C-5201-1 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.**

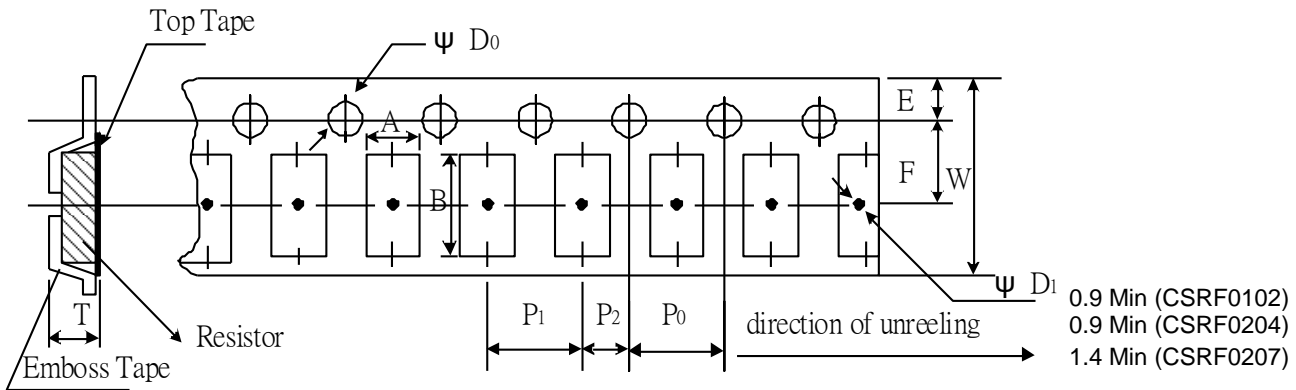
■ Packaging



Packaging Quantity & Reel Specifications

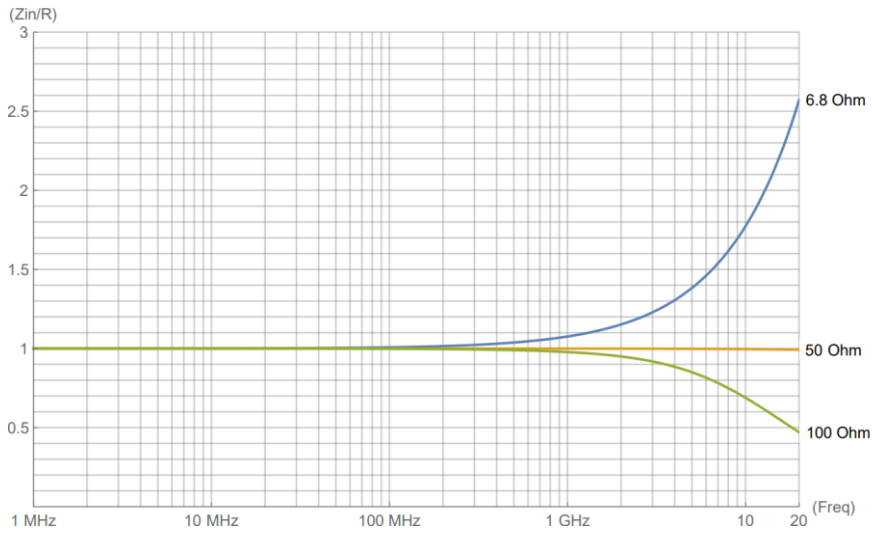
Type	Reel Diameter	ϕA (mm)	ϕB (mm)	ϕC (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
CSRF0102	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.5±0.5	3,000
	13 inch	330±1.0	100±0.5	13.0±0.2	9.5±0.5	13.5±0.5	10,000
CSRF0204	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.5±0.5	3,000
	13 inch	330±1.0	100±0.5	13.0±0.2	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

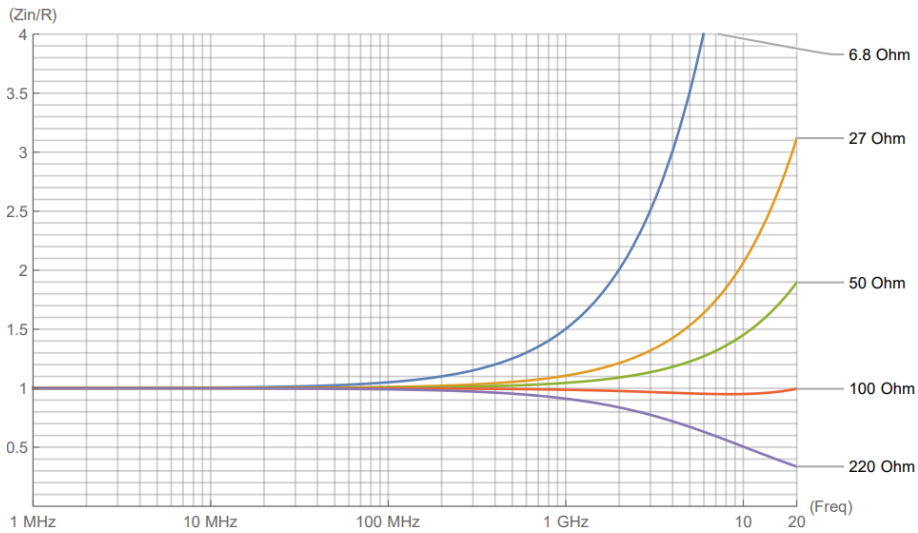


Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ϕD_0 (mm)	T (mm)
CSRF0102	1.30±0.20	2.40±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.50±0.10
CSRF0204	1.55±0.20	3.65±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.80±0.10
CSRF0207	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

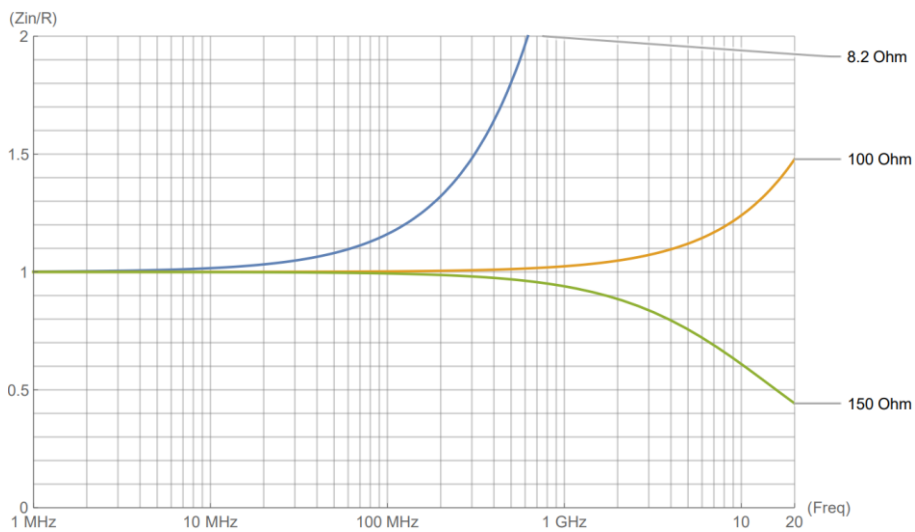
Frequency behavior



CSRFB0102

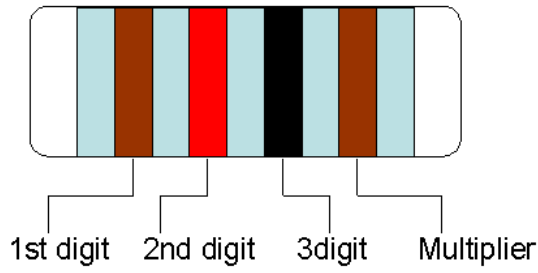


CSRFB0204



CSRFB0207

■ 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
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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