

# Metal Film High Frequency MELF Resistor

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**RoHS  
Compliant**



## Features

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

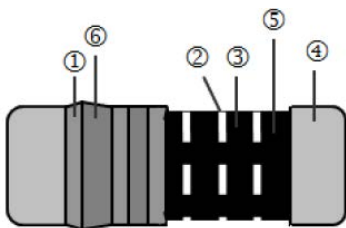
## Applications

- Industrial
- Telecommunication

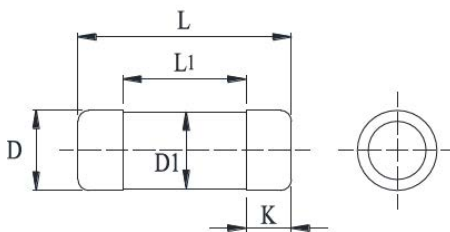
## Technical Specifications

Description	MCPSRF0102		MCPSRF0204		MCPSRF0207	
Resistance range	6.8Ω-100Ω; 50Ω		1.5Ω-220Ω; 50Ω		6.8Ω-220Ω; 50Ω	
Resistance tolerance	±1%					
Temperature coefficient	±50ppm/°C					
Power rating P <sub>70</sub>	1/5W	0.3W	1/4W	2/5W	1/2W	1W
Operating voltage U <sub>max.</sub>	150V		200V		350V	
Operating temperature range	-55°C to 155°C					
Max. resistance change at P70 for resistance range, Δ R/R max., after 1000 h	≤0.5%					

## Construction & Dimension



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



Type	L (mm)	L1 min. (mm)	ΦD (mm)	ΦD1 (mm)	K (mm)	Weight 1,000EA (g)
MCPSRF0102	2.2 ±0.10	1.1	1.1 ±0.1	D +0/-0.15	0.45 ±0.05	7.7
MCPSRF0204	3.5 ±2	1.7	1.4 ±0.15	D +0/-0.2	0.8 ±0.1	18.7
MCPSRF0207	5.9 ±0.2	2.9	2.2 ±0.2	D +0/-0.2	1.3 ±0.1	80.9

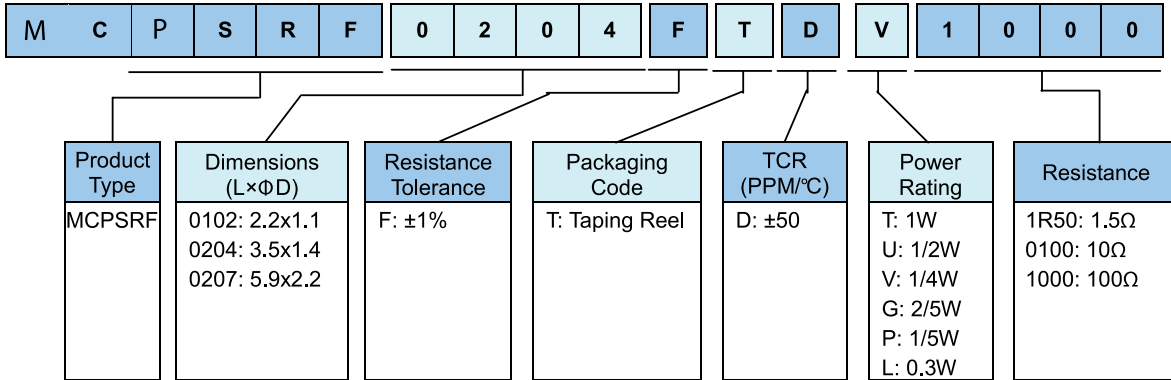
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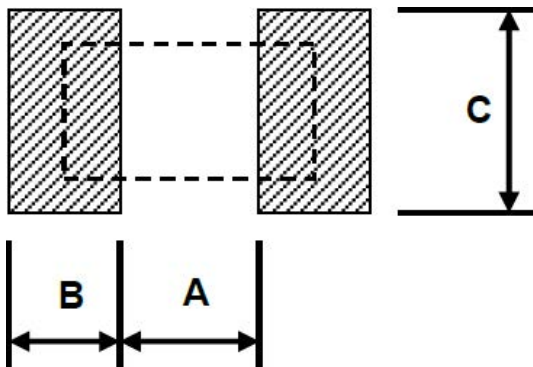
# Metal Film High Frequency MELF Resistor

## Part Numbering

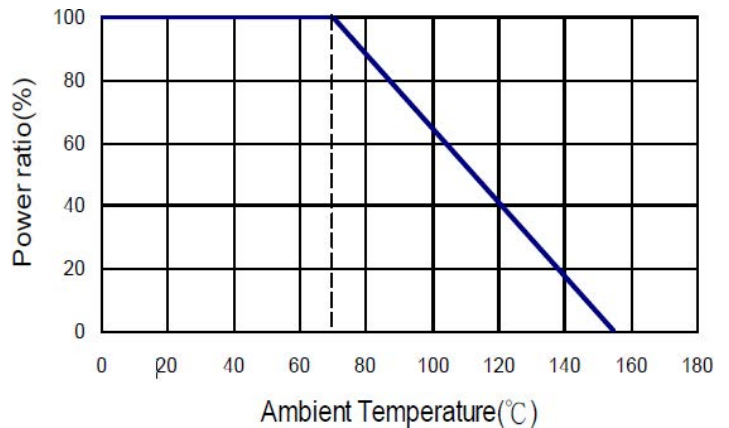
Part Number MCPSRF0204FTDV1000



## Recommend Land Pattern



## Derating Curve

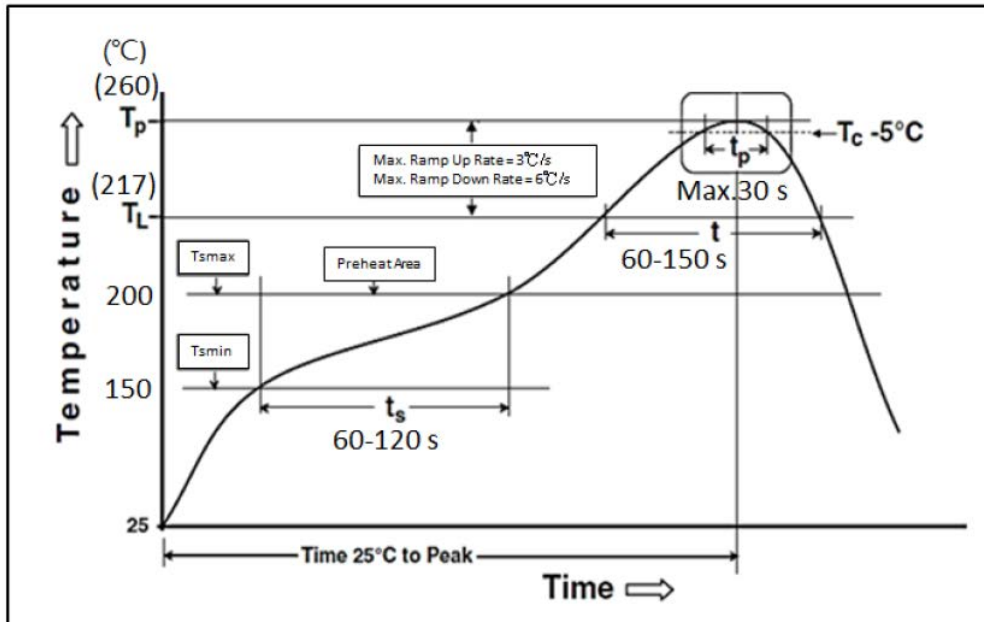


Type	A (mm)	B (mm)	C (mm)
MCPSRF0102	1	0.8	1.5
MCPSRF0204	1.6	1.2	1.6
MCPSRF0207	3	1.7	2.4

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## Soldering Condition (IPC/JEDEC J-STD-020)



## Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Resistance Range	TCR (PPM/°C)
				±1%(E24)	
MCPSRF0102	0.2W	-55°C to +155°C	150V	50Ω, 6.8Ω-100Ω	±50
MCPSRF0204	1/4W		200V	50Ω, 1.5Ω-220Ω	±50
MCPSRF0207	1/2W		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)	
MCPSRF0102	0.3W	-55°C to +155°C	150V	50Ω, 6.8Ω-100Ω	±50
MCPSRF0204	2/5W		200V	50Ω, 1.5Ω-220Ω	±50
MCPSRF0207	1W		350V	50Ω, 6.8Ω-220Ω	±50

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.

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## Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	JISC 5201 1 4.8 IEC60115 1 4.8 At 25°C/55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	$\pm(0.15\%+0.01\Omega)$	JIS-C-5201-1 4.13 IEC-60115-1 4.13 RCWV*2.5 for 5 seconds
Endurance	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.25 IEC-60115-1 4.25.1 70 $\pm$ 2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	$\pm(0.5\%+0.05\Omega)$	JIS-C-5201-1 4.24 IEC-60115-1 4.24 40 $\pm$ 2°C, 90-95% R.H, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Dry Heat	$\pm(1\%+0.05\Omega)$	JIS-C-5201-1 4.23 IEC-60115-1 4.23.2 at +155°C for 1000 hrs
Solderability	95% min. coverage	JISC 5201 1 4.17 IEC60115 1 4.17 245 $\pm$ 5°C for 3 seconds
Resistance to Soldering Heat	$\pm(0.5\%+0.05\Omega)$	JISC 5201 1 4.18 IEC60115 1 4.18 260 $\pm$ 5°C for 10 seconds
Voltage Proof	No breakdown or flashover	JISC 5201 1 4.7 IEC-60115 1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area $\leq$ 5% Total leaching area $\leq$ 10%	JISC 5201 1 4.18 IEC-60068 2-58 8.2.1 260 $\pm$ 5°C for 30 seconds
Rapid Change of Temperature	$\pm(0.25\%+0.05\Omega)$	JIS-C-5201-1 4.19 IEC-60115-1 4.19 -55°C to +155°C, 5 cycles
ESD	$\pm 0.5\%+0.01\Omega$	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	UL94 V-0 or V-1 are acceptable. Electrical test not required.

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

Storage Temperature: 15°C to 28°C; Humidity < 80%RH

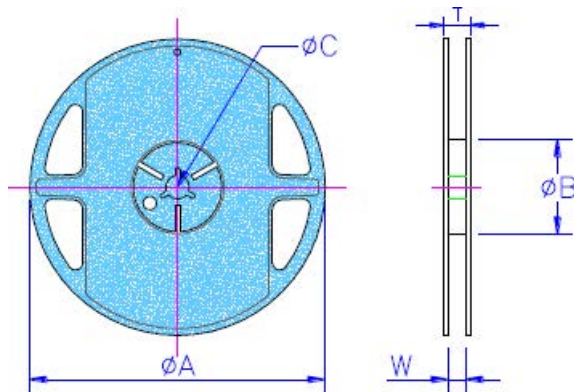
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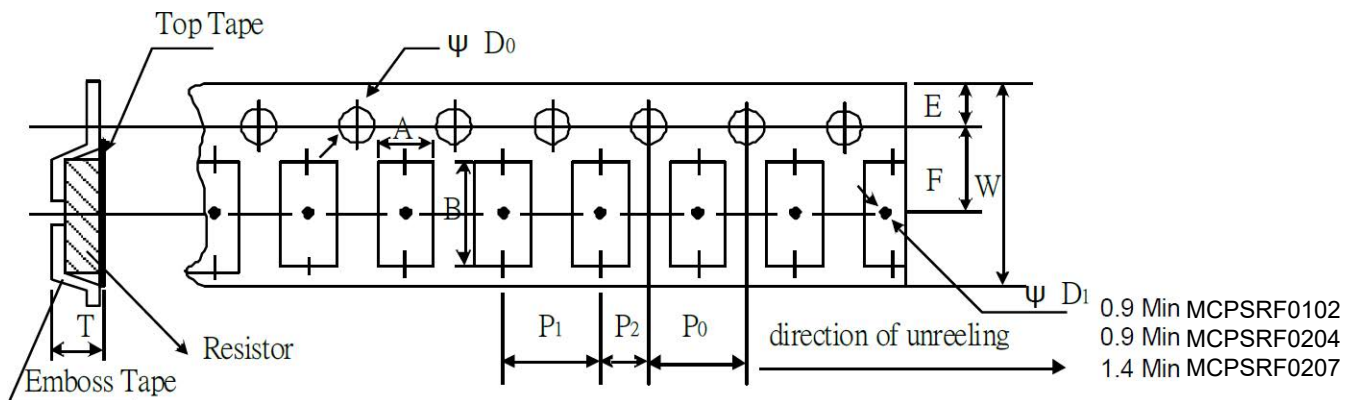
## Packaging



### Packaging Quantity & Reel Specifications

Type	Reel Diameter	$\Phi A$ (mm)	$\Phi B$ (mm)	$\Phi C$ (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
MCPSRF0102	7 inch	178.5 $\pm$ 1.5	60 +1	13 $\pm$ 0.2	9 $\pm$ 0.5	12.5 $\pm$ 0.5	3,000
MCPSRF0204				13 $\pm$ 0.5	13 $\pm$ 0.5	15.5 $\pm$ 0.5	2,000
MCPSRF0207				13 $\pm$ 0.5	13 $\pm$ 0.5	15.5 $\pm$ 0.5	2,000

### Emboss Plastic Tape Specifications

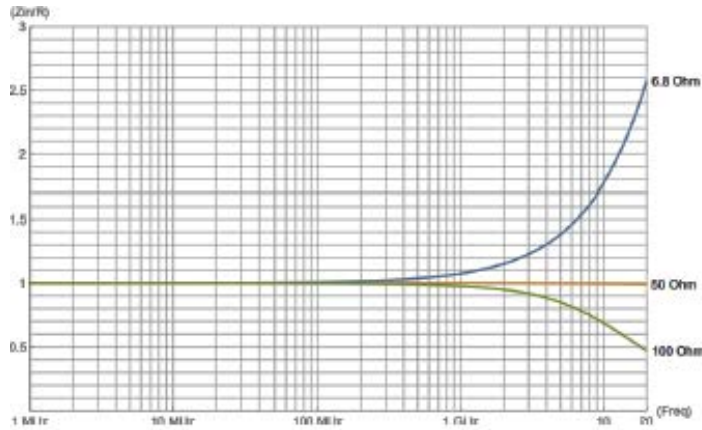


Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P <sub>0</sub> (mm)	P <sub>1</sub> (mm)	P <sub>2</sub> (mm)	$\Phi D_0$ (mm)	T (mm)
MCPSRF0102	1.3 $\pm$ 0.1	2.4 $\pm$ 0.1	8 $\pm$ 0.1	1.75 $\pm$ 0.1	3.5 $\pm$ 0.05	4 $\pm$ 0.1	4 $\pm$ 0.1	2 $\pm$ 0.05	1.5 +0.1	1.5 $\pm$ 0.1
MCPSRF0204	1.55 $\pm$ 0.1	3.65 $\pm$ 0.1								1.8 $\pm$ 0.1
MCPSRF0207	2.4 $\pm$ 0.1	6.15 $\pm$ 0.1	12 $\pm$ 0.1		5.5 $\pm$ 0.05					2.7 $\pm$ 0.1

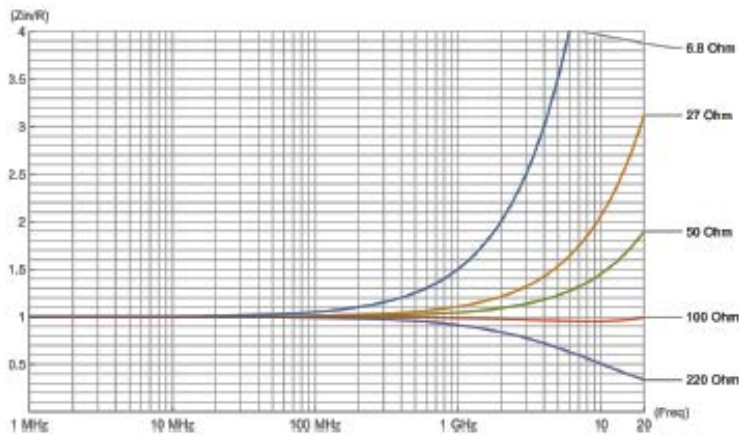
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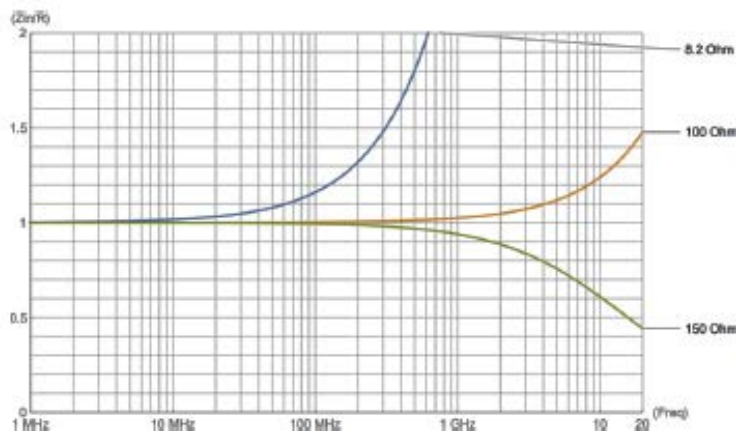
## Frequency behavior



MCPSRF0102



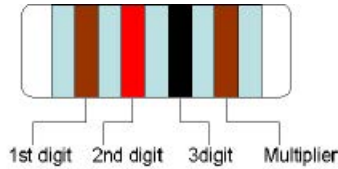
MCPSRF0204



MCPSRF0207

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## 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	$10^9$

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