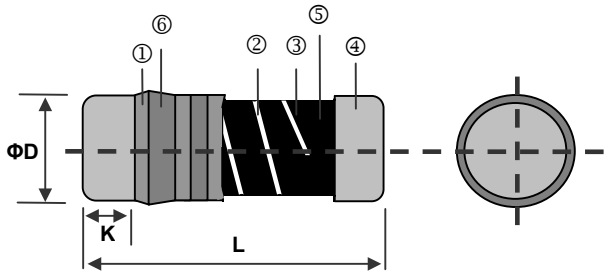
Metal Film Precision MELF Resistor－CSRV Series

■Construction



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

■Features

－AEC-Q200 Compliance
－Thin film technology
－Excellent overall stability
－Sn termination on Ni barrier layer
－Tight tolerance down to ±0.1%
－Extremely low TCR down to ±10 PPM/°C
－High power rating up to 1 Watts
－SMD enabled structure
－Lead-free and RoHS compliant

■Applications

－Automotive
－Industrial
－Telecommunication
－Medical Equipment
－Measurement/Testing Equipment

■Dimensions

Type	L (mm)	ΦD (mm)	K min (mm)	Weight 1,000EA (g)
CSRV0204	3.50±0.2	1.40±0.15	0.5	18.7
CSRV0207	5.90±0.2	2.20±0.20	0.5	80.9

TECHNICAL SPECIFICATIONS				
DESCRIPTION	**CSRV0204**		**CSRV0207**	
Resistance Range	0.1Ω-1MΩ;0Ω		0.1Ω-1MΩ;0Ω	
Resistance Tolerance	±5%;±1%;±0.5%;±0.25%;±0.1%		±5%;±1%;±0.5%;±0.25%;±0.1%	
Temperature Coefficient	±100ppm/℃; ±50ppm/℃; ±25ppm/℃; ±15ppm/℃; ±10ppm/℃			
Operation Mode	Standard	High power	Standard	High power
Power Rating P_{70}	1/4W	2/5W	1/2W	1W
Operating Voltage $U_{max.}$	200V	200V	300V	350V
Operating TempeRature Range	-55℃~155℃			
Max. resistance change at P70 for resistance range, △R/R max., after 1000 h	≦0.5%		≦0.5%	

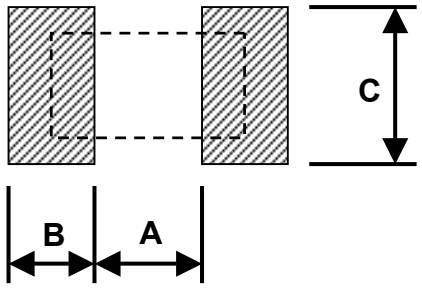
■Part Numbering

Part Number：CSRV0204DTDV1001
Part Number：CSRV0204JT-VR0R0

C	S	R	V	0	2	0	4	D	T	D	V	1	0	0	1
C	S	R	V	0	2	0	4	J	T	–	V	R	0	R	0

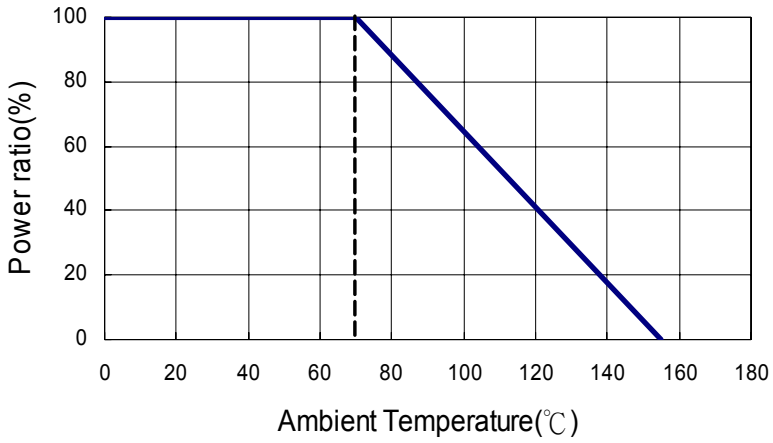
Product Type	Dimensions (L×ΦD)	Resistance Tolerance	Packaging Code	TCR (PPM/℃)	Power Rating	Resistance
CSRV	0204: 3.5x1.4 0207: 5.9x2.2	B: ±0.1% C: ±0.25% D: ±0.5% F: ±1% J: ±5%	T: Taping Reel B: Bulk	B: ±10 N: ±15 C: ±25 D: ±50 E: ±100 -: Jumper	T: 1W U: 1/2W V: 1/4W G: 2/5W	0010: 1Ω 0100: 10Ω 2201: 2200Ω 1001: 1KΩ 1004: 1MΩ R050: 0.05Ω 22R1: 22.1Ω R0R0: 0Ω

■Recommend Land Pattern

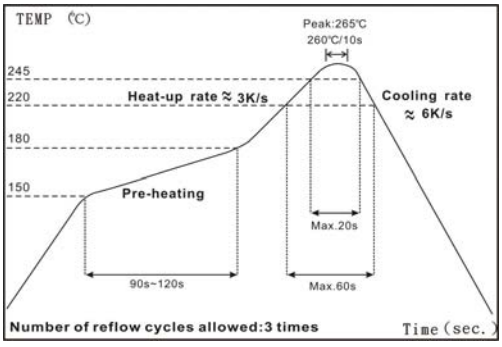


Type	A (mm)	B (mm)	C (mm)
CSRV0204	1.6	1.2	1.6
CSRV0207	3.0	1.7	2.4

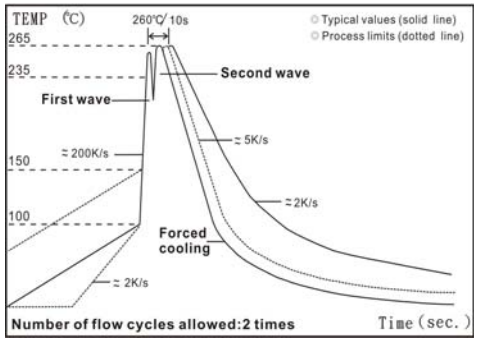
■Derating Curve



■Soldering Condition



IR Reflow Soldering



Wave Soldering (Flow Soldering)

(1) Time of IR reflow soldering at maximum temperature point 260°C：10s
(2) Time of wave soldering at maximum temperature point 260°C：10s
(3) Time of soldering iron at maximum temperature point 410°C：5s

■Standard Electrical Specifications

Item / Type	Power Rating at 70˚C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/˚C)
					±0.1%	±0.25%	±0.5%	±1%	±5%	
0204	1/4W	-55 ~ +155°C	200V	400V	49.9Ω-20KΩ					±10
					49.9Ω-300KΩ					±15
					10Ω-1MΩ			10Ω-1MΩ		±25
					10Ω-1MΩ	1Ω-1MΩ		0.2Ω-1MΩ		±50
					-			0.1Ω-1MΩ		±100
	Jumper: 2A				0Ω(<15mΩ)					-
0207	1/2W	-55 ~ +155°C	300V	500V	49.9Ω-20KΩ					±10
					49.9Ω-300KΩ					±15
					10Ω-1MΩ			10Ω-1MΩ		±25
					10Ω-1MΩ	1Ω-1MΩ		0.2Ω-1MΩ		±50
					-			0.1Ω-1MΩ		±100
	Jumper: 4A				0Ω(<15mΩ)					-

■High Power Rating Electrical Specifications

Item / Type	Power Rating at 70˚C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range					TCR (PPM/˚C)
					±0.1%	±0.25%	±0.5%	±1%	±5%	
0204	2/5W	-55 ~ +155°C	200V	400V	49.9Ω-100KΩ					±15
					49.9Ω-1MΩ					±25
					10Ω-1MΩ	1Ω - 1MΩ		0.2Ω-1MΩ		±50
					-			0.1Ω-1MΩ		±100
0207	1W	-55 ~ +155°C	350V	700V	10Ω-100KΩ					±15
					10Ω-1MΩ					±25
					10Ω-1MΩ	1Ω-1MΩ		0.2Ω-1MΩ		±50
					-			0.1Ω-1MΩ		±100

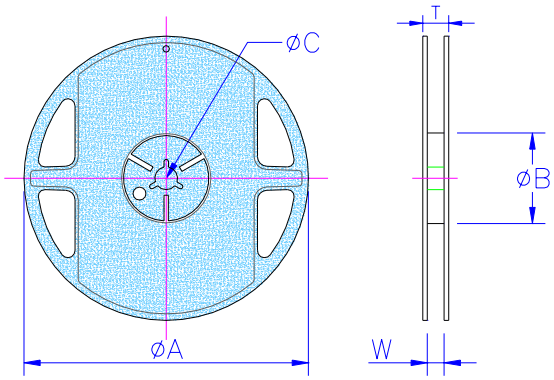
■Environmental Characteristics

Item	Requirement	Test Method
Temperature Coefficient of Resistance (T.C.R.)	As Spec	**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** -55°C~+125°C, 25°C is the reference temperature
Short Time Overload	±(0.15%+0.05Ω)	**JIS-C-5201-1 4.13** **IEC-60115-1 4.13** RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	≥10G	**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Max. overload voltage for 1 minute
Endurance	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.25** **IEC-60115-1 4.25.1** 70±2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Biased Humidity	±(1.0%+0.05Ω)	**MIL-STD-202 Method 103** 1000 hrs 85°C/85%RH 10% of operating power.
High Temperature Exposure	±(1.0%+0.05Ω)	**MIL-STD-202 Method 108** at +155°C for 1000 hrs
Bending Strength	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.33** **IEC-60115-1 4.33** Bending once for 5 seconds with 2mm
Thermal Shock	±(0.5%+0.05Ω)	**MIL-STD-202 Method 107** -55C/+155°C. Note: Number of cycles required-300, Maximum transfer time-20 seconds, Dwell time-15minutes. Air-Air.
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** 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 RCWV (RMS) 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
Temperature Cycling	±(0.5%+0.05Ω)	**JESD22 Method JA-104** -55°C to +125°C, 1000 cycles
Moisture Resistance	±(1.0%+0.05Ω)	**MIL-STD-202 Method 106** 24 hrs/cycle
Mechanical Shock	±(0.25%+0.05Ω)	**MIL-STD-202 Method 213** Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	±(0.5%+0.05Ω)	**MIL-STD-202 Method 204** 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	±(1%+0.05Ω)	**AEC-Q200-002** Human body, 2KV
Flame Retardance	Not flame	**AEC-Q200-001** Temperature sensing at 500℃, voltage power subjected to 32VDC current clamped up to 500ADC and decreased in 1.0VDC/hour.
Resistance to solvents	Marking legible	**MIL-STD-202 Method 215** Add Aqueous wash chemical - OKEM Clean or equivalent. Do not use banned solvents.
Terminal strength	No broken	**JIS-C-6429** Force of 1.8kg for 60 seconds.

■Storage Temperature: 25±3°C; Humidity < 80%RH

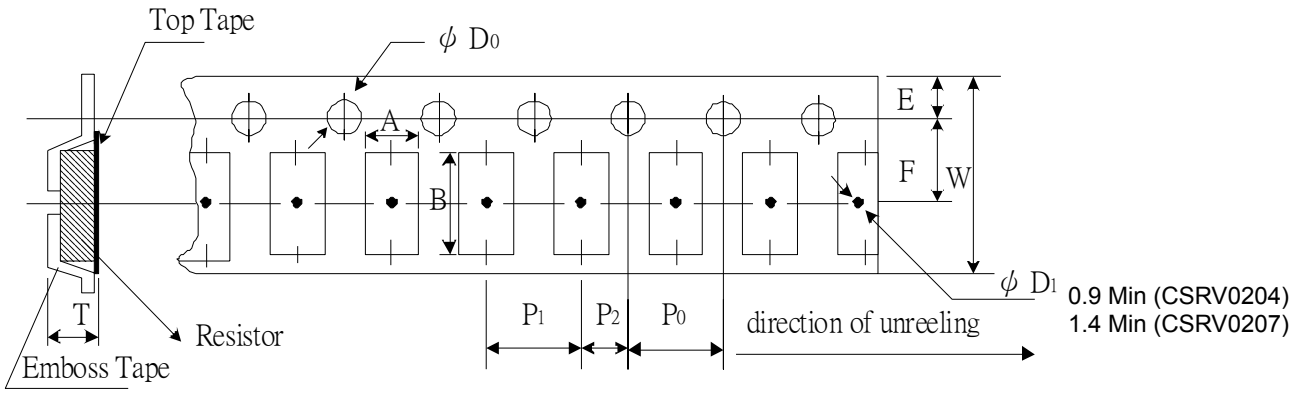
■Packaging

Packaging Quantity & Reel Specifications



Type	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
CSRV0204	7 inch	178.5±1.5	60.0+1.0	13.0±0.2	9.0±0.5	12.5±0.5	3,000
CSRV0207	7 inch	178.5±1.5	60.0+1.0	13.0±0.5	13.0±0.5	15.5±0.5	2,000

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)
CSRV0204	1.60±0.10	3.70±0.10	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	1.87±0.10
CSRV0207	2.40±0.10	6.05±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	2.80±0.10