

Data Sheet

Customer:

Product: Metal Film High Frequency MELF Resistor-CSRFB Series

Size: 0102/0204/0207

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Metal Film High Frequency MELF Resistor

Features

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

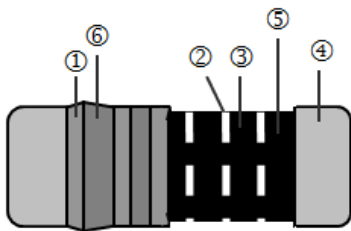


Applications

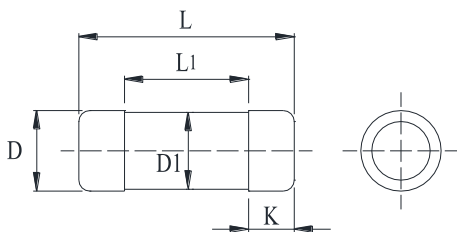
- Industrial
- Telecommunication

TECHNICAL SPECIFICATIONS						
DESCRIPTION	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



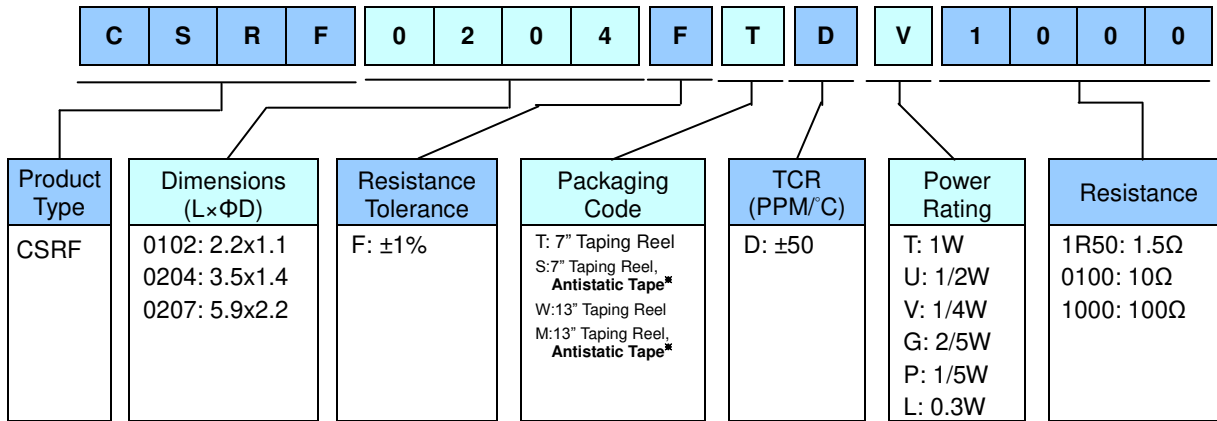
① Insulation Coating	④ Electrode Cap
② Trimming Line	⑤ Resistor Layer
③ Ceramic Rod	⑥ Marking



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

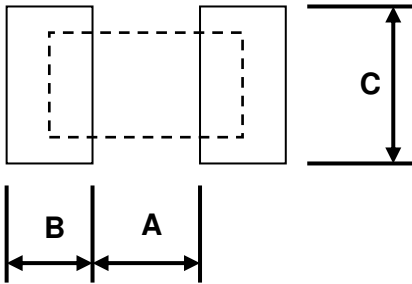
Part Numbering

Part Number : CSRF0204FTDV1000



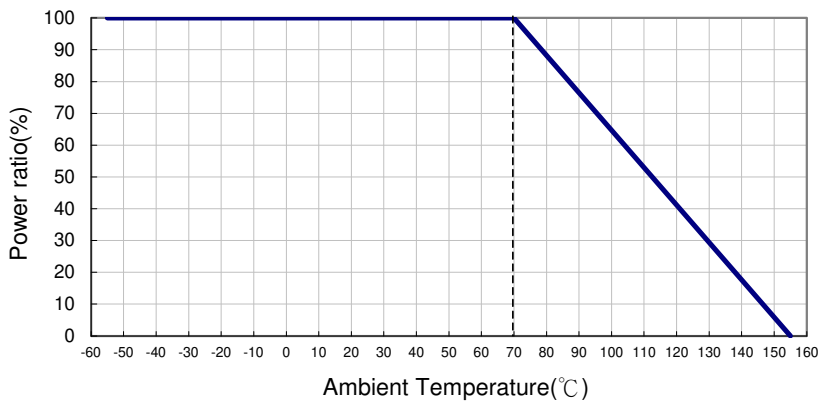
※Packaging Code “S” & “M” only for 0102 & 0204 size products, not include 0207 size product.

Recommend Land Pattern

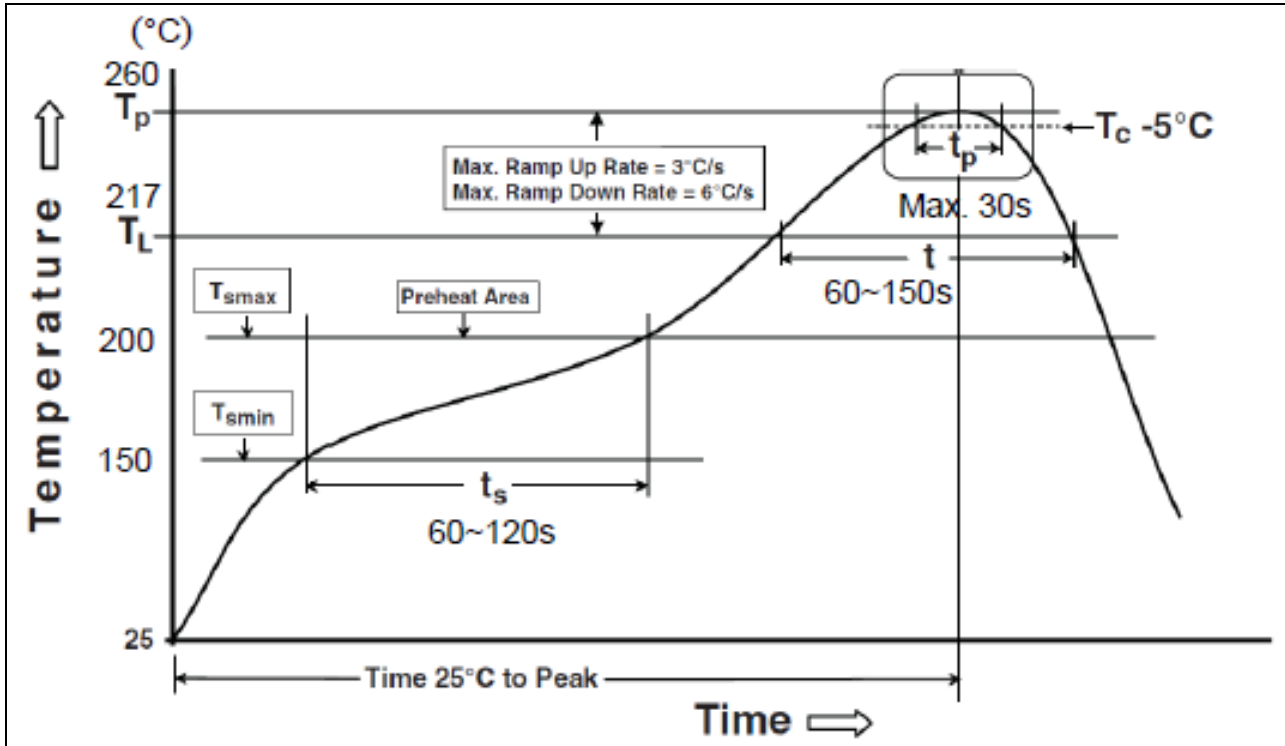


Type	A (mm)	B (mm)	C (mm)
CSRF0102	1.0	0.8	1.5
CSRF0204	1.6	1.2	1.6
CSRF0207	3.0	1.7	2.4

Derating Curve



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



Reflow Profiles	
Profile Feature	Pb-Free Assembly
Preheat Min. Temperature (T_{smin}) Max Temperature (T_{smax}) Preheating time (t_s) from (T_{smin} to T_{smax})	150 °C 200 °C 60-120 seconds
Ramp-up rate (T_L to T_p)	3 °C/second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L	217 °C 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

Metal Film High Frequency MELF Resistor

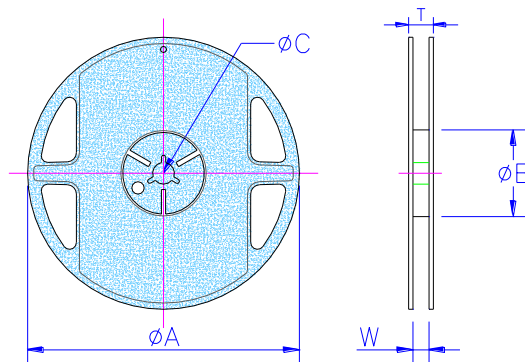
Item	Requirement	Test Method
Voltage Proof	No breakdown or flashover	JIS-C-5201-1 4.7 IEC-60115-1 4.7 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area $\leq 5\%$ Total leaching area $\leq 10\%$	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260 \pm 5°C for 30 seconds
Rapid Change 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	UL-94 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: 15~28°C; Humidity < 80%RH**

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

■ **Packaging**

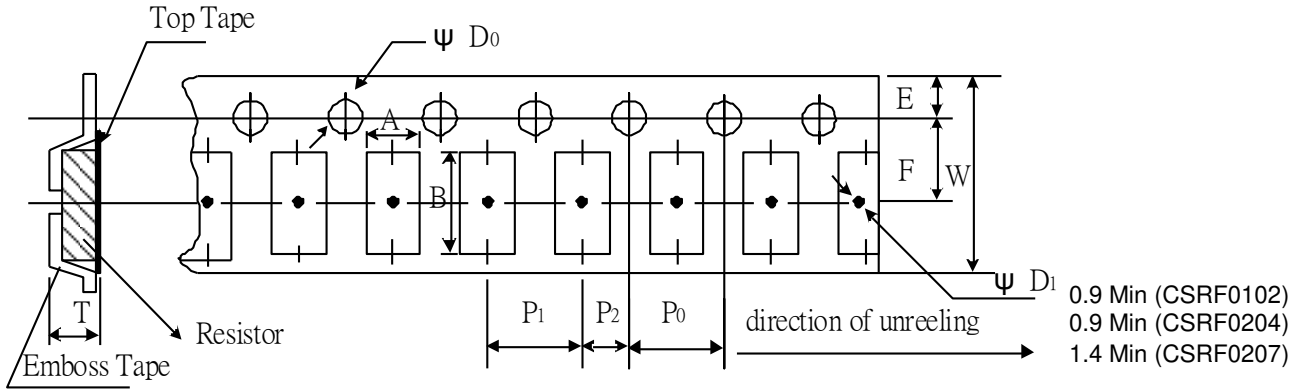


Packaging Quantity & Reel Specifications

Type	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)	Emboss Plastic Tape (EA)
CSRFB0102	7 inch	178.5 \pm 1.5	60.0 \pm 1.0	13.0 \pm 0.2	9.0 \pm 0.5	12.5 \pm 0.5	3,000
	13 inch	330 \pm 1.0	100 \pm 0.5	13.0 \pm 0.2	9.5 \pm 0.5	13.5 \pm 0.5	10,000
CSRFB0204	7 inch	178.5 \pm 1.5	60.0 \pm 1.0	13.0 \pm 0.2	9.0 \pm 0.5	12.5 \pm 0.5	3,000
	13 inch	330 \pm 1.0	100 \pm 0.5	13.0 \pm 0.2	9.5 \pm 0.5	13.5 \pm 0.5	10,000
CSRFB0207	7 inch	178.5 \pm 1.5	60.0 \pm 1.0	13.0 \pm 0.5	13.0 \pm 0.5	15.5 \pm 0.5	2,000
	13 inch	330 \pm 1.0	99 \pm 0.5	13.5 \pm 0.5	13.4 \pm 1	17.8 \pm 1	6,000

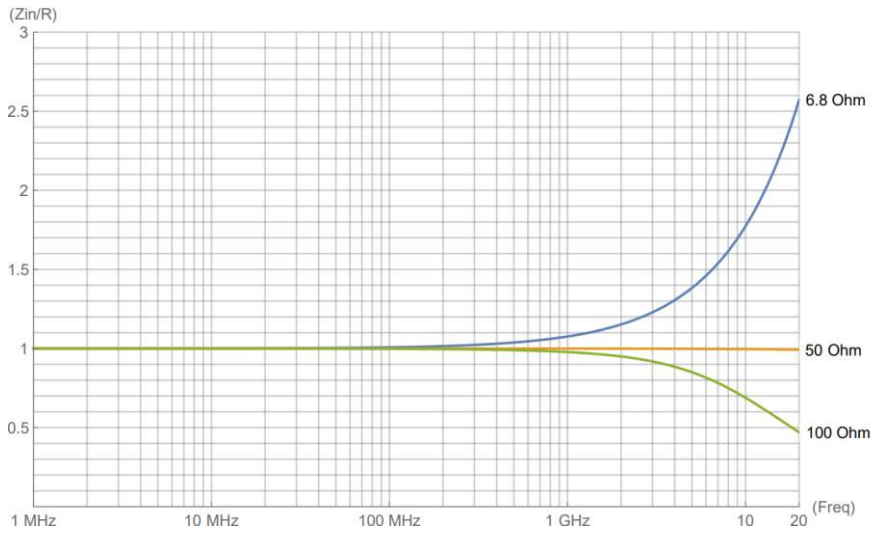
Metal Film High Frequency MELF Resistor

Emboss Plastic Tape Specifications

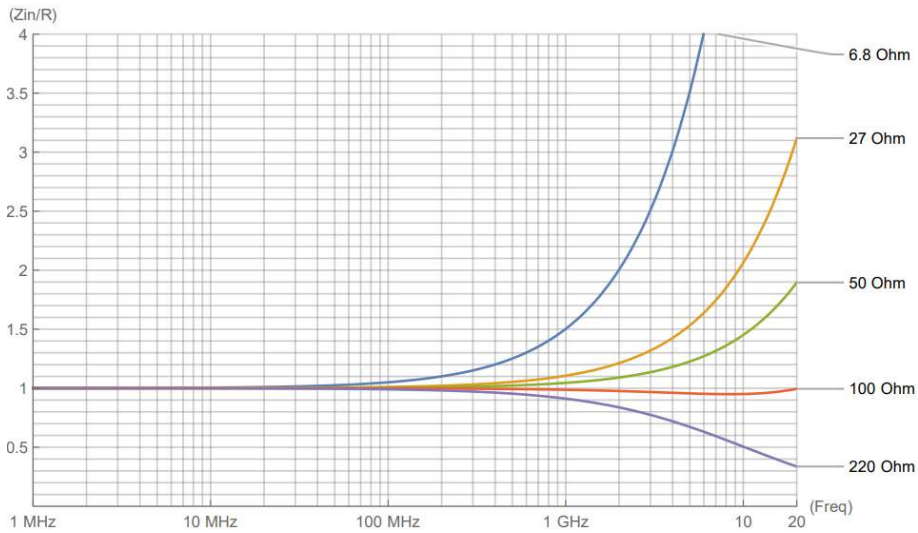


Type	A (mm)	B (mm)	W (mm)	E (mm)	F (mm)	P ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (mm)	T (mm)
CSRF0102	1.30±0.20	2.40±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.50±0.10
CSRF0204	1.55±0.20	3.65±0.20	8.0±0.10	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.10	2.00±0.05	1.50+0.10	1.80±0.10
CSRF0207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

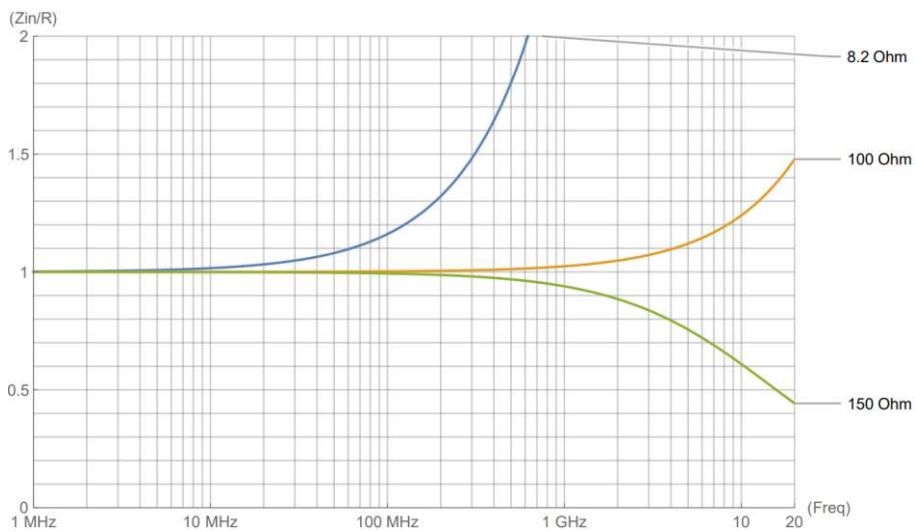
Frequency behavior



CSRFB0102

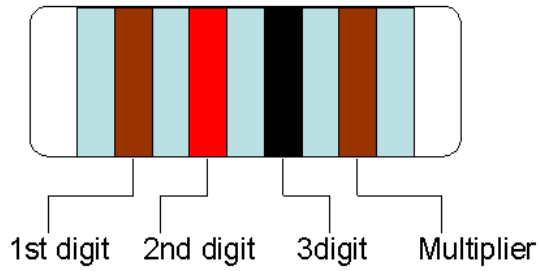


CSRFB0204



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