

## Data Sheet

Customer:

Product: Thick Film Chip Resistor (Wide Terminal) – CRW Series

Size: 0508/0612/1020/1225

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VIKING TECH CORPORATION  
光頡科技股份有限公司  
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  
光頡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.  
光頡電子(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)
15-Jun-22	15-Jun-22	15-Jun-22		
<b>Alice Hsiao</b>	<b>Susan Huang</b>	<b>Susan Huang</b>		

## Thick Film Chip Resistor (Wide Terminal)-CRW Series



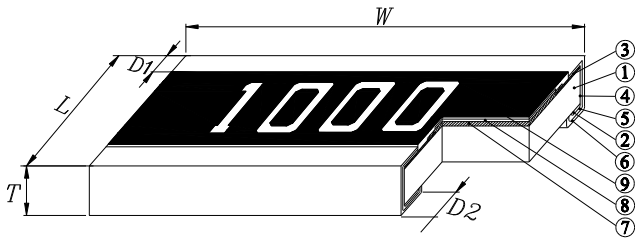
### ■ Scope

- This specification applies to all sizes of rectangular-type fixed chip resistors with Ruthenium-base as material.

### ■ Features

- Highly reliable multilayer electrode construction
- Compatible with all soldering process

### ■ Construction



### ■ Applications

- Telecommunication Equipment
- Radio and Tape Recorders, TV Tuners
- Digital Cameras, Watches, Pocket Calculators
- Computers, Instruments
- Medical Equipment

① Alumina Substrate	④ Edge Electrode	⑦ Resistor Layer
② Bottom Electrode	⑤ Barrier Layer	⑧ Primary Overcoat
③ Top Electrode	⑥ External Electrode	⑨ Secondary Overcoat

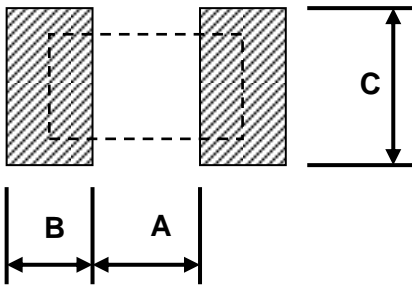
### ■ Dimensions

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	D1 (mm)	D2 (mm)
CRW08	0508	1.25±0.10	2.00±0.10	0.55±0.10	0.30±0.15	0.30±0.15
CRW08(Jumper)					0.20±0.15	
CRW62	0612	1.55±0.10	3.00±0.15	0.55±0.10	0.25±0.15	0.40±0.15
CRW62(Jumper)						
CRW20	1020	2.45±0.15	5.00±0.10	0.60±0.15	0.35±0.20	0.70±0.20
CRW20(Jumper)					0.45±0.20	
CRW25	1225	3.20±0.20	6.40±0.15	0.65±0.15	0.40±0.20	1.10±0.20
CRW25(Jumper)					0.50±0.20	

**Part Numbering**

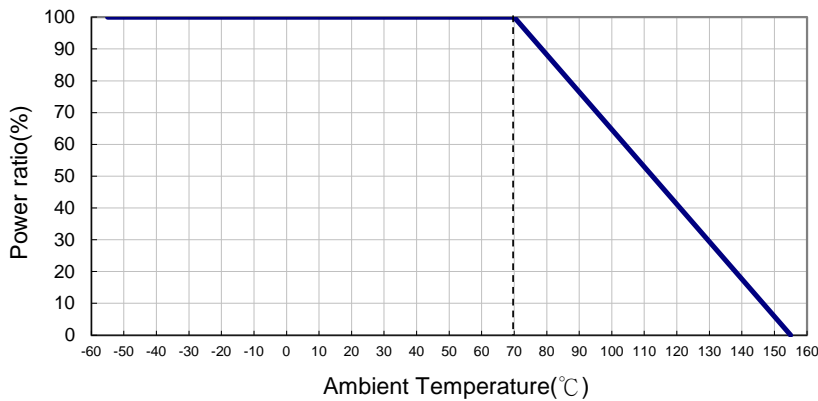
<b>CRW</b>	<b>25</b>	<b>F</b>	<b>L</b>	<b>4</b>	<b>---20R</b>
<b>Product Type</b>	<b>Dimensions</b>	<b>Resistance Tolerance</b>	<b>Function Code</b>	<b>Packaging Code</b>	<b>Resistance</b>
CRW	08: 0508 62: 0612 20: 1020 25: 1225	D: $\pm 0.5\%$ F: $\pm 1\%$ J: $\pm 5\%$	L: Standard & High Precision P: High Power	4: 7" Reel 4Kpcs 7: 7" Reel 5Kpcs	---20R: $20\Omega$ ---1R2: $1.2\Omega$ ---0R: $0\Omega$ "-" to fill up 6 spaces

**Recommend Land Pattern**

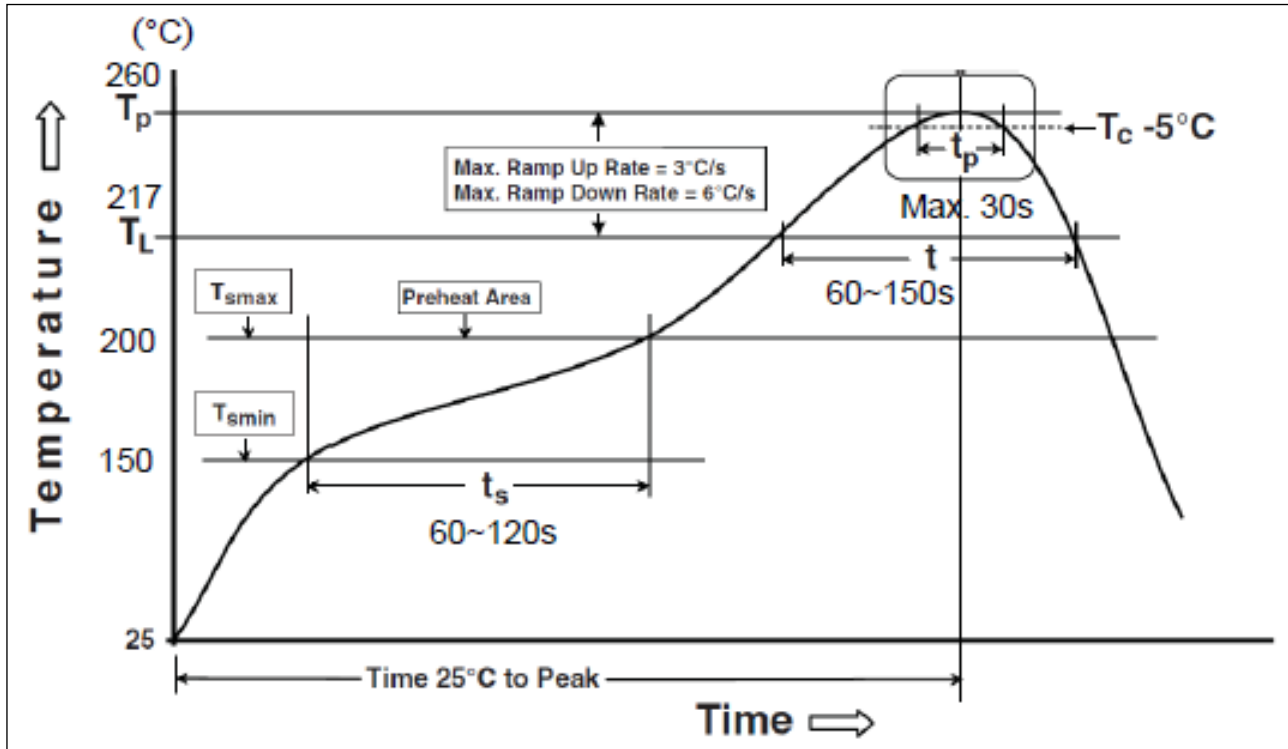


Type	A (mm)	B (mm)	C (mm)
CRW08	0.55	0.90	2.00
CRW62	0.70	0.80	3.20
CRW20	1.00	1.20	5.00
CRW25	1.00	2.00	7.00

**Derating Curve**

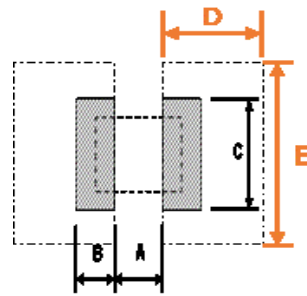
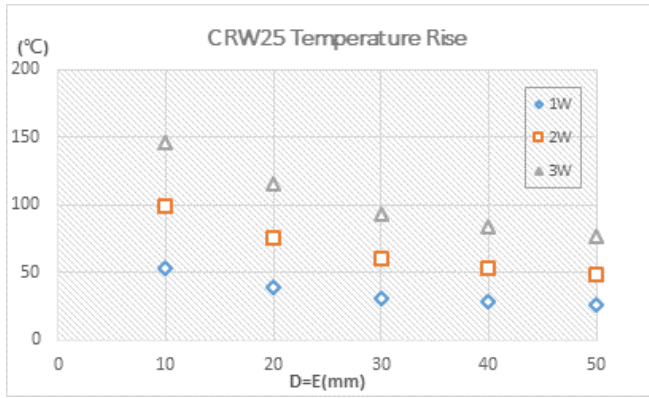


**■ Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)**



Reflow Profiles	
Profile Feature	Pb-Free Assembly
<b>Preheat</b> Min. Temperature (T <sub>smin</sub> ) Max Temperature (T <sub>smax</sub> ) Preheating time (t <sub>s</sub> ) from (T <sub>smin</sub> to T <sub>smax</sub> )	150 °C 200 °C 60-120 seconds
Ramp-up rate (T <sub>L</sub> to T <sub>p</sub> )	3 °C/second max.
Liquidous temperature (T <sub>L</sub> ) Time (t <sub>L</sub> ) maintained above T <sub>L</sub>	217 °C 60-150 seconds
Min. Peak temperature (T <sub>p</sub> min)	235°C
Max. Peak temperature (T <sub>p</sub> max)	260°C
Time (t <sub>p</sub> ) within 5 °C of the specified classification temperature (T <sub>c</sub> )	30 seconds max.
Ramp-down rate (T <sub>p</sub> to T <sub>L</sub> )	6 °C/second max.
Time 25 °C to peak temperature	8 minutes max.

**Thick Film Chip Resistor (Wide Terminal)**



\* FR4 copper board, 35μm of copper pad thickness

**Standard Electrical Specifications**

Type	Item	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
						±0.5% (E24,E96)	±1% (E24,E96)	±5% (E24)	
CRW08 (0508)	0.75W	-55 ~ +155°C	200V	400V	1Ω – 9.76Ω			±150	
					10Ω – 1MΩ			±100	
CRW62 (0612)	1W	-55 ~ +155°C	200V	400V	1Ω – 1MΩ			±100	
CRW20 (1020)	1.5W	-55 ~ +155°C	200V	400V	1Ω – 9.76Ω			±150	
					10Ω – 1MΩ			±100	
CRW25 (1225)	2W	-55 ~ +155°C	200V	400V	1Ω – 29.4Ω			±200	
					30Ω – 1MΩ			±100	

**High Power Rating Electrical Specifications**

Type	Item	Power Rating at 70°C Jumper Rated Current	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
						±0.5% (E24,E96)	±1% (E24,E96)	±5% (E24)	
CRW08 (0508)	1W Jumper: 5A	-55 ~ +155°C	200V	400V	1Ω – 9.76Ω			±150	
					10Ω – 1MΩ			±100	
					-	0Ω(<10mΩ)	-		
CRW62 (0612)	1.5W Jumper: 6A	-55 ~ +155°C	200V	400V	1Ω – 1MΩ			±100	
					-	0Ω(<10mΩ)	-		
					1Ω – 9.76Ω			±150	
CRW20 (1020)	2W Jumper: 10A	-55 ~ +155°C	200V	400V	10Ω – 1MΩ			±100	
					-	0Ω(<10mΩ)	-		
					1Ω – 29.4Ω			±200	
CRW25 (1225)	3W Jumper: 12A	-55 ~ +155°C	200V	400V	30Ω – 1MΩ			±100	
					-	0Ω(<10mΩ)	-		
					1Ω – 9.76Ω			±150	

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.  
 ■ 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.	<b>JIS-C-5201-1 4.8</b> <b>IEC-60115-1 4.8</b> At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	<b>JIS-C-5201-1 4.13</b> <b>IEC-60115-1 4.13</b> RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds
Insulation Resistance	≥10G	<b>JIS-C-5201-1 4.6</b> <b>IEC-60115-1 4.6</b> Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.10Ω)	<b>JIS-C-5201-1 4.25</b> <b>IEC-60115-1 4.25.1</b> 70±2°C, RCWV for 1000 hrs with 1.5 hrs "ON" and 0.5 hr "OFF"
Damp Heat with Load	±(1.0%+0.10Ω)	<b>JIS-C-5201-1 4.24</b> <b>IEC-60115-1 4.24</b> 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)	<b>JIS-C-5201-1 4.23</b> <b>IEC-60115-1 4.23.2</b> at +155°C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	<b>JIS-C-5201-1 4.33</b> <b>IEC-60115-1 4.33</b> Bending once for 60 seconds with 3mm
Solderability	95% min. coverage	<b>JIS-C-5201-1 4.17</b> <b>IEC-60115-1 4.17</b> 245±5°C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	<b>JIS-C-5201-1 4.18</b> <b>IEC-60115-1 4.18</b> 260±5°C for 10 seconds
Voltage Proof	No breakdown or flashover	<b>JIS-C-5201-1 4.7</b> <b>IEC-60115-1 4.7</b> 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤ 10%	<b>JIS-C-5201-1 4.18</b> <b>IEC-60068-2-58 8.2.1</b> 260±5°C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	<b>JIS-C-5201-1 4.19</b> <b>IEC-60115-1 4.19</b> -55°C to +155°C, 5 cycles

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

\* not include Jumper(0Ω)

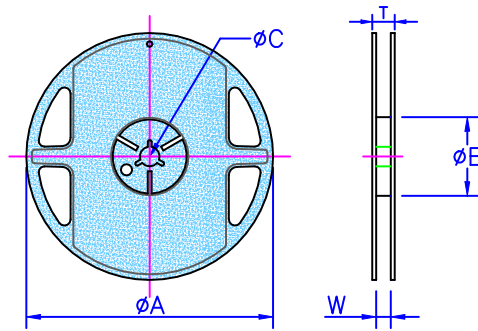
**Storage Temperature: 15~28°C; Humidity < 80%RH**

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

**Thick Film Chip Resistor (Wide Terminal)**

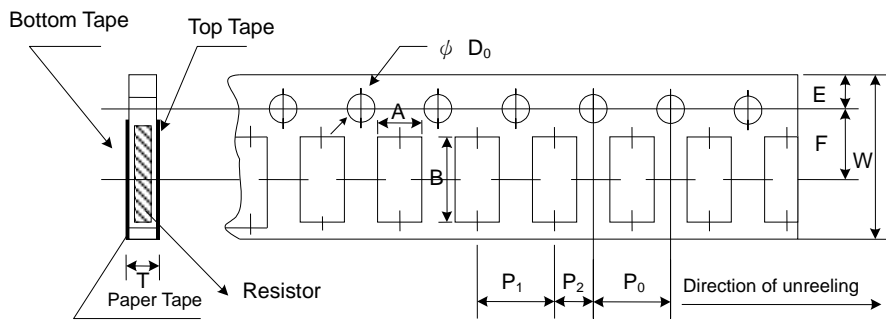
**■ Packaging**

Reel Specifications & Packaging Quantity



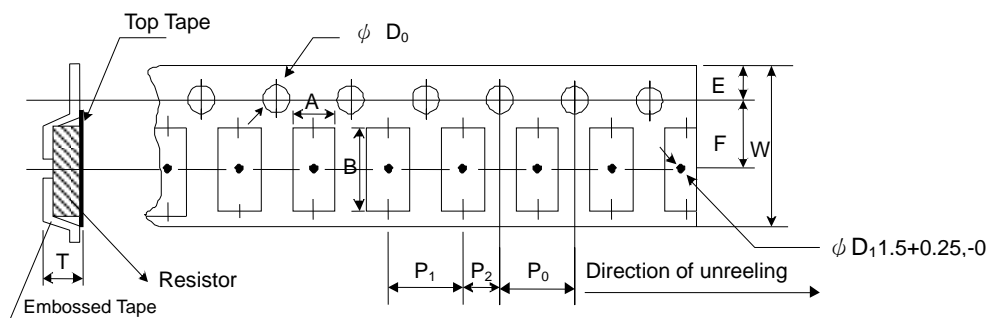
Type	Packaging Quantity		Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)
CRW08 CRW62	Paper	5K	8mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.2	9.0±0.5	12.5±0.5
CRW20 CRW25	Embossed	4K	12mm	7 inch	178.5±1.5	60 <sup>+1/-0</sup>	13.0±0.5	13.0±0.5	15.5±0.5

Paper 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)	ΦD <sub>0</sub> (mm)	T (mm)
CRW08	1.60±0.10	2.40±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10
CRW62	1.90±0.10	3.50±0.20	8.0±0.20	1.75±0.10	3.50±0.05	4.00±0.10	4.00±0.05	2.00±0.05	1.50+0.1,-0	0.85±0.10

Embossed 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)	ΦD <sub>0</sub> (mm)	T (mm)
CRW20	2.80±0.15	5.40±0.20	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.55+0.10	1.00±0.20
CRW25	3.50±0.10	6.70±0.10	12.0±0.10	1.75±0.10	5.5±0.05	4.00±0.05	4.00±0.10	2.00±0.05	1.55+0.10	1.00±0.20

## ■ Marking

1% for 0508/0612/1020/1225: 4 digits marking

Example:

Resistance	20Ω	100Ω	1KΩ
Marking	20R0	1000	1001

5% for 0508/0612/1020/1225: 3 digits marking in E24

Example: 101=100Ω 102=1KΩ (1<sup>st</sup> and 2<sup>nd</sup> are E24 code and 3<sup>rd</sup> code is multiplier)

E24 code	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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**REVISION HISTORY**

<b>REVISION</b>	<b>DATE</b>	<b>CHANGE NOTIFICATION</b>	<b>DESCRIPTION</b>
Version A	Apr 26, 2021	-	- New product release
Version A1	Nov 15, 2021	-	- Increase the shelf life description
Version A2	Feb 15, 2022	-	- Derating Curve changes the temperature range
Version A3	Jun 15, 2022	-	- Modify Soldering Condition