

Data Sheet

Customer:

Product: Automotive Grade Chip Resistor (Wide Terminal) –
CRW..A Series

Size: 0508/0612/1020/1225

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Automotive Grade Chip Resistor (Wide Terminal)-CRW..A Series

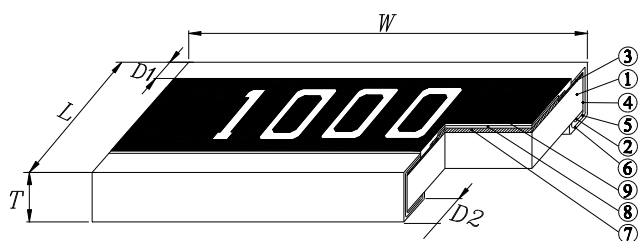
Scope

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

Features

- AEC-Q200 Qualified
- Highly reliable multilayer electrode construction
- Compatible with all soldering process
- 100% CCD inspection

Construction



Applications

- Automotive Industry
- Telecommunication Equipments
- 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

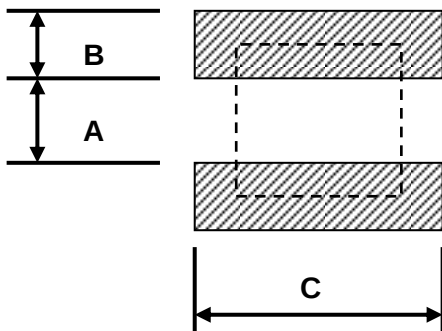
Dimensions

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)					0.25±0.15	
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	0.70±0.20

Part Numbering

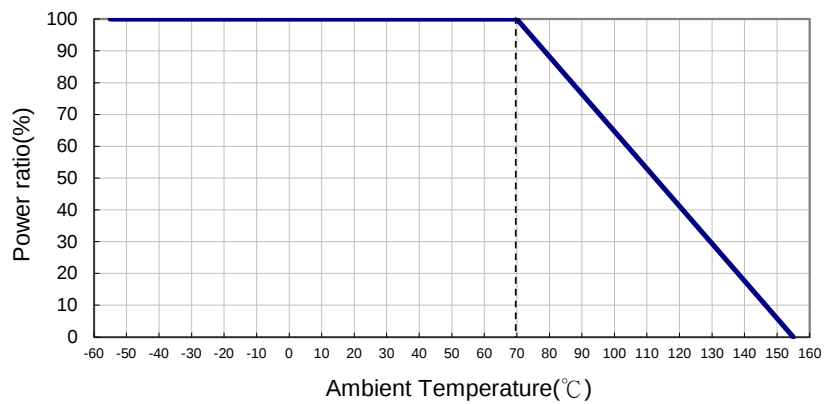
CRW	25	F	C	4	---20R	025
Product Type	Dimensions	Resistance Tolerance	Function Code	Packaging Code	Resistance	Internal
CRW	08: 0508 62: 0612 20: 1020 25: 1225	D: $\pm 0.5\%$ F: $\pm 1\%$ J: $\pm 5\%$	A: Automotive Grade C: High Power & Automotive Grade U: Ultra High Power & Automotive Grade	4: 7" Reel 4Kpcs 7: 7" Reel 5Kpcs	-- -20R: 20 Ω --- 1R2: 1.2 Ω --- -0R: 0 Ω "-" to fill up 6 spaces	

Recommend Land Pattern

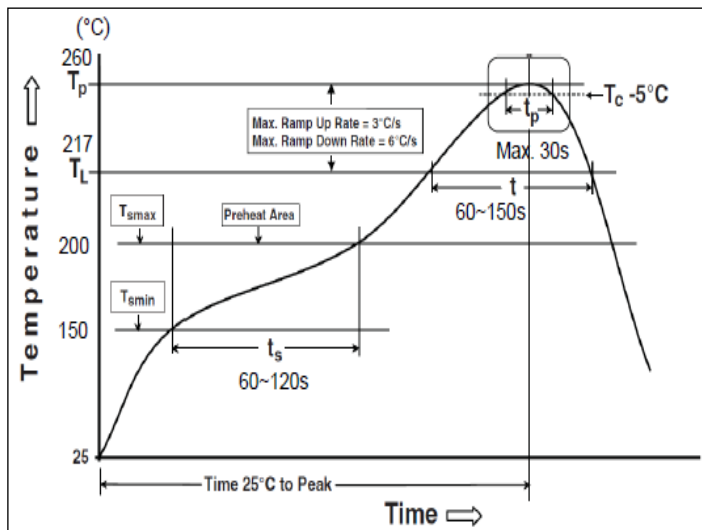


Type	A (mm)	B (mm)	C (mm)
CRW08	0.55	0.90	2.00
CRW62	0.70	0.80	3.20
CRW20	1.00	1.20	5.00
CRW25	1.00	2.00	7.00

Derating Curve

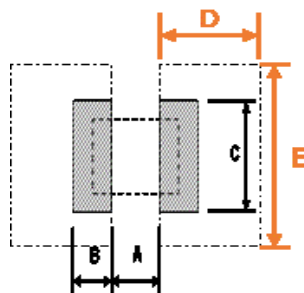
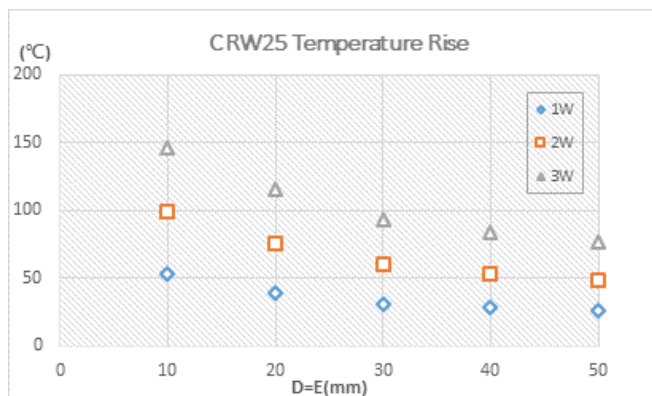


Soldering Condition (Ref. IPC/JEDEC J-STD-020 & J-STD-002)



Reflow Profiles	
Profile Feature	Pb-Free Assembly
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.

Temperature Rise



*FR4 copper board, 35μm of copper pad thickness

Standard Electrical Specifications

Item Type	Power Rating at 70°C	Operating Temp. Range	Max. Operating Voltage	Max. Overload Voltage	Resistance Range			TCR (PPM/°C)
					±0.5% (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

Item Type	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	-55 ~ +155°C	200V	400V	1Ω – 9.76Ω			±150
	Jumper: 5A				10Ω – 1MΩ			±100
					-			-
CRW62 (0612)	1.5W	-55 ~ +155°C	200V	400V	1Ω – 1MΩ			±100
	Jumper: 6A				-			-
					0Ω(<10mΩ)			-
CRW20 (1020)	2W	-55 ~ +155°C	200V	400V	1Ω – 9.76Ω			±150
	Jumper: 10A				10Ω – 1MΩ			±100
					-			-
CRW25 (1225)	3W	-55 ~ +155°C	200V	400V	1Ω – 29.4Ω			±200
	Jumper: 12A				30Ω – 1MΩ			±100
					-			-

■ Ultra High Power Rating 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)	
CRW62 (0612)		2W	-55 ~ +155°C	200V	400V	1Ω – 1MΩ			±100

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.	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	$\pm(1.0\%+0.05\Omega)$	JIS-C-5201-1 4.13 IEC-60115-1 4.13 6.25*rated power or Max. Overload Voltage whichever is lower for 5 seconds Ultra High Power:5*rated power for 5 seconds
Insulation Resistance	$\geq 10G$	JIS-C-5201-1 4.6 IEC-60115-1 4.6 Max. Overload Voltage for 1 minute
Operational Life	$\pm(1.0\%+0.10\Omega)$	MIL-STD-202 Method 108 Condition D Steady State TA=125°C at derated power. Measurement at 24±4 hours after test conclusion.
Biased Humidity	$\pm(1.0\%+0.10\Omega)$	MIL-STD-202 Method 103 1000 hrs 85°C/85%RH 10% of operating power. (≤ 100 V)
High Temperature Exposure	$\pm(1.0\%+0.05\Omega)$	MIL-STD-202 Method 108 at +155°C for 1000 hrs
Board Flex	$\pm(1.0\%+0.05\Omega)$	AEC-Q200-005 Bending once for 60 seconds 3mm
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	$\pm(0.5\%+0.05\Omega)$	MIL-STD-202 Method 210 260±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 $\leq 5\%$ Total leaching area $\leq 10\%$	JIS-C-5201-1 4.18 IEC-60068-2-58 8.2.1 260±5°C for 30 seconds

Item	Requirement	Test Method
Temperature Cycling	$\pm(0.5\%+0.05\Omega)$	JESD22 Method JA-104 -55°C to +125°C, 1000 cycles
Mechanical Shock	$\pm(0.25\%+0.05\Omega)$	MIL-STD-202 Method 213 Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration (D) is 6.
Vibration	$\pm(0.5\%+0.05\Omega)$	MIL-STD-202 Method 204 5 g's for 20 min., 12 cycles each of 3 orientations, 10-2000 Hz
ESD	$\pm(3\%+0.05\Omega)$	AEC-Q200-002 Human body model: 2KV
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.
Sulfur Test	$\Delta R \pm 1\%$	EIA-977 (Condition A) 60 $\pm$ 2°C, no power rating for 500 hrs.

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

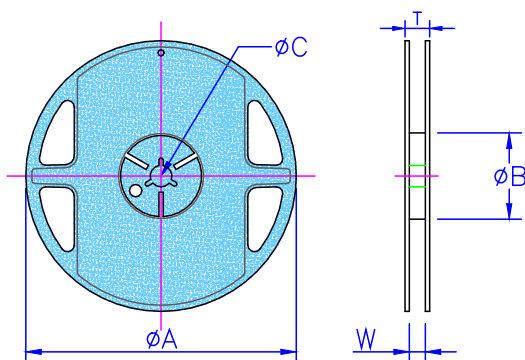
* not include Jumper(0 Ω)

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

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

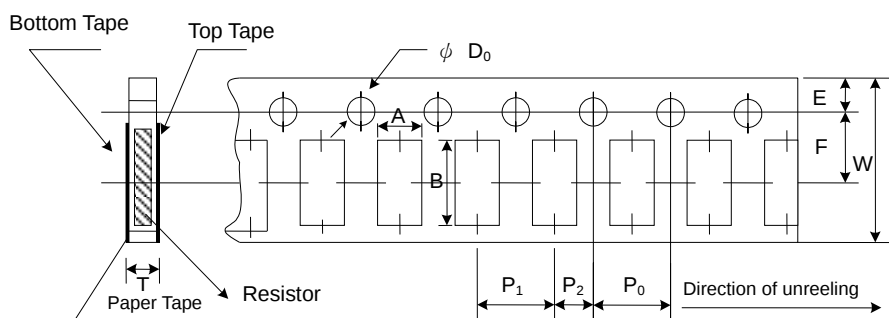
■ Packaging

Reel Specifications & Packaging Quantity



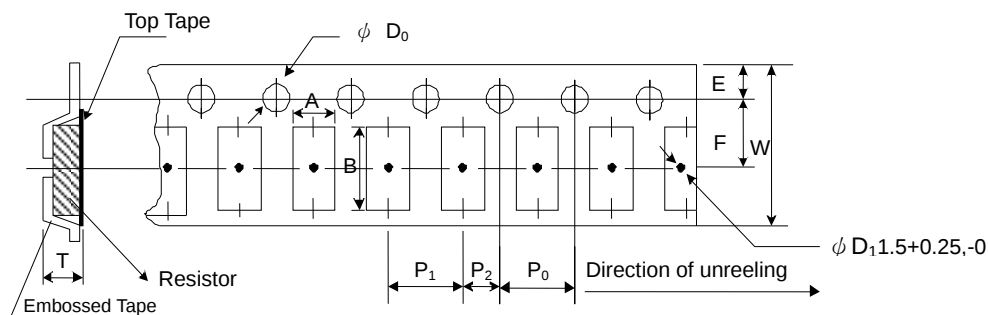
Type	Packaging Quantity		Tape Width	Reel Diameter	ΦA (mm)	ΦB (mm)	ΦC (mm)	W (mm)	T (mm)
CRW08 CRW62	Paper	5K	8mm	7 inch	178.5 $\pm$ 1.5	60 ^{+1/-0}	13.0 $\pm$ 0.2	9.0 $\pm$ 0.5	12.5 $\pm$ 0.5
CRW20 CRW25	Embossed	4K	12mm	7 inch	178.5 $\pm$ 1.5	60 ^{+1/-0}	13.0 $\pm$ 0.5	13.0 $\pm$ 0.5	15.5 $\pm$ 0.5

Paper 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)
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 ₀ (mm)	P ₁ (mm)	P ₂ (mm)	ΦD ₀ (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 (1st and 2nd are E24 code and 3rd 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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