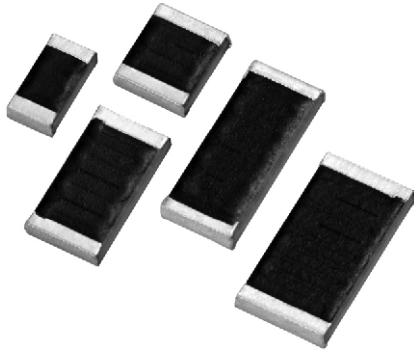


## Thick Film Chip Resistors, High Voltage



### FEATURES

- AEC-Q200 qualified
- Voltages up to 3000 V
- Automatic placement capability
- Termination style: 3-sided wraparound termination or single termination flip chip available
- Tape and reel packaging available
- Internationally standardized sizes, custom sizes available
- Termination material: solder-coated nickel barrier or solder coated non-magnetic terminations standard
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

### LINKS TO ADDITIONAL RESOURCES



### STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	CASE SIZE	POWER RATING $P_{70\text{ }^\circ\text{C}}$ W	MAX. WORKING VOLTAGE <sup>(2)</sup> V	RESISTANCE RANGE <sup>(1)</sup> $\Omega$	TOLERANCE $\pm \%$	TEMPERATURE COEFFICIENT <sup>(3)</sup> $\pm \text{ppm}/^\circ\text{C}$
CRMA1206	1206	0.30	1000	150 to 15M	0.5, 1, 2, 5, 10	100
CRMA1210	1210	0.35	1250	300 to 20M	0.5, 1, 2, 5, 10	100
CRMA2010	2010	0.50	2000	500 to 40M	0.5, 1, 2, 5, 10	100
CRMA2510	2510	0.80	2500	1K to 60M	0.5, 1, 2, 5, 10	100
CRMA2512	2512	1.0	3000	1K to 75M	0.5, 1, 2, 5, 10	100

#### Notes

- For non-standard sizes, lower values or higher power rating requirement, contact factory
- <sup>(1)</sup> Resistance values calibrated at 10 V<sub>DC</sub>. Calibration at other voltages available upon request
- <sup>(2)</sup> Continuous working voltage shall be  $\sqrt{P \times R}$  or maximum working voltage, whichever is less
- <sup>(3)</sup> Reference only: not for all values specified. Consult factory for your size and value

### TECHNICAL SPECIFICATIONS

PARAMETER	UNIT	CRMA1206	CRMA1210	CRMA2010	CRMA2510	CRMA2512
Rated dissipation at 70 °C	W	0.30	0.35	0.50	0.80	1.0
Limiting element voltage	V <sub>≡</sub>	1000	1250	2000	2500	3000
Insulation resistance	$\Omega$	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$
Category temperature range	°C	-55 to +155	-55 to +155	-55 to +155	-55 to +155	-55 to +155
Weight/1000 (typical)	g	12.2	19.6	32.2	39.8	49.7
VCR (typical)	ppm/V	< 2	< 2	< 2	< 2	< 2

**GLOBAL PART NUMBER INFORMATION**

Global Part Numbering: CRMA1210AF1K00FLET (preferred part number format)

<b>C</b>	<b>R</b>	<b>M</b>	<b>A</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>A</b>	<b>F</b>	<b>1</b>	<b>K</b>	<b>0</b>	<b>0</b>	<b>F</b>	<b>L</b>	<b>E</b>	<b>T</b>	
<b>GLOBAL MODEL</b>	<b>SIZE</b>	<b>TERMINAL STYLE</b>	<b>TERMINAL MATERIAL</b>	<b>RESISTANCE VALUE</b>				<b>TOLERANCE</b>	<b>TCR</b>	<b>SOLDER TERMINATION</b>	<b>PACKAGING</b>							
CRMA	1206 1210 2010 2510 2512	A = 3-sided B = top only	F = nickel barrier G = non-magnetic	R = Ω K = kΩ M = MΩ 110R = 110 Ω 49K9 = 49.9 kΩ 10M0 = 10 MΩ					D = ± 0.5 % F = ± 1 % G = ± 2 % J = ± 5 % K = ± 10 %	K = 100 ppm	E = Sn100	B = bulk (250 pcs max.) F = T / R (full reel) 1 = T / R (1000 pcs) 5 = T / R (500 pcs) T = T / R (250 pcs min.) W = waffle tray						

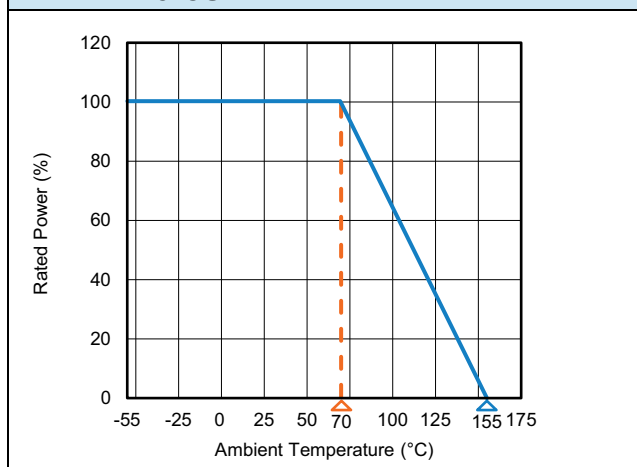
**Note**

- For additional information on packaging, refer to the Surface Mount Resistor Packaging document ([www.vishay.com/doc?31543](http://www.vishay.com/doc?31543))

**DIMENSIONS** in inches (millimeters)

TERMINATION STYLE A (3-SIDED WRAPAROUND)	TERMINATION STYLE B (TOP CONDUCTOR ONLY)	MODEL	LENGTH (L)	WIDTH (W)	THICKNESS (T)
		CRMA1206	0.125 ± 0.006 (3.18 ± 0.15)	0.063 ± 0.006 (1.60 ± 0.15)	0.025 ± 0.004 (0.64 ± 0.10)
		CRMA1210	0.125 ± 0.006 (3.18 ± 0.15)	0.100 ± 0.006 (2.54 ± 0.15)	0.025 ± 0.004 (0.64 ± 0.10)
		CRMA2010	0.200 ± 0.006 (5.08 ± 0.15)	0.100 ± 0.006 (2.54 ± 0.15)	0.025 ± 0.004 (0.64 ± 0.10)
		CRMA2510	0.250 ± 0.006 (6.35 ± 0.15)	0.100 ± 0.006 (2.54 ± 0.15)	0.025 ± 0.004 (0.64 ± 0.10)
		CRMA2512	0.250 ± 0.006 (6.35 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.025 ± 0.004 (0.64 ± 0.10)

TYPE	TERMINATION MATERIAL	TERMINATION STYLE	TERMINATION STYLE / MATERIAL CODE	SOLDER TERMINATION CODE
Solderable	Nickel barrier	3-sided (wraparound)	AF	E
		Top only (flip chip)	BF	
Solderable	Non-magnetic	3-sided (wraparound)	AG	E
		Top only (flip chip)	BG	

**DERATING CURVE**

**MATERIAL SPECIFICATIONS**

Resistive element	Ruthenium oxide
Encapsulation	Epoxy
Substrate	96 % alumina
Termination	Solder-coated nickel barrier
Solder finish	Pure tin standard



PERFORMANCE		
TEST	CONDITIONS OF TEST	TEST RESULTS (TYPICAL TEST LOTS)
Thermal shock	-55 °C to +150 °C, 1000 cycles, 15 min at each extreme	± (1.0 % + 0.05 Ω)
High temperature exposure	1000 h at +170 °C	± (1.0 % + 0.05 Ω)
Bias humidity	+85 °C, 85 % RH, 10 % bias, 1000 h	± (1.0 % + 0.0005 Ω)
Mechanical shock	100 g's for 6 ms, 5 pulses	± (0.5 % + 0.0005 Ω)
Vibration	Frequency varied 10 Hz to 2000 Hz in 1 min, 3 directions, 12 h	± (0.5 % + 0.0005 Ω)
Load life	1000 h at rated power, +70 °C, 1.5 h "ON", 0.5 h "OFF"	± (1.0 % + 0.0005 Ω)
Resistance to solder heat	+260 °C solder, 10 s to 12 s dwell, 25 mm/s emergence	± (1.0 % + 0.0005 Ω)
Moisture resistance	MIL-STD-202, method 106, 0 % power, 7a and 7b not required	± (1.0 % + 0.0005 Ω)



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