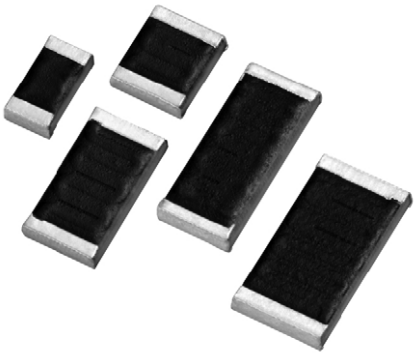
Thick Film Chip Resistors, Medium Voltage



FEATURES

- AEC-Q200 qualified
- Voltages up to 1415 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

Pb Available
RoHS* Available
HALOGEN FREE

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

STANDARD ELECTRICAL SPECIFICATIONS

GLOBAL MODEL	CASE SIZE	POWER RATING $P_{70\,°C}$ W	MAX. WORKING VOLTAGE (2) V	RESISTANCE RANGE (1) Ω	TOLERANCE ± %	TEMPERATURE COEFFICIENT (3) ± ppm/°C
CRMA1206	1206	0.30	550	150 to 15M	0.5, 1, 2, 5, 10	100
CRMA1210	1210	0.35	650	300 to 20M	0.5, 1, 2, 5, 10	100
CRMA2010	2010	0.50	895	500 to 40M	0.5, 1, 2, 5, 10	100
CRMA2510	2510	0.80	1265	1K to 60M	0.5, 1, 2, 5, 10	100
CRMA2512	2512	1.0	1415	1K to 75M	0.5, 1, 2, 5, 10	100

Notes

- For non-standard sizes, lower values or higher power rating requirement, contact factory

(1) Resistance values calibrated at 10 V_{DC}. Calibration at other voltages available upon request
(2) Continuous working voltage shall be $\sqrt{P \times R}$ or Maximum Working Voltage, whichever is less
(3) 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≅	550	650	895	1265	1415
Insulation resistance	Ω	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$	$\geq 10^{11}$
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

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GLOBAL PART NUMBER INFORMATION

Global Part Numbering: CRMA1210AF1K00FLET (preferred part number format)

C	R	M	A	1	2	1	0	A	F	1	K	0	0	F	L	E	T

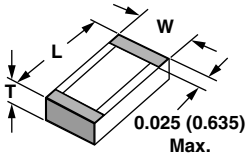
GLOBAL MODEL	SIZE	TERMINAL STYLE	TERMINAL MATERIAL	RESISTANCE VALUE	TOLERANCE	TCR	SOLDER TERMINATION	PACKAGING
CRMA	**1206** **1210** **2010** **2510** **2512**	**A** = 3-sided **B** = top only	**F** = nickel barrier **G** = non-magnetic	**R** = Ω **K** = kΩ **M** = MΩ **110R** = 110 Ω **49K9** = 49.9 kΩ **10M0** = 10 MΩ	**D** = ± 0.5 % **F** = ± 1 % **G** = ± 2 % **J** = ± 5 % **K** = ± 10 %	**K** = 100 ppm	**E** = Sn100 **T** = Sn90 / Pb10	**B** = bulk **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

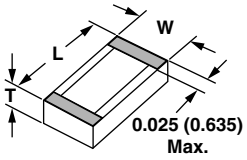
- For additional information on packaging, refer to the Surface Mount Resistor Packaging document (www.vishay.com/doc?31543)

DIMENSIONS in inches (millimeters)

TERMINATION STYLE A (3-SIDED WRAPAROUND)



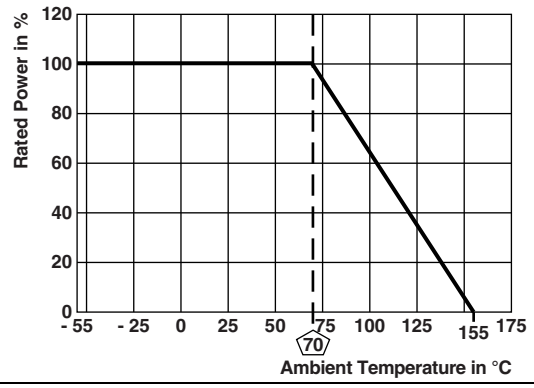
TERMINATION STYLE B (TOP CONDUCTOR ONLY)



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 or T
		Top only (flip chip)	BF	
Solderable	Non-magnetic	3-sided (wraparound)	AG	E or T
		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 or tin / lead solder alloys standard

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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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