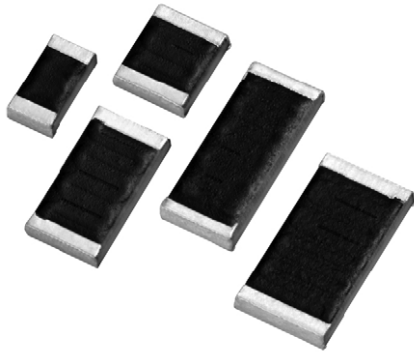


Thick Film Chip Resistors, Medium Voltage



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



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 $P_{70\text{ }^\circ\text{C}}$ W | MAX. WORKING VOLTAGE ⁽²⁾ V | RESISTANCE RANGE ⁽¹⁾ Ω | TOLERANCE $\pm \%$ | TEMPERATURE COEFFICIENT ⁽³⁾ $\pm \text{ppm}/^\circ\text{C}$ |
| 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 |

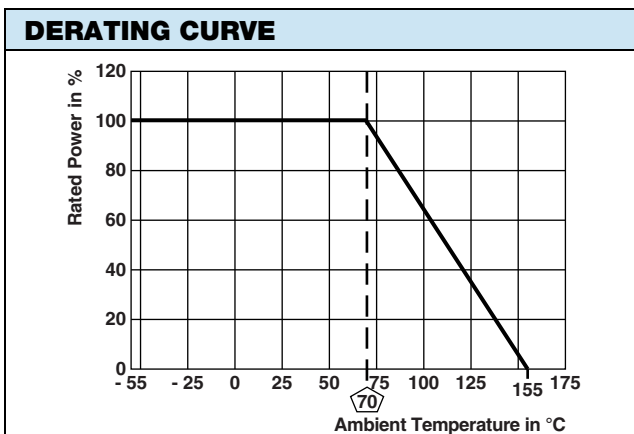
| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | |
|--|--------------------------------------|-----------------------------|--|---|--|---|-------------|------------------------------|---|---|-----------|---|---|---|---|---|---|
| Global Part Numbering: CRMA1210AF1K00FLET (preferred 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 = k Ω M = M Ω 110R = 110 Ω 49K9 = 49.9 k Ω 10M0 = 10 M Ω | D = $\pm 0.5\%$ F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ K = $\pm 10\%$ | | 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 \pm 0.006 (3.18 \pm 0.15) | 0.063 \pm 0.006 (1.60 \pm 0.15) | 0.025 \pm 0.004 (0.64 \pm 0.10) |
| | | CRMA1210 | 0.125 \pm 0.006 (3.18 \pm 0.15) | 0.100 \pm 0.006 (2.54 \pm 0.15) | 0.025 \pm 0.004 (0.64 \pm 0.10) |
| | | CRMA2010 | 0.200 \pm 0.006 (5.08 \pm 0.15) | 0.100 \pm 0.006 (2.54 \pm 0.15) | 0.025 \pm 0.004 (0.64 \pm 0.10) |
| | | CRMA2510 | 0.250 \pm 0.006 (6.35 \pm 0.15) | 0.100 \pm 0.006 (2.54 \pm 0.15) | 0.025 \pm 0.004 (0.64 \pm 0.10) |
| | | CRMA2512 | 0.250 \pm 0.006 (6.35 \pm 0.15) | 0.126 \pm 0.006 (3.20 \pm 0.15) | 0.025 \pm 0.004 (0.64 \pm 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 | |



| 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 |



| 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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