# RMCF / RMCP Series

General Purpose Thick Film Standard Power and High-Power Chip Resistor

Stackpole Electronics, Inc.
Resistive Product Solutions

Features:

- RMCF – standard power ratings
- RMCP – high power ratings
- Nickel barrier terminations standard
- Power derating from 100% at 70ºC to zero at +155ºC
- RoHS compliant, REACH compliant, and halogen free
- AEC-Q200 compliant (except 01005 and 0201 sizes)
- For ultra-high power, see RMCP-UP Series – Thick Film Ultra High Power Chip Resistor

## Electrical Specifications - RMCF

| Type/Code | Power Rating (W) @ 70ºC | Max. Working Voltage (V) (1) | Max. Overload Voltage (V) | Max. Jumper Current (A) | TCR (ppm/ºC) | Ohmic Range (Ω) and Tolerance (2) | |
|---|---|---|---|---|---|---|---|
| | | | | | | 1% | 5% |
| RMCF01005 | 0.03 | 15 | 30 | 0.5 | ± 300 | 10 - 97.6 | |
| | | | | | ± 200 | 100 - 1M | |
| RMCF0201 | 0.05 | 25 | 50 | 0.5 | ± 400 | 1 - 9.76 | |
| | | | | | ± 200 | 10 - 10M | |
| RMCF0402 | 0.063 | 50 | 100 | 1 | ± 200 | 1 - 9.76 | |
| | | | | | ± 100 | 10 - 1M | |
| | | | | | ± 200 | 1.02M - 22.1M | 1.1M - 22M |
| RMCF0603 | 0.1 | 75 | 150 | 1 | ± 500 | 0.1 - 0.499 | |
| | | | | | ± 400 | 0.5 - 0.976 | |
| | | | | | ± 200 | 1 - 9.76 | 1 - 22M |
| | | | | | ± 100 | 10 - 1M | - |
| | | | | | ± 200 | 1.02M - 22.1M | - |
| RMCF0805 | 0.125 | 150 | 300 | 2 | ± 200 | 0.1 - 9.76 | 0.1 - 22M |
| | | | | | ± 100 | 10 - 1M | - |
| | | | | | ± 200 | 1.02M - 22.1M | - |
| RMCF1206 | 0.25 | 200 | 400 | 2 | ± 200 | 0.1 - 9.76 | 0.1 - 22M |
| | | | | | ± 100 | 10 - 1M | - |
| | | | | | ± 200 | 1.02M - 22.1M | - |
| RMCF1210 | 0.5 | 200 | 400 | 3 | ± 200 | 0.1 - 0.976 | |
| | | | | | ± 400 | 1 - 9.76 | |
| | | | | | ± 100 | 10 - 10M | |
| RMCF2010 | 0.75 | 200 | 400 | 3 | ± 200 | 0.1 - 0.976 | |
| | | | | | ± 400 | 1 - 9.76 | |
| | | | | | ± 200 | - | 10 - 10M |
| | | | | | ± 100 | 10 - 10M | - |
| RMCF2512 | 1 | 200 | 400 | 3 | ± 200 | 0.1 - 0.976 | |
| | | | | | ± 400 | 1 - 9.76 | |
| | | | | | ± 200 | - | 10 - 10M |
| | | | | | ± 100 | 10 - 10M | - |

Notes: (1) Lesser of √(P*R) or maximum working voltage
(2) Contact Stackpole for higher or lower values

## Electrical Specifications - RMCP

| Type/Code | Power Rating (W) @ 70ºC | Max. Working Voltage (V) (1) | Max. Overload Voltage (V) | Max. Jumper Current (A) | TCR (ppm/ºC) | Ohmic Range (Ω) and Tolerance (2) |
|---|---|---|---|---|---|---|
| | | | | | | 1%, 5% |
| RMCP0201 | 0.063 | 25 | 50 | 1 | -200 / +400 | 1 - 9.76 |
| | | | | | ± 200 | 10 - 10M |
| RMCP0402 | 0.125 | 50 | 100 | 1.5 | ± 200 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP0603 | 0.25 | 75 | 150 | 2 | ± 200 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP0805 | 0.33 | 150 | 300 | 2.5 | ± 200 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP1206 | 0.5 | 200 | 400 | 3.5 | ± 400 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP1210 | 0.66 | 200 | 400 | 5 | ± 400 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP2010 | 1 | 200 | 400 | 6 | ± 200 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |
| RMCP2512 | 2 | 250 | 500 | 7 | ± 200 | 1 - 9.76 |
| | | | | | ± 100 | 10 - 10M |

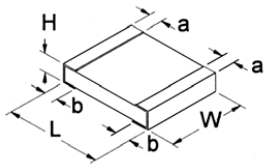
Notes: (1) Lesser of √(P*R) or maximum working voltage
(2) Contact Stackpole for higher or lower values
The resistance value range for RMCP jumper is max. 0.02Ω

## Electrical Specifications - Jumper

| Type/Code | Jumper Rated Current (A) | Max Overload Current (A)* | Jumper Resistance Value (Ω) |
|---|---|---|---|
| RMCF01005 | 0.5 | 1 | 0.05 max. |
| RMCF0201 | 0.5 | 1 | |
| RMCF0402 | 1 | 3 | |
| RMCF0603 | 1 | 5 | |
| RMCF0805 | 2 | 10 | |
| RMCF1206 | 2 | 10 | |
| RMCF1210 | 3 | 12 | |
| RMCF2010 | 3 | 12 | |
| RMCF2512 | 3 | 15 | |

* < 1 second and 1 time

## Mechanical Specifications



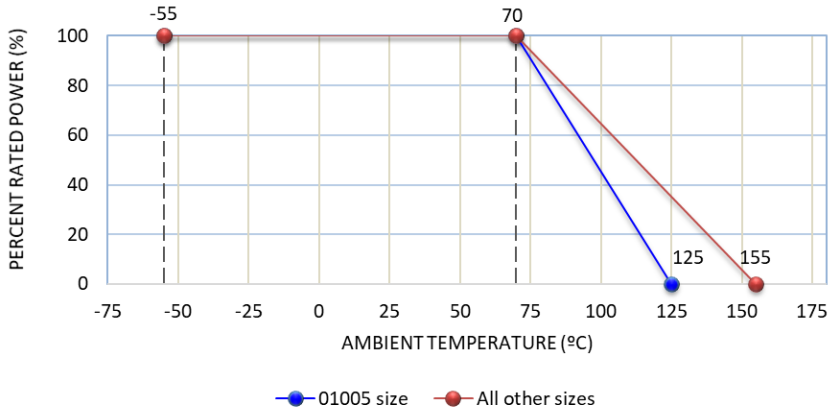

| Type/Code | Average Unit Weight (mg) | L Body Length | W Body Width | H Body Height | a Top Termination | b Bottom Termination | Unit |
|---|---|---|---|---|---|---|---|
| RMCF01005 | 0.07 | 0.016 ± 0.001 | 0.008 ± 0.001 | 0.005 ± 0.001 | 0.004 ± 0.001 | 0.004 ± 0.001 | inches |
| | | 0.40 ± 0.02 | 0.20 ± 0.02 | 0.13 ± 0.02 | 0.10 ± 0.03 | 0.10 ± 0.03 | mm |
| RMCF0201 | 0.16 | 0.024 ± 0.001 | 0.012 ± 0.001 | 0.009 ± 0.002 | 0.006 ± 0.002 | 0.006 ± 0.002 | inches |
| RMCP0201 | | 0.60 ± 0.03 | 0.30 ± 0.03 | 0.23 ± 0.05 | 0.15 ± 0.05 | 0.15 ± 0.05 | mm |
| RMCF0402 | 0.57 | 0.039 ± 0.004 | 0.020 ± 0.002 | 0.012 ± 0.004 | 0.006 ± 0.004 | 0.010 ± 0.006 | inches |
| RMCP0402 | 0.62 | 1.00 ± 0.10 | 0.50 ± 0.05 | 0.30 ± 0.10 | 0.15 ± 0.10 | 0.25 ± 0.15 | mm |
| RMCF0603 | 1.88 | 0.061 ± 0.006 | 0.031 ± 0.006 | 0.018 ± 0.006 | 0.012 ± 0.008 | 0.012 ± 0.008 | inches |
| RMCP0603 | 2.04 | 1.55 ± 0.15 | 0.80 ± 0.15 | 0.45 ± 0.15 | 0.30 ± 0.20 | 0.30 ± 0.20 | mm |
| RMCF0805 | 5.00 | 0.079 ± 0.008 | 0.049 ± 0.004 | 0.020 ± 0.006 | 0.014 ± 0.010 | 0.014 ± 0.010 | inches |
| RMCP0805 | 4.37 | 2.00 ± 0.20 | 1.25 ± 0.10 | 0.50 ± 0.15 | 0.35 ± 0.25 | 0.35 ± 0.25 | mm |

| Mechanical Specifications (cont.) | | | | | | | |
|---|---|---|---|---|---|---|---|
| Type/Code | Average Unit Weight (mg) | L Body Length | W Body Width | H Body Height | a Top Termination | b Bottom Termination | Unit |
| RMCF1206 | 8.86 | 0.126 ± 0.010 | 0.063 ± 0.006 | 0.022 ± 0.006 | 0.020 ± 0.012 | 0.020 ± 0.012 | inches |
| RMCP1206 | 8.95 | 3.20 ± 0.25 | 1.60 ± 0.15 | 0.55 ± 0.15 | 0.50 ± 0.30 | 0.50 ± 0.30 | mm |
| RMCF1210 | 15.55 | 0.126 ± 0.010 | 0.098 ± 0.010 | 0.022 ± 0.006 | 0.020 ± 0.012 | 0.020 ± 0.012 | inches |
| RMCP1210 | 15.96 | 3.20 ± 0.25 | 2.50 ± 0.25 | 0.55 ± 0.15 | 0.50 ± 0.30 | 0.50 ± 0.30 | mm |
| RMCF2010 | 23.56 | 0.197 ± 0.008 | 0.098 ± 0.008 | 0.022 ± 0.006 | 0.024 ± 0.012 | 0.024 ± 0.014 | inches |
| RMCP2010 | 24.24 | 5.00 ± 0.20 | 2.50 ± 0.20 | 0.55 ± 0.15 | 0.60 ± 0.30 | 0.60 ± 0.35 | mm |
| RMCF2512 | 40.02 | 0.248 ± 0.008 | 0.126 ± 0.010 | 0.022 ± 0.008 | 0.024 ± 0.012 | 0.024 ± 0.014 | inches |
| RMCP2512 | 39.45 | 6.30 ± 0.20 | 3.20 ± 0.25 | 0.55 ± 0.20 | 0.60 ± 0.30 | 0.60 ± 0.35 | mm |

| Performance Characteristics | | |
|---|---|---|
| Test | Test Specifications | Test Conditions (JIS-C 5202) |
| Short Time Overload | ± (2% + 0.1Ω) | 2.5 X rated voltage for 5 seconds |
| | Jumper: Max 0.05Ω after test | 0201 = 1A<br>0402 / 0603 = 2.5A<br>0805 / 1206 / 1210 / 2010 / 2512 = 5A |
| Dielectric Withstanding Voltage | No flashover or breakdown | 100 VAC, 1 minute |
| Resistance to Soldering Heat | ± 1% | 260ºC ± 5ºC, for 10 seconds ± 0.5 seconds (Solder Bath) |
| Solderability | 95% coverage, minimum | 235ºC ± 5ºC, for 2 seconds ± 0.5 seconds (Colophonium flux) |
| Temperature Cycle | ± (1% + 0.05Ω)<br>Jumper (< 0.05Ω) | -65ºC: 30 minutes 25ºC: 2 to 3 minutes<br>155ºC: 30 minutes 25ºC: 2 to 3 minutes<br>(5 Cycles) |
| Load Life (Endurance) | 1% and below: ± (1% + 0.05Ω)<br>2% and 5%: ± (3% + 0.1Ω)<br>Value < 1Ω: ± (3% + 0.1Ω)<br>Jumper: Max 0.1Ω after test. | 70ºC ± 2°C, RCWV or max. working voltage whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hour "OFF" |
| Voltage Coefficient | ± 100 (ppm/V) | 1/10 rated voltage for 3 seconds max. then rated voltage for 3 seconds max. |
| Robustness of Termination | ± (1% + 0.05Ω) | Bend of 2 mm for 5 ± 1 seconds |
| Resistance to Solvent | 1%: ± (0.5% + 0.05Ω)<br>5%: ± (0.5% + 0.05Ω)<br>Jumper: Max. 0.05Ω after test | The tested resistor should be immersed into isopropyl alcohol of 20ºC ~ 25°C for 60 seconds. Then the resitor is left in the room for 48 hours. |
| Damp Heat with Load | 1%: ± (1% + 0.05Ω)<br>5%: ± (2% + 0.05Ω)<br>Values < 1Ω: ± (3% + 0.1Ω)<br>Jumper: Max. 0.1Ω after test | 40ºC ± 2°C, 90%~95% R.H. RCWV or max. working voltage whichever is less for 1000 hours with 1.5 hours "ON" and 0.5 hours "OFF" |

Operating temperature range is -55°C to +155°C for all sizes except for 01005 size
Operating temperature range for 01005 is -55°C to +125°C

Power Derating Curve:



## Repetitive Pulse Information

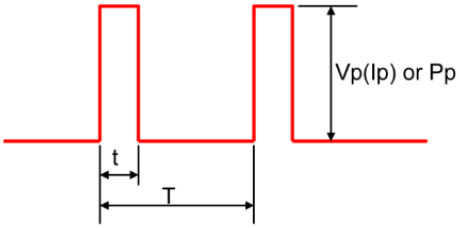
(This information is for reference only and is not guaranteed performance.)

If repetitive pulses are applied to resistors, pulse wave form must be less than “Pulse limiting voltage”, “Pulse limiting current” or “Pulse limiting wattage” calculated by the formula below.

$Vp = K\sqrt{P \times R \times T/t}$

$Ip = K\sqrt{P/R \times T/t}$

$Pp = K^2 \times P \times T/t$



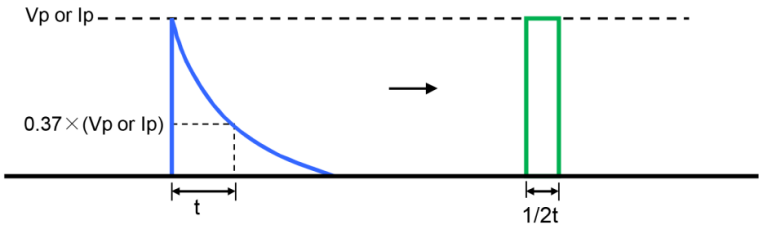

Where: Vp: Pulse limiting voltage (V)
Ip: Pulse limiting current (A)
Pp: Pulse limiting wattage (W)
P: Power rating (W)
R: Nominal resistance (ohm)
T: Repetitive period (sec)
t: Pulse duration (sec)
K: Coefficient by resistors type (refer to below matrix)
[Vr: Rated Voltage (V), Ir: Rated Current (A)]

Note 1: If T > 10 → T = 10 (sec), T / t > 1000 → T / t = 1000
Note 2: If T > 10 and T / t > 1000, “Pulse Limiting power (Single pulse) is applied
Note 3: If Vp < Vr (Ip < Ir or Pp < P), Vr (Ir, P) is Vp (Ip, Pp)
Note 4: Pulse limiting voltage (current, wattage) is applied at less than rated ambient temperature. If ambient temperature is more than the rated temperature (70°C), please decrease power rating according to “Power Derating Curve”
Note 5: Please assure sufficient margin for use period and conditions for “Pulse limiting voltage”
Note 6: If the pulse waveform is not square wave, please judge after transform the waveform into square wave according to the “Waveform Transformation to Square Wave”.

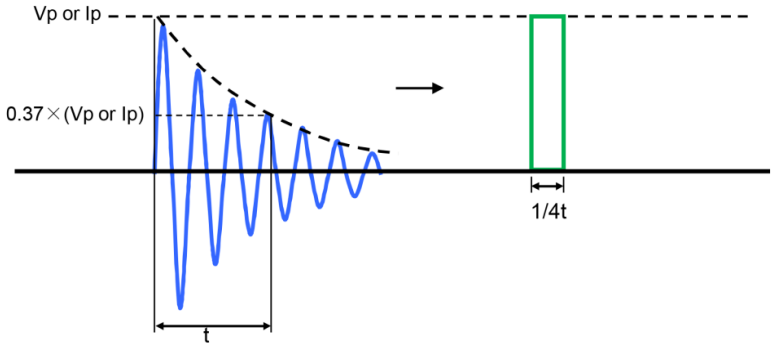
| RMCF Coefficient (K) Matrix | |
|---|---|
| Ohmic Value | K |
| R < 10Ω | 0.50 |
| 10Ω ≤ R < 100Ω | 0.45 |
| 100Ω ≤ R < 1KΩ | 0.35 |
| 1KΩ ≤ R < 10KΩ | 0.25 |
| 10KΩ ≤ R | 0.20 |

## Waveform Transformation to Square Wave

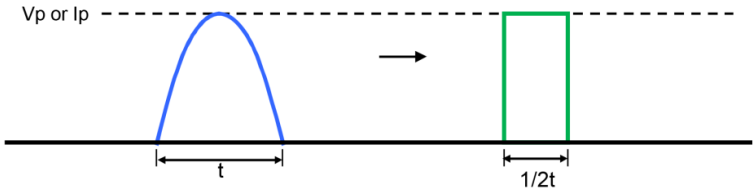
1. Discharge curve wave with time constant "t" → Square wave



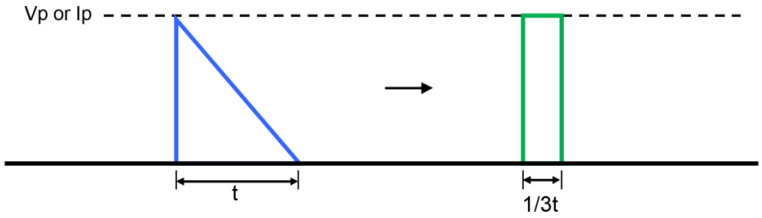

2. Damping oscillation wave with time constant of envelope "t" → Square wave



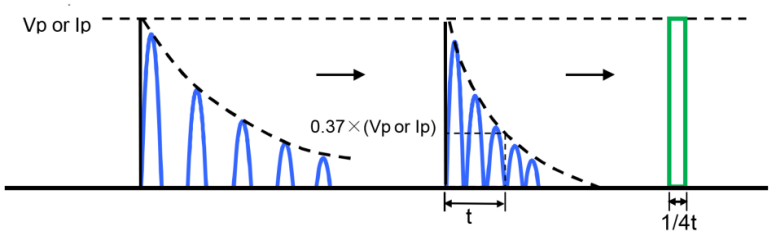

3. Half-wave rectification wave → Square wave



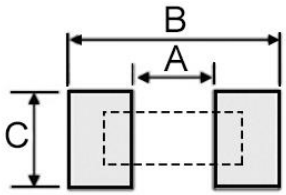

4. Triangular wave → Square wave




5. Special wave → Square wave



## Recommended Pad Layout




| Type/Code | A | B | C | Unit |
|---|---|---|---|---|
| RMCF01005 | 0.008<br>0.20 | 0.020<br>0.50 | 0.008<br>0.20 | inches<br>mm |
| RMCF0201<br>RMCP0201 | 0.012<br>0.30 | 0.039<br>1.00 | 0.016<br>0.40 | inches<br>mm |
| RMCF0402<br>RMCP0402 | 0.020<br>0.50 | 0.059<br>1.50 | 0.024<br>0.60 | inches<br>mm |
| RMCF0603<br>RMCP0603 | 0.031<br>0.80 | 0.083<br>2.10 | 0.035<br>0.90 | inches<br>mm |
| RMCF0805<br>RMCP0805 | 0.047<br>1.20 | 0.118<br>3.00 | 0.051<br>1.30 | inches<br>mm |
| RMCF1206<br>RMCP1206 | 0.087<br>2.20 | 0.165<br>4.20 | 0.063<br>1.60 | inches<br>mm |
| RMCF1210<br>RMCP1210 | 0.087<br>2.20 | 0.165<br>4.20 | 0.110<br>2.80 | inches<br>mm |
| RMCF2010<br>RMCP2010 | 0.138<br>3.50 | 0.240<br>6.10 | 0.110<br>2.80 | inches<br>mm |
| RMCF2512<br>RMCP2512 | 0.193<br>4.90 | 0.315<br>8.00 | 0.138<br>3.50 | inches<br>mm |

## Recommended Solder Profile

This information is intended as a reference for solder profiles for Stackpole resistive components. These profiles should be compatible with most soldering processes. These are only recommendations. Actual numbers will depend on board density, geometry, packages used, etc., especially those cells labeled with "*".

## 100% Matte Tin / RoHS Compliant Terminations

Soldering iron recommended temperatures: 330°C to 350°C with minimum duration.
Maximum number of reflow cycles is 3.

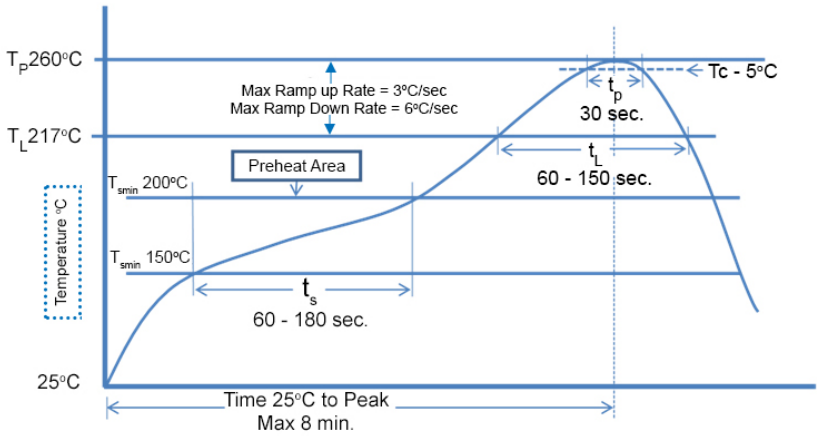
### Wave Soldering

| Description | Maximum | Recommended | Minimum |
|---|---|---|---|
| Preheat Time | 80 seconds | 70 seconds | 60 seconds |
| Temperature Diff. | 140°C | 120°C | 100°C |
| Solder Temp. | 260°C | 250°C | 240°C |
| Dwell Time at Max | 10 seconds | 5 seconds | * |
| Ramp DN (°C/sec) | N/A | N/A | N/A |

Temperature Diff. = Difference between final preheat stage and soldering stage.

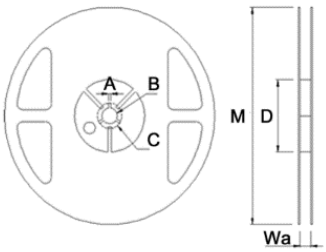
| Convection IR Reflow | | | |
|---|---|---|---|
| Description | Maximum | Recommended | Minimum |
| Ramp Up (°C/sec) | 3°C/sec | 2°C/sec | * |
| Dwell Time > 217°C | 150 seconds | 90 seconds | 60 seconds |
| Solder Temp. | 260°C | 245°C | * |
| Dwell Time at Max. | 30 seconds | 15 seconds | 10 seconds |
| Ramp DN (°C/sec) | 6°C/sec | 3°C/sec | * |

## Recommended Lead Free Resistor Reflow Profile



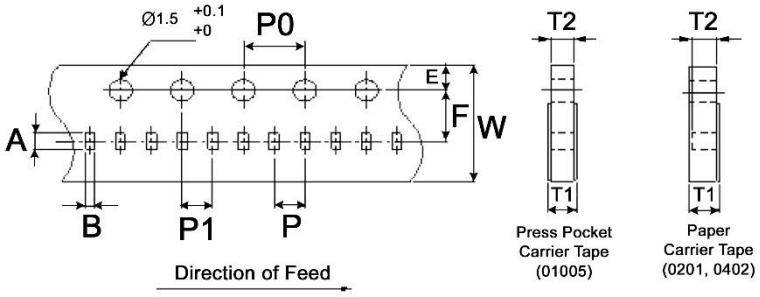

Packaging (EIA Standard RS-481)

## Reel Specifications




| Reel Type | Wa | M | A | B | C | D | Unit |
|---|---|---|---|---|---|---|---|
| 7" reel for | 0.354 ± 0.020 | 7.008 ± 0.079 | 0.079 ± 0.020 | 0.531 ± 0.020 | 0.827 ± 0.020 | 2.362 ± 0.039 | inches |
| 8 mm tape | 9.00 ± 0.50 | 178.00 ± 2.00 | 2.00 ± 0.50 | 13.50 ± 0.50 | 21.00 ± 0.50 | 60.00 ± 1.00 | mm |
| 10" reel for | 0.394 ± 0.020 | 10.000 ± 0.079 | | | | 3.937 ± 0.039 | inches |
| 8 mm tape | 10.00 ± 0.50 | 254.00 ± 2.00 | | | | 100.00 ± 1.00 | mm |

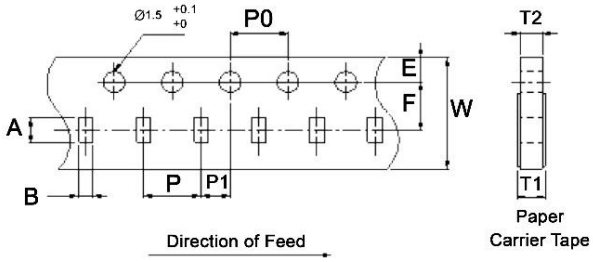
## Taping Specifications - 01005, 0201, 0402




| Type/Code | 7" Reel Quantity | Typical Full Reel Weight (g) | Tape Width | A | B | W | E | F | Unit |
|---|---|---|---|---|---|---|---|---|---|
| RMCF01005 | 10000 | 127.3 ± 12.0 | 0.315 8.00 | 0.018 ± 0.001 0.45 ± 0.02 | 0.010 ± 0.001 0.25 ± 0.02 | 0.315 ± 0.008 8.00 ± 0.20 | 0.069 ± 0.004 1.75 ± 0.10 | 0.138 ± 0.002 3.50 ± 0.05 | inches mm |
| RMCF0201 RMCP0201 | | 97.2 ± 9.0 | | 0.028 ± 0.006 0.70 ± 0.15 | 0.016 ± 0.006 0.40 ± 0.15 | | | | inches mm |
| RMCF0402 RMCP0402 | | 94.5 ± 9.0 | | 0.047 ± 0.006 1.20 ± 0.15 | 0.028 ± 0.006 0.70 ± 0.15 | | | | inches mm |

| Type/Code | T1 | T2 | P | P0 | P1 | Unit |
|---|---|---|---|---|---|---|
| RMCF01005 | 0.012 ± 0.001 0.31 ± 0.03 | 0.007 ± 0.001 0.17 ± 0.03 | 0.079 ± 0.004 2.00 ± 0.10 | 0.157 ± 0.004 4.00 ± 0.10 | 0.079 ± 0.002 2.00 ± 0.05 | inches mm |
| RMCF0201 RMCP0201 | 0.015 ± 0.006 0.38 ± 0.15 | 0.011 ± 0.001 0.28 ± 0.02 | | | | inches mm |
| RMCF0402 RMCP0402 | 0.016 ± 0.008 0.40 ± 0.20 | 0.016 ± 0.002 0.40 ± 0.05 | | | | inches mm |

## Taping Specifications - 0603, 0805, 1206, 1210

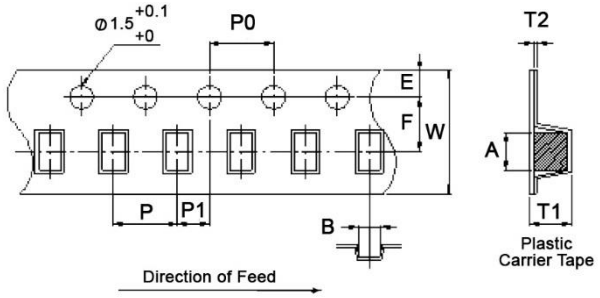



| Type/Code | 7" Reel Quantity (1) | Typical Full Reel Weight (g) | Tape Width | A | B | W | E | Unit |
|---|---|---|---|---|---|---|---|---|
| RMCF0603 RMCP0603 | 5000 | 118.3 ± 11.0 | 0.315 8.00 | 0.071 ± 0.008 1.80 ± 0.20 | 0.041 ± 0.008 1.05 ± 0.20 | 0.315 ± 0.008 8.00 ± 0.20 | 0.069 ± 0.004 1.75 ± 0.10 | inches mm |
| RMCF0805 RMCP0805 | 5000 | 139.2 ± 13.0 | | 0.093 ± 0.010 2.35 ± 0.25 | 0.063 ± 0.010 1.60 ± 0.25 | | | inches mm |
| RMCF1206 RMCP1206 | 5000 | 151.4 ± 15.0 | | 0.140 ± 0.010 3.55 ± 0.25 | 0.077 ± 0.010 1.95 ± 0.25 | | | inches mm |
| RMCF1210 RMCP1210 | 4000 | 175.7 ± 17.0 | | 0.138 ± 0.008 3.50 ± 0.20 | 0.110 ± 0.010 2.80 ± 0.25 | | | inches mm |

## Taping Specifications - 0603, 0805, 1206, 1210 (cont.)

| Type/Code | F | T1 | T2 | P | P0 | P1 | Unit |
|---|---|---|---|---|---|---|---|
| RMCF0603<br>RMCP0603 | 0.138 ± 0.002<br>3.50 ± 0.05 | 0.024 ± 0.008<br>0.60 ± 0.20 | 0.024 ± 0.004<br>0.60 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | inches<br>mm |
| RMCF0805<br>RMCP0805 | | 0.030 ± 0.008<br>0.75 ± 0.20 | 0.030 ± 0.004<br>0.75 ± 0.10 | | | | inches<br>mm |
| RMCF1206<br>RMCP1206 | | 0.030 ± 0.008<br>0.75 ± 0.20 | 0.030 ± 0.004<br>0.75 ± 0.10 | | | | inches<br>mm |
| RMCF1210<br>RMCP1210 | | 0.030 ± 0.008<br>0.75 ± 0.20 | 0.030 ± 0.004<br>0.75 ± 0.10 | | | | inches<br>mm |

## Taping Specifications - 2010, 2512

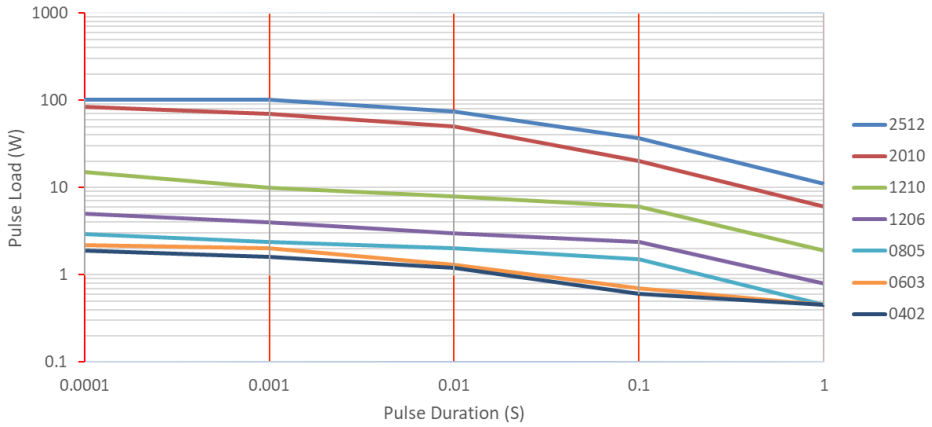



| Type/Code | 7" Reel Quantity | Typical Full Reel Weight (g) | Tape Width | A | B | W | E | F | Unit |
|---|---|---|---|---|---|---|---|---|---|
| RMCF2010<br>RMCP2010 | 4000 | 183.1 ± 18.0 | 0.472<br>12.00 | 0.217 ± 0.012<br>5.50 ± 0.30 | 0.110 ± 0.008<br>2.80 ± 0.20 | 0.472 ± 0.008<br>12.00 ± 0.20 | 0.069 ± 0.004<br>1.75 ± 0.10 | 0.217 ± 0.002<br>5.50 ± 0.05 | inches<br>mm |
| RMCF2512<br>RMCP2512 | | 255.3 ± 25.0 | | 0.264 ± 0.008<br>6.70 ± 0.20 | 0.134 ± 0.008<br>3.40 ± 0.20 | | | | inches<br>mm |

| Type/Code | T1 | T2 | P | P0 | P1 | Unit |
|---|---|---|---|---|---|---|
| RMCF2010<br>RMCP2010 | 0.041 ± 0.008<br>1.05 ± 0.20 | 0.009 ± 0.006<br>0.23 ± 0.15 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.157 ± 0.004<br>4.00 ± 0.10 | 0.079 ± 0.002<br>2.00 ± 0.05 | inches<br>mm |
| RMCF2512<br>RMCP2512 | | | | | | inches<br>mm |

Note: Plastic carrier tape used for 2010 and 2512 sizes.

## Single Pulse Power




The data provided are for reference only. They are typical performance for this product but are not guaranteed. The actual pulse handling of each individual resistor may vary depending on a variety of factors including resistance tolerance and resistance value. Stackpole Electronics, Inc. assumes no liability for the use of this information. Customers should validate the performance of these products in their applications. Contact Stackpole marketing to discuss specific pulse application requirements.

## Temperature Measurement of Resistor Surface

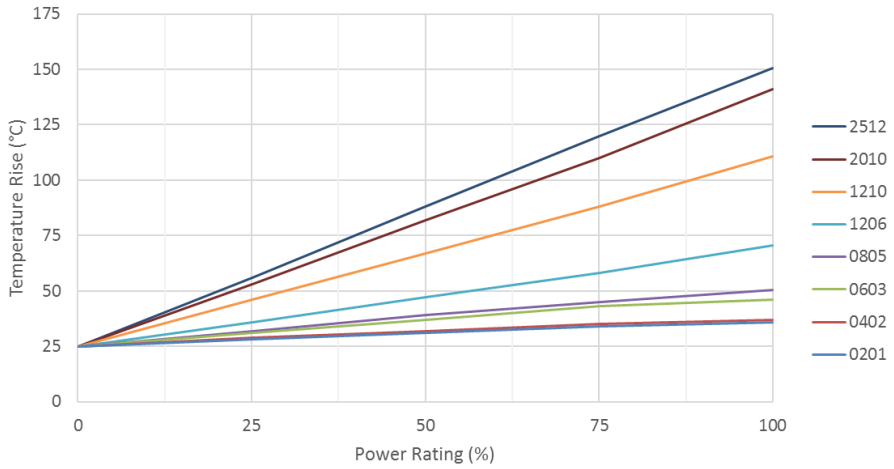
Description: The resistor surface generated temperature variation after applied rated voltage.
Products and power:

| Size | 0201 | 0402 | 0603 | 0805 | 1206 | 1210 | 2010 | 2512 |
|---|---|---|---|---|---|---|---|---|
| R-V | 15K | 40.2K | 57.6K | 180K | 182K | 100K | 100K | 75K |
| Rated Power (W) | 1/20 | 1/16 | 1/10 | 1/8 | 1/4 | 1/2 | 3/4 | 1 |
| Max Rated Voltage (V) | 25 | 50 | 75 | 150 | 200 | 200 | 200 | 200 |

Test method: Measure component surface temperature directly after the temperature stabilizes.

Test result: As per table below:

## Hot Spot Temperature - RMCF




| Size | 0201 | 0402 | 0603 | 0805 | 1206 | 1210 | 2010 | 2512 |
|---|---|---|---|---|---|---|---|---|
| Surface Temp. (°C) | 36 | 37 | 46.2 | 50.4 | 70.6 | 110.6 | 141 | 150.4 |

The thermal resistance of the RMCP will be similar to the RMCF. For example, the RMCF2512 and the RMCP2512 will have similar surface temperatures at 1W; the RMCP is designed to withstand higher temperatures associated with high power levels.

## Part Marking Specifications


**1% Marking**
The nominal resistance is marked on the surface of the overcoating with the use of 4 digit markings.
0201 and 0402 are not marked.


**5% Marking**
The nominal resistance is marked on the surface of the overcoating with the use of 3 digit markings.
0201 and 0402 are not marked.

For shared E24/E96 values, 1% tolerance product may be marked with three-digit marking instead of the standard four-digit marking for all other E96 values. All E24 values available in 1% tolerance are also marked with three-digit marking.

## Marking Instructions for 0603 1% Chip Resistors (per EIA-J)

A two-digit number is assigned to each standard R-Value (E96) as shown in the chart below. This is followed by one alpha character which is used as a multiplier. Each letter represents a specific multiplier as follows:

| | | |
|---|---|---|
| Z = 0.01 | A = 10 | D = 10000 |
| Y = 0.1 | B = 100 | E = 100000 |
| X = 1 | C = 1000 | F = 1000000 |

EXAMPLE:

| Chip Marking | Explanation | Value |
|---|---|---|
| 01B | 01 means 10.0 and B = 100 | 10.0 x 100 = 1K ohm |
| 25C | 25 means 17.8 and C = 1,000 | 17.8 x 1,000 = 17.8K ohm |
| 93D | 93 means 90.9 and D = 10,000 | 90.9 x 10,000 = 909K ohm |

**E96**

| # | R-Value | # | R-Value | # | R-Value | # | R-Value | # | R-Value | # | R-Value |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01 | 10.0 | 17 | 14.7 | 33 | 21.5 | 49 | 31.6 | 65 | 46.4 | 81 | 68.1 |
| 02 | 10.2 | 18 | 15.0 | 34 | 22.1 | 50 | 32.4 | 66 | 47.5 | 82 | 69.8 |
| 03 | 10.5 | 19 | 15.4 | 35 | 22.6 | 51 | 33.2 | 67 | 48.7 | 83 | 71.5 |
| 04 | 10.7 | 20 | 15.8 | 36 | 23.2 | 52 | 34.0 | 68 | 49.9 | 84 | 73.2 |
| 05 | 11.0 | 21 | 16.2 | 37 | 23.7 | 53 | 34.8 | 69 | 51.1 | 85 | 75.0 |
| 06 | 11.3 | 22 | 16.5 | 38 | 24.3 | 54 | 35.7 | 70 | 52.3 | 86 | 76.8 |
| 07 | 11.5 | 23 | 16.9 | 39 | 24.9 | 55 | 36.5 | 71 | 53.6 | 87 | 78.7 |
| 08 | 11.8 | 24 | 17.4 | 40 | 25.5 | 56 | 37.4 | 72 | 54.9 | 88 | 80.6 |
| 09 | 12.1 | 25 | 17.8 | 41 | 26.1 | 57 | 38.3 | 73 | 56.2 | 89 | 82.5 |
| 10 | 12.4 | 26 | 18.2 | 42 | 26.7 | 58 | 39.2 | 74 | 57.6 | 90 | 84.5 |
| 11 | 12.7 | 27 | 18.7 | 43 | 27.4 | 59 | 40.2 | 75 | 59.0 | 91 | 86.6 |
| 12 | 13.0 | 28 | 19.1 | 44 | 28.0 | 60 | 41.2 | 76 | 60.4 | 92 | 88.7 |
| 13 | 13.3 | 29 | 19.6 | 45 | 28.7 | 61 | 42.2 | 77 | 61.9 | 93 | 90.9 |
| 14 | 13.7 | 30 | 20.0 | 46 | 29.4 | 62 | 43.2 | 78 | 63.4 | 94 | 93.1 |
| 15 | 14.0 | 31 | 20.5 | 47 | 30.1 | 63 | 44.2 | 79 | 64.9 | 95 | 95.3 |
| 16 | 14.3 | 32 | 21.0 | 48 | 30.9 | 64 | 45.3 | 80 | 66.5 | 96 | 97.6 |

## RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

| RoHS Compliance Status | | | | | | |
|---|---|---|---|---|---|---|
| Standard Product Series | Description | Package / Termination Type | Standard Series RoHS Compliant | Lead-Free Termination Composition | Lead-Free Mfg. Effective Date (Std Product Series) | Lead-Free Effective Date Code (YY/WW) |
| RMCF | General Purpose Thick Film Surface Mount Chip Resistor | SMD | YES(1) | 100% Matte Sn over Ni | Jan-04 (Japan)<br>Jan-05 (Taiwan, China) | 04/01<br>05/01 |
| RMCP | General Purpose High Power Thick Film Chip Resistor | SMD | YES(1) | 100% Matte Sn over Ni | Always | Always |

Note (1): RoHS Compliant by means of exemption 7c-I.

## "Conflict Metals" Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the "conflict region" of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

## Compliance to "REACH"

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, "The Registration, Evaluation, Authorization and Restriction of Chemicals", otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

## Environmental Policy

It is the policy of Stackpole Electronics, Inc. (SEI) to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

## How to Order - RMCF

| R | M | C | F | 0 | 6 | 0 | 3 | J | T | 4 | K | 7 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Product Series |
|---|
| Code |
| RMCF |

| Size | |
|---|---|
| Size | W |
| 01005 | 0.03 |
| 0201 | 0.05 |
| 0402 | 0.063 |
| 0603 | 0.1 |
| 0805 | 0.125 |
| 1206 | 0.25 |
| 1210 | 0.5 |
| 2010 | 0.75 |
| 2512 | 1 |

| Tolerance | | |
|---|---|---|
| Code | Tol | Value |
| F | 1% | E96, E24 |
| J | 5% | E24 |
| Z | Jumper | |

| Packaging | | | |
|---|---|---|---|
| Code | Description | Size | Quantity |
| T | 7" Reel Paper Tape | 01005 | 10000 |
| | | 0201, 0402 | 10000 |
| | | 0603, 0805, 1206 | 5000 |
| | | 1210 | 4000 |
| | 7" Reel Plastic Tape | 2010, 2512 | 4000 |
| G | 10" Reel Paper Tape | 0603, 0805, 1206 | 10000 |

| Resistance Value |
|---|
| Four characters with the multiplier used as the decimal holder. |
| 0.1 ohm = R100<br>4.70 ohm = 4R70<br>10.0 Kohm = 10K0<br>1 Mohm = 1M00<br>Zero ohm jumper = 0R00 |

## How to Order - RMCP

| R | M | C | P | 0 | 6 | 0 | 3 | J | T | 4 | K | 7 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| Product Series |
|---|
| Code |
| RMCP |

| Size | |
|---|---|
| Size | W |
| 0201 | 0.063 |
| 0402 | 0.125 |
| 0603 | 0.25 |
| 0805 | 0.33 |
| 1206 | 0.5 |
| 1210 | 0.66 |
| 2010 | 1 |
| 2512 | 2 |

| Tolerance | | |
|---|---|---|
| Code | Tol | Value |
| F | 1% | E96, E24 |
| J | 5% | E24 |
| Z | Jumper | |

| Packaging | | | |
|---|---|---|---|
| Code | Description | Size | Quantity |
| T | 7" Reel Paper Tape | 0201, 0402 | 10000 |
| | | 0603, 0805<br>1206, 1210 | 5000 |
| | | 2010, 2512 | 4000 |
| G | 10" Reel Paper Tape | 0603, 0805<br>1206 | 10000 |

| Resistance Value |
|---|
| Four characters with the multiplier used as the decimal holder. |
| 1 ohm = 1R00<br>10 Kohm = 10K0<br>1 Mohm = 1M00 |