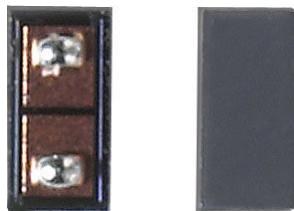


Thin Film Surface Mounted RF Capacitor



Product may not be to scale

RFCS series of thin film capacitors on silicon are designed for RF circuits that require exceptional performance at frequencies up to 20 GHz. The unique structure of the RFCS capacitors is based on thin-film electrodes deposited on a highly conductive silicon substrate. This unique structure is characterized by low parasitic inductance allowing the capacitors to maintain their performance to higher frequencies than other technologies.

The RFCS replaces the HPC product line.

Additional values and form factors available upon request.

FEATURES

- Industries highest SRF
- Low DCR, high Q
- Small size: 0.040" x 0.020" x 0.015"
- S parameter files available upon request
- High frequency up to 20 GHz
- Surface mount
- Case size: 0402
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS*



HALOGEN FREE



GREEN (5-2008)



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.

APPLICATIONS

- Lumped element filters
- Impedance matching circuits
- Decoupling and DC blocking
- Smart cards
- Other high Q RF circuitry

WV (DC) VALUES AND TOLERANCES

| CAPACITOR MODEL | RFCS | UNIT |
|--------------------------|-----------|------|
| Case Size | 0402 | |
| Capacitance Values | 0.2 to 27 | pF |
| Tolerance ⁽¹⁾ | ± 5 | % |
| DC Working Voltage | 50 | V |

Note

⁽¹⁾ ± 0.1 pF for values < 2 pF

STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER | VALUE | UNIT |
|-----------------------------------|--------------------------------|--------|
| Capacitance Range ⁽²⁾ | 0.2 to 27 | pF |
| Maximum Working Voltage | Up to 50 | V |
| Operating Temperature | - 55 to + 125 | °C |
| Storage Temperature | - 55 to + 125 | °C |
| Temperature Coefficient | ± 100 | ppm/°C |
| ESD Classification ⁽³⁾ | Value dependant, up to class 2 | |

Notes

⁽²⁾ Custom values available upon request. See custom design section below

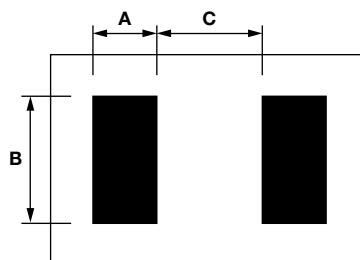
⁽³⁾ According to AEC-Q200 method 002. Contact factory for more details

RF CHARACTERISTICS - typical values

| CAPACITANCE (pF) | Q | | SRF (GHz) | MAX. OPERATING VOLTAGE (V) |
|---------------------|----------|---------|--------------|----------------------------------|
| | AT 1 MHz | 100 MHz | | |
| 0.2 | 70 500 | 3190 | > 20 | 50 |
| 0.3 | 45 700 | 2050 | > 20 | 50 |
| 0.4 | 33 600 | 1490 | 19.4 | 50 |
| 0.5 | 26 500 | 1170 | 18.2 | 50 |
| 0.6 | 21 800 | 960 | 17.2 | 50 |
| 0.7 | 18 500 | 810 | 16.5 | 50 |
| 0.8 | 16 000 | 700 | 15.8 | 50 |
| 0.9 | 14 100 | 610 | 15.3 | 50 |
| 1 | 12 600 | 540 | 14.9 | 50 |
| 1.2 | 10 400 | 450 | 14.1 | 50 |
| 1.5 | 8170 | 350 | 13.2 | 50 |
| 1.8 | 6720 | 290 | 12.5 | 50 |
| 2.2 | 3360 | 130 | 10.6 | 50 |
| 2.7 | 2720 | 100 | 10.4 | 50 |
| 3.3 | 2220 | 80 | 10.2 | 25 |
| 3.9 | 1870 | 70 | 10.1 | 25 |
| 4.7 | 1540 | 60 | 9.9 | 25 |
| 5.6 | 1290 | 50 | 9.8 | 25 |
| 6.8 | 1060 | 40 | 9.6 | 25 |
| 8.2 | 870 | 30 | 9.4 | 25 |
| 10 | 710 | 25 | 9.3 | 25 |
| 12 | 600 | 21 | 9.1 | 16 |
| 15 | 470 | 20 | 8.9 | 16 |
| 18 | 400 | 15 | 8.8 | 16 |
| 22 | 320 | 10 | 8.6 | 10 |
| 27 | 260 | 10 | 8.5 | 10 |

DIMENSIONS in inches (millimeters)

| | LENGTH | WIDTH | THICKNESS |
|------------------------------|--------|-------|-------------------------|
| PART | 0.04 | 0.02 | 0.015 (0.5) \pm 0.001 |
| Mounting Pad C \geq 2.2 pF | 0.014 | 0.006 | |
| Mounting Pad C < 2.2 pF | 0.012 | 0.004 | |

FOOTPRINT DIMENSIONS in inches (millimeters)


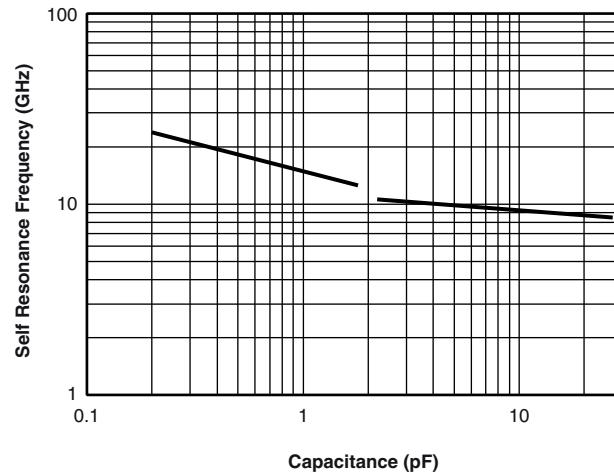
| VALUE RANGE | A | B | C |
|-------------|-------|-------|-------|
| 0.2 to 27 | 0.008 | 0.014 | 0.018 |

CUSTOM DESIGNED CAPACITORS

Vishay EFI will custom design and measure additional values and form factors upon request.
Typical capacitance density is limited to: $\sim 200 \text{ pF/mm}^2$

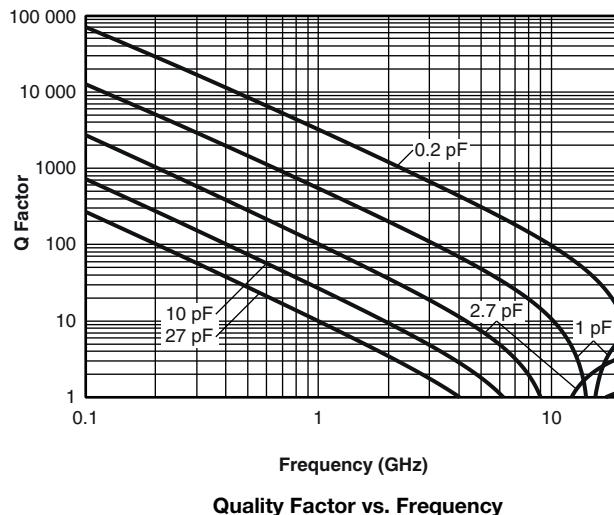
| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | |
|--|------|---|-------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Global Part Number: RFCS04021000BKTT1 | | | | | | | | | | | | | | | | |
| Global Part Number Description: RFCS 0402 10 pF 10 % e1 T1 | | | | | | | | | | | | | | | | |
| R | F | C | S | 0 | 4 | 0 | 2 | 1 | 0 | 0 | 0 | B | K | T | T | 1 |
| MODEL | SIZE | CAPACITANCE (pF) | INDUCTANCE MULTIPLIER CODE | TOLERANCE CODE | TERMINATION | PACKAGING CODE | | | | | | | | | | |
| RFCS | 0402 | First 4 digits are significant figures of capacitance | D = 0.0001 C = 0.001 B = 0.01 | J = 5 % K = 10 % M = 20 % L = 25 % B = $\pm 0.1 \text{ pF}$ | S = SnPb T = Lead (Pb)-free (e1) G = Gold | WAFFLE WS = 100 min., 1 mult TAPE AND REEL T1 = 1000 min., 1000 mult | | | | | | | | | | |

TYPICAL COMPONENT PERFORMANCE



Self Resonance vs. Value

Two electrode geometries are used to cover the value range. For this reason the above plot exhibits discontinuity.



Quality Factor vs. Frequency

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