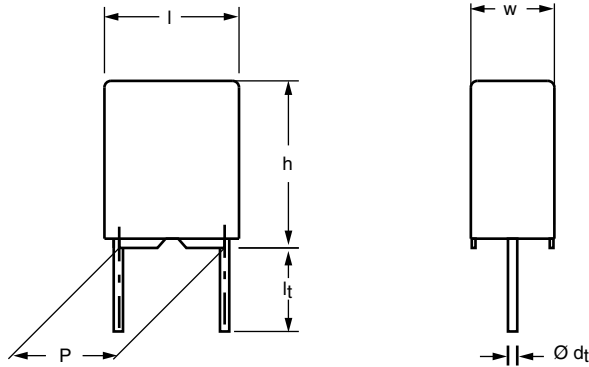


## Series Impedance Film Capacitors Radial Potted Type



### APPLICATIONS

Based on long term capacitance stability and good self-healing properties, these capacitors are intended for applications in series with the mains acting as voltage-dividing impedance.

These capacitors are not allowed to be used as across-the-line capacitors.

### REFERENCE SPECIFICATIONS

IEC 60384-14

### PERFORMANCE GRADE

Grade 1 (long life)

### MARKING

C-value, tolerance, rated voltage, manufacturer's type, code for dielectric material, manufacturer's location, manufacturer's logo, year and week

### DIELECTRIC

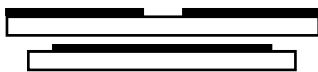
Polyester film <sup>(1)</sup>

### ELECTRODES

Metallized electrodes

### CONSTRUCTION

Series construction



### RATED AC VOLTAGE

AC 275 V; 50 Hz to 60 Hz

### PERMISSIBLE DC VOLTAGE

DC 400 V

### Notes

<sup>(1)</sup> For pitch = 15 mm, C < 15 nF, dielectric is polypropylene

<sup>(2)</sup> 27.5 mm pitch parts - in progress

### FEATURES

- 10 mm to 27.5 mm lead pitch <sup>(2)</sup>
- Supplied loose in box, taped on ammpack or reel
- Compliant to RoHS Directive 2002/95/EC



**RoHS**  
COMPLIANT

### ENCAPSULATION

Plastic case, epoxy resin sealed, flame retardant (UL-class 94 V-0)

### CLIMATIC TESTING CLASS ACC. TO IEC 60068-1

55/105/56/B

### CAPACITANCE RANGE AND TOLERANCE <sup>(2)</sup>

E6 series 0.01 µF to 2.2 µF, tolerance ± 20 %

E12 series 0.01 µF to 2.2 µF, tolerance ± 10 % and ± 5 %

Preferred values acc. to E6

### LEADS

Tinned wire

### RATED TEMPERATURE

110 °C

### MAXIMUM APPLICATION TEMPERATURE

105 °C

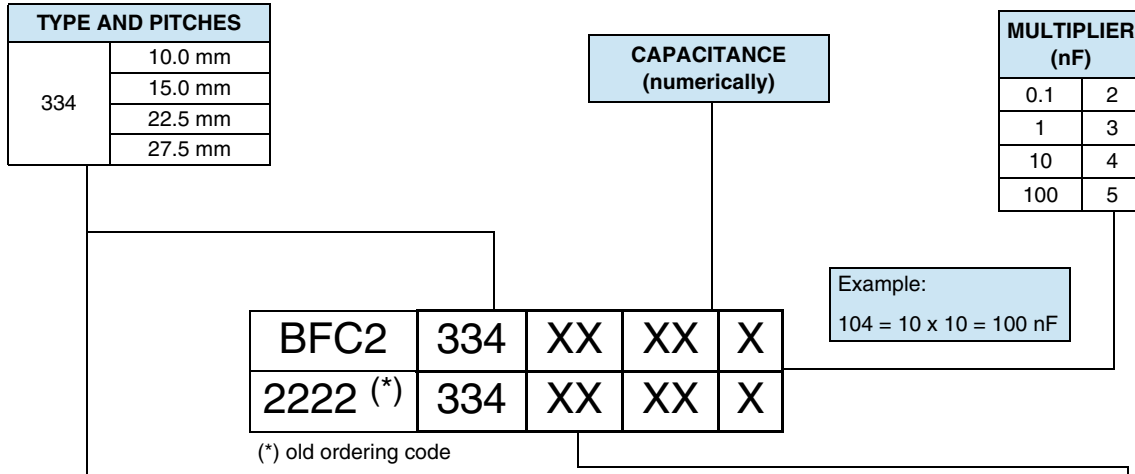
### DETAIL SPECIFICATION

For more detailed data and test requirements contact:

[RFI@vishay.com](mailto:RFI@vishay.com)



## COMPOSITION OF CATALOG NUMBER



| TYPE         | PACKAGING   | STANDARD DIMENSIONS                                     | C-TOL.         | CODE NUMBER    |                    |
|--------------|---|---|----------------|----------------|--------------------|
| 334          | Loose in box  | lead length 3.5 mm + 1/- 0.5 mm or 3.5 mm ± 0.3 mm      | ± 20 %         | BFC2 334 20... |                    |
|              |   | lead length 5.0 mm ± 1.0 mm                             |                | BFC2 334 22... |                    |
|              |   | lead length 25.0 mm ± 2.0 mm                            |                | BFC2 334 24... |                    |
|              | Taped (1)   | reel: H = 18.5 mm; P <sub>0</sub> = 12.7 mm or 15.0 mm  |                | BFC2 334 26... |                    |
|              |   | ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm         |                | BFC2 334 28... |                    |
|              | Loose in box  | lead length 3.5 mm + 1/- 0.5 mm or 3.5 mm ± 0.3 mm      |                | ± 10 %         | BFC2 334 10...     |
|              |   | lead length 5.0 mm ± 1.0 mm                             |                |                | BFC2 334 12...     |
|              |   | lead length 25.0 mm ± 2.0 mm                            |                |                | BFC2 334 14...     |
|              | Taped (1)   | reel: H = 18.5 mm; P <sub>0</sub> = 12.7 mm or 15.0 mm  |                |                | BFC2 334 16...     |
|              |   | ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm         | BFC2 334 18... |                |                    |
|              | Loose in box  | lead length 3.5 mm + 1/- 0.5 mm or 3.5 mm ± 0.3 mm      | ± 5 %          |                | BFC2 334 50...     |
|              |   | lead length 5.0 mm ± 1.0 mm                             |                |                | BFC2 334 52...     |
|              |   | lead length 25.0 mm ± 2.0 mm                            |                |                | BFC2 334 54...     |
|              | Taped (1)   | reel: H = 18.5 mm; P <sub>0</sub> = 12.7 mm or 15.0 mm  |                |                | BFC2 334 56...     |
|              |   | ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm         |                | BFC2 334 58... |                    |
|              | <b>PACKAGING</b>  | <b>ALTERNATIVE LARGER PITCH SIZES</b>                   |                | <b>C-TOL.</b>  | <b>CODE NUMBER</b> |
|              | Loose in box  | lead length 3.5 mm +1 mm/- 0.5 mm or 3.5 mm ± 0.3 mm    |                | ± 20 %         | BFC2 334 21...     |
|              |   | lead length 5.0 mm ± 1.0 mm                             |                |                | BFC2 334 23...     |
|              |   | lead length 25.0 mm ± 2.0 mm                            |                |                | BFC2 334 25...     |
|              | Taped (1)   | reel or ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm | BFC2 334 27... |                |                    |
|              | Loose in box  | lead length 3.5 mm +1 mm/- 0.5 mm or 3.5 mm ± 0.3 mm    | ± 10 %         |                | BFC2 334 11...     |
|              |   | lead length 5.0 mm ± 1.0 mm                             |                |                | BFC2 334 13...     |
|              |   | lead length 25.0 mm ± 2.0 mm                            |                |                | BFC2 334 15...     |
|              | Taped (1)   | reel or ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm |                |                | BFC2 334 17...     |
| Loose in box | lead length 3.5 mm +1 mm/- 0.5 mm or 3.5 mm ± 0.3 mm    | ± 5 %   |                |                | BFC2 334 51...     |
|              | lead length 5.0 mm ± 1.0 mm                             |   |                | BFC2 334 53... |                    |
|              | lead length 25.0 mm ± 2.0 mm                            |   |                | BFC2 334 55... |                    |
| Taped (1)    | reel or ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm |   |                | BFC2 334 57... |                    |

**Note**

(1) For detailed type specifications refer to packaging information: [www.vishay.com/doc?28139](http://www.vishay.com/doc?28139)



**SPECIFIC REFERENCE DATA**

| DESCRIPTION   | VALUE  |
|---|--|
| Rated AC voltage ( $U_{RAC}$ )  | 275 V  |
| Permissible DC voltage ( $U_{RDC}$ )  | 400 V  |
| Tangent of loss angle:  | <b>AT 1 kHz</b> <b>AT 10 kHz</b>                   |
| $C \leq 0.1 \mu F$  | $\leq 75 \times 10^{-4}$ $\leq 110 \times 10^{-4}$ |
| $0.1 \mu F < C \leq 0.47 \mu F$   | $\leq 75 \times 10^{-4}$ $\leq 120 \times 10^{-4}$ |
| $0.47 \mu F < C \leq 2.2 \mu F$   | $\leq 75 \times 10^{-4}$ $\leq 150 \times 10^{-4}$ |
| Rated voltage pulse slope $(dU/dt)_R$ at 400 $V_{DC}$   |  |
| $l_{max.} = 12.5 \text{ mm}$  | 200 V/ $\mu s$                                     |
| $l_{max.} = 17.5 \text{ mm}$  | 100 V/ $\mu s$                                     |
| $l_{max.} = 26.0 \text{ mm}$  | 70 V/ $\mu s$                                      |
| $l_{max.} = 31.0 \text{ mm}$  | 55 V/ $\mu s$                                      |
| R between leads, for $C \leq 0.33 \mu F$ : at 100 V, 1 min  | $> 30\,000 \text{ M}\Omega$                        |
| RC between leads, for $C > 0.33 \mu F$ : at 100 V, 1 min  | $> 10\,000 \text{ s}$                              |
| R between interconnecting leads and casing: at 100 V, 1 min   | $> 30\,000 \text{ M}\Omega$                        |
| Withstanding (DC) voltage (cut off current 10 mA) <sup>(1)</sup> ,<br>rise time $\leq 1000 \text{ V/s}$ | 720 V; 1 min                                       |
| Withstanding (AC) voltage between leads and case  | 2050 V; 1 min                                      |
| Maximum application temperature   | 105 °C   |

**Note**

<sup>(1)</sup> See "Voltage Proof Test for Metalized Film Capacitors": [www.vishay.com/doc?28169](http://www.vishay.com/doc?28169)

**Pitch: 10.0 mm; C-tol. =  $\pm 20\%$**

| C<br>( $\mu F$ )   | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |   |      |  |      |       |   |       |  |  |
|--|---------------------------------|----------------------------|---|---|------|--|------|-------|---|-------|--|--|
|  |                                 |                            | LOOSE IN BOX                                |   |      |  |      |       | AMMOPACK <sup>(1)</sup>                 |       | LARGE REEL<br>(500 mm) <sup>(1)(2)</sup> |  |
|  |                                 |                            | Short leads                                 |   |      | Long leads                                 |      |       | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |       | H = 18.5 mm<br>P <sub>0</sub> = 15.0 mm  |  |
|  |                                 |                            | $l_t =$<br>3.5 mm<br>+ 1 mm/- 0.5 mm        | $l_t =$<br>5.0 mm<br>$\pm 1.0 \text{ mm}$ | SPQ  | $l_t =$<br>25.0 mm<br>$\pm 2.0 \text{ mm}$ | SPQ  |       | SPQ                                     |       | SPQ                                      |  |
| <b>Pitch = 10.0 mm <math>\pm</math> 0.4 mm; <math>d_t = 0.60 \text{ mm} \pm 0.06 \text{ mm}</math></b> |                                 |                            |   |   |      |  |      |       |   |       |  |  |
| 0.01   | 4.0 x 10.0 x 12.5               | 0.7                        | 20103                                       | 22103                                     | 1000 | 24103                                      | 1250 | 28103 | 950                                     |       |  |  |
| 0.015  |                                 |                            | 20153                                       | 22153                                     |      | 24153                                      |      | 28153 |   |       |  |  |
| 0.022  |                                 |                            | 20223                                       | 22223                                     |      | 24223                                      |      | 28223 |   |       |  |  |
| 0.033  |                                 |                            | 20333                                       | 22333                                     |      | 24333                                      |      | 28333 |   |       |  |  |
| 0.047  |                                 |                            | 20473                                       | 22473                                     |      | 24473                                      |      | 28473 |   |       |  |  |
| 0.068  |                                 |                            | 20683                                       | 22683                                     |      | 24683                                      |      | 28683 |   |       |  |  |
| 0.1  | 5.0 x 11.0 x 12.5               | 0.8                        | 20104                                       | 22104                                     | 1000 | 24104                                      | 1000 | 28104 | 750                                     | 26104 | 1900                                     |  |

**Notes**

• SPQ = Standard Packing Quantity

<sup>(1)</sup> H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information

<sup>(2)</sup> Reel diameter = 356 mm is available on request

<sup>(3)</sup> Weight for short lead product only



Pitch: 10.0 mm; C-tol. = ± 10 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |                               |      |                                |      |   |     |  |      |
|--|---------------------------------|----------------------------|---|-------------------------------|------|--------------------------------|------|---|-----|--|------|
|  |                                 |                            | LOOSE IN BOX                                |                               |      |                                |      | AMMOPACK <sup>(1)</sup>                 |     | LARGE REEL<br>(500 mm) <sup>(1)(2)</sup> |      |
|  |                                 |                            | Short leads                                 |                               |      | Long leads                     |      | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |     | H = 18.5 mm<br>P <sub>0</sub> = 15.0 mm  |      |
|  |                                 |                            | $l_t =$<br>3.5 mm<br>+ 1.0 mm/- 0.5 mm      | $l_t =$<br>5.0 mm<br>± 1.0 mm | SPQ  | $l_t =$<br>25.0 mm<br>± 2.0 mm | SPQ  |   | SPQ |  | SPQ  |
| <b>Pitch = 10.0 mm ± 0.4 mm; d<sub>t</sub> = 0.60 mm ± 0.06 mm</b> |                                 |                            |   |                               |      |                                |      |   |     |  |      |
| 0.01   | 4.0 x 10.0 x 12.5               | 0.7                        | 10103                                       | 12103                         | 1000 | 14103                          | 1250 | 18103                                   | 950 |  |      |
| 0.012  |                                 |                            | 10123                                       | 12123                         |      | 14123                          |      | 18123                                   |     |  |      |
| 0.015  |                                 |                            | 10153                                       | 12153                         |      | 14153                          |      | 18153                                   |     |  |      |
| 0.018  |                                 |                            | 10183                                       | 12183                         |      | 14183                          |      | 18183                                   |     |  |      |
| 0.022  |                                 |                            | 10223                                       | 12223                         |      | 14223                          |      | 18223                                   |     |  |      |
| 0.027  |                                 |                            | 10273                                       | 12273                         |      | 14273                          |      | 18273                                   |     |  |      |
| 0.033  |                                 |                            | 10333                                       | 12333                         |      | 14333                          |      | 18333                                   |     |  |      |
| 0.039  |                                 |                            | 10393                                       | 12393                         |      | 14393                          |      | 18393                                   |     |  |      |
| 0.047  |                                 |                            | 10473                                       | 12473                         |      | 14473                          |      | 18473                                   |     |  |      |
| 0.056  |                                 |                            | 10563                                       | 12563                         |      | 14563                          |      | 18563                                   |     |  |      |
| 0.068  |                                 |                            | 10683                                       | 12683                         |      | 14683                          |      | 18683                                   |     |  |      |
| 0.082  | 5.0 x 11.0 x 12.5               | 0.9                        | 10823                                       | 12823                         |      | 14823                          | 1000 | 18823                                   | 750 | 16823                                    | 1900 |
| 0.1  | 6.0 x 12.0 x 12.5               | 1.2                        | 10104                                       | 12104                         | 750  | 14104                          | 750  | 18104                                   | 600 | 16104                                    | 1500 |

Notes

• SPQ = Standard Packing Quantity

<sup>(1)</sup> H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information

<sup>(2)</sup> Reel diameter = 356 mm is available on request

<sup>(3)</sup> Weight for short lead product only

Pitch: 10.0 mm; C-tol. = ± 5 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |                         |      |                          |      |   |     |  |      |
|--|---------------------------------|----------------------------|---|-------------------------|------|--------------------------|------|---|-----|--|------|
|  |                                 |                            | LOOSE IN BOX                                |                         |      |                          |      | AMMOPACK <sup>(1)</sup>                 |     | LARGE REEL<br>(500 mm) <sup>(1)(2)</sup> |      |
|  |                                 |                            | Short leads                                 |                         |      | Long leads               |      | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |     | H = 18.5 mm<br>P <sub>0</sub> = 15.0 mm  |      |
|  |                                 |                            | $l_t = 3.5$<br>+ 1.0 mm/- 0.5 mm            | $l_t =$<br>5.0 ± 1.0 mm | SPQ  | $l_t =$<br>25.0 ± 2.0 mm | SPQ  |   | SPQ |  | SPQ  |
| <b>Pitch = 10.0 mm ± 0.4 mm; d<sub>t</sub> = 0.60 mm ± 0.06 mm</b> |                                 |                            |   |                         |      |                          |      |   |     |  |      |
| 0.01   | 4.0 x 10.0 x 12.5               | 0.7                        | 50103                                       | 52103                   | 1000 | 54103                    | 1250 | 58103                                   | 950 |  |      |
| 0.012  |                                 |                            | 50123                                       | 52123                   |      | 54123                    |      | 58123                                   |     |  |      |
| 0.015  |                                 |                            | 50153                                       | 52153                   |      | 54153                    |      | 58153                                   |     |  |      |
| 0.018  |                                 |                            | 50183                                       | 52183                   |      | 54183                    |      | 58183                                   |     |  |      |
| 0.022  |                                 |                            | 50223                                       | 52223                   |      | 54223                    |      | 58223                                   |     |  |      |
| 0.027  |                                 |                            | 50273                                       | 52273                   |      | 54273                    |      | 58273                                   |     |  |      |
| 0.033  |                                 |                            | 50333                                       | 52333                   |      | 54333                    |      | 58333                                   |     |  |      |
| 0.039  |                                 |                            | 50393                                       | 52393                   |      | 54393                    |      | 58393                                   |     |  |      |
| 0.047  |                                 |                            | 50473                                       | 52473                   |      | 54473                    |      | 58473                                   |     |  |      |
| 0.056  |                                 |                            | 50563                                       | 52563                   |      | 54563                    |      | 58563                                   |     |  |      |
| 0.068  |                                 |                            | 50683                                       | 52683                   |      | 54683                    |      | 58683                                   |     |  |      |
| 0.082  | 5.0 x 11.0 x 12.5               | 0.9                        | 50823                                       | 52823                   |      | 54823                    | 1000 | 58823                                   | 750 | 56823                                    | 1900 |
| 0.1  | 6.0 x 12.0 x 12.5               | 1.2                        | 50104                                       | 52104                   | 750  | 54104                    | 750  | 58104                                   | 600 | 56104                                    | 1500 |

Notes

• SPQ = Standard Packing Quantity

<sup>(1)</sup> H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information

<sup>(2)</sup> Reel diameter = 356 mm is available on request

<sup>(3)</sup> Weight for short lead product only



Series Impedance Film Capacitors  
Radial Potted Type

Vishay BCcomponents

Pitch: 15.0 mm; C-tol. = ± 20 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |      |   |      |   |      |
|--|---------------------------------|----------------------------|---|--|------|---|------|---|------|
|  |                                 |                            | LOOSE IN BOX                                |  |      |   |      | REEL (500 mm) <sup>(1)(2)</sup>         |      |
|  |                                 |                            | Short leads                                 |  |      | Long leads                              |      | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |      |
|  |                                 |                            | l <sub>t</sub> = 3.5 mm<br>± 0.3 mm         | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ  | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ  |   | SPQ  |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.60 mm ± 0.06 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.01   | 5.0 x 11.0 x 17.5               | 1.2                        | 21103                                       | 23103                                  | 1250 | 25103                                   | 1000 | 27103                                   | 1100 |
| 0.015  |                                 |                            | 21153                                       | 23153                                  |      | 25153                                   |      | 27153                                   |      |
| 0.022  |                                 |                            | 21223                                       | 23223                                  |      | 25223                                   |      | 27223                                   |      |
| 0.033  |                                 |                            | 21333                                       | 23333                                  |      | 25333                                   |      | 27333                                   |      |
| 0.047  |                                 |                            | 21473                                       | 23473                                  |      | 25473                                   |      | 27473                                   |      |
| 0.068  |                                 |                            | 21683                                       | 23683                                  |      | 25683                                   |      | 27683                                   |      |
| 0.1  |                                 |                            | 21104                                       | 23104                                  |      | 25104                                   |      | 27104                                   |      |
| 0.15   |                                 |                            | 20154                                       | 22154                                  |      | 24154                                   |      | 26154                                   |      |
| 0.22   | 6.0 x 12.0 x 17.5               | 1.6                        | 20224                                       | 22224                                  | 1000 | 24224                                   | 1000 | 26224                                   | 900  |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.33   | 8.5 x 15.0 x 17.5               | 2.8                        | 20334                                       | 22334                                  | 750  | 24334                                   | 500  | 26334                                   | 650  |
| 0.47   |                                 |                            | 20474                                       | 22474                                  |      | 24474                                   |      | 26474                                   |      |

Notes

- SPQ = Standard Packing Quantity
- (1) H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information
- (2) Reel diameter = 356 mm is available on request
- (3) Weight for short lead product only

Pitch: 15.0 mm; C-tol. = ± 10 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |      |   |      |   |      |
|--|---------------------------------|----------------------------|---|--|------|---|------|---|------|
|  |                                 |                            | LOOSE IN BOX                                |  |      |   |      | REEL (500 mm) <sup>(1)(2)</sup>         |      |
|  |                                 |                            | Short leads                                 |  |      | Long leads                              |      | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |      |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ  | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ  |   | SPQ  |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.60 mm ± 0.06 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.01   | 5.0 x 11.0 x 17.5               | 1.2                        | 11103                                       | 13103                                  | 1250 | 15103                                   | 1000 | 17103                                   | 1100 |
| 0.012  |                                 |                            | 11123                                       | 13123                                  |      | 15123                                   |      | 17123                                   |      |
| 0.015  |                                 |                            | 11153                                       | 13153                                  |      | 15153                                   |      | 17153                                   |      |
| 0.018  |                                 |                            | 11183                                       | 13183                                  |      | 15183                                   |      | 17183                                   |      |
| 0.022  |                                 |                            | 11223                                       | 13223                                  |      | 15223                                   |      | 17223                                   |      |
| 0.027  |                                 |                            | 11273                                       | 13273                                  |      | 15273                                   |      | 17273                                   |      |
| 0.033  |                                 |                            | 11333                                       | 13333                                  |      | 15333                                   |      | 17333                                   |      |
| 0.039  |                                 |                            | 11393                                       | 13393                                  |      | 15393                                   |      | 17393                                   |      |
| 0.047  |                                 |                            | 11473                                       | 13473                                  |      | 15473                                   |      | 17473                                   |      |
| 0.056  |                                 |                            | 11563                                       | 13563                                  |      | 15563                                   |      | 17563                                   |      |
| 0.068  |                                 |                            | 11683                                       | 13683                                  |      | 15683                                   |      | 17683                                   |      |
| 0.082  |                                 |                            | 11823                                       | 13823                                  |      | 15823                                   |      | 17823                                   |      |
| 0.1  |                                 |                            | 11104                                       | 13104                                  |      | 15104                                   |      | 17104                                   |      |
| 0.12   |                                 |                            | 10124                                       | 12124                                  |      | 14124                                   |      | 16124                                   |      |
| 0.15   |                                 |                            | 10154                                       | 12154                                  |      | 14154                                   |      | 16154                                   |      |
| 0.18   | 10184                           | 12184                      | 14184                                       | 16184                                  |      |   |      |   |      |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.22   | 7.0 x 13.5 x 17.5               | 2.1                        | 10224                                       | 12224                                  | 750  | 14224                                   | 500  | 16224                                   | 800  |
| 0.27   |                                 |                            | 10274                                       | 12274                                  |      | 14274                                   |      | 16274                                   |      |
| 0.33   | 8.5 x 15.0 x 17.5               | 2.8                        | 10334                                       | 12334                                  | 750  | 14334                                   | 500  | 16334                                   | 650  |
| 0.39   |                                 |                            | 10394                                       | 12394                                  |      | 14394                                   |      | 16394                                   |      |
| 0.47   | 10.0 x 16.5 x 17.5              | 3.6                        | 10474                                       | 12474                                  | 500  | 14474                                   | 450  | 16474                                   | 600  |

Notes

- SPQ = Standard Packing Quantity
- (1) H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information
- (2) Reel diameter = 356 mm is available on request
- (3) Weight for short lead product only

Pitch: 15.0 mm; C-tol. = ± 5 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(3)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |      |   |      |   |      |
|--|---------------------------------|----------------------------|---|--|------|---|------|---|------|
|  |                                 |                            | LOOSE IN BOX                                |  |      |   |      | REEL (500 mm) <sup>(1)(2)</sup>         |      |
|  |                                 |                            | Short leads                                 |  |      | Long leads                              |      | H = 18.5 mm<br>P <sub>0</sub> = 12.7 mm |      |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ  | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ  |   | SPQ  |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.60 mm ± 0.06 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.01   | 5.0 x 11.0 x 17.5               | 1.2                        | 51103                                       | 53103                                  | 1250 | 55103                                   | 1000 | 57103                                   | 1100 |
| 0.012  |                                 |                            | 51123                                       | 53123                                  |      | 55123                                   |      | 57123                                   |      |
| 0.015  |                                 |                            | 51153                                       | 53153                                  |      | 55153                                   |      | 57153                                   |      |
| 0.018  |                                 |                            | 51183                                       | 53183                                  |      | 55183                                   |      | 57183                                   |      |
| 0.022  |                                 |                            | 51223                                       | 53223                                  |      | 55223                                   |      | 57223                                   |      |
| 0.027  |                                 |                            | 51273                                       | 53273                                  |      | 55273                                   |      | 57273                                   |      |
| 0.033  |                                 |                            | 51333                                       | 53333                                  |      | 55333                                   |      | 57333                                   |      |
| 0.039  |                                 |                            | 51393                                       | 53393                                  |      | 55393                                   |      | 57393                                   |      |
| 0.047  |                                 |                            | 51473                                       | 53473                                  |      | 55473                                   |      | 57473                                   |      |
| 0.056  |                                 |                            | 51563                                       | 53563                                  |      | 55563                                   |      | 57563                                   |      |
| 0.068  |                                 |                            | 51683                                       | 53683                                  |      | 55683                                   |      | 57683                                   |      |
| 0.082  |                                 |                            | 51823                                       | 53823                                  |      | 55823                                   |      | 57823                                   |      |
| 0.1  |                                 |                            | 51104                                       | 53104                                  |      | 55104                                   |      | 57104                                   |      |
| 0.12   |                                 |                            | 50124                                       | 52124                                  |      | 54124                                   |      | 56124                                   |      |
| 0.15   | 6.0 x 12.0 x 17.5               | 1.6                        | 50154                                       | 52154                                  | 1000 | 54154                                   | 500  | 56154                                   | 900  |
| 0.18   |                                 |                            | 50184                                       | 52184                                  |      | 54184                                   |      | 56184                                   |      |
| <b>Pitch = 15.0 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |      |   |      |   |      |
| 0.22   | 7.0 x 13.5 x 17.5               | 2.1                        | 50224                                       | 52224                                  | 750  | 54224                                   | 500  | 56224                                   | 800  |
| 0.27   |                                 |                            | 50274                                       | 52274                                  |      | 54274                                   |      | 56274                                   |      |
| 0.33   | 8.5 x 15.0 x 17.5               | 2.8                        | 50334                                       | 52334                                  | 750  | 54334                                   | 500  | 56334                                   | 650  |
| 0.39   |                                 |                            | 50394                                       | 52394                                  |      | 54394                                   |      | 56394                                   |      |
| 0.47   | 10.0 x 16.5 x 17.5              | 3.6                        | 50474                                       | 52474                                  | 500  | 54474                                   | 450  | 56474                                   | 600  |

**Notes**

- SPQ = Standard Packing Quantity
- (1) H = In-tape height; P<sub>0</sub> = Sprocket hole distance; for detailed specifications refer to packaging information
- (2) Reel diameter = 356 mm is available on request
- (3) Weight for short lead product only

Pitch: 22.5 mm; C-tol. = ± 20 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |     |   |     |
|--|---------------------------------|----------------------------|---|--|-----|---|-----|
|  |                                 |                            | LOOSE IN BOX                                |  |     |   |     |
|  |                                 |                            | Short leads                                 |  |     | Long leads                              |     |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ |
| <b>Pitch = 22.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |     |   |     |
| 0.15   | 6.0 x 15.5 x 26.0               | 2.9                        | 21154                                       | 23154                                  | 300 | 25154                                   | 250 |
| 0.22   |                                 |                            | 21224                                       | 23224                                  |     | 25224                                   |     |
| 0.33   |                                 |                            | 21334                                       | 23334                                  |     | 25334                                   |     |
| 0.47   |                                 |                            | 21474                                       | 23474                                  |     | 25474                                   |     |
| 0.68   | 8.5 x 18.0 x 26.0               | 5.0                        | 20684                                       | 22684                                  | 200 | 24684                                   | 250 |
| 1.0  | 10.0 x 19.5 x 26.0              | 6.6                        | 20105                                       | 22105                                  | 200 | 24105                                   | 200 |
| 1.5  | 12.0 x 22.0 x 26.0              | 8.8                        | 20155                                       | 22155                                  | 200 | 24155                                   | 200 |

**Notes**

- SPQ = Standard Packing Quantity
- (1) Weight for short lead product only



Series Impedance Film Capacitors  
Radial Potted Type

Vishay BCcomponents

Pitch: 22.5 mm; C-tol. = ± 10 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |   |     |  |     |
|--|---------------------------------|----------------------------|---|---|-----|--|-----|
|  |                                 |                            | LOOSE IN BOX                                |   |     |  |     |
|  |                                 |                            | Short leads                                 |   |     | Long leads                                 |     |
|  |                                 |                            | $l_t = 3.5 \text{ mm} \pm 0.3 \text{ mm}$   | $l_t = 5.0 \text{ mm} \pm 1.0 \text{ mm}$ | SPQ | $l_t = 25.0 \text{ mm} \pm 2.0 \text{ mm}$ | SPQ |
| <b>Pitch = 22.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |   |     |  |     |
| 0.15   | 6.0 x 15.5 x 26.0               | 2.9                        | 11154                                       | 13154                                     | 300 | 15154                                      | 250 |
| 0.18   |                                 |                            | 11184                                       | 13184                                     |     | 15184                                      |     |
| 0.22   |                                 |                            | 11224                                       | 13224                                     |     | 15224                                      |     |
| 0.27   |                                 |                            | 11274                                       | 13274                                     |     | 15274                                      |     |
| 0.33   |                                 |                            | 11334                                       | 13334                                     |     | 15334                                      |     |
| 0.39   |                                 |                            | 11394                                       | 13394                                     |     | 15394                                      |     |
| 0.47   | 7.0 x 16.5 x 26.0               | 3.5                        | 11474                                       | 13474                                     | 200 | 15474                                      | 200 |
| 0.56   |                                 |                            | 10564                                       | 12564                                     |     | 14564                                      |     |
| 0.68   | 8.5 x 18.0 x 26.0               | 5.0                        | 10684                                       | 12684                                     | 200 | 14684                                      |     |
| 0.82   |                                 |                            | 10824                                       | 12824                                     |     | 14824                                      |     |
| 1.0  | 10.0 x 19.5 x 26.0              | 6.6                        | 10105                                       | 12105                                     | 150 | 14105                                      |     |
| 1.2  | 12.0 x 22.0 x 26.0              | 8.8                        | 10125                                       | 12125                                     | 150 | 14125                                      |     |

Notes

- SPQ = Standard Packing Quantity
- <sup>(1)</sup> Weight for short lead product only

Pitch: 22.5 mm; C-tol = ± 5 %

| C<br>(µF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |   |     |  |     |
|--|---------------------------------|----------------------------|---|---|-----|--|-----|
|  |                                 |                            | LOOSE IN BOX                                |   |     |  |     |
|  |                                 |                            | Short leads                                 |   |     | Long leads                                 |     |
|  |                                 |                            | $l_t = 3.5 \text{ mm} \pm 0.3 \text{ mm}$   | $l_t = 5.0 \text{ mm} \pm 1.0 \text{ mm}$ | SPQ | $l_t = 25.0 \text{ mm} \pm 2.0 \text{ mm}$ | SPQ |
| <b>Pitch = 22.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |   |     |  |     |
| 0.15   | 6.0 x 15.5 x 26.0               | 2.9                        | 51154                                       | 53154                                     | 300 | 55154                                      | 250 |
| 0.18   |                                 |                            | 51184                                       | 53184                                     |     | 55184                                      |     |
| 0.22   |                                 |                            | 51224                                       | 53224                                     |     | 55224                                      |     |
| 0.27   |                                 |                            | 51274                                       | 53274                                     |     | 55274                                      |     |
| 0.33   |                                 |                            | 51334                                       | 53334                                     |     | 55334                                      |     |
| 0.39   |                                 |                            | 51394                                       | 53394                                     |     | 55394                                      |     |
| 0.47   | 7.0 x 16.5 x 26.0               | 3.5                        | 51474                                       | 53474                                     | 200 | 55474                                      | 200 |
| 0.56   |                                 |                            | 50564                                       | 52564                                     |     | 54564                                      |     |
| 0.68   | 8.5 x 18.0 x 26.0               | 5.0                        | 50684                                       | 52684                                     | 200 | 54684                                      |     |
| 0.82   |                                 |                            | 50824                                       | 52824                                     |     | 54824                                      |     |
| 1.0  | 10.0 x 19.5 x 26.0              | 6.6                        | 50105                                       | 52105                                     | 150 | 54105                                      |     |
| 1.2  | 12.0 x 22.0 x 26.0              | 8.8                        | 50125                                       | 52125                                     | 150 | 54125                                      |     |

Notes

- SPQ = Standard Packing Quantity
- <sup>(1)</sup> Weight for short lead product only

Pitch: 27.5 mm; C-tol. = ± 20 % - IN PROGRESS

| C<br>(μF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |     |   |     |
|--|---------------------------------|----------------------------|---|--|-----|---|-----|
|  |                                 |                            | LOOSE IN BOX                                |  |     |   |     |
|  |                                 |                            | Short leads                                 |  |     | Long leads                              |     |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ |
| <b>Pitch = 27.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |     |   |     |
| 0.68   | 9.0 x 19.0 x 31.5               | 6.6                        | 21684                                       | 23684                                  | 100 | 25684                                   | 150 |
| 1.0  |                                 |                            | 21105                                       | 23105                                  |     | 25105                                   |     |
| 1.5  |                                 |                            | 21155                                       | 23155                                  |     | 25155                                   |     |
| 2.2  | 13.0 x 23.0 x 31.0              | 11.0                       | 20225                                       | 22225                                  |     | 24225                                   | 125 |

**Notes**

• SPQ = Standard Packing Quantity

<sup>(1)</sup> Weight for short lead product only

Pitch: 27.5 mm; C-tol. = ± 10 % - IN PROGRESS

| C<br>(μF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |     |   |     |
|--|---------------------------------|----------------------------|---|--|-----|---|-----|
|  |                                 |                            | LOOSE IN BOX                                |  |     |   |     |
|  |                                 |                            | Short leads                                 |  |     | Long leads                              |     |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ |
| <b>Pitch = 27.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |     |   |     |
| 0.68   | 9.0 x 19.0 x 31.5               | 6.6                        | 11684                                       | 13684                                  | 100 | 15684                                   | 150 |
| 0.82   |                                 |                            | 11824                                       | 13824                                  |     | 15824                                   |     |
| 1.0  |                                 |                            | 11105                                       | 13105                                  |     | 15105                                   |     |
| 1.2  | 11.0 x 21.0 x 31.0              | 8.6                        | 11125                                       | 13125                                  | 100 | 15125                                   | 125 |
| 1.5  |                                 |                            | 10155                                       | 12155                                  |     | 14155                                   |     |
| 1.8  |                                 |                            | 10185                                       | 12185                                  |     | 14185                                   |     |
| 2.2  | 15.0 x 25.0 x 31.5              | 14.8                       | 10225                                       | 12225                                  |     | 14225                                   |     |

**Notes**

• SPQ = Standard Packing Quantity

<sup>(1)</sup> Weight for short lead product only

Pitch: 27.5 mm; C-tol. = ± 5 % - IN PROGRESS

| C<br>(μF)  | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 334 ..... AND PACKAGING |  |     |   |     |
|--|---------------------------------|----------------------------|---|--|-----|---|-----|
|  |                                 |                            | LOOSE IN BOX                                |  |     |   |     |
|  |                                 |                            | Short leads                                 |  |     | Long leads                              |     |
|  |                                 |                            | l <sub>t</sub> =<br>3.5 mm<br>± 0.3 mm      | l <sub>t</sub> =<br>5.0 mm<br>± 1.0 mm | SPQ | l <sub>t</sub> =<br>25.0 mm<br>± 2.0 mm | SPQ |
| <b>Pitch = 27.5 mm ± 0.4 mm; d<sub>t</sub> = 0.80 mm ± 0.08 mm</b> |                                 |                            |   |  |     |   |     |
| 0.68   | 9.0 x 19.0 x 31.5               | 6.6                        | 51684                                       | 53684                                  | 100 | 55684                                   | 150 |
| 0.82   |                                 |                            | 51824                                       | 53824                                  |     | 55824                                   |     |
| 1.0  |                                 |                            | 51105                                       | 53105                                  |     | 55105                                   |     |
| 1.2  | 11.0 x 21.0 x 31.0              | 8.6                        | 51125                                       | 53125                                  | 100 | 55125                                   | 125 |
| 1.5  |                                 |                            | 50155                                       | 52155                                  |     | 54155                                   |     |
| 1.8  |                                 |                            | 50185                                       | 52185                                  |     | 54185                                   |     |
| 2.2  | 15.0 x 25.0 x 31.5              | 14.8                       | 50225                                       | 52225                                  |     | 54225                                   |     |

**Notes**

• SPQ = Standard Packing Quantity

<sup>(1)</sup> Weight for short lead product only



## MOUNTING

### Normal Use

The capacitors are designed for mounting on printed-circuit boards. The capacitors packed in bandoliers are designed for mounting in printed-circuit boards by means of automatic insertion machines.

For detailed tape specification refer to “Packaging Information” [www.vishay.com/doc?28139](http://www.vishay.com/doc?28139)

### Specific Method of Mounting to Withstand Vibration and Shock

In order to withstand vibration and shock tests, it must be ensured that the stand-off pips are in good contact with the printed-circuit board:

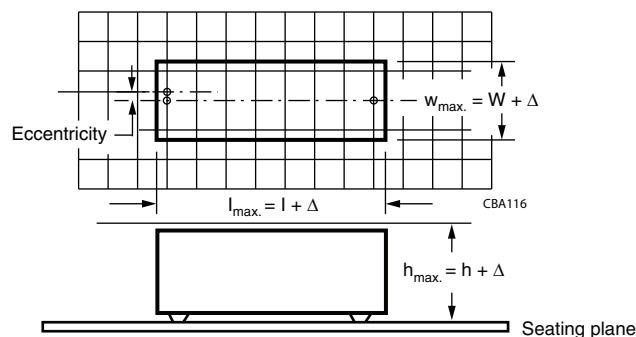
- For pitches  $\leq 15$  mm capacitors shall be mechanically fixed by the leads
- For larger pitches the capacitors shall be mounted in the same way and the body clamped

### Space Requirements on Printed Circuit Board

The maximum space for length ( $l_{max.}$ ), width ( $w_{max.}$ ) and height ( $h_{max.}$ ) of film capacitors to take in account on the printed-circuit board is shown in the drawings.

- For products with pitch  $\leq 15$  mm,  $\Delta w = \Delta l = 0.3$  mm;  $\Delta h = 0.1$  mm
- For products with  $15$  mm  $<$  pitch  $\leq 27.5$  mm,  $\Delta w = \Delta l = 0.5$  mm;  $\Delta h = 0.1$  mm

Eccentricity defined as in drawing. The maximum eccentricity is smaller than or equal to the lead diameter of the product concerned.



## SOLDERING CONDITIONS

For general soldering conditions and wave soldering profile, we refer to the application note:

“Soldering Guidelines for Film Capacitors”: [www.vishay.com/doc?28171](http://www.vishay.com/doc?28171)

### Storage Temperature

- Storage temperature:  $T_{stg} = -25$  °C to  $+40$  °C with RH maximum 80 % without condensation

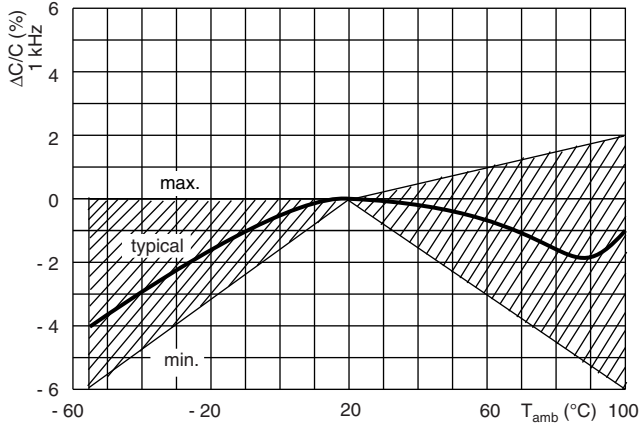
### Ratings and Characteristics Reference Conditions

Unless otherwise specified, all electrical values apply to an ambient temperature of  $23$  °C  $\pm 1$  °C, an atmospheric pressure of 86 kPa to 106 kPa and a relative humidity of  $50$  %  $\pm 2$  %.

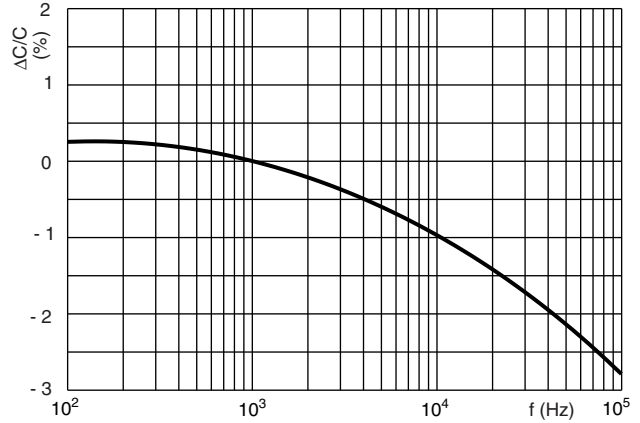
For reference testing, a conditioning period shall be applied over  $96$  h  $\pm 4$  h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.

**CHARACTERISTICS**

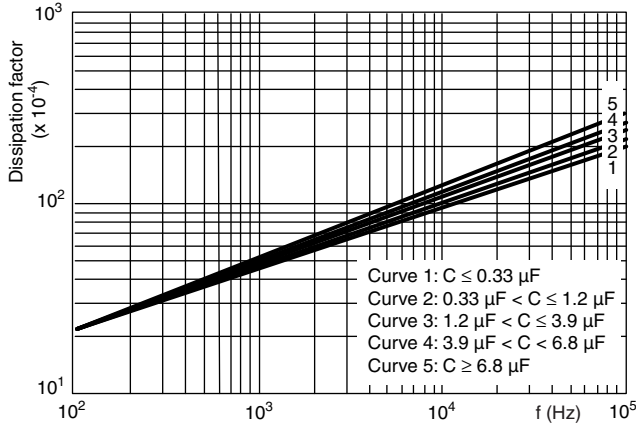
Capacitance change as a function of free air temperature (typical curve)



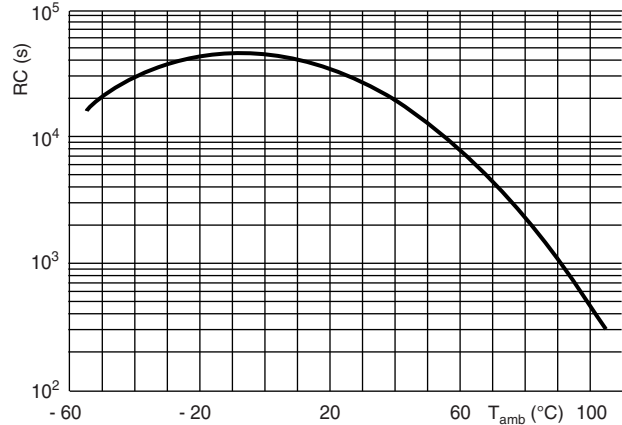
Capacitance change as a function of frequency (typical curve)



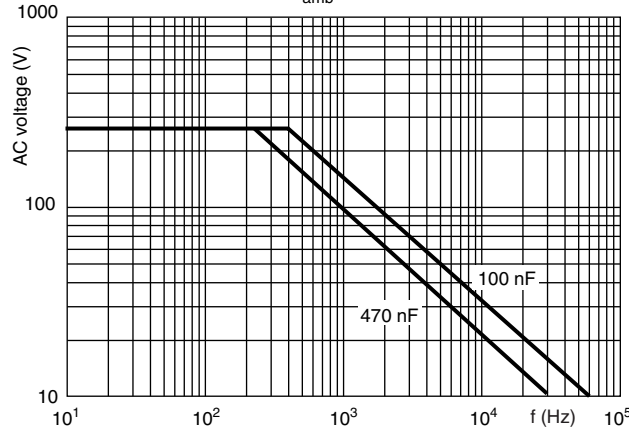
Tangent of loss angle as a function of frequency (typical curves)



Insulation resistance (RC) as a function of ambient free air temperature (typical curve)



Max. RMS voltage (sine wave) as a function of frequency at  $T_{amb} \leq 105 \text{ }^\circ\text{C}$



**APPLICATION NOTES**

- These capacitors are suitable for the application as voltage-division impedance in series with the mains (50 Hz/60 Hz) with a maximum mains voltage of  $U_{RAC}$ .
- For capacitors connected in parallel, normally the proof voltage and possibly the rated voltage must be reduced. For information depending of the capacitance value and the number of parallel connections contact: [dc-film@vishay.com](mailto:dc-film@vishay.com)
- These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described under item 7. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.
- The peak voltage ( $U_p$ ) shall not be greater than the permissible DC voltage ( $U_{RDC}$ ).
- The peak-to-peak voltage ( $U_{p-p}$ ) shall not be greater than  $2 \sqrt{2} \times U_{RAC}$  to avoid the ionization inception level.
- The voltage peak slope ( $dU/dt$ ) shall not exceed the rated voltage pulse slope in an RC-circuit at rated voltage and without ringing. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by  $U_{RDC}$  and divided by the applied voltage.

For all other pulses following equation must be fulfilled:

$$2 \times \int_0^T \left( \frac{dU}{dt} \right)^2 \times dt < U_{RDC} \times \left( \frac{dU}{dt} \right)_{rated}$$

- T is the pulse duration
- The rated voltage pulse slope is valid for ambient temperatures up to 105 °C.
- The maximum component surface temperature must be lower than 105 °C.
- Since in circuits used at voltages over 280 V peak-to-peak the risk for an intrinsically active flammability after a capacitor breakdown (short circuit) increases, it is recommended that the power to the component is limited to 100 times the values mentioned in the table: "Heat conductivity". This is normally fulfilled by the impedance of the device in series with capacitor or by an additional resistor.

**HEAT CONDUCTIVITY (G) AS A FUNCTION OF (ORIGINAL) PITCH AND CAPACITOR BODY THICKNESS IN mW/°C**

| $W_{max.}$ (mm) | HEAT CONDUCTIVITY (mW/°C) |             |               |               |
|-----------------|---------------------------|-------------|---------------|---------------|
|                 | Pitch 10 mm               | Pitch 15 mm | Pitch 22.5 mm | Pitch 27.5 mm |
| 4.0             | 6.0                       | -           | -             | -             |
| 4.5             | -                         | -           | -             | -             |
| 5.0             | 7.5                       | 10          | -             | -             |
| 6.0             | 9.0                       | 11          | 19            | -             |
| 7.0             | -                         | 12          | 21            | -             |
| 8.5             | -                         | 16          | 25            | -             |
| 9.0             | -                         | -           | -             | 30            |
| 10.0            | -                         | 18          | 28            | 33            |
| 11.0            | -                         | -           | -             | 36            |
| 12.0            | -                         | -           | 31            | -             |
| 13.0            | -                         | -           | -             | 42            |
| 15.0            | -                         | -           | -             | 48            |
| 18.0            | -                         | -           | -             | 57            |

**INSPECTION REQUIREMENTS****General notes:**

1. Sub-clause numbers of tests and performance requirements refer to the "Sectional Specification, Publication IEC 60384-14 ed-3 and Specific Reference Data".

**Group C inspection requirements**

| SUB-CLAUSE NUMBER AND TEST                          | CONDITIONS   | PERFORMANCE REQUIREMENTS   |
|---|--|--|
| <b>SUB-GROUP C1A PART OF SAMPLE OF SUB-GROUP C1</b> |  |  |
| 4.1 Dimensions (detail)<br><br>Initial measurements | Capacitance<br>Tangent of loss angle:<br>For $C \leq 1 \mu\text{F}$ at 10 kHz<br>For $C > 1 \mu\text{F}$ at 1 kHz                            | As specified in chapters "General Data" of this specification  |
| 4.3 Robustness of terminations                      | Tensile: load 10 N; 10 s<br>Bending: load 5 N; 4 x 90°   | No visible damage  |
| 4.4 Resistance to soldering heat                    | No pre-drying<br>Method: 1A<br>Solder bath: 280 °C ± 5 °C<br>Duration: 10 s  |  |
| 4.19 Component solvent resistance                   | Isopropylalcohol at room temperature<br>Method: 2<br>Immersion time: 5 min ± 0.5 min<br>Recovery time:<br>Min. 1 h, max. 2 h                 |  |
| 4.4.2 Final measurements                            | Visual examination<br><br>Capacitance<br>Tangent of loss angle<br><br>Insulation resistance  | No visible damage<br>Legible marking<br>$ \Delta C/C  \leq 5\%$ of the value measured initially.<br>Increase of tan $\delta$ :<br>$\leq 0.008$ for: $C \leq 1 \mu\text{F}$ or<br>$\leq 0.005$ for: $C > 1 \mu\text{F}$<br>Compared to values measured initially<br>As specified in section "Specific Reference Data" of this specification |
| <b>SUB-GROUP C1B PART OF SAMPLE OF SUB-GROUP C1</b> |  |  |
| Initial measurements                                | Capacitance<br>Tangent of loss angle:<br>For $C \leq 1 \mu\text{F}$ at 10 kHz<br>For $C > 1 \mu\text{F}$ at 1 kHz                            |  |
| 4.20 Solvent resistance of the marking              | Isopropylalcohol at room temperature<br>Method: 1<br>Rubbing material: cotton wool<br>Immersion time: 5 min ± 0.5 min                        | No visible damage<br>Legible marking   |
| 4.6 Rapid change of temperature                     | $\theta\text{A} = -55 \text{ }^\circ\text{C}$<br>$\theta\text{B} = +105 \text{ }^\circ\text{C}$<br>5 cycles<br>Duration $t = 30 \text{ min}$ |  |



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| SUB-CLAUSE NUMBER AND TEST  | CONDITIONS   | PERFORMANCE REQUIREMENTS   |
|---|--|--|
| 4.6.1 Inspection<br>4.7 Vibration<br><br><br>4.7.2 Final inspection<br>4.9 Shock<br><br><br>4.9.2 Final measurements  | Visual examination<br><br>Mounting: see section "Mounting" of this specification<br><br>Procedure B4<br>Frequency range: 10 Hz to 55 Hz<br>Amplitude: 0.75 mm or<br>Acceleration 98 m/s <sup>2</sup><br>(whichever is less severe)<br>Total duration 6 h<br><br>Visual examination<br><br>Mounting: see section "Mounting" for more information<br><br>Pulse shape: half sine<br>Acceleration: 490 m/s <sup>2</sup><br>Duration of pulse: 11 ms<br><br>Visual examination<br>Capacitance<br>Tangent of loss angle<br><br><br><br>Insulation resistance | No visible damage<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>No visible damage<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br>No visible damage<br>$ \Delta C/C_i  \leq 5\%$ of the value measured initially.<br>Increase of $\tan \delta$ :<br>$\leq 0.008$ for: $C \leq 1 \mu F$ or<br>$\leq 0.005$ for: $C > 1 \mu F$<br>Compared to values measured initially<br>As specified in section "Specific Reference Data" of this specification |
| <b>SUB-GROUP C1<br/>COMBINED SAMPLE OF<br/>SPECIMENS OF SUB-GROUPS<br/>C1A AND C1B</b>  |  |  |
| 4.11 Climatic sequence<br>4.11.1 Initial measurements<br><br><br><br>4.11.2 Dry heat<br><br>4.11.3 Damp heat cyclic<br>Test Db<br>First cycle<br><br>4.11.4 Cold<br><br>4.11.5 Damp heat cyclic<br>Test Db<br>remaining cycles<br>4.11.6 Final measurements | Capacitance<br>Measured in 4.4.2 and 4.9.2<br><br>Tangent of loss angle:<br>Measured initially in C1A and C1B<br><br><br>Temperature: 105 °C<br>Duration: 16 h<br><br><br><br>Temperature: - 55 °C<br>Duration: 2 h<br><br><br><br>Visual examination<br><br>Capacitance<br><br>Tangent of loss angle<br><br><br><br>Voltage proof<br>720 V <sub>DC</sub> , 1 min between terminations<br><br>Insulation resistance  | No visible damage<br>Legible marking<br>$ \Delta C/C_i  \leq 5\%$ of the value measured in 4.11.1.<br><br>Increase of $\tan \delta$ :<br>$\leq 0.008$ for: $C \leq 1 \mu F$ or<br>$\leq 0.005$ for: $C > 1 \mu F$<br>Compared to values measured in 4.11.1.<br><br>No permanent breakdown or flash-over<br><br><br>$\geq 50\%$ of values specified in section "Specific Reference Data" of this specification  |



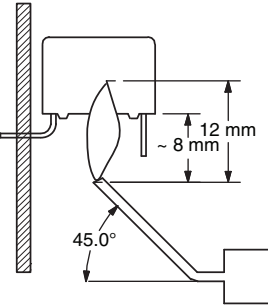
| SUB-CLAUSE NUMBER AND TEST   | CONDITIONS   | PERFORMANCE REQUIREMENTS  |
|--|--|---|
| <b>SUB GROUP C2</b>  |  |   |
| 4.12 Damp heat steady state<br><br>4.12.1 Initial measurements<br><br>4.12.3 Final measurements    | 56 days; 40 °C; 90 % to 95 % RH<br>no load<br><br>Capacitance<br>Tangent of loss angle:<br>At 1 kHz<br><br>Visual examination<br><br>Capacitance<br>Tangent of loss angle<br><br>Voltage proof<br>720 V <sub>DC</sub> , 1 min between terminations<br>Insulation resistance                                  | No visible damage<br>Legible marking<br> ΔC/C  ≤ 5 % of the value measured in 4.12.1.<br>Increase of tan δ:<br>≤ 0.008 for: C ≤ 1 μF or<br>≤ 0.005 for: C > 1 μF<br>Compared to values measured in 4.12.1.<br>No permanent breakdown or flash-over<br><br>≥ 50 % of values specified in section “Specific Reference Data” of this specification |
| <b>SUB GROUP C2A</b>   |  |   |
| 4.12A Damp heat steady state<br><br>4.12.1A Initial measurements<br><br>4.12.3A Final measurements | 1000 h; 40 °C; 90 % to 95 % RH<br>Loading voltage: 1 x U <sub>RAC</sub><br><br>Capacitance<br>Tangent of loss angle:<br>At 1 kHz<br><br>Visual examination<br><br>Capacitance<br>Tangent of loss angle<br><br>Voltage proof<br>720 V <sub>DC</sub> ; 1 min between terminations<br><br>Insulation resistance | No visible damage<br>Legible marking<br> ΔC/C  ≤ 5 % of the value measured in 4.12.1A.<br>Increase of tan δ: ≤ 0.008<br>Compared to values measured in 4.12.1A.<br>No permanent breakdown or flash-over<br><br>≥ 50 % of values specified in section “Specific Reference Data” of this specification  |
| <b>SUB-GROUP C3</b>  |  |   |
| 4.13.1 Initial measurements  | Capacitance<br>Tangent of loss angle:<br>For C ≤ 1 μF at 10 kHz<br>For C > 1 μF at 1 kHz   |   |



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| SUB-CLAUSE NUMBER AND TEST  | CONDITIONS  | PERFORMANCE REQUIREMENTS   |
|---|---|--|
| <b>SUB-GROUP C3</b>   |   |  |
| 4.14 Endurance<br><br>4.14.7 Final measurements   | Duration: 2000 h<br>1.25 x U <sub>RAC</sub> at 105 °C<br><br>Visual examination<br><br>Capacitance<br><br>Tangent of loss angle<br><br>Voltage proof<br>720 V <sub>DC</sub> , 1 min between terminations.<br>2050 V <sub>AC</sub> , 1 min between terminations and case<br><br>Insulation resistance                                | No visible damage<br>Legible marking<br>$ \Delta C/C_i  \leq 5\%$ compared to values measured in 4.13.1.<br>Increase of tan $\delta$ :<br>$\leq 0.008$ for: C $\leq 1 \mu\text{F}$ or<br>$\leq 0.005$ for: C $> 1 \mu\text{F}$<br>Compared to values measured in 4.13.1.<br>No permanent breakdown or flash-over<br><br>$\geq 50\%$ of values specified in section "Specific Reference Data" of this specification |
| <b>SUB-GROUP C4</b>   |   |  |
| 4.15 Charge and discharge<br><br>4.15.1 Initial measurements<br><br>4.15.3 Final measurements | 10 000 cycles<br>Charged to 400 V <sub>DC</sub><br><br>Discharge resistance:<br>$R = \frac{400 V_{DC}}{1.5 \times C (dU/dt)}$<br><br>Capacitance<br>Tangent of loss angle:<br>For C $\leq 1 \mu\text{F}$ at 10 kHz<br>For C $> 1 \mu\text{F}$ at 1 kHz<br><br>Capacitance<br><br>Tangent of loss angle<br><br>Insulation resistance | $ \Delta C/C_i  \leq 10\%$ compared to values measured in 4.15.1.<br>Increase of tan $\delta$ :<br>$\leq 0.008$ for: C $\leq 1 \mu\text{F}$ or<br>$\leq 0.005$ for: C $> 1 \mu\text{F}$<br>Compared to values measured in 4.15.1.<br><br>$\geq 50\%$ of values specified in section "Specific Reference Data" of this specification  |

| SUB-CLAUSE NUMBER AND TEST           | CONDITIONS  | PERFORMANCE REQUIREMENTS   |
|--------------------------------------|---|--|
| <b>SUB-GROUP C6</b>                  |   |  |
| 4.17 Passive flammability<br>Class B | Bore of gas jet: $\varnothing 0.5 \text{ mm}$<br>Fuel: butane<br>Test duration for actual volume V in $\text{mm}^3$ :<br>$V \leq 250$ : 10 s<br>$250 < V \leq 500$ : 20 s<br>$500 < V \leq 1750$ : 30 s<br>$V > 1750$ : 60 s<br>One flame application<br> | After removing test flame from capacitor, the capacitor must not continue to burn for more than 10 s. No burning particle must drop from the sample. |
| <b>SUB-GROUP C7</b>                  |   |  |
| 4.18 Active flammability             | 20 x 1.2 kV discharges on the test capacitor connected to $U_{RAC}$   | The cheese cloth around the capacitors shall not burn with a flame.<br>No electrical measurements are required.                                      |





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