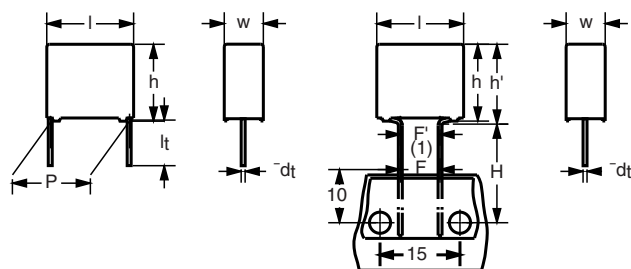




# AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type



Dimensions in mm  
(1)  $|F - F'| < 0.3 \text{ mm}$   
 $F = 7.5 \pm 0.6 / -0.1 \text{ mm}$

## FEATURES

7.5 mm bent back pitch. 15 mm to 27.5 mm lead pitch. Low contact resistance. Low loss dielectric. Small dimensions for high density packaging. Supplied loose in box and taped on reel

Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT

## ENCAPSULATION

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

## CLIMATIC CATEGORY

55/105/56

## CAPACITANCE RANGE (E24 SERIES)

0.001  $\mu\text{F}$  to 2.7  $\mu\text{F}$

## CAPACITANCE TOLERANCE

$\pm 5 \%$

## LEADS

Tinned wire

## RATED (DC) TEMPERATURE

85 °C

## RATED (AC) TEMPERATURE

105 °C

## MAXIMUM APPLICATION TEMPERATURE

105 °C

## DETAIL SPECIFICATION

For more detailed data and test requirements contact: [dc-film@vishay.com](mailto:dc-film@vishay.com)

## APPLICATIONS

Where steep pulses occur e.g. SMPS (switch mode power supplies). Electronic lighting e.g. Ballast. Motor control circuits. S-correction. For flyback applications please use 1400 V series.

## REFERENCE SPECIFICATIONS

IEC 60384-17

## MARKING

C-value; tolerance; rated voltage; sub-class; manufacturer's type; code for dielectric material; code for factory of origin; manufacturer; year and week of manufacture

## DIELECTRIC

Polypropylene film

## ELECTRODES

Metallized

## ENCAPSULATION

Flame retardant plastic case and epoxy resin

## CONSTRUCTION

Internal serial construction

## RATED (DC) VOLTAGE

250 V, 400 V, 630 V, 1000 V, 1400 V, 1600 V, 2000 V, 2500 V

## RATED (AC) VOLTAGE

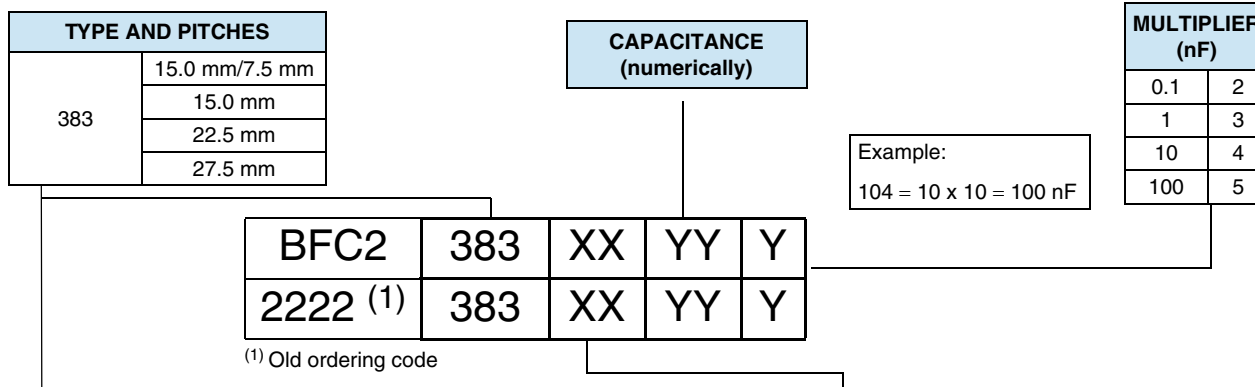
125 V, 200 V, 220 V, 350 V, 500 V, 550 V, 700 V, 900 V

## RATED PEAK-TO-PEAK VOLTAGE

350 V, 560 V, 630 V, 1000 V, 1400 V, 1600 V, 2000 V, 2500 V

**MMKP 383**

Vishay BCcomponents AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

**COMPOSITION OF CATALOG NUMBER**

| TYPE | PACKAGING                                              | LEAD CONFIGURATION                                              | PREFERRED TYPES                                       |       |       |       |        |        |        |        |        |
|------|--------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------|-------|-------|-------|--------|--------|--------|--------|--------|
|      |                                                        |                                                                 | C-TOL.                                                | 250 V | 400 V | 630 V | 1000 V | 1400 V | 1600 V | 2000 V | 2500 V |
| 383  | Loose in box                                           | Lead length 3.5 mm ± 0.3 mm                                     | ± 5 %                                                 | 00    | 10    | 20    | 30     | 40     | 50     | 60     | 70     |
|      | Taped on reel<br>(bent back to 7.5 mm) <sup>(1)</sup>  | H = 16.0 mm; P <sub>0</sub> = 15.0 mm<br>reel diameter = 500 mm | ± 5 %                                                 | 03    | 13    | 23    | 33     | 43     | 53     | 63     | -      |
|      |                                                        |                                                                 | Dimensions of this code numbers stay between brackets |       |       |       |        |        |        |        |        |
|      |                                                        |                                                                 | ON REQUEST                                            |       |       |       |        |        |        |        |        |
| 383  | Loose in box                                           | Lead length 5.0 mm ± 1.0 mm                                     | ± 5 %                                                 | 01    | 11    | 21    | 31     | 41     | 51     | 61     | 71     |
|      |                                                        | Lead length 25.0 mm ± 2.0 mm                                    | ± 5 %                                                 | 04    | 14    | 24    | 34     | 44     | 54     | 64     | 74     |
|      | Taped on reel<br><sup>(1)</sup>                        | H = 18.5 mm; P <sub>0</sub> = 12.7 mm                           | ± 5 %                                                 | 02    | 12    | 22    | 32     | 42     | 52     | 62     | 72     |
|      | Taped on reel<br>(bent back to 7.5 mm) <sup>(1)</sup>  | H = 16.0 mm; P <sub>0</sub> = 15.0 mm<br>reel diameter = 356 mm | ± 5 %                                                 | 05    | 15    | 25    | 35     | 45     | 55     | 65     | -      |
|      | Taped on reel<br>(bent back to 10.0 mm) <sup>(1)</sup> | H = 16.0 mm; P <sub>0</sub> = 15.0 mm<br>reel diameter = 500 mm | ± 5 %                                                 | 08    | 18    | 28    | 38     | 48     | 58     | 68     | -      |
|      |                                                        |                                                                 | Dimensions of this code numbers stay between brackets |       |       |       |        |        |        |        |        |

**Note**

<sup>(1)</sup> For detailed tape specifications refer to "Packaging Information" [www.vishay.com/doc?28139](http://www.vishay.com/doc?28139) or end of catalog

**SPECIFIC REFERENCE DATA (250 Vdc)**

| DESCRIPTION                                                          | VALUE                   |                         |
|----------------------------------------------------------------------|-------------------------|-------------------------|
| Tangent of loss angle:                                               | at 10 kHz               | at 100 kHz              |
| C ≤ 0.15 µF                                                          | ≤ 5 x 10 <sup>-4</sup>  | ≤ 20 x 10 <sup>-4</sup> |
| 0.15 µF < C ≤ 0.39 µF                                                | ≤ 5 x 10 <sup>-4</sup>  | ≤ 25 x 10 <sup>-4</sup> |
| 0.39 µF < C ≤ 0.56 µF                                                | ≤ 10 x 10 <sup>-4</sup> | ≤ 25 x 10 <sup>-4</sup> |
| 0.56 µF < C ≤ 0.82 µF                                                | ≤ 10 x 10 <sup>-4</sup> | ≤ 40 x 10 <sup>-4</sup> |
| 0.82 µF < C ≤ 1.2 µF                                                 | ≤ 10 x 10 <sup>-4</sup> | ≤ 50 x 10 <sup>-4</sup> |
| 1.2 µF < C ≤ 1.8 µF                                                  | ≤ 10 x 10 <sup>-4</sup> | ≤ 65 x 10 <sup>-4</sup> |
| 1.8 µF < C ≤ 2.2 µF                                                  | ≤ 15 x 10 <sup>-4</sup> | ≤ 75 x 10 <sup>-4</sup> |
| 2.2 µF < C ≤ 2.7 µF                                                  | ≤ 15 x 10 <sup>-4</sup> | ≤ 85 x 10 <sup>-4</sup> |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :                     |                         |                         |
| C ≤ 0.15 µF                                                          | 450 V/µs                |                         |
| 0.15 µF < C ≤ 0.39 µF                                                | 900 V/µs                |                         |
| 0.39 µF < C ≤ 0.82 µF                                                | 290 V/µs                |                         |
| 0.82 µF < C ≤ 2 µF                                                   | 190 V/µs                |                         |
| 2 µF < C ≤ 2.7 µF                                                    | 130 V/µs                |                         |
| R between leads, for C ≤ 1 µF at 100 V, 1 min                        | > 100 000 MΩ            |                         |
| RC between leads, for C > 1 µF at 100 V, 1 min                       | > 100 000 s             |                         |
| R between leads and case, 100 V, 1 min                               | > 30 000 MΩ             |                         |
| Ionization (AC) voltage (typical value) at 50 pC peak discharge      | > 220 V                 |                         |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s | 400 V, 1 min            |                         |
| Withstanding (DC) voltage between leads and case                     | 2840 V, 1 min           |                         |
| Maximum application temperature                                      | 105 °C                  |                         |



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

$U_{Rdc} = 250 \text{ V}$ ;  $U_{Rac} = 125 \text{ V}$ ;  $U_{pp} = 350 \text{ V}$ ;  $C\text{-tol.} = \pm 5 \%$

| C<br>(μF)                                                  | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                        |                 |                            |                |                          |
|------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|------------------------|-----------------|----------------------------|----------------|--------------------------|
|                                                            |                                      |                            | LOOSE IN BOX                                |                        | REEL            |                            |                | C-VALUE                  |
|                                                            |                                      |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | Original pitch  | Pitch = 7.5 mm (bent back) |                | ..YYY                    |
|                                                            |                                      |                            |                                             |                        |                 | Ø 500 mm                   | Ø 356 mm       |                          |
|                                                            |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)            | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ)    |                          |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                        | Pitch = 15 mm   | Pitch = 7.5 mm (bent back) |                |                          |
| 0.082<br>0.091<br>0.1                                      | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 00...<br>(1250)                             | 04...<br>(1000)        | 02...<br>(1100) | 03...<br>(950)             | 05...<br>(550) | 823<br>913<br>104        |
| 0.11<br>0.12<br>0.13<br>0.15                               | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 00...<br>(1000)                             | 04...<br>(1000)        | 02...<br>(900)  | 03...<br>(800)             | 05...<br>(450) | 114<br>124<br>134<br>154 |
| 0.16<br>0.18<br>0.2                                        | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 00...<br>(750)                              | 04...<br>(500)         | 02...<br>(800)  | 03...<br>(700)             | 05...<br>(400) | 164<br>184<br>204        |
| 0.22<br>0.24<br>0.27<br>0.3                                | 8.5 x 15.0 (17.0) x 17.5             | 2.6                        | 00...<br>(750)                              | 04...<br>(500)         | 02...<br>(650)  | 03...<br>(550)             | 05...<br>(300) | 224<br>244<br>274<br>304 |
| 0.33<br>0.36<br>0.39                                       | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 00...<br>(500)                              | 04...<br>(450)         | 02...<br>(600)  | 03...<br>(500)             | 05...<br>(250) | 334<br>364<br>394        |

**Notes**

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

$U_{Rdc} = 250 \text{ V}$ ;  $U_{Rac} = 125 \text{ V}$ ;  $U_{pp} = 350 \text{ V}$ ;  $C\text{-tol.} = \pm 5 \%$

| C<br>(μF)                                                    | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XXYYY AND PACKAGING |                        |                |                          |
|--------------------------------------------------------------|---------------------------------|----------------------------|---------------------------------------------|------------------------|----------------|--------------------------|
|                                                              |                                 |                            | LOOSE IN BOX                                |                        | REEL           | C-VALUE                  |
|                                                              |                                 |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | Original pitch | ..YYY                    |
|                                                              |                                 |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)            | XX<br>(SPQ)    |                          |
| Pitch = 22.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                 |                            | Pitch = 22.5 mm                             |                        |                |                          |
| 0.43                                                         | 7.0 x 116.5 x 26.0              | 3.0                        | 00...<br>(200)                              | 04...<br>(250)         | 02...<br>(550) | 434                      |
| 0.47<br>0.51<br>0.56<br>0.62                                 | 8.5 x 18.0 x 26.0               | 4.2                        | 00...<br>(200)                              | 04...<br>(250)         | 02...<br>(450) | 474<br>514<br>564<br>624 |
| 0.68<br>0.75<br>0.82                                         | 10.0 x 19.5 x 26.0              | 5.3                        | 00...<br>(200)                              | 04...<br>(200)         | 02...<br>(350) | 684<br>754<br>824        |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                 |                            | Pitch = 27.5 mm                             |                        |                |                          |
| 0.91<br>1.0<br>1.1<br>1.2                                    | 11.0 x 21.0 x 31.0              | 8.0                        | 00...<br>(750)                              | 04...<br>(125)         | -              | 914<br>105<br>115<br>125 |
| 1.3<br>1.5<br>1.6                                            | 13.0 x 23.0 x 31.0              | 9.7                        | 00...<br>(500)                              | 04...<br>(125)         |                | 135<br>155<br>165        |
| 1.8<br>2.0                                                   | 15.0 x 25.0 x 31.0              | 12.6                       | 00...<br>(100)                              | 04...<br>(125)         |                | 185<br>205               |
| 2.2<br>2.4<br>2.7                                            | 18.0 x 28.0 x 31.0              | 16.3                       | 00...<br>(100)                              | 04...<br>(100)         |                | 225<br>245<br>275        |

**Notes**

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

# MMKP 383



Vishay BCcomponents AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

## SPECIFIC REFERENCE DATA (400 Vdc)

| DESCRIPTION                                                                                                                                                                                                                                                                                                                                      | VALUE                                                                                                                 |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------|
| Tangent of loss angle:<br>$C \leq 0.22 \mu\text{F}$<br>$0.22 \mu\text{F} < C \leq 0.33 \mu\text{F}$<br>$0.33 \mu\text{F} < C \leq 0.43 \mu\text{F}$<br>$0.43 \mu\text{F} < C \leq 0.68 \mu\text{F}$<br>$0.68 \mu\text{F} < C \leq 0.82 \mu\text{F}$<br>$0.82 \mu\text{F} < C \leq 1.2 \mu\text{F}$<br>$1.2 \mu\text{F} < C \leq 1.5 \mu\text{F}$ | at 10 kHz                                                                                                             | at 100 kHz               |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 5 \times 10^{-4}$                                                                                               | $\leq 20 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 35 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 40 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 50 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 55 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 60 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                                                  | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 65 \times 10^{-4}$ |
| Rated voltage pulse slope $(dU/dt)_R$ :<br>$C \leq 0.082 \mu\text{F}$<br>$0.082 \mu\text{F} < C \leq 0.22 \mu\text{F}$<br>$0.22 \mu\text{F} < C \leq 0.43 \mu\text{F}$<br>$0.42 \mu\text{F} < C \leq 1.1 \mu\text{F}$<br>$1.1 \mu\text{F} < C \leq 1.5 \mu\text{F}$                                                                              | 600 V/ $\mu\text{s}$<br>1200 V/ $\mu\text{s}$<br>410 V/ $\mu\text{s}$<br>260 V/ $\mu\text{s}$<br>180 V/ $\mu\text{s}$ |                          |
| R between leads, for $C \leq 1 \mu\text{F}$ at 100 V, 1 min                                                                                                                                                                                                                                                                                      | $> 100\,000 \text{ M}\Omega$                                                                                          |                          |
| RC between leads, for $C > 1 \mu\text{F}$ at 100 V, 1 min                                                                                                                                                                                                                                                                                        | $> 100\,000 \text{ s}$                                                                                                |                          |
| R between leads and case, 100 V, 1 min                                                                                                                                                                                                                                                                                                           | $> 30\,000 \text{ M}\Omega$                                                                                           |                          |
| Ionization (AC) voltage (typical value) at 50 pC peak discharge                                                                                                                                                                                                                                                                                  | $> 220 \text{ V}$                                                                                                     |                          |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                                                                                                                                                                                             | 560 V, 1 min                                                                                                          |                          |
| Withstanding (DC) voltage between leads and case                                                                                                                                                                                                                                                                                                 | 2840 V, 1 min                                                                                                         |                          |
| Maximum application temperature                                                                                                                                                                                                                                                                                                                  | 105 °C                                                                                                                |                          |

$U_{Rdc} = 400 \text{ V}$ ;  $U_{Rac} = 200 \text{ V}$ ;  $U_{pp} = 560 \text{ V}$ ; C-tol. =  $\pm 5 \%$

| C<br>(μF)                                                  | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XXYYY AND PACKAGING |                            |                 |                            |                |                          |
|------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|----------------------------|-----------------|----------------------------|----------------|--------------------------|
|                                                            |                                      |                            | LOOSE IN BOX                                |                            | REEL            |                            |                | C-VALUE<br><br>..YYY     |
|                                                            |                                      |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm     | Original pitch  | Pitch = 7.5 mm (bent back) |                |                          |
|                                                            |                                      |                            |                                             |                            |                 | Ø 500 mm                   | Ø 356 mm       |                          |
|                                                            |                                      |                            |                                             |                            |                 |                            |                |                          |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            | Pitch = 15 mm                               | Pitch = 7.5 mm (bent back) |                 |                            |                |                          |
| 0.047<br>0.051<br>0.056                                    | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 10...<br>(1250)                             | 14...<br>(1000)            | 12...<br>(1100) | 13...<br>(950)             | 15...<br>(550) | 473<br>513<br>563        |
| 0.062<br>0.068<br>0.075<br>0.082                           | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 10...<br>(1000)                             | 14...<br>(1000)            | 12...<br>(900)  | 13...<br>(800)             | 15...<br>(450) | 623<br>683<br>753<br>823 |
| 0.091<br>0.1<br>0.11                                       | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 10...<br>(750)                              | 14...<br>(500)             | 12...<br>(800)  | 13...<br>(700)             | 15...<br>(400) | 913<br>104<br>114        |
| 0.12<br>0.13<br>0.15<br>0.16                               | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 10...<br>(750)                              | 14...<br>(500)             | 12...<br>(650)  | 13...<br>(550)             | 15...<br>(300) | 124<br>134<br>154<br>164 |
| 0.18<br>0.2<br>0.22                                        | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 10...<br>(500)                              | 14...<br>(450)             | 12...<br>(600)  | 13...<br>(500)             | 15...<br>(250) | 184<br>204<br>224        |

### Notes

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

$U_{Rdc} = 400 \text{ V}$ ;  $U_{Rac} = 200$ ;  $U_{p-p} = 560 \text{ V}$ ; C-tol. =  $\pm 5 \%$

| C<br>( $\mu$ F)                                                      | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                            |                |                          |
|----------------------------------------------------------------------|---------------------------------|----------------------------|---------------------------------------------|----------------------------|----------------|--------------------------|
|                                                                      |                                 |                            | LOOSE IN BOX                                |                            | REEL           | C-VALUE                  |
|                                                                      |                                 |                            | Leads<br>3.5 $\pm$ 0.3 mm                   | Leads<br>25.0 $\pm$ 2.0 mm | Original pitch | ..YYY                    |
|                                                                      |                                 |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)                | XX<br>(SPQ)    |                          |
| Pitch = 22.5 mm $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 0.08 mm |                                 |                            | Pitch = 22.5 mm                             |                            |                |                          |
| 0.24                                                                 | 7.0 x 116.5 x 26.0              | 3.0                        | 10...<br>(200)                              | 14...<br>(250)             | 12...<br>(550) | 244                      |
| 0.27<br>0.30<br>0.33                                                 | 8.5 x 18.0 x 26.0               | 4.2                        | 10...<br>(200)                              | 14...<br>(250)             | 12...<br>(450) | 274<br>304<br>334        |
| 0.36<br>0.39<br>0.43                                                 | 10.0 x 19.5 x 26.0              | 5.3                        | 10...<br>(200)                              | 14...<br>(200)             | 12...<br>(350) | 364<br>394<br>434        |
| Pitch = 27.5 mm $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 0.08 mm |                                 |                            | Pitch = 27.5 mm                             |                            |                |                          |
| 0.47<br>0.51<br>0.56<br>0.62                                         | 11.0 x 21.0 x 31.0              | 8.0                        | 10...<br>(100)                              | 14...<br>(125)             | -              | 474<br>514<br>564<br>624 |
| 0.68<br>0.75<br>0.82                                                 | 13.0 x 23.0 x 31.0              | 9.7                        | 10...<br>(100)                              | 14...<br>(125)             | -              | 684<br>754<br>824        |
| 0.91<br>1.<br>1.1                                                    | 15.0 x 25.0 x 31.0              | 12.6                       | 10...<br>(100)                              | 14...<br>(125)             |                | 914<br>105<br>115        |
| 1.2<br>1.3<br>1.5                                                    | 18.0 x 28.0 x 31.0              | 16.3                       | 10...<br>(100)                              | 14...<br>(100)             |                | 125<br>135<br>155        |

**Notes**

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

**SPECIFIC REFERENCE DATA (630 Vdc)**

| DESCRIPTION                                                                                                                                                                                                                                                                                                            | VALUE                                                                                                                 |                          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------|
| Tangent of loss angle:<br>C $\leq$ 0.15 $\mu\text{F}$<br>0.15 $\mu\text{F}$ < C $\leq$ 0.22 $\mu\text{F}$<br>0.22 $\mu\text{F}$ < C $\leq$ 0.3 $\mu\text{F}$<br>0.3 $\mu\text{F}$ < C $\leq$ 0.47 $\mu\text{F}$<br>0.47 $\mu\text{F}$ < C $\leq$ 0.68 $\mu\text{F}$<br>0.68 $\mu\text{F}$ < C $\leq$ 1.0 $\mu\text{F}$ | at 10 kHz                                                                                                             | at 100 kHz               |
|                                                                                                                                                                                                                                                                                                                        | $\leq 5 \times 10^{-4}$                                                                                               | $\leq 15 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                        | $\leq 8 \times 10^{-4}$                                                                                               | $\leq 25 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                        | $\leq 8 \times 10^{-4}$                                                                                               | $\leq 30 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                        | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 40 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                        | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 45 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                                                        | $\leq 10 \times 10^{-4}$                                                                                              | $\leq 50 \times 10^{-4}$ |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :<br>C $\leq$ 0.056 $\mu\text{F}$<br>0.056 $\mu\text{F}$ < C $\leq$ 0.15 $\mu\text{F}$<br>0.15 $\mu\text{F}$ < C $\leq$ 0.3 $\mu\text{F}$<br>0.3 $\mu\text{F}$ < C $\leq$ 0.75 $\mu\text{F}$<br>0.75 $\mu\text{F}$ < C $\leq$ 1.0 $\mu\text{F}$                         | 700 V/ $\mu\text{s}$<br>1400 V/ $\mu\text{s}$<br>470 V/ $\mu\text{s}$<br>300 V/ $\mu\text{s}$<br>210 V/ $\mu\text{s}$ |                          |
| R between leads, for C $\leq$ 1 $\mu\text{F}$ at 100 V, 1 min                                                                                                                                                                                                                                                          | > 100 000 M $\Omega$                                                                                                  |                          |
| R between leads and case, 100 V, 1 min                                                                                                                                                                                                                                                                                 | > 30 000 M $\Omega$                                                                                                   |                          |
| Ionization (AC) voltage (typical value) at 50 pC peak discharge                                                                                                                                                                                                                                                        | > 250 V                                                                                                               |                          |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                                                                                                                                                                   | 1000 V, 1 min                                                                                                         |                          |
| Withstanding (DC) voltage between leads and case                                                                                                                                                                                                                                                                       | 2840 V, 1 min                                                                                                         |                          |
| Maximum application temperature                                                                                                                                                                                                                                                                                        | 105 °C                                                                                                                |                          |

# MMKP 383



## Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

$U_{Rdc} = 630 \text{ V}$ ;  $U_{Rac} = 220 \text{ V}$ ;  $U_{p-p} = 630 \text{ V}$ ; C-tol. =  $\pm 5 \%$

| C<br>(μF)                                                    | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                        |                 |                            |             |        | C-VALUE<br>..YYY |       |       |       |     |
|--------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|------------------------|-----------------|----------------------------|-------------|--------|------------------|-------|-------|-------|-----|
|                                                              |                                      |                            | LOOSE IN BOX                                |                        | REEL            |                            |             |        |                  |       |       |       |     |
|                                                              |                                      |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | Original pitch  | Pitch = 7.5 mm (bent back) |             |        |                  |       |       |       |     |
|                                                              |                                      |                            |                                             |                        |                 | Ø 500 mm                   | Ø 356 mm    |        |                  |       |       |       |     |
|                                                              |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)            | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ) |        |                  |       |       |       |     |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm   |                                      |                            |                                             |                        | Pitch = 15 mm   | Pitch = 7.5 mm (bent back) |             |        |                  |       |       |       |     |
| 0.03                                                         | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 20...                                       | 24...                  | 22...           | 23...                      | 25...       | 303    |                  |       |       |       |     |
| 0.033                                                        |                                      |                            | (1250)                                      | (1000)                 | (2200)          | (950)                      | (550)       | 333    |                  |       |       |       |     |
| 0.036                                                        |                                      |                            |                                             |                        |                 |                            |             | 363    |                  |       |       |       |     |
| 0.039                                                        | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 20...                                       | 24...                  | 22...           | 23...                      | 25...       | 393    |                  |       |       |       |     |
| 0.043                                                        |                                      |                            |                                             |                        |                 |                            |             | (1000) | (1000)           | (900) | (800) | (450) | 433 |
| 0.047                                                        |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 473 |
| 0.051                                                        |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 513 |
| 0.056                                                        |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 563 |
| 0.062                                                        | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 20...                                       | 24...                  | 22...           | 23...                      | 25...       | 623    |                  |       |       |       |     |
| 0.068                                                        |                                      |                            | (750)                                       | (500)                  | (800)           | (700)                      | (400)       | 683    |                  |       |       |       |     |
| 0.075                                                        |                                      |                            |                                             |                        |                 |                            |             | 753    |                  |       |       |       |     |
| 0.082                                                        | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 20...                                       | 24...                  | 22...           | 23...                      | 25...       | 823    |                  |       |       |       |     |
| 0.091                                                        |                                      |                            |                                             |                        |                 |                            |             | (750)  | (500)            | (650) | (550) | (300) | 913 |
| 0.1                                                          |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 104 |
| 0.11                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 114 |
| 0.12                                                         | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 20...                                       | 24...                  | 22...           | 23...                      | 25...       | 124    |                  |       |       |       |     |
| 0.13                                                         |                                      |                            | (500)                                       | (450)                  | (600)           | (500)                      | (250)       | 134    |                  |       |       |       |     |
| 0.15                                                         |                                      |                            |                                             |                        |                 |                            |             | 154    |                  |       |       |       |     |
| Pitch = 22.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                        | Pitch = 22.5 mm |                            |             |        |                  |       |       |       |     |
| 0.16                                                         | 8.5 x 18.0 x 26.0                    | 4.2                        | 20...                                       | 24...                  | 22...           | -                          | -           | 164    |                  |       |       |       |     |
| 0.18                                                         |                                      |                            |                                             |                        |                 |                            |             | (200)  | (250)            | (450) |       |       | 184 |
| 0.2                                                          |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 204 |
| 0.22                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       | 224 |
| 0.24                                                         | 10.0 x 19.5 x 26.0                   | 5.3                        | 20...                                       | 24...                  | 22...           | -                          | -           | 174    |                  |       |       |       |     |
| 0.27                                                         |                                      |                            | (200)                                       | (200)                  | (350)           |                            |             | 304    |                  |       |       |       |     |
| 0.3                                                          |                                      |                            |                                             |                        |                 |                            |             |        |                  |       |       |       |     |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                        | Pitch = 27.5 mm |                            |             |        |                  |       |       |       |     |
| 0.33                                                         | 11.0 x 21.0 x 31.0                   | 8.0                        | 20...                                       | 24...                  | -               |                            |             | 334    |                  |       |       |       |     |
| 0.36                                                         |                                      |                            |                                             |                        |                 |                            |             | (750)  | (125)            | 364   |       |       |     |
| 0.39                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  | 394   |       |       |     |
| 0.43                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  | 434   |       |       |     |
| 0.47                                                         | 13.0 x 23.0 x 31.0                   | 9.7                        | 20...                                       | 24...                  |                 |                            |             |        |                  |       | 474   |       |     |
| 0.51                                                         |                                      |                            | (500)                                       | (125)                  |                 |                            |             |        |                  |       | 514   |       |     |
| 0.56                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  |       | 564   |       |     |
| 0.62                                                         | 15.0 x 25.0 x 31.0                   | 12.6                       | 20...                                       | 24...                  |                 |                            |             |        |                  |       | 624   |       |     |
| 0.68                                                         |                                      |                            | (100)                                       | (125)                  |                 |                            |             |        |                  |       | 684   |       |     |
| 0.75                                                         |                                      |                            |                                             |                        |                 |                            |             |        |                  |       | 754   |       |     |
| 0.82                                                         | 18.0 x 28.0 x 31.0                   | 16.3                       | 20...                                       | 24...                  |                 |                            |             |        |                  |       | 824   |       |     |
| 0.91                                                         |                                      |                            | (100)                                       | (100)                  |                 |                            |             |        |                  |       | 914   |       |     |
| 1.0                                                          |                                      |                            |                                             |                        | 105             |                            |             |        |                  |       |       |       |     |

### Notes

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

**SPECIFIC REFERENCE DATA (1000 Vdc)**

| DESCRIPTION                                                                                                                                                                                                                                                                       | VALUE                   |                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|
| Tangent of loss angle:<br>$C \leq 0.062 \mu\text{F}$<br>$0.062 \mu\text{F} < C \leq 0.13 \mu\text{F}$<br>$0.13 \mu\text{F} < C \leq 0.22 \mu\text{F}$<br>$0.22 \mu\text{F} < C \leq 0.33 \mu\text{F}$<br>$0.33 \mu\text{F} < C \leq 0.47 \mu\text{F}$                             | at 10 kHz               | at 100 kHz               |
|                                                                                                                                                                                                                                                                                   | $\leq 5 \times 10^{-4}$ | $\leq 15 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                   | $\leq 6 \times 10^{-4}$ | $\leq 20 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                   | $\leq 8 \times 10^{-4}$ | $\leq 25 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                   | $\leq 8 \times 10^{-4}$ | $\leq 30 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                   | $\leq 8 \times 10^{-4}$ | $\leq 35 \times 10^{-4}$ |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :<br>$C \leq 0.024 \mu\text{F}$<br>$0.024 \mu\text{F} < C \leq 0.062 \mu\text{F}$<br>$0.062 \mu\text{F} < C \leq 0.13 \mu\text{F}$<br>$0.13 \mu\text{F} < C \leq 0.33 \mu\text{F}$<br>$0.33 \mu\text{F} < C \leq 0.47 \mu\text{F}$ | 1700 V/ $\mu\text{s}$   |                          |
|                                                                                                                                                                                                                                                                                   | 3300 V/ $\mu\text{s}$   |                          |
|                                                                                                                                                                                                                                                                                   | 1200 V/ $\mu\text{s}$   |                          |
|                                                                                                                                                                                                                                                                                   | 700 V/ $\mu\text{s}$    |                          |
|                                                                                                                                                                                                                                                                                   | 470 V/ $\mu\text{s}$    |                          |
|                                                                                                                                                                                                                                                                                   |                         |                          |
| R between leads, for $C \leq 1 \mu\text{F}$ at 500 V, 1 min                                                                                                                                                                                                                       | > 100 000 M $\Omega$    |                          |
| R between leads and case, 500 V, 1 min                                                                                                                                                                                                                                            | > 30 000 M $\Omega$     |                          |
| Ionization (AC) voltage (typical value) at 50 pC peak discharge                                                                                                                                                                                                                   | > 440 V                 |                          |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                                                                                                                              | 1600 V, 1 min           |                          |
| Withstanding (DC) voltage between leads and case                                                                                                                                                                                                                                  | 2840 V, 1 min           |                          |
| Maximum application temperature                                                                                                                                                                                                                                                   | 105 °C                  |                          |

**U<sub>Rdc</sub> = 1000 V; U<sub>Rac</sub> = 350 V; U<sub>p-p</sub> = 1000 V; C-tol. =  $\pm 5\%$**

| C<br>(μF)                                                                                                                                   | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XXYYY AND PACKAGING |                        |                            |                            |                |                                                                                                       | C-VALUE<br>..YYY |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|------------------------|----------------------------|----------------------------|----------------|-------------------------------------------------------------------------------------------------------|------------------|
|                                                                                                                                             |                                      |                            | LOOSE IN BOX                                |                        | REEL                       |                            |                |                                                                                                       |                  |
|                                                                                                                                             |                                      |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | Original pitch             | Pitch = 7.5 mm (bent back) |                |                                                                                                       |                  |
|                                                                                                                                             |                                      |                            |                                             |                        |                            | Ø 500 mm                   | Ø 356 mm       |                                                                                                       |                  |
| XX<br>(SPQ)                                                                                                                                 | XX<br>(SPQ)                          | XX<br>(SPQ)                | XX<br>(SPQ)                                 | XX<br>(SPQ)            |                            |                            |                |                                                                                                       |                  |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm                                                                                  |                                      |                            | Pitch = 15 mm                               |                        | Pitch = 7.5 mm (bent back) |                            |                |                                                                                                       |                  |
| 0.0043<br>0.0047<br>0.0051<br>0.0056<br>0.0062<br>0.0068<br>0.0075<br>0.0082<br>0.0091<br>0.01<br>0.011<br>0.012<br>0.013<br>0.015<br>0.016 | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 30...<br>(1250)                             | 34...<br>(1000)        | 32...<br>(1100)            | 33...<br>(950)             | 35...<br>(550) | 432<br>472<br>512<br>562<br>622<br>682<br>752<br>822<br>912<br>103<br>113<br>123<br>133<br>153<br>163 |                  |
| 0.018<br>0.02<br>0.022<br>0.024                                                                                                             | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 30...<br>(1000)                             | 34...<br>(1000)        | 32...<br>(900)             | 33...<br>(800)             | 35...<br>(450) | 183<br>203<br>223<br>243                                                                              |                  |
| 0.027<br>0.030<br>0.033                                                                                                                     | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 30...<br>(750)                              | 34...<br>(500)         | 32...<br>(800)             | 33...<br>(700)             | 35...<br>(400) | 273<br>303<br>333                                                                                     |                  |
| 0.036<br>0.039<br>0.043<br>0.047                                                                                                            | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 30...<br>(750)                              | 34...<br>(500)         | 32...<br>(650)             | 33...<br>(550)             | 35...<br>(300) | 363<br>393<br>433<br>473                                                                              |                  |
| 0.051<br>0.056<br>0.062                                                                                                                     | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 30...<br>(500)                              | 34...<br>(450)         | 32...<br>(600)             | 33...<br>(500)             | 35...<br>(250) | 513<br>563<br>623                                                                                     |                  |

**Notes**

- <sup>(1)</sup> Net weight for short lead products only  
• SPQ = Standard Packaging Quantity

# MMKP 383



Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

| C<br>(μF)                                                    | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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|                                                              |                                      |                            | LOOSE IN BOX                                |                | REEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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|                                                              |                                      |                            | Leads                                       | Leads          | Original pitch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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|                                                              |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)    | XX<br>(SPQ)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| Pitch = 22.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            | Pitch 22.5 mm                               |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| 0.068                                                        | 7.0 x 16.5 x 26.5                    | 3.0                        | 30 ...<br>(200)                             | 34...<br>(250) | 32...<br>(550)<br><br>683                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            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| 0.075<br>0.082<br>0.091                                      | 8.5 x 18.0 x 26.0                    | 4.2                        | 30...<br>(200)                              | 34...<br>(250) | 32...<br>(450)<br><br>753<br>823<br>913                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |
| 0.1<br>0.11<br>0.12<br>0.13                                  | 10.0 x 19.5 x 26.0                   | 5.3                        | 30...<br>(200)                              | 34...<br>(200) | 32...<br>(350)<br><br>104<br>114<br>124<br>134                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            | Pitch = 27.5 mm                             |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |
| 0.15<br>0.16<br>0.18                                         | 11.0 x 21.0 x 31.0                   | 8.0                        | 30...<br>(100)                              | 34...<br>(125) | -<br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br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|         |

## Notes

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

## SPECIFIC REFERENCE DATA (1400 Vdc)

| DESCRIPTION                                                                                                                                                               | VALUE                                                           |                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------|
| Tangent of loss angle:<br>C ≤ 0.016 μF<br>0.016 μF < C ≤ 0.039 μF<br>0.039 μF < C ≤ 0.13 μF                                                                               | at 10 kHz                                                       | at 100 kHz              |
|                                                                                                                                                                           | ≤ 5 x 10 <sup>-4</sup>                                          | ≤ 10 x 10 <sup>-4</sup> |
|                                                                                                                                                                           | ≤ 5 x 10 <sup>-4</sup>                                          | ≤ 15 x 10 <sup>-4</sup> |
|                                                                                                                                                                           | ≤ 5 x 10 <sup>-4</sup>                                          | ≤ 20 x 10 <sup>-4</sup> |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :<br>C ≤ 0.0056 μF<br>0.0056 μF < C ≤ 0.016 μF<br>0.016 μF < C ≤ 0.039 μF<br>0.039 μF < C ≤ 0.1 μF<br>0.1 μF < C ≤ 0.13 μF | 8000 V/μs<br>15 000 V/μs<br>4000 V/μs<br>2100 V/μs<br>1500 V/μs |                         |
| R between leads, for C ≤ 1 μF at 500 V, 1 min                                                                                                                             | > 100 000 MΩ                                                    |                         |
| R between leads and case, 500 V, 1 min                                                                                                                                    | > 30 000 MΩ                                                     |                         |
| Ionization (AC) voltage (typical value) at 20 pC peak discharge                                                                                                           | > 500 V                                                         |                         |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                      | 2250 V, 1 min                                                   |                         |
| Withstanding (DC) voltage between leads and case                                                                                                                          | 2840 V, 1 min                                                   |                         |
| Maximum application temperature                                                                                                                                           | 105 °C                                                          |                         |



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

$U_{Rdc} = 1400 \text{ V}$ ;  $U_{Rac} = 500 \text{ V}$ ;  $U_{p-p} = 1400 \text{ V}$ ; C-tol. =  $\pm 5 \%$

| C<br>(μF)                                                  | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                        |                 |                            |                |     | C-VALUE<br><br>..YYY |  |     |
|------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|------------------------|-----------------|----------------------------|----------------|-----|----------------------|--|-----|
|                                                            |                                      |                            | LOOSE IN BOX                                |                        | REEL            |                            |                |     |                      |  |     |
|                                                            |                                      |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | Original pitch  | Pitch = 7.5 mm (bent back) |                |     |                      |  |     |
|                                                            |                                      |                            |                                             |                        |                 | Ø 500 mm                   | Ø 356 mm       |     |                      |  |     |
|                                                            |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)            | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ)    |     |                      |  |     |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                        | Pitch = 15 mm   | Pitch = 7.5 mm (bent back) |                |     |                      |  |     |
| 0.0022                                                     | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 40...<br>(1250)                             | 44...<br>(1000)        | 42...<br>(1100) | 43...<br>(950)             | 45...<br>(550) | 222 |                      |  |     |
| 0.0024                                                     |                                      |                            |                                             |                        |                 |                            |                | 242 |                      |  |     |
| 0.0027                                                     |                                      |                            |                                             |                        |                 |                            |                | 272 |                      |  |     |
| 0.003                                                      |                                      |                            |                                             |                        |                 |                            |                | 302 |                      |  |     |
| 0.0033                                                     |                                      |                            |                                             |                        |                 |                            |                | 332 |                      |  |     |
| 0.0036                                                     |                                      |                            |                                             |                        |                 |                            |                | 362 |                      |  |     |
| 0.0039                                                     |                                      |                            |                                             |                        |                 |                            |                | 392 |                      |  |     |
| 0.0043                                                     | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 40...<br>(1000)                             | 44...<br>(1000)        | 42...<br>(900)  | 43...<br>(800)             | 45...<br>(450) | 432 |                      |  |     |
| 0.0047                                                     |                                      |                            |                                             |                        |                 |                            |                | 472 |                      |  |     |
| 0.0051                                                     |                                      |                            |                                             |                        |                 |                            |                | 512 |                      |  |     |
| 0.0056                                                     |                                      |                            |                                             |                        |                 |                            |                | 562 |                      |  |     |
| 0.0062                                                     | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 40...<br>(750)                              | 44...<br>(500)         | 42...<br>(800)  | 43...<br>(700)             | 45...<br>(400) | 622 |                      |  |     |
| 0.0068                                                     |                                      |                            |                                             |                        |                 |                            |                | 682 |                      |  |     |
| 0.0075                                                     |                                      |                            |                                             |                        |                 |                            |                | 752 |                      |  |     |
| 0.0082                                                     |                                      |                            |                                             |                        |                 |                            |                | 822 |                      |  |     |
| 0.0091                                                     | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 40...<br>(750)                              | 44...<br>(500)         | 42...<br>(650)  | 43...<br>(550)             | 45...<br>(300) | 912 |                      |  |     |
| 0.01                                                       |                                      |                            |                                             |                        |                 |                            |                | 103 |                      |  |     |
| 0.011                                                      |                                      |                            |                                             |                        |                 |                            |                | 113 |                      |  |     |
| 0.012                                                      |                                      |                            |                                             |                        |                 |                            |                | 123 |                      |  |     |
| 0.013                                                      | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 40...<br>(500)                              | 44...<br>(450)         | 42...<br>(600)  | 43...<br>(500)             | 45...<br>(250) | 133 |                      |  |     |
| 0.015                                                      |                                      |                            |                                             |                        |                 |                            |                | 153 |                      |  |     |
| 0.016                                                      |                                      |                            |                                             |                        |                 |                            |                | 163 |                      |  |     |
| Pitch = 22.5 ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm  |                                      |                            |                                             |                        | Pitch = 22.5 mm |                            |                |     |                      |  |     |
| 0.018                                                      | 7.0 x 16.5 x 26.0                    | 3                          | 40...<br>(200)                              | 44...<br>(250)         | 42...<br>(550)  | -                          | -              | 183 |                      |  |     |
| 0.02                                                       |                                      |                            |                                             |                        |                 |                            |                | 203 |                      |  |     |
| 0.022                                                      | 8.5 x 18.0 x 26.0                    | 4.2                        | 40...<br>(200)                              | 44...<br>(250)         | 42...<br>(450)  | -                          | -              | 223 |                      |  |     |
| 0.024                                                      |                                      |                            |                                             |                        |                 |                            |                | 243 |                      |  |     |
| 0.027                                                      |                                      |                            |                                             |                        |                 |                            |                | 273 |                      |  |     |
| 0.03                                                       | 10.0 x 19.5 x 26.0                   | 5.3                        | 40...<br>(200)                              | 44...<br>(200)         | 42...<br>(350)  | -                          | -              | 303 |                      |  |     |
| 0.033                                                      |                                      |                            |                                             |                        |                 |                            |                | 333 |                      |  |     |
| 0.036                                                      |                                      |                            |                                             |                        |                 |                            |                | 363 |                      |  |     |
| 0.039                                                      |                                      |                            |                                             |                        |                 |                            |                | 393 |                      |  |     |
| Pitch = 27.5 ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm  |                                      |                            |                                             |                        | Pitch = 27.5 mm |                            |                |     |                      |  |     |
| 0.043                                                      | 11.0 x 21.0 x 31.0                   | 8                          | 40...<br>(100)                              | 44...<br>(125)         | -               |                            |                | 433 |                      |  |     |
| 0.047                                                      |                                      |                            |                                             |                        |                 |                            |                | 473 |                      |  |     |
| 0.051                                                      |                                      |                            |                                             |                        |                 |                            |                | 513 |                      |  |     |
| 0.056                                                      |                                      |                            |                                             |                        |                 |                            |                | 563 |                      |  |     |
| 0.062                                                      | 13.0 x 23.0 x 31.0                   | 9.7                        | 40...<br>(100)                              | 44...<br>(125)         |                 |                            |                |     |                      |  | 623 |
| 0.068                                                      |                                      |                            |                                             |                        |                 |                            |                |     |                      |  | 683 |
| 0.075                                                      |                                      |                            |                                             |                        |                 |                            |                |     |                      |  | 753 |
| 0.082                                                      | 15.0 x 25.0 x 31.0                   | 12.6                       | 40...<br>(100)                              | 44...<br>(125)         |                 |                            |                |     |                      |  | 823 |
| 0.091                                                      |                                      |                            |                                             |                        |                 |                            |                |     |                      |  | 913 |
| 0.1                                                        |                                      |                            |                                             |                        |                 |                            |                |     |                      |  | 104 |
| 0.11                                                       | 18.0 x 28.0 x 31.0                   | 16.3                       | 40...<br>(100)                              | 44...<br>(100)         |                 |                            |                |     |                      |  | 114 |
| 0.12                                                       |                                      |                            |                                             |                        |                 |                            |                |     |                      |  | 124 |
| 0.13                                                       |                                      |                            |                                             |                        | 134             |                            |                |     |                      |  |     |

**Notes**

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

**MMKP 383**

Vishay BCcomponents AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

**SPECIFIC REFERENCE DATA (1600 Vdc)**

| DESCRIPTION                                                                                                                                                                                                                                                                  | VALUE                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Tangent of loss angle:<br>$C \leq 0.015 \mu\text{F}$<br>$0.015 \mu\text{F} < C \leq 0.15 \mu\text{F}$                                                                                                                                                                        | at 10 kHz<br>$\leq 5 \times 10^{-4}$<br>$\leq 5 \times 10^{-4}$                                                             |
|                                                                                                                                                                                                                                                                              | at 100 kHz<br>$\leq 15 \times 10^{-4}$<br>$\leq 20 \times 10^{-4}$                                                          |
| Rated voltage pulse slope $(dU/dt)_R$ :<br>$C \leq 0.0056 \mu\text{F}$<br>$0.0056 \mu\text{F} < C \leq 0.0075 \mu\text{F}$<br>$0.0075 \mu\text{F} < C \leq 0.039 \mu\text{F}$<br>$0.039 \mu\text{F} < C \leq 0.1 \mu\text{F}$<br>$0.1 \mu\text{F} < C \leq 0.15 \mu\text{F}$ | 8000 V/ $\mu\text{s}$<br>15 000 V/ $\mu\text{s}$<br>3100 V/ $\mu\text{s}$<br>1800 V/ $\mu\text{s}$<br>1200 V/ $\mu\text{s}$ |
| R between leads, for $C \leq 1 \mu\text{F}$ at 500 V, 1 min                                                                                                                                                                                                                  | $> 100\,000 \text{ M}\Omega$                                                                                                |
| R between leads and case, 500 V, 1 min                                                                                                                                                                                                                                       | $> 30\,000 \text{ M}\Omega$                                                                                                 |
| Ionization (AC) voltage (typical value) at 20 pC peak discharge                                                                                                                                                                                                              | $> 660 \text{ V}$                                                                                                           |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                                                                                                                         | 2560 V, 1 min                                                                                                               |
| Withstanding (DC) voltage between leads and case                                                                                                                                                                                                                             | 2840 V, 1 min                                                                                                               |
| Maximum application temperature                                                                                                                                                                                                                                              | 105 °C                                                                                                                      |

$U_{Rdc} = 1600 \text{ V}$ ;  $U_{Rac} = 550 \text{ V}$ ;  $U_{p-p} = 1600 \text{ V}$ ; C-tol. =  $\pm 5\%$

| C<br>( $\mu$ F)                                                    | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                         |                 |                            |                      |                                 | C-VALUE<br>..YYY |
|--------------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|-------------------------|-----------------|----------------------------|----------------------|---------------------------------|------------------|
|                                                                    |                                      |                            | LOOSE IN BOX                                |                         | REEL            |                            |                      |                                 |                  |
|                                                                    |                                      |                            | Leads<br>3.5 $\pm$ 0.3                      | Leads<br>25.0 $\pm$ 2.0 | Original pitch  | Pitch = 7.5 mm (bent back) |                      |                                 |                  |
|                                                                    |                                      |                            |                                             |                         |                 | $\varnothing$ 500 mm       | $\varnothing$ 356 mm |                                 |                  |
|                                                                    |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)             | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ)          |                                 |                  |
| Pitch = 15 mm $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 0.08 mm |                                      |                            |                                             |                         | Pitch = 15 mm   | Pitch = 7.5 mm (bent back) |                      |                                 |                  |
| 0.0027<br>0.003<br>0.0033<br>0.0036<br>0.0039                      | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 50...<br>(1250)                             | 54...<br>(1000)         | 52...<br>(1100) | 53...<br>(950)             | 55...<br>(550)       | 272<br>302<br>332<br>362<br>392 |                  |
| 0.0043<br>0.0047<br>0.0051<br>0.0056                               | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 50...<br>(1000)                             | 54...<br>(1000)         | 52...<br>(900)  | 53...<br>(800)             | 55...<br>(450)       | 432<br>472<br>512<br>562        |                  |
| 0.0062<br>0.0068<br>0.0075                                         | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 50...<br>(750)                              | 54...<br>(500)          | 52...<br>(800)  | 53...<br>(700)             | 55...<br>(400)       | 622<br>682<br>752               |                  |
| 0.0082<br>0.0091<br>0.01<br>0.011                                  | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 50...<br>(750)                              | 54...<br>(500)          | 52...<br>(650)  | 53...<br>(550)             | 55...<br>(300)       | 822<br>912<br>103<br>113        |                  |
| 0.012<br>0.013<br>0.015                                            | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 50...<br>(500)                              | 54...<br>(450)          | 52...<br>(600)  | 53...<br>(500)             | 55...<br>(250)       | 123<br>133<br>153               |                  |
| Pitch = 22.5 $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 0.08 mm  |                                      |                            |                                             |                         | Pitch = 22.5 mm |                            |                      |                                 |                  |
| 0.016<br>0.018<br>0.02                                             | 7.0 x 16.5 x 26.0                    | 3.0                        | 50...<br>(200)                              | 54...<br>(250)          | 52...<br>(550)  | -                          | -                    | 163<br>183<br>203               |                  |
| 0.022<br>0.024<br>0.027<br>0.03                                    | 8.5 x 18.0 x 26.0                    | 4.2                        | 50...<br>(200)                              | 54...<br>(250)          | 52...<br>(450)  | -                          | -                    | 223<br>243<br>273<br>303        |                  |
| 0.033<br>0.036<br>0.039                                            | 10.0 x 19.5 x 26.0                   | 5.3                        | 50...<br>(200)                              | 54...<br>(200)          | 52...<br>(350)  | -                          | -                    | 333<br>363<br>393               |                  |

**Notes**

- <sup>(1)</sup> Net weight for short lead products only  
• SPQ = Standard Packaging Quantity



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

$U_{Rdc} = 1600 \text{ V}$ ;  $U_{Rac} = 550 \text{ V}$ ;  $U_{p-p} = 1600 \text{ V}$ ;  $C\text{-tol.} = \pm 5 \%$

| C<br>(μF)                                                 | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                     |                 |                            |             |         |
|-----------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|---------------------|-----------------|----------------------------|-------------|---------|
|                                                           |                                      |                            | LOOSE IN BOX                                |                     | REEL            |                            |             | C-VALUE |
|                                                           |                                      |                            | Leads<br>3.5 ± 0.3                          | Leads<br>25.0 ± 2.0 | Original pitch  | Pitch = 7.5 mm (bent back) |             | ..YYY   |
|                                                           |                                      |                            |                                             |                     |                 | Ø 500 mm                   | Ø 356 mm    |         |
|                                                           |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)         | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ) |         |
| Pitch = 27.5 ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                     | Pitch = 27.5 mm |                            |             |         |
| 0.043                                                     | 11.0 x 21.0 x 31.0                   | 8                          | 50...<br>(100)                              | 54...<br>(125)      |                 |                            |             | 433     |
| 0.047                                                     |                                      |                            |                                             |                     |                 |                            |             | 473     |
| 0.051                                                     |                                      |                            |                                             |                     |                 |                            |             | 513     |
| 0.056                                                     |                                      |                            |                                             |                     |                 |                            |             | 563     |
| 0.062                                                     | 13.0 x 23.0 x 31.0                   | 9.7                        | 50...<br>(100)                              | 54...<br>(125)      |                 |                            |             | 623     |
| 0.068                                                     |                                      |                            |                                             |                     |                 |                            |             | 683     |
| 0.075                                                     |                                      |                            |                                             |                     |                 |                            |             | 753     |
| 0.082                                                     | 15.0 x 25.0 x 31.0                   | 12.6                       | 50...<br>(100)                              | 54...<br>(125)      |                 |                            |             | 823     |
| 0.091                                                     |                                      |                            |                                             |                     |                 |                            |             | 913     |
| 0.1                                                       |                                      |                            |                                             |                     |                 |                            |             | 104     |
| 0.11                                                      | 18.0 x 28.0 x 31.0                   | 16.3                       | 50...<br>(100)                              | 54...<br>(100)      |                 |                            |             | 114     |
| 0.12                                                      |                                      |                            |                                             |                     |                 |                            |             | 124     |
| 0.13                                                      |                                      |                            |                                             |                     |                 |                            |             | 134     |
| 0.15                                                      |                                      |                            |                                             |                     |                 |                            |             | 154     |

**Notes**

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity

**SPECIFIC REFERENCE DATA (2000 Vdc)**

| DESCRIPTION                                                                                                                                                                                                                                                                          | VALUE                                                                                                                         |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Tangent of loss angle:<br>$C \leq 0.01 \mu\text{F}$<br>$0.01 \mu\text{F} < C \leq 0.1 \mu\text{F}$                                                                                                                                                                                   | at 10 kHz                                                                                                                     | at 100 kHz               |
|                                                                                                                                                                                                                                                                                      | $\leq 5 \times 10^{-4}$                                                                                                       | $\leq 15 \times 10^{-4}$ |
|                                                                                                                                                                                                                                                                                      | $\leq 10 \times 10^{-4}$                                                                                                      | $\leq 18 \times 10^{-4}$ |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :<br>$C \leq 0.0036 \mu\text{F}$<br>$0.0036 \mu\text{F} < C \leq 0.01 \mu\text{F}$<br>$0.01 \mu\text{F} < C \leq 0.024 \mu\text{F}$<br>$0.024 \mu\text{F} < C \leq 0.068 \mu\text{F}$<br>$0.068 \mu\text{F} < C \leq 0.1 \mu\text{F}$ | 11 000 V/ $\mu\text{s}$<br>20 000 V/ $\mu\text{s}$<br>4400 V/ $\mu\text{s}$<br>2500 V/ $\mu\text{s}$<br>1800 V/ $\mu\text{s}$ |                          |
| R between leads, for $C \leq 1 \mu\text{F}$ at 500 V, 1 min                                                                                                                                                                                                                          | > 100 000 M $\Omega$                                                                                                          |                          |
| R between leads and case, 500 V, 1 min                                                                                                                                                                                                                                               | > 30 000 M $\Omega$                                                                                                           |                          |
| Ionization (AC) voltage (typical value) at 20 pC peak discharge                                                                                                                                                                                                                      | > 750 V                                                                                                                       |                          |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                                                                                                                                                 | 3200 V, 1 min                                                                                                                 |                          |
| Withstanding (DC) voltage between leads and case                                                                                                                                                                                                                                     | 2840 V, 1 min                                                                                                                 |                          |
| Maximum application temperature                                                                                                                                                                                                                                                      | 105 °C                                                                                                                        |                          |

# MMKP 383



Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

$U_{Rdc} = 2000\text{ V}$ ;  $U_{Rac} = 700\text{ V}$ ;  $U_{p-p} = 2000\text{ V}$ ;  $C\text{-tol.} = \pm 5\%$

| C<br>(μF)                                                    | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                     |                            |                            |                |     | C-VALUE<br><br>..YYY |
|--------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|---------------------|----------------------------|----------------------------|----------------|-----|----------------------|
|                                                              |                                      |                            | LOOSE IN BOX                                |                     | REEL                       |                            |                |     |                      |
|                                                              |                                      |                            | Leads<br>3.5 ± 0.3                          | Leads<br>25.0 ± 2.0 | Original pitch             | Pitch = 7.5 mm (bent back) |                |     |                      |
|                                                              |                                      |                            |                                             |                     |                            | Ø 500 mm                   | Ø 356 mm       |     |                      |
| XX<br>(SPQ)                                                  | XX<br>(SPQ)                          | XX<br>(SPQ)                | XX<br>(SPQ)                                 | XX<br>(SPQ)         |                            |                            |                |     |                      |
| Pitch = 15 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm   |                                      |                            | Pitch = 15 mm                               |                     | Pitch = 7.5 mm (bent back) |                            |                |     |                      |
| 0.001                                                        | 5.0 x 11.0 (13.0) x 17.5             | 1.1                        | 60...<br>(1250)                             | 64...<br>(1000)     | 62...<br>(1100)            | 63...<br>(950)             | 65...<br>(550) | 102 |                      |
| 0.0011                                                       |                                      |                            |                                             |                     |                            |                            |                | 112 |                      |
| 0.0012                                                       |                                      |                            |                                             |                     |                            |                            |                | 122 |                      |
| 0.0013                                                       |                                      |                            |                                             |                     |                            |                            |                | 132 |                      |
| 0.0015                                                       |                                      |                            |                                             |                     |                            |                            |                | 152 |                      |
| 0.0016                                                       |                                      |                            |                                             |                     |                            |                            |                | 162 |                      |
| 0.0018                                                       |                                      |                            |                                             |                     |                            |                            |                | 182 |                      |
| 0.002                                                        |                                      |                            |                                             |                     |                            |                            |                | 202 |                      |
| 0.0022                                                       |                                      |                            |                                             |                     |                            |                            |                | 222 |                      |
| 0.0024                                                       |                                      |                            |                                             |                     |                            |                            |                | 242 |                      |
| 0.0027                                                       | 6.0 x 12.0 (14.0) x 17.5             | 1.4                        | 60...<br>(1000)                             | 64...<br>(1000)     | 62...<br>(900)             | 63...<br>(800)             | 65...<br>(450) | 272 |                      |
| 0.003                                                        |                                      |                            |                                             |                     |                            |                            |                | 302 |                      |
| 0.0033                                                       |                                      |                            |                                             |                     |                            |                            |                | 332 |                      |
| 0.0036                                                       |                                      |                            |                                             |                     |                            |                            |                | 362 |                      |
| 0.0039                                                       | 7.0 x 13.5 (15.5) x 17.5             | 1.8                        | 60...<br>(750)                              | 64...<br>(500)      | 62...<br>(800)             | 63...<br>(700)             | 65...<br>(400) | 392 |                      |
| 0.0043                                                       |                                      |                            |                                             |                     |                            |                            |                | 432 |                      |
| 0.0047                                                       |                                      |                            |                                             |                     |                            |                            |                | 472 |                      |
| 0.0051                                                       | 8.5 x 15.0 (17.0) x 17.5             | 2.5                        | 60...<br>(750)                              | 64...<br>(500)      | 62...<br>(650)             | 63...<br>(550)             | 65...<br>(300) | 512 |                      |
| 0.0056                                                       |                                      |                            |                                             |                     |                            |                            |                | 562 |                      |
| 0.0062                                                       |                                      |                            |                                             |                     |                            |                            |                | 622 |                      |
| 0.0068                                                       |                                      |                            |                                             |                     |                            |                            |                | 682 |                      |
| 0.0075                                                       | 10.0 x 16.5 (18.5) x 17.5            | 3.3                        | 60...<br>(500)                              | 64...<br>(450)      | 62...<br>(600)             | 63...<br>(500)             | 65...<br>(250) | 752 |                      |
| 0.0082                                                       |                                      |                            |                                             |                     |                            |                            |                | 822 |                      |
| 0.0091                                                       |                                      |                            |                                             |                     |                            |                            |                | 912 |                      |
| 0.01                                                         |                                      |                            |                                             |                     |                            |                            |                | 103 |                      |
| Pitch = 22.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                     | Pitch = 22.5 mm            |                            |                |     |                      |
| 0.011                                                        | 7.0 x 16.5 x 26.0                    | 3.0                        | 60...<br>(200)                              | 64...<br>(250)      | 62...<br>(550)             | -                          | -              | 113 |                      |
| 0.012                                                        |                                      |                            |                                             |                     |                            |                            |                | 123 |                      |
| 0.013                                                        |                                      |                            |                                             |                     |                            |                            |                | 133 |                      |
| 0.015                                                        | 8.5 x 18.0 x 26.0                    | 4.2                        | 60...<br>(200)                              | 64...<br>(250)      | 62...<br>(450)             | -                          | -              | 153 |                      |
| 0.016                                                        |                                      |                            |                                             |                     |                            |                            |                | 163 |                      |
| 0.018                                                        |                                      |                            |                                             |                     |                            |                            |                | 183 |                      |
| 0.02                                                         | 10.0 x 19.5 x 26.0                   | 5.3                        | 60...<br>(200)                              | 64...<br>(200)      | 62...<br>(350)             | -                          | -              | 203 |                      |
| 0.022                                                        |                                      |                            |                                             |                     |                            |                            |                | 223 |                      |
| 0.024                                                        |                                      |                            |                                             |                     |                            |                            |                | 243 |                      |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                     | Pitch = 27.5 mm            |                            |                |     |                      |
| 0.027                                                        | 11.0 x 21.0 x 31.0                   | 8.0                        | 60...<br>(100)                              | 64...<br>(125)      | -                          |                            |                | 273 |                      |
| 0.03                                                         |                                      |                            |                                             |                     |                            |                            |                | 303 |                      |
| 0.033                                                        |                                      |                            |                                             |                     |                            |                            |                | 333 |                      |
| 0.036                                                        |                                      |                            |                                             |                     |                            |                            |                | 363 |                      |
| 0.039                                                        |                                      |                            |                                             |                     |                            |                            |                | 393 |                      |

## Notes

(1) Net weight for short lead products only

• SPQ = Standard Packaging Quantity



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

| C<br>(μF)                                                    | DIMENSIONS<br>w x h (h') x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                     |                 |                            |             |         |
|--------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|---------------------|-----------------|----------------------------|-------------|---------|
|                                                              |                                      |                            | LOOSE IN BOX                                |                     | REEL            |                            |             | C-VALUE |
|                                                              |                                      |                            | Leads<br>3.5 ± 0.3                          | Leads<br>25.0 ± 2.0 | Original pitch  | Pitch = 7.5 mm (bent back) |             | ..YYY   |
|                                                              |                                      |                            |                                             |                     |                 | Ø 500 mm                   | Ø 356 mm    |         |
|                                                              |                                      |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)         | XX<br>(SPQ)     | XX<br>(SPQ)                | XX<br>(SPQ) |         |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm |                                      |                            |                                             |                     | Pitch = 27.5 mm |                            |             |         |
| 0.043                                                        | 13.0 x 23.0 x 31.0                   | 9.7                        | 60...<br>(100)                              | 64...<br>(125)      | -               |                            |             | 433     |
| 0.047                                                        |                                      |                            |                                             |                     |                 |                            |             | 473     |
| 0.051                                                        |                                      |                            |                                             |                     |                 |                            |             | 513     |
| 0.056                                                        | 15.0 x 25.0 x 31.0                   | 12.6                       | 60...<br>(100)                              | 64...<br>(125)      |                 |                            |             | 563     |
| 0.062                                                        |                                      |                            |                                             |                     |                 |                            |             | 623     |
| 0.068                                                        |                                      |                            |                                             |                     |                 |                            |             | 683     |
| 0.075                                                        | 18.0 x 28.0 x 31.0                   | 16.3                       | 60...<br>(100)                              | 64...<br>(100)      | 753             |                            |             |         |
| 0.082                                                        |                                      |                            |                                             |                     | 823             |                            |             |         |
| 0.091                                                        |                                      |                            |                                             |                     | 913             |                            |             |         |
| 0.10                                                         |                                      |                            |                                             |                     | 104             |                            |             |         |

**Notes**

- (1) Net weight for short lead products only  
• SPQ = Standard Packaging Quantity

**SPECIFIC REFERENCE DATA (2500 Vdc)**

| DESCRIPTION                                                                                                                                                    | VALUE                                                   |                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|--------------------------|
| Tangent of loss angle:<br>C $\leq$ 0.015 $\mu$ F<br>0.015 $\mu$ F < C $\leq$ 0.056 $\mu$ F                                                                     | at 10 kHz                                               | at 100 kHz               |
|                                                                                                                                                                | $\leq 5 \times 10^{-4}$                                 | $\leq 10 \times 10^{-4}$ |
|                                                                                                                                                                | $\leq 5 \times 10^{-4}$                                 | $\leq 15 \times 10^{-4}$ |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :<br>C $\leq$ 0.015 $\mu$ F<br>0.015 $\mu$ F < C $\leq$ 0.043 $\mu$ F<br>0.043 $\mu$ F < C $\leq$ 0.056 $\mu$ F | 13 000 V/ $\mu$ s<br>6000 V/ $\mu$ s<br>4200 V/ $\mu$ s |                          |
| R between leads, for C $\leq$ 1 $\mu$ F at 500 V, 1 min                                                                                                        | > 100 000 M $\Omega$                                    |                          |
| R between leads and case, 500 V, 1 min                                                                                                                         | > 30 000 M $\Omega$                                     |                          |
| Ionization (AC) voltage (typical value) at 20 pC peak discharge                                                                                                | > 1000 V                                                |                          |
| Withstanding (DC) voltage (cut off current 10 mA), rise time 100 V/s                                                                                           | 3500 V, 1 min                                           |                          |
| Withstanding (DC) voltage between leads and case                                                                                                               | 2840 V, 1 min                                           |                          |
| Maximum application temperature                                                                                                                                | 105 °C                                                  |                          |

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Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

$U_{Rdc} = 2500 \text{ V}$ ;  $U_{Rac} = 900 \text{ V}$ ;  $U_{p-p} = 2500 \text{ V}$ ; C-tol. =  $\pm 5 \%$

| C<br>(μF)                                                                                                                                                                     | DIMENSIONS<br>w x h x l<br>(mm) | MASS<br>(g) <sup>(1)</sup> | CATALOG NUMBER BFC2 383 XYYYY AND PACKAGING |                        |                |                                                                                                                            |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------|---------------------------------------------|------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------|------|----------------|----------------|----------------|--------------------------|-----|----------------|----------------|--------------------|--------------------------|----------------|----------------|-------------------|----------------|-------------------|
|                                                                                                                                                                               |                                 |                            | LOOSE IN BOX                                |                        | REEL           | C-VALUE                                                                                                                    |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
|                                                                                                                                                                               |                                 |                            | Leads<br>3.5 ± 0.3 mm                       | Leads<br>25.0 ± 2.0 mm | H = 18.5 mm    | ..YYY                                                                                                                      |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
|                                                                                                                                                                               |                                 |                            | XX<br>(SPQ)                                 | XX<br>(SPQ)            | XX<br>(SPQ)    |                                                                                                                            |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
| Pitch = 22.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm                                                                                                                  |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
| 0.001<br>0.0011<br>0.0012<br>0.0013<br>0.0015<br>0.0016<br>0.0018<br>0.002<br>0.0022<br>0.0024<br>0.0027<br>0.003<br>0.0033<br>0.0036<br>0.0039<br>0.0043<br>0.0047<br>0.0051 | 6.0 x 15.5 x 26.0               | 2.4                        | 70...<br>(200)                              | 74...<br>(250)         | 72...<br>(600) | 102<br>112<br>122<br>132<br>152<br>162<br>182<br>202<br>222<br>242<br>272<br>302<br>332<br>362<br>392<br>432<br>472<br>512 |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
| 0.0056<br>0.0062<br>0.0068<br>0.0075                                                                                                                                          |                                 |                            |                                             |                        |                | 7.0 x 16.5 x 26.0                                                                                                          | 3.0  | 70...<br>(200) | 74...<br>(250) | 72...<br>(550) | 562<br>622<br>682<br>752 |     |                |                |                    |                          |                |                |                   |                |                   |
| 0.0082<br>0.0091<br>0.01<br>0.011                                                                                                                                             |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                | 8.5 x 18.0 x 26.0        | 4.2 | 70...<br>(200) | 74...<br>(250) | 72...<br>(450)     | 822<br>912<br>103<br>113 |                |                |                   |                |                   |
| 0.012<br>0.013<br>0.015                                                                                                                                                       |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                |                          |     |                |                |                    | 10.0 x 19.5 x 26.0       | 5.3            | 70...<br>(200) | 74...<br>(200)    | 72...<br>(350) | 123<br>133<br>153 |
| Pitch = 27.5 mm ± 0.4 mm; d <sub>t</sub> = 0.80 mm ± 0.08 mm                                                                                                                  |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                |                          |     |                |                |                    |                          |                |                |                   |                |                   |
| 0.016                                                                                                                                                                         |                                 |                            |                                             |                        |                | 9.0 x 19.0 x 31.0                                                                                                          | 5.9  | 70...          | 74...          | -              |                          |     |                |                |                    |                          |                |                |                   |                | 163               |
| 0.018<br>0.02<br>0.022<br>0.024                                                                                                                                               |                                 |                            |                                             |                        |                | 11.0 x 21.0 x 31.0                                                                                                         | 8.0  | 70...<br>(100) | 74...<br>(125) |                | 183<br>203<br>223<br>243 |     |                |                |                    |                          |                |                |                   |                |                   |
| 0.027<br>0.03<br>0.033                                                                                                                                                        |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                | 13.0 x 23.0 x 31.0       | 9.7 | 70...<br>(100) | 74...<br>(125) | 273<br>303<br>333  |                          |                |                |                   |                |                   |
| 0.036<br>0.039<br>0.043                                                                                                                                                       |                                 |                            |                                             |                        |                |                                                                                                                            |      |                |                |                |                          |     |                |                | 15.0 x 25.0 x 31.0 | 12.6                     | 70...<br>(100) | 74...<br>(125) | 363<br>393<br>433 |                |                   |
| 0.047<br>0.051<br>0.056                                                                                                                                                       |                                 |                            |                                             |                        |                | 18.0 x 28.0 x 31.0                                                                                                         | 16.3 | 70...<br>(100) | 74...<br>(100) |                |                          |     |                |                |                    |                          |                |                | 473<br>513<br>563 |                |                   |

## Notes

<sup>(1)</sup> Net weight for short lead products only

• SPQ = Standard Packaging Quantity



## MOUNTING

### Normal Use

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

For detailed tape specifications refer to "Packaging Information" [www.vishay.com/docs?28139](http://www.vishay.com/docs?28139)

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

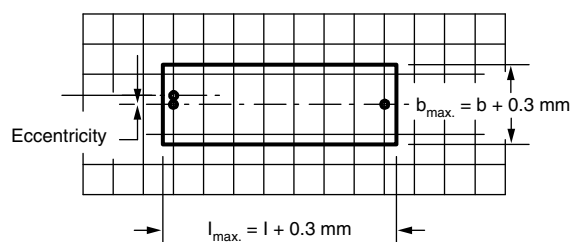
In order to withstand vibration and shock tests, it must be ensured that the stand-off pips are in good contact with the printed-circuit board:

- For original pitch = 15 mm the 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 length and width of film capacitors is shown in the drawing:

- Eccentricity as in drawing. The maximum eccentricity is smaller than or equal to the lead diameter of the product concerned
- Product height with seating plane as given by "IEC 60717" as reference:  $h_{\max.} \leq h + 0.3 \text{ mm}$



### Storage Temperature

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

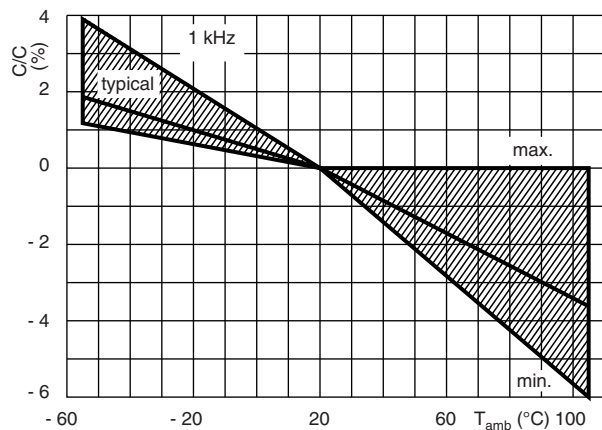
### Ratings and Characteristics Reference Conditions

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

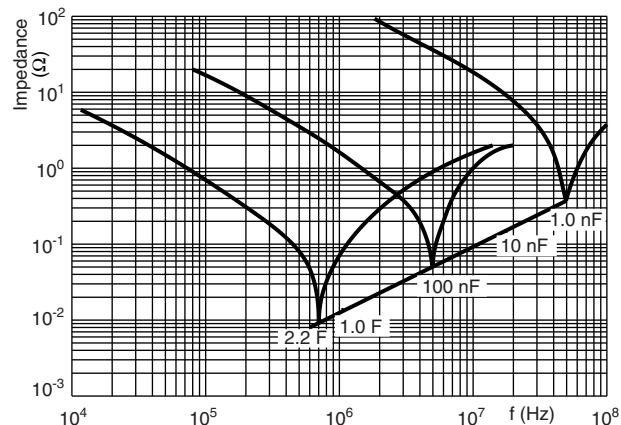
For reference testing, a conditioning period shall be applied over  $96 \text{ h} \pm 4 \text{ h}$  by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.

## CHARACTERISTICS

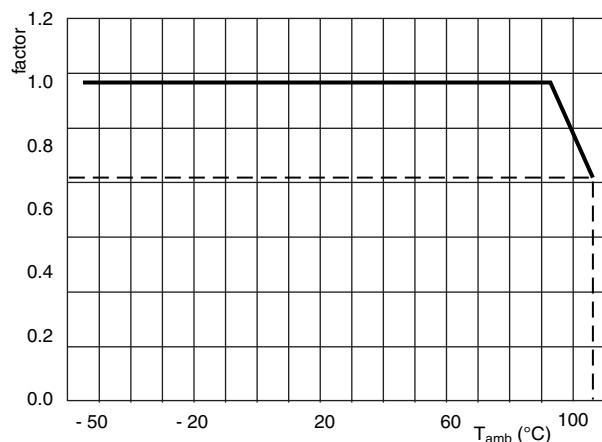
Capacitance as a function of ambient temperature (typical curve)  
(1 kHz)



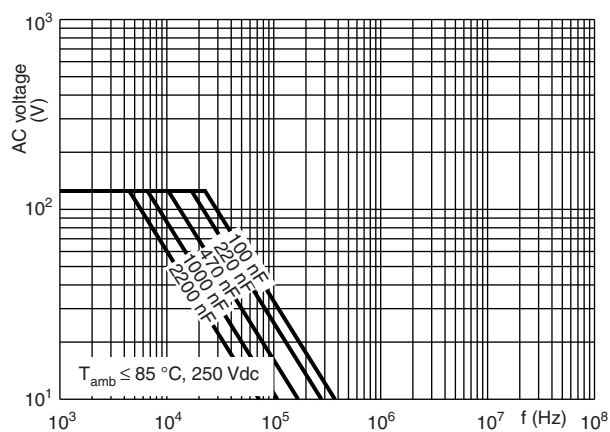
### Impedance as a function of frequency (typical curve)



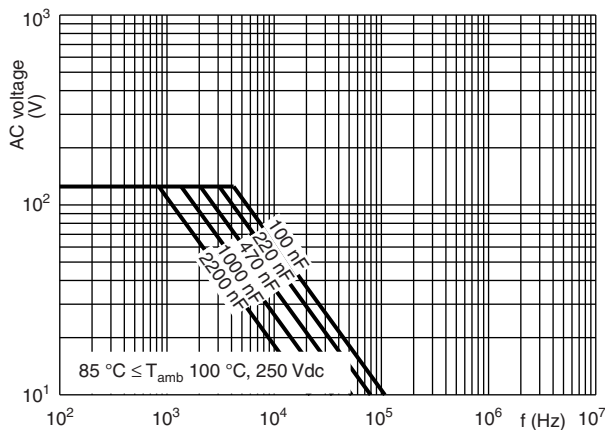
Max. DC and AC voltage as function of temperature



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

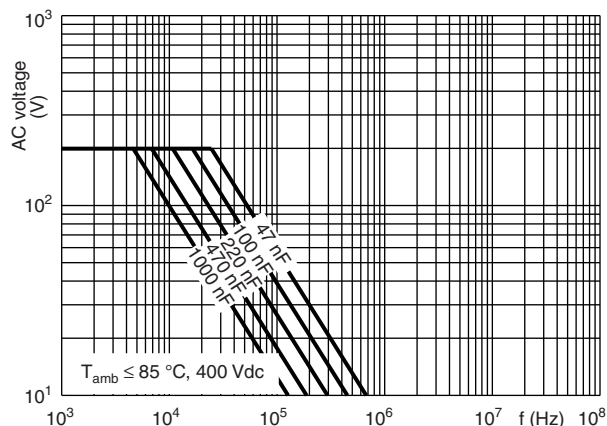




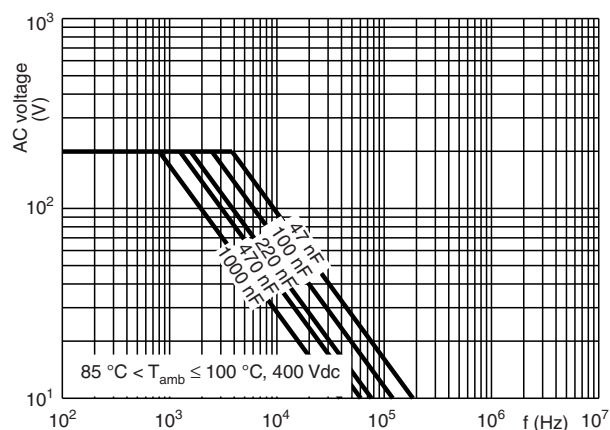
AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

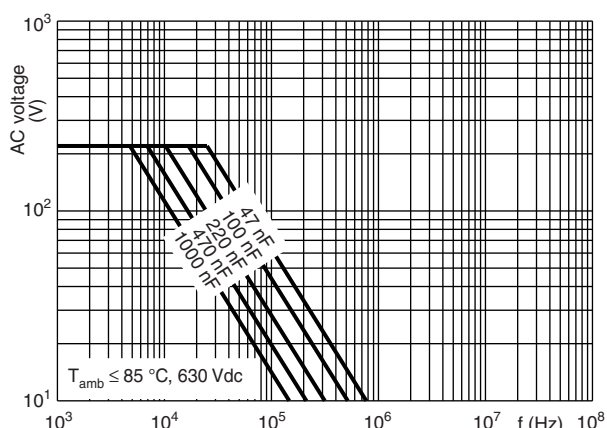
Max. RMS voltage as a function of frequency



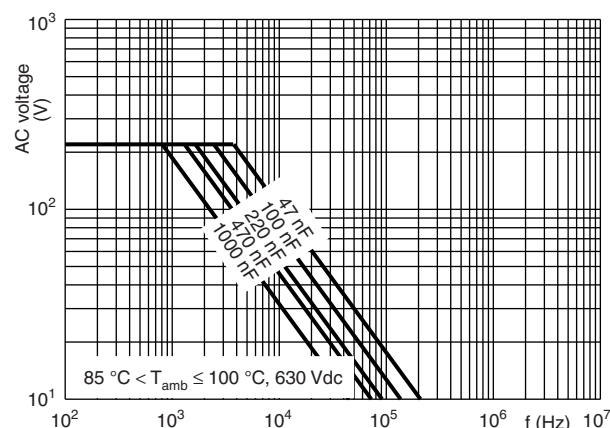
Max. RMS voltage as a function of frequency



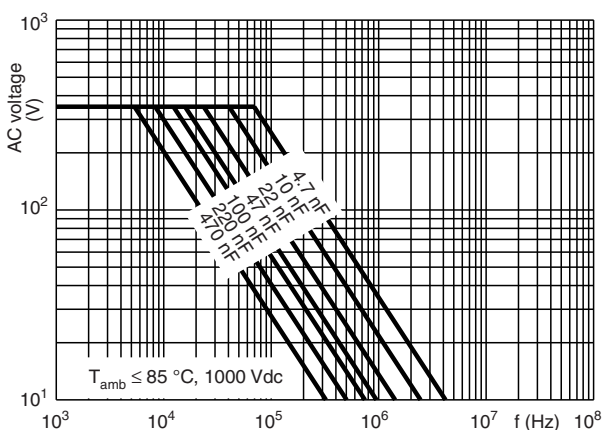
Max. RMS voltage as a function of frequency



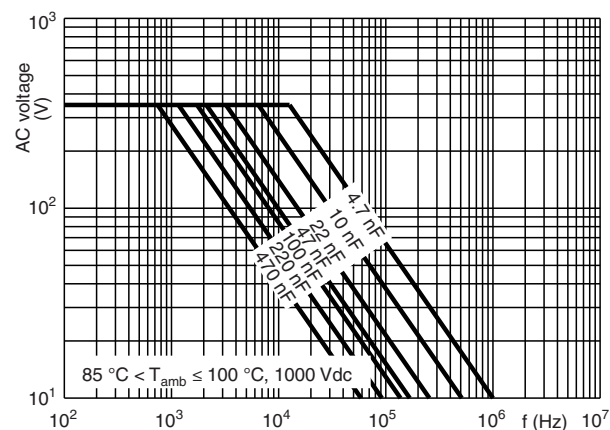
Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

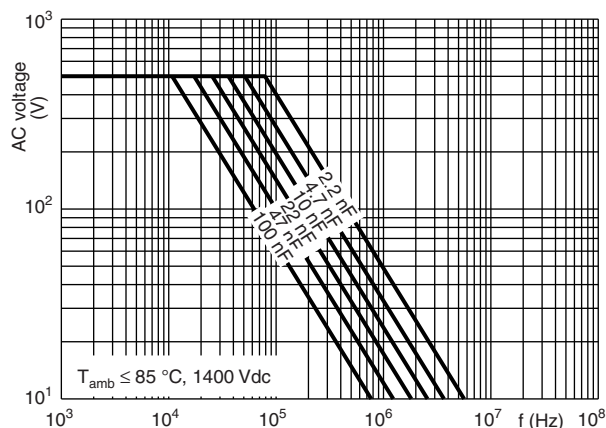


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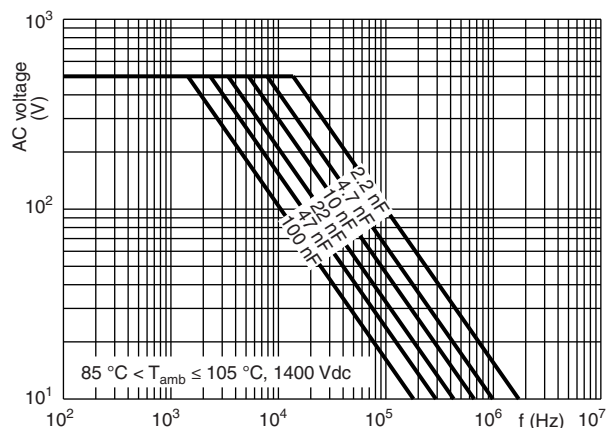
Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type



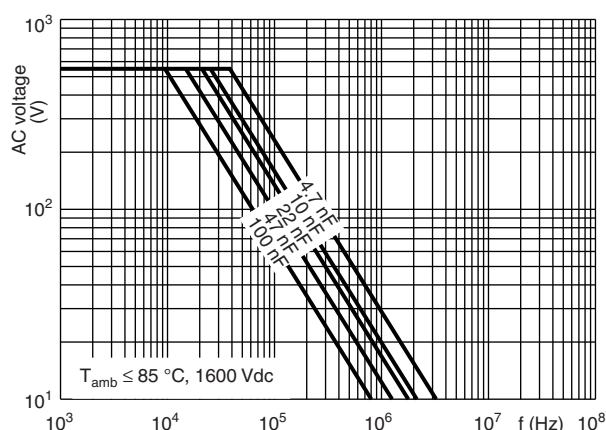
Max. RMS voltage as a function of frequency



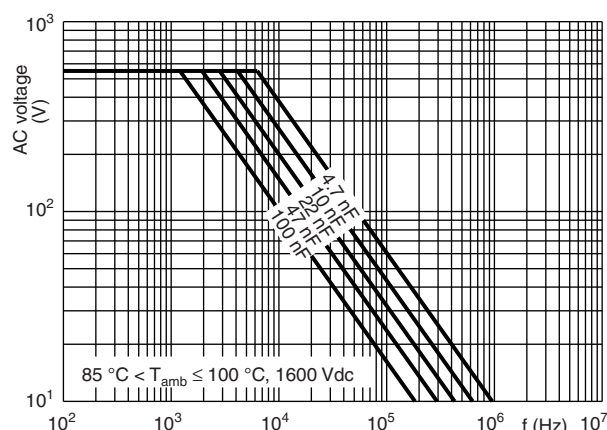
Max. RMS voltage as a function of frequency



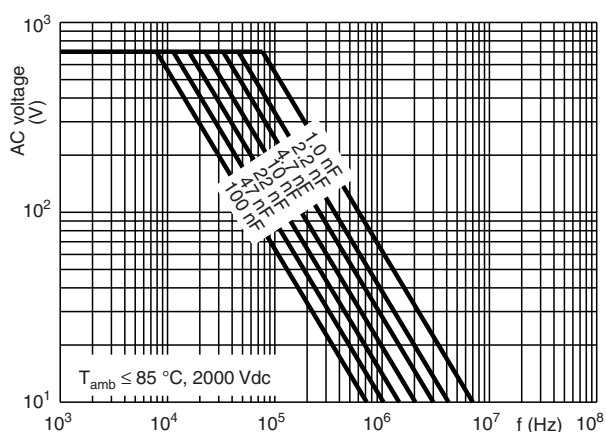
Max. RMS voltage as a function of frequency



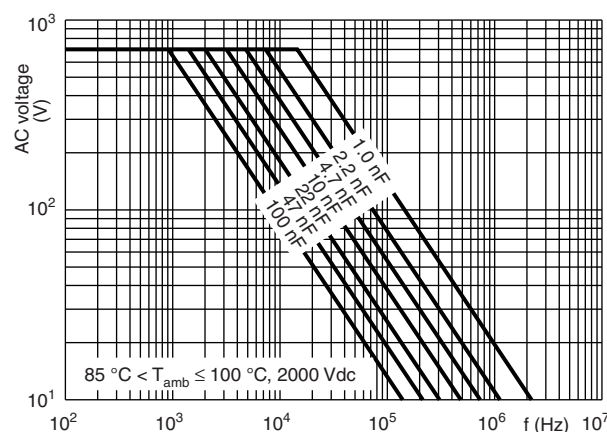
Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

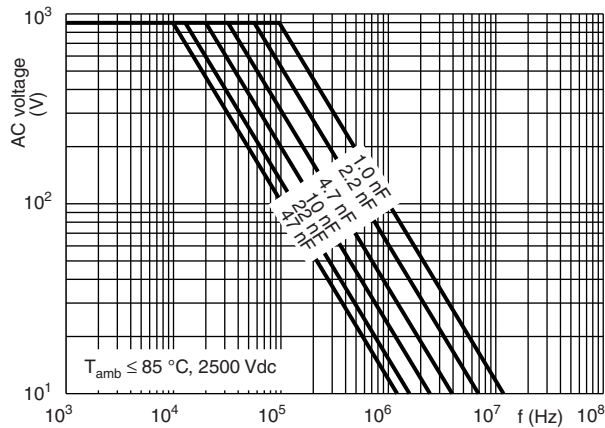




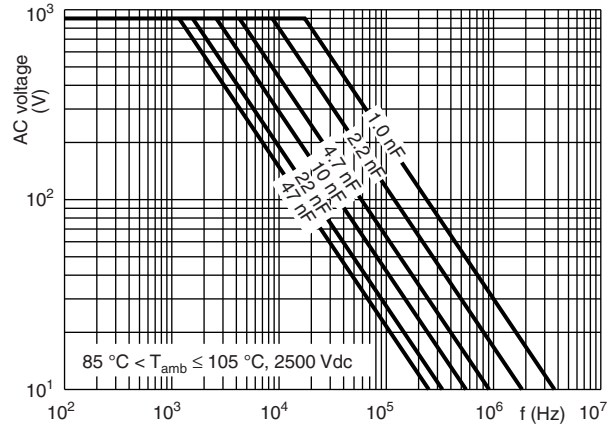
AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

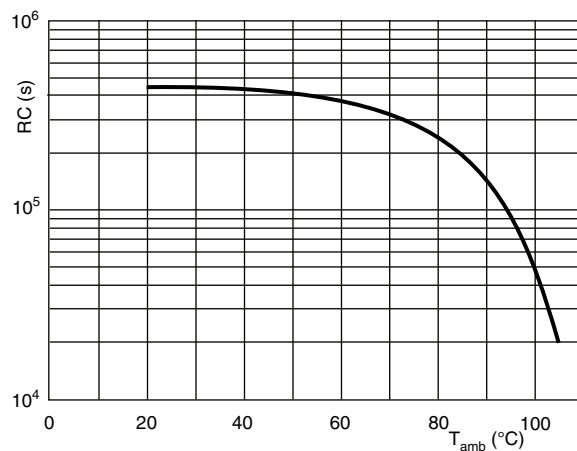
Max. RMS voltage as a function of frequency



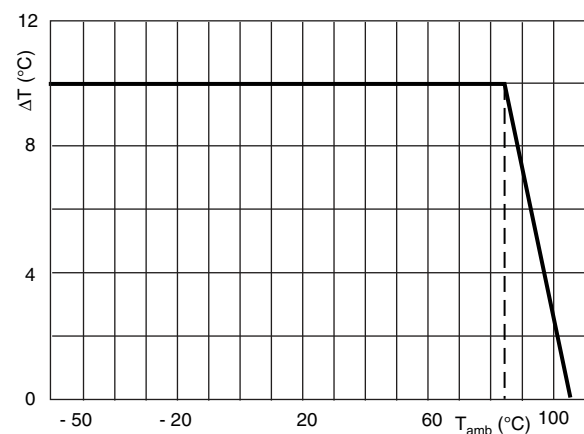
Max. RMS voltage as a function of frequency



Insulation resistance as a function of ambient temperature



Max. allowed component temperature rise ( $\Delta T$ )  
as a function of the ambient temperature ( $T_{amb}$ )

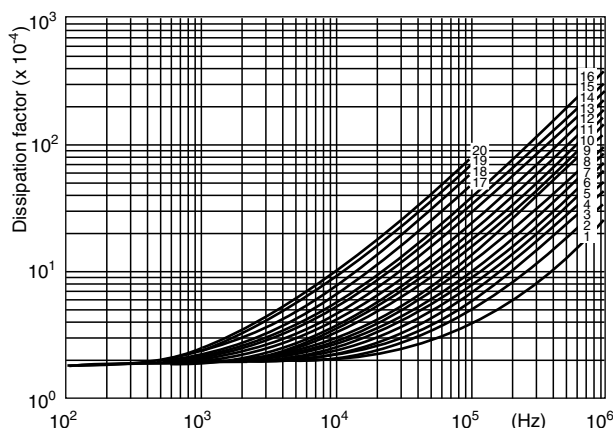


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Tangent of loss angle as a function of frequency (typical curve)



|                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>250 V</b><br>$C \leq 0.091 \mu\text{F}$ , curve 8<br>$C \leq 0.015 \mu\text{F}$ , curve 9<br>$C \leq 0.022 \mu\text{F}$ , curve 10<br>$C \leq 0.027 \mu\text{F}$ , curve 11<br>$C \leq 0.033 \mu\text{F}$ , curve 12<br>$C \leq 0.056 \mu\text{F}$ , curve 15<br>$C \leq 0.082 \mu\text{F}$ , curve 16<br>$C \leq 1.2 \mu\text{F}$ , curve 18<br>$C \leq 1.61 \mu\text{F}$ , curve 19<br>$C \leq 2.21 \mu\text{F}$ , curve 20 | <b>400 V</b><br>$C \leq 0.047 \mu\text{F}$ , curve 5<br>$C \leq 0.068 \mu\text{F}$ , curve 6<br>$C \leq 0.1 \mu\text{F}$ , curve 7<br>$C \leq 0.2 \mu\text{F}$ , curve 8<br>$C \leq 0.24 \mu\text{F}$ , curve 12<br>$C \leq 0.36 \mu\text{F}$ , curve 13<br>$C \leq 0.43 \mu\text{F}$ , curve 14<br>$C \leq 0.56 \mu\text{F}$ , curve 16<br>$C \leq 1.1 \mu\text{F}$ , curve 17 | <b>630 V</b><br>$C \leq 0.033 \mu\text{F}$ , curve 4<br>$C \leq 0.068 \mu\text{F}$ , curve 5<br>$C \leq 0.1 \mu\text{F}$ , curve 6<br>$C \leq 0.15 \mu\text{F}$ , curve 7<br>$C \leq 0.22 \mu\text{F}$ , curve 11<br>$C \leq 0.27 \mu\text{F}$ , curve 12<br>$C \leq 0.47 \mu\text{F}$ , curve 15<br>$C \leq 0.68 \mu\text{F}$ , curve 16 | <b>1000 V</b><br>$C \leq 0.01 \mu\text{F}$ , curve 2<br>$C \leq 0.027 \mu\text{F}$ , curve 3<br>$C \leq 0.047 \mu\text{F}$ , curve 4<br>$C \leq 0.062 \mu\text{F}$ , curve 5<br>$C \leq 0.075 \mu\text{F}$ , curve 6<br>$C \leq 0.1 \mu\text{F}$ , curve 7<br>$C \leq 0.15 \mu\text{F}$ , curve 8<br>$C \leq 0.22 \mu\text{F}$ , curve 9<br>$C \leq 0.3 \mu\text{F}$ , curve 10<br>$C \leq 0.39 \mu\text{F}$ , curve 11<br>$C \leq 0.47 \mu\text{F}$ , curve 12 |
| <b>140 V</b><br>$C \leq 0.0047 \mu\text{F}$ , curve 1<br>$C \leq 0.016 \mu\text{F}$ , curve 2<br>$C \leq 0.033 \mu\text{F}$ , curve 3<br>$C \leq 0.051 \mu\text{F}$ , curve 4<br>$C \leq 0.068 \mu\text{F}$ , curve 5<br>$C \leq 0.082 \mu\text{F}$ , curve 6<br>$C \leq 0.1 \mu\text{F}$ , curve 7                                                                                                                              | <b>1600 V</b><br>$C \leq 0.0047 \mu\text{F}$ , curve 3<br>$C \leq 0.0091 \mu\text{F}$ , curve 4<br>$C \leq 0.068 \mu\text{F}$ , curve 5<br>$C \leq 0.01 \mu\text{F}$ , curve 6<br>$C \leq 0.15 \mu\text{F}$ , curve 7                                                                                                                                                           | <b>2000 V</b><br>$C \leq 0.0047 \mu\text{F}$ , curve 2<br>$C \leq 0.033 \mu\text{F}$ , curve 3<br>$C \leq 0.1 \mu\text{F}$ , curve 4                                                                                                                                                                                                      | <b>2500 V</b><br>$C \leq 0.0047 \mu\text{F}$ , curve 1<br>$C \leq 0.015 \mu\text{F}$ , curve 2<br>$C \leq 0.056 \mu\text{F}$ , curve 3                                                                                                                                                                                                                                                                                                                          |

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

| W <sub>max.</sub><br>(mm) | HEAT CONDUCTIVITY (mW/°C) |               | PITCH 27.5 mm |
|---------------------------|---------------------------|---------------|---------------|
|                           | PITCH 15 mm               | PITCH 22.5 mm |               |
| 4.0                       | -                         | -             | -             |
| 5.0                       | 10                        | -             | -             |
| 6.0                       | 11                        | 19            | -             |
| 7.0                       | 12                        | 21            | -             |
| 8.5                       | 16                        | 25            | -             |
| 10.0                      | 18                        | 28            | -             |
| 11.0                      | -                         | -             | 36            |
| 13.0                      | -                         | -             | 42            |
| 15.0                      | -                         | -             | 48            |
| 18.0                      | -                         | -             | 57            |



## POWER DISSIPATION AND MAXIMUM COMPONENT TEMPERATURE RISE

The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as a function of the free air ambient temperature.

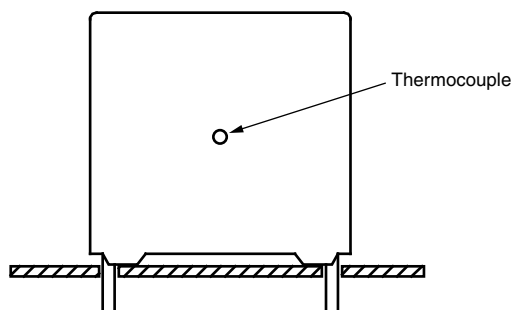
The power dissipation can be calculated according type detail specification "HQN-384-01/101: Technical Information Film Capacitors".

The component temperature rise ( $\Delta T$ ) can be measured (see section "Measuring the component temperature" for more details) or calculated by  $\Delta T = P/G$ :

- $\Delta T$  = Component temperature rise ( $^{\circ}\text{C}$ )
- $P$  = Power dissipation of the component (mW)
- $G$  = Heat conductivity of the component (mW/ $^{\circ}\text{C}$ )

## MEASURING THE COMPONENT TEMPERATURE

A thermocouple must be attached to the capacitor body as in:



The temperature is measured in unloaded ( $T_{\text{amb}}$ ) and maximum loaded condition ( $T_C$ ).

The temperature rise is given by  $\Delta T = T_C - T_{\text{amb}}$ .

To avoid radiation or convection, the capacitor should be tested in a wind-free box.

## APPLICATION NOTE AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described hereunder. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

1. The peak voltage ( $U_P$ ) shall not be greater than the rated DC voltage ( $U_{Rdc}$ )
2. The peak-to-peak voltage ( $U_{P-P}$ ) shall not be greater than  $2\sqrt{2} \times U_{Rac}$  to avoid the ionisation inception level
3. The voltage pulse 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:

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

$T$  is the pulse duration.

4. The maximum component surface temperature rise must be lower than the limits (see graph max. allowed component temperature rise).
5. 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"

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6. When using these capacitors as across-the-line capacitor in the input filter for mains applications or as series connected with an impedance to the mains the applicant must guarantee that the following conditions are fulfilled in any case (spikes and surge voltages from the mains included).

### Voltage Conditions for 6 Above

| ALLOWED VOLTAGES                             | $T_{amb} \leq 85\text{ °C}$ | $85\text{ °C} < T_{amb} \leq 105\text{ °C}$ |
|----------------------------------------------|-----------------------------|---------------------------------------------|
| Maximum continuous RMS voltage               | $U_{Rac}$                   | $U_{Rac}$                                   |
| Maximum temperature RMS-overvoltage (< 24 h) | $1.25 \times U_{Rac}$       | $1.25 \times U_{Rac}$                       |
| Maximum peak voltage ( $V_{O-P}$ ) (< 2 s)   | $1.6 \times U_{Rdc}$        | $1.1 \times U_{Rdc}$                        |

### EXAMPLE

$C = 4\text{ nF}$  - 1600 V used for the voltage signal shown in next drawing.

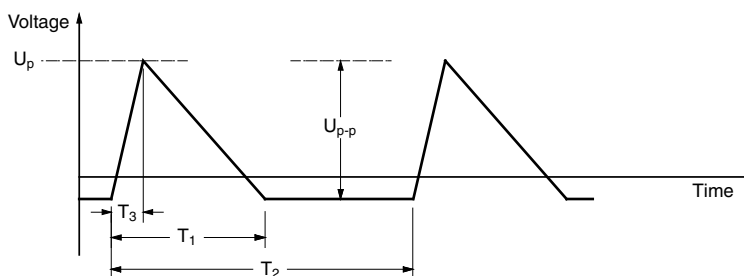
$U_{P-P} = 1000\text{ V}$ ;  $U_P = 900\text{ V}$ ;  $T_1 = 12\text{ }\mu\text{s}$ ;  $T_2 = 64\text{ }\mu\text{s}$ ;  $T_3 = 4\text{ }\mu\text{s}$

The ambient temperature is  $80\text{ °C}$ . In case of failure, the oscillation is blocked.

Checking conditions:

1. The peak voltage  $U_P = 900\text{ V}$  is lower than  $1600\text{ Vdc}$
2. The peak-to-peak voltage  $1000\text{ V}$  is lower than  $2\sqrt{2} \times 550\text{ Vac} = 1600\text{ V}$
3. The voltage pulse slope  $(dU/dt) = 1000\text{ V}/4\text{ }\mu\text{s} = 250\text{ V}/\mu\text{s}$   
This is lower than  $8000\text{ V}/\mu\text{s}$  (see specific reference data for each version)
4. The dissipated power is  $35\text{ mW}$  as calculated with fourier terms and typical  $\text{tg}\delta$ .  
The temperature rise for  $W_{max} = 6.0\text{ mm}$  and pitch =  $15\text{ mm}$  will be  $35\text{ mW}/11\text{ mW}/\text{°C} = 3.2\text{ °C}$   
This is lower than  $10\text{ °C}$  temperature rise at  $80\text{ °C}$ , according graph.
5. Oscillation is blocked
6. Not applicable

### Voltage Signal





AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

**INSPECTION REQUIREMENTS**

**General Notes:**

Sub-clause numbers of tests and performance requirements refer to the “Sectional Specification, Publication IEC 60384-17 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)                                   |                                                                                                                                                                                                                                                 | As specified in chapters “General Data” of this specification                                                                                                                                                                                                                                                               |
| 4.3.1 Initial measurements                                | Capacitance<br>Tangent of loss angle:<br>For $C \leq 1 \mu\text{F}$ at 100 kHz or<br>for $C > 1 \mu\text{F}$ at 10 kHz                                                                                                                          |                                                                                                                                                                                                                                                                                                                             |
| 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                          | Method: 1A<br>Solder bath: 280 °C ± 5 °C<br>Duration: 10 s                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                             |
| 4.14 Component solvent resistance                         | Isopropylalcohol at room temperature<br>Method: 2<br>Immersion time: 5 min ± 0.5 min<br>Recovery time: Min. 1 h, max. 2 h                                                                                                                       |                                                                                                                                                                                                                                                                                                                             |
| 4.4.2 Final measurements                                  | Visual examination<br><br>Capacitance<br><br>Tangent of loss angle                                                                                                                                                                              | No visible damage<br>Legible marking<br><br>$ \Delta C/C  \leq 1 \%$ of the value measured initially<br><br>Increase of $\tan \delta$<br>≤ 0.0005 for: $C \leq 100 \text{ nF}$ or<br>≤ 0.001 for: $100 \text{ nF} < C \leq 470 \text{ nF}$ or<br>≤ 0.0015 for: $C > 470 \text{ nF}$<br>Compared to values measured in 4.3.1 |
| <b>SUB-GROUP C1B OTHER PART OF SAMPLE OF SUB-GROUP C1</b> |                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                             |
| 4.6.1 Initial measurements                                | Capacitance<br>Tangent of loss angle:<br>For $C \leq 1 \mu\text{F}$ at 100 kHz or<br>for $C > 1 \mu\text{F}$ at 10 kHz                                                                                                                          |                                                                                                                                                                                                                                                                                                                             |
| 4.15 Solvent resistance of the marking                    | Isopropylalcohol at room temperature<br>Method: 1<br>Rubbing material: cotton wool                                                                                                                                                              | No visible damage<br>Legible marking                                                                                                                                                                                                                                                                                        |
| 4.6 Rapid change of temperature                           | Immersion time: 5.0 min ± 0.5 min<br>θA = - 55 °C<br>θB = + 105 °C<br>5 cycles<br>Duration t = 30 min                                                                                                                                           |                                                                                                                                                                                                                                                                                                                             |
| 4.7 Vibration                                             | Visual examination<br>Mounting: see section “Mounting” for more information<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 | No visible damage                                                                                                                                                                                                                                                                                                           |

# MMKP 383



## Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

| SUB-CLAUSE NUMBER AND TEST                                                                                                                                                                                 | CONDITIONS                                                                                                                                                                                                                                                                         | PERFORMANCE REQUIREMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SUB-GROUP C1B OTHER PART OF SAMPLE OF SUB-GROUP C1</b>                                                                                                                                                  |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4.7.2 Final inspection<br>4.9 Shock<br><br>4.9.3 Final measurements                                                                                                                                        | Visual examination<br>Mounting:<br>See section "Mounting" for more information<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>Insulation resistance          | No visible damage<br><br>No visible damage<br>$ \Delta C/C  \leq 1\%$ of the value measured in 4.6.1<br>Increase of $\tan \delta$<br>$\leq 0.0005$ for: $C \leq 100$ nF or<br>$\leq 0.001$ for: $100$ nF $< C \leq 470$ nF or<br>$\leq 0.0015$ for: $C > 470$ nF<br>Compared to values measured in 4.6.1<br>As specified in section "Insulation Resistance" of this specification                                                                                                               |
| <b>SUB-GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB-GROUPS C1A AND C1B</b>                                                                                                                                 |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4.10 Climatic sequence<br>4.10.2 Dry heat<br><br>4.10.3 Damp heat cyclic<br>Test Db, first cycle<br>4.10.4 Cold<br><br>4.10.6 Damp heat cyclic<br>Test Db, remaining cycles<br>4.10.6.2 Final measurements | Temperature: + 105 °C<br>Duration: 16 h<br><br>Temperature: - 55 °C<br>Duration: 2 h<br><br>Voltage proof = $U_{Rdc}$ for 1 min within 15 min after removal from testchamber<br>Visual examination<br><br>Capacitance<br><br>Tangent of loss angle<br><br>Insulation resistance    | No breakdown of flash-over<br><br>No visible damage<br>Legible marking<br>For original pitch = 22.5 mm and 27.5 mm:<br>$ \Delta C/C  \leq 3\%$ of the value measured in 4.4.2 or 4.9.3<br>Increase of $\tan \delta$<br>$\leq 0.0005$ for: $C \leq 100$ nF or<br>$\leq 0.001$ for: $100$ nF $< C \leq 470$ nF or<br>$\leq 0.0015$ for: $C > 470$ nF<br>Compared to values measured in 4.3.1 or 4.6.1<br>$\geq 50\%$ of values specified in section "Insulation Resistance" of this specification |
| <b>SUB-GROUP C2</b>                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 4.11 Damp heat steady state<br>4.11.1 Initial measurements<br>4.11.3 Final measurements                                                                                                                    | 56 days, 40 °C, 90 % to 95 % RH<br>no load<br>Capacitance<br>Tangent of loss angle at 1 kHz<br>Voltage proof = $U_{Rdc}$ for 1 min within 15 min after removal from testchamber<br>Visual examination<br><br>Capacitance<br><br>Tangent of loss angle<br><br>Insulation resistance | No breakdown of flash-over<br><br>No visible damage<br>Legible marking<br>$ \Delta C/C  \leq 1\%$ of the value measured in 4.11.1.<br>Increase of $\tan \delta$<br>$\leq 0.0005$ for: $C \leq 100$ nF or<br>$\leq 0.001$ for: $100$ nF $< C \leq 470$ nF or<br>$\leq 0.0015$ for: $C \leq 470$ nF<br>Compared to values measured in 4.11.1<br>$\geq 50\%$ of values specified in section "Insulation Resistance" of this specification                                                          |



AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

| SUB-CLAUSE NUMBER AND TEST |                                                                                                            | CONDITIONS                                                                                                                              | PERFORMANCE REQUIREMENTS                                                                                                                                                                                                                                                                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SUB-GROUP C3A              |                                                                                                            |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.12.1                     | Endurance test at 50 Hz alternating voltage                                                                | Duration: 2000 h<br>1.25 x U <sub>Rdc</sub> at 105 °C                                                                                   | No visible damage<br>Legible marking<br><br> ΔC/C  ≤ 5 % compared to values measured in 4.12.1.1<br><br>Increase of tan δ<br>≤ 0.0005 for: C ≤ 100 nF or<br>≤ 0.001 for: 100 nF < C ≤ 470 nF or<br>≤ 0.0015 for: C > 470 nF<br>Compared to values measured in 4.12.1.1<br><br>≥ 50 % of values specified in section “Insulation Resistance” of this specification |
| 4.12.1.1                   | Initial measurements                                                                                       | Capacitance<br>Tangent of loss angle:<br>For C ≤ 1 μF at 100 kHz or<br>for C > 1 μF at 10 kHz                                           |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.12.1.3                   | Final measurements                                                                                         | Visual examination<br><br>Capacitance<br><br>Tangent of loss angle                                                                      |                                                                                                                                                                                                                                                                                                                                                                   |
|                            |                                                                                                            | Insulation resistance                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                   |
| SUB-GROUP C4               |                                                                                                            |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.2.6                      | Temperature characteristics<br>Initial measurements<br>Intermediate measurements<br><br>Final measurements | Capacitance<br>Capacitance at - 55 °C<br>Capacitance at 20 °C<br>Capacitance at + 105 °C<br>Capacitance<br><br>Insulation resistance    | For - 55 °C to + 20 °C:<br>+ 1 % ≤  ΔC/C  ≤ 3.75 % or<br>for 20 °C to 105 °C:<br>- 6 % ≤  ΔC/C  ≤ 0 %<br>As specified in section “Capacitance” of this specification.<br>As specified in section “Insulation Resistance” of this specification                                                                                                                    |
| 4.13                       | Charge and discharge                                                                                       | 10 000 cycles<br>Charged to U <sub>Rdc</sub><br>Discharge resistance:<br><br>R = $\frac{U_{Rdc}}{5 \times C \times (2.5 \times dU/dt)}$ |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.13.1                     | Initial measurements                                                                                       | Capacitance<br>Tangent of loss angle:<br>For C ≤ 1 μF at 100 kHz or<br>for C > 1 μF at 10 kHz                                           |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.13.3                     | Final measurements                                                                                         | Capacitance<br><br>Tangent of loss angle<br><br>Insulation resistance                                                                   |                                                                                                                                                                                                                                                                                                                                                                   |
|                            |                                                                                                            |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                   |



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