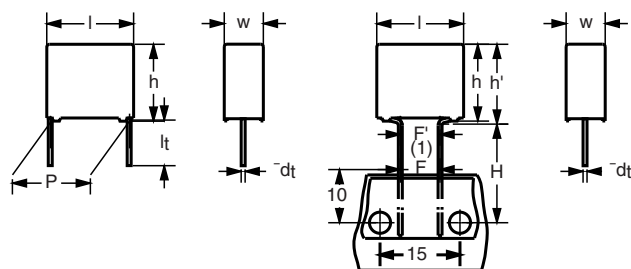




# AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type



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

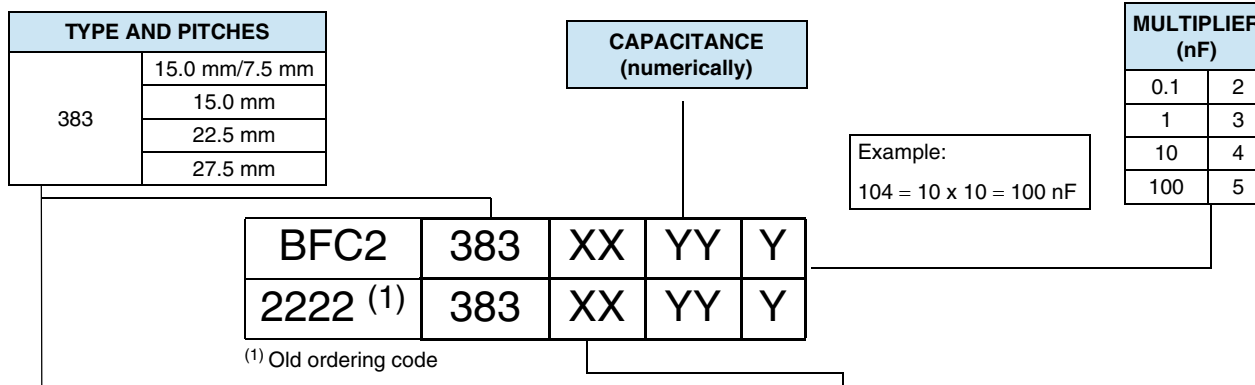
350 V, 560 V, 630 V, 1000 V, 1400 V, 1600 V, 2000 V, 2500 V

# 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 (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 <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 (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 (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>( $\mu$ F)                                                      | 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 $\pm$ 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                             |                            |                |                          |
| 0.43                                                                 | 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 $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 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) <sub>R</sub> :<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 M $\Omega$                                                                                                  |                          |
| RC between leads, for $C > 1 \mu\text{F}$ at 100 V, 1 min                                                                                                                                                                                                                                                                                        | > 100 000 s                                                                                                           |                          |
| R between leads and case, 100 V, 1 min                                                                                                                                                                                                                                                                                                           | > 30 000 M $\Omega$                                                                                                   |                          |
| 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                                                                                                                                                                                                                                                                             | 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                 |                      |                |                          |                |                   |
|                                                            |                                      |                            |                                             |                        |                            |                            |                          |                      | 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) |                            |                          |                      |                |                          |                |                   |
| 0.047<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)    |
| 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)    |

### 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                                                                 | 8.5 x 18.0 x 26.0               | 4.2                        | 10...<br>(200)                              | 14...<br>(250)             | 12...<br>(450)  | 274     |
| 0.30                                                                 |                                 |                            |                                             |                            |                 | 304     |
| 0.33                                                                 |                                 |                            |                                             |                            |                 | 334     |
| 0.36                                                                 | 10.0 x 19.5 x 26.0              | 5.3                        | 10...<br>(200)                              | 14...<br>(200)             | 12...<br>(350)  | 364     |
| 0.39                                                                 |                                 |                            |                                             |                            |                 | 394     |
| 0.43                                                                 |                                 |                            |                                             |                            |                 | 434     |
| Pitch = 27.5 mm $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 0.08 mm |                                 |                            |                                             |                            |                 |         |
| 0.47                                                                 | 11.0 x 21.0 x 31.0              | 8.0                        | 10...<br>(100)                              | 14...<br>(125)             | -               | 474     |
| 0.51                                                                 |                                 |                            |                                             |                            |                 | 514     |
| 0.56                                                                 |                                 |                            |                                             |                            |                 | 564     |
| 0.62                                                                 |                                 |                            |                                             |                            |                 | 624     |
| 0.68                                                                 | 13.0 x 23.0 x 31.0              | 9.7                        | 10...<br>(100)                              | 14...<br>(125)             |                 | 684     |
| 0.75                                                                 |                                 |                            |                                             |                            |                 | 754     |
| 0.82                                                                 |                                 |                            |                                             |                            |                 | 824     |
| 0.91                                                                 | 15.0 x 25.0 x 31.0              | 12.6                       | 10...<br>(100)                              | 14...<br>(125)             | -               | 914     |
| 1.                                                                   |                                 |                            |                                             |                            |                 | 105     |
| 1.1                                                                  |                                 |                            |                                             |                            |                 | 115     |
| 1.2                                                                  | 18.0 x 28.0 x 31.0              | 16.3                       | 10...<br>(100)                              | 14...<br>(100)             |                 | 125     |
| 1.3                                                                  |                                 |                            |                                             |                            |                 | 135     |
| 1.5                                                                  |                                 |                            |                                             |                            |                 | 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 |

**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 |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |
|--------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
|                                                              |                                      |                            | LOOSE IN BOX                                |                | REEL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | C-VALUE |
|                                                              |                                      |                            | Leads                                       | Leads          | 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                               |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |
| 0.068                                                        | 7.0 x 16.5 x 26.5                    | 3.0                        | 30 ...<br>(200)                             | 34...<br>(250) | 32...<br>(550)<br><br>683                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |         |
| 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><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br><br> |         |

## 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:                                               | at 10 kHz      at 100 kHz                      |
| C ≤ 0.016 μF                                                         | ≤ 5 x 10 <sup>-4</sup> ≤ 10 x 10 <sup>-4</sup> |
| 0.016 μF < C ≤ 0.039 μF                                              | ≤ 5 x 10 <sup>-4</sup> ≤ 15 x 10 <sup>-4</sup> |
| 0.039 μF < C ≤ 0.13 μF                                               | ≤ 5 x 10 <sup>-4</sup> ≤ 20 x 10 <sup>-4</sup> |
| Rated voltage pulse slope (dU/dt) <sub>R</sub> :                     |                                                |
| C ≤ 0.0056 μF                                                        | 8000 V/μs                                      |
| 0.0056 μF < C ≤ 0.016 μF                                             | 15 000 V/μs                                    |
| 0.016 μF < C ≤ 0.039 μF                                              | 4000 V/μs                                      |
| 0.039 μF < C ≤ 0.1 μF                                                | 2100 V/μs                                      |
| 0.1 μF < C ≤ 0.13 μF                                                 | 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

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

| 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) |                |         |  |     |     |
| 0.0022                                                     | 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>( $\mu$ 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 |
|-------------------------------------------------------------------|--------------------------------------|----------------------------|---------------------------------------------|-------------------------|-----------------|----------------------------|----------------------|---------|
|                                                                   |                                      |                            | LOOSE IN BOX                                |                         | REEL            |                            |                      | ..YYY   |
|                                                                   |                                      |                            | 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 = 27.5 $\pm$ 0.4 mm; d <sub>t</sub> = 0.80 mm $\pm$ 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                                                  |                          |

# MMKP 383



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<br>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) | -              |                          |     |                |                |                    |                          |                |                |                    |                | 163<br>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)                  |

## 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

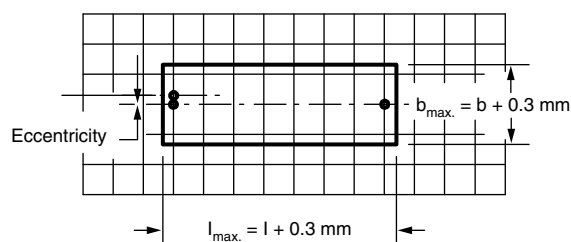
In order to withstand vibration and shock tests, it must be ensured that the stand-off pips are in good contact with the printed-circuit board:

- 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 %.

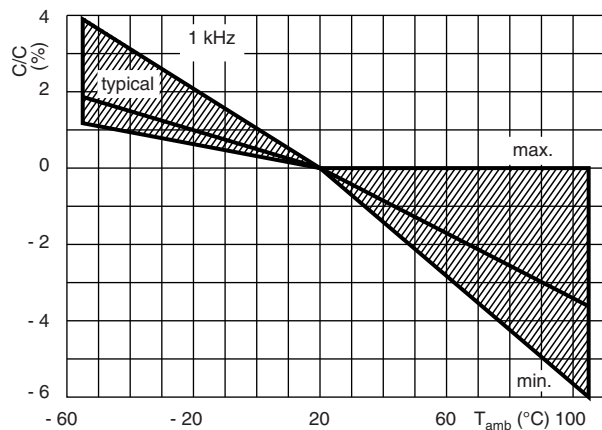
# MMKP 383



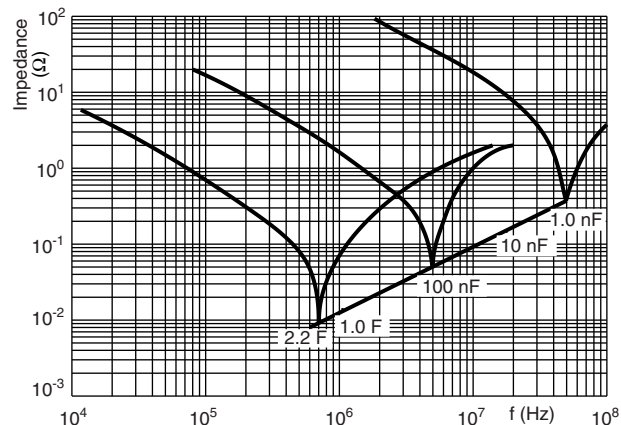
Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type

## CHARACTERISTICS

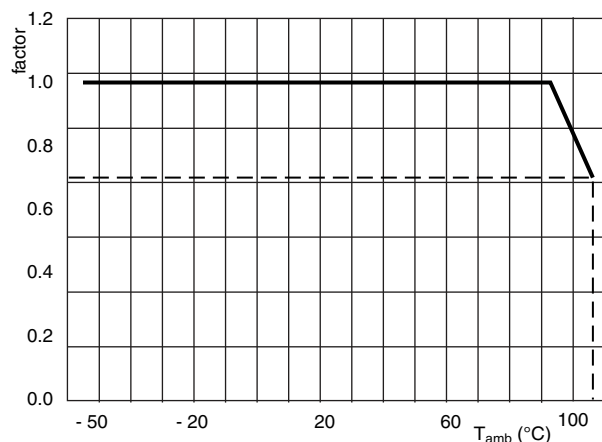
Capacitance as a function of ambient temperature (typical curve)  
(1 kHz)



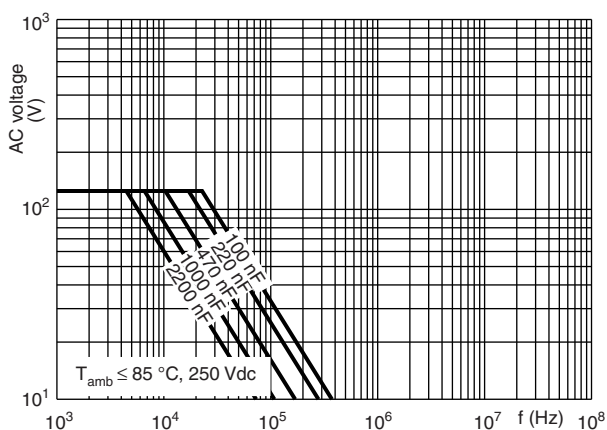
Impedance as a function of frequency (typical curve)



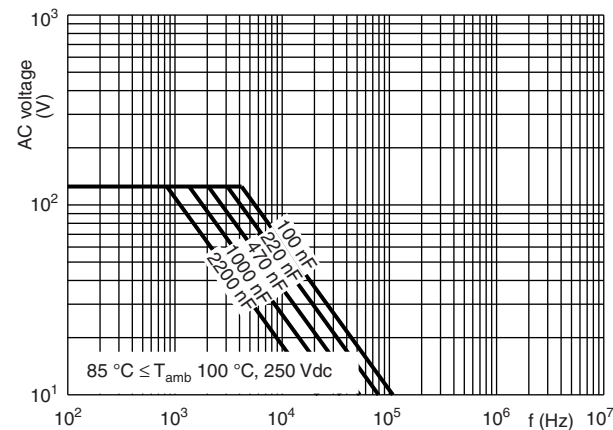
Max. DC and AC voltage as function of temperature



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

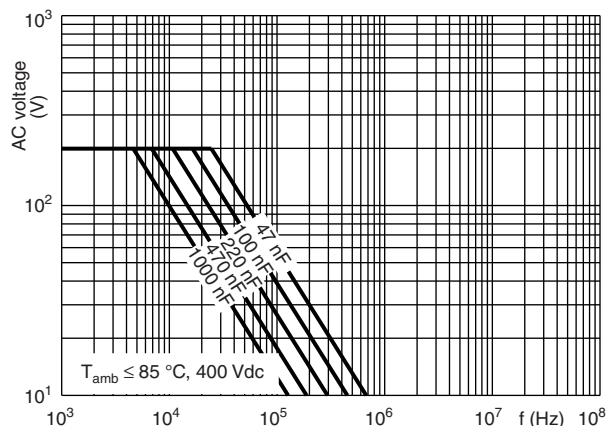




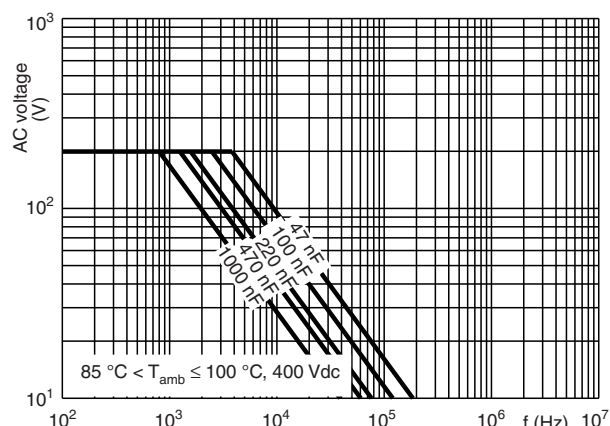
AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

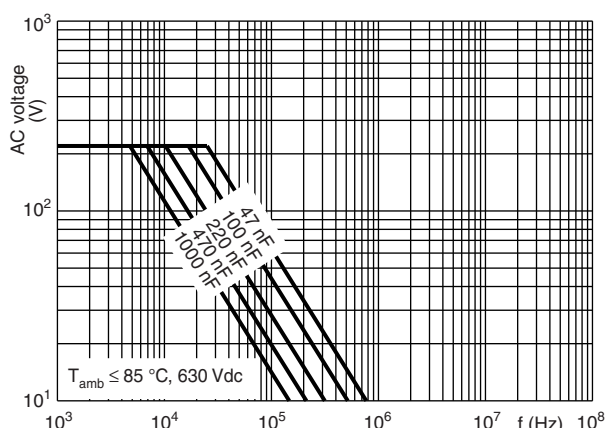
Max. RMS voltage as a function of frequency



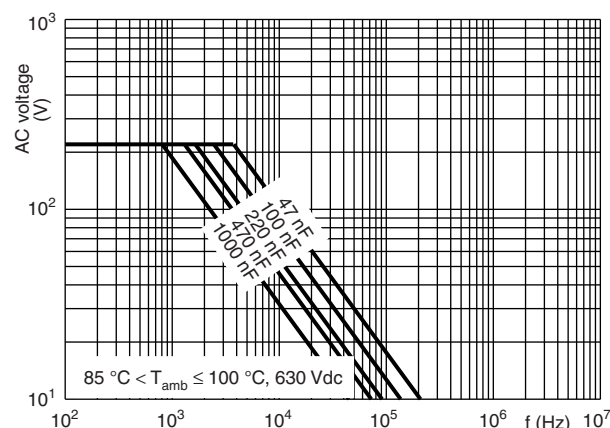
Max. RMS voltage as a function of frequency



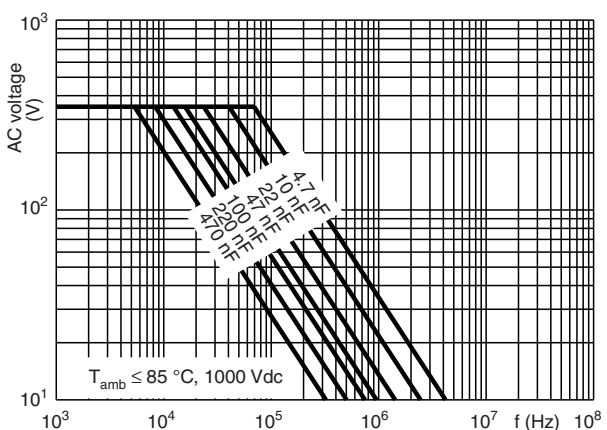
Max. RMS voltage as a function of frequency



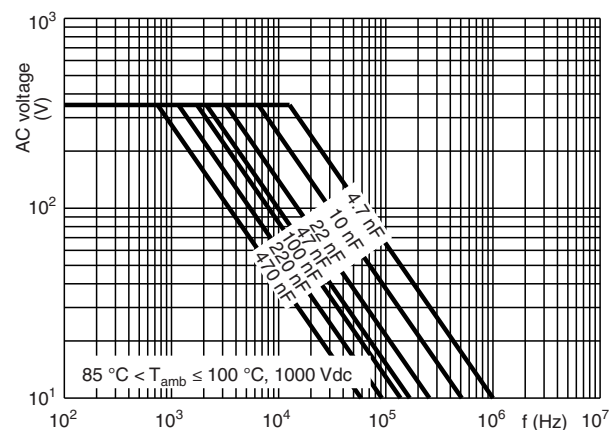
Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

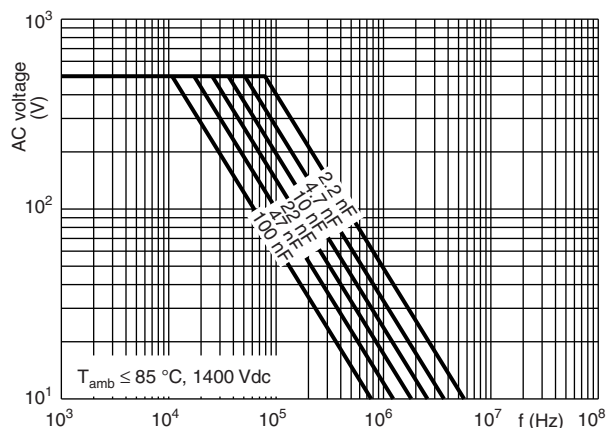


# MMKP 383

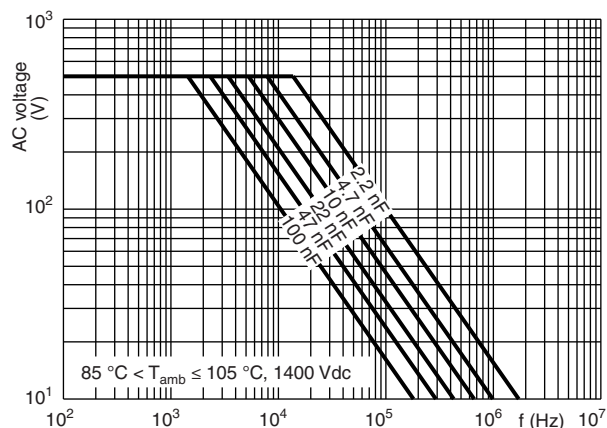
Vishay BCcomponents AC and Pulse Double Metallized Polypropylene Film Capacitors MMKP Radial Potted Type



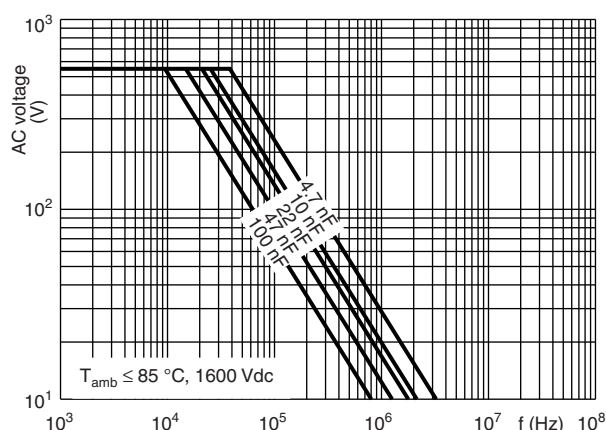
Max. RMS voltage as a function of frequency



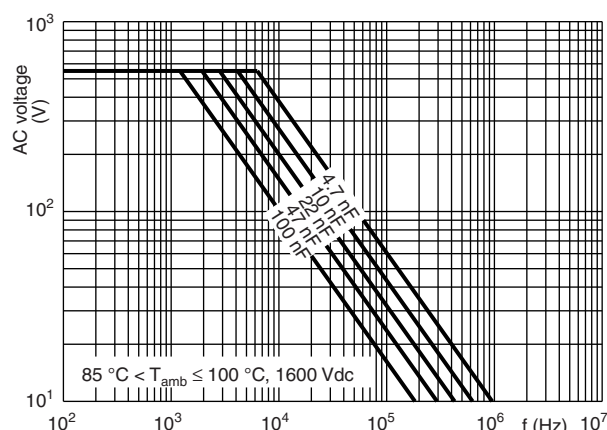
Max. RMS voltage as a function of frequency



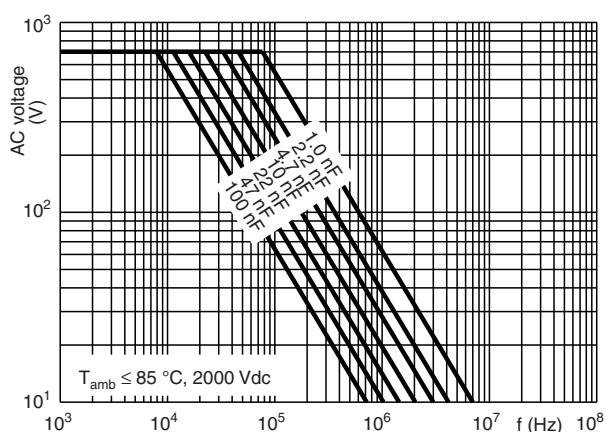
Max. RMS voltage as a function of frequency



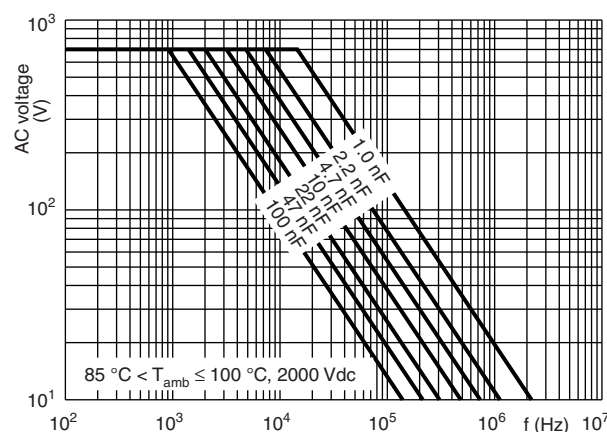
Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency



Max. RMS voltage as a function of frequency

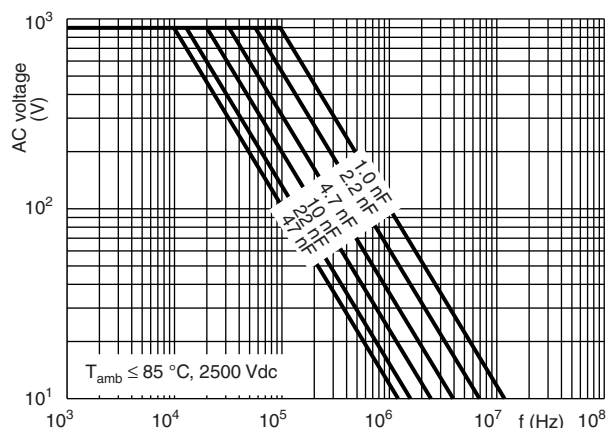




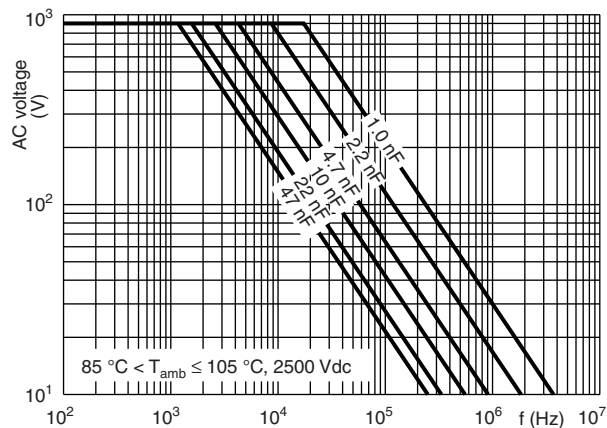
AC and Pulse Double Metallized Polypropylene  
Film Capacitors MMKP Radial Potted Type

Vishay BCcomponents

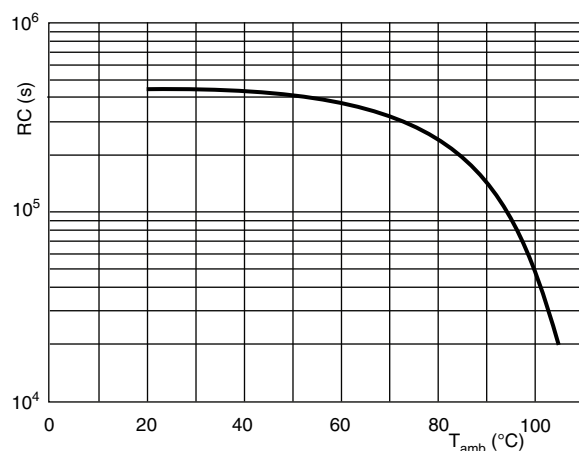
Max. RMS voltage as a function of frequency



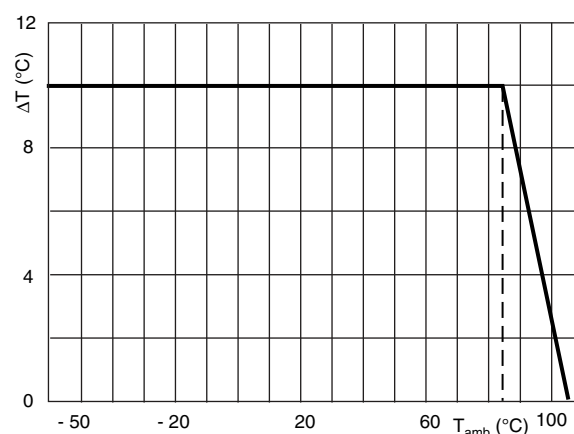
Max. RMS voltage as a function of frequency



Insulation resistance as a function of ambient temperature



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

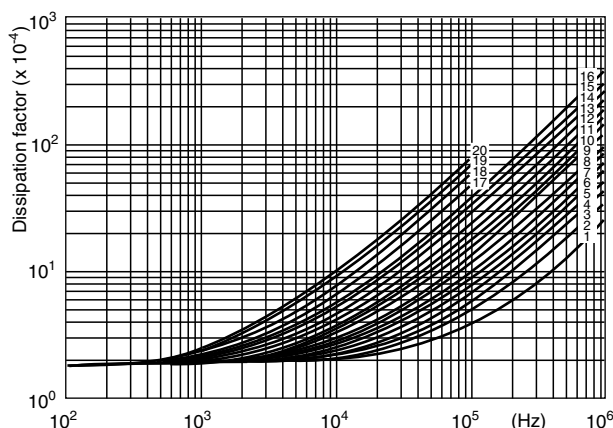


# MMKP 383



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

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

| $W_{\text{max.}}$<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.

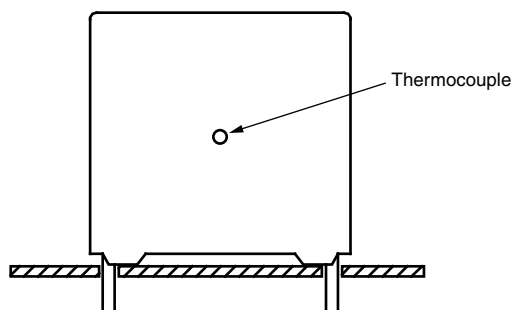
The power dissipation can be calculated according type detail specification "HQN-384-01/101: Technical Information Film Capacitors".

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"

# MMKP 383



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

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                             | $T_{amb} \leq 85\text{ }^{\circ}\text{C}$ | $85\text{ }^{\circ}\text{C} < T_{amb} \leq 105\text{ }^{\circ}\text{C}$ |
|----------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------|
| 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.

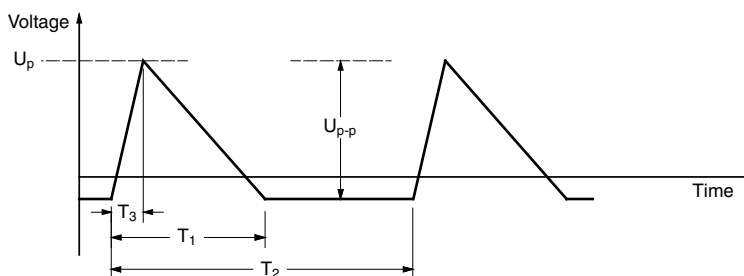
$U_{P-P} = 1000\text{ V}$ ;  $U_P = 900\text{ V}$ ;  $T_1 = 12\text{ }\mu\text{s}$ ;  $T_2 = 64\text{ }\mu\text{s}$ ;  $T_3 = 4\text{ }\mu\text{s}$

The ambient temperature is  $80\text{ }^{\circ}\text{C}$ . 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  $35\text{ mW}/11\text{ mW}/^{\circ}\text{C} = 3.2\text{ }^{\circ}\text{C}$   
This is lower than  $10\text{ }^{\circ}\text{C}$  temperature rise at  $80\text{ }^{\circ}\text{C}$ , 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>$\leq 0.0005$ for: $C \leq 100 \text{ nF}$ or<br>$\leq 0.001$ for: $100 \text{ nF} < C \leq 470 \text{ nF}$ or<br>$\leq 0.0015$ 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                                                                                                                                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SUB-GROUP C3A</b>                                                                                             |                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                   |
| 4.12.1 Endurance test at 50 Hz alternating voltage                                                               | Duration: 2000 h<br>1.25 x U <sub>Rdc</sub> at 105 °C                                                                                |                                                                                                                                                                                                                                                                                                                                                                   |
| 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<br><br>Insulation resistance                                      | 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 |
| <b>SUB-GROUP C4</b>                                                                                              |                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                   |
| 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>$R = \frac{U_{Rdc}}{5 \times C \times (2.5 \times dU/dt)}$  |                                                                                                                                                                                                                                                                                                                                                                   |
| 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                                                                | ΔC/C  ≤ 1 % compared to values measured in 4.13.1<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 4.13.1<br><br>≥ 50 % of values specified in section "Insulation Resistance" of this specification                                                  |



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.