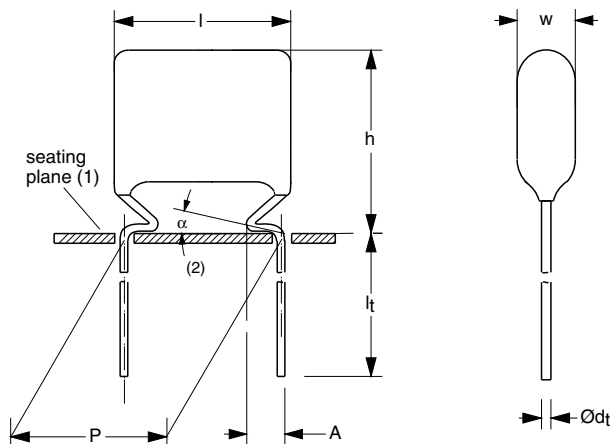


# Metallized Polyester Film Capacitors MKT Radial Epoxy Lacquered Type



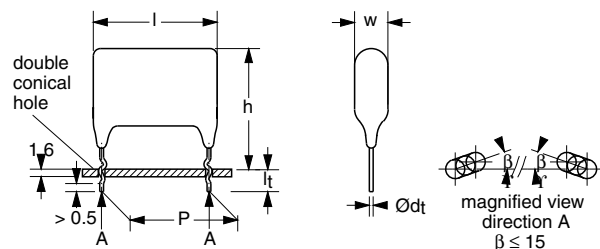
Dimensions in mm

(1) Hole  $\varnothing$  1.0 for  $d_t = 0.6$  mm  
Hole  $\varnothing$  1.3 for  $d_t = 0.8$  mm

(2)  $0 \leq \alpha < 50^\circ$

(3)  $A = 2.0 + 1.0/-0.5$  mm (pitch = 10.0 mm)

$A = 2.5 + 1.4/-0.5$  mm (pitch = 15.0 mm, 22.5 mm and 27.5 mm)



Dimensions in mm

## APPLICATIONS

Blocking and coupling. Bypass and energy reservoir

## MARKING

C-value; tolerance; rated voltage

## DIELECTRIC

Polyester film

## ELECTRODES

Vacuum deposited aluminum

## FEATURES

Available taped on reel and loose in box

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

## COATING

Flame retardant epoxy material (UL-class 94 V-0)

## CONSTRUCTION

Wound mono construction

## LEADS

Tinned wire

## CAPACITANCE RANGE (E12 SERIES)

0.001 to 1.0  $\mu$ F

## CAPACITANCE TOLERANCE

$\pm 10\%$ ;  $\pm 5\%$

## RATED (DC) VOLTAGE

63 V; 100 V; 250 V; 400 V; 630 V

## RATED (AC) VOLTAGE

40 V; 63 V; 160 V; 220 V; 250 V

## CLIMATIC CATEGORY

55/105/56

## RATED TEMPERATURE

85  $^\circ$ C

## MAXIMUM APPLICATION TEMPERATURE

105  $^\circ$ C

## REFERENCE SPECIFICATIONS

IEC 60384-2

## PERFORMANCE GRADE

Grade 1 (long life)

## DETAIL SPECIFICATION

For more detailed data and test requirements see "Type detail specification HQN-384-02/101"



**RoHS**  
COMPLIANT



## COMPOSITION OF CATALOG NUMBER

| TYPE AND PITCHES |         |
|------------------|---------|
| 368              | 10.0 mm |
|                  | 15.0 mm |
|                  | 22.5 mm |
|                  | 27.5 mm |

numerically

| n   | n |
|-----|---|
| 0.1 | 2 |
| 1   | 3 |
| 10  | 4 |
| 100 | 5 |

Example:

104 = 10 x 10 = 100 nF

|       |     |    |    |   |
|-------|-----|----|----|---|
| 0000  | 368 | XX | XX | X |
| 88102 | 368 | XX | XX | X |

\* Use this partnumber for those with access to the Vishay's SAP system and Partners web-site within the Americas

| TYPE | PACKAGING     | LEAD CONFIGURATION                                                                                                                        | ON REQUEST                                             | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
|------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----|-----|-----|-----|-----|
| 368  | loose in box  | lead length 4.0 + 1.0/- 0.5 mm                                                                                                            | ± 10 %                                                 | 15  | 25  | 45  | 55  | 65  |
|      |               |                                                                                                                                           | ± 5 %                                                  | 16  | 26  | 46  | 56  | 66  |
|      |               | lead length 4.0 + 1.0/- 0.5 mm (lock lead)                                                                                                | ± 10 %                                                 | -   | 90  | 90  | 90  | 90  |
|      |               |                                                                                                                                           | dimensions of this code numbers stays between brackets |     |     |     |     |     |
|      |               | lead length 3.5 ± 0.5 mm                                                                                                                  | ± 10 %                                                 | 13  | 23  | 43  | 53  | 63  |
|      |               |                                                                                                                                           | ± 5 %                                                  | 17  | 27  | 47  | 57  | 67  |
|      |               | long leads:<br>19.0 ± 4.0 mm for lead pitch = 15.0 mm<br>25.0 ± 4.0 mm for lead pitch = 22.5 mm<br>24.0 ± 4.0 mm for lead pitch = 27.5 mm | ± 10 %                                                 | 11  | 21  | 41  | 51  | 61  |
|      |               |                                                                                                                                           | ± 5 %                                                  | 12  | 22  | 42  | 52  | 62  |
|      | taped on reel | H = 16.0 mm; P <sub>0</sub> = 12.7 mm;<br>reel diameter = 500 mm                                                                          | ± 10 %                                                 | 18  | 28  | 48  | 58  | 68  |
|      |               |                                                                                                                                           | ± 5 %                                                  | 19  | 29  | 49  | 59  | 69  |

## SPECIFIC REFERENCE DATA

| DESCRIPTION                                                                                                  | VALUE                   |                 |                          |                 |                          |
|--------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|--------------------------|-----------------|--------------------------|
| Tangent of loss angle:<br>C ≤ 0.1 μF<br>0.1 μF < C ≤ 0.47 μF<br>0.47 μF < C ≤ 1.0 μF                         | at 1 kHz                |                 | at 10 kHz                |                 | at 100 kHz               |
|                                                                                                              | ≤ 75 x 10 <sup>-4</sup> |                 | ≤ 130 x 10 <sup>-4</sup> |                 | ≤ 225 x 10 <sup>-4</sup> |
|                                                                                                              | ≤ 75 x 10 <sup>-4</sup> |                 | ≤ 130 x 10 <sup>-4</sup> |                 | ≤ 300 x 10 <sup>-4</sup> |
|                                                                                                              | ≤ 75 x 10 <sup>-4</sup> |                 | ≤ 130 x 10 <sup>-4</sup> |                 | -                        |
| Rated voltage pulse slope (dU/dt) <sub>R</sub><br>P = 10 mm<br>P = 15 mm<br>P = 22.5 mm<br>P = 27.5 mm       | at 63 V (DC)            | at 100 V (DC)   | at 250 V (DC)            | at 400 V (DC)   | at 630 V (DC)            |
|                                                                                                              | 30 V/μs                 | 30 V/μs         | 70 V/μs                  | 110 V/μs        | 70 V/μs                  |
|                                                                                                              |                         | 20 V/μs         | 28 V/μs                  | 44 V/μs         | 70 V/μs                  |
|                                                                                                              |                         | 8 V/μs          | 12 V/μs                  | 20 V/μs         | 28 V/μs                  |
| R between leads, for C ≤ 0.33 μF:<br>at 10 V; 1 minute<br>at 100 V; 1 minute<br>at 500 V; 1 minute           | > 15000 MΩ              | > 15000 MΩ      | > 30000 MΩ               | > 30000 MΩ      | > 30000 MΩ               |
| RC between leads, for C > 0.33 μF:<br>at 10 V; 1 minute<br>at 100 V; 1 minute<br>at 500 V; 1 minute          | > 5000 s                | > 5000 s        | > 10000 s                | > 10000 s       | > 10000 s                |
| R between interconnecting leads and casing;<br>at 10 V; 1 minute<br>at 100 V; 1 minute<br>at 500 V; 1 minute | > 30000 MΩ              | > 30000 MΩ      | > 30000 MΩ               | > 30000 MΩ      | > 30000 MΩ               |
| Withstanding (DC) voltage (cut off current 10 mA);<br>rise time 100 V/s                                      | 100 V; 1 minute         | 160 V; 1 minute | 400 V; 1 minute          | 640 V; 1 minute | 1008 V;<br>1 minute      |
| Withstanding (DC) voltage between leads and case                                                             | 200 V; 1 minute         | 200 V; 1 minute | 500 V; 1 minute          | 800 V; 1 minute | 1260 V;<br>1 minute      |

 $U_{Rdc} = 63 \text{ V}$ ;  $U_{Rac} = 40 \text{ V}$ 

| C<br>( $\mu$ F)                                       | DIMENSIONS<br>$w_{\text{max}} \times h_{\text{max}} \times l_{\text{max}}$<br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |           |                                    |      |
|-------------------------------------------------------|------------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|-----------|------------------------------------|------|
|                                                       |                                                                                    |             | LOOSE IN BOX                                |             |            | REEL      | LOOSE IN BOX                       |      |
|                                                       |                                                                                    |             | $l_t =$<br>4.0 + 1.0/-0.5 mm                | short leads | long leads | SPQ       | $l_t =$<br>4.0 + 1.0/-0.5 mm       | SPQ  |
|                                                       |                                                                                    |             | C-tol = $\pm$ 10 %                          | SPQ         | SPQ        |           | C-tol = $\pm$ 10 %                 |      |
|                                                       |                                                                                    |             | last 5 digits of<br>catalog number          |             |            |           | last 5 digits of<br>catalog number |      |
| Pitch = 10.0 $\pm$ 0.4 mm; $d_t$ = 0.60 $\pm$ 0.06 mm |                                                                                    |             |                                             |             |            | lock lead |                                    |      |
| 0.22                                                  | 4.2 x 13.2 (15.5) x 12.5                                                           | 0.5         | 15224                                       | 2000        | 1000       | 1300      | 90316                              | 1100 |
| 0.27                                                  | 4.0 x 12.8 (15.5) x 12.5                                                           | 0.5         | 15274                                       | 2000        | 1000       | 1300      | 90317                              | 1100 |
| 0.33                                                  | 4.3 x 13.1 (15.5) x 12.5                                                           | 0.5         | 15334                                       | 2000        | 1000       | 1300      | 90318                              | 1100 |
| 0.39                                                  | 4.2 x 12.9 (15.5) x 12.5                                                           | 0.5         | 15394                                       | 2000        | 1000       | 1300      | 90319                              | 1100 |
| 0.47                                                  | 4.3 x 13.4 (16.0) x 12.5                                                           | 0.5         | 15474                                       | 2000        | 1000       | 1200      | 90321                              | 1000 |
| 0.56                                                  | 4.7 x 13.7 (16.0) x 12.5                                                           | 0.5         | 15564                                       | 2000        | 1000       | 1200      | 90322                              | 1000 |
| 0.68                                                  | 5.1 x 14.1 (16.5) x 12.5                                                           | 0.6         | 15684                                       | 2000        | 1000       | 1100      | 90323                              | 1500 |
| 0.82                                                  | 5.5 x 14.5 (17.0) x 12.5                                                           | 0.6         | 15824                                       | 2000        | 1000       | 1000      | 90324                              | 1250 |
| 1.0                                                   | 6.0 x 15.0 (17.5) x 12.5                                                           | 0.8         | 15105                                       | 2000        | 1000       | 900       | 90325                              | 1250 |

 $U_{Rdc} = 100 \text{ V}$ ;  $U_{Rac} = 63 \text{ V}$ 

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |      |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.056                                                  | 4.0 x 13.0 (15.0) x 12.5                                                     | 0.4         | 25563                                       | 2000        | 1000       | 1500 | 90205                                 | 1250 |
| 0.068                                                  |                                                                              |             | 25683                                       |             |            |      | 90206                                 |      |
| 0.082                                                  | 3.7 x 12.7 (15.0) x 12.5                                                     | 0.4         | 25823                                       | 2000        | 1000       | 1500 | 90207                                 | 1250 |
| 0.10                                                   | 4.0 x 13.0 (15.0) x 12.5                                                     | 0.4         | 25104                                       | 2000        | 1000       | 1500 | 90208                                 | 1250 |
| 0.12                                                   | 4.3 x 13.3 (15.0) x 12.5                                                     | 0.4         | 25124                                       | 2000        | 1000       | 1500 | 90209                                 | 1250 |
| 0.15                                                   | 3.9 x 12.9 (15.0) x 12.5                                                     | 0.4         | 25154                                       | 2000        | 1000       | 1500 | 90211                                 | 1250 |
| 0.18                                                   | 4.2 x 13.2 (15.5) x 12.5                                                     | 0.5         | 25184                                       | 2000        | 1000       | 1300 | 90212                                 | 1100 |
| 0.22                                                   | 4.5 x 13.6 (16.0) x 12.5                                                     | 0.5         | 25224                                       | 2000        | 1000       | 1200 | 90213                                 | 1000 |
| Pitch = 15.0 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.27                                                   | 5.0 x 14.0 (17.0) x 17.5                                                     | 0.6         | 25274                                       | 2000        | 1000       | 1200 | 90214                                 | 1750 |
| 0.33                                                   |                                                                              |             | 25334                                       |             |            |      | 90215                                 |      |
| 0.39                                                   |                                                                              |             | 25394                                       |             |            |      | 90216                                 |      |
| 0.47                                                   | 5.5 x 14.5 (17.5) x 17.5                                                     | 0.7         | 25474                                       | 2000        | 1000       | 1100 | 90217                                 | 1500 |
| 0.56                                                   |                                                                              |             | 25564                                       |             |            |      | 90218                                 |      |
| 0.68                                                   | 6.0 x 15.0 (18.0) x 17.5                                                     | 0.9         | 25684                                       | 2000        | 1000       | 1000 | 90219                                 | 1500 |
| 0.82                                                   | 6.5 x 15.5 (18.5) x 17.5                                                     | 1.0         | 25824                                       | 1000        | 1000       | 900  | 90221                                 | 1250 |
| 1.0                                                    | 7.5 x 16.5 (19.5) x 17.5                                                     | 1.3         | 25105                                       | 1000        | 1000       | 800  | 90222                                 | 1000 |



| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |      |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |      |
| Pitch = 22.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 1.2                                                    | 6.0 x 18.0 (21.0) x 26.0                                                     | 2.5         | 25125                                       | 1000        | 1000       |      | 90223                                 | 1000 |
| 1.5                                                    |                                                                              |             | 25155                                       |             |            |      | 90224                                 |      |
| 1.8                                                    | 7.0 x 19.0 (22.0) x 26.0                                                     | 3.2         | 25185                                       | 1000        | 1000       |      | 90225                                 | 900  |
| 2.2                                                    | 7.5 x 19.5 (23.0) x 26.0                                                     | 3.5         | 25225                                       | 1000        | 500        |      | 90226                                 | 750  |
| 2.7                                                    | 8.5 x 21.5 (24.0) x 26.0                                                     | 4.1         | 25275                                       | 1000        | 500        |      | 90227                                 | 600  |
| 3.3                                                    | 9.0 x 22.0 (24.5) x 26.0                                                     | 4.5         | 25335                                       | 1000        | 500        |      | 90228                                 | 600  |
| Pitch = 27.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 3.9                                                    | 9.0 x 22.0 (24.0) x 30.0                                                     | 4.8         | 25395                                       | 500         | 500        |      | 90229                                 | 500  |
| 4.7                                                    | 10.0 x 23.0 (25.0) x 30.0                                                    | 5.5         | 25475                                       | 500         | 500        |      | 90178                                 | 400  |
| 5.6                                                    | 11.0 x 24.0 (26.0) x 30.0                                                    | 6.2         | 25565                                       | 500         | 250        |      | 90231                                 | 350  |
| 6.8                                                    | 12.0 x 25.0 (27.0) x 30.0                                                    | 6.8         | 25685                                       | 500         | 250        |      | 90232                                 | 350  |

$U_{Rdc} = 250$  V;  $U_{Rac} = 160$  V

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |      |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.027                                                  | 4.2 x 13.0 (15.0) x 12.5                                                     | 0.4         | 45273                                       | 2000        | 1000       | 1500 | 90233                                 | 1250 |
| 0.033                                                  | 4.6 x 13.0 (15.0) x 12.5                                                     | 0.5         | 45333                                       | 2000        | 1000       | 1300 | 90234                                 | 1250 |
| 0.039                                                  | 4.0 x 13.0 (15.0) x 12.5                                                     | 0.4         | 45393                                       | 2000        | 1000       | 1500 | 90235                                 | 1250 |
| 0.047                                                  | 4.5 x 13.5 (15.5) x 12.5                                                     | 0.5         | 45473                                       | 2000        | 1000       | 1500 | 90176                                 | 1250 |
| 0.056                                                  | 4.6 x 13.5 (15.5) x 12.5                                                     | 0.5         | 45563                                       | 2000        | 1000       | 1300 | 90236                                 | 1100 |
| 0.068                                                  |                                                                              |             | 45683                                       |             |            |      | 90237                                 |      |
| 0.082                                                  | 4.4 x 13.4 (16.0) x 12.5                                                     | 0.5         | 45823                                       | 2000        | 1000       | 1200 | 90238                                 | 1000 |
| 0.10                                                   | 4.7 x 13.7 (16.0) x 12.5                                                     | 0.5         | 45104                                       | 2000        | 1000       | 1200 | 90177                                 | 1000 |
| Pitch = 15.0 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.12                                                   | 5.0 x 14.0 (17.0) x 17.5                                                     | 0.6         | 45124                                       | 2000        | 1000       | 1200 | 90239                                 | 1750 |
| 0.15                                                   |                                                                              |             | 45154                                       |             |            |      | 90241                                 |      |
| 0.18                                                   | 5.5 x 14.5 (17.5) x 17.5                                                     | 0.7         | 45184                                       | 2000        | 1000       | 1100 | 90242                                 | 1500 |
| 0.22                                                   | 6.0 x 15.0 (18.0) x 17.5                                                     | 0.9         | 45224                                       | 2000        | 1000       | 1000 | 90243                                 | 1500 |
| 0.27                                                   | 6.0 x 15.5 (18.5) x 17.5                                                     | 1.0         | 45274                                       | 2000        | 1000       | 900  | 90244                                 | 1250 |
| 0.33                                                   | 6.8 x 16.0 (19.0) x 17.5                                                     | 1.2         | 45334                                       | 1000        | 1000       | 800  | 90245                                 | 1250 |
| Pitch = 22.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.39                                                   | 5.0 x 17.0 (20.0) x 26.0                                                     | 1.8         | 45394                                       | 1000        | 1000       |      | 90246                                 | 1250 |
| 0.47                                                   | 5.5 x 17.5 (20.5) x 26.0                                                     | 2.2         | 45474                                       | 1000        | 1000       |      | 90247                                 | 1250 |
| 0.56                                                   | 6.0 x 18.0 (21.0) x 26.0                                                     | 2.5         | 45564                                       | 1000        | 1000       |      | 90248                                 | 1000 |
| 0.68                                                   | 6.6 x 18.5 (21.5) x 26.0                                                     | 2.8         | 45684                                       | 1000        | 1000       |      | 90249                                 | 1000 |
| 0.82                                                   | 7.2 x 19.0 (22.0) x 26.0                                                     | 3.2         | 45824                                       | 1000        | 1000       |      | 90251                                 | 900  |
| 1.0                                                    | 8.0 x 20.0 (23.0) x 26.0                                                     | 3.8         | 45105                                       | 1000        | 500        |      | 90252                                 | 750  |



| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |     |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|-----|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |     |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |     |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |     |
| Pitch = 27.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |     |
| 1.2                                                    | 8.0 x 21.0 (23.0) x 30.0                                                     | 4.1         | 45125                                       | 500         | 500        |      | 90253                                 | 600 |
| 1.5                                                    | 9.0 x 22.0 (25.0) x 30.0                                                     | 4.8         | 45155                                       | 500         | 500        |      | 90254                                 | 450 |
| 1.8                                                    | 10.0 x 23.0 (26.0) x 30.0                                                    | 5.5         | 45185                                       | 500         | 500        |      | 90255                                 | 400 |
| 2.2                                                    | 11.0 x 24.0 (27.0) x 30.0                                                    | 6.2         | 45225                                       | 500         | 250        |      | 90256                                 | 350 |

 $U_{Rdc} = 400$  V;  $U_{Rac} = 220$  V

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |      |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.0010                                                 | 4.5 x 13.5 (15.5) x 12.5                                                     | 0.5         | 55102                                       | 2000        | 1000       | 1500 | 90257                                 | 1100 |
| 0.0012                                                 |                                                                              |             | 55122                                       |             |            |      | 90258                                 |      |
| 0.0015                                                 |                                                                              |             | 55152                                       |             |            |      | 90259                                 |      |
| 0.0018                                                 |                                                                              |             | 55182                                       |             |            |      | 90261                                 |      |
| 0.0022                                                 | 4.0 x 13.0 (15.5) x 12.5                                                     | 0.5         | 55222                                       | 2000        | 1000       | 1500 | 90262                                 | 1100 |
| 0.0027                                                 | 4.3 x 13.3 (15.5) x 12.5                                                     | 0.5         | 55272                                       | 2000        | 1000       | 1500 | 90263                                 | 1100 |
| 0.0033                                                 | 4.6 x 13.6 (15.5) x 12.5                                                     | 0.5         | 55332                                       | 2000        | 1000       | 1500 | 90264                                 | 1100 |
| 0.0039                                                 | 4.0 x 13.0 (15.5) x 12.5                                                     | 0.5         | 55392                                       | 2000        | 1000       | 1500 | 90265                                 | 1100 |
| 0.0047                                                 | 4.1 x 13.2 (15.5) x 12.5                                                     | 0.5         | 55472                                       | 2000        | 1000       | 1500 | 90266                                 | 1100 |
| 0.0056                                                 | 4.6 x 13.6 (15.5) x 12.5                                                     | 0.5         | 55562                                       | 2000        | 1000       | 1500 | 90267                                 | 1100 |
| 0.0068                                                 |                                                                              |             | 55682                                       |             |            |      | 90268                                 |      |
| 0.0082                                                 |                                                                              |             | 55822                                       |             |            |      | 90269                                 |      |
| 0.010                                                  |                                                                              |             | 55103                                       |             |            |      | 90271                                 |      |
| 0.012                                                  | 4.0 x 13.0 (15.5) x 12.5                                                     | 0.5         | 55123                                       | 2000        | 1000       | 1500 | 90272                                 | 1100 |
| 0.015                                                  | 4.1 x 13.0 (15.5) x 12.5                                                     | 0.5         | 55153                                       | 2000        | 1000       | 1300 | 90273                                 | 1100 |
| 0.018                                                  | 4.4 x 13.0 (15.5) x 12.5                                                     | 0.5         | 55183                                       | 2000        | 1000       | 1500 | 90274                                 | 1100 |
| 0.022                                                  | 4.2 x 12.9 (15.5) x 12.5                                                     | 0.5         | 55223                                       | 2000        | 1000       | 1500 | 90175                                 | 1100 |
| 0.027                                                  | 4.2 x 13.2 (15.5) x 12.5                                                     | 0.5         | 55273                                       | 2000        | 1000       | 1300 | 90275                                 | 1100 |
| 0.033                                                  | 4.6 x 13.7 (15.5) x 12.5                                                     | 0.5         | 55333                                       | 2000        | 1000       | 1300 | 90188                                 | 1100 |
| Pitch = 15.0 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.039                                                  | 5.0 x 13.9 (16.5) x 17.5                                                     | 0.6         | 55393                                       | 2000        | 1000       | 1200 | 90276                                 | 2000 |
| 0.047                                                  | 5.4 x 14.5 (17.0) x 17.5                                                     | 0.7         | 55473                                       | 2000        | 1000       | 1200 | 90277                                 | 1750 |
| 0.056                                                  | 5.0 x 13.7 (16.5) x 17.5                                                     | 0.6         | 55563                                       | 2000        | 1000       | 1200 | 90278                                 | 2000 |
| 0.068                                                  | 5.0 x 13.5 (16.5) x 17.5                                                     | 0.6         | 55683                                       | 2000        | 1000       | 1200 | 90279                                 | 2000 |
| 0.082                                                  | 4.8 x 14.0 (16.5) x 17.5                                                     | 0.6         | 55823                                       | 2000        | 1000       | 1100 | 90281                                 | 2000 |
| 0.10                                                   | 5.3 x 14.5 (17.5) x 17.5                                                     | 0.7         | 55104                                       | 2000        | 1000       | 1000 | 90186                                 | 1500 |
| 0.12                                                   | 5.7 x 15.0 (18.0) x 17.5                                                     | 0.9         | 55124                                       | 1000        | 1000       | 900  | 90282                                 | 1500 |
| 0.15                                                   | 6.4 x 15.5 (18.5) x 17.5                                                     | 1.0         | 55154                                       | 1000        | 1000       | 800  | 90187                                 | 1250 |



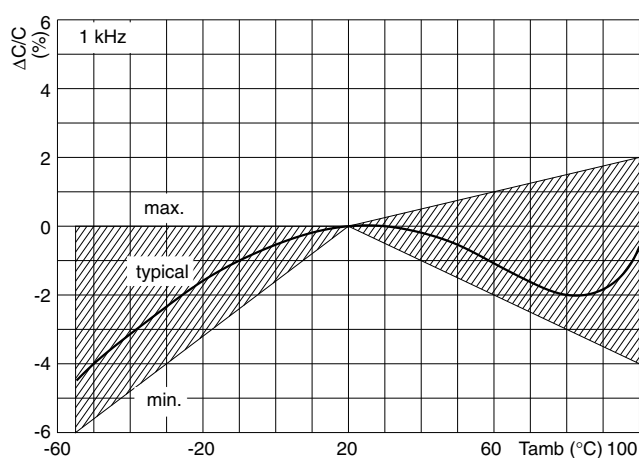
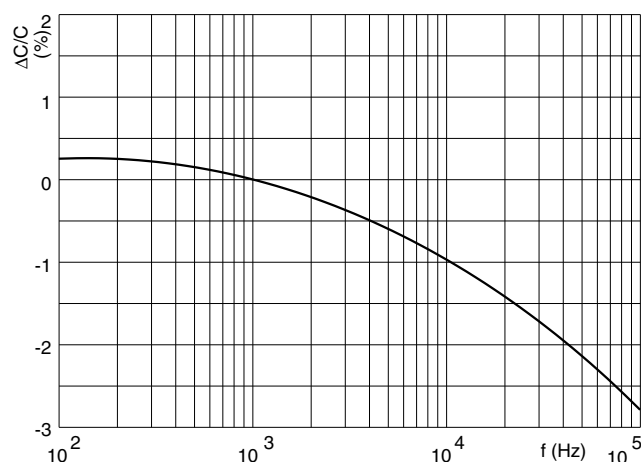
| C<br>( $\mu$ F)                                     | DIMENSIONS<br>$w_{\max} \times h_{\max} \times l_{\max}$<br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                    |      |
|-----------------------------------------------------|------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|------------------------------------|------|
|                                                     |                                                                  |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                       |      |
|                                                     |                                                                  |             | $l_t =$<br>4.0 + 1.0/- 0.5 mm               | short leads | long leads | SPQ  | $l_t =$<br>4.0 + 1.0/-0.5 mm       | SPQ  |
|                                                     |                                                                  |             | C-tol = $\pm 10$ %                          | SPQ         | SPQ        |      | C-tol = $\pm 10$ %                 |      |
|                                                     |                                                                  |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number |      |
| Pitch = 22.5 $\pm$ 0.4 mm; $d_t = 0.80 \pm 0.08$ mm |                                                                  |             |                                             |             |            |      | lock lead                          |      |
| 0.18                                                | 5.6 x 17.5 (20.5) x 26.0                                         | 2.2         | 55184                                       | 1000        | 1000       |      | 90283                              | 1250 |
| 0.22                                                | 6.3 x 18.5 (21.5) x 26.0                                         | 2.8         | 55224                                       | 1000        | 1000       |      | 90284                              | 1000 |
| 0.27                                                | 6.0 x 18.0 (21.0) x 26.0                                         | 2.5         | 55274                                       | 1000        | 1000       |      | 90285                              | 1000 |
| 0.33                                                | 6.4 x 18.5 (21.5) x 26.0                                         | 2.8         | 55334                                       | 1000        | 1000       |      | 90286                              | 1000 |
| 0.39                                                | 7.1 x 19.0 (21.5) x 26.0                                         | 2.8         | 55394                                       | 1000        | 1000       |      | 90287                              | 900  |
| 0.47                                                | 8.0 x 20.0 (22.5) x 26.0                                         | 3.8         | 55474                                       | 1000        | 500        |      | 90179                              | 750  |
| Pitch = 27.5 $\pm$ 0.4 mm; $d_t = 0.80 \pm 0.08$ mm |                                                                  |             |                                             |             |            |      | lock lead                          |      |
| 0.56                                                | 7.5 x 20.5 (22.5) x 30.0                                         | 3.8         | 55564                                       | 500         | 500        |      | 90288                              | 600  |
| 0.68                                                | 8.5 x 21.5 (23.5) x 30.0                                         | 4.5         | 55684                                       | 500         | 500        |      | 90289                              | 500  |
| 0.82                                                | 9.5 x 22.5 (24.5) x 30.0                                         | 5.2         | 55824                                       | 500         | 500        |      | 90291                              | 450  |
| 1.0                                                 | 10.5 x 23.5 (26.5) x 30.0                                        | 5.8         | 55105                                       | 500         | 250        |      | 90292                              | 350  |

$U_{Rdc} = 630$  V;  $U_{Rac} = 250$  V

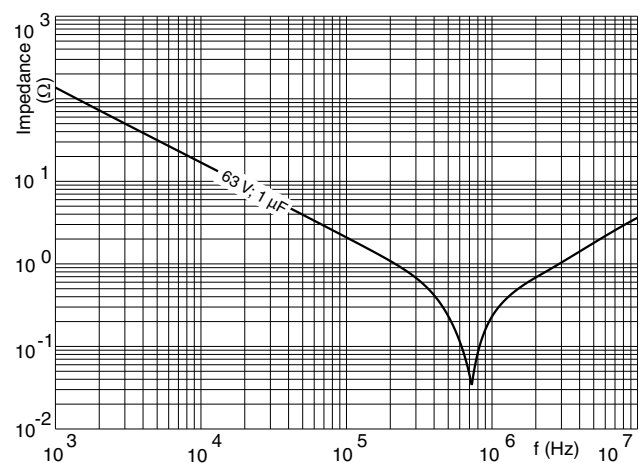
| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |      |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|------|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |      |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ  |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |      |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |      |
| Pitch = 10.0 ± 0.4 mm; d <sub>t</sub> = 0.60 ± 0.06 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.010                                                  | 4.3 x 13.1 (15.5) x 12.5                                                     | 0.5         | 65103                                       | 2000        | 1000       | 1300 | 90293                                 | 1100 |
| 0.012                                                  | 4.6 x 13.4 (16.0) x 12.5                                                     | 0.5         | 65123                                       | 2000        | 1000       | 1200 | 90294                                 | 1000 |
| 0.015                                                  | 4.9 x 13.9 (16.5) x 12.5                                                     | 0.6         | 65153                                       | 2000        | 1000       | 1100 | 90295                                 | 1500 |
| 0.018                                                  | 5.3 x 14.3 (17.0) x 12.5                                                     | 0.6         | 65183                                       | 2000        | 1000       | 1000 | 90296                                 | 1250 |
| 0.022                                                  | 5.9 x 14.9 (17.5) x 12.5                                                     | 0.8         | 65223                                       | 2000        | 1000       | 900  | 90297                                 | 1250 |
| Pitch = 15.0 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.027                                                  | 5.5 x 14.5 (17.5) x 17.5                                                     | 0.7         | 65273                                       | 2000        | 1000       | 1100 | 90298                                 | 1500 |
| 0.033                                                  | 6.0 x 15.0 (18.0) x 17.5                                                     | 0.9         | 65333                                       | 2000        | 1000       | 1000 | 90299                                 | 1500 |
| 0.039                                                  | 6.3 x 15.5 (18.5) x 17.5                                                     | 1.0         | 65393                                       | 2000        | 1000       | 900  | 90301                                 | 1250 |
| 0.047                                                  | 7.0 x 16.0 (19.0) x 17.5                                                     | 1.2         | 65473                                       | 2000        | 1000       | 800  | 90302                                 | 1250 |
| 0.056                                                  | 7.5 x 16.5 (19.5) x 17.5                                                     | 1.3         | 65563                                       | 1000        | 1000       | 800  | 90303                                 | 1000 |
| 0.068                                                  | 8.0 x 17.0 (20.0) x 17.5                                                     | 1.4         | 65683                                       | 1000        | 1000       | 750  | 90304                                 | 1000 |
| Pitch = 22.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |      |
| 0.082                                                  | 6.1 x 18.0 (21.0) x 26.0                                                     | 2.5         | 65823                                       | 1000        | 1000       |      | 90305                                 | 1000 |
| 0.10                                                   | 7.0 x 19.0 (22.0) x 26.0                                                     | 3.2         | 65104                                       | 1000        | 1000       |      | 90306                                 | 900  |
| 0.12                                                   | 7.2 x 19.5 (22.5) x 26.0                                                     | 3.5         | 65124                                       | 1000        | 1000       |      | 90307                                 | 750  |
| 0.15                                                   | 8.0 x 21.0 (23.0) x 26.0                                                     | 3.8         | 65154                                       | 1000        | 500        |      | 90308                                 | 750  |
| 0.18                                                   | 9.0 x 22.0 (24.0) x 26.0                                                     | 4.5         | 65184                                       | 1000        | 500        |      | 90309                                 | 600  |
| 0.22                                                   | 10.0 x 23.0 (25.0) x 26.0                                                    | 5.2         | 65224                                       | 1000        | 500        |      | 90311                                 | 550  |

| C<br>(μF)                                              | DIMENSIONS<br>w <sub>max</sub> x h <sub>max</sub> x l <sub>max</sub><br>(mm) | MASS<br>(g) | CATALOG NUMBER 2222 368 ..... AND PACKAGING |             |            |      |                                       |     |
|--------------------------------------------------------|------------------------------------------------------------------------------|-------------|---------------------------------------------|-------------|------------|------|---------------------------------------|-----|
|                                                        |                                                                              |             | LOOSE IN BOX                                |             |            | REEL | LOOSE IN BOX                          |     |
|                                                        |                                                                              |             | l <sub>t</sub> =<br>4.0 + 1.0/- 0.5 mm      | short leads | long leads | SPQ  | l <sub>t</sub> =<br>4.0 + 1.0/-0.5 mm | SPQ |
|                                                        |                                                                              |             | C-tol = ± 10 %                              | SPQ         | SPQ        |      | C-tol = ± 10 %                        |     |
|                                                        |                                                                              |             | last 5 digits of<br>catalog number          |             |            |      | last 5 digits of<br>catalog number    |     |
| Pitch = 27.5 ± 0.4 mm; d <sub>t</sub> = 0.80 ± 0.08 mm |                                                                              |             |                                             |             |            |      | lock lead                             |     |
| 0.27                                                   | 10.0 x 23.0 (25.0) x 30.0                                                    | 5.5         | 65274                                       | 500         | 500        |      | 90312                                 | 400 |
| 0.33                                                   | 11.5 x 24.5 (26.5) x 30.0                                                    | 6.5         | 65334                                       | 500         | 250        |      | 90313                                 | 350 |
| 0.39                                                   | 12.5 x 25.5 (28.5) x 30.0                                                    | 7.1         | 65394                                       | 500         | 250        |      | 90314                                 | 300 |
| 0.47                                                   | 14.0 x 27.0 (30.0) x 30.0                                                    | 8.2         | 65474                                       | 250         | 250        |      | 90315                                 | 250 |

## CAPACITANCE

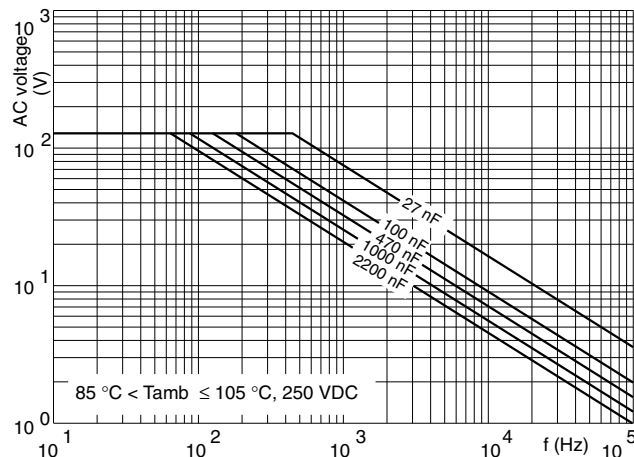
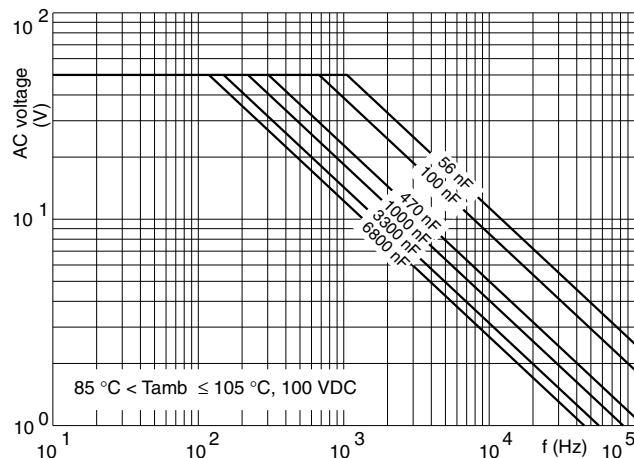
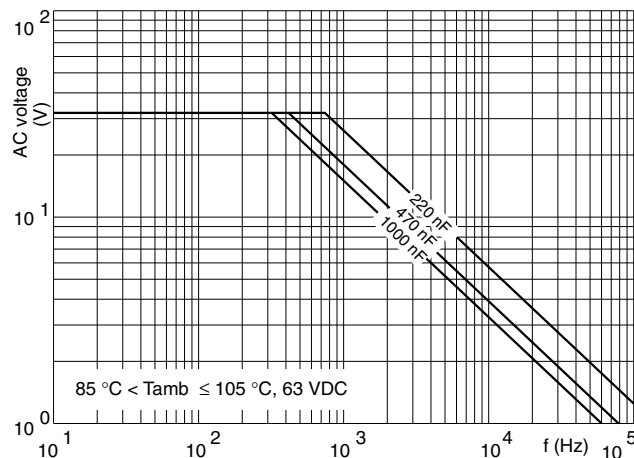
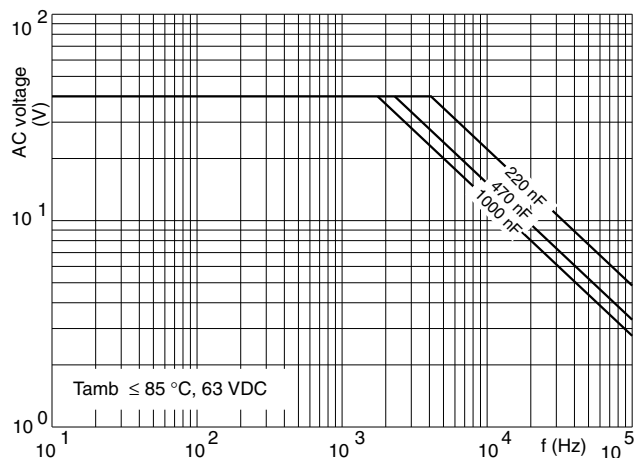


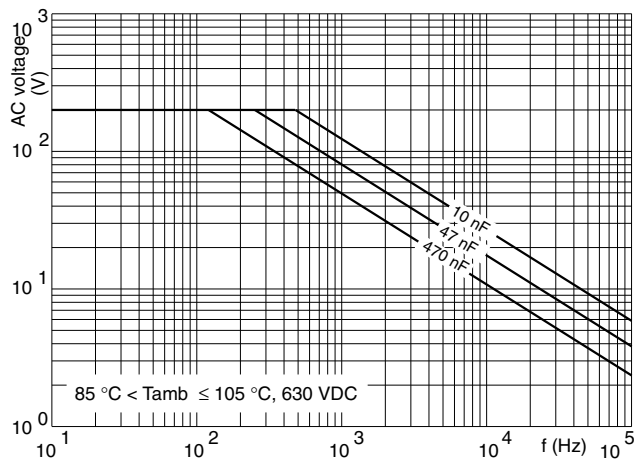
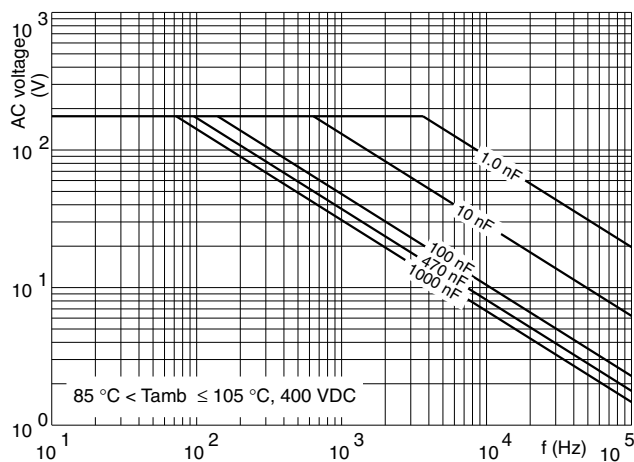
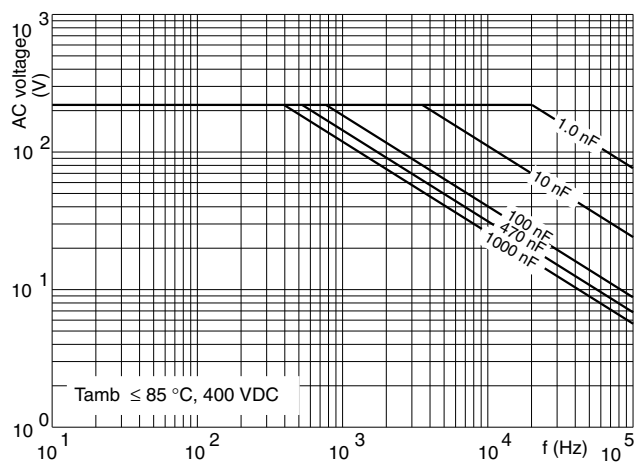
## IMPEDANCE





# MAXIMUM RMS VOLTAGE (SINEWAVE) AS A FUNCTION OF FREQUENCY





## 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.

For capacitors connected in parallel, normally the proof voltage and possibly the rated voltage must be reduced. For information depending of the capacitance value and the number of parallel connections contact [dc-film@vishay.com](mailto:dc-film@vishay.com).

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 ionization inception level
3. The voltage peak slope ( $dU/dt$ ) shall not exceed the rated voltage pulse slope in an RC-circuit at rated voltage and without ringing. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by  $U_{RDC}$  and divided by the applied voltage.

For all other pulses following equation must be fulfilled:

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

T is the pulse duration.

The rated voltage pulse slope is valid for ambient temperatures up to 85 °C. For higher temperatures a derating factor of 3 % per K shall be applied.

4. The maximum component surface temperature rise must be lower than the limits (see figure "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".
6. When using these capacitors as across-the-line capacitor in the input filter for mains applications the applicant must guarantee that the following conditions are fulfilled in any case (spikes and surge voltages from the mains included).
7. For continuous use as series connection with an impedance to the mains, please refer to application note [www.vishay.com/doc?28153](http://www.vishay.com/doc?28153)

### Voltage Conditions for 6 Above

| ALLOWED VOLTAGES                             | $T_{amb} \leq 85\text{ °C}$ | $85\text{ °C} < T_{amb} \leq 105\text{ °C}$ |
|----------------------------------------------|-----------------------------|---------------------------------------------|
| Maximum continuous RMS voltage               | $U_{RAC}$                   | $0.8 \times U_{RAC}$                        |
| Maximum temperature RMS-overvoltage (< 24 h) | $1.25 \times U_{RAC}$       | $U_{RAC}$                                   |
| Maximum peak voltage ( $V_{O-P}$ ) (< 2 s)   | $1.6 \times U_{RDC}$        | $1.3 \times U_{RDC}$                        |

### Example

C = 3300 nF - 100 V used for the voltage signal shown in next figure.

$U_{P-P} = 80\text{ V}$ ;  $U_P = 70\text{ V}$ ;  $T_1 = 0.5\text{ ms}$ ;  $T_2 = 1\text{ ms}$

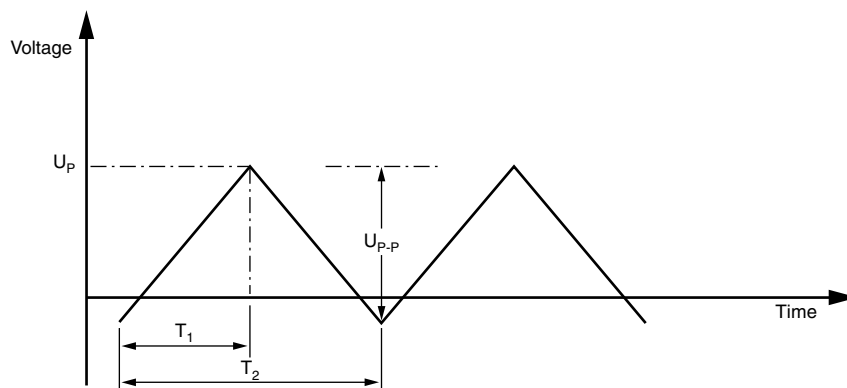
The ambient temperature is 35 °C

Checking conditions:

1. The peak voltage  $U_P = 70\text{ V}$  is lower than  $100\text{ V}_{DC}$
2. The peak-to-peak voltage 80 V is lower than  $2\sqrt{2} \times 63\text{ V}_{AC} = 178\text{ V}_{P-P}$
3. The voltage pulse slope ( $dU/dt$ ) =  $80\text{ V}/500\text{ }\mu\text{s} = 0.16\text{ V}/\mu\text{s}$   
This is lower than  $8\text{ V}/\mu\text{s}$  (see "Specific Reference Data" for each version)
4. The dissipated power is 60 mW as calculated with fourier terms  
The temperature rise for  $W_{max.} = 8.5\text{ mm}$  and pitch = 22.5 mm will be  $60\text{ mW}/18\text{ mW}/\text{°C} = 3.3\text{ °C}$   
This is lower than 15 °C temperature rise at 35 °C, according figure "Maximum allowed component temperature rise"
5. Not applicable
6. Not applicable
7. Not applicable



**Voltage Signal**





## Disclaimer

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