



Interference Suppression Film Capacitor - Class X2 Radial MKT 310 V_{AC} - High Stability Grade



FEATURES

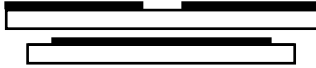
- 15 mm to 37.5 mm lead pitch
- Internal series construction
- AEC-Q200 qualified for C ≤ 470 nF
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



APPLICATIONS

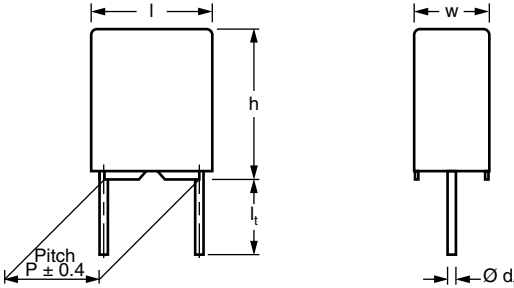
High stability grade for continuous across the line X2 applications.

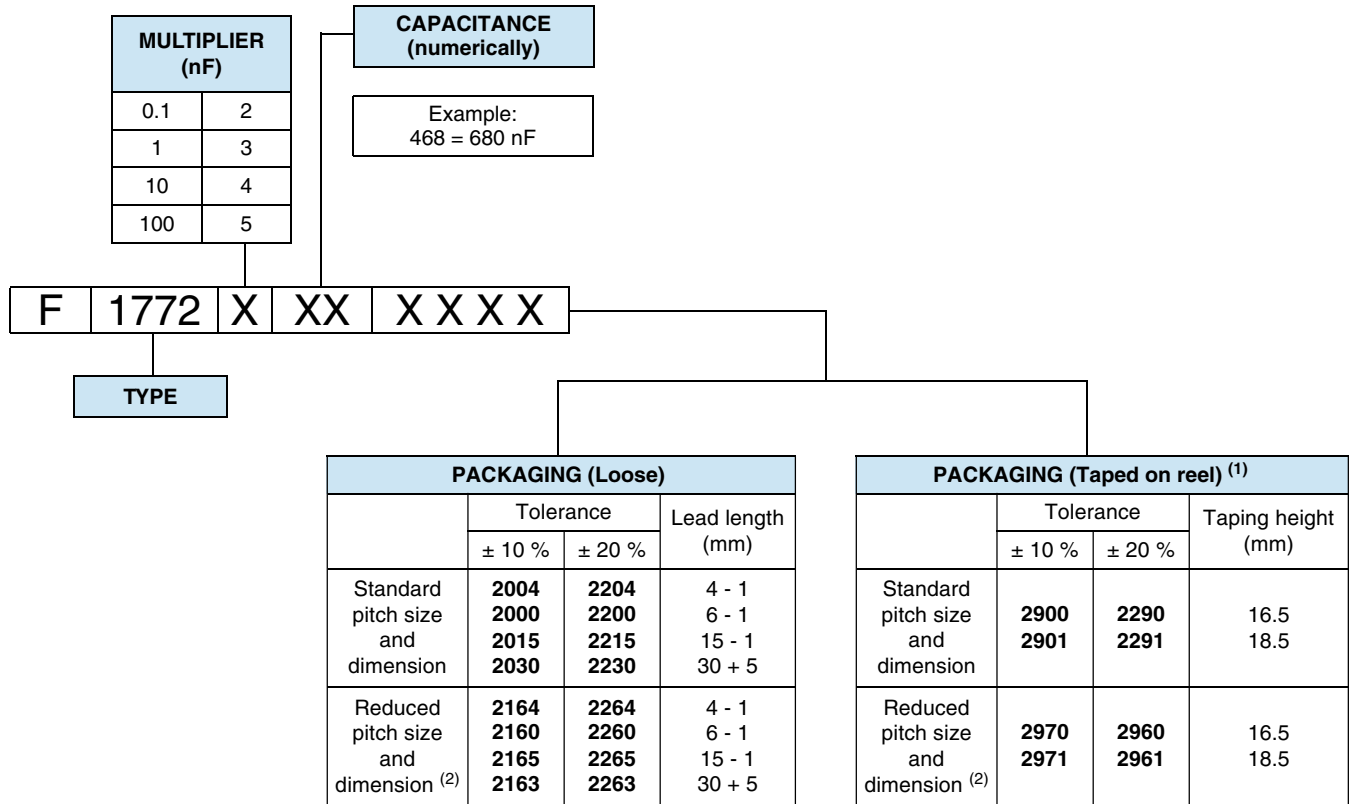
See also application note: www.vishay.com/doc?28153

| QUICK REFERENCE DATA | |
|---|--|
| Capacitance range (E12 series) | 0.01 µF to 2.2 µF (preferred values acc. to E6) |
| Capacitance tolerance | ± 10 %, ± 20 % (± 5 % on request) |
| Rated AC voltage | 310 V _{AC} ; 50 Hz to 60 Hz |
| Permissible DC voltage | 800 V _{DC} at 85 °C 630 V _{DC} at 110 °C |
| Climatic testing class according to IEC 60068-1 | 40/110/56/C |
| Maximum application temperature | 110 °C |
| Reference standards | IEC 60384-14 ed-4 and EN 60384-14 IEC 60065 pass. flamm. class C CSA-E384-14 UL 60384-14 |
| Dielectric | Polyester film |
| Electrodes | Metallized |
| Construction | Series construction  |
| Encapsulation | Plastic case, epoxy resin sealed, flame retardant UL-class 94 V-0 |
| Leads | Tinned wire |
| Marking | C-value; tolerance; rated voltage; sub-class; manufacturer's type; code for dielectric material; manufacturer location, year and week; manufacturer's logo or name; safety approvals |

Note

- For more detailed data and test requirements, contact rfi@vishay.com

| DIMENSIONS in millimeters |
|--|
|  |

COMPOSITION OF CATALOG NUMBER


Example: F17724152215 means 0.15 µF, ± 20 %; standard pitch 22.5 mm; lead length 15 mm - 1 mm;
 F17724152265 means 0.15 µF, ± 20 %; reduced pitch 15.0 mm; lead length 15 mm - 1 mm

Notes

- For detailed tape specifications refer to packaging information www.vishay.com/doc?28139
- ⁽¹⁾ Taped on reel pitch ≥ 27.5 mm is not available
- ⁽²⁾ Same capacitance values ≥ 0.15 µF are available in two different pitch sizes and dimensions

| SPECIFIC REFERENCE DATA | |
|---|-----------------------------------|
| DESCRIPTION | VALUE |
| Rated AC voltage (U _{RAC}) | 310 V |
| Permissible DC voltage (U _{RDC}) | 630 V |
| Tangent of loss angle | ≤ 100 × 10 ⁻⁴ at 1 kHz |
| Rated voltage pulse slope at (dU/dt) _R 435 V _{DC} | 100 V/µs |
| R between leads, for C ≤ 0.33 µF at 100 V; 1 min | > 15 000 MΩ |
| RC between leads, C > 0.33 µF at 100 V; 1 min | > 5000 s |
| R between leads and case; 100 V; 1 min | > 30 000 MΩ |
| Withstanding (DC) voltage (cut off current 10 mA) ⁽¹⁾ ; rise time ≤ 1000 V/s | |
| C ≤ 0.47 µF | 2200 V; for 1 min |
| C > 0.47 µF | 2150 V; for 1 min |
| Withstanding (AC) voltage between leads and case | 2120 V; 1 min |
| Maximum application temperature | 110 °C |

Note

- See "Voltage Proof Test for Metalized Film Capacitors": www.vishay.com/doc?28169



| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | |
|---|---|-----------------------------|--|--|--|---|
| U_{RAC} (V) | CAP. (μF) | PITCH (mm) | DIMENSIONS ⁽⁴⁾ w x h x l MAX. (mm) | MASS ⁽³⁾ (g) | SPQ (pieces) SHORT LEAD | ORDERING CODE BULK LEAD LENGTH 6 mm - 1 mm ⁽¹⁾⁽²⁾ |
| 310 | d_t = 0.60 mm ± 0.06 mm; C-TOL. = ± 10 % | | | | | |
| | 0.010 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723102000 |
| | 0.012 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723122000 |
| | 0.015 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723152000 |
| | 0.018 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723182000 |
| | 0.022 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723222000 |
| | 0.027 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723272000 |
| | 0.033 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723332000 |
| | 0.039 | 15 | 6.0 x 12.0 x 17.5 | 2.0 | 500 | F17723392000 |
| | 0.047 | 15 | 6.0 x 12.0 x 17.5 | 2.0 | 500 | F17723472000 |
| | 0.056 | 15 | 6.0 x 12.0 x 17.5 | 2.0 | 500 | F17723562000 |
| | d_t = 0.80 mm ± 0.08 mm; C-TOL. = ± 10 % | | | | | |
| | 0.068 | 15 | 7.0 x 13.5 x 17.5 | 2.4 | 450 | F17723682000 |
| | 0.082 | 15 | 8.5 x 15.0 x 17.5 | 2.7 | 300 | F17723822000 |
| | 0.10 | 15 | 8.5 x 15.0 x 17.5 | 2.7 | 325 | F17724102000 |
| | 0.12 | 15 | 8.5 x 15.0 x 17.5 | 2.7 | 300 | F17724122000 |
| | 0.15 | 15 | 8.5 x 15.0 x 17.5 | 2.7 | 300 | F17724152160 |
| | 0.15 | 22.5 | 7.0 x 16.5 x 26.0 | 4.1 | 235 | F17724152000 |
| | 0.18 | 22.5 | 7.0 x 16.5 x 26.0 | 4.1 | 235 | F17724182000 |
| | 0.22 | 15 | 10.0 x 16.5 x 17.5 | 3.0 | 235 | F17724222160 |
| | 0.22 | 22.5 | 8.5 x 16.5 x 26.5 | 4.6 | 200 | F17724222000 |
| | 0.27 | 22.5 | 10.0 x 19.5 x 26.0 | 6.7 | 170 | F17724272000 |
| | 0.33 | 15 | 13.5 x 22.5 x 18.0 | 5.5 | 185 | F17724332160 |
| | 0.33 | 22.5 | 10.0 x 19.5 x 26.0 | 6.7 | 170 | F17724332000 |
| | 0.39 | 27.5 | 11.0 x 21.0 x 31.0 | 9.1 | 125 | F17724392000 |
| | 0.47 | 22.5 | 12.0 x 22.0 x 26.0 | 13.0 | 110 | F17724472160 |
| | 0.47 | 27.5 | 11.0 x 21.0 x 31.0 | 9.1 | 125 | F17724472000 |
| | 0.56 | 27.5 | 11.0 x 21.0 x 31.0 | 9.1 | 125 | F17724562000 |
| | 0.68 | 22.5 | 15.5 x 26.5 x 26.5 | 13.5 | 110 | F17724682160 |
| | 0.68 | 27.5 | 13.0 x 23.0 x 31.0 | 12.9 | 110 | F17724682000 |
| | 0.82 | 27.5 | 13.0 x 23.0 x 31.0 | 12.9 | 110 | F17724822000 |
| | 1.0 | 22.5 | 15.5 x 26.5 x 26.5 | 13.5 | 110 | F17725102160 |
| | 1.0 | 27.5 | 15.0 x 25.0 x 31.5 | 15.0 | 100 | F17725102000 |
| | 1.2 | 37.5 | 14.5 x 24.5 x 41.5 | 18.9 | 80 | F17725122000 |
| | 1.5 | 27.5 | 18.0 x 28.0 x 31.0 | 19.0 | 85 | F17725152160 |
| | 1.5 | 37.5 | 15.5 x 28.5 x 41.5 | 24.0 | 70 | F17725152000 |
| | 1.8 | 37.5 | 15.5 x 28.5 x 41.5 | 24.0 | 70 | F17725182000 |
| | 2.2 | 27.5 | 21.0 x 31.0 x 31.0 | 28.0 | 70 | F17725222160 |
| | 2.2 | 37.5 | 18.0 x 32.5 x 41.5 | 31.6 | 60 | F17725222000 |
| | d_t = 0.60 mm ± 0.06 mm; C-TOL. = ± 20 % | | | | | |
| | 0.010 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723102200 |
| | 0.015 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723152200 |
| 0.022 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723222200 | |
| 0.033 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723332200 | |
| 0.047 | 15 | 5.0 x 11.0 x 17.5 | 1.4 | 750 | F17723472200 | |
| 0.068 | 15 | 6.0 x 12.0 x 17.5 | 2.0 | 600 | F17723682200 | |
| 0.10 | 15 | 6.0 x 12.0 x 17.5 | 2.0 | 600 | F17724102200 | |

| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | |
|---|----------------------------|-----------------------------|--|--|--|---|
| U_{RAC} (V) | CAP. (μF) | PITCH (mm) | DIMENSIONS ⁽⁴⁾ w x h x l MAX. (mm) | MASS ⁽³⁾ (g) | SPQ (pieces) SHORT LEAD | ORDERING CODE BULK LEAD LENGTH 6 mm - 1 mm ⁽¹⁾⁽²⁾ |
| d_t = 0.80 mm ± 0.08 mm; C-TOL. = ± 20 % | | | | | | |
| 310 | 0.15 | 15 | 8.5 x 15.0 x 17.5 | 2.7 | 325 | F17724152260 |
| | 0.15 | 22.5 | 6.0 x 15.5 x 26.0 | 3.3 | 260 | F17724152200 |
| | 0.22 | 15 | 10.0 x 16.5 x 17.5 | 4.5 | 300 | F17724222260 |
| | 0.22 | 22.5 | 7.0 x 16.5 x 26.0 | 4.1 | 235 | F17724222200 |
| | 0.33 | 15 | 13.5 x 22.5 x 18.0 | 5.5 | 185 | F17724332260 |
| | 0.33 | 22.5 | 8.5 x 18.0 x 26.0 | 5.3 | 190 | F17724332200 |
| | 0.47 | 22.5 | 10.0 x 19.5 x 26.0 | 6.7 | 170 | F17724472260 |
| | 0.47 | 27.5 | 9.0 x 19.0 x 31.5 | 6.8 | 160 | F17724472200 |
| | 0.68 | 22.5 | 12.0 x 22.0 x 26.0 | 13.4 | 110 | F17724682260 |
| | 0.68 | 27.5 | 11.0 x 21.0 x 31.0 | 12.9 | 125 | F17724682200 |
| | 1.0 | 22.5 | 15.5 x 26.5 x 26.5 | 13.5 | 110 | F17725102260 |
| | 1.0 | 27.5 | 15.0 x 25.0 x 31.5 | 15.0 | 100 | F17725102200 |
| | 1.5 | 27.5 | 18.0 x 28.0 x 31.5 | 19.0 | 85 | F17725152260 |
| | 1.5 | 37.5 | 14.5 x 24.5 x 41.5 | 18.9 | 80 | F17725152200 |
| | 2.2 | 27.5 | 21.0 x 31.0 x 31.0 | 28.0 | 70 | F17725222260 |
| 2.2 | 37.5 | 15.5 x 28.5 x 41.5 | 24.0 | 70 | F17725222200 | |

Notes

- SPQ = Standard Packing Quantity
- For detailed tape specifications refer to packaging information: www.vishay.com/doc?28139
- (1) For further packaging see table “Composition of Catalog Number”
- (2) Further information about packaging quantities with different lead length and / or taped versions, see document “Packing Quantities” www.vishay.com/doc?27608
- (3) Weight for short lead product only
- (4) For tolerances see chapter “Space Requirements for Printed-Circuit Board Applications and Dimension Tolerances”

| APPROVALS | | | | |
|---|---------------------|----------------------|---------------------|--|
| SAFETY APPROVALS X2 | VOLTAGE | VALUE | FILE NUMBERS | LINK |
| EN 60384-14 (ENEC) (= IEC 60384-14 ed-4) | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | 40005079 | www.vishay.com/doc?28196 |
| UL 60384-14 | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | E354331 | www.vishay.com/doc?28191 |
| CSA-E 384-14 | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | E354331 | |
| CB test-certificate | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | DE1-58410 | www.vishay.com/doc?28226 |
| The ENEC-approval together with the CB-certificate replace all national marks of the following countries (they have already signed the ENEC-agreement): Austria; Belgium; Czech. Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Luxembourg; Netherlands; Norway; Portugal; Slovenian; Spain; Sweden; Switzerland and United Kingdom. | | | | |
| | | | | |

MOUNTING

Normal Use

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

For detailed tape specifications refer to packaging information: www.vishay.com/doc?28139.

Specific Method of Mounting to Withstand Vibration and Shock

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

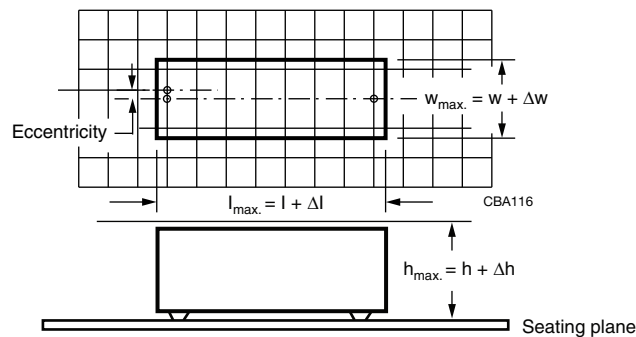
- For pitches ≤ 15 mm capacitors shall be mechanically fixed by the leads
- For larger pitches the capacitors shall be mounted in the same way and the body clamped

SPACE REQUIREMENTS FOR PRINTED-CIRCUIT BOARD APPLICATIONS AND DIMENSION TOLERANCES

For the maximum product dimensions and maximum space requirements for length ($l_{max.}$), width ($w_{max.}$) and height ($h_{max.}$) following tolerances must be taken in account in the envelopment of the components as shown in the drawings below.

- For products with pitch ≤ 15 mm, $\Delta w = \Delta l = 0.3$ mm, and $\Delta h = 0.1$ mm
- For products with 15 mm $<$ pitch ≤ 27.5 mm, $\Delta w = \Delta l = 0.5$ mm, and $\Delta h = 0.1$ mm
- For products with pitch = 37.5 mm, $\Delta w = \Delta l = 0.7$ mm, and $\Delta h = 0.5$ mm

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



For the minimum product dimensions for length ($l_{min.}$), width ($w_{min.}$) and height ($h_{min.}$) following tolerances of the components are valid:

$l_{min.} = l - \Delta l$, $w_{min.} = w - \Delta w$, and $h_{min.} = h - \Delta h$ following

- For products with pitch ≤ 10 mm, $\Delta l = 0.3$ mm, and $\Delta w = \Delta h = 0.3$ mm
- For products with pitch = 15 mm, $\Delta l = 0.5$ mm, and $\Delta w = \Delta h = 0.5$ mm
- For products with 15 mm $<$ pitch ≤ 27.5 mm, $\Delta l = 1.0$ mm and $\Delta w = \Delta h = 0.5$ mm
- For products with pitch = 37.5 mm, $\Delta l = 1.0$ mm and $\Delta w = \Delta h = 1.0$ mm

SOLDERING CONDITIONS

For general soldering conditions and wave soldering profile, we refer to the application note: "Soldering Guidelines for Film Capacitors": www.vishay.com/doc?28171

Storage Temperature

$T_{stg} = -25$ °C to $+35$ °C with RH maximum 75 % without condensation

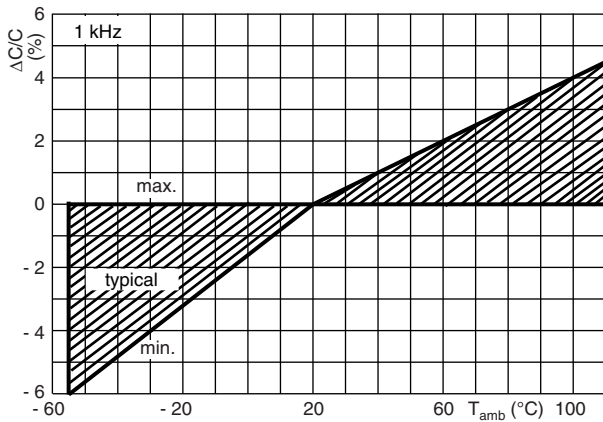
Ratings and Characteristics Reference Conditions

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

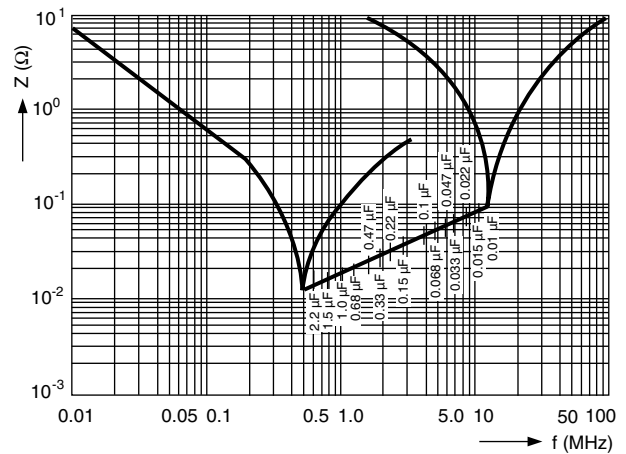
For reference testing, a conditioning period shall be applied over 96 h ± 4 h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.



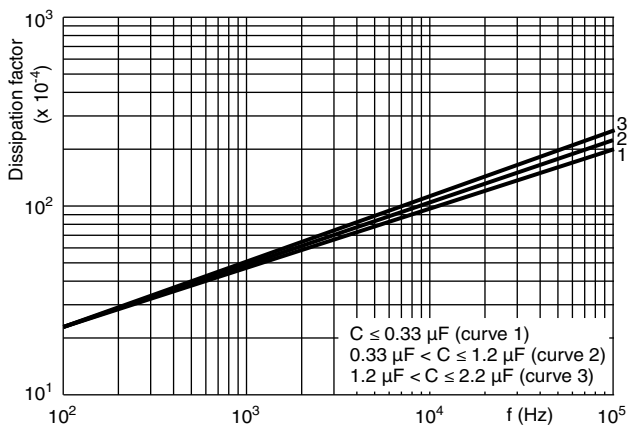
CHARACTERISTICS



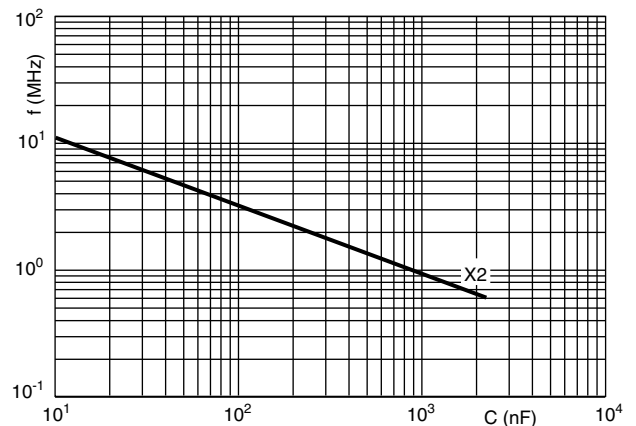
Capacitance as a function of ambient temperature (typical curve)



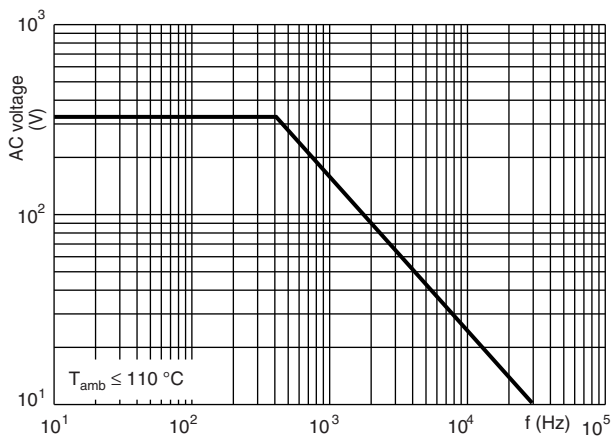
Impedance as a function of frequency (typical curve)



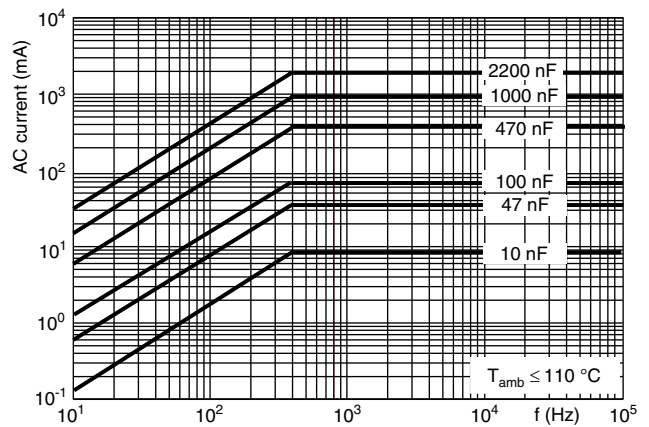
Tangent of loss angle as a function of frequency (typical curve)



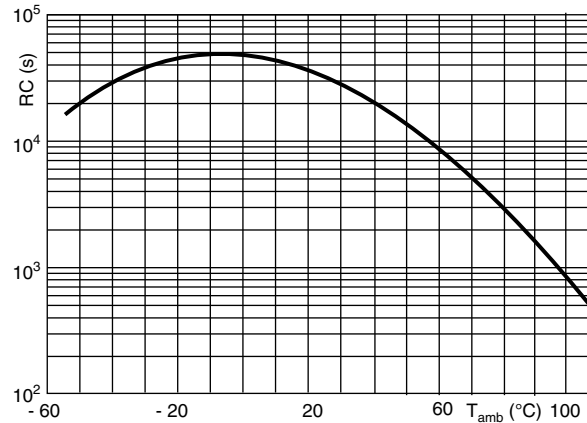
Resonant frequency as a function of capacitance (typical curve)



Max. RMS voltage as a function of frequency



Max. RMS current as a function of frequency



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

APPLICATION NOTES AND LIMITING CONDITIONS

- For X2 electromagnetic interference suppression where a higher stability grade is needed for **continuous across the line applications** (50 Hz/60 Hz) with a maximum mains voltage of 310 V_{AC}.
- These capacitors are not intended for continuous pulse application. For these situations capacitors of the AC and pulse programs must be used.
- For series impedance applications we refer to application note: www.vishay.com/doc?28153
- The maximum ambient temperature must not exceed 110 °C.
- Rated voltage pulse slope:
if the pulse voltage is lower than the rated voltage, the values of the specific reference data can be multiplied by 435 V_{DC} and divided by the applied voltage.

INSPECTION REQUIREMENTS

General Notes

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

| GROUP C INSPECTION REQUIREMENTS | | |
|---|--|--|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C1A PART OF SAMPLE OF SUB-GROUP C1 | | |
| 4.1 Dimensions (detail) | | As specified in chapter “General Data” of this specification |
| Initial measurements | Capacitance Tangent of loss angle: for C ≤ 1 µF at 10 kHz for C > 1 µF at 1 kHz | |
| 4.3 Robustness of terminations | Tensile: load 10 N; 10 s Bending: load 5 N; 4 x 90° | No visible damage |
| 4.4 Resistance to soldering heat | No pre-drying Method: 1A Solder bath: 280 °C ± 5 °C Duration: 10 s | |



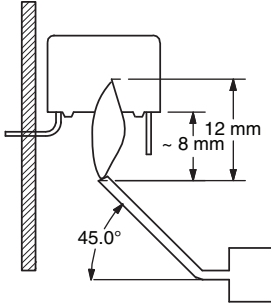
| GROUP C INSPECTION REQUIREMENTS | | |
|---|---|--|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C1A PART OF SAMPLE OF SUB-GROUP C1 | | |
| 4.19 Component solvent resistance | Isopropylalcohol at room temperature Method: 2 Immersion time: 5 min ± 0.5 min Recovery time: min. 1 h, max. 2 h | |
| 4.4.2 Final measurements | Visual examination Capacitance Tangent of loss angle Insulation resistance | No visible damage Legible marking $ \Delta C/C \leq 5\%$ of the value measured initially Increase of $\tan \delta$ ≤ 0.008 for: $C \leq 1 \mu F$ or ≤ 0.005 for: $C > 1 \mu F$ Compared to values measured initially As specified in section "Insulation Resistance" of this specification |
| SUB-GROUP C1B PART OF SAMPLE OF SUB-GROUP C1 | | |
| Initial measurements | Capacitance Tangent of loss angle: for $C \leq 1 \mu F$ at 10 kHz for $C > 1 \mu F$ at 1 kHz | |
| 4.20 Solvent resistance of the marking | Isopropylalcohol at room temperature Method: 1 Rubbing material: cotton wool Immersion time: 5 min ± 0.5 min | No visible damage Legible marking |
| 4.6 Rapid change of temperature | $\theta A = -40\text{ }^\circ C$ $\theta B = +110\text{ }^\circ C$ 5 cycles Duration $t = 30$ min | |
| 4.6.1 Inspection | Visual examination | No visible damage |
| 4.7 Vibration | Mounting: see section "Mounting" of this specification Procedure B4 Frequency range: 10 Hz to 55 Hz Amplitude: 0.75 mm or Acceleration 98 m/s^2 (whichever is less severe) Total duration 6 h | |
| 4.7.2 Final inspection | Visual examination | No visible damage |
| 4.9 Shock | Mounting: See section "Mounting" for more information Pulse shape: half sine Acceleration: 490 m/s^2 Duration of pulse: 11 ms | |
| 4.9.2 Final measurements | Visual examination Capacitance Tangent of loss angle Insulation resistance | No visible damage $ \Delta C/C \leq 5\%$ of the value measured initially Increase of $\tan \delta$ ≤ 0.008 for: $C \leq 1 \mu F$ or ≤ 0.005 for: $C > 1 \mu F$ Compared to values measured initially As specified in section "Specific Reference" of this specification |



| GROUP C INSPECTION REQUIREMENTS | | |
|--|---|--|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB-GROUPS C1A AND C1B | | |
| 4.11 Climatic sequence | Capacitance | |
| 4.11.1 Initial measurements | Measured in 4.4.2 and 4.9.2 Tangent of loss angle Measured initially in C1A and C1B | |
| 4.11.2 Dry heat | Temperature: 110 °C Duration: 16 h | |
| 4.11.3 Damp heat cyclic Test Db, first cycle | | |
| 4.11.4 Cold | Temperature: -40 °C Duration: 2 h | |
| 4.11.5 Damp heat cyclic Test Db, remaining cycles | | |
| 4.11.6 Final measurements | Visual examination | No visible damage Legible marking |
| | Capacitance | $ \Delta C/C \leq 5\%$ of the value measured in 4.11.1 |
| | Tangent of loss angle | Increase of $\tan \delta$ ≤ 0.008 for: $C \leq 1 \mu\text{F}$ or ≤ 0.005 for: $C > 1 \mu\text{F}$ Compared to values measured in 4.11.1 |
| | Voltage proof 1350 V _{DC} 1 min between terminations | No permanent breakdown or flash-over |
| | Insulation resistance | $\geq 50\%$ of values specified in section "Insulation Resistance" of this specification |
| SUB-GROUP C2 | | |
| 4.12 Damp heat steady state | 56 days, 40 °C, 90 % to 95 % RH No load | |
| 4.12.1 Initial measurements | Capacitance Tangent of loss angle: 1 kHz | |
| 4.12.3 Final measurements | Visual examination | No visible damage Legible marking |
| | Capacitance | $ \Delta C/C \leq 5\%$ of the value measured in 4.12.1 |
| | Tangent of loss angle | Increase of $\tan \delta$ ≤ 0.008 for: $C \leq 1 \mu\text{F}$ or ≤ 0.005 for: $C > 1 \mu\text{F}$ Compared to values measured in 4.12.1 |
| | Voltage proof 1350 V _{DC} ; 1 min between terminations | No permanent breakdown or flash-over |
| | Insulation resistance | $\geq 50\%$ of values specified in section "Insulation Resistance" of this specification |



| GROUP C INSPECTION REQUIREMENTS | | |
|---------------------------------|---|--|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C3 | | |
| 4.13.1 Initial measurements | Capacitance Tangent of loss angle: for C ≤ 1 μF at 10 kHz for C > 1 μF at 1 kHz | |
| 4.13 Impulse voltage | 3 successive impulses, full wave, peak voltage: X2: 2.5 kV for C ≤ 1 μF X2: 2.5 kV/√C for C > 1 μF Max. 24 pulses | No self healing breakdowns or flash-over |
| 4.14 Endurance | Duration: 1000 h 1.25 x U _{RAC} at 110 °C Once in every hour the voltage is increased to 1000 V (RMS) for 0.1 s via resistor of 47 Ω ± 5 % | |
| 4.14.7 Final measurements | Visual examination Capacitance Tangent of loss angle Voltage proof 1350 V _{DC} ; 1 min between terminations 2120 V _{AC} ; 1 min between terminations and case Insulation resistance | No visible damage Legible marking ΔC/C ≤ 5 % compared to values measured in 4.13.1 Increase of tan δ ≤ 0.008 for: C ≤ 1 μF or ≤ 0.005 for: C > 1 μF Compared to values measured in 4.13.1 No permanent breakdown or flash-over ≥ 50 % of values specified in section "Insulation Resistance" of this specification |
| SUB-GROUP C4 | | |
| 4.15 Charge and discharge | 10 000 cycles Charged to 435 V _{DC} Discharge resistance: $R = \frac{435 V_{DC}}{1.5 \times C(dU/dt)}$ | |
| 4.15.1 Initial measurements | Capacitance Tangent of loss angle: for C ≤ 1 μF at 10 kHz for C > 1 μF at 1 kHz | |
| 4.13.3 Final measurements | Capacitance Tangent of loss angle Insulation resistance | ΔC/C ≤ 10 % compared to values measured in 4.15.1 Increase of tan δ ≤ 0.008 for: C ≤ 1 μF or ≤ 0.005 for: C > 1 μF Compared to values measured in 4.15.1 ≥ 50 % of values specified in section "Insulation Resistance" of this specification |

| GROUP C INSPECTION REQUIREMENTS | | |
|--|--|--|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C5 | | |
| 4.16 Radio frequency characteristic | Resonance frequency | ≥ 0.9 times the value as specified in section "Resonant Frequency" of this specification. |
| SUB-GROUP C6 | | |
| 4.17 Passive flammability Class C | Bore of gas jet: $\varnothing 0.5$ mm Fuel: butane Test duration for actual volume V in mm^3 : $V \leq 250$: 5 s $250 < V \leq 500$: 10 s $500 < V \leq 1750$: 20 s $V > 1750$: 30 s One flame application  | After removing test flame from capacitor, the capacitor must not continue to burn for more than 30 s. No burning particle must drop from the sample. |
| SUB-GROUP C7 | | |
| 4.18 Active flammability | 20 cycles of 2.5 kV discharges on the test capacitor connected to U_{RAC} . | The cheese cloth around the capacitors shall not burn with a flame. No electrical measurements are required. |



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