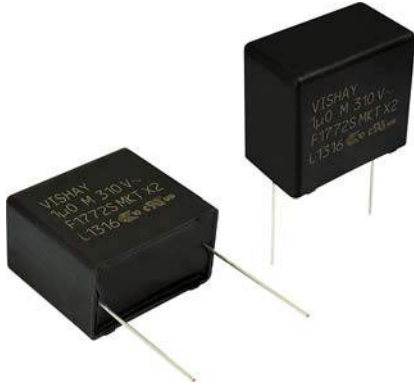


Interference Suppression Film Capacitor - Class X2 Radial MKT - 310 V_{AC} - Series Impedance - 85 °C / 85 % RH


FEATURES

- Stable capacitance in severe ambient conditions 85 °C; 85 % RH, 240 V_{AC}, 1000 h
- 15 mm to 27.5 mm lead pitch
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912




RoHS
COMPLIANT
HALOGEN
FREE
GREEN
(5-2008)

APPLICATIONS

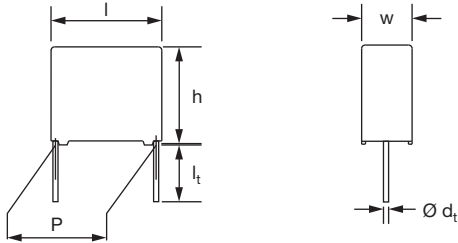
High stability grade X2 capacitors for series impedance and across the line applications.

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

| QUICK REFERENCE DATA | |
|---|--|
| Capacitance range (E12 series) | 10 nF to 2.2 μF (preferred values according to E6) |
| Capacitance tolerance | ± 10 %; ± 20 % |
| Rated AC voltage | 310 V _{AC} |
| Climatic testing class according to IEC 60068-1 | 55/110/56 |
| Rated temperature | C ≤ 1 μF: 110 °C C > 1 μF: 105 °C |
| Reference standards | IEC 60384-14 and EN 60384-14 IEC 60065 requires pass. flamm. class B for volumes > 1750 mm ³ UL 60384-14; CSA-E384-14 |
| 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 |

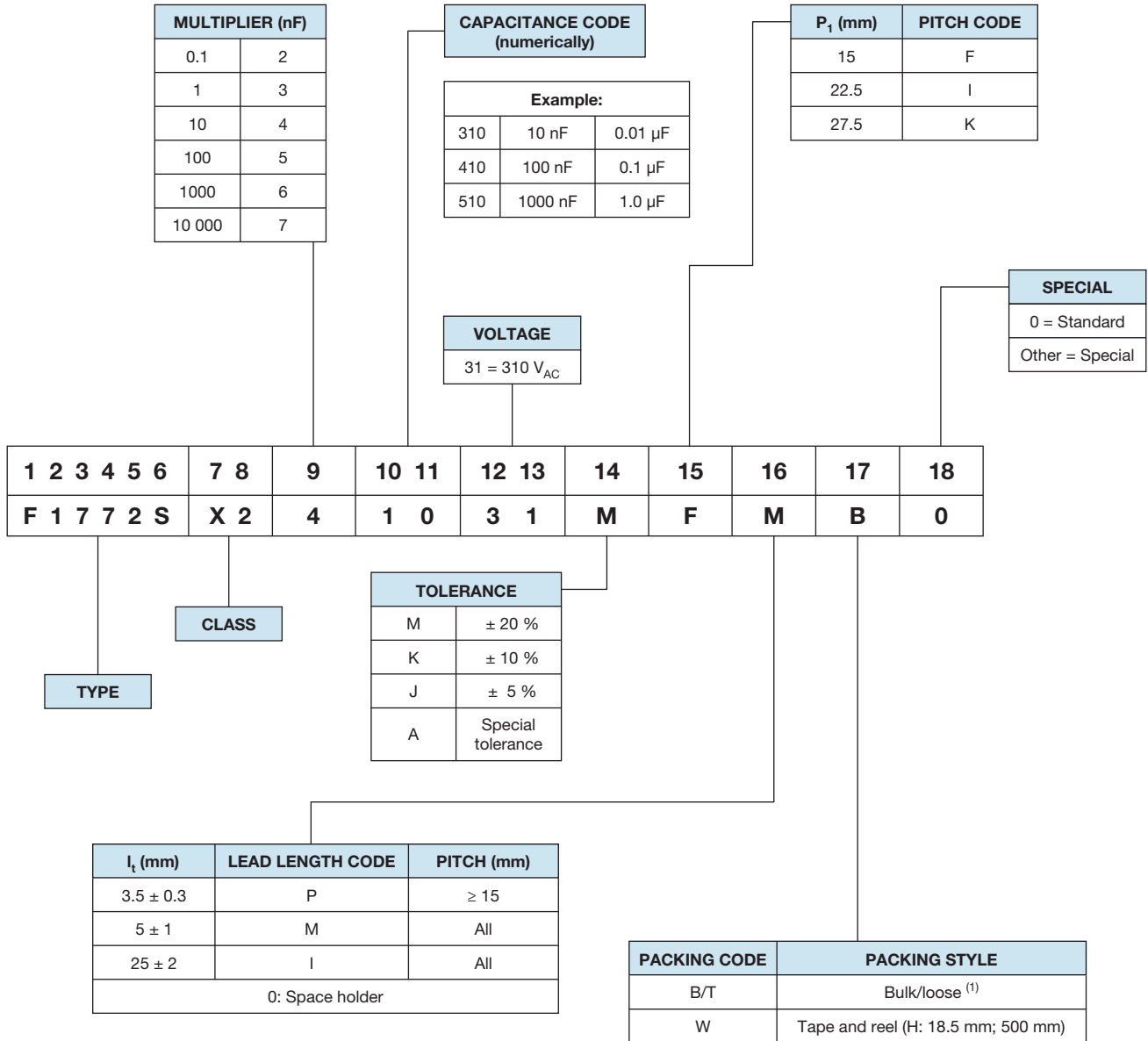
Note

- For more detailed data and test requirements, contact rfi@vishay.com
- For general information like characteristics and definitions used for film capacitors follow the link: www.vishay.com/doc?28147

| DIMENSIONS in millimeters |
|--|
|  |



COMPOSITION OF CATALOG NUMBER



Notes

- For detailed tape specifications refer to packaging information www.vishay.com/doc?28139
- (1) Packaging will be bulk for all capacitors with pitch ≤ 15 mm and such with long leads (> 5 mm). Capacitors with short leads up to 5 mm and pitch > 15 mm will be in tray and asking code will be "T".



| SPECIFIC REFERENCE DATA | |
|---|---|
| DESCRIPTION | VALUE |
| Rated AC voltage (U_{RAC}) | 310 V _{AC} |
| Rated DC voltage (U_{RDC}) | 630 V _{DC} |
| Tangent of loss angle | $\leq 100 \times 10^{-4}$ at 1 kHz |
| Rated voltage pulse slope (dU/dt) _R at 435 V _{DC} | 100 V/ μ s |
| R between leads, for $C \leq 0.33 \mu$ F at 100 V; 1 min | $> 15\,000 \text{ M}\Omega$ |
| RC between leads, for $C > 0.33 \mu$ F at 100 V; 1 min | $> 5000 \text{ s}$ |
| R between leads and case; 100 V; 1 min | $> 30\,000 \text{ M}\Omega$ |
| Withstanding (DC) voltage (cut off current 10 mA) ⁽¹⁾ ; rise time $\leq 1000 \text{ V/s}$: C $\leq 1.0 \mu$ F C $> 1.0 \mu$ F | 1800 V; 1 min 1500 V; 1 min |
| Withstanding (AC) voltage between leads and case | 2120 V; 1 min |
| Maximum application temperature | C $\leq 1 \mu$ F: 110 °C C $> 1 \mu$ F: 105 °C |

Note

⁽¹⁾ See "Voltage Proof Test for Metalized Film Capacitors": www.vishay.com/doc?28169

| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | | | | | | |
|---|---|---------------------------------|----------------------------|--|--|------------|---|------------|---|------------|-----|
| U_{RAC} (V) | CAP. (μ F) | DIMENSIONS w x h x l (mm) | MASS (g) ⁽³⁾ | CATALOG NUMBER F1772S X2... AND PACKAGING | | | | | | | |
| | | | | LOOSE IN BOX | | | | | REEL ⁽¹⁾⁽²⁾ | | |
| | | | | SHORT LEADS | | | LONG LEADS | | $\varnothing = 500 \text{ mm}$ $H = 18.5 \text{ mm};$ $P_0 = 12.7 \text{ mm}$ | SPQ | |
| | | | | $l_t = 3.5 \text{ mm}$ $\pm 0.3 \text{ mm}$ | $l_t = 5.0 \text{ mm}$ $\pm 1.0 \text{ mm}$ | SPQ | $l_t = 25.0 \text{ mm}$ $\pm 2.0 \text{ mm}$ | SPQ | | | |
| PITCH = 15 mm \pm 0.4 mm; $d_t = 0.60 \text{ mm} \pm 0.06 \text{ mm}$; C-TOL. = $\pm 20 \%$ | | | | | | | | | | | |
| 310 | 0.010 | 5.0 x 11.0 x 17.5 | 1.0 | 31031MFPB0 | 31031MFMB0 | 1250 | 31031MFIB0 | 1000 | 31031MF0W0 | 1100 | |
| | 0.015 | | | 31531MFPB0 | 31531MFMB0 | | 31531MFIB0 | | 31531MF0W0 | | |
| | 0.022 | | | 32231MFPB0 | 32231MFMB0 | | 32231MFIB0 | | 32231MF0W0 | | |
| | 0.033 | | | 33331MFPB0 | 33331MFMB0 | | 33331MFIB0 | | 33331MF0W0 | | |
| | 0.047 | | | 34731MFPB0 | 34731MFMB0 | | 34731MFIB0 | | 34731MF0W0 | | |
| | 0.068 | 6.0 x 12.0 x 17.5 | 1.4 | 36831MFPB0 | 36831MFMB0 | 1000 | 36831MFIB0 | 1000 | 36831MF0W0 | 900 | |
| | 0.10 | | | 41031MFPB0 | 41031MFMB0 | | 41031MFIB0 | | 41031MF0W0 | | |
| | PITCH = 15 mm \pm 0.4 mm; $d_t = 0.80 \text{ mm} \pm 0.08 \text{ mm}$; C-TOL. = $\pm 20 \%$ | | | | | | | | | | |
| | | 0.15 | 8.5 x 15.0 x 17.5 | 2.4 | 41531MFPB0 | 41531MFMB0 | 750 | 41531MFIB0 | 500 | 41531MF0W0 | 650 |
| | | 0.22 | 10.0 x 6.5 x 17.5 | 3.0 | 42231MFPB0 | 42231MFMB0 | 500 | 42231MFIB0 | 450 | 42231MF0W0 | 600 |
| | 0.33 | 10.5 x 17.5 x 18.0 | 4.0 | 43331MFPB0 | 43331MFMB0 | 250 | 43331MFIB0 | 400 | 43331MF0W0 | 600 | |
| PITCH = 15 mm \pm 0.4 mm; $d_t = 0.60 \text{ mm} \pm 0.06 \text{ mm}$; C-TOL. = $\pm 10 \%$ | | | | | | | | | | | |
| 310 | 0.010 | 5.0 x 11.0 x 17.5 | 1.0 | 31031KFPB0 | 31031KFMB0 | 1250 | 31031KFIB0 | 1000 | 31031KF0W0 | 1100 | |
| | 0.012 | | | 31231KFPB0 | 31231KFMB0 | | 31231KFIB0 | | 31231KF0W0 | | |
| | 0.015 | | | 31531KFPB0 | 31531KFMB0 | | 31531KFIB0 | | 31531KF0W0 | | |
| | 0.018 | | | 31831KFPB0 | 31831KFMB0 | | 31831KFIB0 | | 31831KF0W0 | | |
| | 0.022 | | | 32231KFPB0 | 32231KFMB0 | | 32231KFIB0 | | 32231KF0W0 | | |
| | 0.027 | | | 32731KFPB0 | 32731KFMB0 | | 32731KFIB0 | | 32731KF0W0 | | |
| | 0.033 | | | 33331KFPB0 | 33331KFMB0 | | 33331KFIB0 | | 33331KF0W0 | | |
| | 0.039 | | | 33931KFPB0 | 33931KFMB0 | | 33931KFIB0 | | 33931KF0W0 | | |
| | 0.047 | | | 34731KFPB0 | 34731KFMB0 | | 34731KFIB0 | | 34731KF0W0 | | |
| | 0.056 | | | 35631KFPB0 | 35631KFMB0 | | 35631KFIB0 | | 35631KF0W0 | | |
| | 0.068 | 6.0 x 12.0 x 17.5 | 1.4 | 36831KFPB0 | 36831KFMB0 | 1000 | 36831KFIB0 | 1000 | 36831KF0W0 | 900 | |
| | 0.082 | | | 38231KFPB0 | 38231KFMB0 | | 38231KFIB0 | | 38231KF0W0 | | |
| | PITCH = 15 mm \pm 0.4 mm; $d_t = 0.80 \text{ mm} \pm 0.08 \text{ mm}$; C-TOL. = $\pm 10 \%$ | | | | | | | | | | |
| | | 0.10 | 7.0 x 13.5 x 17.5 | 1.8 | 41031KFPB0 | 41031KFMB0 | 750 | 41031KFIB0 | 500 | 41031KF0W0 | 800 |
| | 0.12 | 41231KFPB0 | | | 41231KFMB0 | 41231KFIB0 | | 41231KF0W0 | | | |
| | 0.15 | 8.5 x 15.0 x 17.5 | 2.4 | 41531KFPB0 | 41531KFMB0 | 750 | 41531KFIB0 | 500 | 41531KF0W0 | 650 | |
| | 0.18 | | | 41831KFPB0 | 41831KFMB0 | | 41831KFIB0 | | 41831KF0W0 | | |
| | 0.22 | 10.0 x 16.5 x 17.5 | 3.0 | 42231KFPB0 | 42231KFMB0 | 500 | 42231KFIB0 | 450 | 42231KF0W0 | 600 | |
| | 0.27 | 10.5 x 17.5 x 18.0 | 4.0 | 42731KFPB0 | 42731KFMB0 | 250 | 42731KFIB0 | 400 | 42731KF0W0 | 600 | |
| | 0.33 | 11.0 x 18.5 x 18.0 | 5.0 | 43331KFPB0 | 43331KFMB0 | 225 | 43331KFIB0 | 350 | 43331KF0W0 | 550 | |



| ELECTRICAL DATA AND ORDERING INFORMATION | | | | | | | | | | |
|---|--------------------|---------------------------------|----------------------------|---|-------------------------------------|------------|--------------------------------------|------------|--|-----|
| U _{RAC} (V) | CAP. (μF) | DIMENSIONS w x h x l (mm) | MASS (g) ⁽³⁾ | CATALOG NUMBER F1772S X2... AND PACKAGING | | | | | | |
| | | | | LOOSE IN BOX | | | | | REEL ⁽¹⁾⁽²⁾ | |
| | | | | SHORT LEADS | | | LONG LEADS | | Ø = 500 mm H = 18.5 mm; P ₀ = 12.7 mm | SPQ |
| | | | | l _t = 3.5 mm ± 0.3 mm | l _t = 5.0 mm ± 1.0 mm | SPQ | l _t = 25.0 mm ± 2.0 mm | SPQ | | |
| PITCH = 22.5 mm ± 0.4 mm; d _t = 0.80 mm ± 0.08 mm; C-TOL. = ± 20 % | | | | | | | | | | |
| 0.15 | 6.0 x 15.5 x 26.0 | 2.4 | 41531MIPT0 | 41531MIMT0 | 300 | 41531MIIB0 | 250 | 41531MIOW0 | 600 | |
| 0.22 | 7.0 x 16.5 x 26.0 | 2.9 | 42231MIPT0 | 42231MIMT0 | 200 | 42231MIIB0 | 250 | 42231MIOW0 | 500 | |
| 0.33 | 8.5 x 18.0 x 26.0 | 3.8 | 43331MIPT0 | 43331MIMT0 | 200 | 43331MIIB0 | 250 | 43331MIOW0 | 450 | |
| 0.41 | | | 44131MIPT0 | 44131MIMT0 | | 44131MIIB0 | | 44131MIOW0 | | |
| 0.47 | 10.0 x 19.5 x 26.0 | 6.8 | 44731MIPT0 | 44731MIMT0 | 200 | 44731MIIB0 | 200 | 44731MIOW0 | 350 | |
| 0.68 | 12.0 x 22.0 x 26.0 | 7.8 | 46831MIPT0 | 46831MIMT0 | 150 | 46831MIIB0 | 200 | 46831MIOW0 | 300 | |
| 1.0 | 15.5 x 26.5 x 26.5 | 9.0 | 51031MIPT0 | 51031MIMT0 | 110 | 51031MIIB0 | 275 | 51031MIOW0 | 250 | |
| 1.5 | 18.0 x 29.5 x 26.5 | 10.0 | 51531MIPT0 | 51531MIMT0 | 90 | 51531MIIB0 | 250 | 51531MIOW0 | 200 | |
| PITCH = 22.5 mm ± 0.4 mm; d _t = 0.80 mm ± 0.08 mm; C-TOL. = ± 10 % | | | | | | | | | | |
| 0.10 | 6.0 x 15.5 x 26.0 | 2.4 | 41031KIPT0 | 41031KIMT0 | 300 | 41031KIIB0 | 250 | 41031KIOW0 | 600 | |
| 0.12 | | | 41231KIPT0 | 41231KIMT0 | | 41231KIIB0 | | 41231KIOW0 | | |
| 0.15 | 7.0 x 16.5 x 26.0 | 2.9 | 41531KIPT0 | 41531KIMT0 | 200 | 41531KIIB0 | 250 | 41531KIOW0 | 500 | |
| 0.18 | | | 41831KIPT0 | 41831KIMT0 | | 41831KIIB0 | | 41831KIOW0 | | |
| 0.22 | 8.5 x 18.0 x 26.0 | 3.8 | 42231KIPT0 | 42231KIMT0 | 200 | 42231KIIB0 | 250 | 42231KIOW0 | 450 | |
| 0.27 | | | 42731KIPT0 | 42731KIMT0 | | 42731KIIB0 | | 42731KIOW0 | | |
| 0.33 | 10.0 x 19.5 x 26.0 | 6.8 | 43331KIPT0 | 43331KIMT0 | 200 | 43331KIIB0 | 200 | 43331KIOW0 | 350 | |
| 0.39 | | | 43931KIPT0 | 43931KIMT0 | | 43931KIIB0 | | 43931KIOW0 | | |
| 0.41 | 12.0 x 22.0 x 26.0 | 7.8 | 44131KIPT0 | 44131KIMT0 | 150 | 44131KIIB0 | 200 | 44131KIOW0 | 300 | |
| 0.47 | | | 44731KIPT0 | 44731KIMT0 | | 44731KIIB0 | | 44731KIOW0 | | |
| 0.56 | 12.5 x 22.5 x 26.5 | 8.2 | 45631KIPT0 | 45631KIMT0 | 140 | 45631KIIB0 | 400 | 45631KIOW0 | 300 | |
| 0.68 | | | 46831KIPT0 | 46831KIMT0 | | 46831KIIB0 | | 46831KIOW0 | | |
| 0.82 | 15.5 x 26.5 x 26.5 | 9.0 | 48231KIPT0 | 48231KIMT0 | 110 | 48231KIIB0 | 275 | 48231KIOW0 | 250 | |
| 1.0 | | | 51031KIPT0 | 51031KIMT0 | | 51031KIIB0 | | 51031KIOW0 | | |
| 1.2 | 51231KIPT0 | 51231KIMT0 | 51231KIIB0 | 51231KIOW0 | | | | | | |
| PITCH = 27.5 mm ± 0.4 mm; d _t = 0.80 mm ± 0.08 mm; C-TOL. = ± 20 % | | | | | | | | | | |
| 0.39 | 9.0 x 19.0 x 31.5 | 5.5 | 43931MKPT0 | 43931MKMT0 | 100 | 43931MKIB0 | 150 | - | - | |
| 0.41 | | | 44131MKPT0 | 44131MKMT0 | | 44131MKIB0 | | | | |
| 0.47 | | | 44731MKPT0 | 44731MKMT0 | | 44731MKIB0 | | | | |
| 0.68 | 11.0 x 21.0 x 31.0 | 7.4 | 46831MKPT0 | 46831MKMT0 | 100 | 46831MKIB0 | 125 | - | - | |
| 1.0 | 15.0 x 23.0 x 31.0 | 11.0 | 51031MKPT0 | 51031MKMT0 | 100 | 51031MKIB0 | 100 | - | - | |
| 1.5 | 18.0 x 28.0 x 31.5 | 12.3 | 51531MKPT0 | 51531MKMT0 | 100 | 51531MKIB0 | 100 | - | - | |
| 2.2 | 21.0 x 31.0 x 31.0 | 16.1 | 52231MKPT0 | 52231MKMT0 | 50 | 52231MKIB0 | 75 | - | - | |
| PITCH = 27.5 mm ± 0.4 mm; d _t = 0.80 mm ± 0.08 mm; C-TOL. = ± 10 % | | | | | | | | | | |
| 0.39 | 9.0 x 19.0 x 31.5 | 5.5 | 43931KKPT0 | 43931KKMT0 | 100 | 43931KKIB0 | 150 | - | - | |
| 0.41 | | | 44131KKPT0 | 44131KKMT0 | | 44131KKIB0 | | | | |
| 0.47 | | | 44731KKPT0 | 44731KKMT0 | | 44731KKIB0 | | | | |
| 0.56 | 11.0 x 21.0 x 31.0 | 7.4 | 45631KKPT0 | 45631KKMT0 | 100 | 45631KKIB0 | 125 | - | - | |
| 0.68 | | | 46831KKPT0 | 46831KKMT0 | | 46831KKIB0 | | | | |
| 0.82 | | | 48231KKPT0 | 48231KKMT0 | | 48231KKIB0 | | | | |
| 1.0 | 15.0 x 25.0 x 31.5 | 11.0 | 51031KKPT0 | 51031KKMT0 | 100 | 51031KKIB0 | 125 | - | - | |
| 1.2 | 18.0 x 28.0 x 31.5 | 12.3 | 51231KKPT0 | 51231KKMT0 | 100 | 51231KKIB0 | 100 | - | - | |
| 1.5 | | | 51531KKPT0 | 51531KKMT0 | | 51531KKIB0 | | | | |
| 1.8 | | | 51831KKPT0 | 51831KKMT0 | | 51831KKIB0 | | | | |
| 2.2 | 21.0 x 31.0 x 31.0 | 16.1 | 52231KKPT0 | 52231KKMT0 | 50 | 52231KKIB0 | 75 | - | - | |

Notes

- SPQ = Standard Packing Quantity
- (1) Reel diameter = 356 mm is available on request
- (2) H = in-tape height; P₀ = sprocket hole distance; for detailed specifications refer to "Packaging Information"
- (3) Weight for short lead product only

| APPROVALS | | | | |
|--|---------------------|----------------------|--------------|--|
| SAFETY APPROVALS X2 | VOLTAGE | VALUE | FILE NUMBERS | LINK |
| EN 60384-14 (ENEC) (= IEC 60384-14) | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | 40005079 | www.vishay.com/doc?28225 |
| UL 60384-14 | 310 V _{AC} | 0.01 μF to 2.2 μF X2 | E354331 | www.vishay.com/doc?28231 |
| CSA-E384-14 | 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 | DE1-53271 | 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 capacitor unit is designed for mounting on a printed-circuit board. 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

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. The capacitor shall be mechanically fixed by the leads and the body clamped.

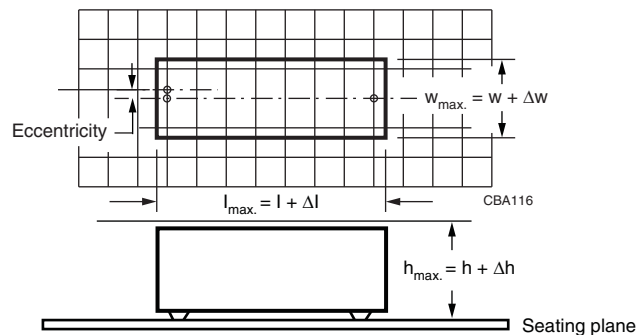
- For pitches ≤ 15 mm the capacitors shall be mechanically fixed by the leads
- For larger pitches the capacitors shall be mounted in the same way and the body clamped

Space Requirements on Printed-Circuit Board

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

- For products with pitch ≤ 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

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





SOLDERING CONDITIONS

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

Storage Temperature

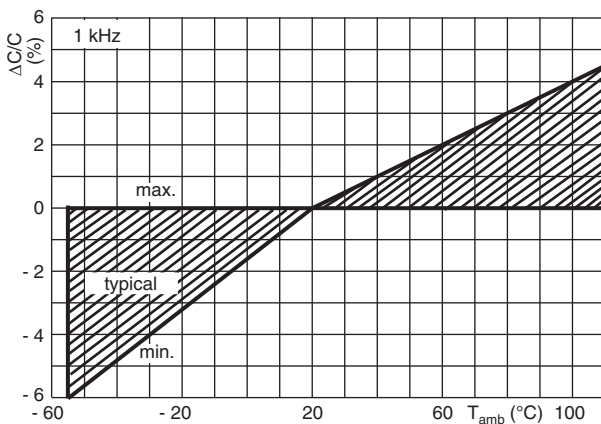
T_{stg} = -25 °C to +35 °C with RH maximum 75 % without condensation

Ratings and Characteristics Reference Conditions

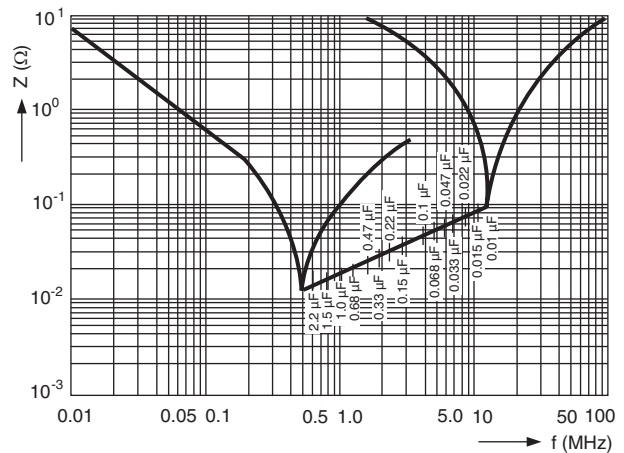
Unless otherwise specified, all electrical values apply to an ambient temperature of 23 °C ± 1 °C, an atmospheric pressure of 86 kPa to 106 kPa and a relative humidity of 50 % ± 2 %.

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 %.

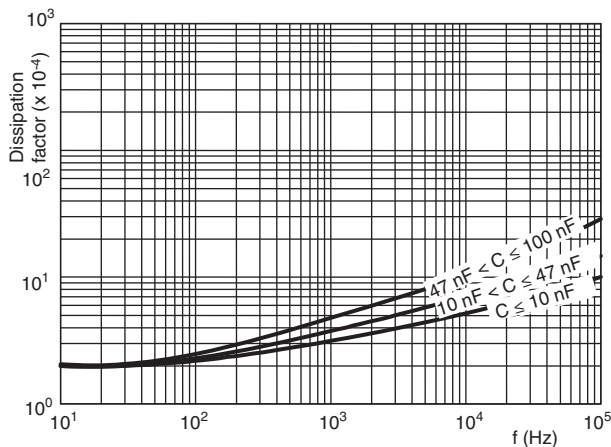
CHARACTERISTICS



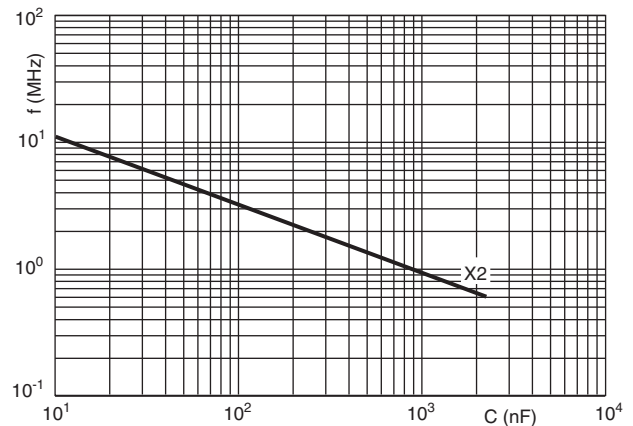
Capacitance as a function of ambient temperature (typical curve)



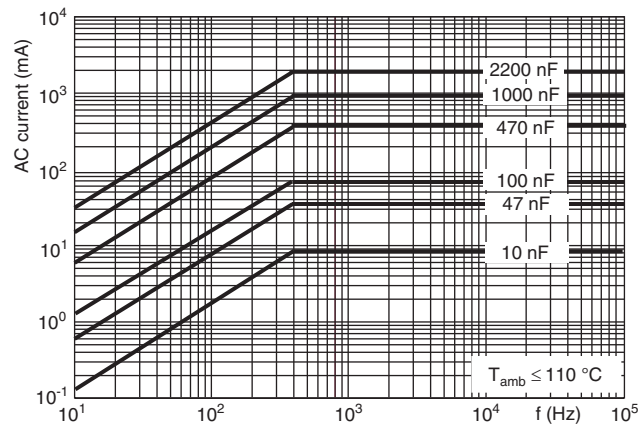
Impedance as a function of frequency (typical curve)



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



Resonant frequency as a function of capacitance (typical curve)



Max. RMS current as a function of frequency

APPLICATION NOTES AND LIMITING CONDITIONS

- For X2 electromagnetic interference suppression in **standard across the line applications** (50 Hz / 60 Hz) with a maximum mains voltage of 310 V_{AC}
- These capacitors are suitable for the application as voltage-division impedance in series with the mains (50 Hz / 60 Hz) with a maximum mains voltage of U_{RAC}.
- To ensure withstanding high humidity requirements in the application the epoxy adhesion at the leads shall not be damaged. Therefore the leads may not be damaged or not be bent before soldering.
- 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 rfi@vishay.com.
- These capacitors are not intended for continuous pulse applications. For these situations, capacitors of the AC and pulse program must be used.
- 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 Chapters “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 | |
| 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 | No visible damage Legible marking |
| | Capacitance | $ \Delta C/C \leq 5\%$ of the value measured initially |
| | Tangent of loss angle | Increase of tan δ: ≤ 0.008 for: C ≤ 1 µF or ≤ 0.005 for: C > 1 µF Compared to values measured initially |
| | Insulation resistance | 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 ≤ 1 µF at 10 kHz for C > 1 µF 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 | θA = -55 °C θB = +110 °C 5 cycles Duration t = 30 min | |



| GROUP C INSPECTION REQUIREMENTS | | |
|--|--|---|
| SUB-CLAUSE NUMBER AND TEST | CONDITIONS | PERFORMANCE REQUIREMENTS |
| SUB-GROUP C1B PART OF SAMPLE OF SUB-GROUP C1 | | |
| 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 | No visible damage |
| | Capacitance | $ \Delta C/C \leq 5\%$ of the value measured initially |
| | Tangent of loss angle | Increase of tan δ : ≤ 0.008 for: $C \leq 1 \mu\text{F}$ or ≤ 0.005 for: $C > 1 \mu\text{F}$ Compared to values measured initially |
| | Insulation resistance | As specified in section "Insulation Resistance" of this specification |
| SUB-GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB-GROUPS C1A AND C1B | | |
| 4.11 Climatic sequence | | |
| 4.11.1 Initial measurements | Capacitance 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: -55 °C Duration: 2 h | |
| 4.11.5 Damp heat cyclic Test Db remaining cycles | | |



| 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 | | |
| 4.11.6 Final measurements | Visual examination Capacitance Tangent of loss angle Voltage proof 1350 V _{DC} 1 min between term. Insulation resistance | No visible damage Legible marking $ \Delta C/C \leq 5\%$ of the value measured in 4.11.1. Increase of tan δ : ≤ 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. No permanent breakdown or flash-over $\geq 50\%$ 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 Capacitance Tangent of loss angle Voltage proof 1350 V _{DC} ; 1 min between terminations Insulation resistance | No visible damage Legible marking $ \Delta C/C \leq 5\%$ of the value measured in 4.12.1. Increase of tan δ : ≤ 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. No permanent breakdown or flash-over $\geq 50\%$ of values specified in section "Insulation resistance" of this specification |
| SUB-GROUP C2A | | |
| 4.12A Damp heat steady state with load | RH: 85 %; Temp.: 85 °C; Load: 240 V _{AC} Duration: 1000 h | |
| 4.12.1A Initial measurements | Capacitance Tangent of loss angle: 1 kHz | |
| 4.12.3A Final measurements | Visual examination Capacitance Tangent of loss angle Voltage proof 1350 V _{DC} ; 1 min between terminations. Insulation resistance | No visible damage Legible marking $ \Delta C/C \leq 10\%$ of the value measured in 4.12.1A Increase of tan δ : ≤ 0.015 Compared to values measured in 4.12.1A No permanent breakdown or flash-over $\geq 50\%$ 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 Duration: 1000 h | No self healing breakdowns or flashover |
| 4.14 Endurance | 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 ≤ 10 % 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 | |
| 4.15.3 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 B for Volume $> 1750 \text{ mm}^3$ Class C for Volume $\leq 1750 \text{ mm}^3$ | Bore of gas jet: $\varnothing 0.5 \text{ mm}$ 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 $V > 1750$: 60 s One flame application | After removing test flame from capacitor, the capacitor must not continue to burn for more than 30 s for $V \leq 1750 \text{ mm}^3$ and 10 s for $V > 1750 \text{ mm}^3$. 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. |



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

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