

## **SPECIFICATION**

### **ACROSS-THE-LINE AND INTERFERENCE SUPPRESSION CAPACITORS CLASS X1 -480VAC**

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1. REFERENCE STANDARDS: UL 60384-14, CSA C22.2  
USED FOR ACROSS-THE LINE CAPACITORS, ANTENNA-COUPLING AND LINE-BY-PASS COMPONENTS.  
ENEC EN 60384-14 : 2005  
  
USED FOR RADIO INTERFERENCE SUPPRESSION CAPACITORS.
2. RATED VOLTAGE : 480 VAC, 50 ~ 60 Hz
3. CAPACITANCE RANGE : 0.0047  $\mu$ F ~ 4.0 $\mu$ F
4. CAPACITANCE TOLERANCE : J ( $\pm 5\%$  ), K ( $\pm 10\%$  ), M ( $\pm 20\%$  ), U (+10-5% )
5. DIELECTRIC : METALLIZED POLYPROPYLENE FILM
6. DISSIPATION FACTOR TAN  $\delta$  : LESS THAN 0.1% AT 1K Hz/20  $^{\circ}$ C  
  
VOLTAGE 1.0 VAC (CAPACITANCE : 1K Hz/20  $^{\circ}$ C, VOLTAGE 1.0 VAC)
7. INSULATION RESISTANCE : BETWEEN TERMINALS
  - (1) LESS THAN OR EQUAL TO 0.33  $\mu$ F  $\cong 3 \times 10^4$  M $\Omega$
  - (2) GREATER THAN 0.33  $\mu$ F  $\cong 1 \times 10^4$  M $\Omega$ / $\mu$ FMEASURED AT 100  $\pm$  15 VDC, 60 Sec./20  $^{\circ}$ C
8. WITHSTAND VOLTAGE :
  - a) BETWEEN TERMINALS.... 1892VDC FOR 60 Sec.OR 2400VDC FOR 1 Sec.  
CUT-OFF CURRENT : 10mA
  - b) BETWEEN TERMINALS AND CASE....2380 VAC 60 Hz FOR 60 Sec.
9. CLIMATIC CATEGORY : IN ACCORDANCE WITH DIN 40040 GMF  
G (MINIMUM LIMIT TEMPERATURE) = - 40  $^{\circ}$ C  
L (MAXIMUM LIMIT TEMPERATURE) = + 110  $^{\circ}$ C  
F (HUMIDITY CATEGORY) = AVERAGE RELATIVE HUMIDITY  $\cong 75\%$   
  
95% FOR 30 DAYS PER YEAR CONTINUOUSLY  
  
85% FOR THE REMAINING DAYS OCCASIONALLY
10. DRY HEAT RESISTANCE :  
IN ACCORDANCE WITH DIN 40046 SHEET 1 OR IEC 68-2-2 TEST BA. CONDITIONS  
TEST TEMPERATURE : 110  $\pm$  2  $^{\circ}$ C  
TEST DURATION : 16 HOURS  
TEST CRITERIA :
  - (1) APPEARANCE : NO VISIBLE DAMAGE AND NO LEAKAGE

(2) WITHSTAND VOLTAGE : 0.66 x RATED WITHSTAND VOLTAGE 60 Sec.

(3) CAPACITANCE CHANGE :  $\cong \pm 5\%$  OF THE INITIAL VALUE

(4) INSULATION RESISTANCE :  $\cong 50\%$  OF INITIAL SPECIFIED VALUE

11. COLD RESISTANCE :

IN ACCORDANCE WITH DIN 40046 SHEET 1 OR IEC 68-2-1 TEST BA. CONDITIONS

TEST TEMPERATURE :  $-40 \pm 2$  °C

TEST DURATION : 2 HOURS

TEST CRITERIA :

(1) APPEARANCE : NO VISIBLE DAMAGE

(2) WITHSTAND VOLTAGE : 0.66 x RATED WITHSTAND VOLTAGE 60 Sec.

(3) CAPACITANCE CHANGE :  $\cong \pm 5\%$  OF THE INITIAL VALUE

12. HUMIDITY TEST CONDITIONS :

TEST TEMPERATURE :  $40$  °C  $\pm 2$  °C

RELATIVE HUMIDITY : 90 – 95 %

TEST DURATION : 500 HOURS

TEST CRITERIA :

(1) WITHSTAND VOLTAGE : 0.66 x RATED WITHSTAND VOLTAGE 60 Sec.

(2) CAPACITANCE DRIFT :  $\cong \pm 5\%$  OF THE INITIAL VALUE

(3) DISSIPATION FACTOR :  $\cong 200\%$  OF INITIAL SPECIFIED VALUE

(4) INSULATION RESISTANCE :  $\cong 50\%$  OF INITIAL SPECIFIED VALUE

13. LIFE TEST CONDITIONS :

TEST TEMPERATURE :  $110$  °C  $\pm 3$  °C

TEST VOLTAGE : 625 VAC AND 1,000 VAC/60 HZ FOR A PERIOD OF 0.1 Sec. ONCE EACH HOUR

TEST DURATION : 1,000 HOURS

TEST CRITERIA :

(1) APPEARANCE : NO VISIBLE DAMAGE AND NO LEAKAGE

(2) WITHSTAND VOLTAGE : 0.66 x RATED WITHSTAND VOLTAGE 60 Sec.

(3) CAPACITANCE DRIFT :  $\cong \pm 10\%$  OF THE INITIAL VALUE

(4) DISSIPATION FACTOR :  $\cong 0.6 \times 10$  (0.06 % ) OF INCREASED VALUE

(5) INSULATION RESISTANCE :  $\cong 50\%$  OF SPECIFIED VALUE

14. SOLDERABILITY CONDITIONS :

SOLDER BATH TEMPERATURE & MATERIAL :

$230 \pm 5$  °C, 60 % OF TIN (Sn) + 40 % OF LEAD (Pb)

SOLDER BATH TEMPERATURE & MATERIAL :

270 ± 5 °C, 99.96 % OF TIN (Sn) + 0.04 % OF SILVER (Ag)

SOLDER TIME : 3 ± 0.5 Sec. TEST CRITERIA :75% OF THE SURFACE TINNING

15. SOLDERING HEAT RESISTANCE :

IN ACCORDANCE WITH DIN 40046 SHEET 18 OR IEC 68-2-20 TEST TA.1 & TB.1

CONDITIONS

SOLDER BATH TEMPERATURE : 260 ± 5 °C

SOLDER TIME : 5 ± 1 Sec.

CAPACITANCE BODY MAY LIE ON PRINTING CIRCUIT BOARD

TEST CRITERIA :

(1) APPEARANCE : NO DAMAGE AND GOOD TINNING

(2) CAPACITANCE CHANGE :  $\leq \pm 3$  % OF THE INITIAL VALUE

16. VIBRATION RESISTANCE :

IN ACCORDANCE WITH DIN 40046 SHEET 8 OR IEC 68-2-6 TEST FC CONDITIONS

FREQUENCY RANGE : 10 - 55 HZ

DISPLACEMENT AMPLITUDE : 0.75 mm

CONFORMING TO MAX. : 10 g

TEST DURATION : 6 HOURS

TEST CRITERIA :

(1) APPEARANCE : NO VISIBLE DAMAGE

(2) CAPACITANCE CHANGE :  $\leq \pm 2$  % OF THE INITIAL VALUE

17. TENSILE STRENGTH OF TERMINALS

IN ACCORDANCE WITH DIN 40046 SHEET 19 OR IEC 68-2-21 TEST UA.1

CONDITIONS

| TERMINAL     | LOAD FORCE | HOLDING TIMES |
|--------------|------------|---------------|
| DIA. (mm)    | KG (N)     | Sec.          |
| $\leq 0.5$   | 0.5 (5)    | 10            |
| >0.5 TO <0.8 | 1.0 (10)   | 10            |
| >0.8         | 2.0 (20)   | 20            |

TEST CRITERIA : NO WIRE BREAKAGE AND NO DAMAGE OF CAPACITOR

18. BENDING OF TERMINALS

IN ACCORDANCE WITH DIN 40046 SHEET 19 OR IEC 68-2-21 TEST UB. CONDITIONS

LOAD FORCE : 0.5 KG (5N)

BENDING TIME : TWO CONSECUTIVE BENDS (4 x 90 °C)

TEST CRITERIA : NO WIRE BREAKAGE AND DAMAGE OF CAPACITOR

19. APPROVED BY :

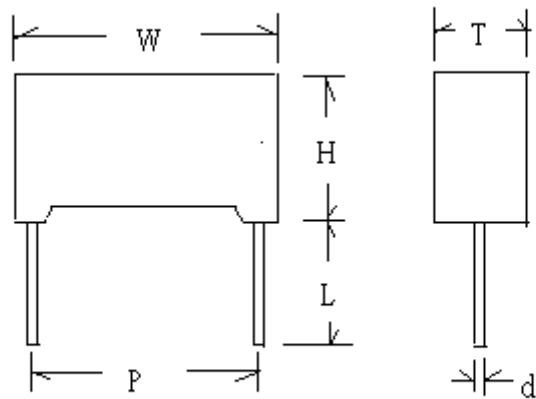
UL \ CUL FILE NO. E193049 (0.0047uF~4.0uF/480V)

20. MARKING :

CAPACITORS ARE MARKED WITH TYPE IDENTIFICATION CAPACITANCE, CAPACITANCE TOLERANCE, RATED VOLTAGE, TEMPERATURE RANGE, NAME OF MANUFACTURE, DATE OF MANUFACTURE AND APPROVED CERTIFICATION MARKS.

Marking Example:

**0.0047 ~ 4.0 uF**



| Product No.     | Capacitance | Rated-Voltage | PVC Wire(W±0.75) |       |       | Dimensions in mm |        |
|-----------------|-------------|---------------|------------------|-------|-------|------------------|--------|
|                 | uF          | VAC           | W±0.5            | H±0.5 | T±0.5 | P±0.5            | d±0.05 |
| CTX472K480VP10  | 0.0047      | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX472K480VP15  | 0.0047      | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX562K480VP10  | 0.0056      | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX562K480VP15  | 0.0056      | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX682K480VP10  | 0.0068      | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX682K480VP15  | 0.0068      | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX822K480VP10  | 0.0082      | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX822K480VP15  | 0.0082      | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX103K480VP10  | 0.01        | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX103K480VP15  | 0.01        | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX123K480VP10  | 0.012       | 480           | 13               | 11    | 5     | 10               | 0.6    |
| CTX123K480VP15  | 0.012       | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX153K480VP10  | 0.015       | 480           | 13               | 12    | 6     | 10               | 0.6    |
| CTX153K480VP15  | 0.015       | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX183K480VP10  | 0.018       | 480           | 13               | 12    | 6     | 10               | 0.6    |
| CTX183K480VP15  | 0.018       | 480           | 18               | 10    | 5     | 15               | 0.8    |
| CTX223K480VP10  | 0.022       | 480           | 12               | 14    | 8     | 10               | 0.6    |
| CTX223K480VP15  | 0.022       | 480           | 17               | 11    | 5.5   | 15               | 0.8    |
| CTX273K480VP10  | 0.027       | 480           | 12               | 14    | 8     | 10               | 0.6    |
| CTX273K480VP15  | 0.027       | 480           | 17               | 11    | 5.5   | 15               | 0.8    |
| CTX333K480VP10  | 0.033       | 480           | 18               | 12    | 6     | 15               | 0.8    |
| CTX393K480VP15  | 0.039       | 480           | 18               | 13.5  | 6     | 15               | 0.8    |
| CTX473K480VP15  | 0.047       | 480           | 18               | 13.5  | 6     | 15               | 0.8    |
| CTX563K480VP15  | 0.056       | 480           | 18               | 13.5  | 7.5   | 15               | 0.8    |
| CTX563K480VP225 | 0.056       | 480           | 25               | 14.5  | 6     | 22.5             | 0.8    |
| CTX683K480VP15  | 0.068       | 480           | 17               | 15.5  | 7.5   | 15               | 0.8    |
| CTX683K480VP225 | 0.068       | 480           | 25               | 14.5  | 6     | 22.5             | 0.8    |
| CTX823K480VP15  | 0.082       | 480           | 18               | 16.5  | 8.5   | 15               | 0.8    |
| CTX823K480VP225 | 0.082       | 480           | 25               | 14.5  | 6     | 22.5             | 0.8    |
| CTX104K480VP15  | 0.1         | 480           | 17               | 16.5  | 9.5   | 15               | 0.8    |
| CTX104K480VP225 | 0.1         | 480           | 26.5             | 16.5  | 7     | 22.5             | 0.8    |
| CTX124K480VP15  | 0.12        | 480           | 17               | 19    | 11    | 15               | 0.8    |
| CTX124K480VP225 | 0.12        | 480           | 26.5             | 16.5  | 7     | 22.5             | 0.8    |
| CTX154K480VP15  | 0.15        | 480           | 17               | 19    | 11    | 15               | 0.8    |
| CTX154K480VP225 | 0.15        | 480           | 26.5             | 17    | 8.5   | 22.5             | 0.8    |
| CTX184K480VP15  | 0.18        | 480           | 17               | 21    | 12    | 15               | 0.8    |
| CTX184K480VP225 | 0.18        | 480           | 25               | 19    | 8.5   | 22.5             | 0.8    |
| CTX224K480VP15  | 0.22        | 480           | 17               | 16.5  | 9.5   | 15               | 0.8    |
| CTX224K480VP225 | 0.22        | 480           | 26.5             | 19    | 10    | 22.5             | 0.8    |

|                 |      |     |      |      |      |      |     |
|-----------------|------|-----|------|------|------|------|-----|
| CTX224K480VP275 | 0.22 | 480 | 31.5 | 20   | 11   | 27.5 | 0.8 |
| CTX274K480VP225 | 0.27 | 480 | 26   | 22   | 12   | 22.5 | 0.8 |
| CTX274K480VP225 | 0.27 | 480 | 31.5 | 20   | 11   | 27.5 | 0.8 |
| CTX334K480VP225 | 0.33 | 480 | 26   | 22   | 12   | 22.5 | 0.8 |
| CTX334K480VP275 | 0.33 | 480 | 30   | 21   | 11.5 | 27.5 | 0.8 |
| CTX394K480VP225 | 0.39 | 480 | 25   | 23.5 | 14   | 22.5 | 0.8 |
| CTX394K480VP275 | 0.39 | 480 | 31.5 | 22.5 | 13   | 27.5 | 0.8 |
| CTX474K480VP275 | 0.47 | 480 | 31.5 | 25   | 14   | 27.5 | 0.8 |
| CTX474K480VP325 | 0.47 | 480 | 37   | 24   | 13.5 | 32.5 | 0.8 |
| CTX564K480VP275 | 0.56 | 480 | 31.5 | 25   | 14   | 27.5 | 0.8 |
| CTX564K480VP325 | 0.56 | 480 | 37   | 24   | 13.5 | 32.5 | 0.8 |
| CTX604K480VP275 | 0.60 | 480 | 31   | 26   | 18   | 27.5 | 0.8 |
| CTX604K480VP325 | 0.60 | 480 | 37   | 24   | 13.5 | 32.5 | 0.8 |
| CTX684K480VP275 | 0.68 | 480 | 31   | 26   | 18   | 27.5 | 0.8 |
| CTX684K480VP325 | 0.68 | 480 | 37   | 26.5 | 16   | 32.5 | 0.8 |
| CTX824K480VP275 | 0.82 | 480 | 31.5 | 33   | 18   | 27.5 | 0.8 |
| CTX824K480VP325 | 0.82 | 480 | 37   | 26.5 | 16   | 32.5 | 0.8 |
| CTX105K480VP275 | 1.0  | 480 | 31.5 | 33   | 18   | 27.5 | 0.8 |
| CTX105K480VP325 | 1.0  | 480 | 37   | 28.5 | 18   | 32.5 | 0.8 |
| CTX125K480VP325 | 1.2  | 480 | 35.5 | 31   | 20   | 32.5 | 0.8 |
| CTX125K480VP475 | 1.2  | 480 | 51   | 27.5 | 17.5 | 47.5 | 0.8 |
| CTX155K480VP325 | 1.5  | 480 | 37   | 34   | 22   | 32.5 | 0.8 |
| CTX155K480VP475 | 1.5  | 480 | 51   | 30.5 | 20   | 47.5 | 0.8 |
| CTX185K480VP475 | 1.8  | 480 | 51   | 30.5 | 20   | 47.5 | 0.8 |
| CTX205K480VP475 | 2.0  | 480 | 51   | 34   | 22   | 47.5 | 0.8 |
| CTX225K480VP475 | 2.2  | 480 | 51   | 34   | 22   | 47.5 | 0.8 |
| CTX275K480VP475 | 2.7  | 480 | 51   | 35   | 24   | 47.5 | 0.8 |
| CTX305K480VP475 | 3.0  | 480 | 51   | 43.5 | 29   | 47.5 | 0.8 |
| CTX335K480VP475 | 3.3  | 480 | 51   | 43.5 | 29   | 47.5 | 0.8 |
| CTX395K480VP475 | 3.9  | 480 | 51   | 43.5 | 29   | 47.5 | 0.8 |
| CTX405K480VP475 | 4.0  | 480 | 51   | 43.5 | 29   | 47.5 | 0.8 |