

**AC Line Rated Disc Capacitors**  
**Class X1, 400 VAC/Class Y1, 500 VAC**



LO' = 0.158" (4.0 mm) typ.

**INSULATION RESISTANCE**

min. 1000 ΩF

**TOLERANCE ON CAPACITANCE**

± 10 %; ± 20 %

**DISSIPATION FACTOR**

2.0 % max. at 1 kHz; 1 V

**CERAMIC DIELECTRIC**

C0G, U2J, P3K, R3L (class 1)  
X7R, Y5U (class 2)

**CATEGORY TEMPERATURE RANGE**

- 25 °C to + 125 °C

**OPERATING TEMPERATURE RANGE**

- 30 °C to + 125 °C

**CLIMATIC CATEGORY ACC. TO EN60068-1**

25/125/21

**FEATURES**

- Worldwide Safety Agency Recognition Underwriters Laboratories - UL 1414 and UL 1283  
Canadian Standards Association - CSA 22.2  
European EN132400 to IEC 60384-14 Second Edition
- Complete range of capacitance values
- Radial leads
- Compliant to RoHS directive 2002/95/EC



**APPLICATIONS**

- Required in AC power supply and filter applications
- Specific industry requirements

**DESIGN**

The capacitors consist of a ceramic disc of which both sides are silver-plated. Connection leads are made of tinned copper having a diameter of 0.032" (0.81 mm). The capacitors may be supplied with radial kinked or straight leads having a lead spacing of 0.375" (9.5 mm). The standard tolerances are ± 10 % or ± 20 %. Coating is made of flame retardant epoxy resin in accordance with "UL 94 V-0".

**CAPACITANCE RANGE**

10 pF to 0.01 μF

**RATED VOLTAGE U<sub>R</sub>**

|                |                      |
|----------------|----------------------|
| IEC 60384-14.2 | (Y1): 500 VAC, 50 Hz |
| IEC 60384-14.2 | (X1): 400 VAC, 50 Hz |
| UL 1414:       | 250 VAC, 60 Hz       |
| UL 1283:       | 600 VAC, 60 Hz       |
| CSA 22.2:      | 250 VAC, 60 Hz       |

**DIELECTRIC STRENGTH BETWEEN LEADS**

Component test:  
4000 VAC, 50 Hz, 2 s  
As repeated test admissible only once with:  
3600 VAC, 50 Hz, 2 s  
Random sampling test (destructive test):  
4000 VAC, 50 Hz, 60 s

**DIELECTRIC STRENGTH OF BODY INSULATION**

4000 VAC, 50 Hz, 60 s (destructive test)

# 440L Series

Vishay Cera-Mite

AC Line Rated Disc Capacitors  
Class X1, 400 VAC/Class Y1, 500 VAC



| ORDERING INFORMATION, CERAMIC X1/Y1 CAPACITORS 440L |              |               |                |           |              |                  |                  |
|---|--------------|---------------|----------------|-----------|--------------|------------------|------------------|
| C<br>(pF)   | TOL.<br>(%)  | D<br>DIAMETER | T<br>THICKNESS | WIRE SIZE |              | LS<br>LEAD SPACE | ORDERING<br>CODE |
|   |              |               |                | AWG       | INCH (mm)    |                  |                  |
| <b>C0G</b>  |              |               |                |           |              |                  |                  |
| 10  | ± 10 %       | 0.330 (8.4)   | 0.195 (5.0)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ10-R        |
| <b>U2J</b>  |              |               |                |           |              |                  |                  |
| 15  | ± 10 %       | 0.330 (8.4)   | 0.210 (5.3)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ15-R        |
| <b>P3K</b>  |              |               |                |           |              |                  |                  |
| 22  | ± 10 %       | 0.330 (8.4)   | 0.190 (4.8)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ22-R        |
| <b>R3L</b>  |              |               |                |           |              |                  |                  |
| 33  | ± 10 %       | 0.330 (8.4)   | 0.200 (5.1)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ33-R        |
| 47  | ± 10 %       | 0.330 (8.4)   | 0.180 (4.6)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ47-R        |
| <b>X7R</b>  |              |               |                |           |              |                  |                  |
| 68  | ± 10 %       | 0.330 (8.4)   | 0.220 (5.6)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LQ68-R        |
| 100   |              |               | 0.220 (5.6)    |           |              |                  | 440LT10-R        |
| 150   |              |               | 0.235 (6.0)    |           |              |                  | 440LT15-R        |
| 220   |              |               | 0.235 (6.0)    |           |              |                  | 440LT22-R        |
| 330   |              |               | 0.225 (5.7)    |           |              |                  | 440LT33-R        |
| <b>Y5U</b>  |              |               |                |           |              |                  |                  |
| 470   | ± 20 %       | 0.330 (8.4)   | 0.230 (5.8)    | 20        | 0.032 (0.81) | 0.375 (9.5)      | 440LT47-R        |
| 560   |              | 0.330 (8.4)   | 0.230 (5.8)    |           |              |                  | 440LT56-R        |
| 680   |              | 0.330 (8.4)   | 0.235 (6.0)    |           |              |                  | 440LT68-R        |
| 1000  |              | 0.365 (9.3)   | 0.220 (5.6)    |           |              |                  | 440LD10-R        |
| 1500  |              | 0.365 (9.3)   | 0.220 (5.6)    |           |              |                  | 440LD15-R        |
| 2000  |              | 0.400 (10.2)  | 0.220 (5.6)    |           |              |                  | 440LD20-R        |
| 2200  |              | 0.430 (10.9)  | 0.225 (5.7)    |           |              |                  | 440LD22-R        |
| 2700  |              | 0.460 (11.7)  | 0.225 (5.7)    |           |              |                  | 440LD27-R        |
| 2800  |              | 0.460 (11.7)  | 0.220 (5.6)    |           |              |                  | 440LD28-R        |
| 3000  |              | 0.490 (12.4)  | 0.225 (5.7)    |           |              |                  | 440LD30-R        |
| 3200  |              | 0.490 (12.4)  | 0.220 (5.6)    |           |              |                  | 440LD32-R        |
| 3300  |              | 0.490 (10.9)  | 0.215 (5.5)    |           |              |                  | 440LD33-R        |
| 3900  |              | 0.530 (13.5)  | 0.220 (5.6)    |           |              |                  | 440LD39-R        |
| 4000  |              | 0.530 (13.5)  | 0.220 (5.6)    |           |              |                  | 440LD40-R        |
| 4700  |              | 0.620 (15.7)  | 0.230 (5.8)    |           |              |                  | 440LD47-R        |
| 5000  |              | 0.620 (15.7)  | 0.225 (5.7)    |           |              |                  | 440LD50-R        |
| 5500  |              | 0.680 (17.3)  | 0.230 (5.8)    |           |              |                  | 440LD55-R        |
| 5600  |              | 0.680 (17.3)  | 0.230 (5.8)    |           |              |                  | 440LD56-R        |
| 6800  |              | 0.720 (18.3)  | 0.235 (6.0)    |           |              |                  | 440LD68-R        |
| 8000  |              | 0.720 (18.3)  | 0.220 (5.6)    |           |              |                  | 440LD80-R        |
| 9000  | 0.790 (20.1) | 0.225 (5.7)   | 440LD90-R      |           |              |                  |                  |
| 0.01 μF   |              | 0.850 (21.6)  | 0.230 (5.8)    |           |              |                  | 440LS10-R        |

**Notes**

- Alternate lead spacings are available bulk or tape and reel on request.
- European required minimum lead clearance (prevents use of inside crimp) 0.315" (8 mm)

**TAPE AND REEL OPTIONS**

- To specify tape and reel, add two letter suffix to the ordering code (for details of the packaging code see general section of the catalog)



### LEAKAGE CURRENT VS. VOLTAGE (TYPICAL)    INSERTION LOSS VS. FREQUENCY (TYPICAL)



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| APPROVALS   |   |              |             |                   |                     |                |
|---|---|--------------|-------------|-------------------|---------------------|----------------|
| IEC 60384 - 14/2nd Issue (1993) incl. Am. 1 (1995) - Safety Tests   |   |              |             |                   |                     |                |
| EN 132 400 (1994) - Safety Tests  |   |              |             |                   |                     |                |
| That approval together with CB Test Certificate substitutes the national approval of the following nations: |   |              |             |                   |                     |                |
| Belgium   | France  | Italy        | Austria     | China             | Japan               | Spain          |
| Denmark   | Greece  | Luxembourg   | Portugal    | Singapore         | Poland              | United Kingdom |
| Germany   | Ireland   | Netherlands  | Sweden      | Slovenia          | Hungaria            | Czech Republic |
| Finland   | Iceland   | Norway       | Switzerland | Korea             | Israel              |                |
| Y1 Capacitor: CB-Test Certificate: DE 1-19452   |   |              |             | 10 pF... 0.01 µF  | 500 V <sub>AC</sub> |                |
| X1 Capacitor: CB-Test Certificate: DE 1-19452   |   |              |             | 10 pF... 0.01 µF  | 400 V <sub>AC</sub> |                |
| UNDERWRITERS LABORATORIES   |   |              |             |                   |                     |                |
| <b>UL 1414</b>  | Across-the-line, Antenna-coupling and Line-by-pass component. |              |             | 10 pF... 0.01 µF  | 250 V <sub>AC</sub> |                |
|   | Agency File/License   | E99264 V2S2  |             |                   |                     |                |
| <b>UL 1283</b>  | EMI Filters   |              |             | 10 pF... 0.01 µF  | 600 V <sub>AC</sub> |                |
|   | Agency File/License   | E128046 V1S2 |             |                   |                     |                |
| CANADIAN STANDARDS ASSOCIATION  |   |              |             |                   |                     |                |
| <b>CSA C22.2</b>  | Across-the-line, Isolation capacitor                          |              |             | 10 pF... 0.01 µF  | 250 V <sub>AC</sub> |                |
| <b>No. 1-98</b>   | Agency File/License   | LR 62016-12  |             |                   |                     |                |
| <b>No. 1-94</b>   | Across-the-line, Line to ground, Isolation capacitor          |              |             | 100 pF... 0.01 µF | 250 V <sub>AC</sub> |                |
|   | Agency File/License   | LR 62016-1   |             |                   |                     |                |

### Note 1

UL 1414 Across-The-Line, Antenna Coupling, and Line-By-Pass Capacitors:

- Across-The-Line - A capacitor connected either across a supply circuit or between one side of a supply circuit and a conductive part that may be connected to earth ground.
- Antenna-Coupling - A capacitor connected from an antenna terminal to circuits within an appliance.
- Line-By-Pass - A capacitor connected between one side of a supply circuit and an accessible conductive part.

### Note 2

IEC 60384-14 Subclass Y Capacitors:

- A capacitor of a type suitable for use in situations where failure of the capacitor could lead to danger of electric shock.
- Class Y capacitors are divided into sub-classes based on type of insulation bridged and voltage ranges.
- For definitions of basic, supplementary, double and reinforced insulation, see IEC Publication 536.
- Subclass Y capacitors may be used in applications which require a Subclass X rating.

### Note 3

IEC 60384-14 Subclass X Capacitors:

- A capacitor of a type suitable for use in situations where failure of the capacitor would not lead to danger of electric shock.
- Class X capacitors are divided into subclasses according to the peak impulse test voltage superimposed on the main voltage.

| MARKING |  |
|---------|--|
|         | <p> <b>Type: 571C085B251AY103MLA612-R</b><br/>           CM PN: 440LS10-R E3<br/>           Qty. : 100<br/>           IEC60384-14/2:<br/>           Y1 (500~), X1 (400~)<br/>           R.C.: 7032 S.L.: 0010<br/>           BATCH NO.: 200622CZ<br/>           PN: 440LS10-R<br/>           LOT1: 11647764<br/>           LOT2:<br/>           DC1: 0622<br/>           DC2:<br/>           Op.No.: 771<br/>           SN: 2901BB14024<br/>           RoHS         </p> |



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