

## AC Line Rated Ceramic Disc Capacitors Class X1, 400 V<sub>AC</sub>/Class Y4, 125 V<sub>AC</sub>


**RoHS  
COMPLIANT**
**FEATURES**

- Worldwide safety agency recognition  
Underwriters laboratories - UL 1414  
Canadian standards association - CSA 22.2  
European EN132400 to IEC 60384-14 2<sup>nd</sup> edition
- Complete range of capacitance values
- Radial leads
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

**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) or 0.025" (0.64 mm). The capacitors may be supplied with radial kinked or straight leads having a lead spacing of 0.375" (9.5 mm) or 0.250" (6.4 mm). The standard tolerance is  $\pm 20\%$ . Coating is made of flame retardant epoxy resin in accordance with "UL 94 V-0".

**CAPACITANCE RANGE**

 1.0 nF to 0.050  $\mu$ F

**RATED VOLTAGE**

IEC 60384-14.2: (Y4): 125 V<sub>AC</sub>, 50 Hz  
 IEC 60384-14.2: (X1): 400 V<sub>AC</sub>, 50 Hz  
 UL 1414: 250 V<sub>AC</sub>, 60 Hz  
 CSA 22.2 No.1: 125 V<sub>AC</sub>/250 V<sub>AC</sub>, 60 Hz

**DIELECTRIC STRENGTH BETWEEN LEADS**

Component test:  
 2000 V<sub>AC</sub>, 50 Hz, 2 s  
 As repeated test admissible only once with:  
 1800 V<sub>AC</sub>, 50 Hz, 2 s  
 Random sampling test (destructive test):  
 2000 V<sub>AC</sub>, 50 Hz, 60 s

**DIELECTRIC STRENGTH OF BODY INSULATION**

 2300 V<sub>AC</sub>, 50 Hz, 60 s (destructive test)

| QUICK REFERENCE DATA       |              |     |     |
|----------------------------|--------------|-----|-----|
| DESCRIPTION                | VALUE        |     |     |
| Ceramic Class              | 2            |     |     |
| Ceramic Dielectric         | Y5V          |     |     |
| Voltage (V <sub>AC</sub> ) | 125          | 250 | 400 |
| Min. Capacitance (pF)      | 1000         |     |     |
| Max. Capacitance (pF)      | 50 000       |     |     |
| Mounting                   | Through hole |     |     |

**INSULATION RESISTANCE**

 Min. 1000  $\Omega$ F

**TOLERANCE ON CAPACITANCE**
 $\pm 20\%$ 
**DISSIPATION FACTOR**

2.0 % max. at 1 kHz; 1 V

**CERAMIC DIELECTRIC**

Y5V (Class 2)

**CATEGORY TEMPERATURE RANGE**

- 25 °C to + 125 °C

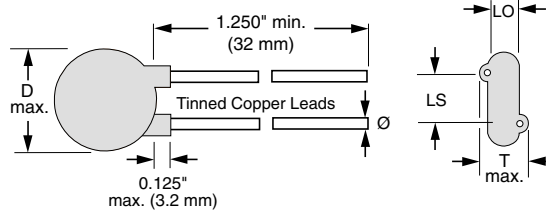
**CLIMATIC CATEGORY ACC. TO EN60068-1**

25/125/21

**OPERATING TEMPERATURE RANGE**

- 30 °C to + 125 °C

### DIMENSIONS in inches (millimeters)



LO' = 0.132" (3.4 mm) typ.

### ORDERING INFORMATION, CERAMIC X1/Y4 CAPACITORS 125L

| C<br>(pF)  | TOL.<br>(%) | D <sub>max.</sub><br>DIAMETER<br>INCH (mm) | T <sub>max.</sub><br>THICKNESS<br>INCH (mm) | WIRE SIZE |              | LS<br>LEAD SPACE<br>INCH (mm) | ORDERING<br>CODE |           |
|------------|-------------|--------------------------------------------|---------------------------------------------|-----------|--------------|-------------------------------|------------------|-----------|
|            |             |                                            |                                             | AWG       | INCH (mm)    |                               |                  |           |
| <b>Y5V</b> |             |                                            |                                             |           |              |                               |                  |           |
| 1000       | ± 20 %      | 0.330 (8.4)                                | 0.195 (5.0)                                 | 20        | 0.032 (0.81) | 0.250 (6.4)                   | 125LD10-R        |           |
| 1500       |             | 0.330 (8.4)                                | 0.195 (5.0)                                 |           |              |                               | 125LD15-R        |           |
| 2000       |             | 0.330 (8.4)                                | 0.188 (4.8)                                 |           |              |                               | 125LD20-R        |           |
| 2200       |             | 0.330 (8.4)                                | 0.182 (4.7)                                 |           |              |                               | 125LD22-R        |           |
| 3300       |             | 0.365 (9.3)                                | 0.195 (5.0)                                 |           |              |                               | 125LD33-R        |           |
| 4700       |             | 0.400 (10.2)                               | 0.185 (4.7)                                 |           |              |                               | 125LD47-R        |           |
| 5000       |             | 0.430 (11.0)                               | 0.195 (5.0)                                 |           |              | 125LD50-R                     |                  |           |
| 6800       |             | 0.490 (12.5)                               | 0.198 (5.1)                                 |           |              | 125LD68-R                     |                  |           |
| 8200       |             | 0.530 (13.5)                               | 0.193 (5.0)                                 |           |              | 125LD82-R                     |                  |           |
| 0.010 μF   |             | 0.560 (14.3)                               | 0.195 (5.0)                                 |           |              | 125LS10-R                     |                  |           |
| 0.015 μF   |             | 0.720 (18.3)                               | 0.205 (5.3)                                 |           |              | 125LS15-R                     |                  |           |
| 0.018 μF   |             | 0.790 (20.1)                               | 0.205 (5.3)                                 |           |              | 125LS18-R                     |                  |           |
| 0.020 μF   |             | 0.720 (18.3)                               | 0.250 (6.4)                                 |           |              | 22                            | 0.025 (0.64)     | 125LS20-R |
| 0.022 μF   |             | 0.790 (20.1)                               | 0.192 (4.9)                                 |           |              | 20                            | 0.032 (0.81)     | 125LS22-R |
| 0.030 μF   |             | 0.720 (18.3)                               | 0.240 (6.1)                                 |           |              | 22                            | 0.025 (0.64)     | 125LS30-R |
| 0.050 μF   |             | 0.925 (23.5)                               | 0.275 (7.0)                                 |           |              | 22                            | 0.025 (0.64)     | 125LS50-R |

#### Notes

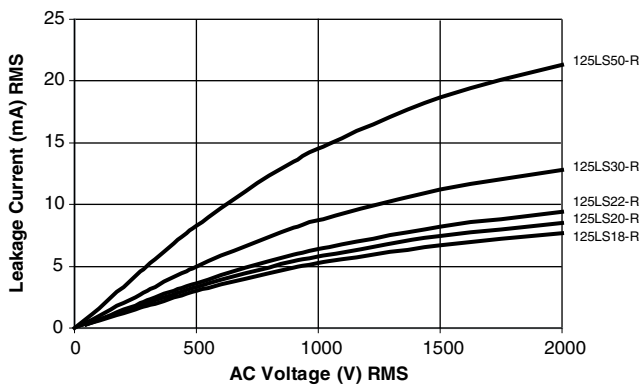
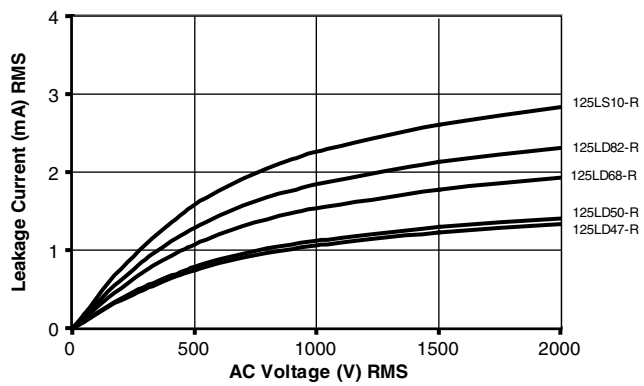
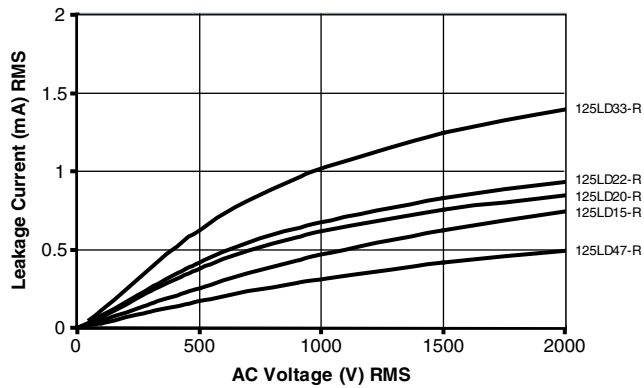
- Alternate lead spacings of 7.5 mm and 10 mm are available bulk or tape and reel on request.
- European required minimum lead clearance (prevents use of inside crimp) 0.118" (3 mm)

#### TAPE AND REEL OPTIONS

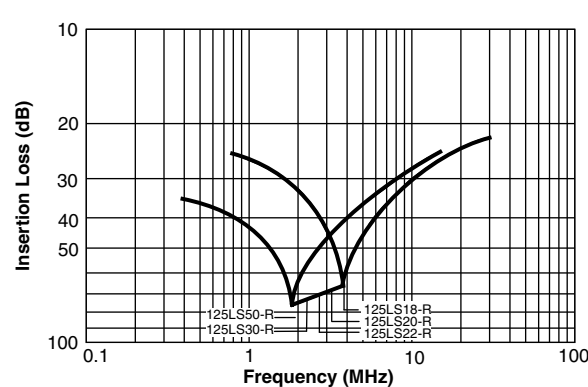
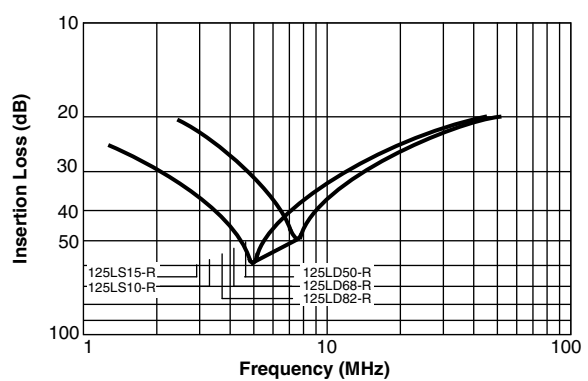
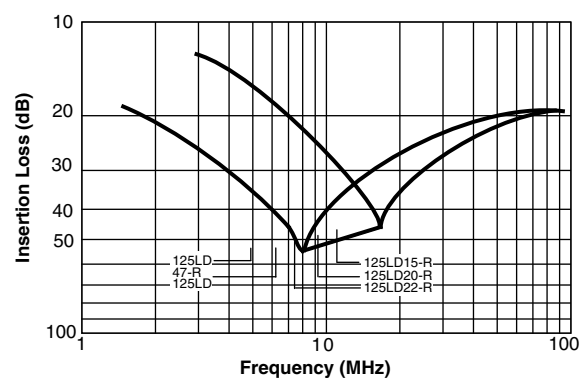
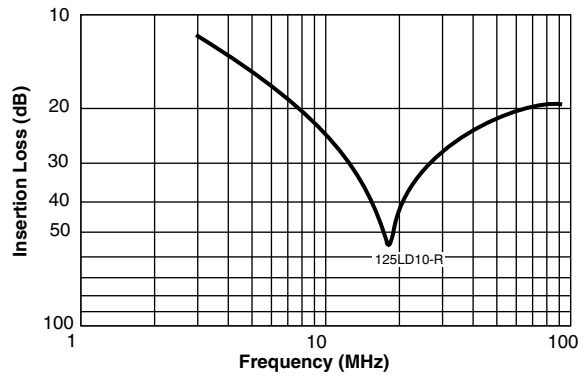
To specify tape and reel, add two letter suffix to the ordering code (for details of the packaging code see general section of the catalog)



### LEAKAGE CURRENT VS. VOLTAGE (TYPICAL)



### INSERTION LOSS VS. FREQUENCY (TYPICAL)



| <b>APPROVALS</b>                                                                                                   |                                               |             |                    |                     |          |                |
|--------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|-------------|--------------------|---------------------|----------|----------------|
| <b>IEC 60384 - 14/2<sup>nd</sup> Issue (1993) incl. Am.1 (1995) - Safety Tests</b>                                 |                                               |             |                    |                     |          |                |
| <b>EN132400 (1994) - Safety Tests</b>                                                                              |                                               |             |                    |                     |          |                |
| <b>That approval together with CB Test Certificate substitutes the national approval of the following nations:</b> |                                               |             |                    |                     |          |                |
| 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   |                |
| X1 Capacitor: CB-Test Certificate:                                                                                 |                                               | DE 1-19447  | 1000 pF to 0.05 µF | 400 V <sub>AC</sub> |          |                |
| Y4 Capacitor: CB-Test Certificate:                                                                                 |                                               | DE 1-19447  | 1000 pF to 0.05 µF | 125 V <sub>AC</sub> |          |                |
| <b>UNDERWRITERS LABORATORIES INC.</b>                                                                              |                                               |             |                    |                     |          |                |
| <b>UL 1414</b>                                                                                                     | Line-by-pass component<br>Agency File/License | E99264      | 1000 pF to 0.05 µF | 250 V <sub>AC</sub> |          |                |
| <b>CANADIAN STANDARDS ASSOCIATION</b>                                                                              |                                               |             |                    |                     |          |                |
| <b>CSA C22.2<br/>No. 1</b>                                                                                         | Isolation component<br>Agency File/License    | LR 62016    | 1000 pF to 0.05 µF | 250 V <sub>AC</sub> |          |                |

**Notes**

UL1414 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.

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 subclasses 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.

IEC 60384-14 Subclass X Capacitors:

- A capacitor of a type suitable for use in situations where failure of the capacitor 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.

| <b>MARKING</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Sample</p>  | <p><b>VISHAY</b></p> <p>Type: 040C085B251AY202MLA010 - R</p> <p>CM PN: 125LD20 - R E3      LOT1: 11642584      DC1: 0622</p> <p>Qty. : 250      IEC60384 - 14 / 2:      LOT2:      DC2:      Op.No. : 771</p> <p>Y4 ( 125~ ), X1 ( 400~ )      R.C. : 7032      S.L. : 0010      BATCH NO. : 200622CZ</p> <p>   LR62016      PN: 125LD20 - R      PO: 0011642584 / 0001       </p> <p style="writing-mode: vertical-rl; transform: rotate(180deg);">S/N: 290R1A6D8012</p> |



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