

## AC Line Rated Ceramic Disc Capacitors

### Class X1, 760 V<sub>AC</sub>/Class Y1, 500 V<sub>AC</sub>



#### FEATURES

- Complying with IEC 60384-14 3<sup>rd</sup> edition
- High reliability
- Radial leads
- Singlelayer AC Disc capacitors
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

#### APPLICATIONS

- X1, Y1 according to IEC 60384-14.3
- Across-the-line
- Line by-pass
- Antenna coupling

#### 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  $\pm 10\%$  or  $\pm 20\%$ . Coating is made of flame retardant epoxy resin in accordance with "UL 94 V-0".

QUICK REFERENCE DATA				
DESCRIPTION	VALUE			
Ceramic Class	1		2	
Ceramic Dielectric	C0G, U2J, P3K, R3L	C0G, U2J, P3K, R3L	X7R, Y5U	X7R, Y5U
Voltage (V <sub>AC</sub> )	500	760	500	760
Min. Capacitance (pF)	10		68	
Max. Capacitance (pF)	47		10 000	
Mounting	Radial			

#### INSULATION RESISTANCE

Min. 1000  $\Omega$ F

#### TOLERANCE ON CAPACITANCE

 $\pm 10\%$ ;  $\pm 20\%$ 

#### DISSIPATION FACTOR

2.0 % max. at 1 kHz; 1 V

#### CERAMIC DIELECTRIC

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

#### OPERATING TEMPERATURE RANGE

- 30 °C to + 125 °C

#### CLIMATIC CATEGORY ACC. TO EN 60068-1

25/125/21

#### CAPACITANCE RANGE

10 pF to 0.01  $\mu$ F

#### RATED VOLTAGE

IEC 60384-14.3:

- X1: 760 V<sub>AC</sub>, 50 Hz
- Y1: 500 V<sub>AC</sub>, 50 Hz

#### DIELECTRIC STRENGTH BETWEEN LEADS

Component test:

4000 V<sub>AC</sub>, 50 Hz, 2 s

As repeated test admissible only once with:

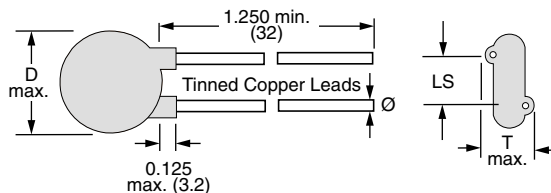
3600 V<sub>AC</sub>, 50 Hz, 2 s

Random sampling test (destructive test):

4000 V<sub>AC</sub>, 50 Hz, 60 s

#### DIELECTRIC STRENGTH OF BODY INSULATION

4000 V<sub>AC</sub>, 50 Hz, 60 s (destructive test)

**DIMENSIONS** in inches (millimeters)

**ORDERING INFORMATION, CERAMIC X1/Y1 CAPACITORS 440L**

C (pF)	TOL. (%)	D <sub>max</sub> . DIAMETER INCH (mm)	T <sub>max</sub> . THICKNESS INCH (mm)	WIRE SIZE		LS LEAD SPACE INCH (mm)	ORDERING CODE
				AWG	INCH (mm)		
C0G							
10	± 10	0.330 (8.4)	0.195 (5.0)	20	0.032 (0.81)	0.375 (9.5)	440LQ10-R
U2J							
15	± 10	0.330 (8.4)	0.210 (5.3)	20	0.032 (0.81)	0.375 (9.5)	440LQ15-R
P3K							
22	± 10	0.330 (8.4)	0.190 (4.8)	20	0.032 (0.81)	0.375 (9.5)	440LQ22-R
R3L							
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
X7R							
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
Y5U							
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)	0.225 (5.7)				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)

**Notes**

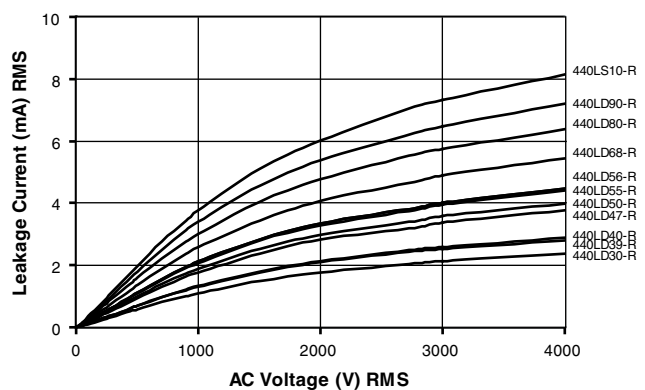
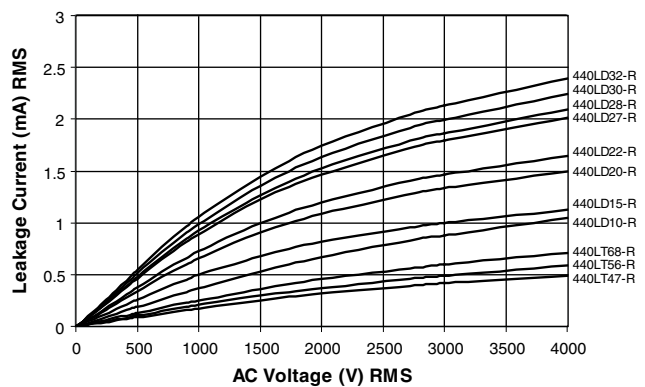
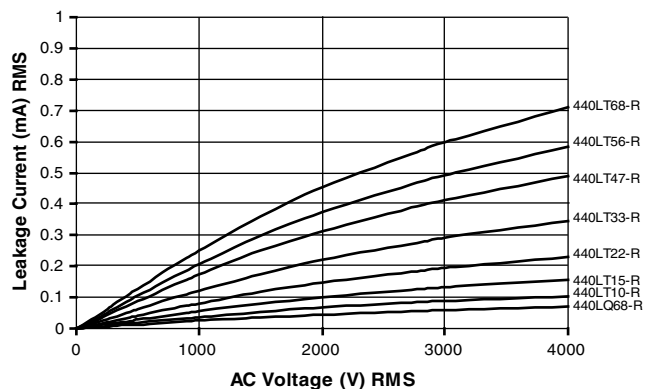
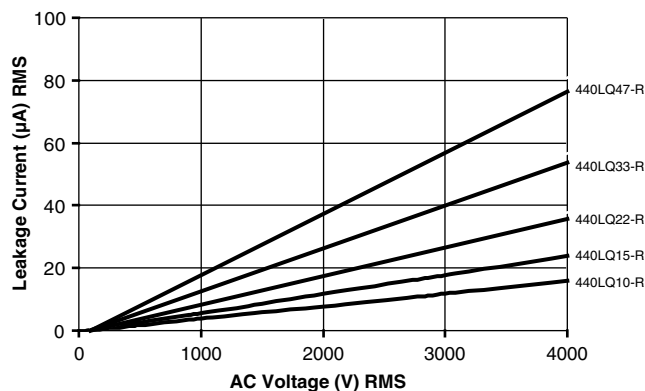
- Alternate lead spacings are available bulk or tape and reel on request.
- Minimum lead clearance according to IEC 60384-14: 0.315" (8 mm)

**TAPE AND REEL OPTIONS**

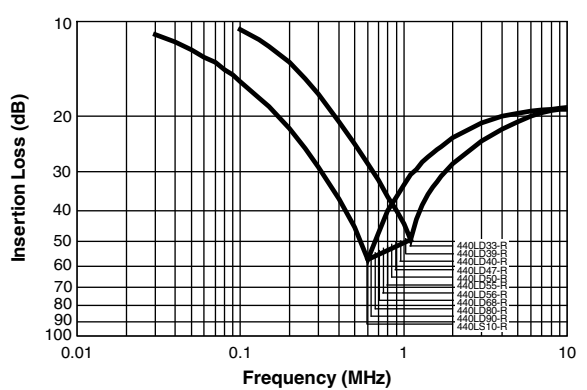
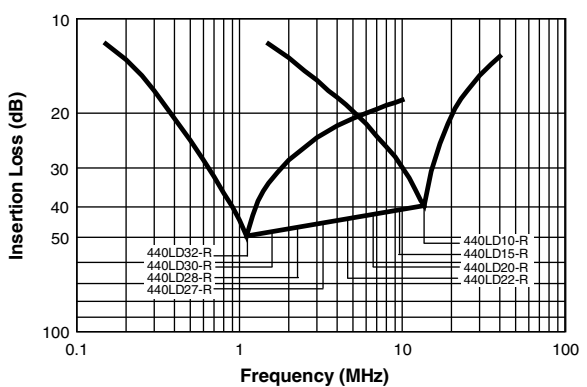
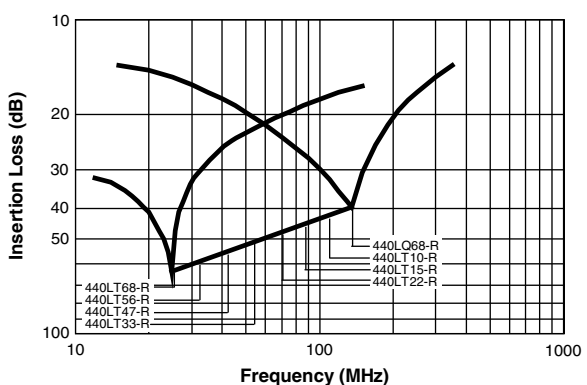
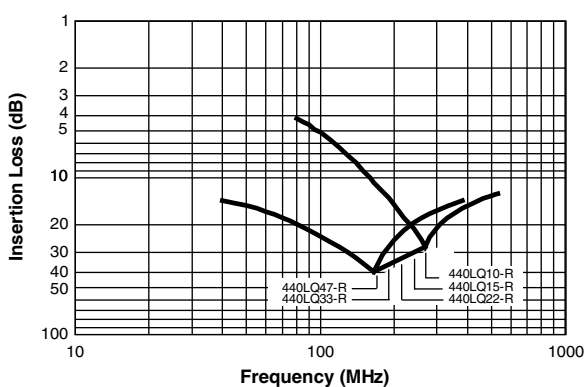
Part number codes and specifications for tape and reel packaging are found in the general information document - find web-link below.



**LEAKAGE CURRENT VS. VOLTAGE (Typical)**



**INSERTION LOSS VS. FREQUENCY (Typical)**



**APPROVALS**

IEC 60384-14.3 - Safety tests

This approval together with CB test certificate substitutes all national approvals.

**CB Certificate**

Y1-capacitor: CB test certificate:

CA/14105/CSA

10 pF to 10 nF

500 V<sub>AC</sub>

X1-capacitor: CB test certificate:

CA/14105/CSA

10 pF to 10 nF

760 V<sub>AC</sub>**VDE**

Y1-capacitor: VDE marks approval:

40003985

10 pF to 10 nF

500 V<sub>AC</sub>

X1-capacitor: VDE marks approval:

40003985

10 pF to 10 nF

400 V<sub>AC</sub>

DIN EN 60384-14 VDE 0565-1-1:2006-04 - Safety tests

**Underwriters Laboratories Inc.**

Y1-capacitor: UL test certificate:

E99264

10 pF to 10 nF

500 V<sub>AC</sub>

X1-capacitor: UL test certificate:

E99264

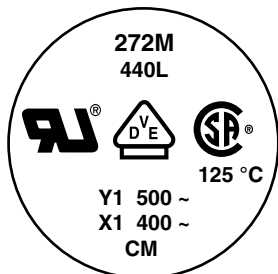
10 pF to 10 nF

760 V<sub>AC</sub>

UL 60384-14, CSA E60384-1:03, CSA E60384-14:09



Fixed capacitors for electromagnetic interference suppression and connection to the supply mains.

**MARKING****Sample****RELATED DOCUMENTS**

General Information	<a href="http://www.vishay.com/doc?23140">www.vishay.com/doc?23140</a>
CB Test Certificate	<a href="http://www.vishay.com/doc?22237">www.vishay.com/doc?22237</a>
VDE Marks Approval	<a href="http://www.vishay.com/doc?22238">www.vishay.com/doc?22238</a>
UL Test Certificate	<a href="http://www.vishay.com/doc?22239">www.vishay.com/doc?22239</a>



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