

AC Line Rated Ceramic Disc Capacitors

Class X1, 760 V_{AC} / Class Y1, 500 V_{AC}



FEATURES

- Complies with IEC 60384-14, 4th edition
- High reliability
- Radial leads
- High capacitance up to 20 nF
- Singlelayer AC disc safety capacitors
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


RoHS
COMPLIANT

APPLICATIONS

- X1, Y1 according to IEC 60384-14.4
- 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 _{AC})	500	760	500	760
Min. Capacitance (pF)	10		68	
Max. Capacitance (pF)	47		20 000	
Mounting	Radial			

INSULATION RESISTANCE

Min. 1000 Ω 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 20 nF

RATED VOLTAGE

IEC 60384-14.4:

- X1: 760 V_{AC}, 50 Hz
- Y1: 500 V_{AC}, 50 Hz

DIELECTRIC STRENGTH BETWEEN LEADS

Component test:

4000 V_{AC}, 50 Hz, 2 s

As repeated test admissible only once with:

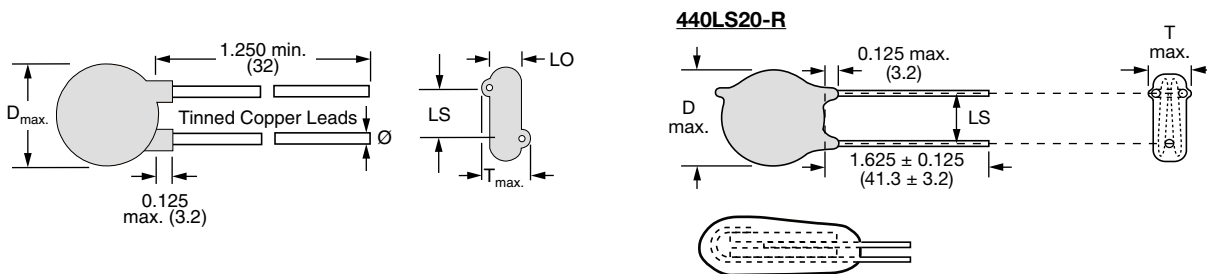
3600 V_{AC}, 50 Hz, 2 s

Random sampling test (destructive test):

4000 V_{AC}, 50 Hz, 60 s

DIELECTRIC STRENGTH OF BODY INSULATION

4000 V_{AC}, 50 Hz, 60 s (destructive test)

DIMENSIONS in inches (millimeters)

ORDERING INFORMATION, CERAMIC X1 / Y1 CAPACITORS 440L

C (pF)	TOL. (%)	D _{max.} DIAMETER INCH (mm)	T _{max.} THICKNESS INCH (mm)	WIRE SIZE		LS LEAD SPACE INCH (mm) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	ORDERING CODE		
C0G										
10	± 10	0.330 (8.4)	0.195 (5.0)	20	0.032 (0.81)	0.375 (9.5)	0.098 (2.5)	440LQ10-R		
U2J										
15	± 10	0.330 (8.4)	0.210 (5.3)	20	0.032 (0.81)	0.375 (9.5)	0.110 (2.8)	440LQ15-R		
P3K										
22	± 10	0.330 (8.4)	0.190 (4.8)	20	0.032 (0.81)	0.375 (9.5)	0.094 (2.4)	440LQ22-R		
R3L										
33	± 10	0.330 (8.4)	0.200 (5.1)	20	0.032 (0.81)	0.375 (9.5)	0.102 (2.6)	440LQ33-R		
47	± 10	0.330 (8.4)	0.180 (4.6)	20	0.032 (0.81)	0.375 (9.5)	0.083 (2.1)	440LQ47-R		
X7R										
68	± 10	0.330 (8.4)	0.220 (5.6)	20	0.032 (0.81)	0.375 (9.5)	0.122 (3.1)	440LQ68-R		
100			0.220 (5.6)				0.122 (3.1)	440LT10-R		
150			0.235 (6.0)				0.138 (3.5)	440LT15-R		
220			0.235 (6.0)				0.138 (3.5)	440LT22-R		
330			0.225 (5.7)				0.126 (3.2)	440LT33-R		
Y5U										
470	± 20	0.330 (8.4)	0.230 (5.8)	20	0.032 (0.81)	0.375 (9.5)	0.130 (3.3)	440LT47-R		
560		0.330 (8.4)	0.230 (5.8)				0.130 (3.3)	440LT56-R		
680		0.330 (8.4)	0.235 (6.0)				0.138 (3.5)	440LT68-R		
1000		0.365 (9.3)	0.225 (5.7)				0.126 (3.2)	440LD10-R		
1500		0.365 (9.3)	0.220 (5.6)				0.118 (3.0)	440LD15-R		
2000		0.400 (10.2)	0.220 (5.6)				0.118 (3.0)	440LD20-R		
2200		0.430 (10.9)	0.225 (5.7)				0.126 (3.2)	440LD22-R		
2700		0.460 (11.7)	0.225 (5.7)				0.126 (3.2)	440LD27-R		
2800		0.460 (11.7)	0.220 (5.6)				0.122 (3.1)	440LD28-R		
3000		0.490 (12.4)	0.225 (5.7)				0.126 (3.2)	440LD30-R		
3200		0.490 (12.4)	0.220 (5.6)				0.122 (3.1)	440LD32-R		
3300		0.490 (10.9)	0.220 (5.6)				0.122 (3.1)	440LD33-R		
3900		0.530 (13.5)	0.220 (5.6)				0.118 (3.0)	440LD39-R		
4000		0.530 (13.5)	0.220 (5.6)				0.122 (3.1)	440LD40-R		
4700		0.620 (15.7)	0.230 (5.8)				0.130 (3.3)	440LD47-R		
5000		0.620 (15.7)	0.225 (5.7)				0.126 (3.2)	440LD50-R		
5500		0.680 (17.3)	0.230 (5.8)				0.134 (3.4)	440LD55-R		
5600		0.680 (17.3)	0.230 (5.8)				0.134 (3.4)	440LD56-R		
6800		0.720 (18.3)	0.235 (6.0)				0.138 (3.5)	440LD68-R		
8000		0.720 (18.3)	0.220 (5.6)				0.122 (3.1)	440LD80-R		
9000		0.790 (20.1)	0.225 (5.7)				0.126 (3.2)	440LD90-R		
10 000			0.850 (21.6)				0.230 (5.8)		0.134 (3.4)	440LS10-R
20 000			0.850 (21.6)				0.355 (9.0)		0.134 (3.4)	440LS20-R

Notes

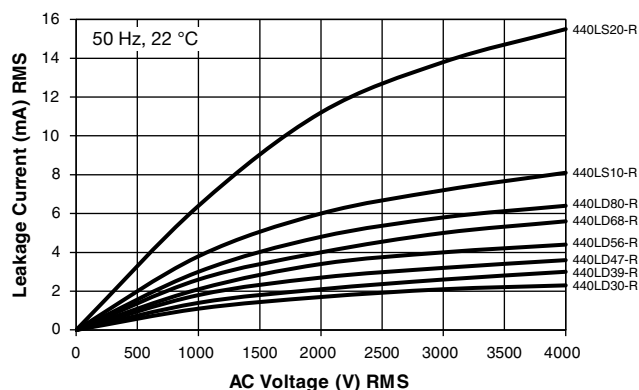
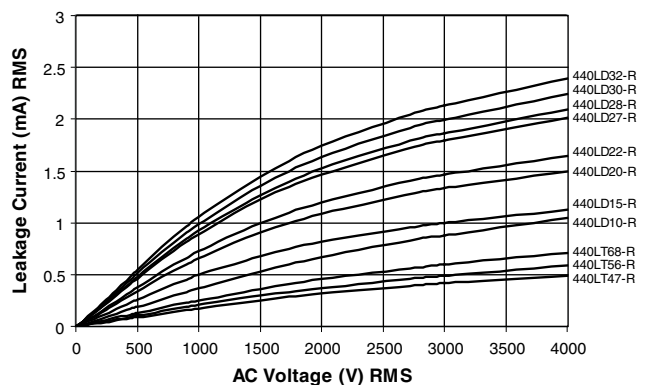
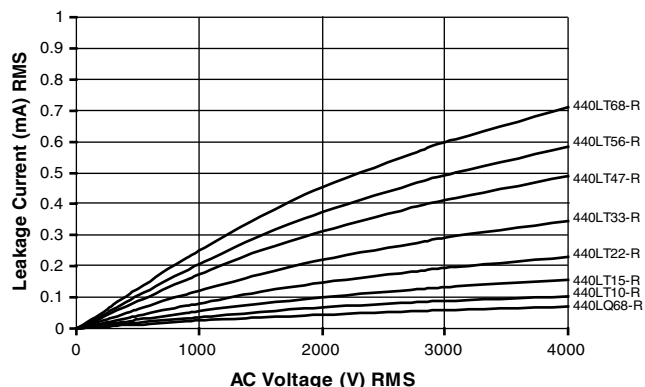
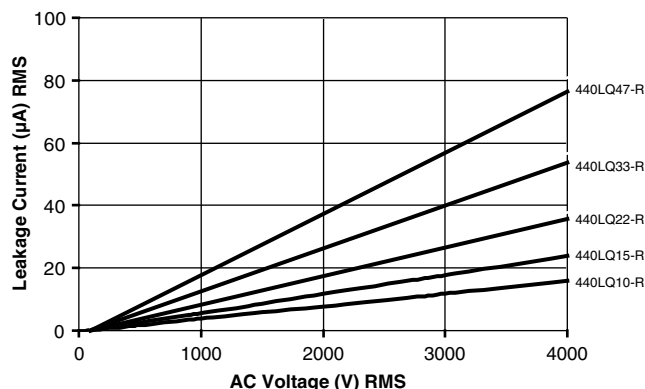
- Alternate lead spacings are available bulk or tape and reel on request.
- Minimum lead clearance according to IEC 60384-14: 0.315" (8 mm)

TAPE AND REEL OPTIONS

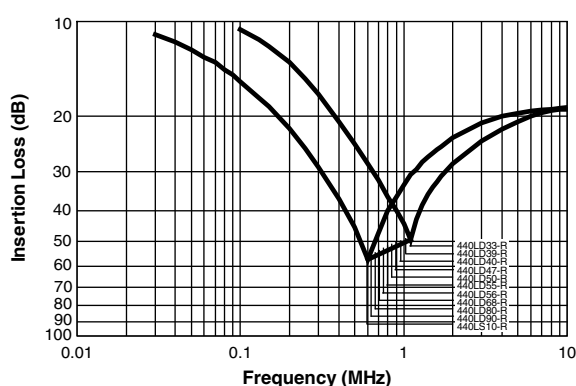
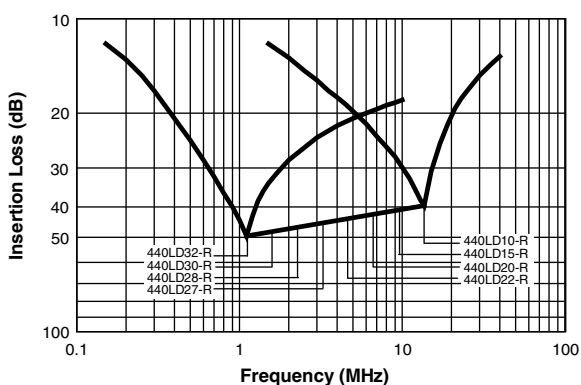
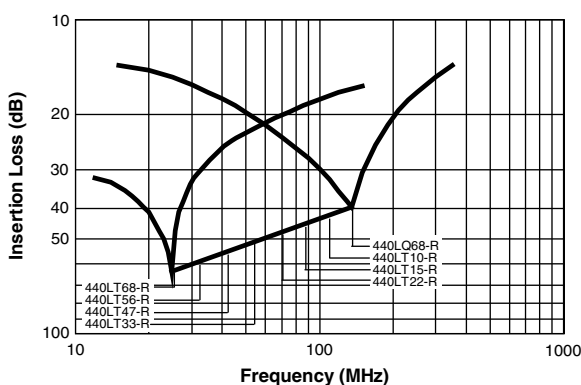
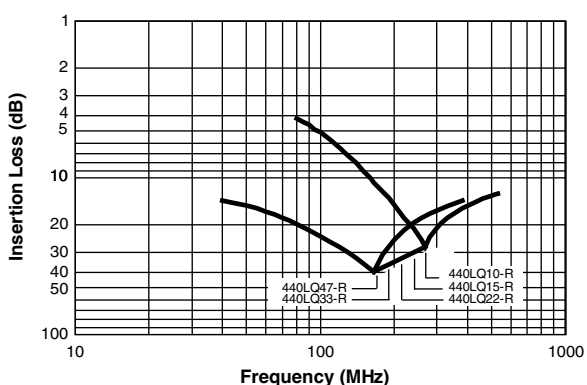
Part number codes and specifications for tape and reel packaging are found in the general information document - find web-link below.



LEAKAGE CURRENT VS. VOLTAGE (Typical)



INSERTION LOSS VS. FREQUENCY (Typical)





APPROVALS

IEC 60384-14.4 - Safety tests

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

CB Certificate

Y1-capacitor: CB test certificate:	DE1-56450/A1	10 pF to 20 nF	500 V _{AC}
X1-capacitor: CB test certificate:	DE1-56450/A1	10 pF to 20 nF	760 V _{AC}



VDE

Y1-capacitor: VDE marks approval:	40003985	10 pF to 20 nF	500 V _{AC}
X1-capacitor: VDE marks approval:	40003985	10 pF to 20 nF	400 V _{AC}



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

Underwriters Laboratories Inc.

Y1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	500 V _{AC}
X1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	760 V _{AC}



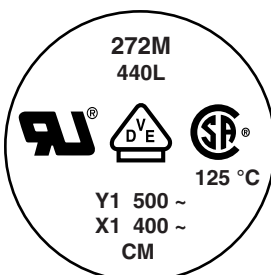
UL 60384-14, CSA E60384-1:03, CSA E60384-14:09

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

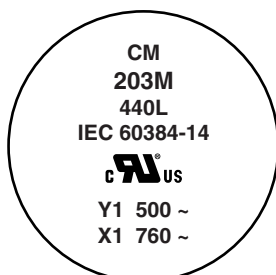
MARKING

Samples

10 pF to 10 nF



20 nF



RELATED DOCUMENTS

General Information	www.vishay.com/doc?23140
CB Test Certificate	www.vishay.com/doc?22237
VDE Marks Approval	www.vishay.com/doc?22238
UL Test Certificate	www.vishay.com/doc?22239



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