AC Line Rated Ceramic Disc Capacitors
Class X1, 760 V_{AC} / Class Y1, 500 V_{AC}

ADDITIONAL RESOURCES

3D Models SPICE Models

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 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)

OPERATING TEMPERATURE RANGE

-30 °C to +125 °C

CLIMATIC CATEGORY ACC. TO EN 60068-1

25/125/21

FEATURES

- Complies with IEC 60384-14
- 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
- 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 ± 10 % or ± 20 %. Coating is made of flame-retardant epoxy resin in accordance with "UL 94 V-0."

CAPACITANCE RANGE

10 pF to 20 nF

RATED VOLTAGE

IEC 60384-14:

- 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)

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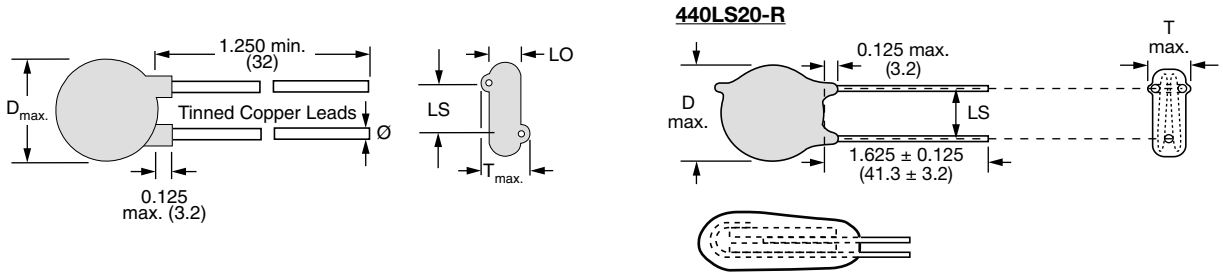
DIMENSIONS in inches (millimeters)



ORDERING INFORMATION, CERAMIC X1 / Y1 CAPACITORS 440L

C (pF)	TOL. (%)	$D_{max.}$ DIAMETER INCH (mm)	$T_{max.}$ THICKNESS INCH (mm)	WIRE SIZE AWG	WIRE SIZE INCH (mm)	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 (12.4)	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.

For technical questions, contact: ceramitesupport@vishay.com

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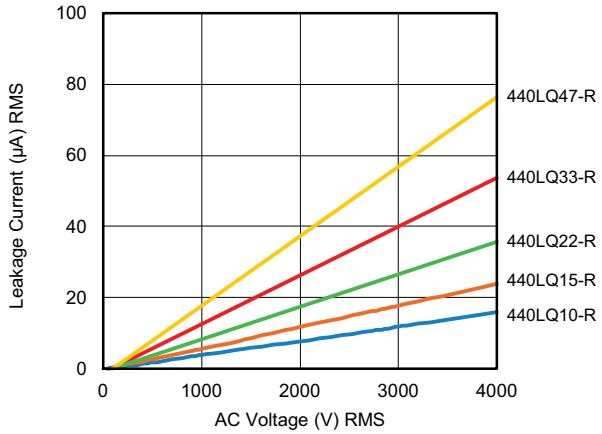
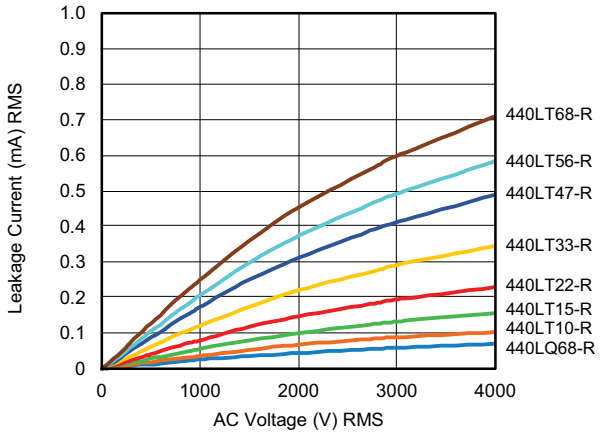
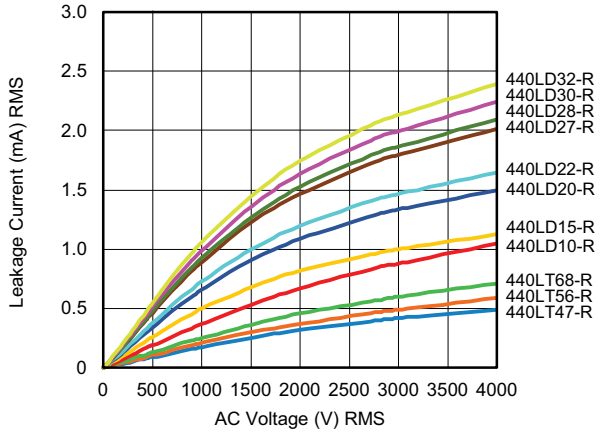
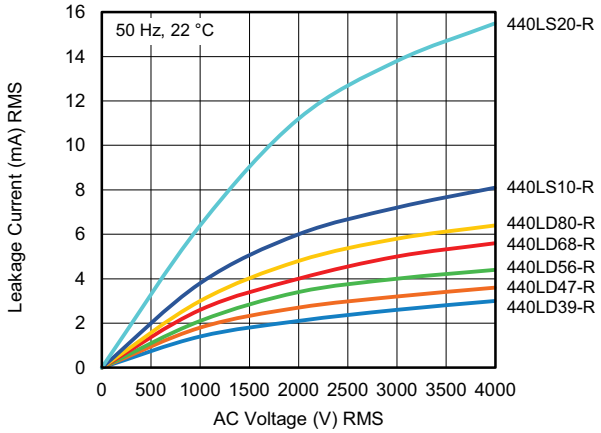
AC CURRENT VS. VOLTAGE (Leakage Current)

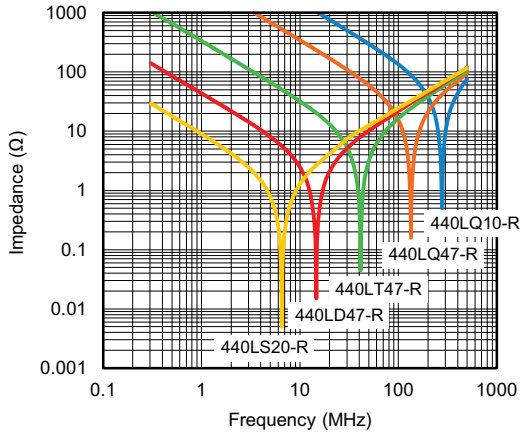








IMPEDANCE VS. FREQUENCY (Wire Length 10 mm)



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APPROVALS

IEC 60384-14 - 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 - Safety tests

Underwriters Laboratories Inc.

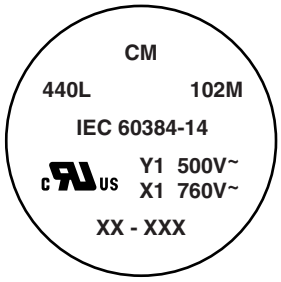
Y1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	500 V_{AC}
X1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	760 V_{AC}

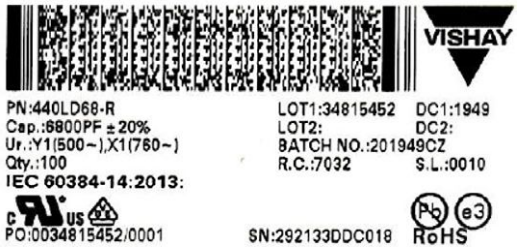
UL 60384-14, CSA E60384-1, CSA E60384-14

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

MARKING

Sample





Notes

- Marking IEC 60384-14 does not apply for Ø ≤ 9 mm
- Coding is as follows: 1st figure indicates the year and 2nd figure indicates the month according to IEC 60062. The 3rd to 5th figure indicate the last three digits of the lot number

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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