

## AC Line Rated Ceramic Disc Capacitors Class X1, 760 V<sub>AC</sub> / Class Y1, 500 V<sub>AC</sub>



### ADDITIONAL RESOURCES



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		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](http://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<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:

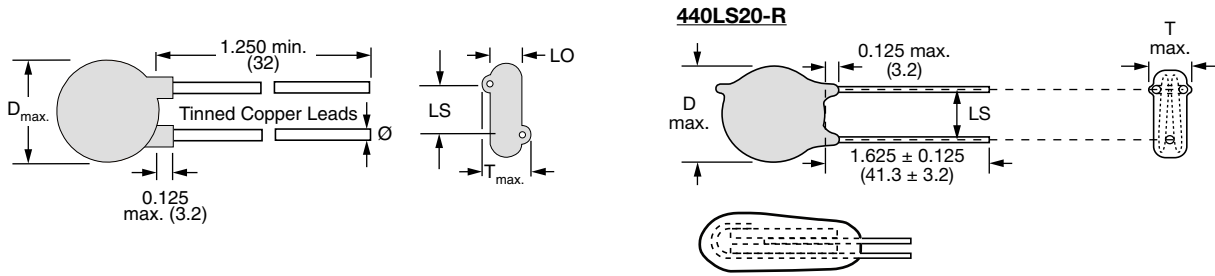
3600 V<sub>AC</sub>, 50 Hz, 2 s

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) ± 1 mm	LO LEAD OFFSET INCH (mm) ± 0.5 mm	ORDERING 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)	0.098 (2.5)	440LQ10-R
<b>U2J</b>								
15	± 10	0.330 (8.4)	0.210 (5.3)	20	0.032 (0.81)	0.375 (9.5)	0.110 (2.8)	440LQ15-R
<b>P3K</b>								
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
<b>R3L</b>								
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
<b>X7R</b>								
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
<b>Y5U</b>								
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**

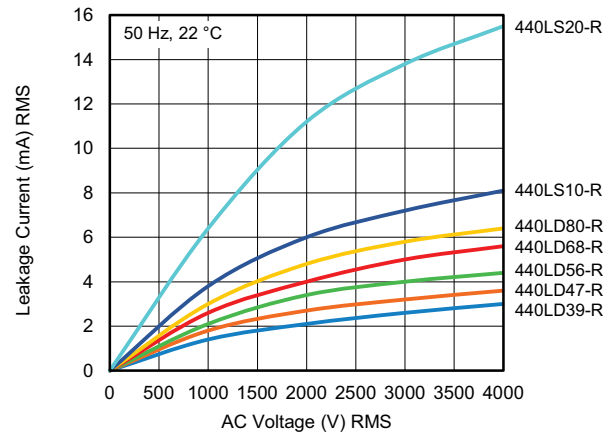
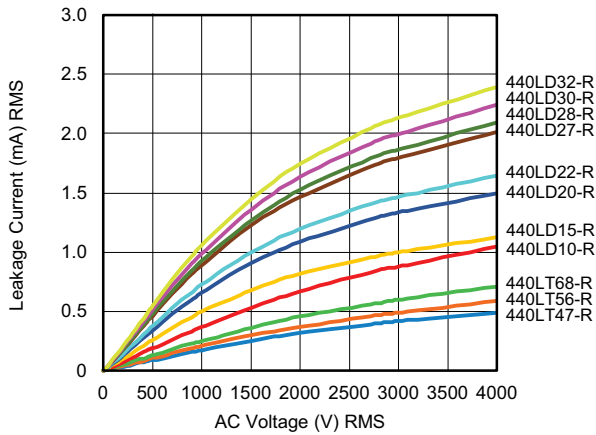
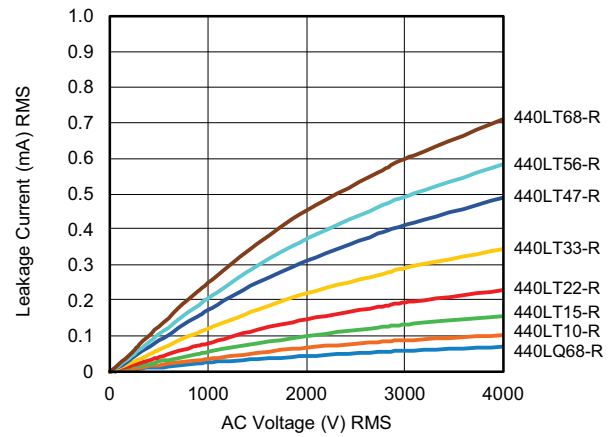
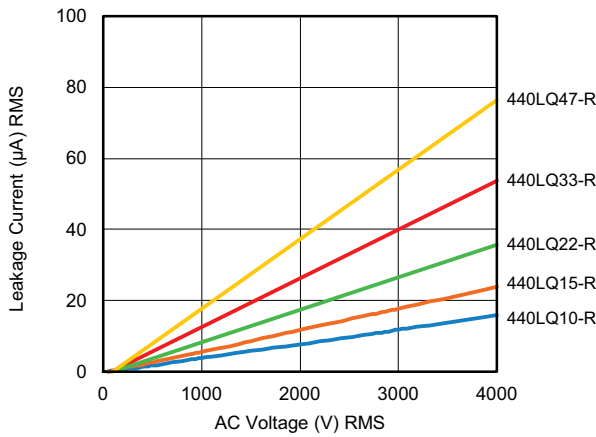
- Alternate lead spacings are available bulk or tape and reel on request
- Minimum lead clearance according to IEC 60384-14: 0.315" (8 mm)

**TAPE AND REEL OPTIONS**

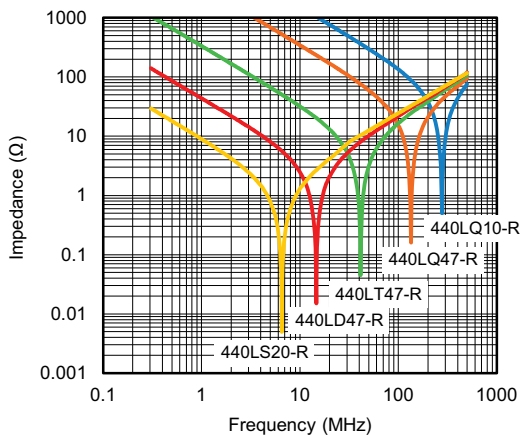
Part number codes and specifications for tape and reel packaging are found in the general information document - find web-link below.



### AC CURRENT VS. VOLTAGE (Leakage Current)



### IMPEDANCE VS. FREQUENCY (Wire Length 10 mm)





APPROVALS				
IEC 60384-14 - Safety tests This approval together with CB test certificate substitutes all national approvals.				
<b>CB Certificate</b>				
Y1-capacitor: CB test certificate:	DE1-56450/A1	10 pF to 20 nF	500 V <sub>AC</sub>	
X1-capacitor: CB test certificate:	DE1-56450/A1	10 pF to 20 nF	760 V <sub>AC</sub>	
<b>VDE</b>				
Y1-capacitor: VDE marks approval:	40003985	10 pF to 20 nF	500 V <sub>AC</sub>	
X1-capacitor: VDE marks approval:	40003985	10 pF to 20 nF	400 V <sub>AC</sub>	
DIN EN 60384-14 VDE 0565-1-1 - Safety tests				
<b>Underwriters Laboratories Inc.</b>				
Y1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	500 V <sub>AC</sub>	
X1-capacitor: UL test certificate:	E99264	10 pF to 20 nF	760 V <sub>AC</sub>	
UL 60384-14, CSA E60384-1, CSA E60384-14				
Fixed capacitors for electromagnetic interference suppression and connection to the supply mains.				

MARKING	
<p>Sample</p>	<p>PN:440LD68-R      LOT1:34815452      DC1:1949      Cap.:9800PF ± 20%      LOT2:      Ur.:Y1(500~),X1(760~)      BATCH NO.:201949CZ      Qty.:100      R.C.:7032      S.L.:0010      IEC 60384-14:2013:   PO:0034815452/0001      SN:292133DDC018      </p>

**Notes**

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

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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