

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



### LINKS TO ADDITIONAL RESOURCES



QUICK REFERENCE DATA	
DESCRIPTION	VALUE
Ceramic Class	2
Ceramic Dielectric	Y5U
Voltage (V <sub>AC</sub> )	760      500
Min. Capacitance (pF)	470
Max. Capacitance (pF)	4700
Mounting	Radial

### MARKING

Marking indicates series, AC rating, capacitance, tolerance code, and approvals.

### OPERATING TEMPERATURE RANGE

-40 °C to +125 °C

### TEMPERATURE CHARACTERISTICS

Class 2      Y5U

### SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1)

Class 2      40/125/21

### APPROVALS

IEC 60384-14.4

UL 60384-14.1

CSA E60384-1:03 2<sup>nd</sup> edition, CSA E60384-14:09 2<sup>nd</sup> edition

### FEATURES

- Complying with IEC 60384-14 4<sup>th</sup> edition
- High reliability
- Wide range of different leadstyles
- Small dimensions
- 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 60384-14.4
- Across-the-line
- Line-by-pass
- Antenna coupling
- EMI / RFI suppression and filtering

### DESIGN

The capacitors consist of ceramic disc both sides of which are silver plated. Connection leads are made of tinned copper having diameters of 0.6 mm or 0.8 mm.

The capacitors may be supplied with straight or kinked leads having a lead spacing of 10.0 mm or 12.5 mm.

Coating is made of blue colored flame retardant epoxy resin in accordance with UL 94 V-0.

### CAPACITANCE RANGE

470 pF to 4.7 nF

### TOLERANCE ON CAPACITANCE

± 10 %, ± 20 %

### RATED VOLTAGE

- X1:      760 V<sub>AC</sub>, 50 Hz (IEC 60384-14.4)  
            760 V<sub>AC</sub>, 50 Hz / 60 Hz (US/UL/CSA 60384-14)
- Y1:      500 V<sub>AC</sub>, 50 Hz (IEC 60384-14.4)  
            500 V<sub>AC</sub>, 50 Hz / 60 Hz (US/UL/CSA 60384-14)

### TEST VOLTAGE

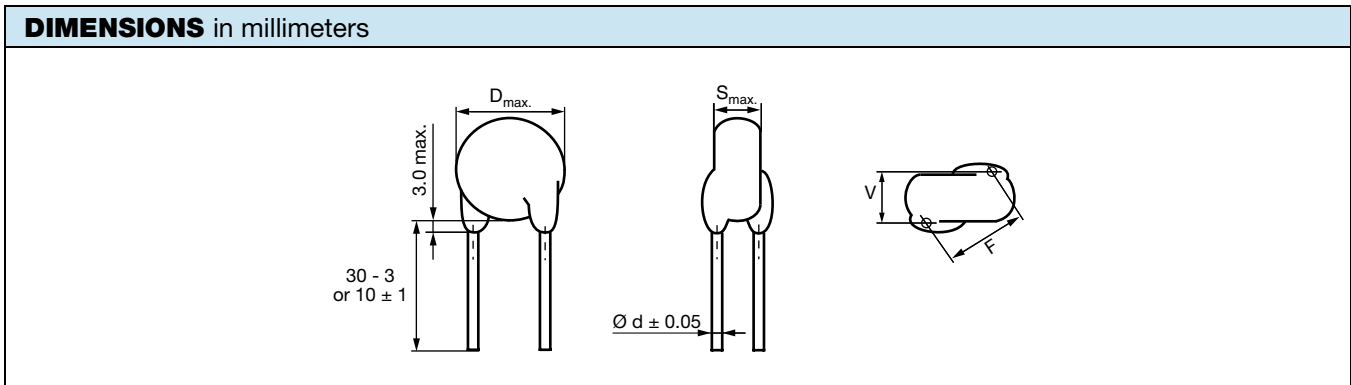
- 4000 V<sub>AC</sub>, 50 Hz, 2 s      Component test (100 %)
- 4000 V<sub>AC</sub>, 50 Hz, 60 s      Random sampling test (destructive)
- 4000 V<sub>AC</sub>, 50 Hz, 60 s      Voltage proof of coating (destructive)

### INSULATION RESISTANCE AT 500 V<sub>DC</sub>

≥ 10 000 MΩ (60 s)

### DISSIPATION FACTOR

Class 2:      max. 2.5 % (1 kHz)



TECHNICAL DATA							
CAPACITANCE (2) C (pF)	CAPACITANCE TOLERANCE (%)	BODY DIAMETER D <sub>MAX.</sub> (mm)	BODY THICKNESS S <sub>MAX.</sub> (mm)	LEAD SPACING (1) F (mm) ± 1 mm	LEAD DIAMETER (1) d (mm) ± 0.05 mm	WIDTH (1) V (mm) ± 0.5 mm	PART NUMBER MISSING DIGITS SEE ORDERING CODE BELOW
<b>Y5U (2E3)</b>							
470	± 10, ± 20	8.0	5.0	12.5	0.6	2.1	VKP471#CQ###KR
680		8.0					VKP681#CQ###KR
1000		9.0					VKP102#CQ###KR
1500		10.0					VKP152#CQ###KR
2200		12.0					VKP222#CQ###KR
2700		13.0			VKP272#CQ###KR		
3300		15.0			VKP332#CQ###KR		
3900		15.0			VKP392#CQ###KR		
4700		17.0			VKP472#CQ###KR		

**Notes**

- (1) Standard lead configuration, other lead spacing and diameter available on request
- (2) When capacitance values less than 470 pF are required, the usage of WKP series is recommended

ORDERING CODE							
#	7 <sup>th</sup> digit	Capacitance tolerance	± 10 % = K, ± 20 % = M				
###	10 <sup>th</sup> to 12 <sup>th</sup> digit	Lead configuration	see "General Information"				
<b>Example</b>	<b>VKP</b>	<b>222</b>	<b>M</b>	<b>CQ</b>	<b>ED0</b>	<b>K</b>	<b>R</b>
	Series	Capacitance value	Tolerance code	Voltage code	Lead configuration	Internal code	RoHS compliant

**MARKING**

VKP 470 pF to 1.5 nF

VKP 2.2 nF to 4.7 nF

Type: VKP222MCQED0KR  
 Cap.: 2200pF ±20%  
 Ur.: 500/760VAC  
 Qty.: 1000  
 IEC 60 384-14/2: Y1(500~), X1(760~)  
 EN132400:125°C cAuS

LOT1: 032673 DC1: 1134  
 LOT2: DC2:  
 BATCH NO.: 201134CZ  
 REGION: 7032 S.L.: 0010

PN: VKP222MCQED0KR PO: 0031254565/0001 SN: 28032673B012

## APPROVALS

IEC 60384-14.4 - Safety tests  
This approval together with CB test certificate substitutes all national approvals.

### CB Test Certificate

Y1 Capacitor: CB-test certificate:	US-26551-UL	470 pF to 4.7 nF	500 V <sub>AC</sub>
X1 Capacitor: CB-test certificate:	US-26551-UL	470 pF to 4.7 nF	760 V <sub>AC</sub>
Minimum thickness of insulation: 0.4 mm			



### VDE

Y1 Capacitor: VDE marks approval:	136494	470 pF to 4.7 nF	500 V <sub>AC</sub>
X1 Capacitor: VDE marks approval:	136494	470 pF to 4.7 nF	760 V <sub>AC</sub>



DIN EN 60384-14 VDE 0565-1-1:2006-04 - Safety tests  
Minimum thickness of insulation: 0.4 mm

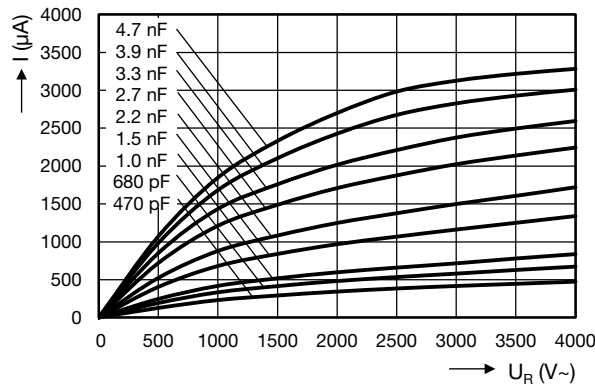
### Underwriters Laboratories Inc. / Canadian Standards Association

Y1 Capacitor: UL-test certificate:	E183844	470 pF to 4.7 nF	500 V <sub>AC</sub>
X1 Capacitor: UL-test certificate:	E183844	470 pF to 4.7 nF	760 V <sub>AC</sub>

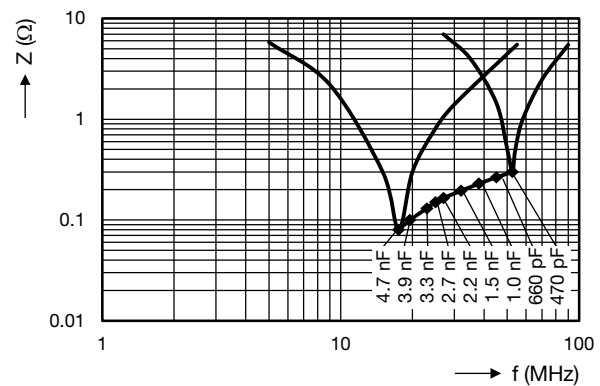


UL 60384-14.1, CSA E60384-1:03 2<sup>nd</sup> edition, CSA E60384-14:09 2<sup>nd</sup> edition  
Across-the-line, antenna-coupling and line-by-pass component  
Minimum thickness of insulation: 0.4 mm

## LEAKAGE CURRENT VS. VOLTAGE (typical)



## IMPEDANCE VS. FREQUENCY (typical)



## RELATED DOCUMENTS

General Information	<a href="http://www.vishay.com/doc?22001">www.vishay.com/doc?22001</a>
CB-Test Certificate	<a href="http://www.vishay.com/doc?22211">www.vishay.com/doc?22211</a>
VDE Marks Approval	<a href="http://www.vishay.com/doc?22212">www.vishay.com/doc?22212</a>
UL-Test Certificate	<a href="http://www.vishay.com/doc?22213">www.vishay.com/doc?22213</a>



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