

AC Line Rated Ceramic Disc Capacitors

Class X1, 440 V_{AC}, Class Y2, 300 V_{AC}


RoHS
COMPLIANT

FEATURES

- Complying with IEC 60384-14 3rd edition
- High reliability
- Wide range of different leadstyles
- Singlelayer AC disc safety capacitors
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- X1, Y2 according to IEC 60384-14.3
- Line-by-pass

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 7.5 mm or 12.5 mm.

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

CAPACITANCE RANGE

33 pF to 4.7 nF

TOLERANCE ON CAPACITANCE

± 10 %, ± 20 %

RATED VOLTAGE

- X1: 440 V_{AC}, 50 Hz (IEC 60384-14.3)
440 V_{AC}, 50 Hz / 60 Hz (US/UL/CSA 60384-14)
- Y2: 300 V_{AC}, 50 Hz (IEC 60384-14.3)
300 V_{AC}, 50 Hz / 60 Hz (US/UL/CSA 60384-14)

TEST VOLTAGE

- 2600 V_{AC}, 50 Hz, 2 s Component test (100 %)
- 2600 V_{AC}, 50 Hz, 60 s Random sampling test (destructive)
- 2600 V_{AC}, 50 Hz, 60 s Voltage proof of coating (destructive)

INSULATION RESISTANCE AT 500 V_{DC}

≥ 6000 MΩ (60 s)

DISSIPATION FACTOR

- Class 1: max. 0.5 % (1 MHz)
- Class 2: max. 2.5 % (1 kHz)

QUICK REFERENCE DATA

DESCRIPTION	VALUE			
Ceramic Class	1		2	
Ceramic Dielectric	N750	N750	Y5S, Y5T, Y5U	Y5S, Y5T, Y5U
Voltage (V _{AC})	300	440	300	440
Min. Capacitance (pF)	33		68	
Max. Capacitance (pF)	47		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 1 N750 (U2J)

Class 2 Y5S, Y5T, Y5U

SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1)

Class 1 40/125/21

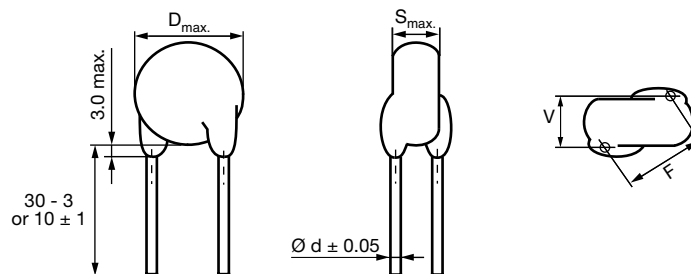
Class 2 40/125/21

APPROVALS

IEC 60384-14.3

UL 60384-14.1

CSA E60384-1:03 2nd edition, CSA E60384-14:09 2nd edition

DIMENSIONS in millimeters

TECHNICAL DATA

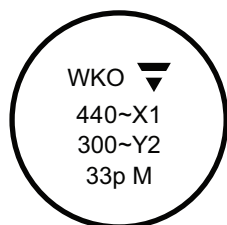
CAPACITANCE ⁽²⁾ C (pF)	CAPACITANCE TOLERANCE	BODY DIAMETER D _{MAX.} (mm)	BODY THICKNESS S _{MAX.} (mm)	LEAD SPACING ⁽¹⁾ F (mm) ± 1 mm	LEAD DIAMETER ⁽¹⁾ d (mm) ± 0.05 mm	WIDTH ⁽¹⁾ V (mm) ± 0.5 mm	PART NUMBER
							MISSING DIGITS SEE ORDERING CODE BELOW
N750 (U2J)							
33	± 10 %, ± 20 %	8.0	5.0	7.5	0.6	1.6	WKO330#CP###KR
47							WKO470#CP###KR
Y5S (2C3)							
68	± 10 %, ± 20 %	8.0	5.0	7.5	0.6	1.9	WKO680#CP###KR
100							WKO101#CP###KR
Y5T (2D3)							
150	± 10 %, ± 20 %	8.0	5.0	7.5	0.6	1.9	WKO151#CP###KR
220							WKO221#CP###KR
330							WKO331#CP###KR
Y5U (2E3)							
470	± 10 %, ± 20 %	8.0	5.0	7.5	0.6	2.0	WKO471#CP###KR
680		9.0			0.8	1.6	WKO681#CP###KR
1000		10.0					WKO102#CP###KR
1500		12.0					WKO152#CP###KR
2200		13.0		WKO222#CP###KR			
3300		15.0		WKO332#CP###KR			
3900		16.0		WKO392#CP###KR			
4700		18.0		12.5			WKO472#CP###KR

Notes

- (1) Standard lead configuration, other lead spacing and diameter available on request
(2) Capacitance values from 1 nF to 4.7 nF: the alternative usage of VKO series is recommended for new application

ORDERING CODE

#	7 th digit	Capacitance tolerance	± 10 % = K, ± 20 % = M
###	10 th to 12 th digit	Lead configuration	see "General Information"
Example	WKO	222	M
	Series	Capacitance value	Tolerance code
			CP
			Voltage code
			CJ0
			Lead configuration
			K
			Internal code
			R
			RoHS compliant

MARKING


WKO 33 pF to 1.0 nF



WKO 1.5 nF to 4.7 nF



APPROVALS

IEC 60384-14.3 - Safety tests

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

CB Certificate

Y2-capacitor: CB test certificate:

US-19595-UL

33 pF to 4.7 nF

300 V_{AC}

X1-capacitor: CB test certificate:

US-19595-UL

33 pF to 4.7 nF

440 V_{AC}

Minimum thickness of insulation: 0.4 mm



VDE

Y2-capacitor: VDE marks approval:

136820

33 pF to 4.7 nF

300 V_{AC}

X1-capacitor: VDE marks approval:

136820

33 pF to 4.7 nF

440 V_{AC}

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

Y2-capacitor: UL-test certificate:

E183844

33 pF to 4.7 nF

300 V_{AC}

X1-capacitor: UL-test certificate:

E183844

33 pF to 4.7 nF

440 V_{AC}

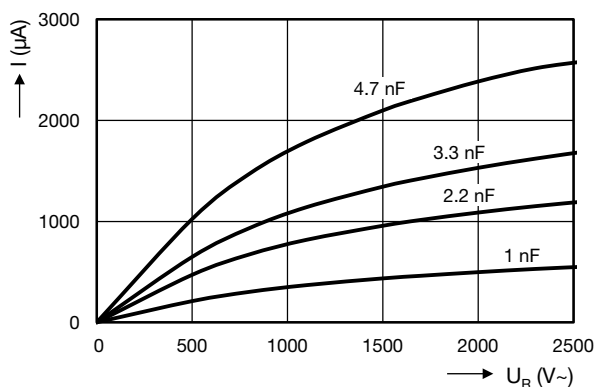
UL 60384-14.1, CSA E60384-1:03 2nd edition, CSA E60384-14:09 2nd edition

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	www.vishay.com/doc?222001
CB Test Certificate	www.vishay.com/doc?22217
VDE Marks Approval	www.vishay.com/doc?22219
UL Test Certificate	www.vishay.com/doc?22218



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.