AC Line Rated Ceramic Disc Capacitors Class X1, 440 V_{AC}, Class Y2, 300 V_{AC}

FEATURES

- Complying with IEC 60384-14 4th edition
- High reliability
- Vertical (inline) kinked or straight leads
- Singlelayer AC disc safety capacitors
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb e3 RoHS COMPLIANT HALOGEN FREE GREEN (5-2008)

APPLICATIONS

- X1, Y2 according to IEC 60384-14.4
- Across-the-line
- Line by-pass
- Antenna coupling

QUICK REFERENCE DATA				
DESCRIPTION	VALUE			
Ceramic Class	1		2	
Ceramic Dielectric	N750		Y5S, Y5U, Y5V	
Voltage (V_{AC})	300	440	300	440
Min. Capacitance (pF)	10		68	
Max. Capacitance (pF)	47		10 000	
Mounting	Radial			

OPERATING TEMPERATURE RANGE

-40 °C to +125 °C

TEMPERATURE CHARACTERISTICS

Class 1: N750 (U2J)
Class 2: Y5S, Y5U, Y5V

SECTIONAL SPECIFICATIONS

Climatic category (according to EN 60058-1)
Class 1 and class 2: 40/125/21

COATING

According to UL 94 V-0
Epoxy resin, isolating, flame retardant

APPROVALS

IEC 60384-14.4
UL 60384-14
DIN EN 60384-14
CSA E60384-1:03, CSA E60384-14:09
CQC11-471112

PACKAGING

Bulk, tape and reel, taped ammopack

DESIGN

The capacitor consists of a ceramic disc which is silver plated on both sides. Connection leads are made of tinned copper having a diameter of 0.6 mm.

The capacitors may be supplied with vertical (inline) kinked leads having a lead spacing of 5.0 mm, 7.5 mm, 10.0 mm, or 12.5 mm. Encapsulation is made of flame retardant epoxy resin in accordance with UL 94 V-0.

CAPACITANCE RANGE

10 pF to 0.01 µF

RATED VOLTAGE U_R

IEC 60384-14 and UL60384-14:
(X1): 440 V_{AC}, 50 Hz
(Y2): 300 V_{AC}, 50 Hz
1000 V_{DC}

TEST VOLTAGE

Component test (100 %):
2600 V_{AC}, 50 Hz, 2 s
(2600 V_{AC} for LS 7.5 mm and above)
(2200 V_{AC} for LS 5.0 mm)
Random sampling test (destructive test):
2600 V_{AC}, 50 Hz, 60 s
Voltage proof of coating (destructive test):
2600 V_{AC}, 50 Hz, 60 s

INSULATION RESISTANCE

≥ 10 000 MΩ

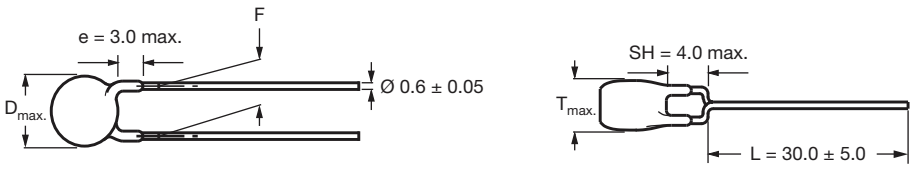
CAPACITANCE TOLERANCE

± 20 % (code M); ± 10 % (code K)

DISSIPATION FACTOR

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

DIMENSIONS in millimeters



Capacitors with 5.0 mm, 7.5 mm, 10 mm, or 12.5 mm lead spacing.
Coating extension e valid for straight leads only.

TECHNICAL DATA

CAPACITANCE C (pF)	CAPACITANCE TOLERANCE (%)	BODY DIAMETER $D_{max.}$ (mm)	BODY THICKNESS $T_{max.}$ (mm)	LEAD SPACING [1] F (mm) ± 1 mm	PART NUMBER MISSING DIGITS SEE ORDERING CODE BELOW
U2J (N750)					
10	± 10	7.5	5.0	5.0, 7.5, 10.0, or 12.5	VY2100K29U2JS6###
15					VY2150K29U2JS6###
22					VY2220K29U2JS6###
33					VY2330K29U2JS6###
47					VY2470K29U2JS6###
Y5S (2C3)					
68	± 10	7.5	5.0	5.0, 7.5, 10.0, or 12.5	VY2680K29Y5SS6###
100					VY2101K29Y5SS6###
150					VY2151K29Y5SS6###
220					VY2221K29Y5SS6###
330					VY2331K29Y5SS6###
470					VY2471K29Y5SS6###
Y5U (2E3)					
680	± 20	7.5	5.0	5.0, 7.5, 10.0, or 12.5	VY2681M29Y5US6###
1000					VY2102M29Y5US6###
1500		8.0			VY2152M31Y5US6###
2200		9.0			VY2222M35Y5US6###
3300		10.5			VY2332M41Y5US6###
3900		11.0			VY2392M43Y5US6###
4700		12.5		7.5, 10.0, or 12.5	VY2472M49Y5US6###
6800		14.5			VY2682M59Y5US63##
10 000		16.0			VY2103M63Y5US63##
Y5V (2F3) MINI SIZE SERIES					
1000	± 20	7.5	5.0	5.0, 7.5, 10.0, or 12.5	VY2102M29Y5VS6###
1500		7.5			VY2152M29Y5VS6###
2200		8.0			VY2222M31Y5VS6###
3300		9.0			VY2332M35Y5VS6###
3900		10.0			VY2392M39Y5VS6###
4700		10.5			VY2472M41Y5VS6###
6800		12.0			VY2682M47Y5VS6###
10 000		15.0			VY2103M59Y5VS6###

Note

[1] Straight leads are available on request

ORDERING CODE										
###	15th to 17th digit		Lead configuration			Available configurations see below				
Example	**VY2**	**221**	**K**	**29**	**Y5S**	**S**	**6**	**U**	**V**	**7**
	Series	Capacitance value	Tolerance code	Size code	Temperature coefficient	Rated voltage	Lead wire diameter	Packaging / lead length	Lead style	Lead spacing
						S = X1/Y2 300 V (AC)		3 = bulk T = tape and reel U = ammopack	L = straight V = inline kinked	5 = 5.0 7 = 7.5 0 = 10.0 X = 12.5

LEADSPACING 5.0 mm AND 7.5 mm

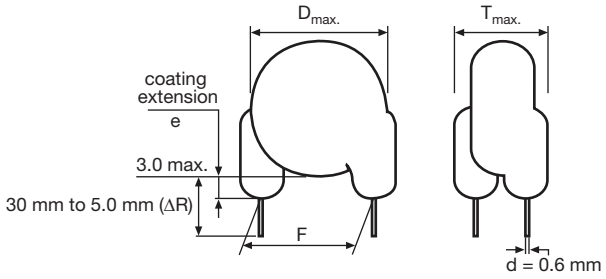
PACKAGING				
SIZE CODE	**BODY DIAMETER $D_{max.}$ (mm)**	**PACKAGING QUANTITIES**		
		BULK	**REEL**	**AMMO**
29 to 49	12.5	1000	1000	1000
59 to 63	16.0	500	-	-

LEADSPACING 10.0 mm AND 12.5 mm

PACKAGING					
CAPACITANCE VALUE	**SIZE CODE**	**BODY DIAMETER $D_{max.}$ (mm)**	**PACKAGING QUANTITIES**		
			BULK	**REEL**	**AMMO**
10 pF to 4700 pF	29 to 49	12.5	1000	500	750
6800 pF to 0.01 µF	59 to 63	16.0	500	500	750

Note
- The capacitors are supplied in bulk packaging (cardboard boxes), in tape on reel in ammopack.

STRAIGHT LEADS



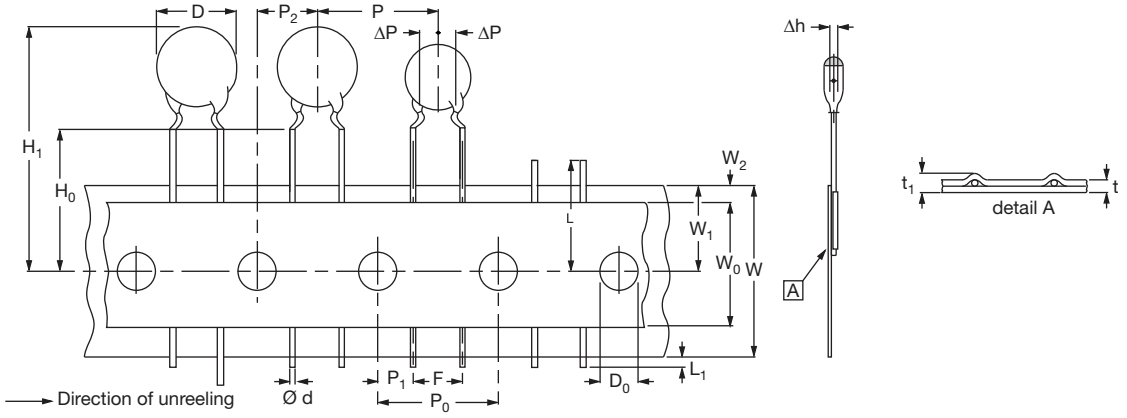


Fig. 1 - Kinked capacitors on tape, lead spacing 5.0 mm (0.2") and 7.5 mm (0.3")

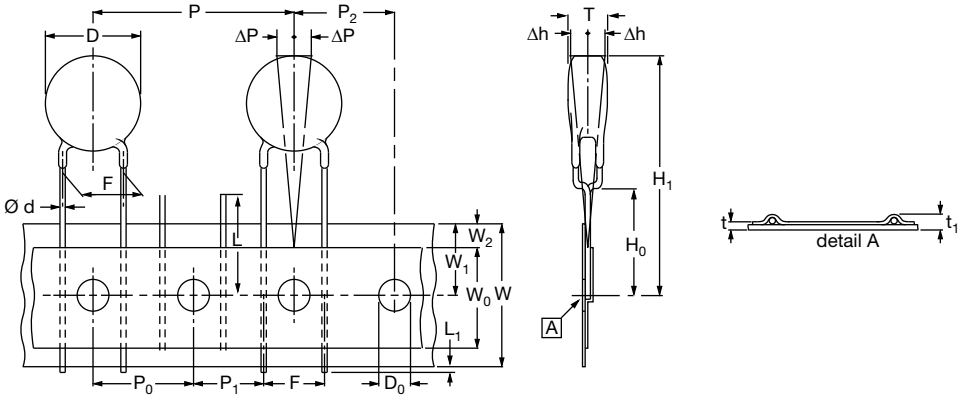


Fig. 2 - Inline kink (V) leaded capacitors on tape, lead spacing 10 mm (0.40")

DIMENSION OF TAPE				
SYMBOL	PARAMETER	DIMENSIONS (mm)		
		FIG. 1 (5 mm)	FIG. 1 (7.5 mm)	FIG. 2 (10 mm)
D (1)	Body diameter	11.0 max.	14.0 max.	16.0 max.
d	Lead diameter	0.6 ± 0.05	0.6 ± 0.05	0.6 ± 0.05
P	Pitch of component	12.7 ± 1	15.0 ± 1	25.4 ± 1
P_0 (2)	Pitch of sprocket hole	12.7 ± 0.3	15.0 ± 0.3	12.7 ± 0.3
P_1 (3)	Distance, hole center to lead	3.85 ± 0.7	3.75 ± 0.7	7.7 ± 1.0
P_2 (3)	Distance, hole to center of component	6.35 ± 1.3	7.5 ± 1.5	12.7 ± 1.5
F	Lead spacing	5.0 (+ 0.6/- 0.4)	7.5 (+ 0.6/- 0.4)	10.0 (+ 0.6/- 0.4)
Δh	Average deviation across tape	± 1.0 max.	± 1.0 max.	± 1.0 max.
ΔP	Average deviation in direction of reeling	± 1.0 max.	± 1.0 max.	± 1.0 max.
W	Carrier tape width	18.0 + 1/- 0.5	18.0 + 1/- 0.5	18.0 + 1/- 0.5
W_0	Hold-down tape width	5.0 min.	5.0 min.	5.0 min.
W_1	Position of sprocket hole	9.0 + 0.75/- 0.5	9.0 + 0.75/- 0.5	9.0 + 0.75/- 0.5
W_2	Distance of hold-down tape	3.0 max.	3.0 max.	3.0 max.
H_1	Maximum component height	32	40	40
H_0	Height to seating plane (for kinked leads)	16.0 ± 0.5	16.0 ± 0.5	16.0 ± 0.5
H_0	Height to seating plane (for straight leads)	20.0 ± 0.5	20.0 ± 0.5	20.0 ± 0.5
L	Length of cut leads	11.0 max.	11.0 max.	11.0 max.
L_1	Length of lead protrusion	1.0 max.	1.0 max.	1.0 max.
D_0	Diameter of sprocket hole	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.2
t	Total tape thickness	0.9 max.	0.9 max.	0.9 max.
t_1	Maximum thickness of tape and wires	1.5 max.	1.5 max.	1.5 max.

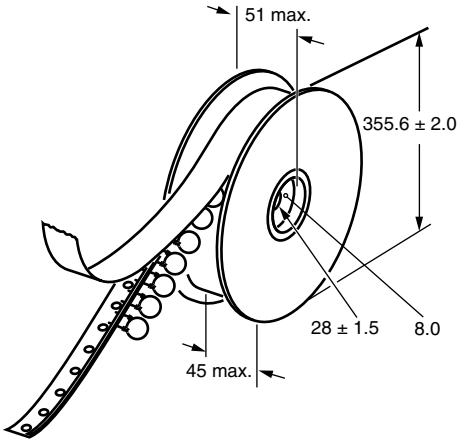
Notes

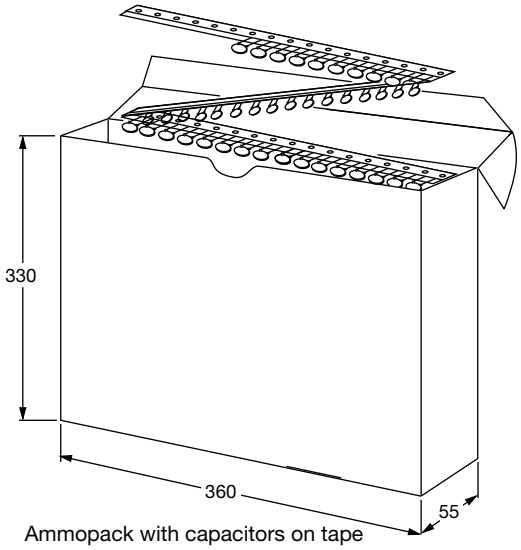
(1) See “Technical Data” table

(2) Cumulative pitch error: ± ≤ 1 mm/20 pitches

(3) Obliquity maximum 3°

REEL AND TAPE DATA in millimeters





Ammopack with capacitors on tape

APPROVALS

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

CB Certificate

Y2-capacitor: CB test certificate:	US-26163-UL	10 pF to 10 nF	300 V_{AC}
X1-capacitor: CB test certificate:	US-26163-UL	10 pF to 10 nF	440 V_{AC}

VDE

Y2-capacitor: VDE marks approval:	40009669	10 pF to 10 nF	300 V_{AC}
X1-capacitor: VDE marks approval:	40009669	10 pF to 10 nF	440 V_{AC}

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

Underwriters Laboratories Inc. / Canadian Standards Association

Y2-capacitor: UL-test certificate:	E183844	10 pF to 10 nF	300 V_{AC}
X1-capacitor: UL-test certificate:	E183844	10 pF to 10 nF	440 V_{AC}

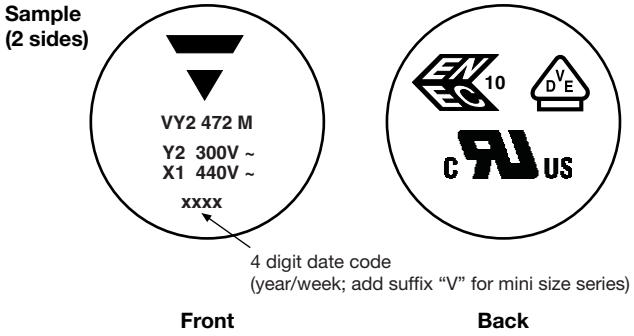
UL 60384-14.1, CSA E60384-1:03 2nd edition, CSA E60384-14:09 2nd edition

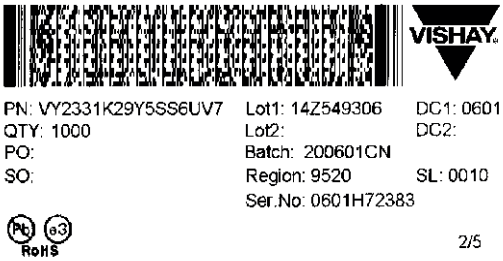
Across-the-line, antenna-coupling, and line-by-pass component

CQC

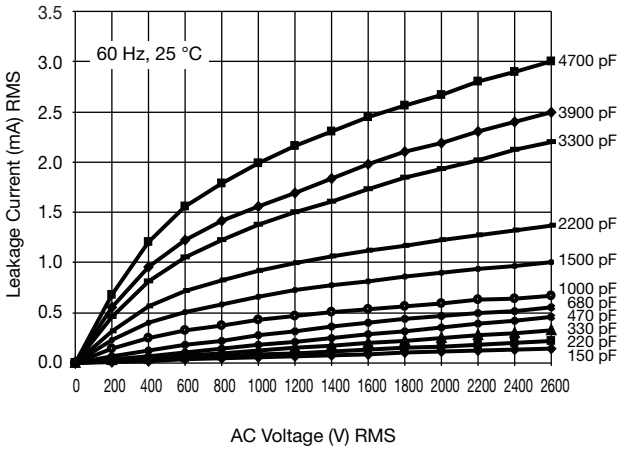
Y2-capacitor: CQC test certificate:	CQC05001012316	10 pF to 10 nF	300 V_{AC}
X1-capacitor: CQC test certificate:	CQC05001012316	10 pF to 10 nF	440 V_{AC}

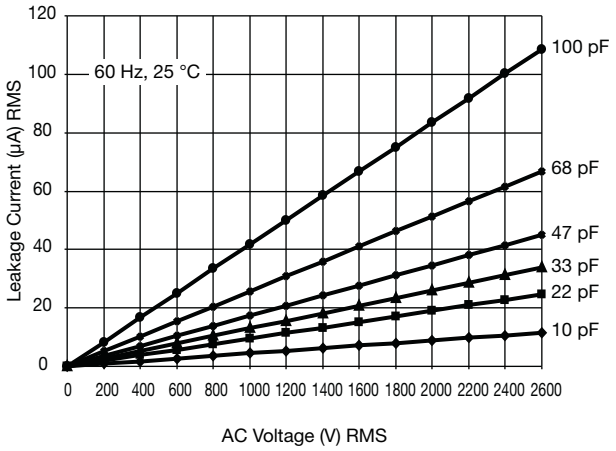
MARKING





LEAKAGE CURRENT VS. VOLTAGE (Typical)





Note

- The capacitors meet the essential requirements of EIA 198. Unless stated otherwise all electrical values apply at an ambient temperature of 25 °C ± 3 °C, at normal atmospheric conditions.

RELATED DOCUMENTS	
General Information	www.vishay.com/doc?28536
CB Test Certificate	www.vishay.com/doc?22254
VDE Marks Approval	www.vishay.com/doc?22256
UL Test Certificate	www.vishay.com/doc?22253
CQC Test Certificate	www.vishay.com/doc?22255

SAMPLE KITS	
Part Number (VY2 Sample Kit)	VY21-KIT-HF
Link (VY2 Sample Kit)	www.vishay.com/doc?28554
Part Number (VY2...Y5V Sample Kit)	VY2-KIT-MS
Link (VY2...Y5V Sample Kit)	www.vishay.com/doc?28562

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