

## AC Line Rated Disc Capacitors

### Class X1, 760 V<sub>AC</sub>, Class Y1, 500 V<sub>AC</sub>



#### FEATURES

- Complying with IEC 60384-14, 3<sup>rd</sup> edition
- High reliability
- Vertical (inline) kinked or straight leads
- Material categorization:  
For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

#### APPLICATIONS

- X1, Y1 according to IEC 60384-14.3
- Across-the-line
- Line by-pass
- Antenna coupling

#### DESIGN

The capacitors consist of a ceramic disc both sides of which are silver-plated. 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 10.0 mm and 12.5 mm. Encapsulation is made of flammable resistant epoxy resin in accordance with "UL 94 V-0".

| QUICK REFERENCE DATA       |                |                |                |                |                |                |
|----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| DESCRIPTION                | CLASS X1 (U2J) | CLASS X1 (Y5S) | CLASS X1 (Y5U) | CLASS Y1 (U2J) | CLASS Y1 (Y5S) | CLASS Y1 (Y5U) |
| Voltage (V <sub>AC</sub> ) | 760            |                |                | 500            | 250            | 500            |
| Min. Capacitance (pF)      | 10             | 33             | 470            | 10             | 33             | 470            |
| Max. Capacitance (pF)      | 22             | 330            | 4700           | 22             | 330            | 4700           |
| Mounting                   | Through hole   |                |                |                |                |                |

#### OPERATING TEMPERATURE RANGE

- 40 °C to + 125 °C

#### TEMPERATURE CHARACTERISTICS

See Ordering Information table

#### CLIMATIC CATEGORY

40/125/21 according to EN 60068-1

#### COATING

According to UL 94 V-0

Epoxy resin, isolating, flame retardant

#### APPROVALS

ENEC VDE (DE1-32019)

UL 60384-14 file E183844

CSA 22.2

#### PACKAGING

Bulk, tape and reel, taped ammpack

#### CAPACITANCE RANGE

10 pF to 4700 pF

#### RATED VOLTAGE U<sub>R</sub>

IEC 60384-14.3 and UL 60384-14:

(X1): 760 V<sub>AC</sub>, 50 Hz

(Y1): 500 V<sub>AC</sub>, 50 Hz

#### TEST VOLTAGE

Component test (100 %):

4000 V<sub>AC</sub>, 50 Hz, 2 s

Random sampling test (destructive test):

4000 V<sub>AC</sub>, 50 Hz, 60 s

Voltage proof of coating (destructive test):

4000 V<sub>AC</sub>, 50 Hz, 60 s

#### INSULATION RESISTANCE

10 000 MΩ minimum

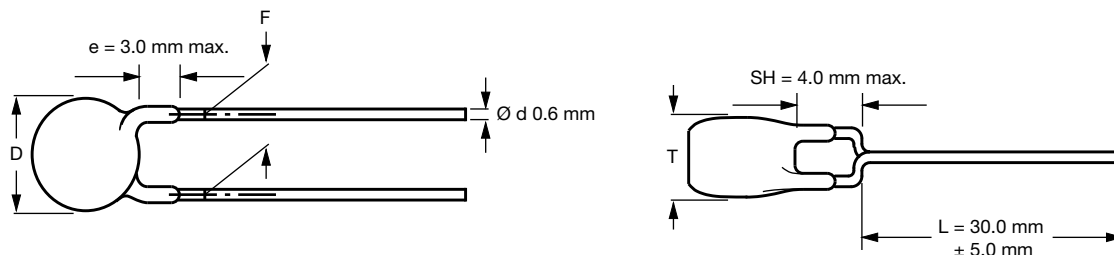
#### TOLERANCE OF CAPACITANCE

± 20 % (code M); ± 10 % (code K)

#### DISSIPATION FACTOR

2.5 % maximum

## DIMENSIONS



Capacitors with 10.0 mm and 12.5 mm lead spacing

## ORDERING INFORMATION

| C<br>(pF) | TOL.<br>(%)       | TEMP.<br>COEFFICIENT | BODY<br>DIAMETER<br>D <sub>MAX.</sub><br>(mm) | BODY<br>THICKNESS<br>T <sub>MAX.</sub><br>(mm) | LEAD<br>SPACING<br>F<br>(mm) | CLEAR TEXT CODE                                                        |                       |                   |                   |
|-----------|-------------------|----------------------|-----------------------------------------------|------------------------------------------------|------------------------------|------------------------------------------------------------------------|-----------------------|-------------------|-------------------|
|           |                   |                      |                                               |                                                |                              | 15 <sup>TH</sup> DIGIT:<br>T = REEL; U = AMMO; 3 = BULK <sup>(1)</sup> |                       |                   |                   |
|           |                   |                      |                                               |                                                |                              | RoHS COMPLIANT                                                         | RoHS AND HALOGEN-FREE |                   |                   |
| 10        | ± 10              | U2J (N750)           | 8.0                                           | 5.0                                            | 10.0                         | VY1100K31U2JQ6*V0                                                      | VY1100K31U2JG6*V0     |                   |                   |
| 15        |                   |                      |                                               |                                                |                              | VY1150K31U2JQ6*V0                                                      | VY1150K31U2JG6*V0     |                   |                   |
| 22        |                   |                      |                                               |                                                |                              | VY1220K31U2JQ6*V0                                                      | VY1220K31U2JG6*V0     |                   |                   |
| 33        |                   |                      |                                               |                                                |                              | VY1330K31Y5SQ6*V0                                                      | VY1330K31Y5SG6*V0     |                   |                   |
| 47        |                   |                      |                                               |                                                |                              | VY1470K31Y5SQ6*V0                                                      | VY1470K31Y5SG6*V0     |                   |                   |
| 68        |                   | Y5S (2C3)            |                                               |                                                |                              | VY1680K31Y5SQ6*V0                                                      | VY1680K31Y5SG6*V0     |                   |                   |
| 100       |                   |                      |                                               |                                                |                              | VY1101K31Y5SQ6*V0                                                      | VY1101K31Y5SG6*V0     |                   |                   |
| 150       |                   |                      |                                               |                                                |                              | VY1151K31Y5SQ6*V0                                                      | VY1151K31Y5SG6*V0     |                   |                   |
| 220       |                   |                      |                                               |                                                |                              | VY1221K31Y5SQ6*V0                                                      | VY1221K31Y5SG6*V0     |                   |                   |
| 330       |                   |                      |                                               |                                                |                              | VY1331K31Y5SQ6*V0                                                      | VY1331K31Y5SG6*V0     |                   |                   |
| 470       | ± 20              | Y5U (2E3)            |                                               |                                                |                              | VY1471M31Y5UQ6*V0                                                      | VY1471M31Y5UG6*V0     |                   |                   |
| 680       |                   |                      |                                               |                                                |                              | VY1681M31Y5UQ6*V0                                                      | VY1681M31Y5UG6*V0     |                   |                   |
| 1000      |                   |                      |                                               |                                                |                              | VY1102M35Y5UQ6*V0                                                      | VY1102M35Y5UG6*V0     |                   |                   |
| 1500      |                   |                      |                                               |                                                |                              | VY1152M41Y5UQ6*V0                                                      | VY1152M41Y5UG6*V0     |                   |                   |
| 2200      |                   |                      |                                               |                                                |                              | VY1222M47Y5UQ6*V0                                                      | VY1222M47Y5UG6*V0     |                   |                   |
| 3300      |                   |                      |                                               |                                                |                              | VY1332M59Y5UQ6*V0                                                      | VY1332M59Y5UG6*V0     |                   |                   |
| 3900      |                   |                      |                                               |                                                |                              | VY1392M61Y5UQ6*V0                                                      | VY1392M61Y5UG6*V0     |                   |                   |
| 4700      |                   |                      |                                               |                                                |                              | VY1472M63Y5UQ6*V0                                                      | VY1472M63Y5UG6*V0     |                   |                   |
| 10        |                   |                      | ± 10                                          | U2J (N750)                                     | 8.0                          | 5.0                                                                    | 12.5                  | VY1100K31U2JQ6*VX | VY1100K31U2JG6*VX |
| 15        |                   |                      |                                               |                                                |                              |                                                                        |                       | VY1150K31U2JQ6*VX | VY1150K31U2JG6*VX |
| 22        | VY1220K31U2JQ6*VX | VY1220K31U2JG6*VX    |                                               |                                                |                              |                                                                        |                       |                   |                   |
| 33        | VY1330K31Y5SQ6*VX | VY1330K31Y5SG6*VX    |                                               |                                                |                              |                                                                        |                       |                   |                   |
| 47        | VY1470K31Y5SQ6*VX | VY1470K31Y5SG6*VX    |                                               |                                                |                              |                                                                        |                       |                   |                   |
| 68        | Y5S (2C3)         | VY1680K31Y5SQ6*VX    |                                               | VY1680K31Y5SG6*VX                              |                              |                                                                        |                       |                   |                   |
| 100       |                   | VY1101K31Y5SQ6*VX    |                                               | VY1101K31Y5SG6*VX                              |                              |                                                                        |                       |                   |                   |
| 150       |                   | VY1151K31Y5SQ6*VX    |                                               | VY1151K31Y5SG6*VX                              |                              |                                                                        |                       |                   |                   |
| 220       |                   | VY1221K31Y5SQ6*VX    |                                               | VY1221K31Y5SG6*VX                              |                              |                                                                        |                       |                   |                   |
| 330       |                   | VY1331K31Y5SQ6*VX    |                                               | VY1331K31Y5SG6*VX                              |                              |                                                                        |                       |                   |                   |
| 470       | ± 20              | Y5U (2E3)            | VY1471M31Y5UQ6*VX                             | VY1471M31Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 680       |                   |                      | VY1681M31Y5UQ6*VX                             | VY1681M31Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 1000      |                   |                      | VY1102M35Y5UQ6*VX                             | VY1102M35Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 1500      |                   |                      | VY1152M41Y5UQ6*VX                             | VY1152M41Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 2200      |                   |                      | VY1222M47Y5UQ6*VX                             | VY1222M47Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 3300      |                   |                      | VY1332M59Y5UQ6*VX                             | VY1332M59Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 3900      |                   |                      | VY1392M61Y5UQ6*VX                             | VY1392M61Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |
| 4700      |                   |                      | VY1472M63Y5UQ6*VX                             | VY1472M63Y5UG6*VX                              |                              |                                                                        |                       |                   |                   |

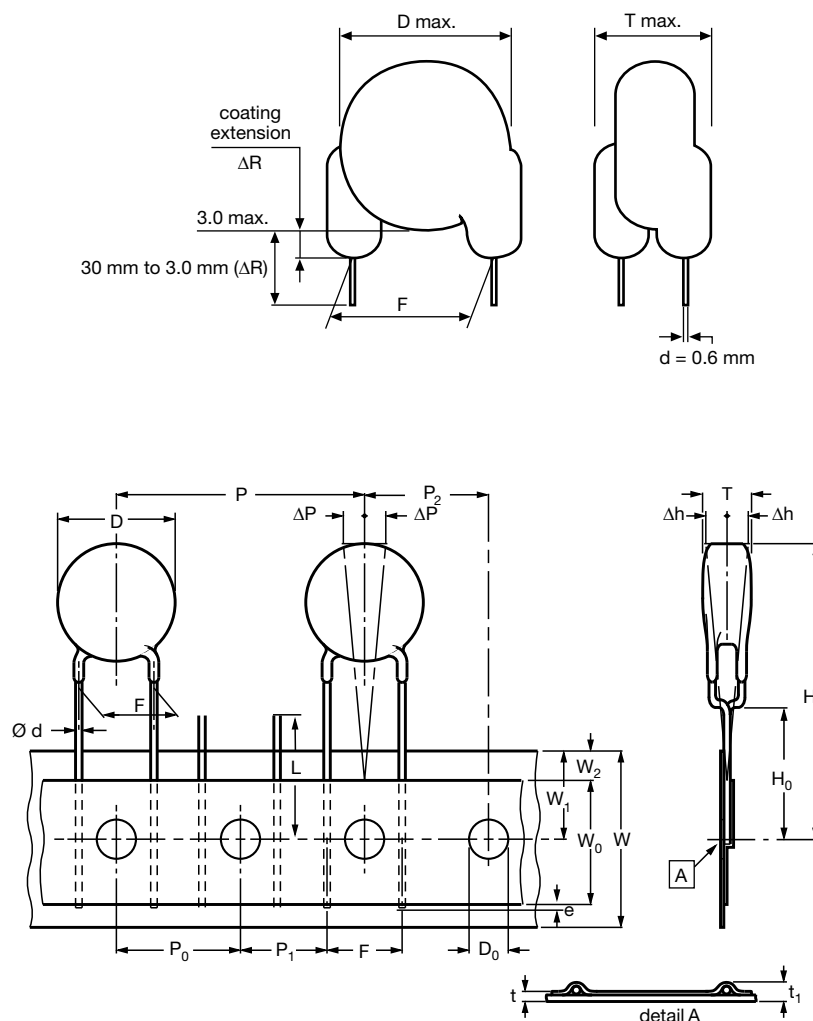
### Notes

- Straight leads are available on request
- Coating extension DR valid for straight leads only
- On request available: ± 10 % tolerance
- <sup>(1)</sup> 15<sup>th</sup> digit of the clear text code number to be completed with the packaging code

| PACKAGING          |           |                                     |                      |      |      |
|--------------------|-----------|-------------------------------------|----------------------|------|------|
| CAPACITANCE VALUE  | SIZE CODE | BODY DIAMETER<br>$D_{MAX.}$<br>(mm) | PACKAGING QUANTITIES |      |      |
|                    |           |                                     | BULK                 | REEL | AMMO |
| 10 pF to 2200 pF   | 31 to 47  | 12.0                                | 1000                 | 500  | 750  |
| 3300 pF to 4700 pF | 51 to 63  | 16.0                                | 500                  | 500  | 750  |

**Note**

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

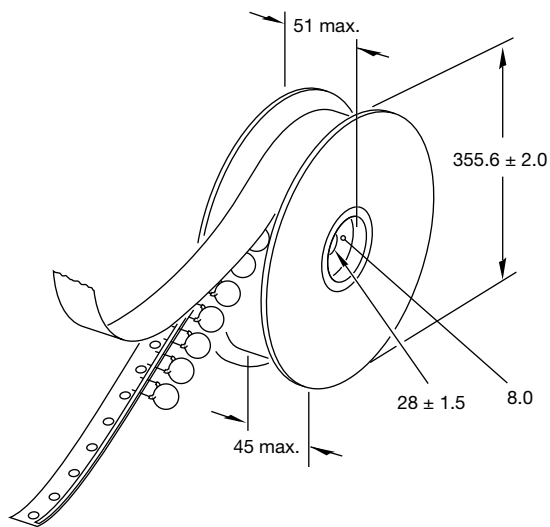
**STRAIGHT LEADS**


Lead spacing 10.0 mm and 12.5 mm, sprocket hole pitch 25.04 mm for lead spacing

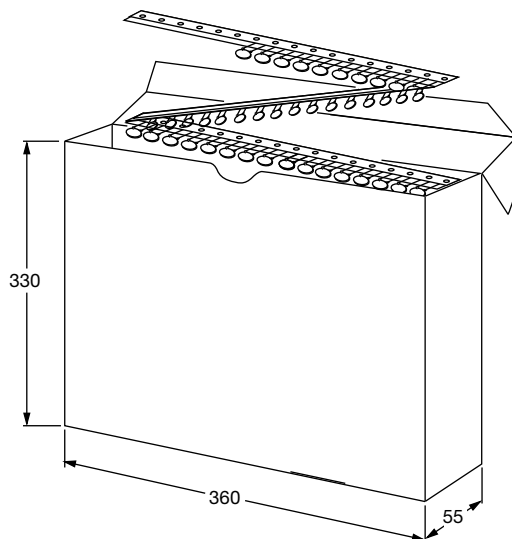
| DIMENSIONS OF TAPE            |                                              |                          |
|-------------------------------|----------------------------------------------|--------------------------|
| SYMBOL                        | PARAMETER                                    | DIMENSIONS (mm)          |
|                               |                                              | FIG. 2                   |
| D <sup>(1)</sup>              | Body diameter                                | 16.0 max.                |
| d                             | Lead diameter                                | 0.6 ± 0.05               |
| P                             | Pitch of component                           | 25.4 ± 1                 |
| P <sub>0</sub> <sup>(2)</sup> | Pitch of sprocket hole                       | 12.7 ± 0.3               |
| P <sub>1</sub> <sup>(3)</sup> | Distance, hole center to lead                | 7.7 or 6.4 ± 1.0         |
| P <sub>2</sub> <sup>(3)</sup> | Distance, hole to center of component        | 12.7 ± 1.5               |
| F                             | Lead spacing                                 | 10.0 or 12.5 + 0.6/- 0.4 |
| Δh                            | Average deviation across tape                | ± 1.0 max.               |
| ΔP                            | Average deviation in direction of reeling    | ± 1.0 max.               |
| W                             | Carrier tape width                           | 18.0 + 1/- 0.5           |
| W <sub>0</sub>                | Hold-down tape width                         | 5.0 min.                 |
| W <sub>1</sub>                | Position of sprocket hole                    | 9.0 + 0.75/- 0.5         |
| W <sub>2</sub>                | Distance of hold-down tape                   | 3.0 max.                 |
| H <sub>1</sub>                | Maximum component height                     | 40.0                     |
| H <sub>0</sub>                | Height to seating plane (for kinked leads)   | 16.0 ± 0.5               |
| H <sub>0</sub>                | Height to seating plane (for straight leads) | 20.0 ± 0.5               |
| L                             | Length of cut leads                          | 11.0 max.                |
| l                             | Length of lead protrusion                    | 1.0 max.                 |
| D <sub>0</sub>                | Diameter of sprocket hole                    | 4.0 ± 0.2                |
| t                             | Total tape thickness                         | 0.9 max.                 |

**Notes**

- (1) See Ordering Information table  
(2) Cumulative pitch error: ± 1 mm/20 pitches  
(3) Obliquity maximum 3°

**REEL AND TAPE DATA** in millimeters


Reel with capacitors on tape



Ammopack with capacitors on tape

## STANDARD RECOGNITION

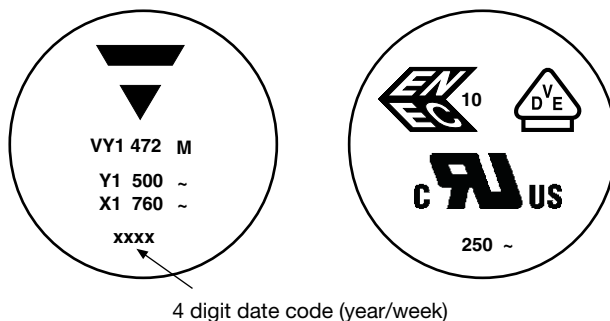
IEC 60384 - 14/3<sup>rd</sup> issue (2005) - Safety tests

UL 1414 - Across-the-line, antenna-coupling and line-by-pass component

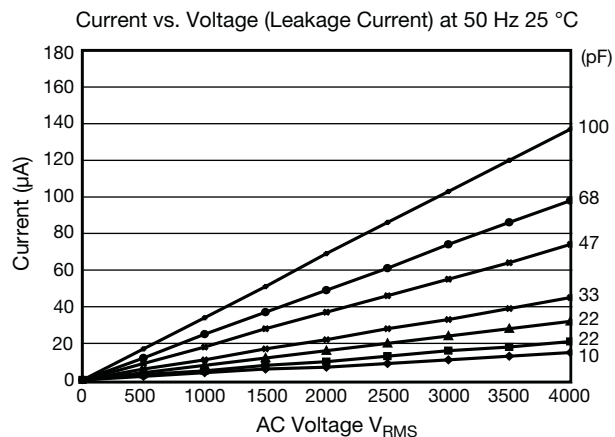
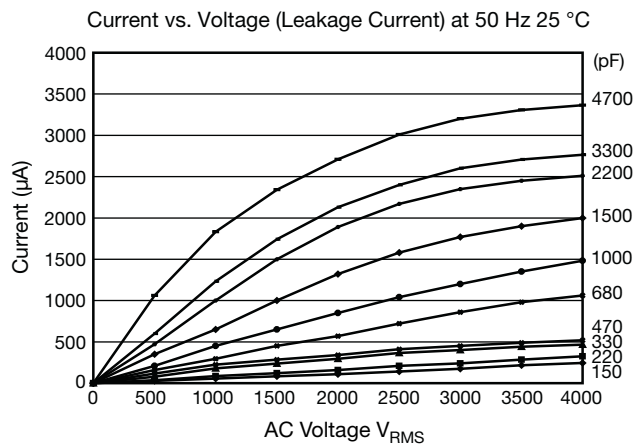
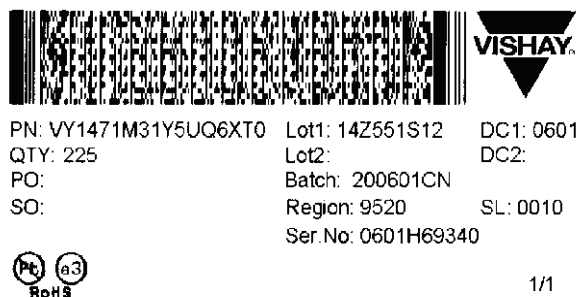
CSA C22.2 - Across-the-line, line to ground and antenna isolation capacitor

CQC - China Quality Certification Center-Safety Tests

## MARKING: 2 SIDES (EXAMPLE)



## LABEL (EXAMPLE)



### 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.



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