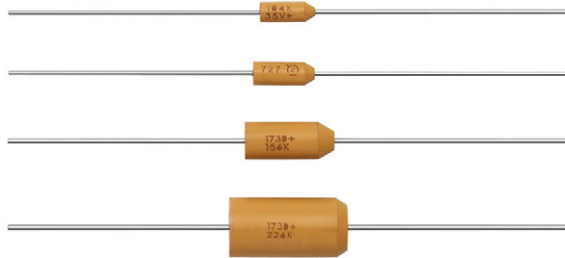


## Solid-Electrolyte TANTALEX™ Capacitors, Axial-Leaded, Molded Case



### LINKS TO ADDITIONAL RESOURCES



### PERFORMANCE CHARACTERISTICS

**Operating Temperature:** -55 °C to +85 °C  
(to +125 °C with voltage derating)

**Capacitance Tolerance:** at 120 Hz, +25 °C.  
± 20 %, ± 10 % standard ± 5 % available as special

**Capacitance Range:** 0.10 µF to 330 µF.

**Voltage Rating:** 2 V<sub>DC</sub> to 50 V<sub>DC</sub>.

**Dissipation Factor:** at 120 Hz, +25 °C. Dissipation factor, as determined from the expression  $2\pi fRC$ , shall not exceed the values listed in the Standard Ratings table.

**DC Leakage Current (DCL Max.):**

at +25 °C: leakage current shall not exceed the values listed in the Standard Ratings table.

### FEATURES

- Axial through-hole terminations: tin / lead (SnPb), 100 % tin (RoHS-compliant)
- Miniature axial-lead capacitors available in 5 sizes
- Precision molded in gold colored, flame retardant, thermosetting epoxy resin
- Laser marked for improved legibility and tapered end of case provides easy identification of positive terminal
- Standard orders are lead taped and reeled; orders under 500 are taped only
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



### Note

\* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

### APPLICATIONS

Designed for high performance automotive, industrial and commercial electronic equipment.

at +85 °C: leakage current shall not exceed 10 times the values listed in the Standard Ratings table.

at +125 °C: leakage shall not exceed 15 times the values listed in the Standard Ratings table.

**Life Test:** capacitors shall withstand rated DC voltage applied at +85 °C for 2000 h and for 1000 h applied at + 25 °C derated voltage.

Following the life test:

1. DCL shall not exceed 125 % of the initial requirements.
2. Dissipation factor shall meet the initial requirement.
3. Change in capacitance shall not exceed ± 10 %.

### ORDERING INFORMATION

| 173D<br>MODEL | 335<br>CAPACITANCE   | X9<br>CAPACITANCE<br>TOLERANCE                               | 006<br>DC VOLTAGE RATING<br>AT +85 °C  | U<br>CASE<br>CODE                | W<br>PACKAGING                         | E3<br>RoHS-<br>COMPLIANT  |
|---------------|--|--|--|----------------------------------|--|---|
|               | This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow. | X0 = ± 20 %<br>X9 = ± 10 %<br>*X5 = ± 5 %<br>* Special order | This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. | See Ratings and Case Codes table | W = tape and reel<br>Blank = ammo pack | E3 = 100 % tin termination (RoHS-compliant)<br>Blank = SnPb termination |

### DIMENSIONS in inches [millimeters]

| CASE CODE | D (MAX.)     | L (MAX.)      | LEAD DIAMETER |
|-----------|--------------|---------------|---------------|
| U         | 0.095 [2.41] | 0.260 [6.60]  | 0.020 [0.51]  |
| V         | 0.110 [2.79] | 0.290 [7.37]  | 0.020 [0.51]  |
| W         | 0.180 [4.57] | 0.345 [8.76]  | 0.020 [0.51]  |
| X         | 0.180 [4.57] | 0.420 [10.67] | 0.020 [0.51]  |
| Y         | 0.280 [7.11] | 0.550 [13.97] | 0.025 [0.64]  |



| RATINGS AND CASE CODES |     |     |     |      |      |      |      |      |      |
|------------------------|-----|-----|-----|------|------|------|------|------|------|
| μF                     | 2 V | 4 V | 6 V | 10 V | 15 V | 20 V | 25 V | 35 V | 50 V |
| 0.10                   |     |     |     |      |      |      |      | U    | U    |
| 0.12                   |     |     |     |      |      |      |      | U    | U    |
| 0.15                   |     |     |     |      |      |      |      | U    | U    |
| 0.18                   |     |     |     |      |      |      |      | U    | U    |
| 0.22                   |     |     |     |      |      |      |      | U    | U    |
| 0.27                   |     |     |     |      |      |      |      | U    | U    |
| 0.33                   |     |     |     |      |      |      |      | U    | V    |
| 0.39                   |     |     |     |      |      |      |      | U    | V    |
| 0.47                   |     |     |     |      |      |      | U    | U    | V    |
| 0.56                   |     |     |     |      |      |      | U    | V    | V    |
| 0.68                   |     |     |     |      |      |      | U    | V    | V    |
| 0.82                   |     |     |     |      |      |      | U    | V    | V    |
| 1.0                    |     |     |     |      | U    | U    | U    | V    | V    |
| 1.2                    |     |     |     |      |      | U    | V    | V    | W    |
| 1.5                    |     |     |     |      | U    | U    | V    | V    | W    |
| 1.8                    |     |     |     |      | U    | V    | V    | W    | W    |
| 2.2                    |     |     |     | U    | U    | U/V  | V    | W    | W    |
| 2.7                    |     |     |     | U    | V    | V    | V    | W    | X    |
| 3.3                    |     |     | U   | U    | V    | V    | V    | W    | X    |
| 3.9                    |     |     | U   | V    | V    | V    | W    | W    | X    |
| 4.7                    |     | U   | U   | V    | V    | V    | W    | W    | X    |
| 5.6                    |     | U   | V   | V    | V    | W    | W    | X    | Y    |
| 6.8                    | U   | U   | V   | V    | V    | W    | W    | X    | Y    |
| 8.2                    | U   | V   | V   | V    | W    | W    | W    | X    | Y    |
| 10                     | U   | V   | V   | V    | W    | W    | W    | X    | Y    |
| 12                     | V   | V   | V   | W    | W    | X    | X    | Y    | Y    |
| 15                     | V   | V   | V   | W    | W    | X    | X    | Y    | Y    |
| 18                     | V   | V   | W   | W    | X    | X    | Y    | Y    | Y    |
| 22                     | V   | V   | W   | W    | X    | X    | Y    | Y    | Y    |
| 27                     | V   | W   | W   | X    | X    | Y    | Y    | Y    |      |
| 33                     | V   | W   | W   | X    | X    | Y    | Y    | Y    |      |
| 39                     | W   | W   | X   | X    | Y    | Y    | Y    | Y    |      |
| 47                     | W   | W   | X   | X    | Y    | Y    | Y    | Y    |      |
| 56                     | W   | X   | X   | Y    | Y    | Y    |      |      |      |
| 68                     | W   | X   | X   | Y    | Y    | Y    |      |      |      |
| 82                     |     |     | Y   | Y    | Y    | Y    |      |      |      |
| 100                    |     |     | Y   | Y    | Y    | Y    |      |      |      |
| 120                    |     |     | Y   | Y    | Y    |      |      |      |      |
| 150                    |     |     | Y   | Y    | Y    |      |      |      |      |
| 180                    |     |     | Y   | Y    |      |      |      |      |      |
| 220                    |     |     | Y   | Y    |      |      |      |      |      |
| 270                    |     |     | Y   |      |      |      |      |      |      |
| 330                    |     |     | Y   |      |      |      |      |      |      |



| MARKING                                 |         |
|---|---------|
| PARAMETER                               | EXAMPLE |
| Product type                            | 173D    |
| Polarity                                | +       |
| Capacitance code, pF                    | 156     |
| Capacitance tolerance code              | K       |
| Voltage                                 | 25 V    |
| Date code                               | 1209    |
| Lead (Pb)-free indicator <sup>(1)</sup> | L       |
| Vishay marking                          |         |

**Note**

<sup>(1)</sup> On big case sizes (W,X,Y) lead free indicator is printed after date code, for example 1209L

| STANDARD RATINGS   |           |                      |                                     |                                    |
|--|-----------|----------------------|-------------------------------------|------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz (%) |
| <b>2 V<sub>DC</sub> AT +85 °C, SURGE = 2.5 V; 1.5 V<sub>DC</sub> AT +125 °C, SURGE = 1.8 V</b> |           |                      |                                     |                                    |
| 6.8  | U         | 173D685(1)002U(2)(3) | 0.5                                 | 10                                 |
| 8.2  | U         | 173D825(1)002U(2)(3) | 0.5                                 | 10                                 |
| 10   | U         | 173D106(1)002U(2)(3) | 0.5                                 | 10                                 |
| 12   | V         | 173D126(1)002V(2)(3) | 0.5                                 | 10                                 |
| 15   | V         | 173D156(1)002V(2)(3) | 0.5                                 | 10                                 |
| 18   | V         | 173D186(1)002V(2)(3) | 0.5                                 | 10                                 |
| 22   | V         | 173D226(1)002V(2)(3) | 0.5                                 | 10                                 |
| 27   | V         | 173D276(1)002V(2)(3) | 0.5                                 | 10                                 |
| 33   | V         | 173D336(1)002V(2)(3) | 0.5                                 | 10                                 |
| 39   | W         | 173D396(1)002W(2)(3) | 0.6                                 | 10                                 |
| 47   | W         | 173D476(1)002W(2)(3) | 0.8                                 | 10                                 |
| 56   | W         | 173D566(1)002W(2)(3) | 0.9                                 | 10                                 |
| 68   | W         | 173D686(1)002W(2)(3) | 1.1                                 | 10                                 |
| <b>4 V<sub>DC</sub> AT +85 °C, SURGE = 5 V; 2.5 V<sub>DC</sub> AT +125 °C, SURGE = 3 V</b>     |           |                      |                                     |                                    |
| 4.7  | U         | 173D475(1)004U(2)(3) | 0.5                                 | 8                                  |
| 5.6  | U         | 173D565(1)004U(2)(3) | 0.5                                 | 8                                  |
| 6.8  | U         | 173D685(1)004U(2)(3) | 0.5                                 | 8                                  |
| 8.2  | V         | 173D825(1)004V(2)(3) | 0.5                                 | 8                                  |
| 10   | V         | 173D106(1)004V(2)(3) | 0.5                                 | 8                                  |
| 12   | V         | 173D126(1)004V(2)(3) | 0.5                                 | 8                                  |
| 15   | V         | 173D156(1)004V(2)(3) | 0.5                                 | 8                                  |
| 18   | V         | 173D186(1)004V(2)(3) | 0.6                                 | 8                                  |
| 22   | V         | 173D226(1)004V(2)(3) | 0.7                                 | 8                                  |
| 27   | W         | 173D276(1)004W(2)(3) | 0.9                                 | 8                                  |
| 33   | W         | 173D336(1)004W(2)(3) | 1.1                                 | 8                                  |
| 39   | W         | 173D396(1)004W(2)(3) | 1.2                                 | 8                                  |
| 47   | W         | 173D476(1)004W(2)(3) | 1.5                                 | 8                                  |
| 56   | X         | 173D566(1)004X(2)(3) | 1.5                                 | 8                                  |
| 68   | X         | 173D686(1)004X(2)(3) | 2.2                                 | 8                                  |

**Note**

- Part number definition:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - Packaging code: for reel 13" specify W, leave blank for ammo pack
  - Termination: for 100 % tin specify E3, for SnPb leave blank



| STANDARD RATINGS   |           |                      |                                     |                                    |
|--|-----------|----------------------|-------------------------------------|------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz (%) |
| <b>6 V<sub>DC</sub> AT +85 °C, SURGE = 8 V; 4 V<sub>DC</sub> AT +125 °C, SURGE = 5 V</b>   |           |                      |                                     |                                    |
| 3.3  | U         | 173D335(1)006U(2)(3) | 0.5                                 | 4                                  |
| 3.9  | U         | 173D395(1)006U(2)(3) | 0.5                                 | 4                                  |
| 4.7  | U         | 173D475(1)006U(2)(3) | 0.5                                 | 4                                  |
| 5.6  | V         | 173D565(1)006V(2)(3) | 0.5                                 | 4                                  |
| 6.8  | V         | 173D685(1)006V(2)(3) | 0.5                                 | 6                                  |
| 8.2  | V         | 173D825(1)006V(2)(3) | 0.5                                 | 6                                  |
| 10   | V         | 173D106(1)006V(2)(3) | 0.5                                 | 6                                  |
| 12   | V         | 173D126(1)006V(2)(3) | 0.6                                 | 6                                  |
| 15   | V         | 173D156(1)006V(2)(3) | 0.7                                 | 6                                  |
| 18   | W         | 173D186(1)006W(2)(3) | 0.9                                 | 6                                  |
| 22   | W         | 173D226(1)006W(2)(3) | 1.1                                 | 6                                  |
| 27   | W         | 173D276(1)006W(2)(3) | 1.3                                 | 6                                  |
| 33   | W         | 173D336(1)006W(2)(3) | 1.5                                 | 6                                  |
| 39   | X         | 173D396(1)006X(2)(3) | 1.6                                 | 6                                  |
| 47   | X         | 173D476(1)006X(2)(3) | 2.3                                 | 6                                  |
| 56   | X         | 173D566(1)006X(2)(3) | 2.7                                 | 6                                  |
| 68   | X         | 173D686(1)006X(2)(3) | 3.3                                 | 6                                  |
| 82   | Y         | 173D826(1)006Y(2)(3) | 3.9                                 | 8                                  |
| 100  | Y         | 173D107(1)006Y(2)(3) | 4.8                                 | 8                                  |
| 120  | Y         | 173D127(1)006Y(2)(3) | 5.0                                 | 8                                  |
| 150  | Y         | 173D157(1)006Y(2)(3) | 5.0                                 | 8                                  |
| 180  | Y         | 173D187(1)006Y(2)(3) | 8.6                                 | 8                                  |
| 220  | Y         | 173D227(1)006Y(2)(3) | 10.0                                | 8                                  |
| 270  | Y         | 173D277(1)006Y(2)(3) | 10.0                                | 8                                  |
| 330  | Y         | 173D337(1)006Y(2)(3) | 10.0                                | 8                                  |
| <b>10 V<sub>DC</sub> AT +85 °C, SURGE = 13 V; 7 V<sub>DC</sub> AT +125 °C, SURGE = 9 V</b> |           |                      |                                     |                                    |
| 2.2  | U         | 173D225(1)010U(2)(3) | 0.5                                 | 4                                  |
| 2.7  | U         | 173D275(1)010U(2)(3) | 0.5                                 | 4                                  |
| 3.3  | U         | 173D335(1)010U(2)(3) | 0.5                                 | 4                                  |
| 3.9  | V         | 173D395(1)010V(2)(3) | 0.5                                 | 4                                  |
| 4.7  | V         | 173D475(1)010V(2)(3) | 0.5                                 | 4                                  |
| 5.6  | V         | 173D565(1)010V(2)(3) | 0.5                                 | 4                                  |
| 6.8  | V         | 173D685(1)010V(2)(3) | 0.5                                 | 6                                  |
| 8.2  | V         | 173D825(1)010V(2)(3) | 0.7                                 | 6                                  |
| 10   | V         | 173D106(1)010V(2)(3) | 0.8                                 | 6                                  |
| 12   | W         | 173D126(1)010W(2)(3) | 1.0                                 | 6                                  |
| 15   | W         | 173D156(1)010W(2)(3) | 1.2                                 | 6                                  |
| 18   | W         | 173D186(1)010W(2)(3) | 1.4                                 | 6                                  |
| 22   | W         | 173D226(1)010W(2)(3) | 1.5                                 | 6                                  |
| 27   | X         | 173D276(1)010X(2)(3) | 2.2                                 | 6                                  |
| 33   | X         | 173D336(1)010X(2)(3) | 2.6                                 | 6                                  |
| 39   | X         | 173D396(1)010X(2)(3) | 3.1                                 | 6                                  |
| 47   | X         | 173D476(1)010X(2)(3) | 3.8                                 | 6                                  |
| 56   | Y         | 173D566(1)010Y(2)(3) | 4.4                                 | 6                                  |
| 68   | Y         | 173D686(1)010Y(2)(3) | 5.0                                 | 6                                  |
| 82   | Y         | 173D826(1)010Y(2)(3) | 5.0                                 | 8                                  |
| 100  | Y         | 173D107(1)010Y(2)(3) | 8.0                                 | 8                                  |

**Note**

- Part number definition:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - Packaging code: for reel 13" specify W, leave blank for ammo pack
  - Termination: for 100 % tin specify E3, for SnPb leave blank



| <b>STANDARD RATINGS</b>  |                  |                      |   |   |
|--|------------------|----------------------|---|---|
| <b>CAPACITANCE<br/>(<math>\mu</math>F)</b>   | <b>CASE CODE</b> | <b>PART NUMBER</b>   | <b>MAX. DCL<br/>AT +25 °C<br/>(<math>\mu</math>A)</b> | <b>MAX. DF<br/>AT +25 °C<br/>120 Hz (%)</b> |
| <b>10 V<sub>DC</sub> AT +85 °C, SURGE = 13 V; 7 V<sub>DC</sub> AT +125 °C, SURGE = 9 V</b>   |                  |                      |   |   |
| 120  | Y                | 173D127(1)010Y(2)(3) | 9.6   | 8   |
| 150  | Y                | 173D157(1)010Y(2)(3) | 10.0  | 8   |
| 180  | Y                | 173D187(1)010Y(2)(3) | 10.0  | 8   |
| 220  | Y                | 173D227(1)010Y(2)(3) | 10.0  | 8   |
| <b>15 V<sub>DC</sub> AT +85 °C, SURGE = 20 V; 10 V<sub>DC</sub> AT +125 °C, SURGE = 12 V</b> |                  |                      |   |   |
| 1.0  | U                | 173D105(1)015U(2)(3) | 0.5   | 4   |
| 1.5  | U                | 173D155(1)015U(2)(3) | 0.5   | 4   |
| 1.8  | U                | 173D185(1)015U(2)(3) | 0.5   | 4   |
| 2.2  | U                | 173D225(1)015U(2)(3) | 0.5   | 4   |
| 2.7  | V                | 173D275(1)015V(2)(3) | 0.5   | 4   |
| 3.3  | V                | 173D335(1)015V(2)(3) | 0.5   | 4   |
| 3.9  | V                | 173D395(1)015V(2)(3) | 0.5   | 4   |
| 4.7  | V                | 173D475(1)015V(2)(3) | 0.6   | 4   |
| 5.6  | V                | 173D565(1)015V(2)(3) | 0.7   | 4   |
| 6.8  | V                | 173D685(1)015V(2)(3) | 0.8   | 6   |
| 8.2  | W                | 173D825(1)015W(2)(3) | 1.0   | 6   |
| 10   | W                | 173D106(1)015W(2)(3) | 1.2   | 6   |
| 12   | W                | 173D126(1)015W(2)(3) | 1.4   | 6   |
| 15   | W                | 173D156(1)015W(2)(3) | 1.5   | 6   |
| 18   | X                | 173D186(1)015X(2)(3) | 2.2   | 6   |
| 22   | X                | 173D226(1)015X(2)(3) | 2.6   | 6   |
| 27   | X                | 173D276(1)015X(2)(3) | 3.2   | 6   |
| 33   | X                | 173D336(1)015X(2)(3) | 4.0   | 6   |
| 39   | Y                | 173D396(1)015Y(2)(3) | 4.7   | 6   |
| 47   | Y                | 173D476(1)015Y(2)(3) | 5.0   | 6   |
| 56   | Y                | 173D566(1)015Y(2)(3) | 6.7   | 6   |
| 68   | Y                | 173D686(1)015Y(2)(3) | 8.2   | 6   |
| 82   | Y                | 173D826(1)015Y(2)(3) | 9.8   | 8   |
| 100  | Y                | 173D107(1)015Y(2)(3) | 10.0  | 8   |
| 120  | Y                | 173D127(1)015Y(2)(3) | 10.0  | 8   |
| 150  | Y                | 173D157(1)015Y(2)(3) | 10.0  | 8   |
| <b>20 V<sub>DC</sub> AT +85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT +125 °C, SURGE = 16 V</b> |                  |                      |   |   |
| 1.0  | U                | 173D105(1)020U(2)(3) | 0.5   | 4   |
| 1.2  | U                | 173D125(1)020U(2)(3) | 0.5   | 4   |
| 1.5  | U                | 173D155(1)020U(2)(3) | 0.5   | 4   |
| 1.8  | V                | 173D185(1)020V(2)(3) | 0.5   | 4   |
| 2.2  | U                | 173D225(1)020U(2)(3) | 0.5   | 4   |
| 2.2  | V                | 173D225(1)020V(2)(3) | 0.5   | 4   |
| 2.7  | V                | 173D275(1)020V(2)(3) | 0.5   | 4   |
| 3.3  | V                | 173D335(1)020V(2)(3) | 0.5   | 4   |
| 3.9  | V                | 173D395(1)020V(2)(3) | 0.6   | 4   |
| 4.7  | V                | 173D475(1)020V(2)(3) | 0.8   | 4   |
| 5.6  | W                | 173D565(1)020W(2)(3) | 0.9   | 4   |

**Note**

- Part number definition:
  - (1) For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - (2) Packaging code: for reel 13" specify W, leave blank for ammo pack
  - (3) Termination: for 100 % tin specify E3, for SnPb leave blank



| STANDARD RATINGS   |           |                      |                                     |                                    |  |
|--|-----------|----------------------|-------------------------------------|------------------------------------|--|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz (%) |  |
| <b>20 V<sub>DC</sub> AT +85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT +125 °C, SURGE = 16 V</b> |           |                      |                                     |                                    |  |
| 6.8  | W         | 173D685(1)020W(2)(3) | 1.1                                 | 6                                  |  |
| 8.2  | W         | 173D825(1)020W(2)(3) | 1.3                                 | 6                                  |  |
| 10   | W         | 173D106(1)020W(2)(3) | 1.6                                 | 6                                  |  |
| 12   | X         | 173D126(1)020X(2)(3) | 1.9                                 | 6                                  |  |
| 15   | X         | 173D156(1)020X(2)(3) | 2.4                                 | 6                                  |  |
| 18   | X         | 173D186(1)020X(2)(3) | 2.9                                 | 6                                  |  |
| 22   | X         | 173D226(1)020X(2)(3) | 3.5                                 | 6                                  |  |
| 27   | Y         | 173D276(1)020Y(2)(3) | 4.3                                 | 6                                  |  |
| 33   | Y         | 173D336(1)020Y(2)(3) | 5.0                                 | 6                                  |  |
| 39   | Y         | 173D396(1)020Y(2)(3) | 6.2                                 | 6                                  |  |
| 47   | Y         | 173D476(1)020Y(2)(3) | 7.5                                 | 6                                  |  |
| 56   | Y         | 173D566(1)020Y(2)(3) | 8.9                                 | 6                                  |  |
| 68   | Y         | 173D686(1)020Y(2)(3) | 10.0                                | 6                                  |  |
| 82   | Y         | 173D826(1)020Y(2)(3) | 10.0                                | 6                                  |  |
| 100  | Y         | 173D107(1)020Y(2)(3) | 10.0                                | 6                                  |  |
| <b>25 V<sub>DC</sub> AT +85 °C, SURGE = 32 V; 17 V<sub>DC</sub> AT +125 °C, SURGE = 21 V</b> |           |                      |                                     |                                    |  |
| 0.47   | U         | 173D474(1)025U(2)(3) | 0.5                                 | 3                                  |  |
| 0.56   | U         | 173D564(1)025U(2)(3) | 0.5                                 | 3                                  |  |
| 0.68   | U         | 173D684(1)025U(2)(3) | 0.5                                 | 3                                  |  |
| 0.82   | U         | 173D824(1)025U(2)(3) | 0.5                                 | 3                                  |  |
| 1.0  | U         | 173D105(1)025U(2)(3) | 0.5                                 | 3                                  |  |
| 1.2  | V         | 173D125(1)025V(2)(3) | 0.5                                 | 3                                  |  |
| 1.5  | V         | 173D155(1)025V(2)(3) | 0.5                                 | 3                                  |  |
| 1.8  | V         | 173D185(1)025V(2)(3) | 0.5                                 | 3                                  |  |
| 2.2  | V         | 173D225(1)025V(2)(3) | 0.5                                 | 3                                  |  |
| 2.7  | V         | 173D275(1)025V(2)(3) | 0.5                                 | 3                                  |  |
| 3.3  | V         | 173D335(1)025V(2)(3) | 0.7                                 | 3                                  |  |
| 3.9  | W         | 173D395(1)025W(2)(3) | 0.8                                 | 3                                  |  |
| 4.7  | W         | 173D475(1)025W(2)(3) | 0.9                                 | 4                                  |  |
| 5.6  | W         | 173D565(1)025W(2)(3) | 1.1                                 | 4                                  |  |
| 6.8  | W         | 173D685(1)025W(2)(3) | 1.4                                 | 4                                  |  |
| 8.2  | W         | 173D825(1)025W(2)(3) | 1.5                                 | 4                                  |  |
| 10   | W         | 173D106(1)025W(2)(3) | 1.5                                 | 4                                  |  |
| 12   | X         | 173D126(1)025X(2)(3) | 2.4                                 | 4                                  |  |
| 15   | X         | 173D156(1)025X(2)(3) | 3.0                                 | 4                                  |  |
| 18   | Y         | 173D186(1)025Y(2)(3) | 3.6                                 | 6                                  |  |
| 22   | Y         | 173D226(1)025Y(2)(3) | 4.4                                 | 6                                  |  |
| 27   | Y         | 173D276(1)025Y(2)(3) | 5.4                                 | 6                                  |  |
| 33   | Y         | 173D336(1)025Y(2)(3) | 6.6                                 | 6                                  |  |
| 39   | Y         | 173D396(1)025Y(2)(3) | 7.8                                 | 6                                  |  |
| 47   | Y         | 173D476(1)025Y(2)(3) | 9.4                                 | 6                                  |  |

**Note**

- Part number definition:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - Packaging code: for reel 13" specify W, leave blank for ammo pack
  - Termination: for 100 % tin specify E3, for SnPb leave blank



| STANDARD RATINGS   |           |                      |                                     |                                    |  |
|--|-----------|----------------------|-------------------------------------|------------------------------------|--|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz (%) |  |
| <b>35 V<sub>DC</sub> AT +85 °C, SURGE = 46 V; 23 V<sub>DC</sub> AT +125 °C, SURGE = 28 V</b> |           |                      |                                     |                                    |  |
| 0.10   | U         | 173D104(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.12   | U         | 173D124(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.15   | U         | 173D154(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.18   | U         | 173D184(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.22   | U         | 173D224(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.27   | U         | 173D274(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.33   | U         | 173D334(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.39   | U         | 173D394(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.47   | U         | 173D474(1)035U(2)(3) | 0.5                                 | 3                                  |  |
| 0.56   | V         | 173D564(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 0.68   | V         | 173D684(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 0.82   | V         | 173D824(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 1.0  | V         | 173D105(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 1.2  | V         | 173D125(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 1.5  | V         | 173D155(1)035V(2)(3) | 0.5                                 | 3                                  |  |
| 1.8  | W         | 173D185(1)035W(2)(3) | 0.5                                 | 3                                  |  |
| 2.2  | W         | 173D225(1)035W(2)(3) | 0.6                                 | 3                                  |  |
| 2.7  | W         | 173D275(1)035W(2)(3) | 0.8                                 | 3                                  |  |
| 3.3  | W         | 173D335(1)035W(2)(3) | 0.9                                 | 4                                  |  |
| 3.9  | W         | 173D395(1)035W(2)(3) | 1.1                                 | 4                                  |  |
| 4.7  | W         | 173D475(1)035W(2)(3) | 1.3                                 | 4                                  |  |
| 5.6  | X         | 173D565(1)035X(2)(3) | 1.6                                 | 4                                  |  |
| 6.8  | X         | 173D685(1)035X(2)(3) | 1.9                                 | 4                                  |  |
| 8.2  | X         | 173D825(1)035X(2)(3) | 2.3                                 | 4                                  |  |
| 10   | X         | 173D106(1)035X(2)(3) | 2.8                                 | 4                                  |  |
| 12   | Y         | 173D126(1)035Y(2)(3) | 3.3                                 | 4                                  |  |
| 15   | Y         | 173D156(1)035Y(2)(3) | 4.2                                 | 4                                  |  |
| 18   | Y         | 173D186(1)035Y(2)(3) | 5.0                                 | 6                                  |  |
| 22   | Y         | 173D226(1)035Y(2)(3) | 6.2                                 | 6                                  |  |
| 27   | Y         | 173D276(1)035Y(2)(3) | 7.5                                 | 6                                  |  |
| 33   | Y         | 173D336(1)035Y(2)(3) | 9.2                                 | 6                                  |  |
| 39   | Y         | 173D396(1)035Y(2)(3) | 10.0                                | 6                                  |  |
| 47   | Y         | 173D476(1)035Y(2)(3) | 10.0                                | 6                                  |  |
| <b>50 V<sub>DC</sub> AT +85 °C, SURGE = 65 V; 33 V<sub>DC</sub> AT +125 °C, SURGE = 40 V</b> |           |                      |                                     |                                    |  |
| 0.10   | U         | 173D104(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.12   | U         | 173D124(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.15   | U         | 173D154(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.18   | U         | 173D184(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.22   | U         | 173D224(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.27   | U         | 173D274(1)050U(2)(3) | 0.5                                 | 3                                  |  |
| 0.33   | V         | 173D334(1)050V(2)(3) | 0.5                                 | 3                                  |  |
| 0.39   | V         | 173D394(1)050V(2)(3) | 0.5                                 | 3                                  |  |

**Note**

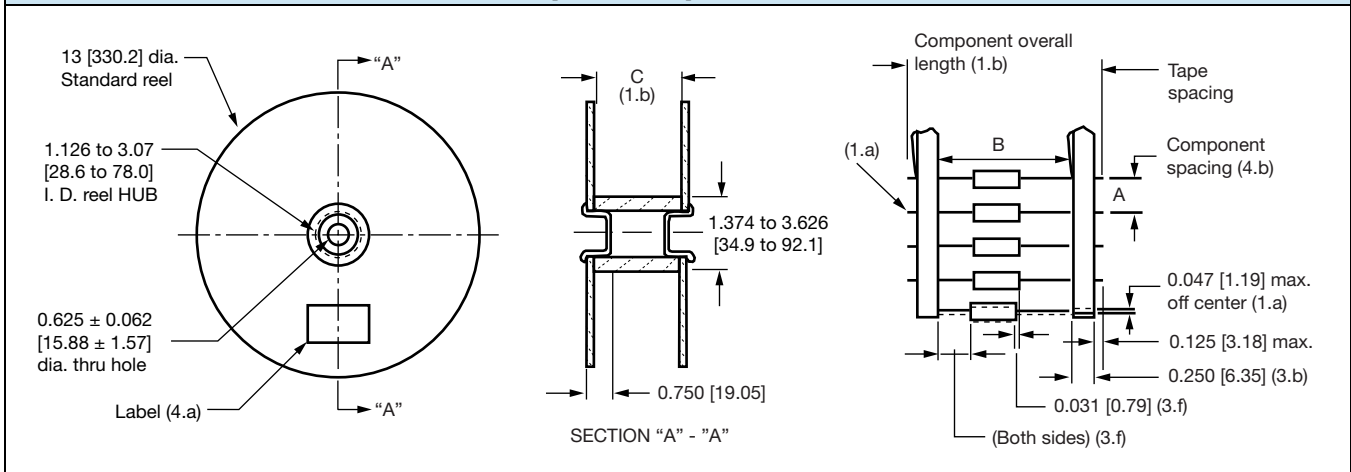
- Part number definition:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - Packaging code: for reel 13" specify W, leave blank for ammo pack
  - Termination: for 100 % tin specify E3, for SnPb leave blank



| STANDARD RATINGS   |           |                      |                                     |                                    |
|--|-----------|----------------------|-------------------------------------|------------------------------------|
| CAPACITANCE<br>( $\mu$ F)  | CASE CODE | PART NUMBER          | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz (%) |
| <b>50 V<sub>DC</sub> AT +85 °C, SURGE = 65 V; 33 V<sub>DC</sub> AT +125 °C, SURGE = 40 V</b> |           |                      |                                     |                                    |
| 0.47   | V         | 173D474(1)050V(2)(3) | 0.5                                 | 3                                  |
| 0.56   | V         | 173D564(1)050V(2)(3) | 0.5                                 | 3                                  |
| 0.68   | V         | 173D684(1)050V(2)(3) | 0.5                                 | 3                                  |
| 0.82   | V         | 173D824(1)050V(2)(3) | 0.5                                 | 3                                  |
| 1.0  | V         | 173D105(1)050V(2)(3) | 0.5                                 | 3                                  |
| 1.2  | W         | 173D125(1)050W(2)(3) | 0.5                                 | 3                                  |
| 1.5  | W         | 173D155(1)050W(2)(3) | 0.6                                 | 3                                  |
| 1.8  | W         | 173D185(1)050W(2)(3) | 0.7                                 | 4                                  |
| 2.2  | W         | 173D225(1)050W(2)(3) | 0.9                                 | 4                                  |
| 2.7  | X         | 173D275(1)050X(2)(3) | 1.1                                 | 4                                  |
| 3.3  | X         | 173D335(1)050X(2)(3) | 1.3                                 | 4                                  |
| 3.9  | X         | 173D395(1)050X(2)(3) | 1.6                                 | 4                                  |
| 4.7  | X         | 173D475(1)050X(2)(3) | 1.9                                 | 4                                  |
| 5.6  | Y         | 173D565(1)050Y(2)(3) | 2.2                                 | 4                                  |
| 6.8  | Y         | 173D685(1)050Y(2)(3) | 2.7                                 | 4                                  |
| 8.2  | Y         | 173D825(1)050Y(2)(3) | 3.2                                 | 4                                  |
| 10   | Y         | 173D106(1)050Y(2)(3) | 4.0                                 | 6                                  |
| 12   | Y         | 173D126(1)050Y(2)(3) | 5.0                                 | 6                                  |
| 15   | Y         | 173D156(1)050Y(2)(3) | 6.0                                 | 6                                  |
| 18   | Y         | 173D186(1)050Y(2)(3) | 6.0                                 | 6                                  |
| 22   | Y         | 173D226(1)050Y(2)(3) | 11.0                                | 6                                  |

**Note**

- Part number definition:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % specify "X5" (special order)
  - Packaging code: for reel 13" specify W, leave blank for ammo pack
  - Termination: for 100 % tin specify E3, for SnPb leave blank

**TAPE AND REEL PACKAGING in inches [millimeters]**


| CASE CODE | UNITS PER REEL | COMPONENT SPACING               | TAPE SPACING                    | UNITS PER AMMOPACK |
|-----------|----------------|---------------------------------|---------------------------------|--------------------|
|           |                | A                               | B                               |                    |
| U         | 4500           | 0.200 ± 0.015<br>[5.08 ± 3.81]  | 2.062 ± 0.062<br>[52.37 ± 1.57] | 1000               |
| V         | 4000           |                                 |                                 |                    |
| W, X      | 2500           |                                 |                                 |                    |
| Y         | 500            | 0.400 ± 0.015<br>[10.16 ± 3.81] |                                 | 500                |

**STANDARD REEL PACKAGING INFORMATION**
**1. Component Leads**

- a. Component leads shall not be bent beyond 0.047" [1.19 mm] maximum from their nominal position when measured from the leading edge of the component lead at the inside tape edge and at the lead egress from the component.
- b. The "C" dimension shall be governed by the overall length of the reel packaged component. The distance between flanges shall be 0.125" to 0.250" [3.18 mm to 6.35 mm] greater than the overall component length.

**2. Orientation**

All polarized components must be oriented to one direction. The cathode lead tape shall be a color and the anode lead tape shall be white.

**3. Reeling**

- a. Components on any reel shall not represent more than two date codes when date code identification is required.
- b. Component leads shall be positioned between pairs of 0.250" [6.35 mm] tape.
- c. The disposable reels have hubs and corrugated fibreboard flanges and core.
- d. A minimum of 12" [304.8 mm] leader of tape shall be provided before the first and after the last component on the reel.
- e. 50 lb to 60 lb. Kraft paper must be wound between layers of components as far as necessary for component protection. Width of paper to be 0.062" to 0.250" [1.57 mm to 6.35 mm] less than the "C" dimension of the reel.

- f. Row components must be centered between tapes ± 0.047" [1.19 mm]. In addition, individual components may deviate from center of component row ± 0.031" [0.79 mm].
- g. Staples shall not be used for splicing. Not more than 4 layers of tape shall be used in any splice area and no tape shall be offset from another by more than 0.031" [0.79 mm] non-cumulative. Tape splices shall overlap at least 6.0" [152.4 mm] for butt joints and at least 3" [76.2 mm] for lap joints and shall not be weaker than unspliced tape. Universal splicing clips may also be used.
- h. Quantity per reel shall be controlled so that tape components and cover shall not extend beyond the smallest dimension of the flange (either across flats or diameter). Once the quantity per reel for each part number has been established, future orders for that part number shall be packaged in that quantity. When order release quantity is less than the established quantity, a standard commercial pack is to be used.
- i. A maximum of 0.25 % of the components per reel quantity may be missing without consecutive missing components.
- j. Adequate protection must be provided to prevent physical damage to both reel and components during shipment and storage.



GUIDE TO APPLICATION

- 1. **AC Ripple Current:** the maximum allowable ripple current shall be determined from the formula:

$$I_{RMS} = \sqrt{\frac{P_{max.}}{ESR}}$$

where,

P = maximum allowed power dissipation in W at +25 °C as given in the table in paragraph number 3.

ESR = the capacitor equivalent series resistance at the specified frequency.

- 2. **AC Ripple Voltage:** the maximum allowable ripple voltage shall be determined from the formula:

$$V_{RMS} = Z \sqrt{\frac{P_{max.}}{ESR}}$$

where,

P = maximum allowed power dissipation in W at +25 °C as given in the table in paragraph number 3.

ESR = the capacitor equivalent series resistance at the specified frequency.

Z = the capacitor impedance at the specified frequency.

- 3. **Power Dissipation:** the maximum allowed power dissipation (P<sub>max.</sub>, W) at 25 °C. It is affected by the heat dissipating capability of the capacitor surface.

Table below shows P<sub>max.</sub> for each case size.

For more details refer to technical note “AC Ripple Current Calculations”, link is provided in the “Product Information” table.

| 173D CASE CODE | P <sub>max.</sub> AT +25 °C (W) IN FREE AIR |
|----------------|---|
| U              | 0.070                                       |
| V              | 0.080                                       |
| W              | 0.095                                       |
| X              | 0.110                                       |
| Y              | 0.160                                       |

- 4. **Temperature Derating:** if capacitors are to be operated at temperatures above +25 °C, the maximum allowed I<sub>RMS</sub> (or V<sub>RMS</sub>) shall be calculated using the derating factors as shown below:

| TEMPERATURE | DERATING FACTOR |
|-------------|-----------------|
| +25 °C      | 1.0             |
| +55 °C      | 0.8             |
| +85 °C      | 0.6             |
| +125 °C     | 0.4             |

- 5. **Voltage Derating:** the sum of the peak AC voltage plus the DC voltage shall not exceed the DC rated voltage of the capacitor. For more details refer to technical note “Solid Tantalum Capacitors (With MnO<sub>2</sub> Electrolyte) Voltage Derating”, link is provided in the “Product Information” table.

- 6. **Reverse Voltage:** the sum of the negative peak AC voltage plus the applied DC voltage shall not allow a reversal voltage exceeding 10 % of the DC rated voltage at +25 °C, and 5 % at +85 °C.

| PRODUCT INFORMATION  |  |
|--|--|
| Mounting of Through Hole Components  | <a href="http://www.vishay.com/doc?40108">www.vishay.com/doc?40108</a> |
| Solid Tantalum Capacitors (With MnO <sub>2</sub> Electrolyte) Voltage Derating | <a href="http://www.vishay.com/doc?40246">www.vishay.com/doc?40246</a> |
| AC Ripple Current Calculations Solid Tantalum Capacitors                       | <a href="http://www.vishay.com/doc?40031">www.vishay.com/doc?40031</a> |
| SELECTOR GUIDES  |  |
| Selector Guide   | <a href="http://www.vishay.com/doc?49054">www.vishay.com/doc?49054</a> |
| FAQ  |  |
| Frequently Asked Questions   | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a> |



## **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.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View 173D335X9025VWE3 on WIN SOURCE](#)

 [Vishay Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management