

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



### 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:** 0.10µF 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)



**RoHS\***  
COMPLIANT

### Note

\* Lead (Pb)-containing terminations are not RoHS-compliant. Exemptions may apply.

### 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       |
| Sprague logo                            |         |

**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:

(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 (%) |
| 6 V <sub>DC</sub> AT + 85 °C, SURGE = 8 V; 4 V <sub>DC</sub> AT + 125 °C, SURGE = 5 V   |           |                      |                                      |                                     |
| 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                                   |
| 10 V <sub>DC</sub> AT + 85 °C, SURGE = 13 V; 7 V <sub>DC</sub> AT + 125 °C, SURGE = 9 V |           |                      |                                      |                                     |
| 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:
  - (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 (%) |
| 10 V <sub>DC</sub> AT + 85 °C, SURGE = 13 V; 7 V <sub>DC</sub> AT + 125 °C, SURGE = 9 V   |           |                      |                                      |                                     |
| 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                                   |
| 15 V <sub>DC</sub> AT + 85 °C, SURGE = 20 V; 10 V <sub>DC</sub> AT + 125 °C, SURGE = 12 V |           |                      |                                      |                                     |
| 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                                   |
| 20 V <sub>DC</sub> AT + 85 °C, SURGE = 26 V; 13 V <sub>DC</sub> AT + 125 °C, SURGE = 16 V |           |                      |                                      |                                     |
| 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 (%) |
| 20 V <sub>DC</sub> AT + 85 °C, SURGE = 26 V; 13 V <sub>DC</sub> AT + 125 °C, SURGE = 16 V |           |                      |                                      |                                     |
| 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                                   |
| 25 V <sub>DC</sub> AT + 85 °C, SURGE = 32 V; 17 V <sub>DC</sub> AT + 125 °C, SURGE = 21 V |           |                      |                                      |                                     |
| 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:

(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 (%) |
| 35 V <sub>DC</sub> AT + 85 °C, SURGE = 46 V; 23 V <sub>DC</sub> AT + 125 °C, SURGE = 28 V |           |                      |                                      |                                     |
| 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                                   |
| 50 V <sub>DC</sub> AT + 85 °C, SURGE = 65 V; 33 V <sub>DC</sub> AT + 125 °C, SURGE = 40 V |           |                      |                                      |                                     |
| 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:
  - (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>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:

(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

**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           |                                |                                 | 500                |
| W, X      | 2500           |                                |                                 |                    |
| Y         | 500            | 0.400 ± 0.015                  |                                 |                    |

**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  $\pm 0.047$ " [1.19 mm]. In addition, individual components may deviate from center of component row  $\pm 0.031$ " [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

| PRODUCT INFORMATION                 |                                                                        |
|-------------------------------------|------------------------------------------------------------------------|
| Mounting of Through Hole Components | <a href="http://www.vishay.com/doc?40108">www.vishay.com/doc?40108</a> |
| SELECTOR GUIDES                     |                                                                        |
| Quick Reference Guide               | <a href="http://www.vishay.com/doc?40037">www.vishay.com/doc?40037</a> |
| Selector Guide                      | <a href="http://www.vishay.com/doc?49054">www.vishay.com/doc?49054</a> |
| Parameter Comparison Guide          | <a href="http://www.vishay.com/doc?40033">www.vishay.com/doc?40033</a> |
| FAQ                                 |                                                                        |
| Frequently Asked Questions          | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</a> |



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