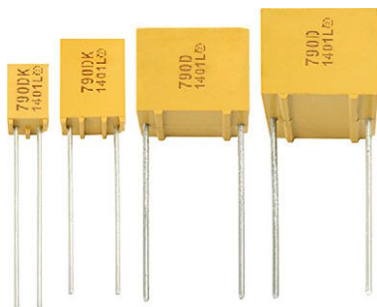


## Resin-Molded, Radial-Lead Solid Tantalum Capacitors



### PERFORMANCE CHARACTERISTICS

**Operating Temperature:** -55 °C to +125 °C  
(above 85 °C, voltage derating is required)

**Capacitance Range:** 0.1 µF to 330 µF

**Capacitance Tolerance:** ± 10 %, ± 20 %

**Voltage Rating:** 6.3 V<sub>DC</sub> to 50 V<sub>DC</sub>

### FEATURES

- Terminations: tin / lead (SnPb), 100 % tin (Sn)
- Four case sizes precisely molded with a flame retardant epoxy resin
- Stand off on all case sizes
- Available on tape for automatic insertion equipment (only A- and B-case, C- and D-case on request)
- Low leakage current
- Low impedance
- Extended value ranges available
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS\***  
Available

### 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

### ORDERING INFORMATION

| 790D                               | 157                                                                                                                    | X0                         | 6R3                                                                                                                                           | C                                | 2                         | B                                                                                                                                                                                                                                        | E3                                                                      |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| MODEL                              | CAPACITANCE                                                                                                            | CAPACITANCE TOLERANCE      | DC VOLTAGE RATING                                                                                                                             | CASE CODE                        | STYLE NUMBER              | PACKAGING                                                                                                                                                                                                                                | RoHS COMPLIANT                                                          |
| 790D = standard and extended range | Expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros following. | X0 = ± 20 %<br>X9 = ± 10 % | Expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V) | See Ratings and Case Codes table | Insulated case (standard) | See packing information<br>B: bulk<br>G: ammpack (H = 16.5 mm)<br>H: ammpack (H = 18.5 mm)<br>I: ammpack shouldered leads (A case)<br>X: reel pack (H = 16.5 mm)<br>Y: reel pack (H = 18.5 mm)<br>Z: reel pack shouldered leads (A case) | E3 = 100 % tin termination (RoHS-compliant)<br>Blank = SnPb termination |

### DIMENSIONS in inches [millimeters]

| CASE CODE | H MAX.       | D MAX.       | T MAX.       | E ± 0.006 [0.15] | Ø 0.002 [0.05] (+10 %) |
|-----------|--------------|--------------|--------------|------------------|------------------------|
| A         | 0.287 [7.3]  | 0.185 [4.7]  | 0.165 [4.2]  | 0.100 [2.54]     | 0.020 [0.5]            |
| B         | 0.413 [10.5] | 0.287 [7.3]  | 0.189 [4.8]  | 0.200 [5.08]     | 0.020 [0.5]            |
| C         | 0.413 [10.5] | 0.484 [12.3] | 0.287 [7.3]  | 0.400 [10.16]    | 0.024 [0.6]            |
| D         | 0.413 [10.5] | 0.484 [12.3] | 0.484 [12.3] | 0.400 [10.16]    | 0.024 [0.6]            |

**RATINGS AND CASE CODES**

| C <sub>R</sub><br>(μF) | RATED VOLTAGE U <sub>R</sub> AT +85 °C     |      |       |      |      |      |      |      |      |      |      |      |      |      |      |       |
|------------------------|--------------------------------------------|------|-------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
|                        | 6.3 V                                      |      | 10 V  |      | 16 V |      | 20 V |      | 25 V |      | 35 V |      | 40 V |      | 50 V |       |
|                        | CATEGORY VOLTAGE U <sub>C</sub> AT +125 °C |      |       |      |      |      |      |      |      |      |      |      |      |      |      |       |
|                        | 4.0 V                                      |      | 6.3 V |      | 10 V |      | 13 V |      | 16 V |      | 23 V |      | 25 V |      | 32 V |       |
|                        | STD.                                       | EXT. | STD.  | EXT. | STD. | EXT. | STD. | EXT. | STD. | EXT. | STD. | EXT. | STD. | EXT. | STD. | EXT.  |
| 0.10                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      | A    |      | A     |
| 0.15                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      |      | A    | A     |
| 0.22                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      |      | A    | A     |
| 0.33                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      | A    |      |       |
| 0.47                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      | A    |      |       |
| 0.68                   |                                            |      |       |      |      |      |      |      |      |      |      |      |      |      |      | A     |
| 1.0                    |                                            |      |       |      |      |      |      |      |      |      |      |      |      | A    |      | A / B |
| 1.5                    |                                            |      |       |      |      |      |      |      | A    |      |      |      |      | B    |      | B     |
| 2.2                    |                                            |      |       |      | A    |      | A    |      |      |      |      |      |      | B    |      | B     |
| 3.3                    |                                            |      |       |      | A    |      |      |      |      |      |      | A    | B    | A    | B    |       |
| 4.7                    |                                            |      | A     |      |      |      |      |      |      | A    |      |      | B    |      | B    |       |
| 6.8                    | A                                          |      |       |      |      |      |      | A    |      |      |      |      | B    |      | C    |       |
| 10                     |                                            |      |       |      |      | A    |      |      | B    |      |      | B    | C    |      | C    |       |
| 15                     |                                            |      |       | A    | B    |      | B    |      |      | B    |      |      | C    |      | C    |       |
| 22                     |                                            | A    |       |      | B    |      |      | B    |      | B    |      |      | C    |      |      |       |
| 33                     |                                            |      | B     |      |      | B    |      |      | C    |      |      | C    |      | D    |      |       |
| 47                     |                                            | B    |       | B    | C    |      | C    |      |      | D    |      |      |      | D    |      |       |
| 68                     |                                            |      |       | B    | C    |      |      | C    |      |      |      |      |      |      |      |       |
| 100                    |                                            |      | C     |      | D    | C    | D    |      |      |      |      |      |      |      |      |       |
| 150                    | C                                          |      |       | C    |      | D    |      |      |      |      |      |      |      |      |      |       |
| 220                    |                                            | C    | D     |      |      |      |      |      |      |      |      |      |      |      |      |       |
| 330                    | D                                          |      |       |      |      |      |      |      |      |      |      |      |      |      |      |       |

**STANDARD RATINGS / EXTENDED RATINGS**

| CAPACITANCE<br>$C_R$ ( $\mu F$ )                                                    | CASE CODE | PART NUMBER                | MAX. DCL<br>AT +25 °C<br>( $\mu A$ ) | MAX. DF<br>120 Hz, AT +25 °C<br>(%) | MAX. IMPEDANCE<br>100 kHz, AT +25 °C<br>( $\Omega$ ) |
|-------------------------------------------------------------------------------------|-----------|----------------------------|--------------------------------------|-------------------------------------|------------------------------------------------------|
| $U_R = 6.3 V_{DC}$ AT +85 °C, SURGE = 8 V; $U_C = 4 V_{DC}$ AT +125 °C, SURGE = 5 V |           |                            |                                      |                                     |                                                      |
| 6.8                                                                                 | A         | 790D685X(1)6R3A2(2)        | 1.0                                  | 6                                   | 4.0                                                  |
| <b>22</b>                                                                           | <b>A</b>  | <b>790D226X(1)6R3A2(2)</b> | <b>1.3</b>                           | <b>6</b>                            | <b>2.1</b>                                           |
| 47                                                                                  | B         | 790D476X(1)6R3B2(2)        | 2.9                                  | 6                                   | 1.3                                                  |
| <b>68</b>                                                                           | <b>B</b>  | <b>790D686X(1)6R3B2(2)</b> | <b>4.2</b>                           | <b>6</b>                            | <b>1.3</b>                                           |
| 150                                                                                 | C         | 790D157X(1)6R3C2(2)        | 9.4                                  | 6                                   | 0.6                                                  |
| <b>220</b>                                                                          | <b>C</b>  | <b>790D227X(1)6R3C2(2)</b> | <b>13.8</b>                          | <b>6</b>                            | <b>0.6</b>                                           |
| 330                                                                                 | D         | 790D337X(1)6R3D2(2)        | 20.7                                 | 8                                   | 0.4                                                  |

**Notes**

- Part number definitions:
  - Insert 0 for  $\pm 20\%$  tolerance or 9 for  $\pm 10\%$
  - See Ordering Information, packaging code
- Extended ratings in bold print



| STANDARD RATINGS / EXTENDED RATINGS                                                                                |           |                            |                                     |                                     |                                                      |
|--------------------------------------------------------------------------------------------------------------------|-----------|----------------------------|-------------------------------------|-------------------------------------|------------------------------------------------------|
| CAPACITANCE<br>$C_R$ ( $\mu$ F)                                                                                    | CASE CODE | PART NUMBER                | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>120 Hz, AT +25 °C<br>(%) | MAX. IMPEDANCE<br>100 kHz, AT +25 °C<br>( $\Omega$ ) |
| <b><math>U_R = 10 V_{DC}</math> AT +85 °C, SURGE = 13 V; <math>U_C = 6.3 V_{DC}</math> AT +125 °C, SURGE = 8 V</b> |           |                            |                                     |                                     |                                                      |
| 4.7                                                                                                                | A         | 790D475X(1)010A2(2)        | 1.0                                 | 6                                   | 4.0                                                  |
| <b>15</b>                                                                                                          | <b>A</b>  | <b>790D156X(1)010A2(2)</b> | <b>1.5</b>                          | <b>6</b>                            | <b>2.5</b>                                           |
| 33                                                                                                                 | B         | 790D336X(1)010B2(2)        | 3.3                                 | 6                                   | 1.3                                                  |
| <b>47</b>                                                                                                          | <b>B</b>  | <b>790D476X(1)010B2(2)</b> | <b>4.7</b>                          | <b>6</b>                            | <b>1.4</b>                                           |
| <b>68</b>                                                                                                          | <b>B</b>  | <b>790D686X(1)010B2(2)</b> | <b>6.8</b>                          | <b>6</b>                            | <b>1.3</b>                                           |
| 100                                                                                                                | C         | 790D107X(1)010C2(2)        | 10.0                                | 6                                   | 0.6                                                  |
| <b>150</b>                                                                                                         | <b>C</b>  | <b>790D157X(1)010C2(2)</b> | <b>15.0</b>                         | <b>6</b>                            | <b>0.6</b>                                           |
| 220                                                                                                                | D         | 790D227X(1)010D2(2)        | 22.0                                | 8                                   | 0.4                                                  |
| <b><math>U_R = 16 V_{DC}</math> AT +85 °C, SURGE = 20 V; <math>U_C = 10 V_{DC}</math> AT +125 °C, SURGE = 13 V</b> |           |                            |                                     |                                     |                                                      |
| 2.2                                                                                                                | A         | 790D225X(1)016A2(2)        | 1.0                                 | 6                                   | 5.5                                                  |
| 3.3                                                                                                                | A         | 790D335X(1)016A2(2)        | 1.0                                 | 6                                   | 4.4                                                  |
| <b>10</b>                                                                                                          | <b>A</b>  | <b>790D106X(1)016A2(2)</b> | <b>1.6</b>                          | <b>6</b>                            | <b>2.7</b>                                           |
| 15                                                                                                                 | B         | 790D156X(1)016B2(2)        | 2.4                                 | 6                                   | 1.6                                                  |
| 22                                                                                                                 | B         | 790D226X(1)016B2(2)        | 3.5                                 | 6                                   | 1.3                                                  |
| <b>33</b>                                                                                                          | <b>B</b>  | <b>790D336X(1)016B2(2)</b> | <b>5.2</b>                          | <b>6</b>                            | <b>1.6</b>                                           |
| 47                                                                                                                 | C         | 790D476X(1)016C2(2)        | 7.5                                 | 6                                   | 0.8                                                  |
| 68                                                                                                                 | C         | 790D686X(1)016C2(2)        | 10.8                                | 6                                   | 0.6                                                  |
| <b>100</b>                                                                                                         | <b>C</b>  | <b>790D107X(1)016C2(2)</b> | <b>16.0</b>                         | <b>6</b>                            | <b>0.7</b>                                           |
| 100                                                                                                                | D         | 790D107X(1)016D2(2)        | 16.0                                | 6                                   | 0.5                                                  |
| 150                                                                                                                | D         | 790D157X(1)016D2(2)        | 24.0                                | 8                                   | 0.4                                                  |
| <b><math>U_R = 20 V_{DC}</math> AT +85 °C, SURGE = 26 V; <math>U_C = 13 V_{DC}</math> AT +125 °C, SURGE = 16 V</b> |           |                            |                                     |                                     |                                                      |
| 2.2                                                                                                                | A         | 790D225X(1)020A2(2)        | 1.0                                 | 6                                   | 5.5                                                  |
| <b>6.8</b>                                                                                                         | <b>A</b>  | <b>790D685X(1)020A2(2)</b> | <b>1.3</b>                          | <b>6</b>                            | <b>3.5</b>                                           |
| 15                                                                                                                 | B         | 790D156X(1)020B2(2)        | 3.0                                 | 6                                   | 1.5                                                  |
| <b>22</b>                                                                                                          | <b>B</b>  | <b>790D226X(1)020B2(2)</b> | <b>4.4</b>                          | <b>6</b>                            | <b>2.1</b>                                           |
| 47                                                                                                                 | C         | 790D476X(1)020C2(2)        | 9.4                                 | 6                                   | 0.7                                                  |
| <b>68</b>                                                                                                          | <b>C</b>  | <b>790D686X(1)020C2(2)</b> | <b>13.6</b>                         | <b>6</b>                            | <b>0.8</b>                                           |
| 100                                                                                                                | D         | 790D107X(1)020D2(2)        | 20.0                                | 6                                   | 0.7                                                  |
| <b><math>U_R = 25 V_{DC}</math> AT +85 °C, SURGE = 32 V; <math>U_C = 16 V_{DC}</math> AT +125 °C, SURGE = 20 V</b> |           |                            |                                     |                                     |                                                      |
| 1.5                                                                                                                | A         | 790D155X(1)025A2(2)        | 1.0                                 | 6                                   | 6.0                                                  |
| <b>4.7</b>                                                                                                         | <b>A</b>  | <b>790D475X(1)025A2(2)</b> | <b>1.1</b>                          | <b>6</b>                            | <b>4.5</b>                                           |
| 10                                                                                                                 | B         | 790D106X(1)025B2(2)        | 2.5                                 | 6                                   | 1.6                                                  |
| <b>15</b>                                                                                                          | <b>B</b>  | <b>790D156X(1)025B2(2)</b> | <b>3.7</b>                          | <b>6</b>                            | <b>2.4</b>                                           |
| <b>22</b>                                                                                                          | <b>B</b>  | <b>790D226X(1)025B2(2)</b> | <b>5.5</b>                          | <b>6</b>                            | <b>2.1</b>                                           |
| 33                                                                                                                 | C         | 790D336X(1)025C2(2)        | 8.2                                 | 6                                   | 0.8                                                  |
| 47                                                                                                                 | D         | 790D476X(1)025D2(2)        | 11.8                                | 6                                   | 1.0                                                  |
| <b><math>U_R = 35 V_{DC}</math> AT +85 °C, SURGE = 45 V; <math>U_C = 23 V_{DC}</math> AT +125 °C, SURGE = 29 V</b> |           |                            |                                     |                                     |                                                      |
| <b>3.3</b>                                                                                                         | <b>A</b>  | <b>790D335X(1)035A2(2)</b> | <b>1.2</b>                          | <b>6</b>                            | <b>6.0</b>                                           |
| <b>10</b>                                                                                                          | <b>B</b>  | <b>790D106X(1)035B2(2)</b> | <b>3.5</b>                          | <b>6</b>                            | <b>2.6</b>                                           |
| <b>33</b>                                                                                                          | <b>C</b>  | <b>790D336X(1)035C2(2)</b> | <b>11.6</b>                         | <b>6</b>                            | <b>1.3</b>                                           |

## Notes

- Part number definitions:
  - Insert 0 for  $\pm 20$  % tolerance or 9 for  $\pm 10$  %
  - See Ordering Information, packaging code
- Extended ratings in bold print



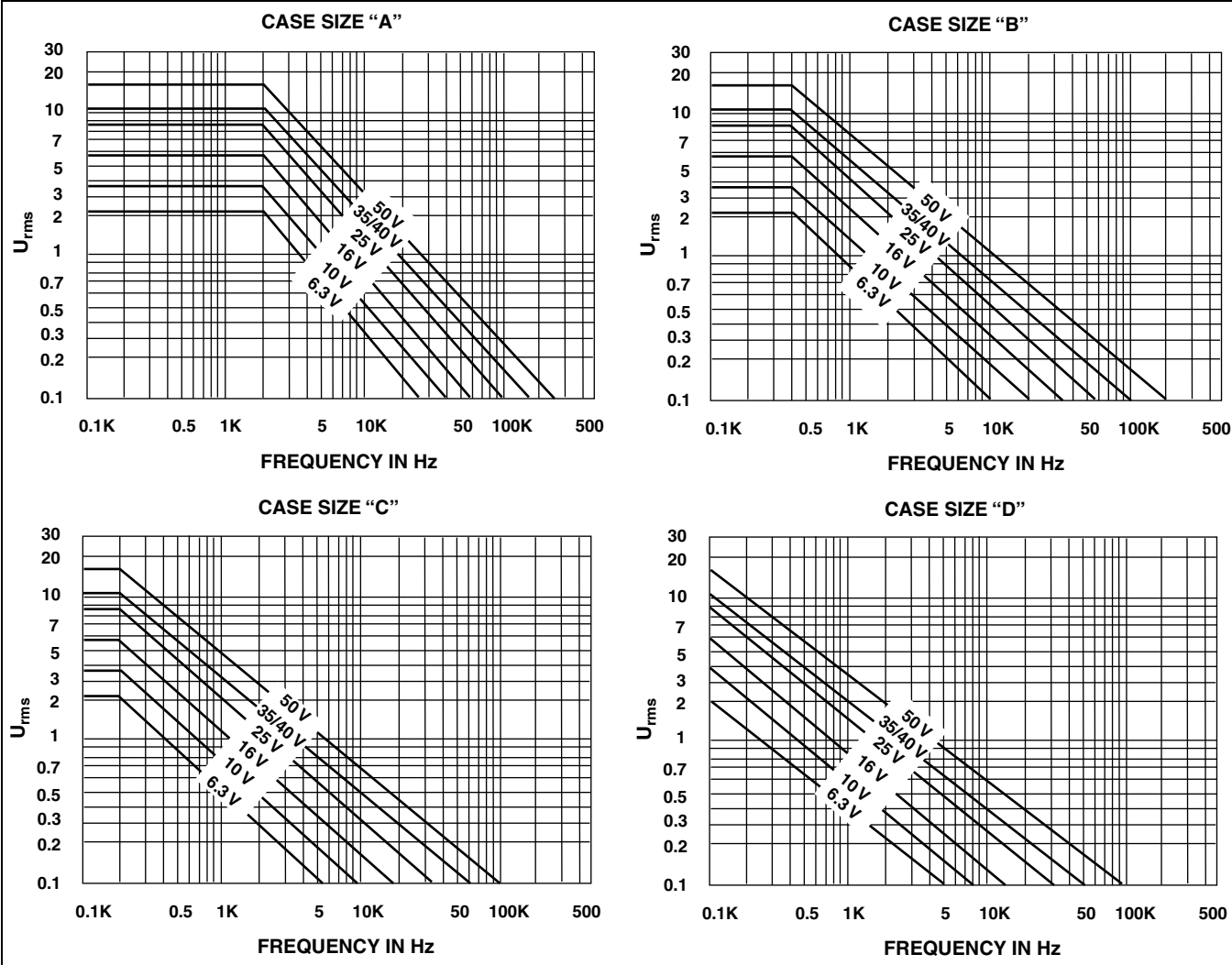
| STANDARD RATINGS / EXTENDED RATINGS                                                                                |           |                     |                                     |                                     |                                                      |
|--------------------------------------------------------------------------------------------------------------------|-----------|---------------------|-------------------------------------|-------------------------------------|------------------------------------------------------|
| CAPACITANCE<br>$C_R$ ( $\mu$ F)                                                                                    | CASE CODE | PART NUMBER         | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>120 Hz, AT +25 °C<br>(%) | MAX. IMPEDANCE<br>100 kHz, AT +25 °C<br>( $\Omega$ ) |
| <b><math>U_R = 40 V_{DC}</math> AT +85 °C, SURGE = 52 V; <math>U_C = 25 V_{DC}</math> AT +125 °C, SURGE = 32 V</b> |           |                     |                                     |                                     |                                                      |
| 0.10                                                                                                               | A         | 790D104X(1)040A2(2) | 1.0                                 | 6                                   | 30.0                                                 |
| 0.15                                                                                                               | A         | 790D154X(1)040A2(2) | 1.0                                 | 6                                   | 24.0                                                 |
| 0.22                                                                                                               | A         | 790D224X(1)040A2(2) | 1.0                                 | 6                                   | 18.0                                                 |
| 0.33                                                                                                               | A         | 790D334X(1)040A2(2) | 1.0                                 | 6                                   | 14.0                                                 |
| 0.47                                                                                                               | A         | 790D474X(1)040A2(2) | 1.0                                 | 6                                   | 11.0                                                 |
| 1.0                                                                                                                | A         | 790D105X(1)040A2(2) | 1.0                                 | 6                                   | 6.5                                                  |
| 1.5                                                                                                                | B         | 790D155X(1)040B2(2) | 1.0                                 | 6                                   | 5.2                                                  |
| 2.2                                                                                                                | B         | 790D225X(1)040B2(2) | 1.0                                 | 6                                   | 4.0                                                  |
| 3.3                                                                                                                | A         | 790D335X(1)040A2(2) | 1.3                                 | 6                                   | 2.8                                                  |
| 3.3                                                                                                                | B         | 790D335X(1)040B2(2) | 1.3                                 | 6                                   | 2.8                                                  |
| 4.7                                                                                                                | B         | 790D475X(1)040B2(2) | 1.8                                 | 6                                   | 2.0                                                  |
| 6.8                                                                                                                | B         | 790D685X(1)040B2(2) | 2.7                                 | 6                                   | 1.6                                                  |
| 10                                                                                                                 | C         | 790D106X(1)040C2(2) | 4.0                                 | 6                                   | 1.3                                                  |
| 15                                                                                                                 | C         | 790D156X(1)040C2(2) | 6.0                                 | 6                                   | 1.0                                                  |
| 22                                                                                                                 | C         | 790D226X(1)040C2(2) | 8.8                                 | 6                                   | 0.8                                                  |
| 33                                                                                                                 | D         | 790D336X(1)040D2(2) | 13.2                                | 6                                   | 0.6                                                  |
| 47                                                                                                                 | D         | 790D476X(1)040D2(2) | 18.8                                | 6                                   | 0.5                                                  |
| <b><math>U_R = 50 V_{DC}</math> AT +85 °C, SURGE = 65 V; <math>U_C = 32 V_{DC}</math> AT +125 °C, SURGE = 41 V</b> |           |                     |                                     |                                     |                                                      |
| 0.10                                                                                                               | A         | 790D104X(1)050A2(2) | 1.0                                 | 6                                   | 30                                                   |
| 0.15                                                                                                               | A         | 790D154X(1)050A2(2) | 1.0                                 | 6                                   | 24                                                   |
| 0.22                                                                                                               | A         | 790D224X(1)050A2(2) | 1.0                                 | 6                                   | 18                                                   |
| 0.68                                                                                                               | A         | 790D684X(1)050A2(2) | 1.0                                 | 6                                   | 8.0                                                  |
| 1.0                                                                                                                | A         | 790D105X(1)050A2(2) | 1.0                                 | 6                                   | 6.5                                                  |
| 1.0                                                                                                                | B         | 790D105X(1)050B2(2) | 1.0                                 | 6                                   | 6.5                                                  |
| 1.5                                                                                                                | B         | 790D155X(1)050B2(2) | 1.0                                 | 6                                   | 5.2                                                  |
| 2.2                                                                                                                | B         | 790D225X(1)050B2(2) | 1.1                                 | 6                                   | 4.0                                                  |
| 3.3                                                                                                                | B         | 790D335X(1)050B2(2) | 1.6                                 | 6                                   | 2.8                                                  |
| 4.7                                                                                                                | B         | 790D475X(1)050B2(2) | 2.3                                 | 6                                   | 2.0                                                  |
| 6.8                                                                                                                | C         | 790D685X(1)050C2(2) | 3.4                                 | 6                                   | 1.6                                                  |
| 10                                                                                                                 | C         | 790D106X(1)050C2(2) | 5.0                                 | 6                                   | 1.3                                                  |
| 15                                                                                                                 | C         | 790D156X(1)050C2(2) | 7.5                                 | 6                                   | 1.0                                                  |

**Notes**

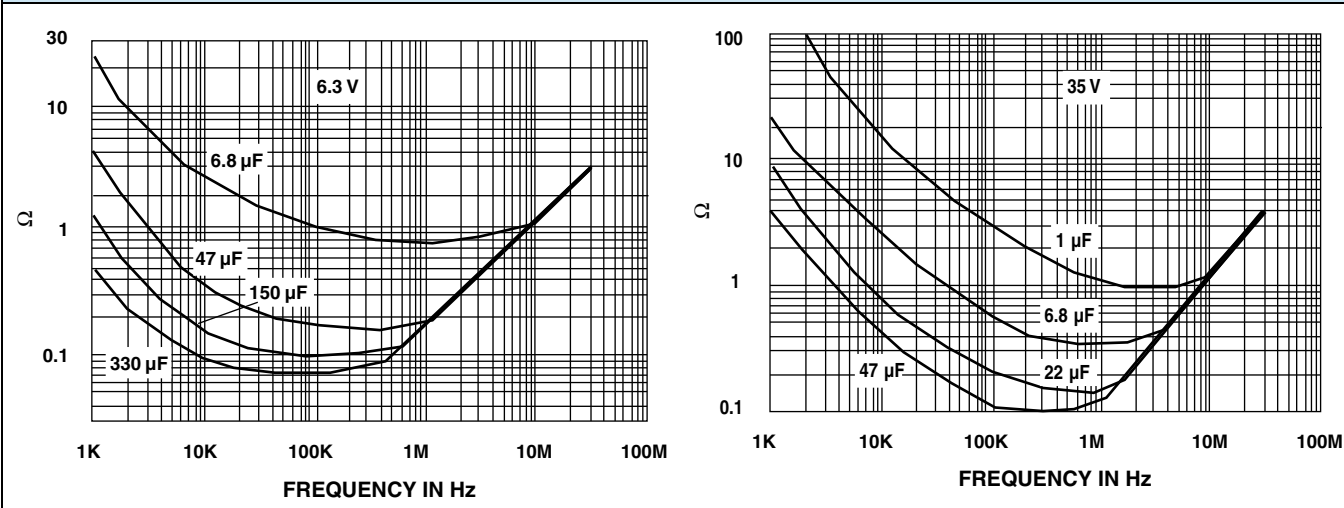
- Part number definitions:
  - Insert 0 for  $\pm 20$  % tolerance or 9 for  $\pm 10$  %
  - See Ordering Information, packaging code
- Extended ratings in bold print



### MAXIMUM PERMISSIBLE RIPPLE VOLTAGE AT +25 °C



### TYPICAL CURVES OF IMPEDANCE VS FREQUENCY



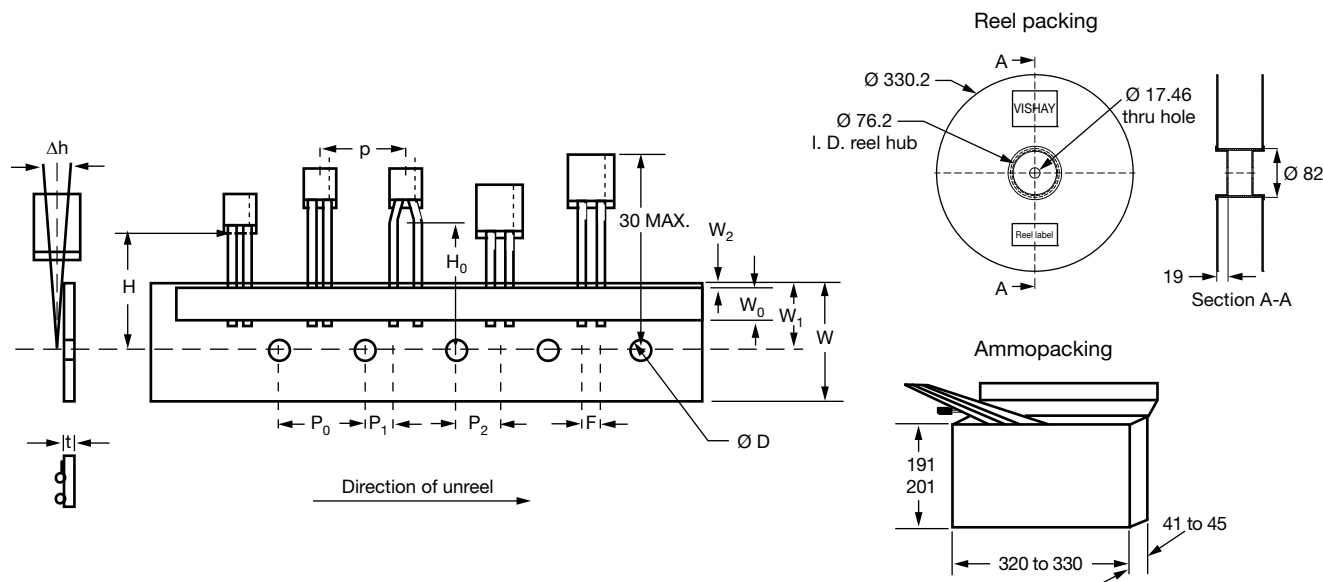
**PACKAGING QUANTITIES**

| CASE CODE | TAPE AND REEL | AMMO | BULK |
|-----------|---------------|------|------|
| A         | 1000          | 1000 | 500  |
| B         | 1000          | 1000 | 250  |
| C         | 300           | 300  | 100  |
| D         | 200           | 200  | 50   |

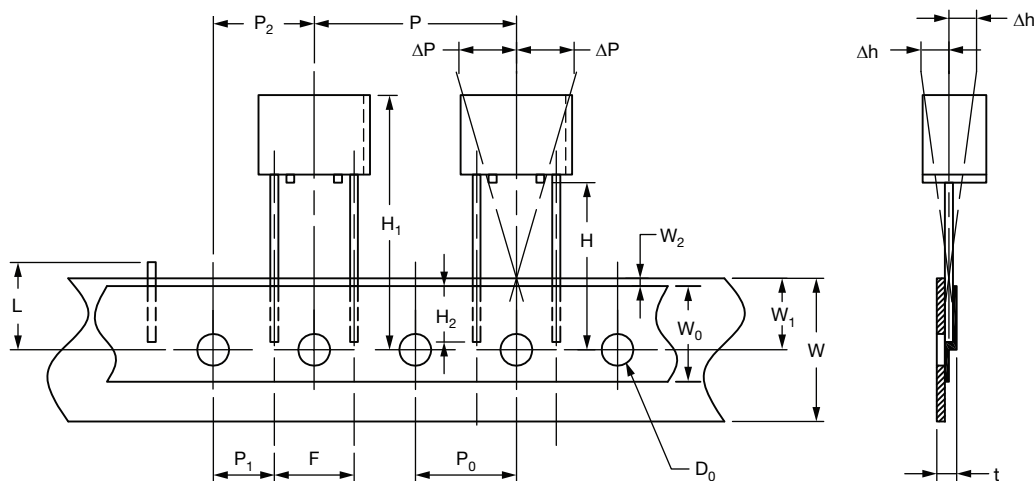
**PERFORMANCE CHARACTERISTICS**

- Operating Temperature:** -55 °C to +85 °C with rated voltage  $U_R$  applied. +85 °C to 125 °C with linear voltage derating to category voltage  $U_C$  (see general information) applied.
- Capacitance and Tolerance:** capacitance measured at 100 Hz and +25 °C shall be within the specified tolerance limits of the nominal rating.
- Reverse Voltage:** 15 % of rated voltage at +25 °C  
5 % of rated voltage at +85 °C
- Surge Voltage:** 130 % of  $U_R$  at +85 °C  
130 % of  $U_C$  at +125 °C
- Impedance at 100 kHz:** measured at +20 °C  $\pm$  5 °C, impedance shall not exceed the values listed in datasheet.
- Stability at low and high temperatures:** capacitance change with temperature, dissipation factor and DC leakage current shall not exceed the limits of the following table.
- Life Test:** 2000 h at +85 °C with rated voltage applied  
2000 h at +125 °C with category voltage applied  
 $\Delta C/C \leq 10$  % of initial value  
 $IL \leq 1.25$  initial limit  
 $DF \leq$  initial limit
- Humidity Test:** 56 days at +40 °C, 90 % relative humidity  
 $\Delta C/C \leq 8$  % of initial value  
 $IL \leq$  initial limit  
 $DF \leq$  initial limit
- Charge and Discharge Test:**  
1 million cycles at +85 °C,  
0.5 s charge at  $U_R$   
0.5 s discharge  
Series resistance < 0.5  $\Omega$   
 $\Delta C/C \leq 5$  % of initial value  
 $IL \leq$  initial limit  
 $DF \leq$  initial limit
- Marking:**  
Top: Rating and polarity  
Front: Type, date code, Vishay identification

| TEMP.   | CAPACITANCE CHANGE | DISSIPATION FACTOR<br>$C_R U_R \leq 1900$<br>$C_R U_R > 1900$ | LEAKAGE CURRENT<br>$I_L$                                              |
|---------|--------------------|---------------------------------------------------------------|-----------------------------------------------------------------------|
| -55 °C  | -10 %              | 9 %                                                           | -                                                                     |
|         |                    | 11 %                                                          |                                                                       |
| +25 °C  | -                  | 6 %                                                           | 0.01 x $C_R$ x $U_R$ or<br>1 $\mu A$ , whichever<br>is greater        |
|         |                    | 8 %                                                           |                                                                       |
| +85 °C  | +12 %              | 9 %                                                           | 0.1 x $C_R$ x $U_R$ or<br>10 $\mu A$ , whichever<br>is greater        |
|         |                    | 11 %                                                          |                                                                       |
| +125 °C | +15 %              | 12 %                                                          | 0.125 x $C_R$ x $U_R$<br>or 12.5 $\mu A$ ,<br>whichever<br>is greater |
|         |                    | 14 %                                                          |                                                                       |

**TAPE AND REEL PACKING (Case A and B - meets IEC 286-2)**


| DESIGNATIONS                                         | SYMBOL         | DIMENSIONS (mm)                  |                                |                                |
|------------------------------------------------------|----------------|----------------------------------|--------------------------------|--------------------------------|
| Pitch of component                                   | P              | 12.7 ± 1.0                       |                                |                                |
| Feed hole pitch                                      | P <sub>0</sub> | 12.7 ± 0.3                       |                                |                                |
| Tape width                                           | W              | 18 (+ 1/- 0.5)                   |                                |                                |
| Hold down tape width                                 | W <sub>0</sub> | 12                               |                                |                                |
| Hole position                                        | W <sub>1</sub> | 9 (+ 0.75/-0.5)                  |                                |                                |
| Hold down tape position                              | W <sub>2</sub> | 0 (+ 3/-0)                       |                                |                                |
| Feed hole diameter                                   | D <sub>0</sub> | 4.0 ± 0.3                        |                                |                                |
| Tape thickness                                       | T              | 0.5 ± 0.2                        |                                |                                |
| Component alignment                                  | Δh             | 0 ± 2                            |                                |                                |
| Lead clinch height                                   | H <sub>0</sub> | 16.0 ± 0.5                       |                                |                                |
| Hole center to component center                      | P <sub>2</sub> | 6.35 ± 1.3                       |                                |                                |
| Lead wire spacing<br>Feed hole center to wire center | F              | <b>CASE A</b><br>2.5 + 0.6/- 0.1 | <b>CASE A</b><br>5 + 0.6/- 0.1 | <b>CASE B</b><br>5 + 0.6/- 0.1 |
|                                                      | P <sub>1</sub> | 5.1 ± 0.7                        | 3.85 ± 0.7                     | 3.85 ± 0.7                     |
| Reel pack options                                    | H = 16.5       | X                                | Z                              | X                              |
|                                                      | H = 18.5       | Y                                |                                | Y                              |
| Ammopack options                                     | H = 16.5       | G                                | I                              | G                              |
|                                                      | H = 18.5       | H                                |                                | H                              |

**TAPE AND REEL PACKING (Case C and D)**


| DESIGNATIONS                            | SYMBOL               | DIMENSIONS (mm)      |               |
|-----------------------------------------|----------------------|----------------------|---------------|
| Pitch of component                      | P                    | 25.4 ± 1.0           |               |
| Feed hole pitch                         | P <sub>0</sub>       | 12.7 ± 0.3           |               |
| Tape width                              | W                    | 18.0 (+ 1/- 0.5)     |               |
| Hold down tape width                    | W <sub>0</sub>       | 12                   |               |
| Hole position                           | W <sub>1</sub>       | 9.0 (+ 0.75/- 0.5)   |               |
| Hold down tape position                 | W <sub>2</sub>       | 0 (+ 3/- 0)          |               |
| Maximum height of components            | H <sub>1</sub>       | 32 max.              |               |
| Tolerance of positioning parts sideways | ΔP                   | 0 ± 1.0              |               |
| Feed hole diameter                      | D <sub>0</sub>       | 4.0 ± 0.3            |               |
| Tape thickness                          | t                    | 0.5 ± 0.2            |               |
| Component alignment                     | Δh                   | 0 ± 2                |               |
| Cut out length                          | L                    | 11 max.              |               |
| Lead wire spacing                       | F                    | 10.16 + 0.6/- 0.1    |               |
| Feed hole center to wire center         | P <sub>1</sub>       | 7.62 ± 0.7           |               |
| Hole center to component center         | P <sub>2</sub>       | 12.7 ± 1.0           |               |
| Length of leads under adhesive tape     | H <sub>2</sub>       | 5.0 min. to 9.0 max. |               |
| Reel pack options                       | H = 16.5<br>H = 18.5 | <b>CASE C</b>        | <b>CASE D</b> |
|                                         |                      | X<br>Y               | X<br>Y        |
| Ammopack options                        | H = 16.5<br>H = 18.5 | G<br>H               | G<br>H        |

**PRODUCT INFORMATION**

|                                                                                |                                                                        |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 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> |
| Mounting of Through-Hole Components                                            | <a href="http://www.vishay.com/doc?40108">www.vishay.com/doc?40108</a> |
| Frequently Asked Questions                                                     | <a href="http://www.vishay.com/doc?40110">www.vishay.com/doc?40110</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> |



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