



## Solid-Electrolyte TANTALEX™ Capacitors, Hermetically Sealed, Axial-Lead, CECC Approved



### PERFORMANCE CHARACTERISTICS

#### Operating Temperature:

-55 °C to +85 °C (types CTS13)

-55 °C to +125 °C (types CTS1, 749DX)

### SPECIFICATIONS

#### CECC

30201-001

30201-002 CTS1

30201-005 CTS13

30201-029 749DX

#### BS

749DX 9073-N001 749DX

### FEATURES

- Terminations: tin / lead (SnPb), 100 % tin (RoHS-compliant)
- Hermetically sealed metal case with plastic film insulation
- Extended capacitance range (type 749DX)
- High operational stability with both time and temperature
- Low leakage current
- Low dissipation factor
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

RoHS\*  
AvailableHALOGEN  
**FREE**  
GREEN  
(5-2008)  
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

### APPLICATIONS

Performance and reliability has been proven in a wide range of applications such as: filtering, by-pass, coupling, energy storage, timing circuits.

### ORDERING INFORMATION

| CTS13<br>TYPE                                                                                                                                   | 105<br>CAPACITANCE                                                                                             | X0<br>CAPACITANCE<br>TOLERANCE                                            | 040<br>DC VOLTAGE RATING<br>AT +85 °C                                                                                 | A<br>CASE<br>CODE                 | 2<br>STYLE<br>NUMBER                         | P<br>PACKAGING              | E3<br>RoHS-<br>COMPLIANT                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------|-----------------------------|-------------------------------------------------------------------------|
| Identifies the basic capacitor design<br>CTS1 =<br>CECC 30201-002<br>CTS13 =<br>CECC 30201-005<br>749DX =<br>CECC 30201-001 /<br>CECC 30201-029 | Expressed in picofarads.<br>First two digits are significant.<br>Third digit is the number of zeros following. | X0 = $\pm 20\%$<br>X9 = $\pm 10\%$<br>X5 = $\pm 5\%$ *<br>* Special order | Expressed in volts.<br>Where necessary, zeros precede the voltage rating to complete the 3 digit block<br>6R3 = 6.3 V | See Ratings and Case Codes table. | 0 = bare case<br>2 = plastic-film insulation | See Tape and Reel Packaging | E3 = 100 % tin termination (RoHS-compliant)<br>Blank = SnPb termination |

### DIMENSIONS in inches [millimeters]

| CASE CODE | $L_1 \pm 0.031$ [0.79] | J max.       | D max.      | LEAD DIAMETER<br>+ 10 %, - 0.05 |
|-----------|------------------------|--------------|-------------|---------------------------------|
| A         | 0.286 [7.26]           | 0.402 [10.2] | 0.141 [3.6] | 0.020 [0.5]                     |
| B         | 0.474 [12.04]          | 0.590 [15.0] | 0.192 [4.9] | 0.020 [0.5]                     |
| C         | 0.686 [17.42]          | 0.807 [20.5] | 0.295 [7.5] | 0.025 [0.6]                     |
| D         | 0.786 [19.96]          | 0.945 [24.0] | 0.364 [9.1] | 0.025 [0.6]                     |



| RATINGS AND CASE CODES - TYPE CTS1 |                                           |       |      |      |      |      |      |
|------------------------------------|-------------------------------------------|-------|------|------|------|------|------|
| C <sub>R</sub><br>(μF)             | RATED VOLTAGE U <sub>R</sub> (+85 °C)     |       |      |      |      |      |      |
|                                    | 6.3 V                                     | 10 V  | 16 V | 25 V | 40 V | 50 V | 63 V |
|                                    | CATEGORY VOLTAGE U <sub>C</sub> (+125 °C) |       |      |      |      |      |      |
|                                    | 4 V                                       | 6.3 V | 10 V | 13 V | 25 V | 33 V | 40 V |
| 0.10                               |                                           |       |      |      |      |      | A    |
| 0.12                               |                                           |       |      |      |      |      | A    |
| 0.15                               |                                           |       |      |      |      |      | A    |
| 0.18                               |                                           |       |      |      |      |      | A    |
| 0.22                               |                                           |       |      |      |      |      | A    |
| 0.27                               |                                           |       |      |      |      | A    | A    |
| 0.33                               |                                           |       |      |      |      | A    | A    |
| 0.39                               |                                           |       |      |      |      | A    | A    |
| 0.47                               |                                           |       |      |      | A    | A    | A    |
| 0.56                               |                                           |       |      |      | A    | A    | A    |
| 0.68                               |                                           |       |      |      | A    | A    | A    |
| 0.82                               |                                           |       |      |      | A    | A    | B    |
| 1.0                                |                                           |       |      |      | A    | A    | B    |
| 1.2                                |                                           |       |      |      | A    | B    | B    |
| 1.5                                |                                           |       |      | A    | B    | B    | B    |
| 1.8                                |                                           |       | A    |      | B    | B    | B    |
| 2.2                                |                                           |       | A    |      | B    | B    | B    |
| 2.7                                |                                           |       | A    |      | B    | B    | B    |
| 3.3                                |                                           |       | A    |      | B    | B    | B    |
| 3.9                                |                                           | A     |      |      | B    | B    | B    |
| 4.7                                |                                           | A     |      |      | B    | B    | C    |
| 5.6                                | A                                         |       |      |      | B    | C    | C    |
| 6.8                                | A                                         |       |      |      | B    | C    | C    |
| 8.2                                |                                           |       |      | B    | C    | C    | C    |
| 10                                 |                                           |       |      | B    | C    | C    | C    |
| 12                                 |                                           |       | B    |      | C    | C    | D    |
| 15                                 |                                           |       | B    |      | C    | C    | D    |
| 18                                 |                                           |       | B    |      | C    | C    | D    |
| 22                                 |                                           |       | B    |      | C    | D    |      |
| 27                                 |                                           | B     |      | C    | D    |      |      |
| 33                                 |                                           | B     |      | C    | D    |      |      |
| 39                                 | B                                         |       | C    |      | D    |      |      |
| 47                                 | B                                         |       | C    |      | D    |      |      |
| 56                                 | B                                         |       | C    | D    |      |      |      |
| 68                                 |                                           |       | C    | D    |      |      |      |
| 82                                 |                                           | C     | D    |      |      |      |      |
| 100                                |                                           | C     | D    |      |      |      |      |
| 120                                | C                                         |       | D    |      |      |      |      |
| 150                                | C                                         |       | D    |      |      |      |      |
| 180                                |                                           | D     |      |      |      |      |      |
| 220                                |                                           | D     |      |      |      |      |      |
| 270                                | D                                         |       |      |      |      |      |      |
| 330                                | D                                         |       |      |      |      |      |      |



| RATINGS AND CASE CODES - TYPE CTS13 |                                       |      |      |      |      |      |      |      |
|-------------------------------------|---------------------------------------|------|------|------|------|------|------|------|
| C <sub>R</sub><br>(μF)              | RATED VOLTAGE U <sub>R</sub> (+85 °C) |      |      |      |      |      |      |      |
|                                     | 6.3 V                                 | 10 V | 16 V | 20 V | 25 V | 40 V | 50 V | 63 V |
| 0.10                                |                                       |      |      |      |      |      |      | A    |
| 0.12                                |                                       |      |      |      |      |      |      | A    |
| 0.15                                |                                       |      |      |      |      |      |      | A    |
| 0.18                                |                                       |      |      |      |      |      |      | A    |
| 0.22                                |                                       |      |      |      |      |      |      | A    |
| 0.27                                |                                       |      |      |      |      |      | A    | A    |
| 0.33                                |                                       |      |      |      |      |      | A    | A    |
| 0.39                                |                                       |      |      |      |      |      | A    | A    |
| 0.47                                |                                       |      |      |      |      | A    | A    | A    |
| 0.56                                |                                       |      |      |      |      | A    | A    | A    |
| 0.68                                |                                       |      |      |      |      | A    | A    | A    |
| 0.82                                |                                       |      |      |      |      | A    | A    | B    |
| 1.0                                 |                                       |      |      |      |      | A    | A    | B    |
| 1.2                                 |                                       |      |      |      | A    | A    | B    | B    |
| 1.5                                 |                                       |      |      |      | A    | B    | B    | B    |
| 1.8                                 |                                       |      |      | A    |      | B    | B    | B    |
| 2.2                                 |                                       |      |      | A    |      | B    | B    | B    |
| 2.7                                 |                                       |      | A    |      |      | B    | B    | B    |
| 3.3                                 |                                       |      | A    |      |      | B    | B    | B    |
| 3.9                                 |                                       | A    |      |      |      | B    | B    | B    |
| 4.7                                 |                                       | A    |      |      |      | B    | B    | C    |
| 5.6                                 | A                                     |      |      |      |      | B    | C    | C    |
| 6.8                                 | A                                     |      |      |      |      | B    | C    | C    |
| 8.2                                 |                                       |      |      |      | B    | C    | C    | C    |
| 10                                  |                                       |      |      |      | B    | C    | C    | C    |
| 12                                  |                                       |      |      | B    |      | C    | C    | D    |
| 15                                  |                                       |      |      | B    |      | C    | C    | D    |
| 18                                  |                                       |      | B    |      |      | C    | C    | D    |
| 22                                  |                                       |      | B    |      |      | C    | D    |      |
| 27                                  |                                       | B    |      |      | C    | D    |      |      |
| 33                                  |                                       | B    |      |      | C    | D    |      |      |
| 39                                  | B                                     |      |      | C    |      | D    |      |      |
| 47                                  | B                                     |      |      | C    |      | D    |      |      |
| 56                                  | B                                     |      | C    |      | D    |      |      |      |
| 68                                  |                                       |      | C    |      | D    |      |      |      |
| 82                                  |                                       | C    |      | D    |      |      |      |      |
| 100                                 |                                       | C    |      | D    |      |      |      |      |
| 120                                 | C                                     |      | D    |      |      |      |      |      |
| 150                                 | C                                     |      | D    |      |      |      |      |      |
| 180                                 |                                       | D    |      |      |      |      |      |      |
| 220                                 |                                       | D    |      |      |      |      |      |      |
| 270                                 | D                                     |      |      |      |      |      |      |      |
| 330                                 | D                                     |      |      |      |      |      |      |      |

**RATINGS AND CASE CODES - TYPE 749DX**

| C <sub>R</sub><br>(μF) | RATED VOLTAGE U <sub>R</sub> (+85 °C)     |       |      |      |      |      |      |      |      |
|------------------------|-------------------------------------------|-------|------|------|------|------|------|------|------|
|                        | 6.3 V                                     | 10 V  | 16 V | 20 V | 25 V | 35 V | 40 V | 50 V | 63 V |
|                        | CATEGORY VOLTAGE U <sub>C</sub> (+125 °C) |       |      |      |      |      |      |      |      |
|                        | 4 V                                       | 6.3 V | 10 V | 13 V | 16 V | 23 V | 25 V | 33 V | 40 V |
| 0.068                  |                                           |       |      |      |      |      |      |      |      |
| 0.10                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.12                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.15                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.18                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.22                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.27                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.33                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.39                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.47                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.56                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.68                   |                                           |       |      |      |      | A    | A    |      | A    |
| 0.82                   |                                           |       |      |      |      | A    | A    | A    | B    |
| 1.0                    |                                           |       |      |      |      | A    | A    | A    | B    |
| 1.2                    |                                           |       |      |      | A    | B    | B    | B    | B    |
| 1.5                    |                                           |       |      |      | A    | B    | B    | B    | B    |
| 1.8                    |                                           |       |      | A    |      | B    | B    | B    | B    |
| 2.2                    |                                           |       |      | A    |      | B    | B    | B    | B    |
| 2.7                    |                                           |       | A    |      |      | B    | B    | B    | B    |
| 3.3                    |                                           |       | A    |      |      | B    | B    | B    | B    |
| 3.9                    |                                           | A     |      |      |      | B    | B    | B    | B    |
| 4.7                    |                                           | A     |      |      |      | B    | B    | B    | C    |
| 5.6                    | A                                         |       |      |      |      | B    | B    | C    | C    |
| 6.8                    | A                                         |       |      |      |      | B    | B    | C    | C    |
| 8.2                    |                                           |       |      |      | B    | C    | C    | C    | C    |
| 10                     |                                           |       |      |      | B    | C    | C    | C    | C    |
| 12                     |                                           |       |      | B    |      | C    | C    | C    | D    |
| 15                     |                                           |       |      | B    |      | C    | C    | C    | D    |
| 18                     |                                           |       | B    |      |      | C    | C    | C    | D    |
| 22                     |                                           |       | B    |      |      | C    | C    | D    |      |
| 27                     |                                           | B     |      |      | C    | D    | D    |      |      |
| 33                     |                                           | B     |      |      | C    | D    | D    |      |      |
| 39                     |                                           | B     |      | C    |      | D    | D    |      |      |
| 47                     | B                                         |       |      | C    |      | D    |      |      |      |
| 56                     | B                                         |       | C    |      | D    | D    |      |      |      |
| 68                     |                                           |       | C    |      | D    |      |      |      |      |
| 82                     |                                           | C     |      | D    |      |      |      |      |      |
| 100                    |                                           | C     |      | D    |      |      |      |      |      |
| 120                    |                                           | C     | D    |      |      |      |      |      |      |
| 150                    | C                                         |       | D    |      |      |      |      |      |      |
| 180                    | C                                         | D     |      |      |      |      |      |      |      |
| 220                    |                                           | D     |      |      |      |      |      |      |      |
| 270                    | D                                         |       |      |      |      |      |      |      |      |
| 330                    | D                                         |       |      |      |      |      |      |      |      |

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|-------------------------------------------------------------------|-----------|----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>6.3 V<sub>DC</sub> AT +85 °C; 4 V<sub>DC</sub> AT +125 °C</b>  |           |                      |                                     |                                       |                                                        |
| 5.6                                                               | A         | CTS1565(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 6.8                                                               | A         | CTS1685(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 39                                                                | B         | CTS1396(1)6R3B(2)(3) | 2.3                                 | 6                                     | 5                                                      |
| 47                                                                | B         | CTS1476(1)6R3B(2)(3) | 2.8                                 | 6                                     | 5                                                      |
| 56                                                                | B         | CTS1566(1)6R3B(2)(3) | 3.4                                 | 6                                     | 5                                                      |
| 120                                                               | C         | CTS1127(1)6R3C(2)(3) | 7.2                                 | 6                                     | 2                                                      |
| 150                                                               | C         | CTS1157(1)6R3C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 270                                                               | D         | CTS1277(1)6R3D(2)(3) | 16.2                                | 6                                     | 1                                                      |
| 330                                                               | D         | CTS1337(1)6R3D(2)(3) | 19.8                                | 8                                     | 1                                                      |
| <b>10 V<sub>DC</sub> AT +85 °C; 6.3 V<sub>DC</sub> AT +125 °C</b> |           |                      |                                     |                                       |                                                        |
| 3.9                                                               | A         | CTS1395(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 4.7                                                               | A         | CTS1475(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 27                                                                | B         | CTS1276(1)010B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 33                                                                | B         | CTS1336(1)010B(2)(3) | 3.3                                 | 6                                     | 5                                                      |
| 82                                                                | C         | CTS1826(1)010C(2)(3) | 8.2                                 | 6                                     | 2                                                      |
| 100                                                               | C         | CTS1107(1)010C(2)(3) | 10.0                                | 6                                     | 2                                                      |
| 180                                                               | D         | CTS1187(1)010D(2)(3) | 18.0                                | 6                                     | 1                                                      |
| 220                                                               | D         | CTS1227(1)010D(2)(3) | 22.0                                | 8                                     | 1                                                      |
| <b>16 V<sub>DC</sub> AT +85 °C; 10 V<sub>DC</sub> AT +125 °C</b>  |           |                      |                                     |                                       |                                                        |
| 1.8                                                               | A         | CTS1185(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 2.2                                                               | A         | CTS1225(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 2.7                                                               | A         | CTS1275(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 3.3                                                               | A         | CTS1335(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 12                                                                | B         | CTS1126(1)016B(2)(3) | 1.9                                 | 6                                     | 5                                                      |
| 15                                                                | B         | CTS1156(1)016B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 18                                                                | B         | CTS1186(1)016B(2)(3) | 2.9                                 | 6                                     | 5                                                      |
| 22                                                                | B         | CTS1226(1)016B(2)(3) | 3.5                                 | 6                                     | 5                                                      |
| 39                                                                | C         | CTS1396(1)016C(2)(3) | 6.2                                 | 6                                     | 2                                                      |
| 47                                                                | C         | CTS1476(1)016C(2)(3) | 7.5                                 | 6                                     | 2                                                      |
| 56                                                                | C         | CTS1566(1)016C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 68                                                                | C         | CTS1686(1)016C(2)(3) | 10.9                                | 6                                     | 2                                                      |
| 82                                                                | D         | CTS1826(1)016D(2)(3) | 13.1                                | 6                                     | 1                                                      |
| 100                                                               | D         | CTS1107(1)016D(2)(3) | 16.0                                | 6                                     | 1                                                      |
| 120                                                               | D         | CTS1127(1)016D(2)(3) | 19.2                                | 8                                     | 1                                                      |
| 150                                                               | D         | CTS1157(1)016D(2)(3) | 24.0                                | 8                                     | 1                                                      |
| <b>25 V<sub>DC</sub> AT +85 °C; 16 V<sub>DC</sub> AT +125 °C</b>  |           |                      |                                     |                                       |                                                        |
| 1.5                                                               | A         | CTS1155(1)025A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 8.2                                                               | B         | CTS1825(1)025B(2)(3) | 2.1                                 | 6                                     | 5                                                      |
| 10                                                                | B         | CTS1106(1)025B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 27                                                                | C         | CTS1276(1)025C(2)(3) | 6.8                                 | 6                                     | 2                                                      |
| 33                                                                | C         | CTS1336(1)025C(2)(3) | 8.3                                 | 6                                     | 2                                                      |
| 56                                                                | D         | CTS1566(1)025D(2)(3) | 14.0                                | 6                                     | 1                                                      |
| 68                                                                | D         | CTS1686(1)025D(2)(3) | 17.0                                | 6                                     | 1                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|------------------------------------------------------------------|-----------|----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>40 V<sub>DC</sub> AT +85 °C; 25 V<sub>DC</sub> AT +125 °C</b> |           |                      |                                     |                                       |                                                        |
| 0.47                                                             | A         | CTS1474(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                                                             | A         | CTS1564(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                                                             | A         | CTS1684(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                             | A         | CTS1824(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                                                              | A         | CTS1105(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                                                              | A         | CTS1125(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.5                                                              | B         | CTS1155(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                              | B         | CTS1185(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                                                              | B         | CTS1225(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.7                                                              | B         | CTS1275(1)040B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 3.3                                                              | B         | CTS1335(1)040B(2)(3) | 1.3                                 | 6                                     | 5                                                      |
| 3.9                                                              | B         | CTS1395(1)040B(2)(3) | 1.6                                 | 6                                     | 5                                                      |
| 4.7                                                              | B         | CTS1475(1)040B(2)(3) | 1.9                                 | 6                                     | 5                                                      |
| 5.6                                                              | B         | CTS1565(1)040B(2)(3) | 2.2                                 | 6                                     | 5                                                      |
| 6.8                                                              | B         | CTS1685(1)040B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 8.2                                                              | C         | CTS1825(1)040C(2)(3) | 3.3                                 | 6                                     | 2                                                      |
| 10                                                               | C         | CTS1106(1)040C(2)(3) | 4.0                                 | 6                                     | 2                                                      |
| 12                                                               | C         | CTS1126(1)040C(2)(3) | 4.8                                 | 6                                     | 2                                                      |
| 15                                                               | C         | CTS1156(1)040C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 18                                                               | C         | CTS1186(1)040C(2)(3) | 7.2                                 | 6                                     | 2                                                      |
| 22                                                               | C         | CTS1226(1)040C(2)(3) | 8.8                                 | 6                                     | 2                                                      |
| 27                                                               | D         | CTS1276(1)040D(2)(3) | 10.8                                | 6                                     | 1                                                      |
| 33                                                               | D         | CTS1336(1)040D(2)(3) | 13.2                                | 6                                     | 1                                                      |
| 39                                                               | D         | CTS1396(1)040D(2)(3) | 15.6                                | 6                                     | 1                                                      |
| 47                                                               | D         | CTS1476(1)040D(2)(3) | 18.8                                | 6                                     | 1                                                      |
| <b>50 V<sub>DC</sub> AT +85 °C; 33 V<sub>DC</sub> AT +125 °C</b> |           |                      |                                     |                                       |                                                        |
| 0.27                                                             | A         | CTS1274(1)050A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                                                             | A         | CTS1334(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.39                                                             | A         | CTS1394(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.47                                                             | A         | CTS1474(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                                                             | A         | CTS1564(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                                                             | A         | CTS1684(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                             | A         | CTS1824(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                                                              | A         | CTS1105(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                                                              | B         | CTS1125(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                              | B         | CTS1155(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                              | B         | CTS1185(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                                                              | B         | CTS1225(1)050B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.7                                                              | B         | CTS1275(1)050B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 3.3                                                              | B         | CTS1335(1)050B(2)(3) | 1.7                                 | 6                                     | 5                                                      |
| 3.9                                                              | B         | CTS1395(1)050B(2)(3) | 2.0                                 | 6                                     | 5                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|------------------------------------------------------------------|-----------|----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>50 V<sub>DC</sub> AT +85 °C; 33 V<sub>DC</sub> AT +125 °C</b> |           |                      |                                     |                                       |                                                        |
| 4.7                                                              | B         | CTS1475(1)050B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 5.6                                                              | C         | CTS1565(1)050C(2)(3) | 2.8                                 | 6                                     | 2                                                      |
| 6.8                                                              | C         | CTS1685(1)050C(2)(3) | 3.4                                 | 6                                     | 2                                                      |
| 8.2                                                              | C         | CTS1825(1)050C(2)(3) | 4.1                                 | 6                                     | 2                                                      |
| 10                                                               | C         | CTS1106(1)050C(2)(3) | 5.0                                 | 6                                     | 2                                                      |
| 12                                                               | C         | CTS1126(1)050C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 15                                                               | C         | CTS1156(1)050C(2)(3) | 7.5                                 | 6                                     | 2                                                      |
| 18                                                               | C         | CTS1186(1)050C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 22                                                               | D         | CTS1226(1)050D(2)(3) | 11.0                                | 6                                     | 1                                                      |
| <b>63 V<sub>DC</sub> AT +85 °C; 40 V<sub>DC</sub> AT +125 °C</b> |           |                      |                                     |                                       |                                                        |
| 0.10                                                             | A         | CTS1104(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.12                                                             | A         | CTS1124(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.15                                                             | A         | CTS1154(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.18                                                             | A         | CTS1184(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.22                                                             | A         | CTS1224(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.27                                                             | A         | CTS1274(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                                                             | A         | CTS1334(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.39                                                             | A         | CTS1394(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.47                                                             | A         | CTS1474(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                                                             | A         | CTS1564(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                                                             | A         | CTS1684(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                             | B         | CTS1824(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.0                                                              | B         | CTS1105(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.2                                                              | B         | CTS1125(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                              | B         | CTS1155(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                              | B         | CTS1185(1)063B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.2                                                              | B         | CTS1225(1)063B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 2.7                                                              | B         | CTS1275(1)063B(2)(3) | 1.7                                 | 6                                     | 5                                                      |
| 3.3                                                              | B         | CTS1335(1)063B(2)(3) | 2.1                                 | 6                                     | 5                                                      |
| 3.9                                                              | B         | CTS1395(1)063B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 4.7                                                              | C         | CTS1475(1)063C(2)(3) | 3.0                                 | 6                                     | 2                                                      |
| 5.6                                                              | C         | CTS1565(1)063C(2)(3) | 3.5                                 | 6                                     | 2                                                      |
| 6.8                                                              | C         | CTS1685(1)063C(2)(3) | 4.3                                 | 6                                     | 2                                                      |
| 8.2                                                              | C         | CTS1825(1)063C(2)(3) | 5.2                                 | 6                                     | 2                                                      |
| 10                                                               | C         | CTS1106(1)063C(2)(3) | 6.3                                 | 6                                     | 2                                                      |
| 12                                                               | D         | CTS1126(1)063D(2)(3) | 7.6                                 | 6                                     | 1                                                      |
| 15                                                               | D         | CTS1156(1)063D(2)(3) | 9.5                                 | 6                                     | 1                                                      |
| 18                                                               | D         | CTS1186(1)063D(2)(3) | 11.3                                | 6                                     | 1                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS13**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|-------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>6.3 V<sub>DC</sub> AT +85 °C</b> |           |                       |                                     |                                       |                                                        |
| 5.6                                 | A         | CTS13565(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 6.8                                 | A         | CTS13685(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 39                                  | B         | CTS13396(1)6R3B(2)(3) | 2.3                                 | 6                                     | 5                                                      |
| 47                                  | B         | CTS13476(1)6R3B(2)(3) | 2.8                                 | 6                                     | 5                                                      |
| 56                                  | B         | CTS13566(1)6R3B(2)(3) | 3.4                                 | 6                                     | 5                                                      |
| 120                                 | C         | CTS13127(1)6R3C(2)(3) | 7.2                                 | 6                                     | 2                                                      |
| 150                                 | C         | CTS13157(1)6R3C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 270                                 | D         | CTS13277(1)6R3D(2)(3) | 16.2                                | 6                                     | 1                                                      |
| 330                                 | D         | CTS13337(1)6R3D(2)(3) | 19.8                                | 8                                     | 1                                                      |
| <b>10 V<sub>DC</sub> AT +85 °C</b>  |           |                       |                                     |                                       |                                                        |
| 3.9                                 | A         | CTS13395(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 4.7                                 | A         | CTS13475(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 27                                  | B         | CTS13276(1)010B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 33                                  | B         | CTS13336(1)010B(2)(3) | 3.3                                 | 6                                     | 5                                                      |
| 82                                  | C         | CTS13826(1)010C(2)(3) | 8.2                                 | 6                                     | 2                                                      |
| 100                                 | C         | CTS13107(1)010C(2)(3) | 10.0                                | 6                                     | 2                                                      |
| 180                                 | D         | CTS13187(1)010D(2)(3) | 18.0                                | 6                                     | 1                                                      |
| 220                                 | D         | CTS13227(1)010D(2)(3) | 22.0                                | 8                                     | 1                                                      |
| <b>16 V<sub>DC</sub> AT +85 °C</b>  |           |                       |                                     |                                       |                                                        |
| 2.7                                 | A         | CTS13275(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 3.3                                 | A         | CTS13335(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 18                                  | B         | CTS13186(1)016B(2)(3) | 2.9                                 | 6                                     | 5                                                      |
| 22                                  | B         | CTS13226(1)016B(2)(3) | 3.5                                 | 6                                     | 5                                                      |
| 56                                  | C         | CTS13566(1)016C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 68                                  | C         | CTS13686(1)016C(2)(3) | 10.9                                | 6                                     | 2                                                      |
| 120                                 | D         | CTS13127(1)016D(2)(3) | 19.2                                | 8                                     | 1                                                      |
| 150                                 | D         | CTS13157(1)016D(2)(3) | 24.0                                | 8                                     | 1                                                      |
| <b>20 V<sub>DC</sub> AT +85 °C</b>  |           |                       |                                     |                                       |                                                        |
| 1.8                                 | A         | CTS13185(1)020A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 2.2                                 | A         | CTS13225(1)020A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 12                                  | B         | CTS13126(1)020B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 15                                  | B         | CTS13156(1)020B(2)(3) | 3.0                                 | 6                                     | 5                                                      |
| 39                                  | C         | CTS13396(1)020C(2)(3) | 7.8                                 | 6                                     | 2                                                      |
| 47                                  | C         | CTS13476(1)020C(2)(3) | 9.4                                 | 6                                     | 2                                                      |
| 82                                  | D         | CTS13826(1)020D(2)(3) | 16.4                                | 6                                     | 1                                                      |
| 100                                 | D         | CTS13107(1)020D(2)(3) | 20.0                                | 8                                     | 1                                                      |
| <b>25 V<sub>DC</sub> AT +85 °C</b>  |           |                       |                                     |                                       |                                                        |
| 1.2                                 | A         | CTS13125(1)025A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.5                                 | A         | CTS13155(1)025A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 8.2                                 | B         | CTS13825(1)025B(2)(3) | 2.1                                 | 6                                     | 5                                                      |
| 10                                  | B         | CTS13106(1)025B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 27                                  | C         | CTS13276(1)025C(2)(3) | 6.8                                 | 6                                     | 2                                                      |
| 33                                  | C         | CTS13336(1)025C(2)(3) | 8.3                                 | 6                                     | 2                                                      |
| 56                                  | D         | CTS13566(1)025D(2)(3) | 14.0                                | 6                                     | 1                                                      |
| 68                                  | D         | CTS13686(1)025D(2)(3) | 17.0                                | 6                                     | 1                                                      |

**Note**

- Part number definitions:
  - (1) Capacitance tolerance code: X5, X9, X0
  - (2) Style number: 0 or 2
  - (3) Packaging code





## STANDARD RATINGS / EXTENDED RATINGS - CTS13

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| 40 V <sub>DC</sub> AT +85 °C |           |                       |                                     |                                       |                                                        |
| 0.47                         | A         | CTS13474(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                         | A         | CTS13564(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                         | A         | CTS13684(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                         | A         | CTS13824(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                          | A         | CTS13105(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                          | A         | CTS13125(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.5                          | B         | CTS13155(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                          | B         | CTS13185(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                          | B         | CTS13225(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.7                          | B         | CTS13275(1)040B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 3.3                          | B         | CTS13335(1)040B(2)(3) | 1.3                                 | 6                                     | 5                                                      |
| 3.9                          | B         | CTS13395(1)040B(2)(3) | 1.6                                 | 6                                     | 5                                                      |
| 4.7                          | B         | CTS13475(1)040B(2)(3) | 1.9                                 | 6                                     | 5                                                      |
| 5.6                          | B         | CTS13565(1)040B(2)(3) | 2.2                                 | 6                                     | 5                                                      |
| 6.8                          | B         | CTS13685(1)040B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 8.2                          | C         | CTS13825(1)040C(2)(3) | 3.3                                 | 6                                     | 2                                                      |
| 10                           | C         | CTS13106(1)040C(2)(3) | 4.0                                 | 6                                     | 2                                                      |
| 12                           | C         | CTS13126(1)040C(2)(3) | 4.8                                 | 6                                     | 2                                                      |
| 15                           | C         | CTS13156(1)040C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 18                           | C         | CTS13186(1)040C(2)(3) | 7.2                                 | 6                                     | 2                                                      |
| 22                           | C         | CTS13226(1)040C(2)(3) | 8.8                                 | 6                                     | 2                                                      |
| 27                           | D         | CTS13276(1)040D(2)(3) | 10.8                                | 6                                     | 1                                                      |
| 33                           | D         | CTS13336(1)040D(2)(3) | 13.2                                | 6                                     | 1                                                      |
| 39                           | D         | CTS13396(1)040D(2)(3) | 15.6                                | 6                                     | 1                                                      |
| 47                           | D         | CTS13476(1)040D(2)(3) | 18.8                                | 6                                     | 1                                                      |
| 50 V <sub>DC</sub> AT +85 °C |           |                       |                                     |                                       |                                                        |
| 0.27                         | A         | CTS13274(1)050A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                         | A         | CTS13334(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.39                         | A         | CTS13394(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.47                         | A         | CTS13474(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                         | A         | CTS13564(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                         | A         | CTS13684(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                         | A         | CTS13824(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                          | A         | CTS13105(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                          | B         | CTS13125(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                          | B         | CTS13155(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                          | B         | CTS13185(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                          | B         | CTS13225(1)050B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.7                          | B         | CTS13275(1)050B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 3.3                          | B         | CTS13335(1)050B(2)(3) | 1.7                                 | 6                                     | 5                                                      |
| 3.9                          | B         | CTS13395(1)050B(2)(3) | 2.0                                 | 6                                     | 5                                                      |

## Note

- Part number definitions:
  - (1) Capacitance tolerance code: X5, X9, X0
  - (2) Style number: 0 or 2
  - (3) Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS13**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>50 V<sub>DC</sub> AT +85 °C</b> |           |                       |                                     |                                       |                                                        |
| 4.7                                | B         | CTS13475(1)050B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 5.6                                | C         | CTS13565(1)050C(2)(3) | 2.8                                 | 6                                     | 2                                                      |
| 6.8                                | C         | CTS13685(1)050C(2)(3) | 3.4                                 | 6                                     | 2                                                      |
| 8.2                                | C         | CTS13825(1)050C(2)(3) | 4.1                                 | 6                                     | 2                                                      |
| 10                                 | C         | CTS13106(1)050C(2)(3) | 5.0                                 | 6                                     | 2                                                      |
| 12                                 | C         | CTS13126(1)050C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 15                                 | C         | CTS13156(1)050C(2)(3) | 7.5                                 | 6                                     | 2                                                      |
| 18                                 | C         | CTS13186(1)050C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 22                                 | D         | CTS13226(1)050D(2)(3) | 11.0                                | 6                                     | 1                                                      |
| <b>63 V<sub>DC</sub> AT +85 °C</b> |           |                       |                                     |                                       |                                                        |
| 0.10                               | A         | CTS13104(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.12                               | A         | CTS13124(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.15                               | A         | CTS13154(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.18                               | A         | CTS13184(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.22                               | A         | CTS13224(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.27                               | A         | CTS13274(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                               | A         | CTS13334(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.39                               | A         | CTS13394(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.47                               | A         | CTS13474(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.56                               | A         | CTS13564(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.68                               | A         | CTS13684(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                               | B         | CTS13824(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.0                                | B         | CTS13105(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.2                                | B         | CTS13125(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                | B         | CTS13155(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                | B         | CTS13185(1)063B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.2                                | B         | CTS13225(1)063B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 2.7                                | B         | CTS13275(1)063B(2)(3) | 1.7                                 | 6                                     | 5                                                      |
| 3.3                                | B         | CTS13335(1)063B(2)(3) | 2.1                                 | 6                                     | 5                                                      |
| 3.9                                | B         | CTS13395(1)063B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 4.7                                | C         | CTS13475(1)063C(2)(3) | 3.0                                 | 6                                     | 2                                                      |
| 5.6                                | C         | CTS13565(1)063C(2)(3) | 3.5                                 | 6                                     | 2                                                      |
| 6.8                                | C         | CTS13685(1)063C(2)(3) | 4.3                                 | 6                                     | 2                                                      |
| 8.2                                | C         | CTS13825(1)063C(2)(3) | 5.2                                 | 6                                     | 2                                                      |
| 10                                 | C         | CTS13106(1)063C(2)(3) | 6.3                                 | 6                                     | 2                                                      |
| 12                                 | D         | CTS13126(1)063D(2)(3) | 7.6                                 | 6                                     | 1                                                      |
| 15                                 | D         | CTS13156(1)063D(2)(3) | 9.5                                 | 6                                     | 1                                                      |
| 18                                 | D         | CTS13186(1)063D(2)(3) | 11.3                                | 6                                     | 1                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code



| STANDARD RATINGS / EXTENDED RATINGS - 749DX                       |           |                       |                                     |                                       |                                                        |
|-------------------------------------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
| <b>6.3 V<sub>DC</sub> AT +85 °C; 4 V<sub>DC</sub> AT +125 °C</b>  |           |                       |                                     |                                       |                                                        |
| 5.6                                                               | A         | 749DX565(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 6.8                                                               | A         | 749DX685(1)6R3A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 47                                                                | B         | 749DX476(1)6R3B(2)(3) | 2.8                                 | 6                                     | 5                                                      |
| 56                                                                | B         | 749DX566(1)6R3B(2)(3) | 3.4                                 | 6                                     | 5                                                      |
| 150                                                               | C         | 749DX157(1)6R3C(2)(3) | 9.0                                 | 8                                     | 2                                                      |
| 180                                                               | C         | 749DX187(1)6R3C(2)(3) | 10.8                                | 8                                     | 2                                                      |
| 270                                                               | D         | 749DX277(1)6R3D(2)(3) | 16.2                                | 8                                     | 1                                                      |
| 330                                                               | D         | 749DX337(1)6R3D(2)(3) | 19.8                                | 8                                     | 1                                                      |
| <b>10 V<sub>DC</sub> AT +85 °C; 6.3 V<sub>DC</sub> AT +125 °C</b> |           |                       |                                     |                                       |                                                        |
| 3.9                                                               | A         | 749DX395(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 4.7                                                               | A         | 749DX475(1)010A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 27                                                                | B         | 749DX276(1)010B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 33                                                                | B         | 749DX336(1)010B(2)(3) | 3.3                                 | 6                                     | 5                                                      |
| 39                                                                | B         | 749DX396(1)010B(2)(3) | 3.9                                 | 6                                     | 5                                                      |
| 82                                                                | C         | 749DX826(1)010C(2)(3) | 8.2                                 | 6                                     | 2                                                      |
| 100                                                               | C         | 749DX107(1)010C(2)(3) | 10.0                                | 6                                     | 2                                                      |
| 120                                                               | C         | 749DX127(1)010C(2)(3) | 12.0                                | 8                                     | 2                                                      |
| 180                                                               | D         | 749DX187(1)010D(2)(3) | 18.0                                | 8                                     | 1                                                      |
| 220                                                               | D         | 749DX227(1)010D(2)(3) | 22.0                                | 8                                     | 1                                                      |
| <b>16 V<sub>DC</sub> AT +85 °C; 10 V<sub>DC</sub> AT +125 °C</b>  |           |                       |                                     |                                       |                                                        |
| 2.7                                                               | A         | 749DX275(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 3.3                                                               | A         | 749DX335(1)016A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 18                                                                | B         | 749DX186(1)016B(2)(3) | 2.9                                 | 6                                     | 5                                                      |
| 22                                                                | B         | 749DX226(1)016B(2)(3) | 3.5                                 | 6                                     | 5                                                      |
| 56                                                                | C         | 749DX566(1)016C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 68                                                                | C         | 749DX686(1)016C(2)(3) | 10.9                                | 6                                     | 2                                                      |
| 120                                                               | D         | 749DX127(1)016D(2)(3) | 19.2                                | 8                                     | 1                                                      |
| 150                                                               | D         | 749DX157(1)016D(2)(3) | 24.0                                | 8                                     | 1                                                      |
| <b>20 V<sub>DC</sub> AT +85 °C; 13 V<sub>DC</sub> AT +125 °C</b>  |           |                       |                                     |                                       |                                                        |
| 1.8                                                               | A         | 749DX185(1)020A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 2.2                                                               | A         | 749DX225(1)020A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 12                                                                | B         | 749DX126(1)020B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 15                                                                | B         | 749DX156(1)020B(2)(3) | 3.0                                 | 6                                     | 5                                                      |
| 39                                                                | C         | 749DX396(1)020C(2)(3) | 7.8                                 | 6                                     | 2                                                      |
| 47                                                                | C         | 749DX476(1)020C(2)(3) | 9.4                                 | 6                                     | 2                                                      |
| 82                                                                | D         | 749DX826(1)020D(2)(3) | 16.4                                | 6                                     | 1                                                      |
| 100                                                               | D         | 749DX107(1)020D(2)(3) | 20.0                                | 6                                     | 1                                                      |
| <b>25 V<sub>DC</sub> AT +85 °C; 16 V<sub>DC</sub> AT +125 °C</b>  |           |                       |                                     |                                       |                                                        |
| 1.2                                                               | A         | 749DX125(1)025A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.5                                                               | A         | 749DX155(1)025A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 8.2                                                               | B         | 749DX825(1)025B(2)(3) | 2.1                                 | 6                                     | 5                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code



| STANDARD RATINGS / EXTENDED RATINGS - 749DX                 |           |                       |                                     |                                       |                                                        |
|-------------------------------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
| 25 V <sub>DC</sub> AT +85 °C; 16 V <sub>DC</sub> AT +125 °C |           |                       |                                     |                                       |                                                        |
| 10                                                          | B         | 749DX106(1)025B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 27                                                          | C         | 749DX276(1)025C(2)(3) | 6.8                                 | 6                                     | 2                                                      |
| 33                                                          | C         | 749DX336(1)025C(2)(3) | 8.3                                 | 6                                     | 2                                                      |
| 56                                                          | D         | 749DX566(1)025D(2)(3) | 14.0                                | 6                                     | 1                                                      |
| 68                                                          | D         | 749DX686(1)025D(2)(3) | 17.0                                | 6                                     | 1                                                      |
| 35 V <sub>DC</sub> AT +85 °C; 23 V <sub>DC</sub> AT +125 °C |           |                       |                                     |                                       |                                                        |
| 0.10                                                        | A         | 749DX104(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.12                                                        | A         | 749DX124(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.15                                                        | A         | 749DX154(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.18                                                        | A         | 749DX184(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.22                                                        | A         | 749DX224(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.27                                                        | A         | 749DX274(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                                                        | A         | 749DX334(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.39                                                        | A         | 749DX394(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.47                                                        | A         | 749DX474(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.56                                                        | A         | 749DX564(1)035A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.68                                                        | A         | 749DX684(1)035A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                        | A         | 749DX824(1)035A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                                                         | A         | 749DX105(1)035A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                                                         | B         | 749DX125(1)035B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                         | B         | 749DX155(1)035B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                         | B         | 749DX185(1)035B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                                                         | B         | 749DX225(1)035B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.7                                                         | B         | 749DX275(1)035B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 3.3                                                         | B         | 749DX335(1)035B(2)(3) | 1.2                                 | 6                                     | 5                                                      |
| 3.9                                                         | B         | 749DX395(1)035B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 4.7                                                         | B         | 749DX475(1)035B(2)(3) | 1.6                                 | 6                                     | 5                                                      |
| 5.6                                                         | B         | 749DX565(1)035B(2)(3) | 2.0                                 | 6                                     | 5                                                      |
| 6.8                                                         | B         | 749DX685(1)035B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 8.2                                                         | C         | 749DX825(1)035C(2)(3) | 2.9                                 | 6                                     | 2                                                      |
| 10                                                          | C         | 749DX106(1)035C(2)(3) | 3.5                                 | 6                                     | 2                                                      |
| 12                                                          | C         | 749DX126(1)035C(2)(3) | 4.2                                 | 6                                     | 2                                                      |
| 15                                                          | C         | 749DX156(1)035C(2)(3) | 5.3                                 | 6                                     | 2                                                      |
| 18                                                          | C         | 749DX186(1)035C(2)(3) | 6.3                                 | 6                                     | 2                                                      |
| 22                                                          | C         | 749DX226(1)035C(2)(3) | 7.7                                 | 6                                     | 2                                                      |
| 27                                                          | D         | 749DX276(1)035D(2)(3) | 9.5                                 | 6                                     | 1                                                      |
| 33                                                          | D         | 749DX336(1)035D(2)(3) | 11.6                                | 6                                     | 1                                                      |
| 39                                                          | D         | 749DX396(1)035D(2)(3) | 13.7                                | 6                                     | 1                                                      |
| 47                                                          | D         | 749DX476(1)035D(2)(3) | 16.5                                | 6                                     | 1                                                      |
| 56                                                          | D         | 749DX566(1)035D(2)(3) | 19.6                                | 6                                     | 1                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - 749DX**

| 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<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|------------------------------------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| <b>40 V<sub>DC</sub> AT +85 °C; 25 V<sub>DC</sub> AT +125 °C</b> |           |                       |                                     |                                       |                                                        |
| 0.10                                                             | A         | 749DX104(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.12                                                             | A         | 749DX124(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.15                                                             | A         | 749DX154(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.18                                                             | A         | 749DX184(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.22                                                             | A         | 749DX224(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.27                                                             | A         | 749DX274(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                                                             | A         | 749DX334(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.39                                                             | A         | 749DX394(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.47                                                             | A         | 749DX474(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.56                                                             | A         | 749DX564(1)040A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.68                                                             | A         | 749DX684(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                             | A         | 749DX824(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                                                              | A         | 749DX105(1)040A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                                                              | B         | 749DX125(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                              | B         | 749DX155(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                              | B         | 749DX185(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                                                              | B         | 749DX225(1)040B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.7                                                              | B         | 749DX275(1)040B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 3.3                                                              | B         | 749DX335(1)040B(2)(3) | 1.3                                 | 6                                     | 5                                                      |
| 3.9                                                              | B         | 749DX395(1)040B(2)(3) | 1.6                                 | 6                                     | 5                                                      |
| 4.7                                                              | B         | 749DX475(1)040B(2)(3) | 1.9                                 | 6                                     | 5                                                      |
| 5.6                                                              | B         | 749DX565(1)040B(2)(3) | 2.2                                 | 6                                     | 5                                                      |
| 6.8                                                              | B         | 749DX685(1)040B(2)(3) | 2.7                                 | 6                                     | 5                                                      |
| 8.2                                                              | C         | 749DX825(1)040C(2)(3) | 3.3                                 | 6                                     | 2                                                      |
| 10                                                               | C         | 749DX106(1)040C(2)(3) | 4.0                                 | 6                                     | 2                                                      |
| 12                                                               | C         | 749DX126(1)040C(2)(3) | 4.8                                 | 6                                     | 2                                                      |
| 15                                                               | C         | 749DX156(1)040C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 18                                                               | C         | 749DX186(1)040C(2)(3) | 7.2                                 | 6                                     | 2                                                      |
| 22                                                               | C         | 749DX226(1)040C(2)(3) | 8.8                                 | 6                                     | 2                                                      |
| 27                                                               | D         | 749DX276(1)040D(2)(3) | 10.8                                | 6                                     | 1                                                      |
| 33                                                               | D         | 749DX336(1)040D(2)(3) | 13.2                                | 6                                     | 1                                                      |
| 39                                                               | D         | 749DX396(1)040D(2)(3) | 15.6                                | 6                                     | 1                                                      |
| <b>50 V<sub>DC</sub> AT +85 °C; 33 V<sub>DC</sub> AT +125 °C</b> |           |                       |                                     |                                       |                                                        |
| 0.82                                                             | A         | 749DX824(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.0                                                              | A         | 749DX105(1)050A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 1.2                                                              | B         | 749DX125(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                              | B         | 749DX155(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                              | B         | 749DX185(1)050B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 2.2                                                              | B         | 749DX225(1)050B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.7                                                              | B         | 749DX275(1)050B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 3.3                                                              | B         | 749DX335(1)050B(2)(3) | 1.7                                 | 6                                     | 5                                                      |

**Note**

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code



## STANDARD RATINGS / EXTENDED RATINGS - 749DX

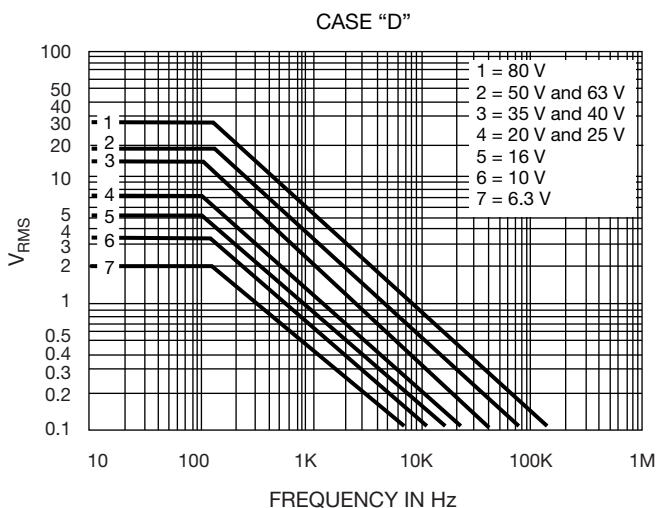
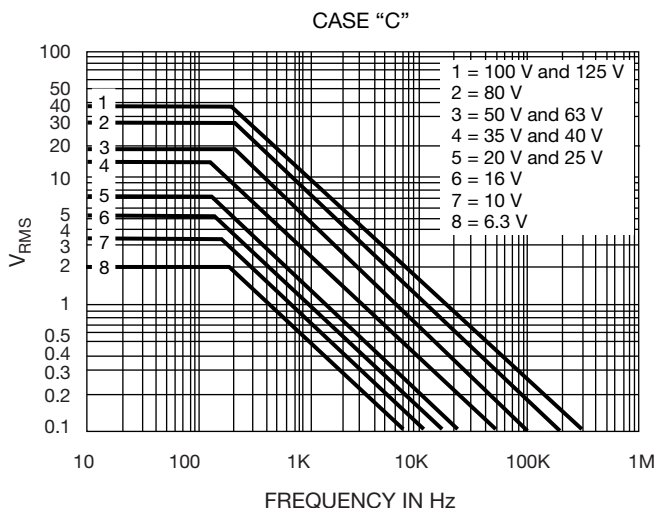
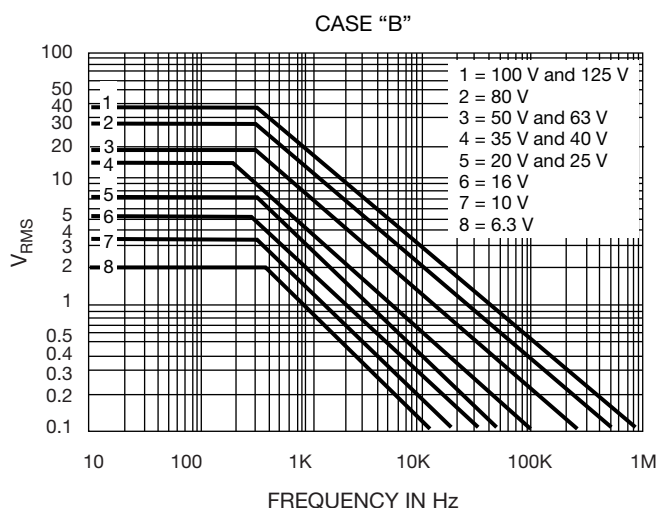
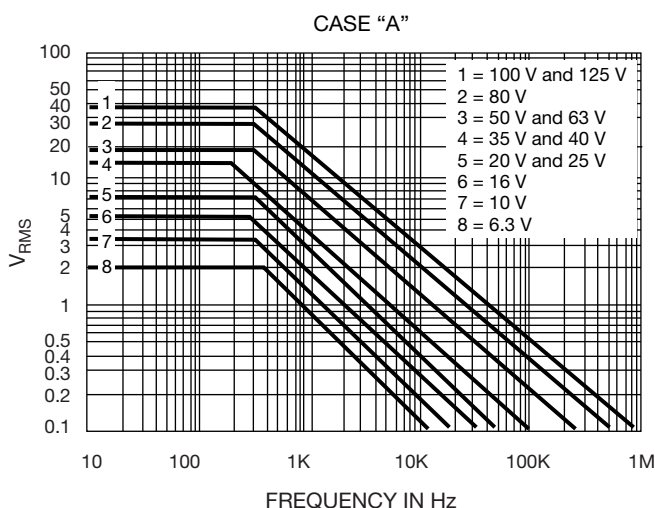
| CAPACITANCE<br>( $\mu$ F)                                   | CASE CODE | PART NUMBER           | MAX. DCL<br>AT +25 °C<br>( $\mu$ A) | MAX. DF<br>AT +25 °C<br>120 Hz<br>(%) | MAX. IMPEDANCE<br>AT +25 °C<br>100 kHz<br>( $\Omega$ ) |
|-------------------------------------------------------------|-----------|-----------------------|-------------------------------------|---------------------------------------|--------------------------------------------------------|
| 50 V <sub>DC</sub> AT +85 °C; 33 V <sub>DC</sub> AT +125 °C |           |                       |                                     |                                       |                                                        |
| 3.9                                                         | B         | 749DX395(1)050B(2)(3) | 2.0                                 | 6                                     | 5                                                      |
| 4.7                                                         | B         | 749DX475(1)050B(2)(3) | 2.4                                 | 6                                     | 5                                                      |
| 5.6                                                         | C         | 749DX565(1)050C(2)(3) | 2.8                                 | 6                                     | 2                                                      |
| 6.8                                                         | C         | 749DX685(1)050C(2)(3) | 3.4                                 | 6                                     | 2                                                      |
| 8.2                                                         | C         | 749DX825(1)050C(2)(3) | 4.1                                 | 6                                     | 2                                                      |
| 10                                                          | C         | 749DX106(1)050C(2)(3) | 5.0                                 | 6                                     | 2                                                      |
| 12                                                          | C         | 749DX126(1)050C(2)(3) | 6.0                                 | 6                                     | 2                                                      |
| 15                                                          | C         | 749DX156(1)050C(2)(3) | 7.5                                 | 6                                     | 2                                                      |
| 18                                                          | C         | 749DX186(1)050C(2)(3) | 9.0                                 | 6                                     | 2                                                      |
| 22                                                          | D         | 749DX226(1)050D(2)(3) | 11.0                                | 6                                     | 1                                                      |
| 63 V <sub>DC</sub> AT +85 °C; 40 V <sub>DC</sub> AT +125 °C |           |                       |                                     |                                       |                                                        |
| 0.10                                                        | A         | 749DX104(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.12                                                        | A         | 749DX124(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.15                                                        | A         | 749DX154(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.18                                                        | A         | 749DX184(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.22                                                        | A         | 749DX224(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.27                                                        | A         | 749DX274(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.33                                                        | A         | 749DX334(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.39                                                        | A         | 749DX394(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.47                                                        | A         | 749DX474(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.56                                                        | A         | 749DX564(1)063A(2)(3) | 1.0                                 | 6                                     | n/a                                                    |
| 0.68                                                        | A         | 749DX684(1)063A(2)(3) | 1.0                                 | 6                                     | 10                                                     |
| 0.82                                                        | B         | 749DX824(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.0                                                         | B         | 749DX105(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.2                                                         | B         | 749DX125(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.5                                                         | B         | 749DX155(1)063B(2)(3) | 1.0                                 | 6                                     | 5                                                      |
| 1.8                                                         | B         | 749DX185(1)063B(2)(3) | 1.1                                 | 6                                     | 5                                                      |
| 2.2                                                         | B         | 749DX225(1)063B(2)(3) | 1.4                                 | 6                                     | 5                                                      |
| 2.7                                                         | B         | 749DX275(1)063B(2)(3) | 1.7                                 | 6                                     | 5                                                      |
| 3.3                                                         | B         | 749DX335(1)063B(2)(3) | 2.1                                 | 6                                     | 5                                                      |
| 3.9                                                         | B         | 749DX395(1)063B(2)(3) | 2.5                                 | 6                                     | 5                                                      |
| 4.7                                                         | C         | 749DX475(1)063C(2)(3) | 3.0                                 | 6                                     | 2                                                      |
| 5.6                                                         | C         | 749DX565(1)063C(2)(3) | 3.5                                 | 6                                     | 2                                                      |
| 6.8                                                         | C         | 749DX685(1)063C(2)(3) | 4.3                                 | 6                                     | 2                                                      |
| 8.2                                                         | C         | 749DX825(1)063C(2)(3) | 5.2                                 | 6                                     | 2                                                      |
| 10                                                          | C         | 749DX106(1)063C(2)(3) | 6.3                                 | 6                                     | 2                                                      |
| 12                                                          | D         | 749DX126(1)063D(2)(3) | 7.6                                 | 6                                     | 1                                                      |
| 15                                                          | D         | 749DX156(1)063D(2)(3) | 9.5                                 | 6                                     | 1                                                      |
| 18                                                          | D         | 749DX186(1)063D(2)(3) | 11.3                                | 6                                     | 1                                                      |

## Note

- Part number definitions:
  - Capacitance tolerance code: X5, X9, X0
  - Style number: 0 or 2
  - Packaging code



**TYPICAL CURVES RIPPLE VOLTAGE AT +25 °C**



**PRODUCT INFORMATION**

Mounting of Through Hole Components

[www.vishay.com/doc?40108](http://www.vishay.com/doc?40108)

Solid Tantalum Capacitors (With MnO<sub>2</sub> Electrolyte) Voltage Derating

[www.vishay.com/doc?40246](http://www.vishay.com/doc?40246)

**SELECTOR GUIDES**

Quick Reference Guide

[www.vishay.com/doc?40037](http://www.vishay.com/doc?40037)

Selector Guide

[www.vishay.com/doc?49054](http://www.vishay.com/doc?49054)

Parameter Comparison Guide

[www.vishay.com/doc?40033](http://www.vishay.com/doc?40033)

**FAQ**

Frequently Asked Questions

[www.vishay.com/doc?40110](http://www.vishay.com/doc?40110)

**PERFORMANCE CHARACTERISTICS****1. Operating Temperature:**

-55 °C to +85 °C with rated DC voltage  $U_R$  applied, +85 °C to +125 °C with linear voltage derating to category voltage  $U_C$  (only for types CTS1, 749DX).

**2. Capacitance and Tolerance:**

Capacitance measured at 100 Hz and +25 °C shall be within the specified tolerance limits of the nominal rating. Capacitance measurement shall be made by means of a polarized capacitance bridge. The polarizing voltage shall be of 2.2 V. The maximum voltage applied during measurements shall be 1.0  $V_{RMS}$  at 100 Hz and +25 °C.

**3. Reverse Voltage:**

These capacitors are capable of withstanding peak voltage in the reverse direction equal to: 15 % of the rated DC voltage at +25 °C, 5 % of the rated DC voltage at +85 °C.

**4. Surge Voltage:****Table 1**

| PRODUCT TYPE | SURGE VOLTAGE AT +85 °C | SURGE VOLTAGE AT +125 °C |
|--------------|-------------------------|--------------------------|
| CTS13        | 1.30 $U_R$              | -                        |
| 749DX / CTS1 | 1.30 $U_R$              | 1.30 $U_C$               |

Capacitors shall withstand the surge voltage applied in series with a 1000 W resistor, at the rate of 1.5 min on, 5.5 min off, for 1000 successive test cycles at +85 °C or at +125 °C. After test, dissipation factor and leakage current shall meet the initial requirements at +25 °C (see below), capacitance change shall not exceed  $\pm 10$  % of initial value at +25 °C.

**5. Leakage Current:**

Rated voltage  $U_R$  shall be applied to capacitors during five minutes with a resistor of 1000 W in series with each capacitor, before making DC leakage current measurements. The leakage current shall not exceed the following limits:

**Table 2**

| TEMPERATURE | CTS1 / CTS13 / 749DX                                           |
|-------------|----------------------------------------------------------------|
| +25 °C      | 0.01 $C_R \times U_R$ or<br>1 $\mu A$ whichever is greater     |
| +85 °C      | 0.1 $C_R \times U_R$ or<br>10 $\mu A$ whichever is greater     |
| +125 °C     | 0.125 $C_R \times U_R$ or<br>12.5 $\mu A$ whichever is greater |

**6. Dissipation Factor:**

The dissipation factor, when measured at 100 Hz, shall not exceed the values below:

**Table 3**

| TEMP.                  | CTS1 / CTS13        |                  | 749DX          |             |
|------------------------|---------------------|------------------|----------------|-------------|
|                        | $C_R U_R \leq 1900$ | $C_R U_R > 1900$ | $C_R \leq 100$ | $C_R > 100$ |
| -55 °C                 | 9 %                 | 11 %             | 8 %            | 10 %        |
| +25 °C                 | 6 %                 | 8 %              | 6 %            | 8 %         |
| +85 °C                 | 9 %                 | 11 %             | -              | -           |
| +125 °C <sup>(1)</sup> | 12 %                | 14 %             | 10 %           | 11 %        |

**Note**

<sup>(1)</sup> Not applicable for CTS13

**7. Stability at Low and High Temperature:**

Capacitance change with temperature shall not exceed the limits of the following table, leakage current and dissipation factor shall be within the limits specified in Tables 2 and 3.

**Table 4**

| TEMPERATURE            | CTS1 / CTS13 / 749DX |
|------------------------|----------------------|
| -55 °C                 | -10 %                |
| +85 °C                 | +12 %                |
| +125 °C <sup>(1)</sup> | +15 %                |

**Note**

<sup>(1)</sup> Not applicable for CTS13

**8. Impedance:**

The impedance measured at 100 kHz and 25 °C shall not exceed the following values:

**Table 5**

| CASE CODE | Z (W) <sup>(1)</sup> |
|-----------|----------------------|
| A         | 10                   |
| B         | 5                    |
| C         | 2                    |
| D         | 1                    |

**Note**

<sup>(1)</sup> Not applicable for  $C_R \leq 0.68 \mu F$

**9. Life Test:**

After 2000 h at +85 °C with rated DC voltage applied, or after 2000 h at +125 °C with category DC voltage applied (for types CTS1, 749DX only) capacitors shall meet the requirements in Table 6.

**Table 6**

| PRODUCT TYPE           | CAPACITANCE CHANGE                           | DISSIPATION FACTOR                   | DC LEAKAGE CURRENT                             |
|------------------------|----------------------------------------------|--------------------------------------|------------------------------------------------|
| CTS1<br>CTS13<br>749DX | Within $\pm 10$ % of initial value at +25 °C | Within initial requirement at +25 °C | Within 125 % of initial requirements at +25 °C |



**PERFORMANCE CHARACTERISTICS (Continued)****10. Humidity Test:**

After 56 days (1350 h) at +40 °C, 90 % to 95 % of relative humidity (per IEC 68-2-3) with no voltage applied, capacitors shall meet the requirements in Table 7 below.

**Table 7**

|                           |                                                |
|---------------------------|------------------------------------------------|
| <b>CAPACITANCE CHANGE</b> | Within ± 3 % of initial value                  |
| <b>DC LEAKAGE CURRENT</b> | Within initial requirement at +25 °C - Table 2 |
| <b>DISSIPATION FACTOR</b> | Within initial requirement at +25 °C - Table 3 |

**Table 8**

|                           |                                                |
|---------------------------|------------------------------------------------|
| <b>CAPACITANCE CHANGE</b> | Within ± 5 % of initial value at +25 °C        |
| <b>DC LEAKAGE CURRENT</b> | Within initial requirement at +25 °C - Table 2 |
| <b>DISSIPATION FACTOR</b> | Within initial requirement at +25 °C - Table 3 |

Typical values of charge-discharge current (per above test conditions).

| <b>RATED VOLTAGE<br/>U<sub>R</sub> (V)</b> | <b>CHARGE-DISCHARGE CURRENT<br/>(A)</b> |
|--------------------------------------------|-----------------------------------------|
| 6.3                                        | 13                                      |
| 10                                         | 20                                      |
| 16                                         | 32                                      |
| 25                                         | 50                                      |
| 40                                         | 80                                      |
| 50                                         | 100                                     |
| 63                                         | 126                                     |

**11. Insulation Test:**

For capacitors with insulating sleeves, a DC voltage of 100 V shall be applied for one minute between the case of the capacitor and a metal "V" block in intimate contact with the insulating sleeve. The insulating resistance measured in these conditions shall be at least 100 MΩ.

**12. Lead Pull Test:**

Leads shall withstand the following test (IEC 68-2-2): tensile stress of 5N (cases A and B) or 10N (cases C and D) for 10 s in any direction

One bend in each direction

Two consecutive rotations of 180°

**GUIDE TO APPLICATION****1. AC Ripple Current:**

The maximum allowable ripple current shall be determined from the formula:

$$I_{RMS} = \sqrt{\frac{P}{R_{ESR}}}$$

where,

P = power dissipation in W at +25 °C as given below

R<sub>ESR</sub> = the capacitor equivalent series resistance at the specified frequency.

**2. AC Ripple Voltage:**

The maximum allowable ripple voltage shall be determined from the formula:

$$V_{RMS} = \sqrt{\frac{P}{R_{ESR}}} \times Z$$

where,

Z = the capacitor impedance at the specified frequency.

The calculations are summarized on the graphs in table "Typical Curves Ripple Voltage at +25 °C" giving the maximum available ripple voltage as a function of frequency.

However, the sum of the peak AC voltage plus the DC voltage shall not exceed the rated DC voltage at +85 °C of the capacitor. The sum of the negative peak AC voltage plus the DC voltage shall not allow a voltage reversal exceeding 15 % of the rated DC voltage.

**3. AC Ripple Current or Voltage Derating Factor:**

If these capacitors are to be operated at temperatures above +25 °C, the permissible RMS ripple current or voltage shall be calculated using the derating factors in the table below:

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

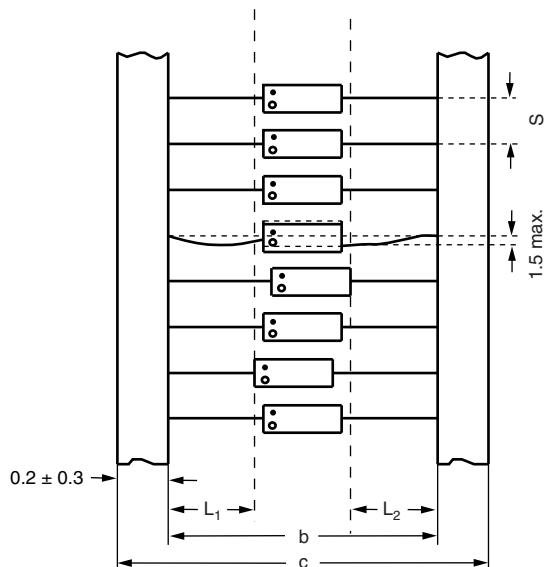
**4. Power Dissipation:**

Power dissipation will be affected by the heat sinking capability of the mounting surface. Non-sinusoidal ripple current may produce heating effects which differ from those shown in the following table. It is important that the equivalent I<sub>RMS</sub> value be established when calculating permissible operating levels.

| <b>CASE CODE</b> | <b>POWER DISSIPATION AT +25 °C (W)</b> |
|------------------|----------------------------------------|
| A                | 0.115                                  |
| B                | 0.145                                  |
| C                | 0.185                                  |
| D                | 0.225                                  |

**TAPE AND REEL PACKAGING**

Meets EIA standard RS-296



$L_1 - L_2 = 1.5 \text{ mm max.}$   
 $S$  = component spacing  
(cumulative tolerance on 20 units = 4 mm)  
 $b$  = tape spacing  
 $c$  = overall length

**STANDARD PACKAGING QUANTITY AND DIMENSIONS** in millimeters

| CASE SIZE      | REEL AND AMMO S | REEL PACK |        |          |        |              | AMMO PACK |        |             | BULK         |
|----------------|-----------------|-----------|--------|----------|--------|--------------|-----------|--------|-------------|--------------|
|                |                 | OPTION P  |        | OPTION R |        | QTY PER REEL | OPTION G  |        | QTY PER BOX | QTY PER PACK |
|                |                 | B         | C MAX. | B        | C MAX. |              | B         | C MAX. |             |              |
| A              | 5.0 ± 0.3       | 63 ± 2    | 78     | 53 ± 2   | 68     | 1000         | 53 ± 2    | 68     | 500         | 100          |
| B              | 5.0 ± 0.3       | 63 ± 2    | 78     | 53 ± 2   | 68     | 1000         | 53 ± 2    | 68     | 500         | 75           |
| C              | 10.0 ± 0.3      | 63 ± 2    | 78     | 63 ± 2   | 78     | 500          | 53 ± 2    | 68     | 250         | 50           |
| D              | 10.0 ± 0.3      | 63 ± 2    | 78     | 63 ± 2   | 78     | 500          | 53 ± 2    | 68     | 250         | 25           |
| PACKAGING CODE |                 | P         |        | R        |        |              | G         |        |             | B            |

**MARKING**

Capacitors shall be marked with Vishay Sprague marking (circled 2); the type number; rated capacitance and tolerance (with a letter code, if different from  $\pm 20\%$ ,  $K = \pm 10\%$ ;  $J = \pm 5\%$ ); rated DC voltage at  $+85^\circ\text{C}$  and the date code of manufacture. Capacitors shall be marked on one end with a “plus” sign (+) to identify the positive terminal.



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