

# Solid-Electrolyte TANTALEX™ Capacitors, Extended Capacitance Values, Hermetically-Sealed



## FEATURES

- Axial through-hole terminations: tin / lead (SnPb), 100 % tin (RoHS-compliant)
- High capacitance and small size
- Exceptional operating stability
- Hermetically-sealed, cylindrical, metal-case
- Low leakage current and low dissipation factor
- The military equivalent of the 152D is the M39003/03 (style CSR23) which is qualified to MIL-PRF-39003/3
- Provide proven reliability in a wide variety of high performance military, industrial and commercial markets
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



## Note

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

## PERFORMANCE CHARACTERISTICS

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

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

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

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

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

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

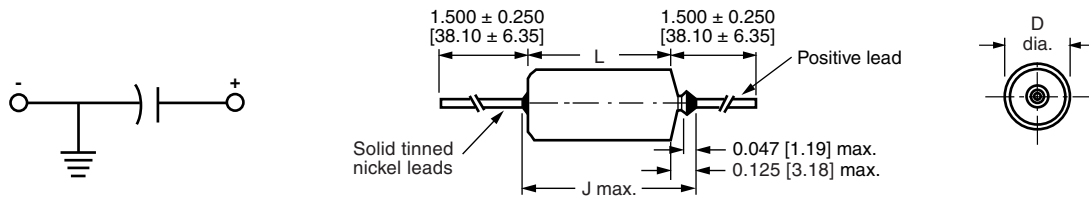
**At +125 °C:** leakage shall not exceed 12 times the values listed in the Standard Ratings table

**Life Test:** capacitors shall withstand rated DC voltage applied at +85 °C for 2000 h or derated DC voltage applied at +125 °C for 1000 h

Following the life test:

1. DCL shall not exceed 125 % of the initial requirement. In no case need the leakage current be less than 2  $\mu$ A
2. Dissipation factor shall meet the initial requirement
3. Change in capacitance shall not exceed ± 5 %

152D	106	X0	006	A	2	T	E3
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	CASE CODE	STYLE NUMBER	PACKAGING	RoHS-COMPLIANT
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	X0 = ± 20 % X9 = ± 10 % X5 = ± 5 % * * Special order	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating.	See Ratings and Case Codes table	2 = insulated sleeve	B = bulk T = tape and reel G = ammo pack	E3 = 100 % tin termination (RoHS-compliant) Blank = SnPb termination

**DIMENSIONS** in inches [millimeters]


CASE CODE	D	L	J (MAXIMUM)	LEAD SIZE	
	WITH INSULATING SLEEVE <sup>(1)</sup>			AWG NO.	NOMINAL DIAMETER
A	0.135 ± 0.016 [3.43 ± 0.41]	0.286 ± 0.031 [7.26 ± 0.79]	0.422 [10.72]	24	0.020 [0.51]
B	0.185 ± 0.016 [4.70 ± 0.41]	0.474 ± 0.031 [12.04 ± 0.79]	0.610 [15.49]	24	0.020 [0.51]
R	0.289 ± 0.016 [7.34 ± 0.41]	0.686 ± 0.031 [17.42 ± 0.79]	0.822 [20.88]	22	0.025 [0.64]
S	0.351 ± 0.016 [8.92 ± 0.41]	0.786 ± 0.031 [19.96 ± 0.79]	0.922 [23.42]	22	0.025 [0.64]

**Note**

<sup>(1)</sup> When a shrink-fitted insulation is used, it shall lap over the ends of the capacitor body

**STANDARD RATINGS**

CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C ( $\mu$ A)	MAX. DF AT +25 °C 120 Hz (%)
<b>6 V<sub>DC</sub> AT +85 °C, SURGE = 8 V; 4 V<sub>DC</sub> AT +125 °C, SURGE = 5 V</b>				
10	A	152D106(1)006A2(2)(3)	1.0	6
12	A	152D126(1)006A2(2)(3)	1.0	6
15	A	152D156(1)006A2(2)(3)	1.0	6
68	B	152D686(1)006B2(2)(3)	3.0	6
82	B	152D826(1)006B2(2)(3)	3.0	6
100	B	152D107(1)006B2(2)(3)	6.0	6
330	R	152D337(1)006R2(2)(3)	10.0	8
390	R	152D397(1)006R2(2)(3)	10.0	8
470	R	152D477(1)006R2(2)(3)	10.0	8
560	S	152D567(1)006S2(2)(3)	20.0	10
680	S	152D687(1)006S2(2)(3)	20.0	10
820	S	152D827(1)006S2(2)(3)	20.0	10
1000	S	152D108(1)006S2(2)(3)	20.0	10
<b>10 V<sub>DC</sub> AT +85 °C, SURGE = 13 V; 7 V<sub>DC</sub> AT +125 °C, SURGE = 9 V</b>				
5.6	A	152D565(1)010A2(2)(3)	1.0	4
6.8	A	152D685(1)010A2(2)(3)	1.0	6
8.2	A	152D825(1)010A2(2)(3)	1.2	6
10	A	152D106(1)010A2(2)(3)	1.2	6
47	B	152D476(1)010B2(2)(3)	4.0	6
56	B	152D566(1)010B2(2)(3)	5.0	6

**Note**

- Part number definitions:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % "X5" (special order)
  - Packaging options: B = bulk, T = tape and reel, G = ammo pack
  - Termination: E3 = 100 % tin, blank = SnPb



<b>STANDARD RATINGS</b>				
<b>CAPACITANCE (<math>\mu</math>F)</b>	<b>CASE CODE</b>	<b>PART NUMBER</b>	<b>MAX. DCL AT +25 °C (<math>\mu</math>A)</b>	<b>MAX. DF AT +25 °C 120 Hz (%)</b>
<b>10 V<sub>DC</sub> AT +85 °C, SURGE = 13 V; 7 V<sub>DC</sub> AT +125 °C, SURGE = 9 V</b>				
68	B	152D686(1)010B2(2)(3)	6.0	6
82	B	152D826(1)010B2(2)(3)	7.0	6
150	R	152D157(1)010R2(2)(3)	8.0	8
180	R	152D187(1)010R2(2)(3)	8.0	8
220	R	152D227(1)010R2(2)(3)	12.0	8
270	R	152D277(1)010R2(2)(3)	13.0	8
330	S	152D337(1)010S2(2)(3)	16.0	8
390	S	152D397(1)010S2(2)(3)	16.0	10
470	S	152D477(1)010S2(2)(3)	16.0	10
560	S	152D567(1)010S2(2)(3)	20.0	10
<b>15 V<sub>DC</sub> AT +85 °C, SURGE = 20 V; 10 V<sub>DC</sub> AT +125 °C, SURGE = 12 V</b>				
3.9	A	152D395(1)015A2(2)(3)	1.0	4
4.7	A	152D475(1)015A2(2)(3)	1.0	4
5.6	A	152D565(1)015A2(2)(3)	1.3	4
6.8	A	152D685(1)015A2(2)(3)	1.3	6
27	B	152D276(1)015B2(2)(3)	3.0	6
33	B	152D336(1)015B2(2)(3)	5.0	6
39	B	152D396(1)015B2(2)(3)	5.0	6
82	R	152D826(1)015R2(2)(3)	8.0	6
100	R	152D107(1)015R2(2)(3)	10.0	8
120	R	152D127(1)015R2(2)(3)	10.0	8
150	R	152D157(1)015R2(2)(3)	15.0	8
180	R	152D187(1)015R2(2)(3)	15.0	8
220	S	152D227(1)015S2(2)(3)	20.0	8
270	S	152D277(1)015S2(2)(3)	20.0	8
330	S	152D337(1)015S2(2)(3)	20.0	8
<b>20 V<sub>DC</sub> AT +85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT +125 °C, SURGE = 16 V</b>				
2.7	A	152D275(1)020A2(2)(3)	0.8	4
3.3	A	152D335(1)020A2(2)(3)	1.0	4
3.9	A	152D395(1)020A2(2)(3)	1.2	4
4.7	A	152D475(1)020A2(2)(3)	1.2	4
18	B	152D186(1)020B2(2)(3)	3.0	4
22	B	152D226(1)020B2(2)(3)	3.0	4
27	B	152D276(1)020B2(2)(3)	4.0	4
56	R	152D566(1)020R2(2)(3)	7.0	6
68	R	152D686(1)020R2(2)(3)	8.0	6
82	R	152D826(1)020R2(2)(3)	10.0	6
<b>20 V<sub>DC</sub> AT +85 °C, SURGE = 26 V; 13 V<sub>DC</sub> AT +125 °C, SURGE = 16 V</b>				
100	R	152D107(1)020R2(2)(3)	12.0	6
120	R	152D127(1)020R2(2)(3)	12.0	6
150	S	152D157(1)020S2(2)(3)	15.0	8
180	S	152D187(1)020S2(2)(3)	15.0	8
220	S	152D227(1)020S2(2)(3)	15.0	8

**Note**

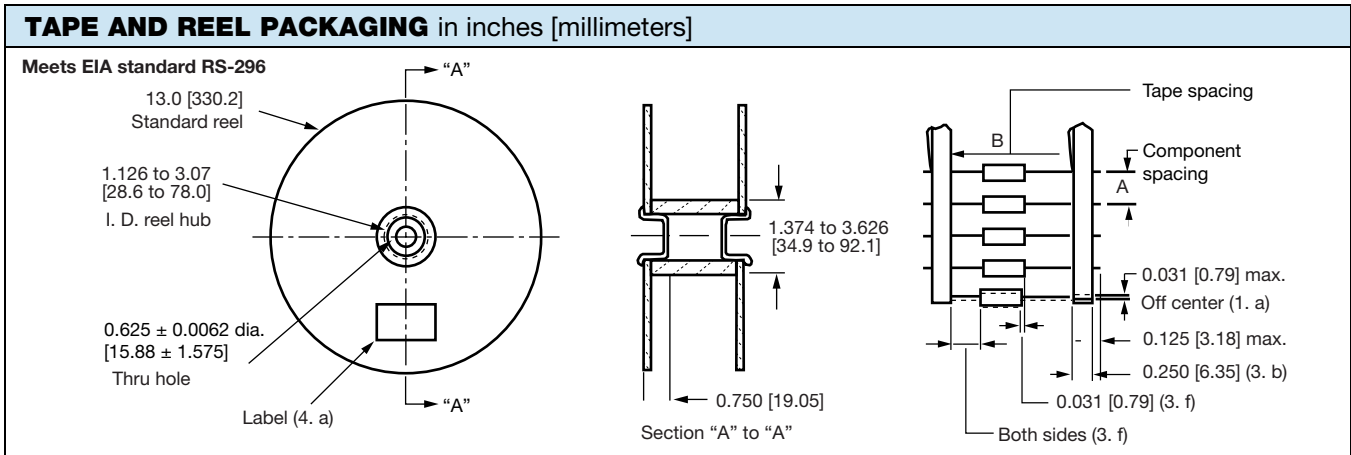
- Part number definitions:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % "X5" (special order)
  - Packaging options: B = bulk, T = tape and reel, G = ammo pack
  - Termination: E3 = 100 % tin, blank = SnPb



<b>STANDARD RATINGS</b>				
<b>CAPACITANCE (<math>\mu</math>F)</b>	<b>CASE CODE</b>	<b>PART NUMBER</b>	<b>MAX. DCL AT +25 °C (<math>\mu</math>A)</b>	<b>MAX. DF AT +25 °C 120 Hz (%)</b>
<b>30 V<sub>DC</sub> AT +85 °C, SURGE = 39 V; 20 V<sub>DC</sub> AT +125 °C, SURGE = 26 V</b>				
2.2	A	152D225(1)030A2(2)(3)	1.0	4
2.7	A	152D275(1)030A2(2)(3)	1.0	4
12	B	152D126(1)030B2(2)(3)	3.0	4
15	B	152D156(1)030B2(2)(3)	3.0	4
18	B	152D186(1)030B2(2)(3)	3.0	4
56	R	152D566(1)030R2(2)(3)	7.0	6
68	R	152D686(1)030R2(2)(3)	7.0	6
82	S	152D826(1)030S2(2)(3)	10.0	8
100	S	152D107(1)030S2(2)(3)	10.0	8
<b>35 V<sub>DC</sub> AT +85 °C, SURGE = 46 V; 23 V<sub>DC</sub> AT +125 °C, SURGE = 28 V</b>				
1.2	A	152D125(1)035A2(2)(3)	0.6	4
1.5	A	152D155(1)035A2(2)(3)	0.8	4
1.8	A	152D185(1)035A2(2)(3)	1.0	4
8.2	B	152D825(1)035B2(2)(3)	3.0	4
10	B	152D106(1)035B2(2)(3)	3.0	4
27	R	152D276(1)035R2(2)(3)	7.0	6
33	R	152D336(1)035R2(2)(3)	8.0	6
39	R	152D396(1)035R2(2)(3)	10.0	6
47	R	152D476(1)035R2(2)(3)	10.0	6
56	S	152D566(1)035S2(2)(3)	12.0	6
68	S	152D686(1)035S2(2)(3)	12.0	6
82	S	152D826(1)035S2(2)(3)	30.0	8
100	S	152D107(1)035S2(2)(3)	30.0	8
<b>50 V<sub>DC</sub> AT +85 °C, SURGE = 65 V; 33 V<sub>DC</sub> AT +125 °C, SURGE = 40 V</b>				
1.2	A	152D125(1)050A2(2)(3)	0.6	4
1.5	A	152D155(1)050A2(2)(3)	0.8	4
5.6	B	152D565(1)050B2(2)(3)	2.5	4
6.8	B	152D685(1)050B2(2)(3)	2.5	4
22	R	152D226(1)050R2(2)(3)	7.0	6
27	R	152D276(1)050R2(2)(3)	8.0	6
33	S	152D336(1)050S2(2)(3)	10.0	6
39	S	152D396(1)050S2(2)(3)	10.0	6
47	S	152D476(1)050S2(2)(3)	10.0	6
<b>60 V<sub>DC</sub> AT +85 °C, SURGE = 78 V; 39 V<sub>DC</sub> AT +125 °C, SURGE = 49 V</b>				
22	R	152D226(1)060R2(2)(3)	7	6

**Note**

- Part number definitions:
  - For 10 % tolerance specify "X9"; for 20 % specify "X0"; for 5 % "X5" (special order)
  - Packaging options: B = bulk, T = tape and reel, G = ammo pack
  - Termination: E3 = 100 % tin, blank = SnPb



<b>STANDARD PACKAGING QUANTITY AND DIMENSIONS</b> in inches [millimeters]					
CASE CODE	COMPONENT SPACING A	TAPE AND REEL		AMMO PACK	
		TAPE SPACING B	UNITS PER REEL	TAPE SPACING B	UNITS PER BOX
A	0.200 ± 0.015 [5.08 ± 0.38]	2.500 ± 0.062 [63.5 ± 1.57]	1000	2.063 ± 0.073 [53 ± 2]	500
B	0.200 ± 0.015 [5.08 ± 0.38]	2.500 ± 0.062 [63.5 ± 1.57]	1000	2.063 ± 0.073 [53 ± 2]	500
R	0.400 ± 0.015 [10.16 ± 0.38]	2.875 ± 0.062 [73.03 ± 1.57]	500	2.063 ± 0.073 [53 ± 2]	250
S	0.400 ± 0.015 [10.16 ± 0.38]	2.875 ± 0.062 [73.03 ± 1.57]	500	2.063 ± 0.073 [53 ± 2]	250

### STANDARD REEL PACKAGING INFORMATION

#### 1. Component Leads

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

#### 2. Orientation

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

#### 3. Reeling

- Components on any reel shall not represent more than two date codes when date code identification is required.
- Component leads shall be positioned between pairs of 0.250" [6.35 mm] tape.
- The disposable reels have hubs and corrugated fibreboard flanges and core or equivalent.
- A minimum of 12.0" [304.8 mm] leader of tape shall be provided before the first and after the last component on the reel.
- 50 lb or 60 lb. Kraft paper must be wound between layer of components as far as necessary for component protection. Width of paper to be 0.062" to 0.250" [1.57 mm to 6.35 mm] less than the "C" dimension of the reel.

- A row of components must be centered between tapes ± 0.047" [1.19 mm]. In addition, individual components may deviate from center of component row ± 0.031" [0.79 mm].
- Staples shall not be used for splicing. Not more than 4 layers of tape shall be used in any splice area and no tape shall be offset from another by more than 0.031" [0.79 mm] non-cumulative. Tape splices shall overlap at least 6.0" [152.4 mm] for butt joints and at least 3.0" [76.2 mm] for lap joints and shall not be weaker than unspliced tape. Universal splicing clips may also be used.
- Quantity per reel shall be controlled so that tape components and cover shall not extend beyond the smallest dimension of the flange (either across flats or diameter). Once the quantity per reel for each part number has been established, future orders for that part number shall be packaged in that quantity. When order or release quantity is less than the established quantity, a standard commercial pack is to be used.
- A maximum of 0.25 % of the components per reel quantity may be missing without consecutive missing components.
- Adequate protection must be provided to prevent physical damage to both reel and components during shipment and storage.

#### 4. Marking

Minimum reel and carton marking shall consist of the following: customer part number, purchase order no., quantity, package date, manufacturer's name, electrical value, date code, Vishay Sprague part number and country of origin.



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