

# SuperTan<sup>®</sup> Extended (STE) Capacitors, Wet Tantalum Capacitors with Hermetic Seal



## FEATURES

Vishay SuperTan<sup>®</sup> Extended (STE) represents a major breakthrough in wet tantalum capacitor technology. Its unique cathode system, also used in the ST, provides the highest capacitance per unit volume available. The STE combines the inherent reliability of wet tantalum with the capacitance stability of solid tantalum, and there are no circuit impedance restrictions. The range is exceptionally well suited for low voltage filtering and energy storage applications. Ideal for designs targeting the military and aerospace industry.



**RoHS\***  
COMPLIANT

The SuperTan<sup>®</sup> Extended (STE) is housed in an all tantalum, hermetically sealed case and is manufactured to withstand high stress and hazardous environments.

- Axial through-hole terminations: Standard tin/lead (Sn/Pb) 100 % tin (RoHS compliant) available
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

### Note

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

## PERFORMANCE CHARACTERISTICS

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

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

**DC Leakage Current (DCL Max.):** At + 25 °C and above: Leakage current shall not exceed the values listed in the Standard Ratings Tables.

**Life Test:** Capacitors are capable of withstanding a 2000 h life test at a temperature of + 85 °C at the applicable rated DC working voltage.

| ORDERING INFORMATION |                   |                                 |           |                          |                                  |   |
|----------------------|-------------------|---------------------------------|-----------|--------------------------|----------------------------------|---|
| STE                  | 6000              | 16                              | T4        | M                        | I                                | E3  |
| TYPE                 | CAPACITANCE<br>μF | DC VOLTAGE RATING<br>AT + 85 °C | CASE SIZE | CAPACITANCE<br>TOLERANCE | INSULATING<br>SLEEVE             | RoHS COMPLIANT  |
|                      |                   |                                 |           | M = ± 20 %<br>K = ± 10 % | I = Insulated<br>X = Uninsulated | E3 = 100 % tin termination<br>(RoHS compliant)<br>Blank = SnPb termination<br>(standard design) |

### Note

- Packaging: The use of formed plastic trays for packaging this type of axial lead component is standard. Tape and reel is not recommended due to the unit weight.

| DIMENSIONS in inches [millimeters] |                  |                       |   |                       |
|------------------------------------|------------------|-----------------------|---|-----------------------|
|                                    |                  |                       |   |                       |
| CASE CODE                          | D ± 0.016 [0.41] | MAX. INSULATED (DIA.) | L <sub>1</sub> + 0.031 [0.79] UNINSULATED | E ± 0.250 [6.35] MAX. |
| T1                                 | 0.188 [4.78]     | 0.219 [5.56]          | 0.453 [11.51]                             | 1.500 [38.10]         |
| T2                                 | 0.281 [7.14]     | 0.312 [7.92]          | 0.641 [16.28]                             | 2.250 [57.15]         |
| T3                                 | 0.375 [9.52]     | 0.406 [10.31]         | 0.766 [19.46]                             | 2.250 [57.15]         |
| T4                                 | 0.375 [9.52]     | 0.406 [10.31]         | 1.062 [26.97]                             | 2.250 [57.15]         |

**Notes**

- Material at egress is tantalum
- Insulation sleeving will lap over the ends of the capacitor case
- Tinned nickel leads, solderable and weldable
- Approx. weight:  
T1: 2.3 g, T2: 5.7 g  
T3: 9.4 g, T4: 14.8 g

| STANDARD RATINGS   |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
|--|-----------|-----------|-----------------|---|-------------------------|-----------------|------------------------------|----------------------------|----------------|-----------------|--------------------------|------------------------------|--|
| CAPACITANCE (μF)   | VOLTAGE   | CASE CODE | PART NUMBER     | MAX. ESR AT                                 | TYP. ESR AT             | MAX. DCL AT     |                              | MAX. CAPACITANCE CHANGE AT |                |                 | MAX. IMP. AT             | AC RIPPLE                    |  |
|  |           |           |                 | + 25 °C<br>120 Hz<br>(Ω)                    | + 25 °C<br>1 kHz<br>(Ω) | + 25 °C<br>(μA) | + 85 °C/<br>+ 125 °C<br>(μA) | - 55 °C<br>(%)             | + 85 °C<br>(%) | + 125 °C<br>(%) | - 55 °C<br>120 Hz<br>(Ω) | 85 °C<br>40 kHz<br>mA<br>RMS |  |
| <b>10 V<sub>DC</sub> at + 85 °C; 7 V<sub>DC</sub> at + 125 °C</b>  |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>680</b>   | <b>10</b> | <b>T1</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>2000</b>  | <b>10</b> | <b>T2</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| 4700   | 10        | T3        | STE4700-10T3MI  | 0.35  | < 0.200                 | 16              | 100                          | - 80                       | 10             | 20              | 3.50                     | 4000                         |  |
| 10 000   | 10        | T4        | STE10000-10T4MI | 0.25  | < 0.100                 | 25              | 150                          | - 85                       | 20             | 35              | 3.00                     | 5000                         |  |
| <b>16 V<sub>DC</sub> at + 85 °C; 11 V<sub>DC</sub> at + 125 °C</b> |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>430</b>   | <b>16</b> | <b>T1</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>1200</b>  | <b>16</b> | <b>T2</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| 3300   | 16        | T3        | STE3300-16T3MI  | 0.35  | < 0.200                 | 16              | 100                          | - 80                       | 10             | 15              | 3.50                     | 4000                         |  |
| 6000   | 16        | T4        | STE6000-16T4MI  | 0.30  | < 0.150                 | 25              | 150                          | - 80                       | 15             | 20              | 3.00                     | 4500                         |  |
| <b>25 V<sub>DC</sub> at + 85 °C; 15 V<sub>DC</sub> at + 125 °C</b> |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>270</b>   | <b>25</b> | <b>T1</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>1000</b>  | <b>25</b> | <b>T2</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>2200</b>  | <b>25</b> | <b>T3</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| 4000   | 25        | T4        | STE4000-25T4MI  | 0.35  | < 0.150                 | 25              | 125                          | - 80                       | 15             | 20              | 5.00                     | 4250                         |  |
| <b>30 V<sub>DC</sub> at + 85 °C; 20 V<sub>DC</sub> at + 125 °C</b> |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>220</b>   | <b>30</b> | <b>T1</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>820</b>   | <b>30</b> | <b>T2</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>1800</b>  | <b>30</b> | <b>T3</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| 3300   | 30        | T4        | STE3300-30T4MI  | 0.35  | < 0.200                 | 25              | 125                          | - 80                       | 20             | 25              | 4.00                     | 2750                         |  |
| <b>35 V<sub>DC</sub> at + 85 °C; 22 V<sub>DC</sub> at + 125 °C</b> |           |           |                 |   |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>180</b>   | <b>35</b> | <b>T1</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>680</b>   | <b>35</b> | <b>T2</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| <b>1500</b>  | <b>35</b> | <b>T3</b> |                 | <i>Preliminary value, contact marketing</i> |                         |                 |                              |                            |                |                 |                          |                              |  |
| 2800   | 35        | T4        | STE2800-35T4MI  | 0.35  | < 0.200                 | 25              | 125                          | - 80                       | 20             | 30              | 4.50                     | 4000                         |  |



| STANDARD RATINGS  |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
|---|------------|--------------|----------------|-----------------------------------|----------------------------------|-----------------------|------------------------------------|----------------|----------------|-------------------------------|-------|------|--|--|
| CAPACITANCE<br>( $\mu$ F)   | VOLTAGE    | CASE<br>CODE | PART NUMBER    | MAX. ESR AT                       |                                  | TYP. ESR AT           |                                    | MAX. DCL AT    |                | MAX. CAPACITANCE<br>CHANGE AT |       |      | MAX.<br>IMP. AT<br>- 55 °C<br>120 Hz<br>( $\Omega$ ) | AC<br>RIPPLE<br>85 °C<br>40 kHz<br>mA<br>RMS |
|   |            |              |                | + 25 °C<br>120 Hz<br>( $\Omega$ ) | + 25 °C<br>1 kHz<br>( $\Omega$ ) | + 25 °C<br>( $\mu$ A) | + 85 °C/<br>+ 125 °C<br>( $\mu$ A) | - 55 °C<br>(%) | + 85 °C<br>(%) | + 125 °C<br>(%)               |       |      |  |  |
| <b>50 V<sub>DC</sub> at + 85 °C; 30 V<sub>DC</sub> at + 125 °C</b>  |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
| <b>110</b>  | <b>50</b>  | <b>T1</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>350</b>  | <b>50</b>  | <b>T2</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>900</b>  | <b>50</b>  | <b>T3</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| 1500  | 50         | T4           | STE1500-50T4MI | 0.35                              | < 0.215                          | 15                    | 110                                | - 70           | 20             | 20                            | 6.00  | 3500 |  |  |
| 2200  | 50         | T4           | STE2200-50T4MI | 0.60                              | < 0.400                          | 25                    | 125                                | - 80           | 25             | 30                            | 4.50  | 3000 |  |  |
| <b>60 V<sub>DC</sub> at + 85 °C; 40 V<sub>DC</sub> at + 125 °C</b>  |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
| <b>68</b>   | <b>60</b>  | <b>T1</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>220</b>  | <b>60</b>  | <b>T2</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>560</b>  | <b>60</b>  | <b>T3</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| 1000  | 60         | T4           | STE1000-60T4MI | 0.50                              | < 0.300                          | 20                    | 120                                | - 40           | 10             | 15                            | 5.50  | 3500 |  |  |
| <b>75 V<sub>DC</sub> at + 85 °C; 50 V<sub>DC</sub> at + 125 °C</b>  |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
| <b>56</b>   | <b>75</b>  | <b>T1</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| 180   | 75         | T2           | STE180-75T2MI  | 1.50                              | < 0.500                          | 5                     | 25                                 | - 35           | 15             | 20                            | 30.00 | 2000 |  |  |
| 470   | 75         | T3           | STE470-75T3MI  | 0.60                              | < 0.325                          | 25                    | 100                                | - 45           | 10             | 25                            | 10.00 | 3000 |  |  |
| 750   | 75         | T4           | STE750-75T4MI  | 0.50                              | < 0.400                          | 20                    | 120                                | - 35           | 10             | 15                            | 6.50  | 3500 |  |  |
| <b>100 V<sub>DC</sub> at + 85 °C; 65 V<sub>DC</sub> at + 125 °C</b> |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
| <b>27</b>   | <b>100</b> | <b>T1</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>86</b>   | <b>100</b> | <b>T2</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| 220   | 100        | T3           | STE220-100T3MI | 1.40                              | < 0.200                          | 5                     | 25                                 | - 55           | 10             | 15                            | 18.00 | 2500 |  |  |
| 400   | 100        | T4           | STE400-100T4MI | 0.70                              | < 0.400                          | 10                    | 120                                | - 40           | 6              | 12                            | 15.00 | 3000 |  |  |
| <b>125 V<sub>DC</sub> at + 85 °C; 85 V<sub>DC</sub> at + 125 °C</b> |            |              |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  |  |
| <b>18</b>   | <b>125</b> | <b>T1</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>56</b>   | <b>125</b> | <b>T2</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| <b>150</b>  | <b>125</b> | <b>T3</b>    |                |                                   |                                  |                       |                                    |                |                |                               |       |      |  | <i>Preliminary value, contact marketing</i>  |
| 240   | 125        | T4           | STE240-125T4MI | 0.80                              | < 0.600                          | 15                    | 150                                | - 35           | 6              | 12                            | 20.00 | 2500 |  |  |



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