We, Samsung, declare that our Polymer Tantalum Capacitor is produced in accordance with EU RoHS directive.

1. RoHS compliance and restriction of Br
The following restricted materials are not used in packaging materials as well as products in compliance with the law and restriction.
- Cd, Pb, Hg, Cr6+, As, Br and the compounds, PCB, asbestos
- Bromic materials: PBBs, PBxs, PBDO, PBDE, PBB
- Phthalate materials: DEHP, BBP, DBP, DIBP

2. No use of materials breaking Ozone layer
The following ODS materials are not used in our fabrication process.
- ODS materials: Freon, Haron, 1-1-1 TCE, CCl4, HCFC

If you want more information, please visit the website of Samsung Electro-Mechanics. http://www.samsungsem.com
# Contents

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<th>Page</th>
</tr>
</thead>
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</tr>
<tr>
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<td>15</td>
</tr>
</tbody>
</table>
Guidelines for Using Polymer Tantalum Capacitor

Operational Attentions

Operating Voltage

It is recommended to use within 80% of the rated voltage. In a circuit in which instantaneous current flows by switching or charging and discharging, a resistor of 3Ω or more per 1V of the applied voltage is connected in series.

Reverse Voltage

Since the solid electrolytic tantalum chip capacitor has polarity, the application of reverse voltage should be avoided. The sum of the DC voltage and the negative peak ripple voltage should not allow a voltage reversal.

Ripple Voltage

The sum of DC voltage and peak ripple voltage should not exceed the rated voltage. This is based on an ambient temperature of 25°C.

Restriction of Rapid Charge and Discharge

Rapid charge and discharge are restricted (for maintenance of high-proof reliability). A protection circuit is recommended for when a rapid charge or discharge causes excessive rush current because this is main cause of short circuit and large leakage current. Use protection circuits when the rush current value exceeds 20A. Be sure to insert a protection resistor of about 1KΩ for charge and discharge when measuring the leakage current.

Prohibited Circuits

Polymer tantalum capacitors should not be used in the following circuits.

① High impedance voltage retention circuits
② Time constant circuits
③ Coupling circuits
④ Circuit greatly affected by leakage current and ESR
⑤ Circuit in which two or more polymer tantalum capacitors are connected in series to increase withstand voltage
Guidelines for Using Polymer Tantalum Capacitor

Mounting

Caution before Mounting

A capacitor that has been damaged should be discarded to avoid later problems resulting from mechanical stress. Printed circuit boards on which capacitors are mounted should have a low thermal expansion coefficient. In reflow soldering, if footprints on printed circuit boards are much wider than the capacitor terminals, the capacitor position may shift when the solder melts.

Caution during Mounting with Mounting (pick-and-place) Machine

1. Mounting Head Pressure
   Excessive pressure may cause cracks in capacitor. It is recommended to adjust the nozzle pressure within the maximum value of 300g.f.

2. Bending Stress
   When using a two-sided substrate, it is required to mount capacitor on one side first before mounting on the other side due to the bending of the substrate caused by the mounting head. Support the substrate as shown in the picture below when capacitor is mounted on the other side. If the substrate is not supported, bending of the substrate may cause cracks in capacitor.

3. Suction Nozzle
   Dust accumulated in a suction nozzle and suction mechanism can impede a smooth movement of the nozzle. This may cause cracks in capacitor due to the excessive force during mounting. If the mounting claw is worn out, it may cause cracks in capacitor due to the uneven force during positioning. A regular inspection such as maintenance, monitor and replacement for the suction nozzle and mounting claw should be conducted.
Guidelines for Using Polymer Tantalum Capacitor

**Soldering**

**Reflow Soldering**

Polymer tantalum capacitors must be attached to the substrate according to an appropriate method to prevent unexpected defects in the assembly process. Reflow soldering is recommended to attach the tantalum capacitor. The assembly substrate must be preheated before reflow soldering is performed. As shown below, it should not exceed 260°C and 5 seconds, and it is recommended to keep the number of reflow repetitions less than 3 times.

The recommended conditions are as follows.

1. **Power**: 30W
2. **Iron core temperature**: Max 350°C
3. **Time**: 3 seconds or less

---

**Hand Soldering**

When mounting using a soldering iron, make sure that it does not directly touch the chip. The recommended conditions are as follows.

- Power: 30W
- Iron core temperature: Max 300°C
- Time: 3 seconds or less
Guidelines for Using Polymer Tantalum Capacitor

Land Dimension

Storage

When storing the polymer tantalum capacitor, it is necessary to maintain an environment capable of preventing deterioration of solderability and moisture absorption. It should be kept sealed in the Moisture Barrier Bag under 5°-40 °C and 20%-60% RH conditions. Do not leave the remaining amount after opening. If the remaining amount is inevitably left, it should be put in MBB and resealed.

The polymer tantalum capacitor must follow the following usage conditions after opening.

<table>
<thead>
<tr>
<th>Level</th>
<th>Floor Life (Out of Bag)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Time</td>
</tr>
<tr>
<td></td>
<td>Condition</td>
</tr>
<tr>
<td></td>
<td>168 hrs</td>
</tr>
<tr>
<td></td>
<td>≤30°C / 60%RH</td>
</tr>
</tbody>
</table>

Polymer tantalum capacitors should not be stored in the following places.

① A place where direct sunlight shines
② A damp place with water, dew, condensation, oil, etc.
③ Places filled with toxic gases (e.g., hydrogen sulfide, sulfur dioxide, nitrous acid, chlorine, ammonia, etc.)
④ A place that can be exposed to ozone, ultraviolet rays, radiation, etc.;
Part Numbering

1. PRODUCT NAME
   TC = Tantalum Capacitors

2. SERIES

3. RATED VOLTAGE

<table>
<thead>
<tr>
<th>Code</th>
<th>0D</th>
<th>0E</th>
<th>0G</th>
<th>0J</th>
<th>1A</th>
<th>1C</th>
<th>1D</th>
<th>1E</th>
<th>1V</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.V (V)</td>
<td>2</td>
<td>2.5</td>
<td>4</td>
<td>6.3</td>
<td>10</td>
<td>16</td>
<td>20</td>
<td>25</td>
<td>35</td>
</tr>
</tbody>
</table>
※ The rated voltages not in the table above are indicated by double digits number.

4. CAPACITANCE

<table>
<thead>
<tr>
<th>Code</th>
<th>Pico Farad</th>
<th>Micro Farad</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>10x10^6</td>
<td>10</td>
</tr>
<tr>
<td>107</td>
<td>10x10^7</td>
<td>100</td>
</tr>
</tbody>
</table>
※ First two digits represent significant figures and third digit represents multiplier in pF.

5. CAPACITANCE TOLERANCE
   K = ±10%, M = ±20%

6. CASE CODE

7. REEL SIZE
   A = 7 inches, C = 13 inches

8. TAPING DIRECTION
   R = Right Hand Orientation
   ; polarity marking on the opposite side of sprocket hole

9. ESR/HEIGHT
   4 Numbers ; ESR Spec (mOhm)
   (ex) 0100 = 100 mOhm, 0050 = 50 mOhm
   3 Numbers + 1 Character ; ESR Spec + H code
   3 Numbers = ESR Spec (mOhm)
   First two digits represent significant figures.
   Third digit represents decimal multiple ( x 10^n, n; integer).
   1 Character = H Code (max Height in mm)
   (ex) 500S = 50 (50 x 10^0) mOhm, max 1.0mm
   201T = 200 (20 x 10^1) mOhm, max 0.9mm

The specification and designs contained herein may be subjected to change without notice.
Please contact our sales representatives or application engineers before order.
Product Information

Structure

Structure of Element

PCF Series

PFT Series

PBL Series

Dimension

[Table]

<table>
<thead>
<tr>
<th>Case code</th>
<th>EI A</th>
<th>H code</th>
<th>L</th>
<th>W₁</th>
<th>W₂</th>
<th>H</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>1608-09</td>
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<td>1.6±0.2</td>
<td>0.8±0.2</td>
<td>0.6±0.1</td>
<td>0.8±0.1</td>
<td>0.4±0.1</td>
</tr>
<tr>
<td>J</td>
<td>1608-10</td>
<td></td>
<td>1.6±0.2</td>
<td>0.8±0.2</td>
<td>0.6±0.1</td>
<td>0.9±0.1</td>
<td>0.4±0.1</td>
</tr>
<tr>
<td>P</td>
<td>2012-06</td>
<td>B</td>
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<td>0.9±0.1</td>
<td>0.65max</td>
<td>0.5±0.2</td>
</tr>
<tr>
<td>O</td>
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<td>0.7±0.1</td>
<td>0.5±0.2</td>
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<td>0.8±0.1</td>
<td>0.5±0.2</td>
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<tr>
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<td>0.9±0.1</td>
<td>0.5±0.2</td>
</tr>
<tr>
<td>A</td>
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<td>S</td>
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<td>1.2±0.1</td>
<td>0.9±0.1</td>
<td>0.8±0.2</td>
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<tr>
<td>S</td>
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<td></td>
<td>3.2±0.2</td>
<td>1.6±0.2</td>
<td>1.2±0.1</td>
<td>1.1±0.1</td>
<td>0.8±0.2</td>
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<td>0.8±0.2</td>
</tr>
<tr>
<td>B</td>
<td>3528-10</td>
<td>S</td>
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<td>2.2±0.1</td>
<td>0.9±0.1</td>
<td>0.8±0.2</td>
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<tr>
<td>T</td>
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<td></td>
<td>3.5±0.2</td>
<td>2.8±0.2</td>
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<td>1.1±0.1</td>
<td>0.8±0.2</td>
</tr>
<tr>
<td>B</td>
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<td>0.8±0.2</td>
</tr>
<tr>
<td>G</td>
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<td>4.3±0.2</td>
<td>2.4±0.1</td>
<td>1.4±0.1</td>
<td>1.3±0.2</td>
</tr>
<tr>
<td>W</td>
<td>7343-20</td>
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<td>4.3±0.2</td>
<td>2.4±0.1</td>
<td>1.9±0.1</td>
<td>1.3±0.2</td>
</tr>
<tr>
<td>D</td>
<td>7343-30</td>
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<td>4.3±0.2</td>
<td>2.4±0.1</td>
<td>2.8±0.2</td>
<td>1.3±0.2</td>
</tr>
</tbody>
</table>

* H code only available on PFT series parts

Ratings & Part Number Reference

Please refer to the website below for detailed specifications of each model.

http://product.samsungsem.com

The specification and designs contained herein may be subjected to change without notice. Please contact our sales representatives or application engineers before order.
## Characteristics Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>Characteristics</th>
<th>Test Condition</th>
</tr>
</thead>
</table>
| Surge voltage | · Change in capacitance: within ±20% of initial value  
 · Dissipation Factor: within initial limit  
 · Leakage Current: within 3 x initial limit | · Applied voltage: Surge voltage  
 · Temperature: 85°C  
 · Test condition:  
   - Charging: 30 ± 5 sec  
   - Discharging: 5.5 ± 0.5 min  
   - Repetition: 1,000 cycles |
| Load life (Endurance) | · Change in capacitance: within ±30% of initial value*1  
 · Dissipation Factor: within 1.5 x initial limit at 85°C  
 · Leakage Current: within 1.5 x initial limit  
 · No sign of remarkable damage | · Applied voltage:  
   - For parts with rated temperature of 85°C  
   - Rated voltage @ 85°C  
   - Derated voltage @ 105°C  
   - Time: 2,000 (+72/-0) hrs  
   - Measurement should be made after a cooling time of 4 hours or more at room temperature. |
| Moisture resistance | · Change in capacitance: within -20 ~ +35% of initial value*1  
 · Dissipation Factor: within -30 ~ +35% of initial value*2  
 · Leakage Current: within 1.5 x initial limit  
 · No sign of remarkable damage | · Temperature: 40 ± 2°C  
 · Humidity: 90 ~ 95% RH  
 · Applied voltage: No load  
 · Duration: 500 (+8/-0) hrs  
 · Measurement should be made after a cooling time of 4 hours or more at room temperature. |

*1 Category 1  
*2 Category 2

### Applied voltage for reliability test

<table>
<thead>
<tr>
<th>Voltage Type</th>
<th>2.5</th>
<th>4</th>
<th>6.3</th>
<th>8</th>
<th>10</th>
<th>15</th>
<th>16</th>
<th>18</th>
<th>20</th>
<th>25</th>
<th>35</th>
<th>38</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage (@ 85°C)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surge Voltage (@ 85°C)</td>
<td>3.3</td>
<td>5.2</td>
<td>8.2</td>
<td>10.4</td>
<td>13.0</td>
<td>19.5</td>
<td>20.8</td>
<td>23.4</td>
<td>26.0</td>
<td>32.5</td>
<td>45.5</td>
<td>49.4</td>
</tr>
<tr>
<td>Derated Voltage (@ 105°C)</td>
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<td>5.0</td>
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<td>16.0</td>
<td>20.0</td>
<td>28.0</td>
<td>30.4</td>
</tr>
</tbody>
</table>

[Unit: Volts]

---

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Marking

1608 size

![Diagram](image1)

2012 size

![Diagram](image2)

Marking code references

1608 size

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<tr>
<th>Capacitance</th>
<th>Voltage</th>
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<th>4</th>
<th>6.3</th>
<th>10</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2012 size

<table>
<thead>
<tr>
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<th>Voltage</th>
<th>6.3</th>
<th>8</th>
<th>25</th>
<th>38</th>
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</thead>
<tbody>
<tr>
<td>1.0</td>
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<td></td>
<td></td>
<td></td>
<td>XA</td>
</tr>
<tr>
<td>3.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EN</td>
</tr>
<tr>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ES</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td>KJ</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
<td></td>
<td></td>
<td>KN</td>
<td></td>
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<tr>
<td>47</td>
<td>JS</td>
<td></td>
<td></td>
<td>KS</td>
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</tbody>
</table>

H code reference

<table>
<thead>
<tr>
<th>Code</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
<th>P</th>
<th>Q</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>H_{max}</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
<td>1.7</td>
<td>1.6</td>
<td>1.5</td>
<td>1.4</td>
<td>1.3</td>
<td>1.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>W</th>
<th>X</th>
<th>Y</th>
<th>A</th>
<th>B</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>H_{max}</td>
<td>1.0</td>
<td>0.9</td>
<td>0.8</td>
<td>0.7</td>
<td>0.6</td>
<td>0.5</td>
<td>0.55</td>
<td>0.65</td>
<td>0.95</td>
</tr>
</tbody>
</table>

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Marking

3216 size

(+ Polarity (Voltage/Capacitance/Height)

3528 size

(+ Polarity Voltage/Capacitance Production Code

7343 size

(+ Polarity Capacitance Voltage

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Packaging Specification

Packaging

The tantalum chip capacitors shall be packaged in a tape and reel form for effective use.

- Carrier tape: Semi-transparent embossed plastic
- Cover tape: Attached by heating press, polyester

Reel Dimension

<table>
<thead>
<tr>
<th>Reel</th>
<th>Tape Width</th>
<th>A +0/-3.0</th>
<th>N Min.</th>
<th>C ±0.3</th>
<th>G ±0.5</th>
<th>T ±0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 inch</td>
<td>8mm</td>
<td>180</td>
<td>60</td>
<td>13</td>
<td>9</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>12mm</td>
<td>180</td>
<td>60</td>
<td>13</td>
<td>13</td>
<td>1.2</td>
</tr>
<tr>
<td>13 inch</td>
<td>8mm</td>
<td>330</td>
<td>80</td>
<td>13</td>
<td>9</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>12mm</td>
<td>330</td>
<td>80</td>
<td>13</td>
<td>13</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The specification and designs contained herein may be subjected to change without notice. Please contact our sales representatives or application engineers before order.
## Packaging Specification

### Carrier Tape Dimension

![Carrier Tape Dimension Diagram](image)

<table>
<thead>
<tr>
<th>EIA Code</th>
<th>Chip Height</th>
<th>Case Code</th>
<th>W (±0.3/0.1)</th>
<th>P₁ (±0.1)</th>
<th>E₁ (±0.05)</th>
<th>F (±0.05)</th>
<th>D₀ (±0.25/0)</th>
<th>D₁ (±0.25/0)</th>
<th>P₂ (±0.05)</th>
<th>P₂ (±0.05)</th>
<th>A₀ (±0.1)</th>
<th>B₀ (±0.1)</th>
<th>K₀ (±0.1)</th>
<th>T (±0.02)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1608</td>
<td>0.9</td>
<td>K</td>
<td>8.0</td>
<td>4.0</td>
<td>1.75</td>
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<td>J</td>
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*1 Tolerance: ±0.03
Packaging Specification

Packaging Box

![Diagram of packaging box]

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The products listed as follows are NOT designed and manufactured for any use and applications set forth below. Please note that any misuse of the products deviating from product specifications or information provided in this Spec sheet may cause serious property damages or personal injury.

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② Automotive of Transportation equipment (vehicles, trains, ships, etc.)
③ Military equipment
④ Atomic energy-related equipment
⑤ Undersea equipment
⑥ Any other applications with the same as or similar complexity or reliability to the applications

Limitation

Please contact us with usage environment information such as voltage, current, temperature, or other special conditions before using our products for the applications listed below. The below application conditions require especially high reliability products to prevent defects that may directly cause damages or loss to third party's life, body or property.

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② Disaster prevention/crime prevention equipment
③ Power plant control equipment
④ Traffic signal equipment
⑤ Data-processing equipment
⑥ Electric heating apparatus, burning equipment
⑦ Safety equipment
⑧ Any other applications with the same as or similar complexity or reliability to the applications
Quality System Certification

Certification Lists of Philippines Factory

- **IATF 16949**
  - Authority: BSI
  - Number: IATF_91430-005
  - Date: 2021-08-17
  - Validity: 2024-08-16

- **QC 080000**
  - Authority: IECQ
  - Number: IECQ-H_ULTW_10.0016
  - Date: 2022-06-27
  - Validity: 2025-07-04

- **ISO 14001**
  - Authority: BSI
  - Number: EMS_77354
  - Date: 2021-07-13
  - Validity: 2024-07-12

- **ISO 45001**
  - Authority: BSI
  - Number: OHS_568723
  - Date: 2022-10-14
  - Validity: 2025-10-13
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