

Tantalum Capacitors - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts 2019 - 2029

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Report description:

The Tantalum Capacitors Market size is estimated at USD 3.81 billion in 2024, and is expected to reach USD 4.69 billion by 2029, growing at a CAGR of 4.30% during the forecast period (2024-2029).

Key Highlights

- Tantalum capacitors include a conductive cathode surrounding a layer of oxide that serves as a dielectric and acts as an anode for the tantalum metal. The use of tantalum enables a very thin dielectric layer. This results in a higher capacitance value per volume, superior frequency characteristics compared to multiple other types of capacitors, and excellent stability over time.
- However, the downside of using these tantalum capacitors is their unfavorable failure mode, which may lead to thermal runaway, fires, and small explosions. However, external failsafe devices like thermal fuses or current limiters can prevent this from happening. Technological advancements have enabled these tantalum capacitors to be used in various circuits found in laptops, automobiles, and cell phones, among others, most often in the form of surface-mounted devices. These surface-mount tantalum capacitors also require less space on the PCBs and allow for greater packing densities.
- These tantalum capacitors have also been made available in military-specified versions that offer tighter tolerances and a more comprehensive operating temperature range. These have become a popular replacement for aluminum electrolytics in military applications as they do not tend to dry out and change capacitance over a period of time. Medical electronic technologies also rely on these owing to their higher stability. Also, audio amplifiers sometimes use these tantalum capacitors where stability is a critical factor.
- Similarly, the demand for tantalum capacitors in harsh environments is expected to increase the bargaining power of the suppliers as there are more product innovations. For instance, in May 2022, Exxelia announced the launch of MIL-PRF-39006/25 and MIL-PRF-39006/22 tantalum capacitors with support for reliability level R. The capacitors meet standards set by the US Department of Defense and are designed to operate in the harshest environmental conditions, with temperatures ranging from

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-55C to +125C.

-Additionally, in May 2022, Vishay also introduced wet tantalum capacitors with the highest capacitance per voltage rating for military and avionics applications. The capacitors are made available as an option in the B and C case codes and are built on SuperTan technology to feature a capacitance from 3,600 F to 72,000 F in the C case code and 2,700 F to 48,000 F in the B case code. Therefore, such innovations are driving adoption growth for tantalum capacitors in military sectors.

-Moreover, as 5G is rapidly growing, the need for tantalum capacitor increases. The replacement of solid capacitors with wet tantalum capacitors is likely to present an opportunity soon. In military applications, they are a popular replacement for aluminum electrolytes as they do not tend to dry out and change capacitance over time.

-On the other side, tantalum capacitors have several challenges, including their high cost compared to aluminum electrolytic capacitors, being inherently polarized and vulnerable to reverse voltage, and the potential for failure due to transient voltage, surge, peak, or pulse currents. Current surges or leakage current can also harm solid tantalum electrolytic capacitors. However, tantalum capacitors also offer advantages such as high capacitance per volume and lower weight due to their very thin and high permittivity dielectric layer.

-There were several COVID-19-related applications of tantalum capacitors, as mentioned in various reports. For example, a report by Medical Design Briefs mentioned using tantalum capacitors in medical devices that were essential for the life support monitoring of COVID-19 patients. Another report by TTI, Inc. suggested that in many applications, tantalum capacitors could be used instead of multilayer ceramic capacitors (MLCCs), which faced supply chain disruptions and fallout due to the COVID-19 pandemic. In the post-pandemic scenario, there was an increase in the use of tantalum capacitors as the situation became more normalized.

Tantalum Capacitors Market Trends

Consumer Electronics Segment is Expected to Drive the Market's Growth

- Tantalum capacitors are essential components in many electronic devices, including consumer electronics such as smartphones, laptops, and tablets. These capacitors offer high capacitance per volume, allowing for smaller, more efficient devices. However, tantalum capacitors are considerably more reliable than comparable aluminum electrolytic capacitors and must be carefully handled as they are inherently polarized.

- Tantalum capacitors are commonly used in various consumer electronic devices, including smartphones. These capacitors are often used as the capacitor connected to the power line of the Power Amplifier (PA) for GSM on smartphones. Tantalum capacitors are small in size, making them suitable for use in small-footprint applications like smartphones. According to Ericsson, the global number of smartphone subscriptions reached over 6.6 billion in 2022 and is expected to hit 7.8 billion by 2028. The countries with the most smartphone mobile network subscriptions are China, India, and the United States. Such a huge rise in smartphones would drive the market.

- Tantalum capacitors are also used in laptops and other electronic devices. For example, researchers demonstrated that about 1 gram of tantalum is used per unit in laptops, specifically in motherboard power supply filters. This is because tantalum capacitors offer higher capacitance values than MLCC capacitors and display no microphonic effect, making them an attractive option for devices with flat or compact designs.

- According to the National Bureau of Statistics of China, China produced around 32.66 million units completed computers in April 2022. Further, according to the Ministry of Electronics and Information Technology, the value of computer hardware output in India was INR 220 billion (USD 2.64 billion), in the fiscal year 2021. The value of computer accessories produced in the country has been steadily increasing. Such huge spending on computer production would create an opportunity for the tantalum capacitors manufacturers to expand their product portfolio.

- Furthermore, a television uses capacitors for multiple purposes. They are used as couplers between circuits, timing components, and electronic filters. Most televisions have a power supply converting the 110-volt alternating current from a household outlet to

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a low-voltage direct current. Power supply circuits utilize large tantalum capacitors as a form of electronic muffler that removes electrical noise. As tantalum capacitors hold electric charge, they act as dampers, which significantly slows down sudden movements of current, including noise.

North America is Expected to Hold a Major Market Share

- The North American region is one of the largest consumers of capacitors in the world. The automotive and electronics sectors are anticipated to be significant consumers of capacitors in countries such as the United States. The U.S. is one of the largest automotive markets in the world and is home to more than 13 major automakers.
- Recently, the two largest automotive industry trade associations in the United States, Global Automakers and the Alliance of Automobile Manufacturers, merged to form a new alliance known as the Alliance for Automotive Innovation, which is expected to help introduce innovations in the automotive industry. With changing dynamics in the sector, automotive manufacturers are moving towards electric vehicles to meet the needs of next-generation consumers. California dominates the United States market in terms of sales of EVs. Its Zero Emission Vehicle (ZEV) program is driving demand for EVs by requiring automakers in the state to sell a certain percentage of electric cars.
- According to the US Energy Information Administration (EIA), hybrid, plug-in hybrid, and battery EVs collectively represented 16% of US light-duty vehicle sales in the second quarter of 2023. Additionally, According to Statistics Canada, ZEVs make up approximately 10% of the new vehicles registered in Canada. The market share of ZEVs reached a new high of 10.5% in Q2 2023, showing a significant increase from 9.2%. Furthermore, the total volume of light industry vehicles (with a gross vehicle weight of 8500 lbs or less) in Canada saw a notable growth of 34.3%. Such a rise in EV sales would create lucrative opportunities for the studied market.
- Tantalum capacitors are commonly used in defense electronics due to their high reliability and performance in harsh environments. Tantalum capacitors can withstand high temperatures and vibrations, making them ideal for use in military and aerospace applications. The Defense Federal Acquisition Regulation Supplement (DFARS) requires that tantalum capacitors used in defense systems not contain materials sourced from certain countries to ensure supply chain security.
- The rise in the defense budget would drive demand for the studied market. According to the US Congressional Budget Office, defense spending in the United States is expected to rise annually until 2033. Defense spending in the United States is expected to reach USD 746 billion in 2023. Defense spending is expected to rise to USD 1.1 trillion by 2033, according to the prediction. Such huge spending in defense would allow the players to develop new products to cater to a wide range of customer needs.

Tantalum Capacitors Industry Overview

The tantalum capacitors market is semi-consolidated due to large vendors in the global market. The key players are involved in various strategies, such as acquisitions and partnerships, to improve their market share and enhance their profitability in the market. The key players in the market include Vishay Intertechnology, Inc., KEMET Corporation, TE Connectivity, AVX Corporation, ROHM Co., Ltd., and many others.

- October 2023: Vishay Intertechnology, Inc. announced the release of a new series of wet tantalum capacitors with hermetic glass-to-metal seals. These STH electrolytic capacitors are specifically designed for avionics and aerospace applications and offer all the benefits of Vishay's SuperTan extended series devices. They also feature a higher reliability design, enhancing military H-level shock (500 g) and vibration capabilities and increased thermal shock up to 300 cycles.
- October 2023: KYOCERA AVX announced its contribution to the Indian Space Research Organization's (ISRO's) historic Chandrayaan-3 lunar mission. The company provided various essential components for the Pragyaan lunar rover, including

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specially designed stacked TCH Series surface-mount tantalum polymer capacitors that meet ISRO specifications. Additionally, KYOCERA AVX engineered miniature CWR15 MIL-PRF-55365/12 tantalum chip capacitors to downsize military and aerospace circuits, along with high-capacitance and low-ESR TES Series ESCC QPL tantalum chip capacitors.

Additional Benefits:

- The market estimate (ME) sheet in Excel format
- 3 months of analyst support

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