

# Tantalum capacitor production issues

Why do tantalum capacitors fail?

The reasons for the failure of tantalum capacitors can be generally divided into two major categories of quality problems and circuit design problems of tantalum capacitors. The specifications of the tantalum capacitors are required to meet the circuit design requirements.

Can tantalum capacitors be substituted?

Although tantalum capacitors constitute less than 10 percent of the overall capacitor market, almost 50 percent of the tantalum supply is used by the capacitor industry, making tantalum prices very sensitive to the demand from the capacitor industry (Vulcan, 2009). Therefore, we focus on substitution of tantalum capacitors.

What happens if a tantalum capacitor has too high ESR?

When a tantalum capacitor with too high ESR is used in a filter circuit with very high AC ripples, even if the voltage is far below the derating limit, sometimes a sudden breakdown will occur at the moment of startup; The main reason for this kind of problem is the serious mismatch between the ESR of the capacitor and the AC ripple in the circuit.

Why do R & D Engineers not use tantalum capacitors?

The burning or explosion of tantalum capacitors is the biggest headache for R & D engineers and makes them puzzled sometimes. Because of the danger of the failure mode of tantalum capacitors, many R & D technicians dare not use tantalum capacitors.

Why is primary tantalum supply prone to disruptions?

Analyzing the exposure of primary tantalum supply to disruptions is complex because of a lack of data on production and trade and the mismatch between production data and trade data, as well as a general lack of transparency in minor metal industries. Artisanal mining in Africa adds further complications.

What is the growth rate of tantalum consumption?

The overall growth rate of tantalum consumption is 4%~5%, and more Ta is needed in preparing sputtering targets, superalloys and Ta compounds. The Ta consumption in the capacitor field grows by 1.5%, a value below average, and saturation of the market and miniaturisation of capacitors are the main reasons.

Tantalum capacitors often raise concerns, especially in industries like switching and LED power supplies, due to their history of occasional failures. Despite this, they are valued for their high capacitance, reliability, and compact design, making them a popular choice in space-constrained electronic systems. These failures are typically ...

the end electronic device. In Tantalum (Ta) capacitors 50% or higher de-rating (reduced application voltage  $V_a$  vs. rated voltage  $V_r$ ) is the way the reliability issues with the commercial parts is addressed. In reality,

# Tantalum capacitor production issues

commercial Ta capacitors with 50% de-rating may be more expensive and less reliable than high

Case sizes, mounting guidelines etc of the niobium-based chip capacitors are, however, identical to tantalum and tantalum polymer capacitors, which can be considered as drop-in alternatives on the same footprint to avoid single-source issues. Thus, the niobium-based capacitors can be considered as an additional option where tantalum capacitor designs are ...

Tantalum capacitors often raise concerns, especially in industries like switching and LED power supplies, due to their history of occasional failures. Despite this, they are valued for their high ...

The authors have examined three interconnected issues linked to tantalum supply interruption, which has resulted in a growing tantalum scarcity: (1) rising demand for tantalum ores and...

The authors have examined three interconnected issues linked to tantalum supply interruption, which has resulted in a growing tantalum scarcity: (1) rising demand for tantalum ores and high-tech equipment while mining activities are in decline owing to the COVID-19 pandemic; (2) tantalum ore price volatility constrains the ore supply ...

significant raw material for tantalum production. Electronic applications, and particularly capacitors, ... Tantalum capacitors contain either liquid or solid electrolytes. In solid electrolyte capacitors, a dry material (manganese dioxide) forms the cathode plate. A tantalum lead is embedded in or welded to the pellet, which is in turn connected to a termination or lead wire. ...

Tantalum capacitor failure modes have been discussed both for the standard manganese dioxide cathode and the new conductive polymer (CP) type. For standard ...

production and supply of tantalum affect the development of related industries. Therefore, it is essential to know the supply chain of tantalum. There are three critical parts of the Ta...

The electronics industry, accounting for around 50% of consumption, has consumed the largest part of tantalum, in which met-grade tantalum powder, capacitor-grade tantalum powder and Ta mill production are used in manufacturing sputtering targets and tantalum capacitors. Ta is an important alloying element in preparing high-temperature alloys ...

KEMET has addressed issues in the supply of raw materials and capacitor production, while at the same time developing advanced tantalum capacitor technologies to deliver even more capable and compelling products ...

The authors have examined three interconnected issues linked to tantalum supply interruption, which has resulted in a growing tantalum scarcity: (1) rising demand for ...

o These changes have impacted the demand for Tantalum o With specific regards to Ta capacitor demand, last

# Tantalum capacitor production issues

year I stated: - Trends favor Tantalum - The Tide has Turned - Supply Chain Stability is Critical to Longevity  
o Let's take a fresh look at the overall market, market trends and demand Overview 3

Tantalum capacitor failure modes have been discussed both for the standard manganese dioxide cathode and the new conductive polymer (CP) type. For standard tantalum in the normal operation mode, an electrical breakdown can be stimulated by an increase of the electrical conductance in channel by an electrical pulse or voltage level. This leads ...

Our interest is to see how dependent the tantalum supply chain is on specific countries and regions, how exposed primary production is to disruptions, and what mechanism ...

Control and Detection of Production Issues: Mechanical testing is used both for controlling sintered samples and for identifying problems in their production. Reduction of Production Costs: Early detection of defects reduces ...

Web: <https://nakhsolarandelectric.co.za>

