ISSUE: April 2025

Simulation Software Eases Evaluation Of Supercapacitors

KYOCERA AVX's new version of its SpiCAT online simulation software dedicated to supercapacitors makes it easy for engineers to identify the unique characteristics of a wide variety of KYOCERA AVX components. These include multilayer ceramic capacitors (MLCCs), polymer, tantalum, and niobium capacitors, multilayer varistors (MLVs), negative-temperature-coefficient (NTC) thermistors, and—now — supercapacitors (see the figure).

Supercapacitors are electrochemical double layer capacitors that strike a beneficial balance between the capabilities of electronic or dielectric capacitors (such as ceramic, tantalum, film, and aluminum electrolytic capacitors) and batteries. Specifically, they provide excellent pulse power handling characteristics resulting from the combination of very high capacitance and very low ESR.

These unique large-energy-storage devices can be used by themselves or in conjunction with primary or secondary batteries to extend back-up time, lengthen battery life, and provide instantaneous power pulses in power backup, hold-up, energy harvesting, peak power assist, pulse power, and battery applications in the industrial, energy, telecommunications, automotive, transportation, and medical industries.

The new SpiCAT SpiSCAP online simulation software for KYOCERA AVX supercapacitors makes it easy for engineers to evaluate and select SCC and SCM series supercapacitors optimized for their applications' discharge requirements. Evaluation criteria include:

- Initial and end-of-life capacitance values, the latter of which is defined as exhibiting 70% of rated capacitance and 200% ESR
- Initial and final voltage
- Constant-current, constant-power, or constant-resistance modes
- Power (W)
- Duration time

Users can identify recommended supercapacitor solutions ranging from single cells and modules to series and parallel combinations of parts and enjoy one-click access to detailed information about the proposed solutions, including physical and electrical characteristics, input values, part number explanations, and even interactive voltage and current vs. time graphs.

KYOCERA AVX supercapacitors, including SCC and SCM series supercapacitors and supercapacitor modules, provide engineers with a number of practical advantages, such as:

- Capacitance values extending from 0.47 F to 3,000 F, depending on the series
- High pulse power and large energy storage capabilities
- Very low ESR and low leakage current ratings
- Reliable performance and long lifetimes when designed-in properly
- Support for series and parallel configurations capable of achieving custom working voltage and capacitance ratings
- Faster charge/discharge cycles, better performance over a wider range of rated operating temperatures (-40°C to +65°C at rated voltage or +85°C with appropriate derating), and superior cycle life compared to batteries
- The ability to extend primary and secondary battery lifetimes by a minimum of 2x on average
- The option of bent leads, custom wiring, connectors, and solder/weld terminals
- Rugged designs, including high-reliability, moisture-resistant models and automotive-grade options qualified to AEC-Q200

According to the company the SCC and SCM series also offer competitive pricing, favorable lead-times, manufacturing ownership and supply chain confidence and highly experienced engineering and technical support services.

These characteristics also enable broad application suitability. KYOCERA AVX supercapacitors are well suited for emergency memory and power backup, battery supplement, peak power assist, and pulse power applications in automation, robotics, and smart metering equipment; engine and motor starters; uninterruptible power supplies; and wind turbines; mobile communications (GSM), radio (GPRS), telemetry, wireless alarm, emergency lighting, and hybrid systems; handheld controllers and scanners; electronic locks and wearables.

For more information about KYOCERA AVX's SpiCAT online engineering simulation software and its SCC and SCM series supercapacitors, see the SpiCAT Online Simulation Catalog page. Also see the Supercapacitors page. For all other inquiries, visit the company's home page or email inquiry@kyocera-avx.com.

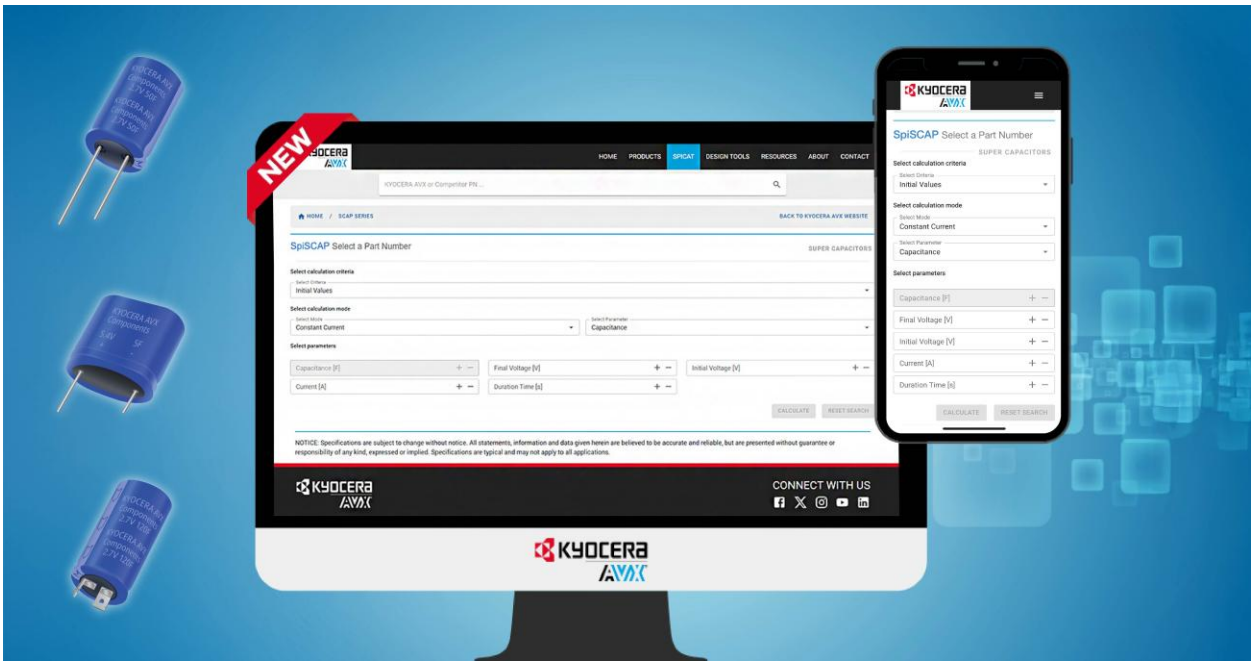

Figure. The SpiCAT SpiSCAP online engineering simulation software now makes it easy for engineers to evaluate and select SCC and SCM series supercapacitors designed to overcome common power challenges in industrial, energy, automotive, transportation, telecommunications, commercial building, and consumer electronics applications.