

SUPPORTING EV BATTERY INNOVATION WITH THE HIGHEST VOLTAGE AEC-Q200 MLCCS



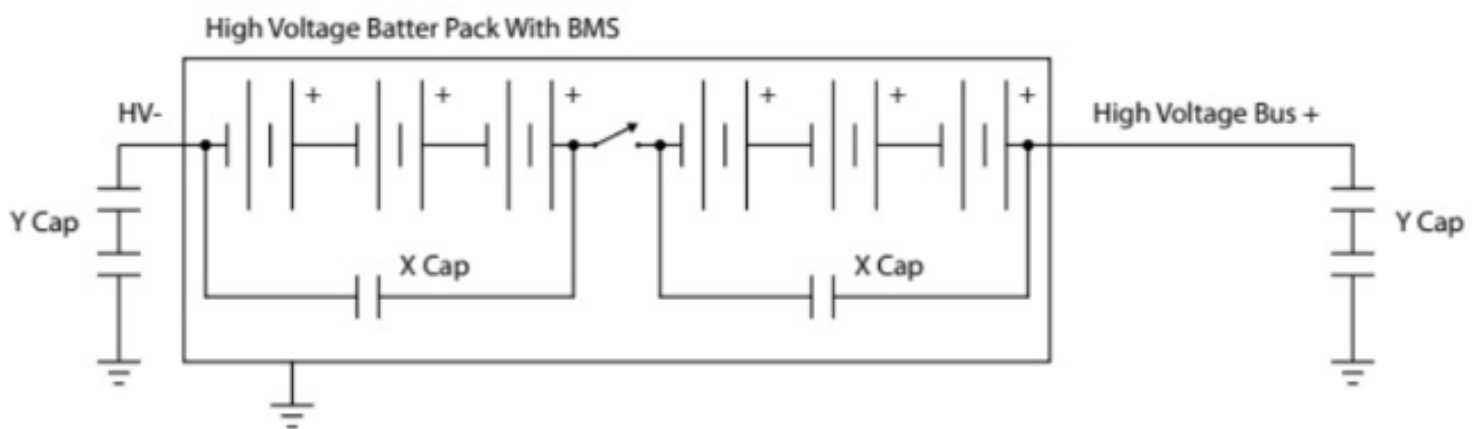
To meet consumer demand for longer driving ranges and faster charging, electric vehicle (EV) manufacturers are redesigning vehicles to move from 400V to 800V battery systems. As a result of using higher operating voltages, EV designers and original equipment manufacturers (OEMs) need components, such as multi-layer ceramic capacitors (MLCCs), that can withstand voltages well beyond those expected under normal operating conditions. For example, a drivetrain running off an 800V battery system may be subjected to a withstand test of up to 4kV DC for 60 seconds, which is a standard safety test in high voltage systems.

Therefore, it is now more critical than ever for EV OEMs to ensure they are using high-reliability components designed to withstand the higher voltages and temperatures sustained in these environments. In general, MLCCs are well suited to meet these demanding requirements because they are constructed with alternating layers of ceramic dielectric and metal electrodes. They can also be capped with a flexible termination for surface mount, such as Knowles Precision Devices FlexiCap™, which protects the ceramic from mechanical stresses and reduces the likelihood of catastrophic failure in the case of cracking.

At Knowles Precision Devices, our [automotive-grade MLCCs](#) are specifically designed to be used in EV electronics and subsystems because of their high temperature ratings, tiny size, and easy surface mount form factor. Additionally, we are the first supplier to offer AEC-Q200 approved capacitors that support voltages up to 4,000Vdc. This means you can trust that we have subjected our capacitors to rigorous thermal, mechanical, and other stress testing as set forth by the Automotive Electronics Council.

Creating the Right MLCC Solution for your BMS

More specifically, given the high temperature and tiny size requirements for the battery management subsystem (BMS), MLCCs are the only viable option that will not melt away under these operating conditions.



A simplified circuit diagram of a high-voltage battery pack integrated with BMS



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Knowles Precision Devices also offers the flexibility to customize the perfect MLCC solution for your BMS. Some of the configurations we recommend are as follows:

- 1808Y4K00102KST (1808, 4000V, 1.0nF, $\pm 10\%$, X7R (2R1) to AEC-Q200 – With FlexiCap™ Polymer termination)
- 1812Y4K00222KST (1812, 4000V, 2.2nF, $\pm 10\%$, X7R (2R1) to AEC-Q200 – With FlexiCap™ Polymer termination)
- 2220Y4K00472KST (2220, 4000V, 4.7nF, $\pm 10\%$, X7R (2R1) to AEC-Q200 – With FlexiCap™ Polymer termination)
- 2211YA250392KETSP (2211, 250Vac Class Y2/X1 safety rated (5kV impulse) with TUV & UL certification. 3.9nF $\pm 10\%$ X7R (2R1) to AEC-Q200 – With FlexiCap™ Polymer termination)
- 2220YA250103KETB16 (2220, 250Vac Class Y2/X1 safety rated (5kV impulse) with TUV & UL certification. 10nF $\pm 10\%$ X7R (2R1) to AEC-Q200 – With FlexiCap™ Polymer termination)

Finally, with our unique wet process manufacturing technique, we can provide some of the fastest lead times in the industry and we offer high flexibility for supporting urgent demand.

Use our parts builder to create custom AEC-Q200-certified MLCCs for your BMS.

[Use Parts Builder](#)

If you need help, please contact us and we can guide you through the process.



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