

Frequently Asked Questions

Q: What is KONNEKT Technology?

A: KONNEKT technology is a high-density packaging technology that allows components to be bonded together without the use of metal frames. KONNEKT technology utilizes innovative transient liquid phase sintering (TLPS) material which has low temperature reaction of low melting point metal or alloy with a high melting point metal or alloy to form a reacted metal matrix. The result is a highly conductive bonding material that can be used to connect multiple MLCCs together to form a single surface mountable component.

Q: Why does KONNEKT technology use TLPS and not metal frames?

A: Metal frames add ESR, ESL, and thermal resistance to capacitors. KONNEKT technology allows for the lowest ESR, ESL and thermal resistance possible in the form factor.

Q: Is there a difference between the materials or construction of standard orientation KONNEKT capacitors versus Low-Loss orientation?

A: No, the material and construction between standard orientation and low loss orientation is identical. Standard orientation refers to a KONNEKT capacitor when the MLCCs are stacked on top of one another and the internal electrodes are parallel with the PCB plane. Low Loss orientation refers to the KONNEKT capacitor when the MLCCs are positioned where the electrodes are perpendicular to the PCB plane. Before shipping the capacitors from the KEMET manufacturing facility, the KONNEKT capacitors are placed in either standard or low loss orientation in the Tape and Reel pocket. This allows the capacitors to be Pick-N-Placed in the correct orientation.



Q: What dielectrics are compatible with KONNEKT technology?

A: KEMET's KONNEKT technology can be utilized with any dielectric. In fact, KONNEKT technology is not just limited to MLCCs. Other technologies can be bonded together such as inductors, filters, semiconductors, etc.

Q: When would I choose KONNEKT capacitors versus individual MLCCs?

A: You would use KONNEKT:

- When board space is constrained and need bulk capacitance
- When higher power density is required but need the smallest package possible
- When you need to reduce the number of Pick-N-Place operations

Q: Can KONNEKT capacitors be mounted using Pb-Free reflow processes?

A: Yes. Capacitors utilizing KONNEKT technology are compatible with both Pb based and Pb-Free solder reflow profiles.

Q: Can KONNEKT capacitors be mounted using hand soldering methods?

A: KEMET recommends using standard reflow processes for case sizes greater than 1206. However, it is often necessary to mount using hand soldering methods. Please refer to KEMET's KONNEKT Hand Soldering Guidelines document.

[\(https://ec.kemet.com/konnekt-hand-soldering-guideline/\)](https://ec.kemet.com/konnekt-hand-soldering-guideline/)

Q: Should I choose standard or Low Loss orientation for my applications?

A: Versus Standard Orientation, Low loss Orientation provides lower ESR, lower Thermal Resistance, lower Inductance, and Higher Ripple Current. This increases the overall power density of the KONNEKT part type for higher power applications. KEMET recommends choosing the Low Loss orientation if increased power handling capability is necessary.

Q: Why are some KONNEKT capacitors available in standard orientation but not Low Loss?

A: For certain form factors and dielectrics, there is no benefit in using the KONNEKT capacitors in low loss orientation. For example, a KONNEKT KC-LINK 3640 2-chip capacitor is only available in standard orientation.

Q: Can KONNEKT capacitors withstand applications with vibration?

A: KEMET's KONNEKT capacitors are tested using the following test conditions:

MIL-STD-202 Method 204

5 g for 20 minutes, 12 cycles each of 3 orientations.

Note: Use 8" x 5" PCB 0.031" thick 7 secure points on one long side and 2 secure points at corners of opposite sides. Parts mounted within 2" from any secure point. Test from 10 – 2,000 Hz.

Q: Are KONNEKT capacitors more susceptible to flex cracks?

A: No, KONNEKT capacitors have the same flex performance as a standard MLCC of the same case size.

Q: I have an application that requires high power capacitors and want to use KONNEKT KC-LINK. What factors influence the ripple current rating? Do I have to put a heat sink on my board to keep the capacitors cool?

A: High AC currents generate i^2R losses in capacitors due to ESR resulting in self-heating. Since KEMET's Class 1 C0G dielectrics provides very low ESR, this allows them to operate at much higher AC currents compared to Class 2 X7R. However, as AC current increases, the i^2R losses do create self-heating and eventually can lead to thermal runaway. Just like power transistors, adding thermal heat sinking can reduce the device temperature rise and

increase the overall power rating of the capacitors. For KONNEKT capacitors, this can be done by:

- Adding thicker traces leading up to the MLCCs to help remove heat.
- Adding thicker metal for the land patterns to help remove heat.
- Add thermal bias.
- Active cooling such as a fan

Q: I have a high-power wireless charging application that requires high power capacitors. I looked in the KC-LINK with KONNEKT technology catalog and none of the capacitors meet the AC voltage and current levels I need. What do I do?

A: For very high-power applications such as EV wireless charging, it is common that the resonant capacitor is not a single device solution. By adding multiple capacitors in series and parallel, the overall power of the solution can be drastically increased.

Q: Can KEMET provide custom KONNEKT solutions?

A: Yes, please contact your local KEMET sales rep for customer KONNEKT solutions.

Visit <https://ec.kemet.com/KONNEKT> for more information.

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