Cooling in tight spaces

CTX Thermal Solutions

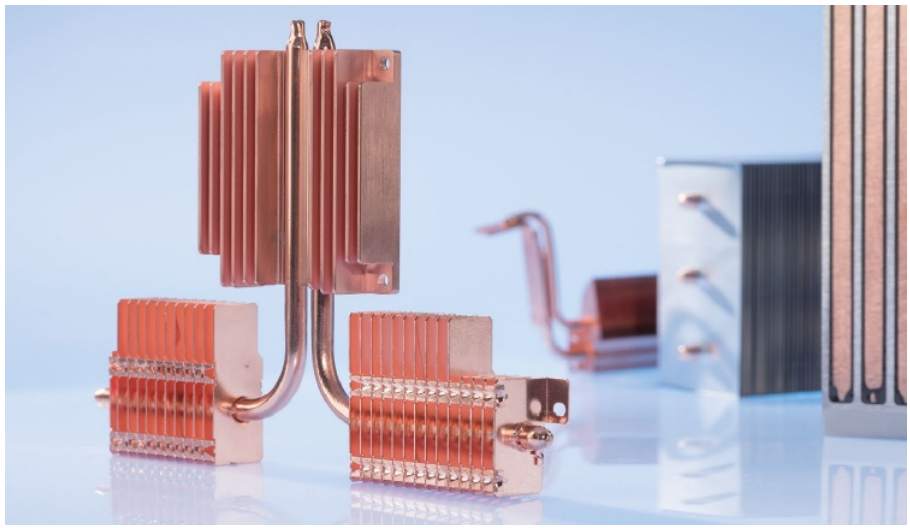
Since customised cooling solutions can provide efficient cooling of electronic components, even in the tightest of spaces, the ongoing 'higher performance and smaller dimensions' trend that is defining the development of electronic components may be served and supported.

Electronic components – such as IGBTs, CPUs or components in electric vehicles – are becoming ever smaller, but simultaneously more powerful. To maintain the performance of components at high operating temperatures, they have to be efficiently cooled, despite tight installation conditions. A suitable cooling system for such requirements is available using heat pipes, such as those from CTX Thermal Solutions.

Cooling with water vapour and condensation

Heat pipes may be used for all applications in which a heat sink cannot be connected directly to an electronic component. Operating via a closed system, their design and operating principle allow installation in virtually any situation.

A copper tube with a capillary structure connects the actual heat pipe to a heat sink. A cooling medium in the interior, generally methanol or water, transports heat from an electronic component to the heat sink. This is made possible by the phase change between evaporation and condensation.



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The cooling medium evaporates in the heat zone, reducing the pressure in the copper tube. The pressure differential causes vapour to flow to the cold zone at the transition to the heat sink, where it condenses, and heat is released. The capillary action causes the cooling medium to flow back to the starting point of the circuit.

Efficient thermal transfer solution

Heat pipes are considered an efficient solution for thermal transfer in electronic components. Even when they bridge small differences in temperature, they dissipate large amounts of heat. Their design also makes it possible for them to perform their function over large distances. As they need no additional pumps or pipes, they require less maintenance than other systems, which use liquid for cooling.

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Heat pipes allow for high freedom of design. This means that companies such as CTX can individually adapt heat pipes to a particular installation space and according to the power dissipation of each application.

Customised thermal management

Companies which are positioned to develop and produce customised cooling solutions can offer several benefits to their customers. This may include solutions that incorporate all available manufacturing processes, from die-casting to extrusion, as well as finishing on CNC machines, which improves thermal transfer performance even more.

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