

ANMELDUNG | SCHUTZ | VERWERTUNG



Focus Sectors

- Cooling Systems

Key Words

- Cooling
- Phase Change Storage Material/PCM
- Thermal Conduction
- Surface Temperature
- Latent Heat Storage

Development Status

- POC planned

Patent Procedure Status

- DE Patent filed
- EP Patent filed

Chances for Cooperation

- Licensing
- Patent Sale
- F&E Cooperation

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Highly Effective Cooling of Hot Spots

Innovation and Customer Benefit

Electronic components e.g. for control and regulation of consumers with high electrical currents possess a time-varying surface temperature, which is also locally inhomogeneous because of the non-continuous operation.

On the surface occur hot spots. At first these hot spots pass the maximum temperature, if it is not sufficiently cooled.

The cooling system shall be designed for the worst-case, i.e. for the highest temperature and the highest maximum occurring heat flow. This makes cooling systems difficult and expensive.

Possible customer benefits are:

- Effective and appropriate component cooling
- Reduced dimensions of the heat flow

Technical Description

The combination of evaporative cooling and PCM-storage offers new possibilities for the construction of cooling plates. Coils are embedded in the phase-change material or in the cooling plate which are traversed by a vaporizing refrigerant.

The PCM material dampens the temperature of the coolant, so that the risk of overheating by exceeding the burn-out point can be significantly attenuated or eliminated.

The thermal conduction structure which can be respectively optimized to each configuration ensures rapid thermal conduction heat transfer from the surface to the cooling coils. The cooling system does not need to be designed for the maximum heat flux.

The invention relates to a cold plate for cooling components with inhomogeneous and unsteady surface temperature, characterized in that

- An evaporating refrigerant is used together with a phase change storage material.
- Through mathematical optimization a tailored structure of the temperature distribution on the surface of the body is created. This structure of e.g. Aluminum or carbon fiber material takes on the task of heat transfer and heat distribution.

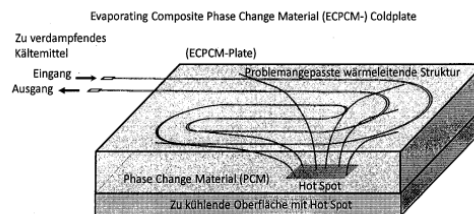


Fig 1: ECPCM-Cooling Plate