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THERMAL CONDUCTIVE TAPES – TECHNOLOGY, FUNCTION AND APPLICATIONS

ABSTRACT

The number of electronical components, especially in automotive vehicles, grew over the past years and is expected to grow further in the future. The functionality and reliability of these components play an important role. Root cause of > 50% of the malfunctions of electronical components is considered to be thermal overstress.

Therefore, the demand for sophisticated thermal management in electronic components is rising. To define and engineer an effective „heat dissipation path“ is a major task in thermal management of electronic components.

Heat transfer in general can occur by three different mechanisms: Thermal conduction, thermal convection and thermal radiation. Thermal conduction describes the heat transfer by mechanical linkage, thermal convection describes transfer of thermal energy by liquids, gas, fluids and thermal radiation describes heat transfer by electromagnetic radiation.

For the conjunction between heat source (for example IC or LED or PCB) and heat sink (for example aluminum body) there are used Thermal Interface Materials (TIM) like pastes, adhesives, adhesive tapes or gap pads. Their task is improving the heat transfer between heat source and heat sink by thermal conduction.

Thermal conductive tapes are used for combining bonding performance with thermal conjunction. Softness and conformability of pressure sensitive adhesive layers are very suitable for this task.

Adhesive apes provide additional advantages like

- Form stability
- Preparation as 3D part (die-cut)
- Easy applicability compared to liquids
- Quick processability
- Ready for automatized production processes

But thermal conductivity of polymer materials is low. Therefore, a combination of thermal conductive materials and adhesive polymers is necessary. The challenge is to keep the bonding performance of the tape.

The talk will present the technology of thermal conductive adhesive tapes, their characterization and their function in several manual and automated applications.

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