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Heatsink with reduced airflow bypass

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ABSTRACT

When multiple heatsinks are placed side-by-side on a motherboard, air tends to bypass the heatsinks and flows through the gaps between the heatsinks, thereby reducing heatsink efficacy. To combat the bypassing of air, foam is used to seal gaps between the heatsinks. However, the adhesive of the foam degrades with time, causing the foam to fly off and damage the fan blades. This disclosure describes heatsinks with interlocking edge fins that are perpendicular to the direction of airflow. When two such heatsinks are placed side-by-side, their edge fins interlock, forming a labyrinth seal that reliably prevents airflow bypass. Airflow occurs in an optimal direction, e.g., through fins of the heatsinks that are parallel to airflow, resulting in better heatsink thermal performance.

KEYWORDS

- Heatsink
- Labyrinth seal
- Edge fin
- Airflow bypass
- Foam seal
- Heat dissipation

BACKGROUND

Heatsinks typically have fins parallel to the direction of airflow to improve heat dissipation by presenting an increased surface area. For effective heat dissipation, air must flow smoothly and quickly past the fins.

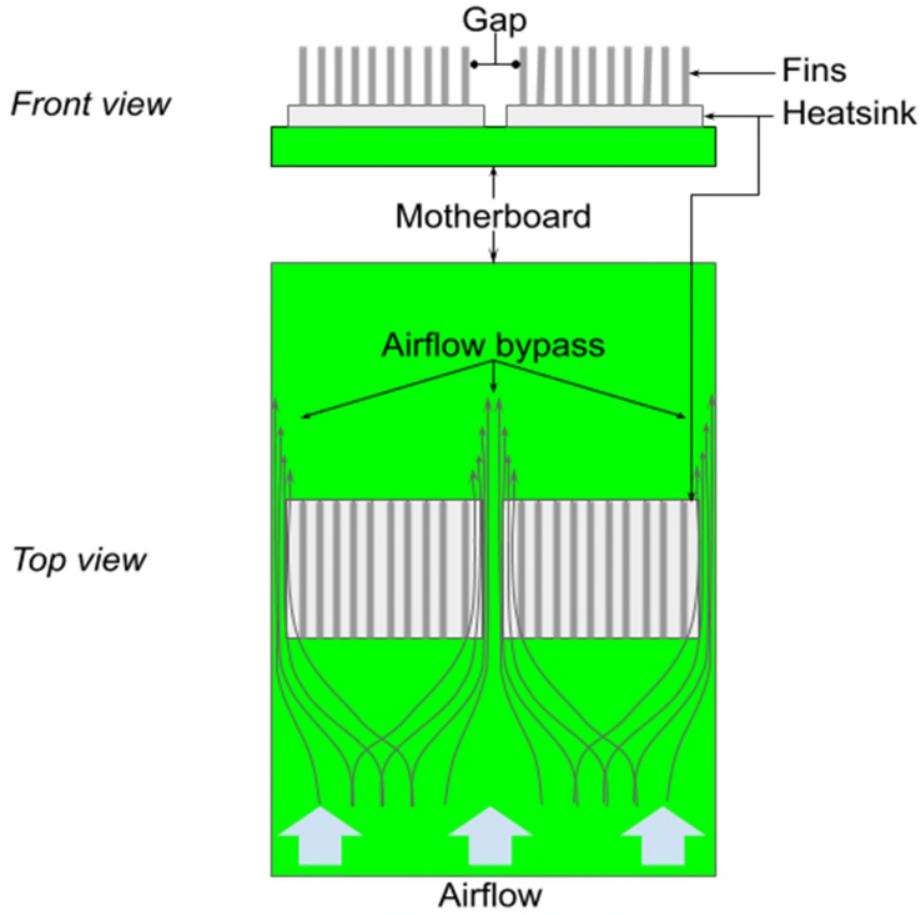

Fig. 1: Airflow bypass occurs when multiple heatsinks are placed side-by-side

When multiple heatsinks are placed side-by-side on a motherboard, as illustrated in Fig. 1, a gap forms between them. Air tends to bypass the fins and flows through the gaps between the heatsinks, thereby reducing the flow rate through the fins, and hence the thermal performance of the heatsinks. To combat the bypassing of air, foam is used to seal the gap between heatsinks. However, adhesive of the foam degrades with time, causing the foam to fly off and damage the fan blades or obstruct the airflow. Further, if the tray is robotically assembled, it is difficult to precisely apply the foam.

DESCRIPTION

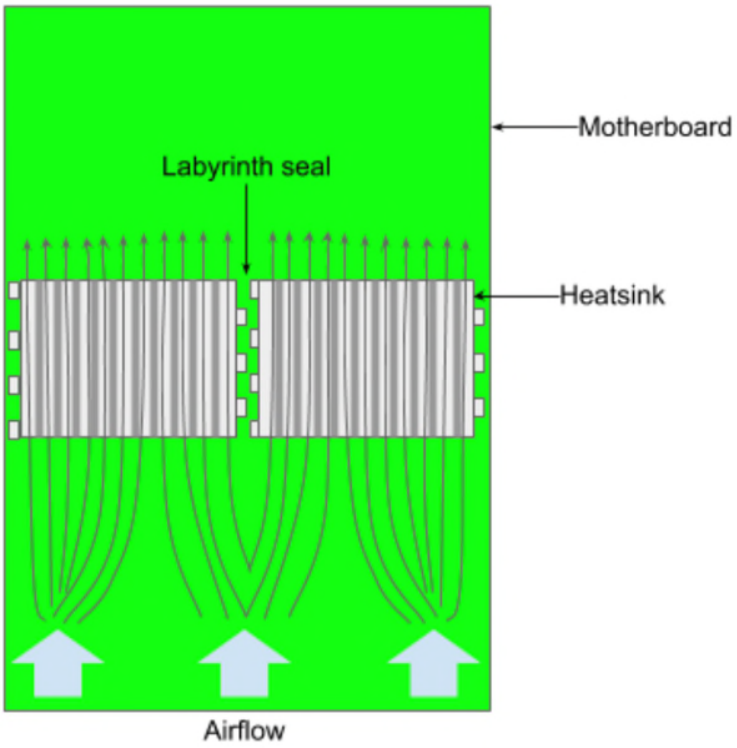

Fig. 2: Labyrinth seal between two heatsinks

Per the techniques of this disclosure, illustrated in Fig. 2, a heatsink is manufactured with interlocking edge fins perpendicular to the direction of airflow. When two heatsinks are placed side-by-side, their edge fins interlock, forming a labyrinth seal that reliably prevents airflow bypass. The labyrinth seal between the two heatsinks presents a long-winded path for airflow, thereby reducing bypass. As illustrated, the airflow continues in the intended direction, e.g., through fins of the heatsinks that are parallel to the airflow, resulting in better heatsink thermal performance. The heatsinks described herein have no detachable part that can degrade or fall off, and are amenable to assembly by robots.

CONCLUSION

This disclosure describes heatsinks with interlocking edge fins that are perpendicular to the direction of airflow. When two such heatsinks are placed side-by-side, their edge fins interlock, forming a labyrinth seal that reliably prevents airflow bypass. Airflow occurs in an optimal direction, e.g., through fins of the heatsinks that are parallel to airflow, resulting in better heatsink thermal performance.