

AirJet® Mini Slim

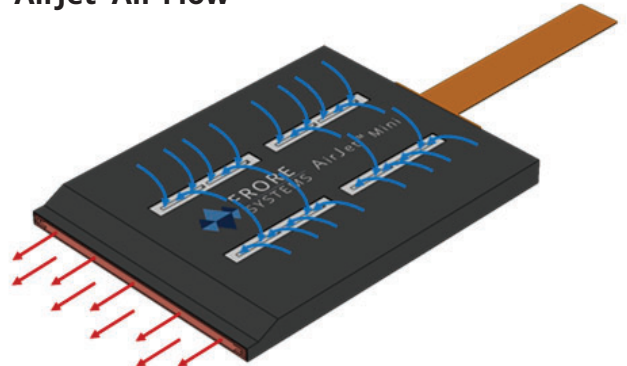
Heat has become the biggest bottleneck in computing. The latest processors promise higher performance, but only 50% or less of that performance is realized in actual devices. While processors continue to advance and generate more heat, thermal solutions have not kept pace. Thermal is the only aspect of modern day computing that still uses century old technology. In today's devices, what often determines performance is the capability of the thermal solution, not the sophistication of the processor.

Frore Systems has developed a revolutionary active cooling chip, AirJet®, the first ever solid-state thermal solution. AirJet is a fully self contained active heat sink module. AirJet® is silent, thin, light and outperforms fans.

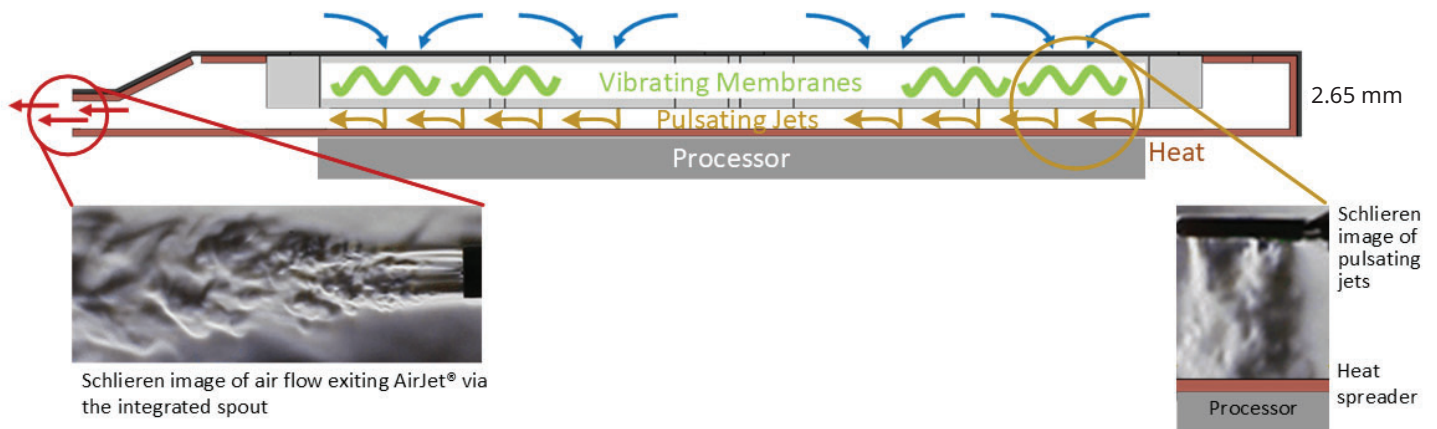
Inside AirJet are tiny membranes that vibrate at ultrasonic frequency. These membranes generate a powerful flow of air that enters the AirJet through inlet vents in the top. Inside AirJet the air flow is transformed into high velocity pulsating jets.

The pulsating jets of air remove heat from the heat spreader at the bottom of the AirJet with high efficiency. The flowing air reaches the same temperature as the heat spreader which is in contact with the processor. Hot air exits to the side via an integrated spout.

AirJet® Air Flow



Cross Section of AirJet® Module



AirJet® Mini Slim

AirJet’s multiphysics design converges structural, fluidic, acoustic and electrical resonance. AirJet is manufactured using proprietary techniques that draw from multiple sectors, including semiconductor, flat panel display, aerospace and automotive.

AirJet Mini Slim generates 1750 Pascals of back pressure, ensuring air flow into and out from product enclosures. When integrated into a compute platform with processor die temperature of 85C, **AirJet Mini Slim** removes a net 4.25 Watts of heat at a silent 21 dBA noise level, while consuming 1 Watt of power.

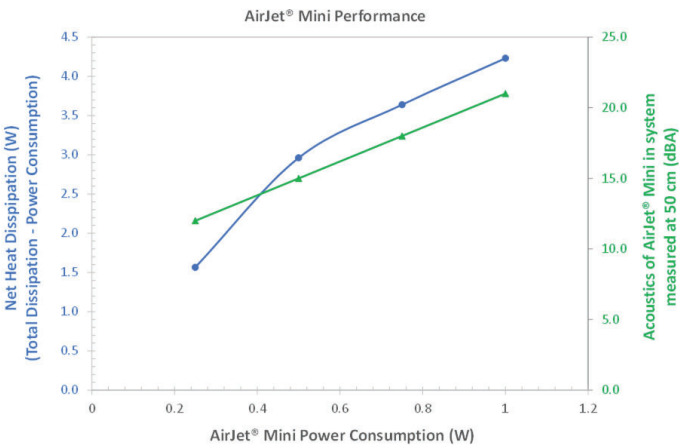
For example, 11 mm thick fanless 13” notebooks have a thermal limit of only 10 Watts sustained processor power. In a similar 11 mm thick notebook, 4 x **AirJet Mini Slim** can support a sustained processor power of 20 Watts, at a silent 27 dBA noise level, increasing processor performance by 2x.

The **AirJet Mini Slim** is just 2.65mm thick and 8g, trimming an additional 0.3mm from the height of the original AirJet Mini, while maintaining its exceptional heat removal capabilities. This ultra-thin profile opens up new possibilities for manufacturers catering to consumer demand for higher performance in more compact devices. The **AirJet Mini Slim** is an ideal solution for ultra-thin products like fanless laptops, professional tablets, handheld gaming devices, and gaming smartphones.

Featuring intelligent self-cleaning, **AirJet Mini Slims’** 1750 pascals of backpressure enables air to be pulled into the host device where it circulates and picks up heat before being pulled into the **AirJet Mini Slim**. Dustproof filters on the **AirJet Mini Slim** ensure any dust that enters the system is stopped in its tracks. The chip’s self-cleaning feature enables automatic reversal of the massive air flow, clearing any dust away from **AirJet Mini Slim** filters. This ensures the sustained thermal performance of AirJet and, as a result the high performance of the host device.

Metric	AirJet® Mini Slim
Total heat dissipation (@ 85C die temperature, 25C ambient)	5.25 W (Net 4.25W)
Maximum noise (inside device at 50cm)	21 dBA
Maximum power consumption	1 W
Back pressure	1750 Pa
Dimensions (width x length x thickness)	27.5 x 41.5 x 2.65mm
Weight	8 g

Power Consumption and Acoustics



AirJet Mini Slim’s also introduces Thermoception, a capability that enables the chip to independently sense its surrounding temperature. This innovation allows the AirJet Mini Slim to optimize its performance autonomously, maximizing heat removal without relying on temperature sensors in the host device. This opens new possibilities for micro devices that may lack integrated CPUs or other temperature sensing components.

In today’s devices, what often determines performance is the capability of the thermal solution, not the sophistication of the processor.

Thanks to **AirJet Mini Slim**, compact electronic devices can now deliver on the promise of cutting edge technology. **Do more.**