NEXTREME'S eTEC™ TECHNOLOGY PROVIDES HOT SPOT COOLING FOR ICS

Advanced thin film eTEC™ prototype increases thermal management performance…

Research Triangle Park, N.C. (June 13, 2007) – Nextreme has developed an advanced thin film embedded thermoelectric cooler (eTEC™) to address thermal management needs of the electronics, photonics, bio-tech and defense/aerospace industries. Functioning as a miniature, solid state heat pump, the eTEC is ideal for cooling hot spots that result from localized areas of high heat flux on an IC. The nano-structured thermoelectric thin film device is manufactured using semiconductor processing techniques.

"The eTEC pumps heat from one place to another in the same manner that a water pump moves water," said Dr. Paul A. Magill, Nextreme Thermal Solutions VP Marketing and Business Development. "By pumping heat from low thermal conductivity materials — the die and thermal interface materials — to a high thermal conductivity material — a heat spreader, the eTEC cools hot spots on ICs. The cooling of hot spots increases product performance, reliability and yield while reducing system costs by simplifying downstream chip cooling requirements."

The eTEC operates by the Peltier effect: When an electric current is driven through a circuit containing two dissimilar materials, heat is absorbed at one junction — the cold side — and released at the other junction — the hot side. The eTEC is designed with thin-film compound semiconductor materials that have high electrical conductivity and poor thermal conductivity to maximize current flow and minimize heat flowing back from the hot side to the cold side.

Nextreme's eTECs are designed utilizing thin films that are small, thin, fast, efficient and reliable, adding just 100 microns of height to a heat spreader, enabling unobtrusive integration close to the heat source. The eTEC has an ultra-fast, millisecond response time for rapid cooling and heating to maintain a precise temperature depending on the needs of the application. The device pumps a maximum heat flux of 150W/cm^2 with some designs delivering as much as 400W/cm^2 versus less than 10 - 20W/cm^2 for typical bulk TECs.

Nextreme's eTECs can operate in a high COP (Coefficient of Performance) regime and still pump a reasonably high heat flux (50 – 100W/cm^2). COP is a measure of efficiency defined as cooling power divided by input power. To cool a 4W hot spot, an eTEC with a COP of 2.0 would only need 2W of input power. The input power can be dynamically controlled to provide active cooling.

For more information, or to request an eTEC prototype, contact Nextreme at 3040 Cornwallis Road, P.O. Box 13981, Research Triangle Park, NC 27709-3981; call (919)-990-8300; e-mail info@nextreme.com; or go to www.nextreme.com.

About Nextreme

Nextreme manufactures thin film thermoelectric components that address most challenging thermal management and power generation needs of the semiconductor, photonics, consumer, and defense/aerospace industries. Nextreme's miniature, thin film eTEC offers an industry first — a micro-refrigerator the size of a piece of confetti that enables solid state temperature control or power generation on a micro-scale, in close proximity to the source. eTECs operate as point-specific heat pumps for rapid cooling or heating of semiconductors and other electronics; for thermal management of fiber-optic laser controls integrated optoelectronics; or for power generation by converting otherwise wasted heat into useful electricity.

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