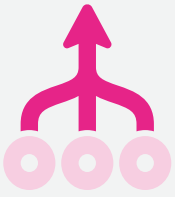
phononic

Optoelectronics

Phononic's
3 key TEC advancements:

BETTER
heat pumping density

LOWER
power consumption



NEW
integration schemes

3 Key Advances in TEC Design

Challenges in the market:

Today, content providers in the datacom space are releasing new technology faster than ever, demanding the same pace of development from transceiver and optical components providers. You need to innovate fast, without increasing cost, to keep up with this demand.

There's a global effort to lower power consumption, reducing operating costs. But traditional TECs can be one of the larger power drains in the TOSA. As power consumption budgets tighten, you need to find ways to increase efficiency across every part of your package - **and a great place to start is the TEC.**

Five major trends influencing laser package designs:

- Increasing heat density as form factors shrink
- Increasing maximum ambient temperatures, from C-Temp to I-Temp
- Increasing power consumption budget stringency, as defined in MSA specifications
- Optics moving closer to CPUs, forcing a switch from electrons to light. Innovation in on-board optics will require new cooling approaches
- Environmental challenges introduced by non-hermetic packages that reduce package complexity and cost

How do we deliver all this?
We're obsessed with performance.

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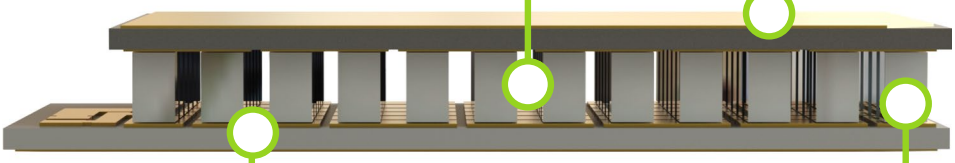
Limitless Innovation

Thermoelectric materials

High performance, mechanically robust, Enables ultra-thin devices (<700um), Extremely high heat pumping flux and/or efficacy

Custom metal patterning

Metallization layouts to suit your package design



Ultra-thin substrates

Minimize thermal resistance, Increase TEC ΔT_{MAX}

Pico-TEC device platform

Ultra-small, ultra-thin, Designed for TO can, box TOSA packages

Superior contact metallization

Industry-leading contact resistance, High reliability, Excellent solderability

Our process delivers consistent, repeatable results.

With extremely tight process control, we deliver unrivaled quality. Our TECs are assembled in a US-based automated manufacturing facility that scales quickly from design into production, reducing NPI timelines.

★ ★ ★ ★ ★

We're **constantly** developing new technologies.

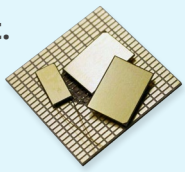
Our mission is simple but bold: push the limits of what's possible in active cooling and thermal management with thermoelectrics. A deep understanding of semiconductor processes, product assembly and their inherent challenges such as reliability and integration feed our radically different approach.

From performance-enhancing R&D on our materials and processes to hybrid TEC/package designs that integrate tightly with 2.5D or 3D Photonic Integrated Circuits, we **develop innovations that shatter old limitations**.

CERTIFIED ISO 9001:2008 COMPANY

A TEC isn't just a TEC. **A Phononic TEC is different.**

Contact us today - we'll assess your system requirements and partner with you on TEC design and development for your cooled TOSA.



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