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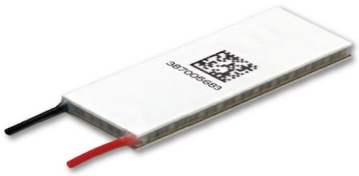
PowerCycling PCX Elongated Thermoelectric Coolers from Laird Thermal Systems Speed up PCR Testing

The PowerCycling PCX Elongated Series offers a robust module construction with high reliability in thermal cycling applications…

February 7, 2022 – Thermal Cycling devices used for Real-Time PCR utilize thermoelectric technology to precisely manage temperature set points and ramp rates, enabling amplification of DNA segments. To improve temperature precision control in PCR devices, Laird Thermal Systems, has developed an elongated series of PowerCycling PCX thermoelectric coolers. Utilizing proprietary processes and a unique module construction, the PCX Elongated Series provides high reliability and a minimal temperature gradient for PCR applications resulting in greater throughput and faster test results.



PCR requires a high number of thermal cycles to create millions of DNA strands used for medical diagnosis. Each thermal cycle consists of three steps, where the first separates the DNA strands at a high temperature of 95°C. The second step is a cool down to a melt temperature between 50 to 65°C where the biomarkers will bond to the DNA and the third stage increases the temperature to 72°C to sequence a copy of the DNA. Thermoelectric coolers are installed under the PCR wells to precisely manage these temperature setpoints to within ±0.5ºC.

Determining the optimum melt temperature of each thermal cycling stage is often a time-consuming process for laboratory technicians. By creating more temperature zones on the PCR tray, the optimal melt temp can be found. The new PCX Elongated series allows for more narrow temperature zones than standard thermoelectric coolers, providing more precise temperature control across the tray, making it easier for technicians to determine the right temperature.

“Elongated thermoelectric coolers are extremely challenging to manufacture due to the bowing effect that can occur with longer parts. The longer the length is to the width, the more likely the ceramics tend to bow, which can be challenging to manufacture”, said Andrew Dereka, Product Director at Laird Thermal Systems. “Through proprietary process controls and advanced semiconductor materials, our PCX Elongated thermoelectric cooler eliminates the impact of this effect to provide a highly reliable part for Real-Time PCR.”

The PowerCycling PCX Series features a unique robust construction with a thermally conductive “soft layer” that absorbs the mechanically induced stresses caused by thermal cycling applications. This series has been tested to meet the latest PCR industry standards without degrading in performance.

Access PowerCycling PCX Series datasheets or learn more about thermal management for PCR in our application note.

About Laird Thermal Systems
Laird Thermal Systems designs, develops and manufactures thermal management solutions for demanding applications across medical, industrial and telecommunications markets. We manufacture one of the most diverse product portfolios in the industry, ranging from active thermoelectric coolers and assemblies to temperature controllers and liquid cooling systems. With unmatched thermal management expertise, our engineers use advanced thermal modeling and management techniques to solve complex heat and temperature control problems. By offering a broad range of design, prototyping and in-house testing capabilities, we partner closely with our customers across the entire product development lifecycle to reduce risk and accelerate time-to-market. Our global design, manufacturing and support resources help customers shorten their product design cycle, maximize productivity, uptime, performance and product quality. Laird Thermal Systems is the optimum choice for standard or custom thermal solutions.

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