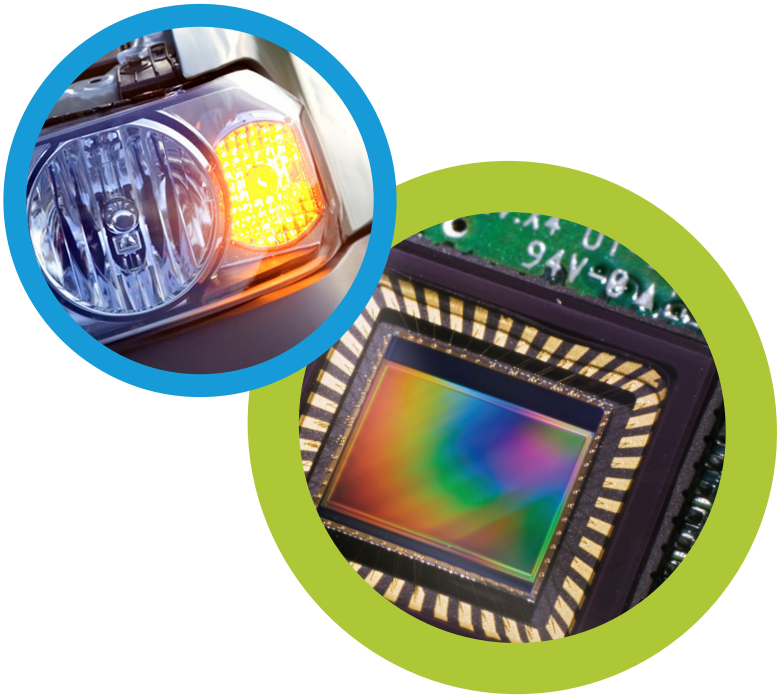
Laird™

Smart Technology. Delivered.

Thermal Interface Solutions

Laird designs and manufactures customized, performance-critical products for wireless and other advanced electronics applications.



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About Laird

Laird is a global technology business focused on enabling wireless communication and smart systems, and providing components and systems that protect electronics. Laird operates through two divisions, Wireless Systems and Performance Materials. Wireless Systems solutions include antenna systems, embedded wireless modules, telematics products and wireless automation and control solutions. Performance Materials solutions include electromagnetic interference shielding, thermal management and signal integrity products. As a leader in the design, supply and support of innovative technology, our products allow people, organisations, machines and applications to connect effectively, helping to build a world where smart technology transforms the way of life. Custom products are supplied to major sectors of the electronics industry including the handset, telecommunications, IT, automotive, public safety, consumer, medical, rail, mining and industrial markets. Providing value and differentiation to our customers though innovation, reliable fulfilment and speed, Laird PLC is listed and headquartered in London, and employs over 9,000 people in more than 58 facilities located in 18 countries.

Thermal Interface Solutions

As an industry leader in high-performance, cost-effective Thermal Interface Materials (TIMs) and technologies, Laird designs and manufactures thermal products; including gap fillers and putties, phase change materials, thermal grease and thermally-conductive insulator materials that meet the demands of any application.

Meeting Ever-Increasing Thermal Demands

Today's electronics are smaller and more powerful than ever before, leading to ever increasing thermal challenges for the systems designer. While fans, heat sinks, and even liquid cooling and thermoelectric devices can be used to provide enough cooling power, the problem remains transferring the heat from the hot components into the cooling hardware. TIMs are designed to fill in air gaps and microscopic irregularities, resulting in dramatically lower thermal resistance and thus better cooling. Laird is the world leader in material development for TIMs, and offers the broadest line of products to meet every design challenge.

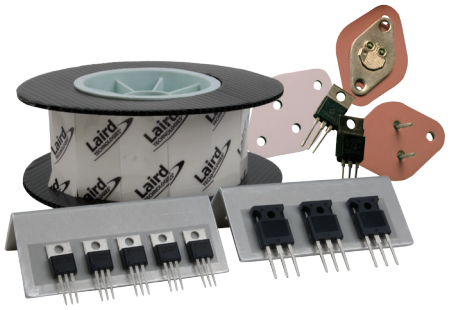
With gap filler pads as thick as 9 mm, as well as electrically insulating and electrically conductive pads, Laird can solve any TIM design challenge. In addition, Laird provides phase change TIMs that soften and fill tiny gaps at operating temperature, as well as thermally conductive greases that conform to any irregularity.

Laird's TIMs offer operating temperatures up to 200°C, thermal conductivities over 5 W/m-K in the Z axis, and tremendous flexibility in form factor and packaging, including die-cut parts on tape and other solutions to support any manufacturing scenario.

Thermal Interface Materials

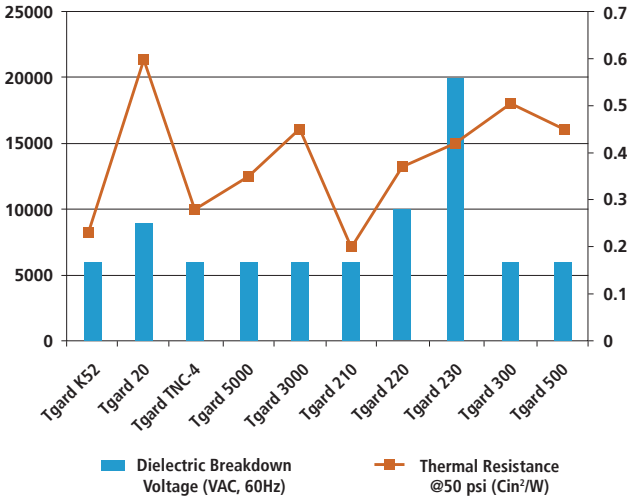
Tgard™ Electrical Insulators

Tgard™ thermally conductive electrical insulators are used where electrical isolation is a critical design consideration, with reliability, cut-through resistance, and thermal conductivity. The Tgard product line has a wide variety of materials for the unique performance, handling, and assembly considerations required in electronics devices.



APPLICATIONS

- Switching mode power supplies for:
  - Power semiconductors
  - Consumer electronics
  - Audio and video components
  - Automotive control units
  - Power conversion equipment
  - Computers
  - Industrial
  - Instrumentation
  - Medical
- Electrical power generators
- UPS Unit



Tpcm™ and Tgrease™ High-Performance Products

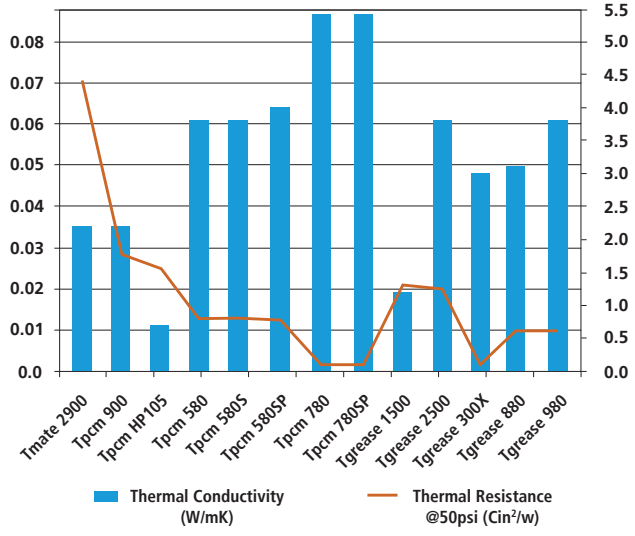
High-performance products are used in applications where mechanical tolerances and general design has been optimized for thermal performance.

The Tpcm™ phase change product line is used in applications where reliability, repeatability, and handling must be controlled to optimize the performance as part of the total thermal solution. The Tpcm product line is available in a screen printable formulation that offers the reliability and performance of a phase change material with the low cost handling of thermal grease.

Tgrease™ is used in applications where a minimum bond line, constant pressure, and ease of screen printing is desired for optimal performance. Laird's high-performance Tgrease products are designed to maximize reliability by eliminating pump out in most applications.

APPLICATIONS

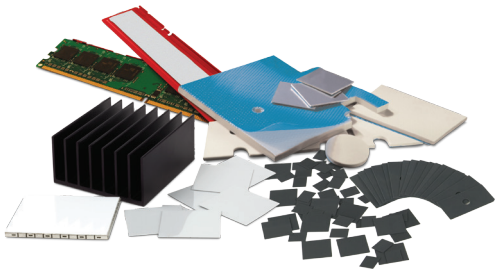
- IT – servers, desktops, notebooks, and memory modules
- Industrial – power supplies, lighting, LED lighting, and industrial electronics
- Telecom – routers and wireless infrastructure
- Consumer – gaming systems and portable devices



Tflex™, and Tpli™ and Tputty™ Gap Filler Pads

Tflex™ gap fillers are used to bridge the interface between hot components and a chassis or heat sink assembly. The combination of good thermal conductivity and softness reduces mechanical stress, but maintains thermal performance.

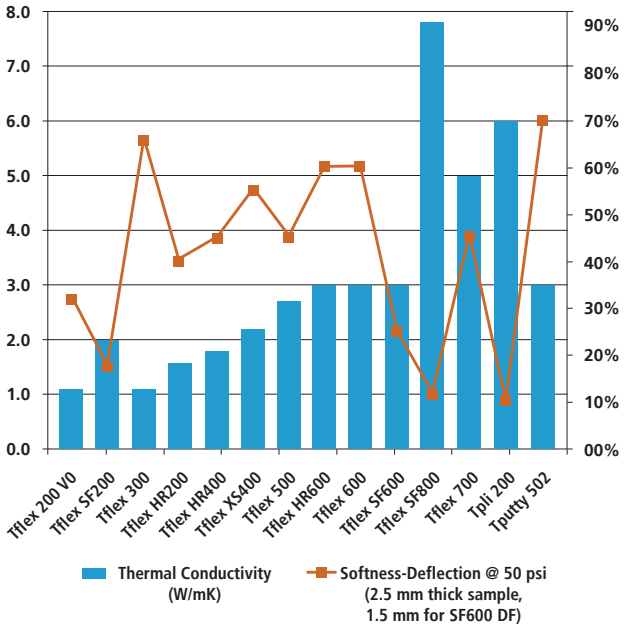
Tpli™ gap fillers are used where high thermal conductivity and low pressures are required.



APPLICATIONS

- Telecom – wireless infrastructure, routers, and VOIP phones
- IT – notebooks, servers, memory modules, hard disk drives, solid state drives, scanners, and printers
- Consumer – gaming systems, LCD PDP televisions, and displays
- Industrial – LED lighting, power supplies, lighting ballasts, controllers, scanners, and power converters
- Aerospace and military – power supplies, microwave radio, and controllers

SPECIFICATIONS	
Thickness range	0.2 to 8.9mm (0.008" to 0.350"), availability varies by product line
UL flammability	94 V0, UL file number E180840

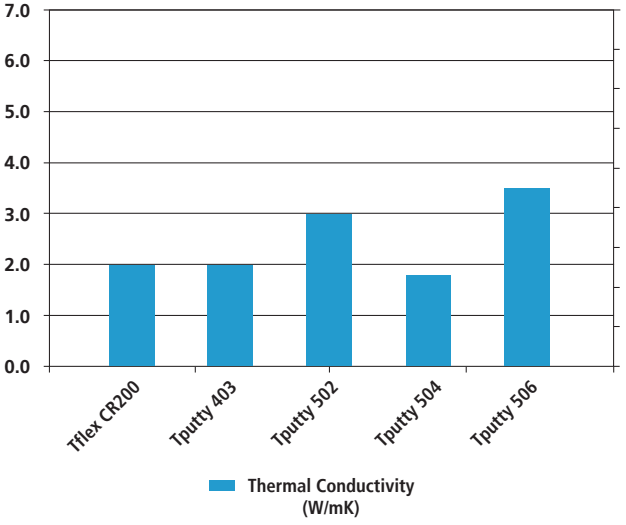


Dispensable Gap Fillers

Our dispensible gap fillers are used to bridge the interface between hot components and a chassis or heat sink assembly when elimination of mechanical stress or bulk dispensing are critical design considerations.

APPLICATIONS

- Telecom – wireless infrastructure, routers, and VOIP phones
- IT – notebooks, servers, memory modules, hard disk drives, solid state drives, scanners, and printers
- Consumer – gaming systems, LCD PDP televisions, and displays
- Industrial – LED lighting, power supplies, lighting ballasts, controllers, scanners, and power converters
- Aerospace and military – power supplies, microwave radio, and controllers



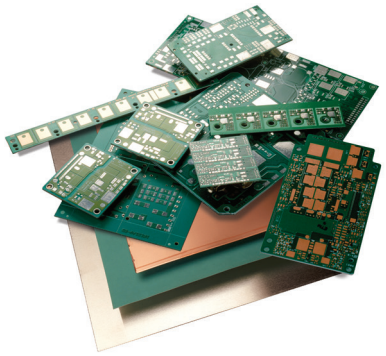
Tlam™ and Tpreg™ Thermal Printed Circuit Board

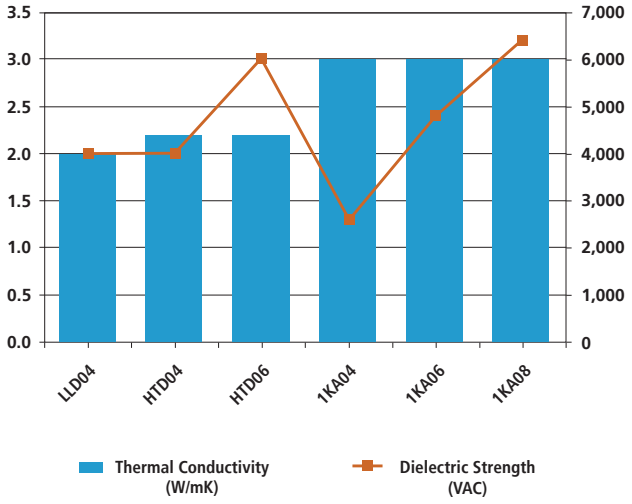
Tlam™ thermally conductive circuit boards are designed with Laird's unique dielectric materials 1KA, HTD and LLD. Tlam technology improves thermal performance while retaining good dielectric isolation.

The 1KA material offers high thermal conductivity for applications where a thick dielectric is required. The 1KA material is available as a freestanding Tpreg™ to facilitate multilayer and FR4 hybrid circuit boards.

The HTD material is used where high withstand voltage (>5000 V DC) and continuous use temperature of 150°C are required.

The LLD material is specifically designed for LED applications where cost and performance need to be balanced for high volume applications.



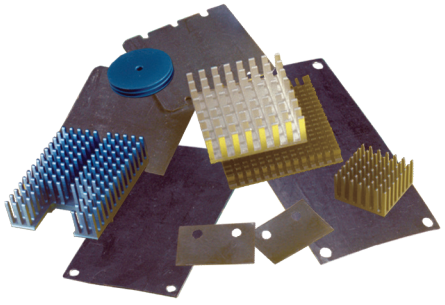


APPLICATIONS

- LED lighting – architectural lighting and street/highway/parking/signal lighting
- Telecom – DC/DC convertors and base stations
- Automotive – motor control systems, power steering modules, ABS braking systems, headlights, brake lights, and day time running lights
- Consumer – LCD LED backlighting units
- Industrial – solar voltaic, industrial voltage regulators, and power supplies

Tgon™ 800

Tgon™ 800 is a high-performance, cost-effective TIM that can be used where electrical isolation is not required. Tgon™ 800's unique grain oriented graphite plate structure provides 5 W/mK through the Z axis.



APPLICATIONS

- Tgon™ 800 is especially good for applications that require high conductivity and low cost without softness
- Power conversion equipment
- Power supplies
- Large telecommunications switching hardware
- Notebook computers
- Where electrical grounding is required with good thermal conductivity

Laird™

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