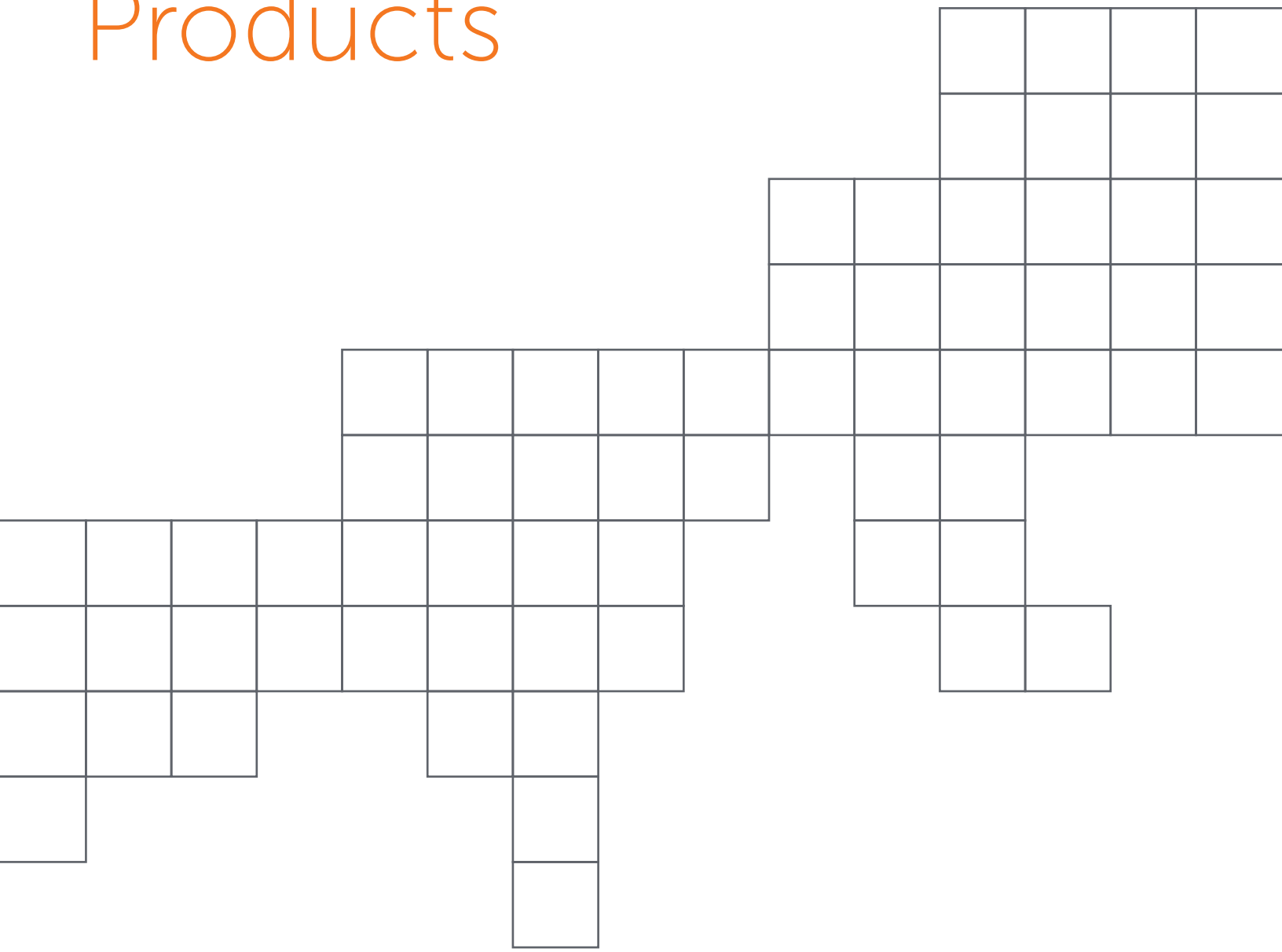
Move

Thermal Products



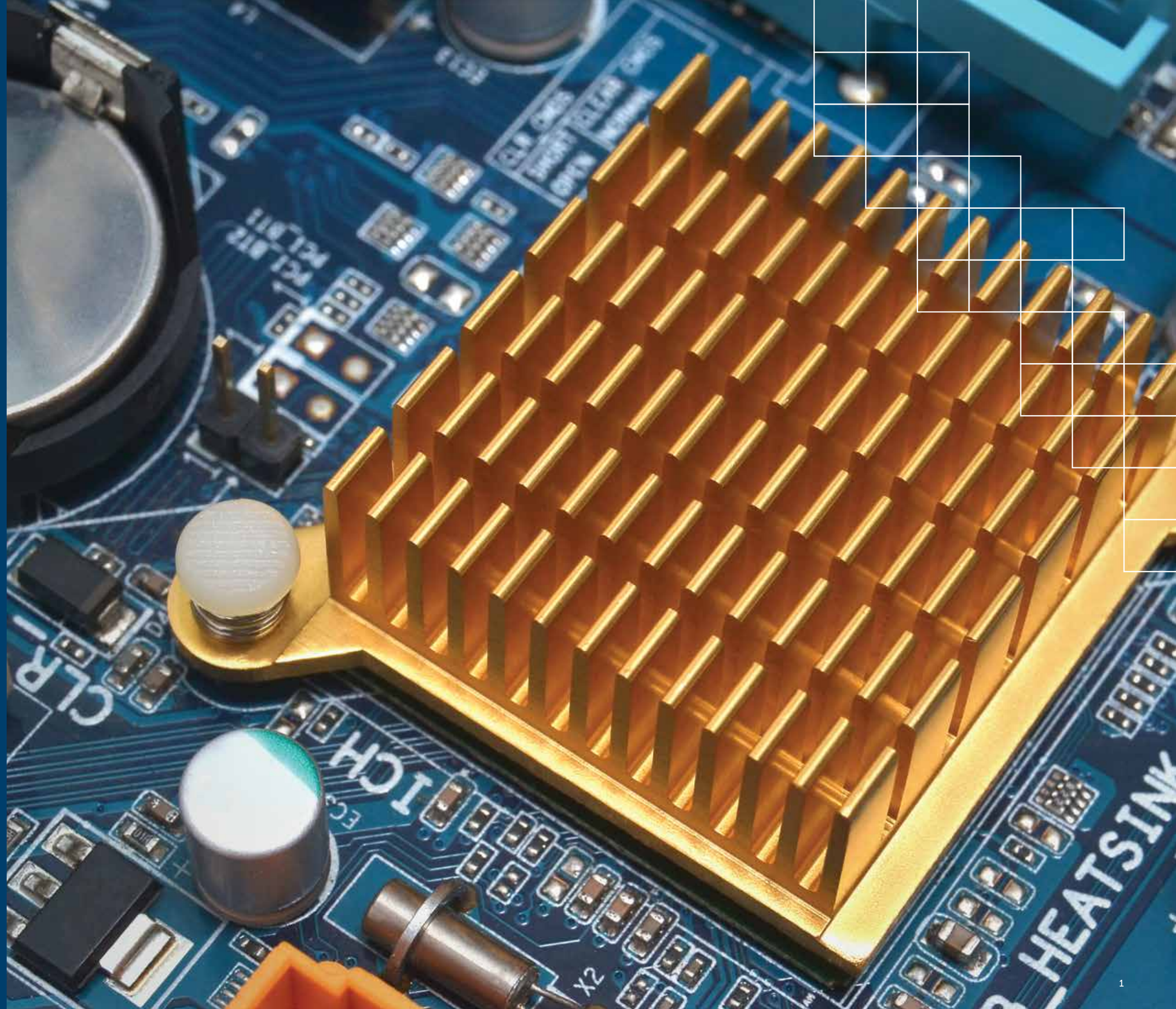
CTS Your Partner in Smart Solutions

Thermal Products

CTS provides manufacturers with a broad range of thermal management products and engineered solutions for heat mitigation, part retention and thermal conductivity.

Leveraging a global team of distributors, engineers and customer service professionals, CTS prides itself in being your partner in smart solutions. By providing expert technical assistance during the design stage, quick prototype turnaround and dedicated manufacturing throughout the application lifecycle, CTS delivers more than just world-class technologies for thermal management.

cts Your Partner in Smart Solutions



Thermal Products

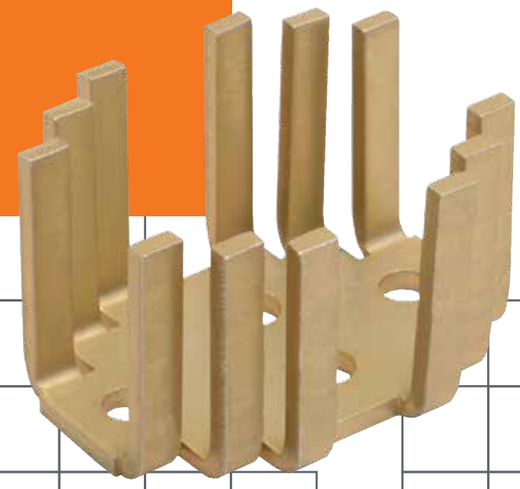
Move

Heat Sinks

Extruded Heat Sinks
Manufactured using an aluminum extrusion process, extruded heat sinks provide a cost effective heat dissipation method for various applications.

LED Lighting Heat Sinks
CTS offers standard and customized LED lighting heat sinks with thermal simulation capabilities. Design assistance is also available.

Stamped Heat Sinks
Designed for an assortment of transistor applications, stamped heat sinks are easily interfaced with popular transistor packages.



Fan Sinks
Designed to provide significant cooling over system level fans, CTS fan sinks enhance performance, increase life and reliability of critical components and allow for increased airflow when space may be limited.

Forged Heat Sinks
Forged heat sinks maximize surface area within a given footprint for optimal thermal performance.

Thermal Products

Retainers

Zero Insertion Force Retainers

Zero insertion force retainers hold circuit boards and remove heat in ruggedized computer cage environments.

Thermal Link Retainers

CTS thermal link retainers are designed to hold transistor packages firmly in high shock/ vibration environments.

Materials

Thermal Interface Materials

Our portfolio of advanced thermal interface materials enhances the thermal management of electronic assemblies and circuit boards.

Extruded Heat Sinks

Move

Convenient Attachment Method

Excellent Mechanical Bond

Applications

Economical low- to medium-power components for many consumer and commercial applications such as PC processing and semiconductor industries

» Various mounting options that offer convenience as well as cost and time-saving advantages
» Thermally optimized, omnidirectional pin fins

BDN Series

These high-performance, extruded heat sinks offer a convenient and easy-to-use solution for critical components running at maximum heat-generating speeds.

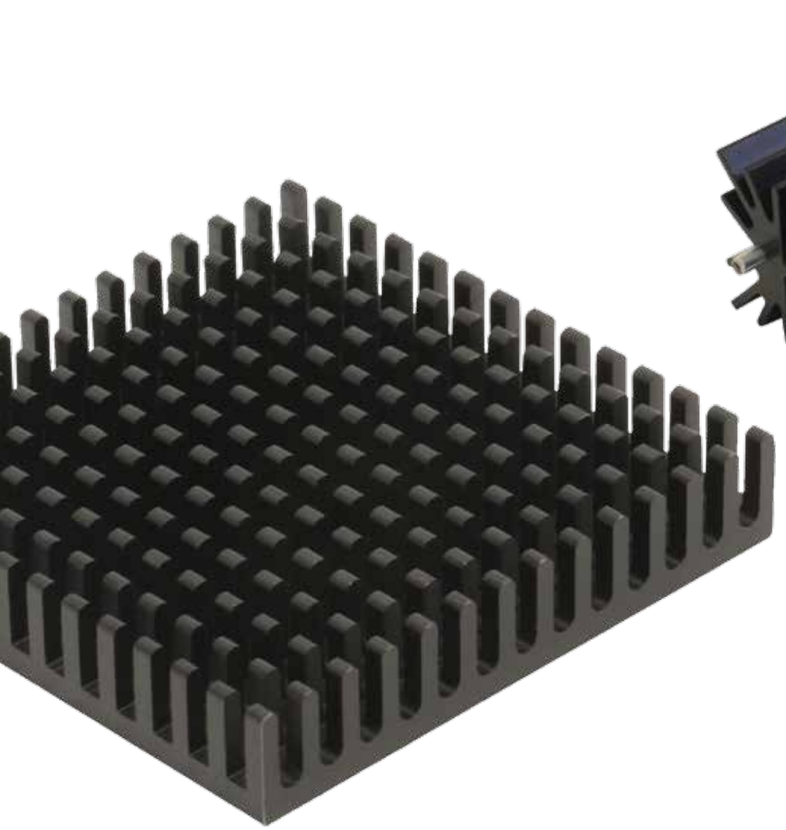
The BDN series have a pre-applied peel & stick adhesive tape with a 36-psi shear strength at 100°C. This greatly reduces assembly costs and eliminates messy adhesives or greases.

Thermal resistance is as low as 2.2°C/watt at 400 LFPM convection flow conditions for BGA, PGA, PLCC and QFP packages.

Additional Extruded Heat Sinks

CTS also designs extruded heat sinks with fanned, flared and vertical fins. These heat sinks are for TO-126, TO-202, TO-218 and TO-220 transistor package applications.

These heat sinks are made of 6063-T5 aluminum in a single- or double-component style and are finished with a black anodized surface. The thermal performance is as low as 3.3°C/watt at natural convection.



LED Lighting Heat Sinks

Move

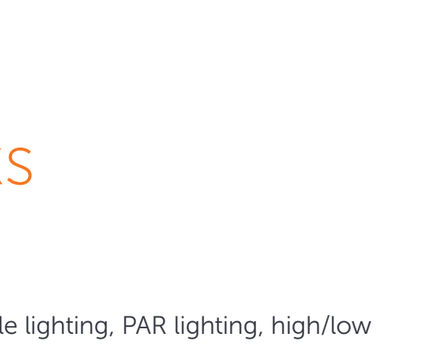
High Aspect Ratio

High Performance, Low Thermal Resistance

Applications

LED bulb lighting, LED candle lighting, PAR lighting, high/low bay lighting and indoor/outdoor sign applications

- Heat sinks with thermal resistance as low as 0.24°C/watt (stamped) and 0.84°C/watt (forged)
- Thermal coating provides up to 15% better thermal performance than standard finishes
- High performance omnidirectional pin fins and radial plate fins for use in natural convection applications
- Select from multiple fin heights and diameters for the right fit with various LED application
- Custom configurations available to fit your needs



Forged LED Heat Sinks

CTS forged LED heat sinks utilize precision forging technology and feature omnidirectional, round pin fins of multiple heights to precisely fit various LED substrates. These heat sinks are perfect for low- to medium-power LED applications from 5W to 80W.

Due to the high aspect ratio design, these heat sinks provide excellent thermal performance for their size. They also provide good thermal performance for applications having natural convection and omnidirectional air flow. This advantage makes them suitable for use in indoor/outdoor LED lighting applications.

The heat sinks range from 32 mm in diameter to 160 mm in diameter and 20 mm to 70 mm in height. The circular shape is easy to integrate with LED substrates and mechanical components.

Stamped LED Heat Sinks

CTS stamped heat sinks for LED applications feature plate fins with a larger surface area coupling excellent performance in a lightweight package at an economical price. These heat sinks are ideal for lighting solutions ranging from 10W bulb lighting to 600W high/low bay lighting applications.

Our proprietary thermal coating technology is available on CTS stamped heat sinks. The thermal coating enhances the thermal radiation of heat transfer by 15% and is available in white or black.

CTS can also provide a complete kit solution, which contains the heat sink, lens, housing and connector. This saves mechanical component design costs.

Move

Stamped Heat Sinks and Thermal Link Retainers

Suitable for Various Transistor Packages

Applications

Economical low- to medium-power components for many consumer and commercial applications such as PC processing and semiconductor industries

Stamped Heat Sinks

- Excellent thermal solution for various transistors in a wide range of industries
- Single- or double-component styles with multiple fin heights
- Made of 1050/1100 aluminum with a black anodized surface finish

Thermal Link Retainers

- Provide an effective retainer and efficient thermal path between semiconductor packages and heat sinks or chassis
- A variety of types are available including fan top, barrel style and flat top
- Black cadmium or dull nickel finish

Stamped Heat Sinks

CTS designs stamped heat sinks in single- or double-component styles and multiple fin heights. They are made of 1050/1100 aluminum with a black anodized surface finish.

These heat sinks have a thermal resistance as low as 7.0°C/watt at natural convection. They are used for TO-3, TO-66, TO-126, TO-127 and TO-220 transistor packages and offer an excellent thermal solution for other various transistors in a wide range of industries including military and aerospace.

Thermal Link Retainers

CTS thermal link retainers provide an effective retainer and efficient thermal path between semiconductor packages and heat sinks or chassis. The links' unique 6- to 8-segment finger design provides superior retention and thermal conductivity, compared to the 2- to 3-segment finger design other manufacturers offer. CTS links offer thermal performance as low as 4.8°C/watt at natural convection.

A variety of package types are available, including fan top, barrel style and flat top and come in your choice of a black cadmium or dull nickel finish.

These links are designed for TO-5, TO-8 and TO-18 transistor packages. They have excellent retention under high shock loads, which makes them highly reliable in military and aerospace applications.

Thermal link retainers for TO-5 and TO-18 transistor packages come with or without BeO insulators and mounting hardware.

Forged Heat Sinks

Move

- High Aspect Ratio
- Low Thermal Resistance

Applications

Economical low- to medium-power components for many consumer and commercial applications such as PC processing and semiconductor industries

- Produced using precision forging technology
- Thermal resistance as low as 1.2°C/watt (pin fins) and 1.9°C/watt (plate fins) at 200 LFPM convection flow conditions
- Omnidirectional pin fins (APR series) or plate fins (AER and APF series)
- Adhesive tape, clip and peel & stick (APF series only) mounting methods available
- Adhesive lap shear adhesion, 15–70 psi
- Select from multiple fin heights for the right fit with various surface mount packages

APR Series

This series of CTS heat sinks features omnidirectional, multiple-height pin fins with a high aspect ratio.

This design provides excellent thermal performance in relationship to their size for medium- and high-power applications. These advantages also makes them suitable for use in military and aerospace applications.

These heat sinks easily snap on the PCB and self-align without the need for special tools during assembly.

AER / APF Series

These CTS heat sinks feature forged, omnidirectional, thin plate fins ideal for use in high power BGA and other surface mount applications.

The APF series heat sink is available in three heights (6.3 mm, 9.5 mm and 12.7 mm) and in three footprints (19, 30 and 40 mm square).

The low-profile design requires less system space to provide adequate device cooling than other thermal solutions.

Fan Sinks

Move

Wide Range of Footprints and Fin Heights

Industry-leading Maximum Operating Temperature of 90°C

Applications

Suitable for many elevated temperature applications such as component testing, burn-in, high-density servers, high-speed computing and video and use in areas where the system's airflow is constrained

- Compatible with chipset footprints ranging from 21x21 mm to 55x55 mm
- Total heights from 16.1 mm for low profile applications to 44.6 mm for lowest thermal resistance
- Common 5V DC @ 0.5 A (max) USB 2.0 fan electrical specifications
- Forged and extruded versions available
- Choice of elliptical, round pin and plate fin styles

CTS integrated-fan heat sinks are uniquely designed to absorb and disperse heat away from high-temperature devices while offering key features such as an operating temperature range of –10°C to 90°C, calculated MTTF @ 90°C: 86,858 hours (GEM, 90% confidence) and various package sizes to best fit the application. Thermal resistance values range from 3.45°C/watt to as low as 1.19°C/watt. These fan sinks can maintain superior thermal dissipation for devices that emit high amounts of heat.

Fan sinks product line includes:

- **FHL Series—Line Fins:** Thermal resistance values from 3.45°C/watt to as low as 1.29°C/watt
- **FHE Series—Elliptical Fins:** Thermal resistance values from 1.65°C/watt to as low as 1.19°C/watt
- **FHP series—Pin Fins:** Thermal resistance values from 3.35°C/watt to as low as 1.95°C/watt
- **FEX series—Extruded fins:** This series is customizable and features a thermal resistance range that is defined upon creation of the component.

Zero Insertion Force (ZIF) Retainer

Move

Rugged PCB Retainers for Military & Aerospace

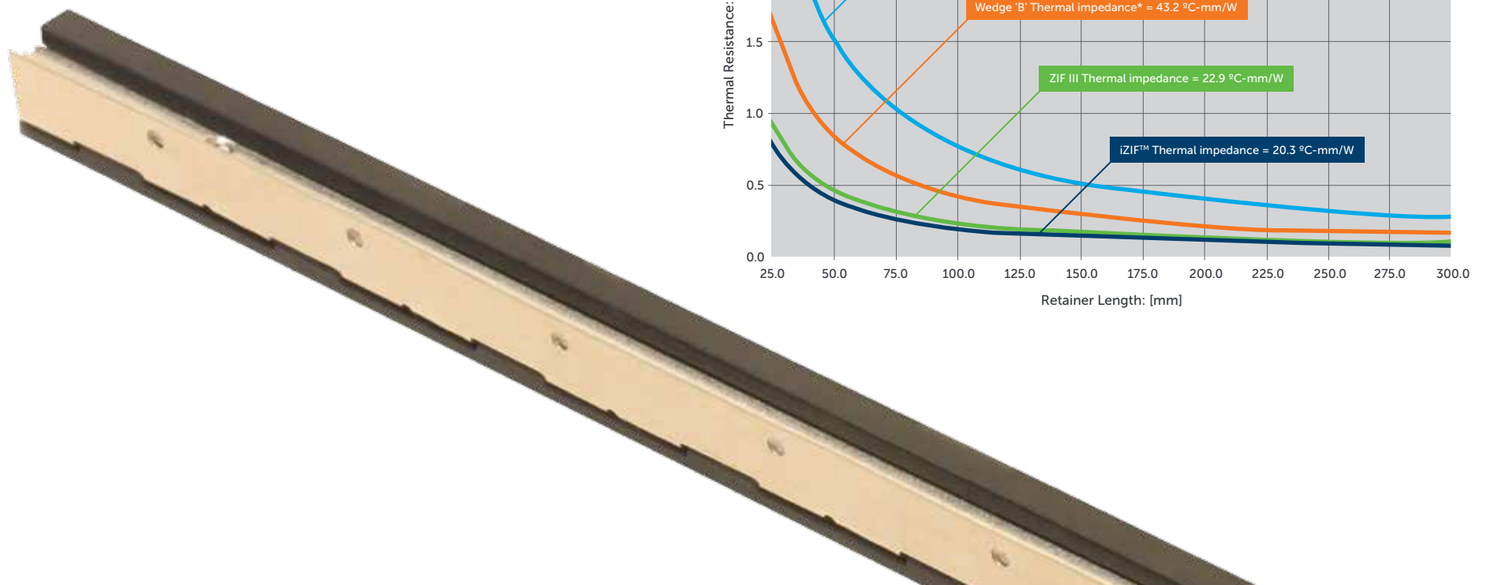
Superior Performance

Applications

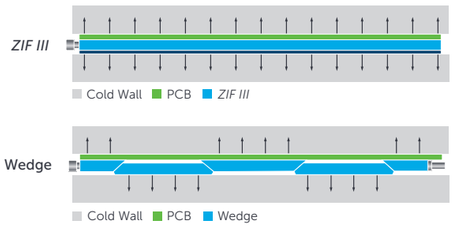
Aircraft, aerospace, military ground vehicles and rugged computer systems, as well as secure circuit cards located inside ATR enclosures and auxiliary distribution assemblies

- Quick quarter-turn locking action
- Uniform clamping pressure eliminates hot spots and creates uniform heat transfer resulting in an efficient heat transfer path
- Oustanding low thermal resistance of 0.8°C per inch per watt (20.3°C per millimeter per watt) from the PCB to the cold wall
- ZIF characteristics are unaffected by adverse environments typically encountered in military and industrial applications
- ZIF provides a visual indication that the rods are in the “open” or “closed” position relative to the position of the drive assembly
- Design interchangeability makes field repairs quick and simple — no special tools required

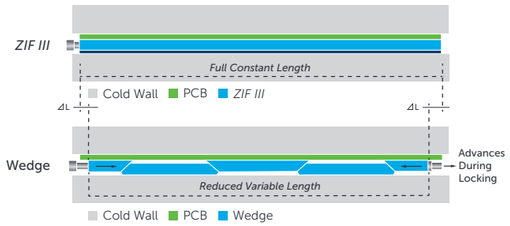
The Zero Insertion Force (ZIF) PCB retainer is a thermally-conductive clamp that secures the PCB to a chassis cold wall. The ZIF acts as both a thermal conductive path and a quick ‘n’ easy structural fastening device. ZIF retainers are designed to be rugged for high shock and vibration military and aerospace applications.



Clamping Pressure



Length Comparison



ZIF & Wedge Thermal Resistance Comparison

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