



TCLAD

Product Selection Guide

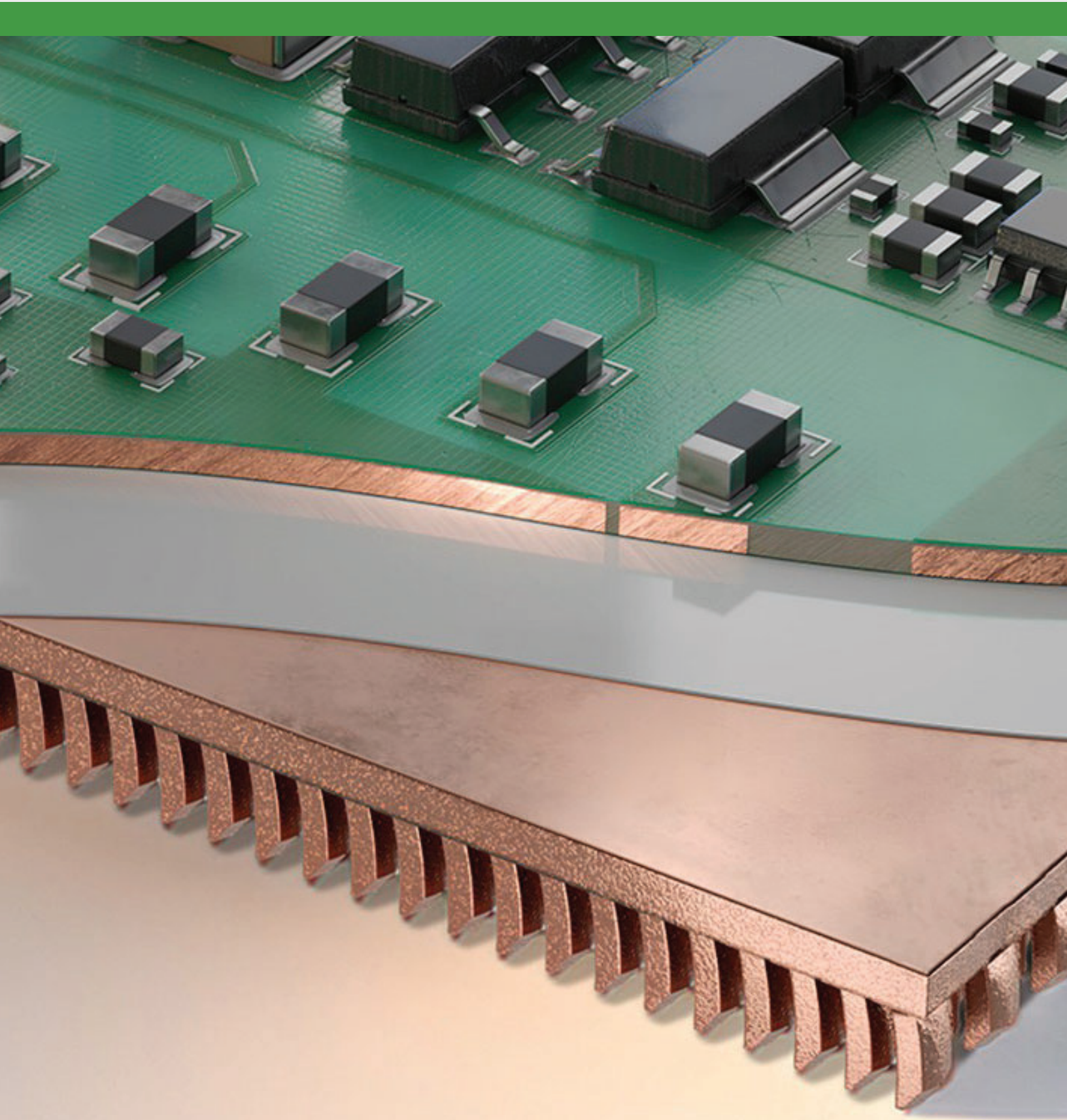




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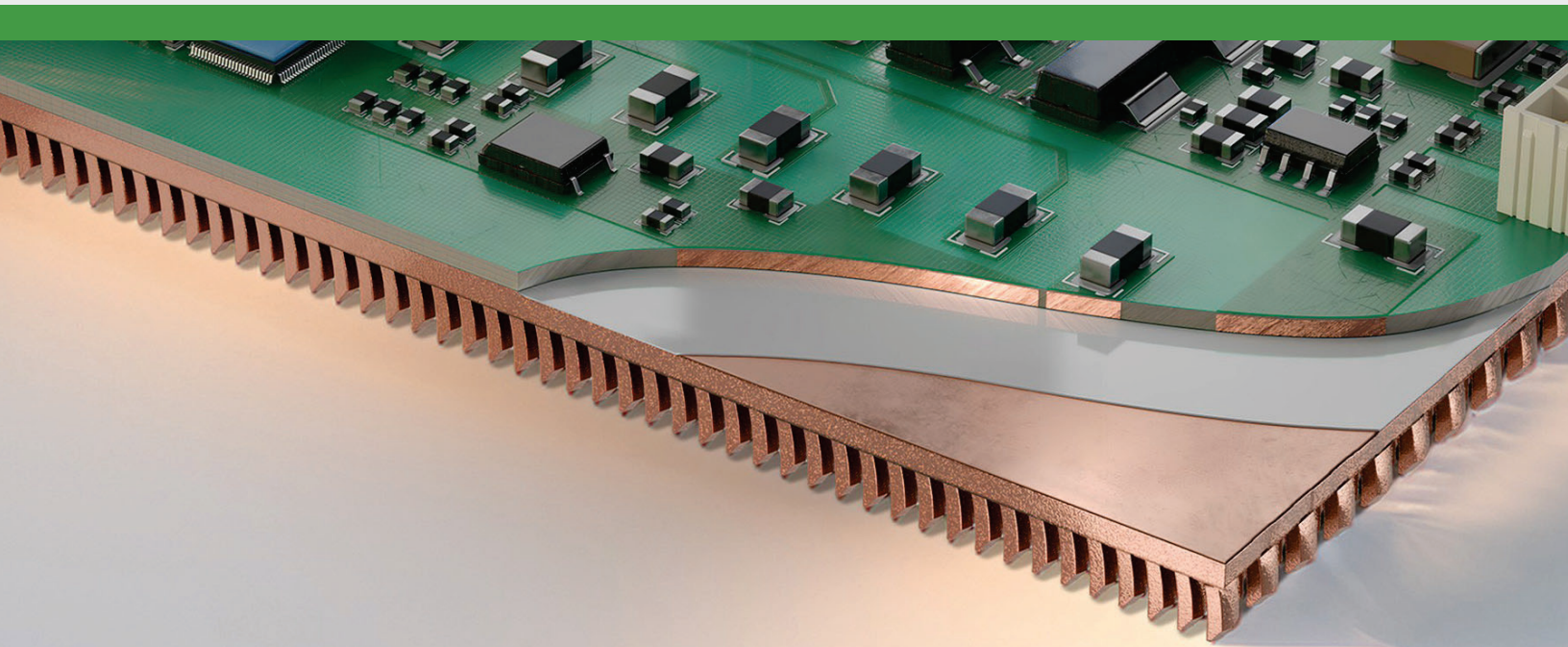
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Who we are

TCLAD is a global leader in advanced thermal management solutions for high-power electronics. With roots dating back to 1987, our story began with the pioneering development of Thermal Clad® materials – a breakthrough that set a new standard for managing heat in demanding applications. From our 100,000 sq. ft. Innovation Center in Prescott, Wisconsin, our dedicated team continues to push the boundaries of performance, quality, and reliability.

What we do

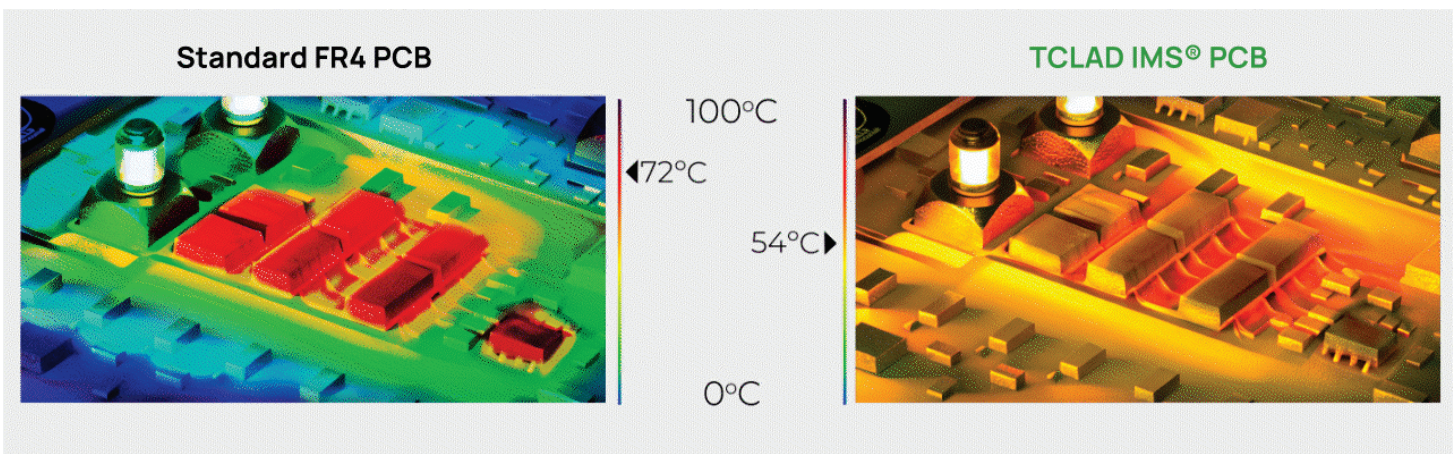
We engineer and manufacture innovative solutions for high power applications that divert heat, improve efficiency, and extend product life – enabling higher performance thermally, switching speeds, and shielding in smaller, more compact designs. Our expertise spans industries including automotive, industrial automation, aerospace, and defense. With cutting-edge materials, precision manufacturing, and rigorous in-house testing, TCLAD partners closely with customers to solve complex thermal challenges and deliver proven results.



TCLAD's Insulated Metal Substrate (IMS®) solutions are purpose-built to meet the most demanding thermal challenges. Engineered for high-performance, our IMS®/Thermal Clad Metal Core PCBs (MCPCBs) dramatically reduce thermal impedance and improve heat conduction – enabling more effective and efficient heat transfer compared to traditional FR4 PCBs. Beyond enhancing thermal performance, TCLAD IMS® products offer outstanding mechanical strength, making them significantly more durable than conventional FR4 PCBs.

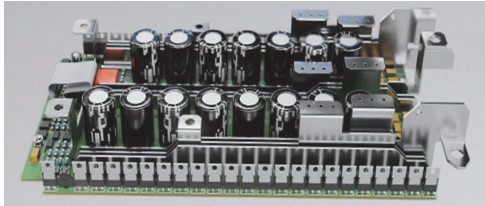
See the Difference with TCLAD IMS®

Independent testing proves TCLAD IMS® improves heat spreading, effectively lowering temperatures of critical components.

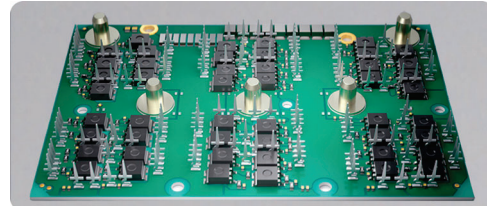




TCLAD IMS® reduces hardware and production costs by simplifying PCB design and assembly.



- **66** Thru-Hole FETs
- **15** High Profile Capacitors
- **9** High Profile Bus Bars
- **3.4 lbs** Total Weight

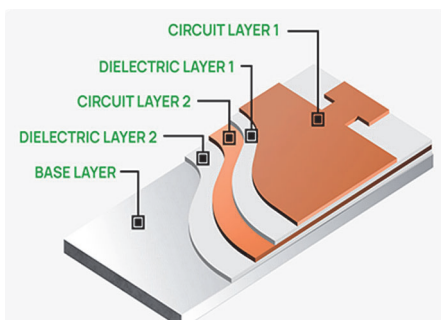


- **48** Surface Mount FETs
- **9** Low Profile Capacitors
- **5** Low Profile Bus Bars
- **0.82 lbs** Total Weight

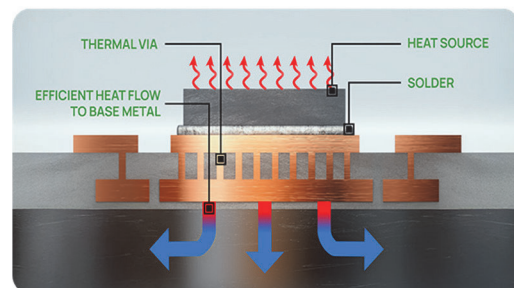
Anatomy of TCLAD IMS® PCB

Standard IMS® construction consists of:

- **Circuit Layers:** Etched copper circuitry, with typical thicknesses ranging from 0.5 oz. to 10 oz. (17 – 360 μm). 1-2 circuit layers are most common with advanced capability for higher layer counts.
- **Dielectric Layers:** Provide excellent electrical insulation and outstanding thermal conductivity. Our patented dielectrics are formulated with polymer and ceramic. The dielectric layer also serves to bond the base metal and circuit layers together.
- **Base Layer:** Typically made of aluminum or copper, with thicknesses tailored to meet specific application demands. This layer functions as a heat sink or heat spreader, playing a critical role in TCLAD IMS® thermal management.



IMS® enhances heat dissipation & EMI shielding

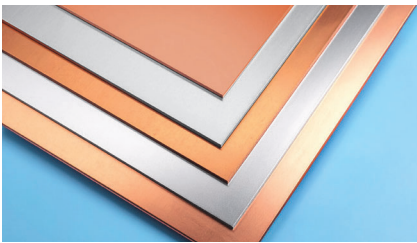


Thermal vias reduce thermal impedance



Thermal Clad Materials for IMS®/Metal Core PCBs (MCPCBs)

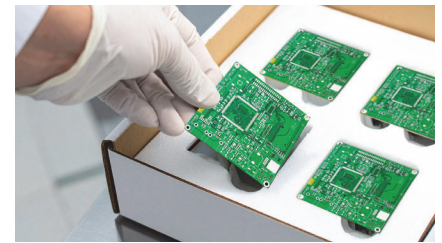
TCLAD offers a broad portfolio of IMS® dielectric materials available for direct purchase. We can also collaborate with you to custom-configure solutions that meet your specific requirements. From design concept and rapid prototyping to final production, we support every stage of development to ensure peak performance and manufacturability.



**Copper or Aluminum
Base Metals**



**Broad Portfolio of Patented
Dielectric Materials**



**Custom IMS®
Circuit Fabrication**

Where IMS® Excels

- Power Converters
- Power Rails
- High-Power LEDs
- Motor Drives
- Motor Controllers
- Solid-State Relays
- High-Voltage Devices
- Aerospace & Defense Applications
- Radar Power Supply, Direct Energy Weapon Power, Drone Power Supply.

Key Benefits of TCLAD IMS®

- RoHs & REACH compliant, halogen-free, PFAS-free
- Lowers component operating temperatures
- Very low moisture absorption & outgassing
- Extends component life
- Supports higher power densities
- Enables smaller & uniquely shaped PCB designs
- Shielding for high power switching, increased switching speeds (up to 6x).
- Minimizes need for heat sinks, mounting hardware, and Thermal Interface Materials (TIMs)
- Supports high-current & high-voltage applications
- Improves mechanical durability and long-term reliability
- Supports higher power densities
- Reduces assembly complexity and cost

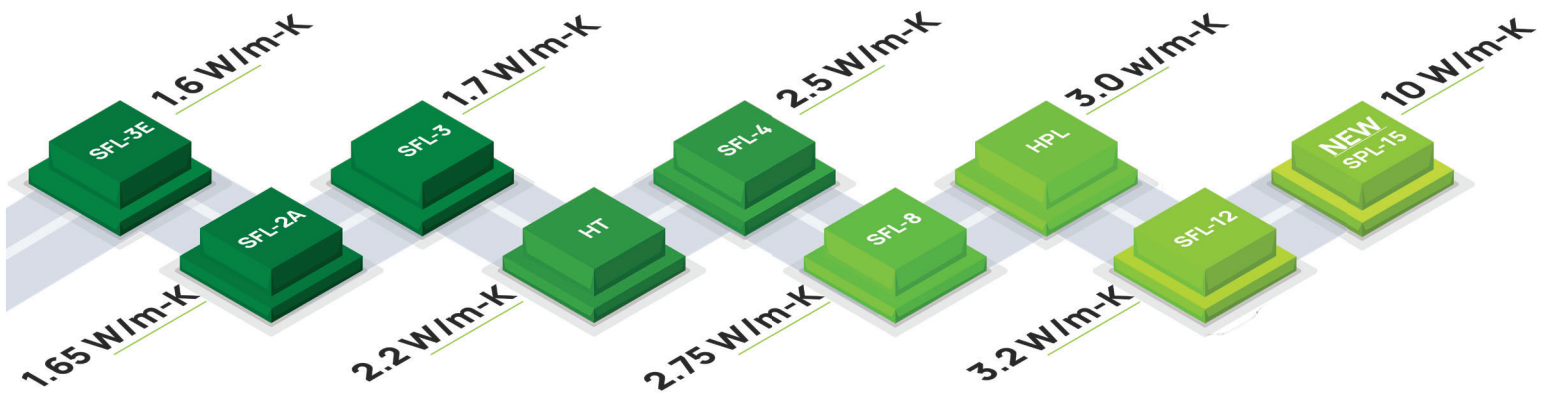


Thermal Clad Dielectrics

TCLAD offers the industry's most extensive range of dielectric materials, providing unmatched design flexibility across a variety of PCB formats – from insulated metal substrate (IMS®), to prepreg (PP) composites, and rigid copper-clad (RCC) laminates, as well as advanced Thin Core Series (TCS) materials.

High-Performance Dielectrics by TCLAD

Engineered for High-Power IMS®/MCPCB Applications





Where Thermal Clad Dielectrics Excels

- High-Power IMS® & MCPCBs
- EV Power Modules & Fast Chargers
- Solar Power Inverters & Optimizers
- Robust Eutectic AuSn Die Attach
- High-Reliability ENEPIG Surface Finishes
- Wide-Bandgap GaN & SiC Applications
- Harsh Environment Defense Applications

Key Benefits of TCLAD IMS®

- Low z-axis expansion for stability under thermal cycling
- Supports thin stack-up designs for compact assemblies
- Solvent-free, low-VOC options for sustainable manufacturing
- High electrical insulation and breakdown strength
- Lead-free process compatibility
- Durable and reliable for long-term performance
- Semi-flexible bond layer absorbs stress and strain
- Built for extreme automotive, military, and aerospace conditions

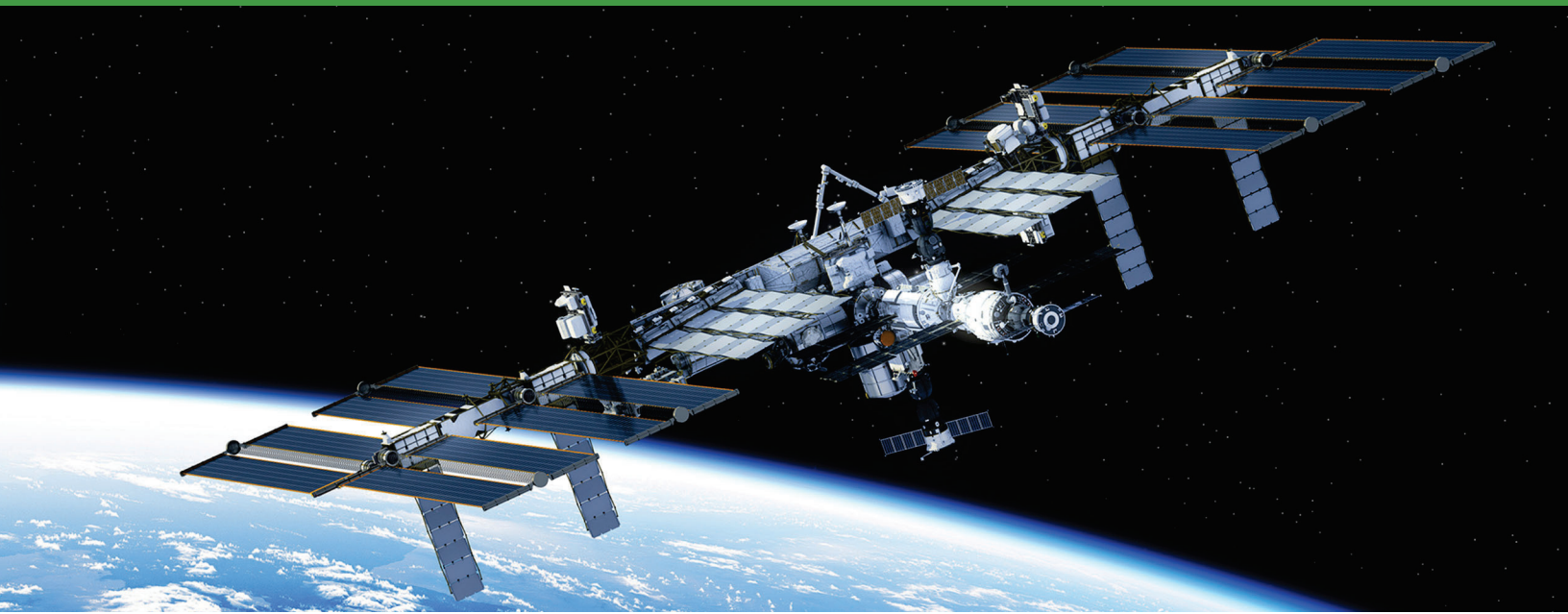


TCLAD offers the industry's most extensive range of dielectric materials, providing unmatched design flexibility across a variety of PCB formats – from insulated metal substrate (IMS®), to prepreg (PP) composites, thin core series (TCS) and rigid copper-clad (RCC) laminates.

Thermal Clad Products	Typical Thickness	Thermal Conductivity (W/m-K)	Thermal Resistance (°C-in²/W)	Breakdown Voltage (KVAC)	Glass Transition (Tg °C)	CTE in XY/Z < Tg (µm/m°C)	CTE in XY/Z < Tg (µm/m°C)
SFL-3E	4.0 mil (100µm)	1.6	<0.13	7	55	24	37
SFL-2A	4.0 mil (100µm)	1.65	<0.13	6	130	20	30
SFL-3	4.0 mil (100µm)	1.7	<0.12	6	140	25	32
HT	3.0 mil (76µm)	2.2	0.05	8.5	150	25	95
	4.0 mil (100µm)	2.2	0.077	9.3	150	25	95
	6.0 mil (152µm)	2.2	0.11	11	150	25	95
	9.0 mil (225µm)	2.2	0.16	20	150	25	95



Thermal Clad Products	Typical Thickness	Thermal Conductivity (W/m-K)	Thermal Resistance (°C-in ² /W)	Breakdown Voltage (KVAC)	Glass Transition (T _g °C)	CTE in XY/Z < T _g (μm/m°C)	CTE in XY/Z < T _g (μm/m°C)
SFL-4	4.0 mil (100μm)	2.5	0.11	5	150	16	25
SFL-8	4.0 mil (100μm)	2.75	0.08	5	150	28	35
HPL	1.5 mil (38μm)	3.0	0.02	5	185	35	85
	2.0 mil (50μm)	3.0	0.026	7.7	185	35	85
	4.0 mil (100μm)	3.0	0.031	12.2	185	35	85
	6.0 mil (152μm)	3.0	0.039	17.4	185	35	85
SFL-12	4.0 mil (100μm)	3.2	0.06	5	180	15	18
SPL-15	4.0 mil (100μm)	10.0	<0.015	4	270	11.7	24.3
SFLG-8	4.0 mil (100μm)	1.85	0.09	5	150	28	35
SFLG-12	4.0 mil (100μm)	2.8	0.065	5	180	15	18



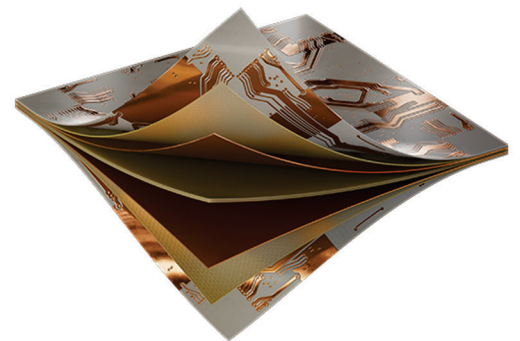
Innovative Board-Level Thermal Management Solutions

At TCLAD, our Engineers are constantly developing new methods to manage and reduce heat. As the demand for high-performance, power-dense systems increases, system designers need innovative materials and technologies to create compact, robust solutions that withstand extreme conditions, operate at higher temperatures, voltages, and switching frequencies – all while maintaining long-term efficiency and reliability. Effective thermal management is key to overcoming these challenges.

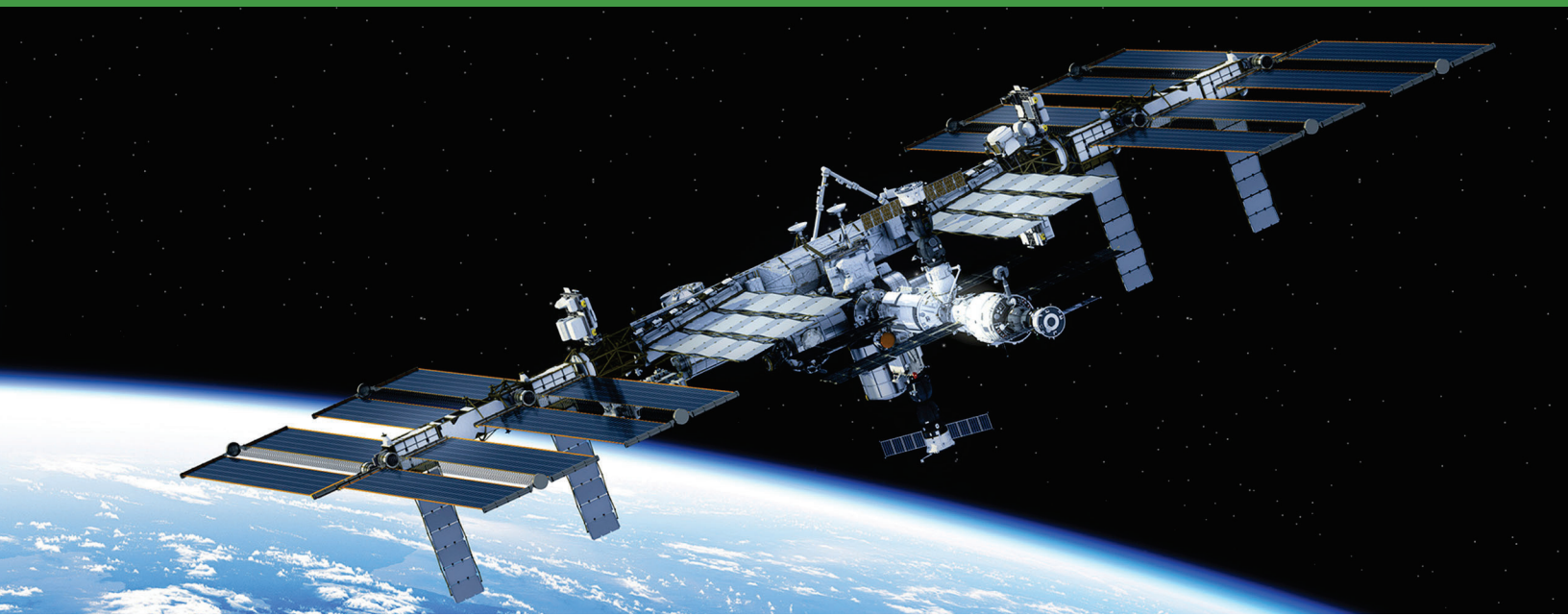
Multi-Layer Circuit Stacks with Thermal Clad Dielectrics

Thermal Clad dielectric film is easy to laminate, simplifying the fabrication of advanced multi-layer circuit boards. By vertically stacking copper foils with glass-fiber-reinforced dielectric layers, we create complex circuit structures that deliver superior thermal conductivity, electrical isolation, and mechanical strength. When paired with a copper base plate, blind vias can be implemented to create conductive pathways between circuit layers and the base – boosting thermal conduction and electrical performance.

Ideal for high-power and high-frequency RF applications that demand low dielectric constant and minimal loss tangent, this cost-effective additive buildup process serves as a drop-in replacement for standard FR4. It delivers substantial thermal performance improvements without the need for costly redesign.



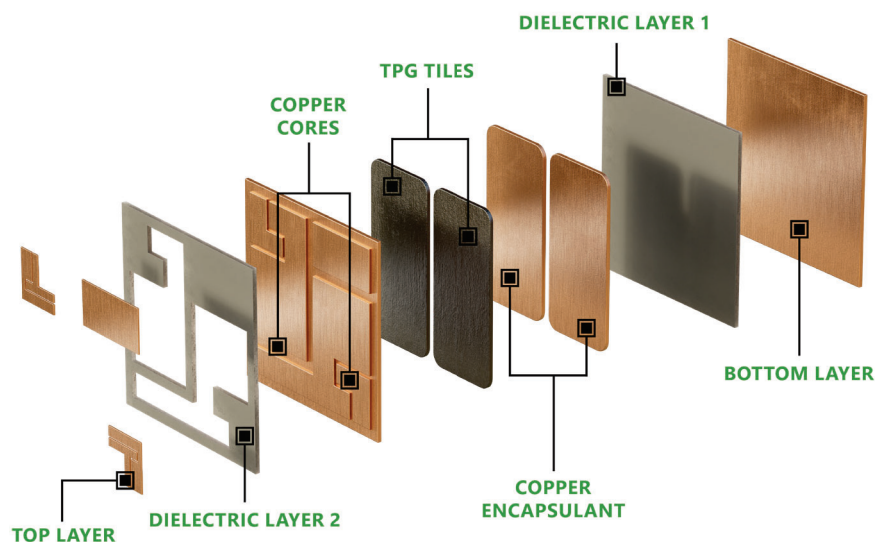
Multi-Layer Thermal Clad PCB



Insulated Metal Substrate (IMS®) with Thermal Pyrolytic Graphite (TPG)

Thermal Pyrolytic Graphite (TPG) is a synthetic graphite material with a unique layered structure, featuring strong covalent bonds within the layers and weak electrostatic bonds between them. Its distinctive structure provides exceptional thermal conductivity – up to four times higher than copper – along with valuable anisotropic electrical properties, making it an excellent choice for enhancing thermal performance in high-power PCBs.

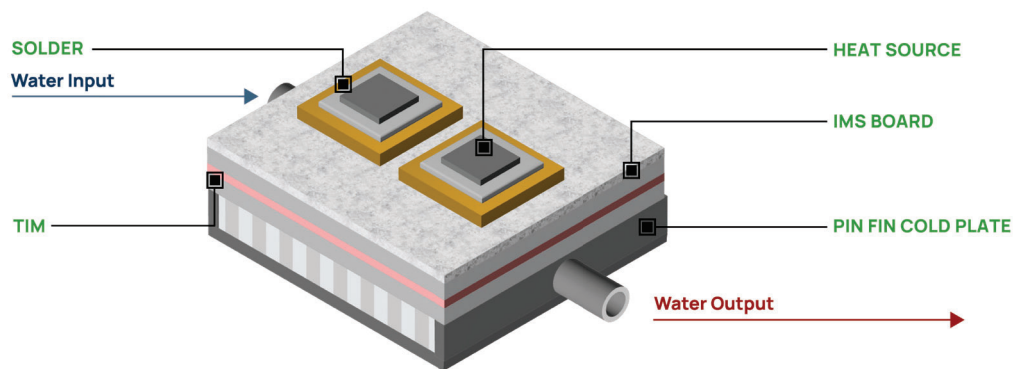
TCLAD's advanced IMSwTPG solutions combine the superior thermal conductivity of TPG with the proven thermal, mechanical and electrical properties of IMS®. The result is significantly improved heat distribution, enabling higher performance and greater reliability in next-generation wide-bandgap power systems.





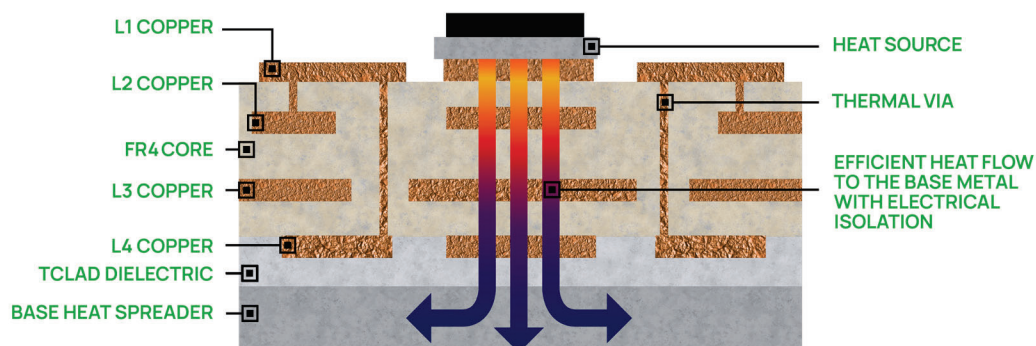
High-Performance Liquid Cooled IMS®

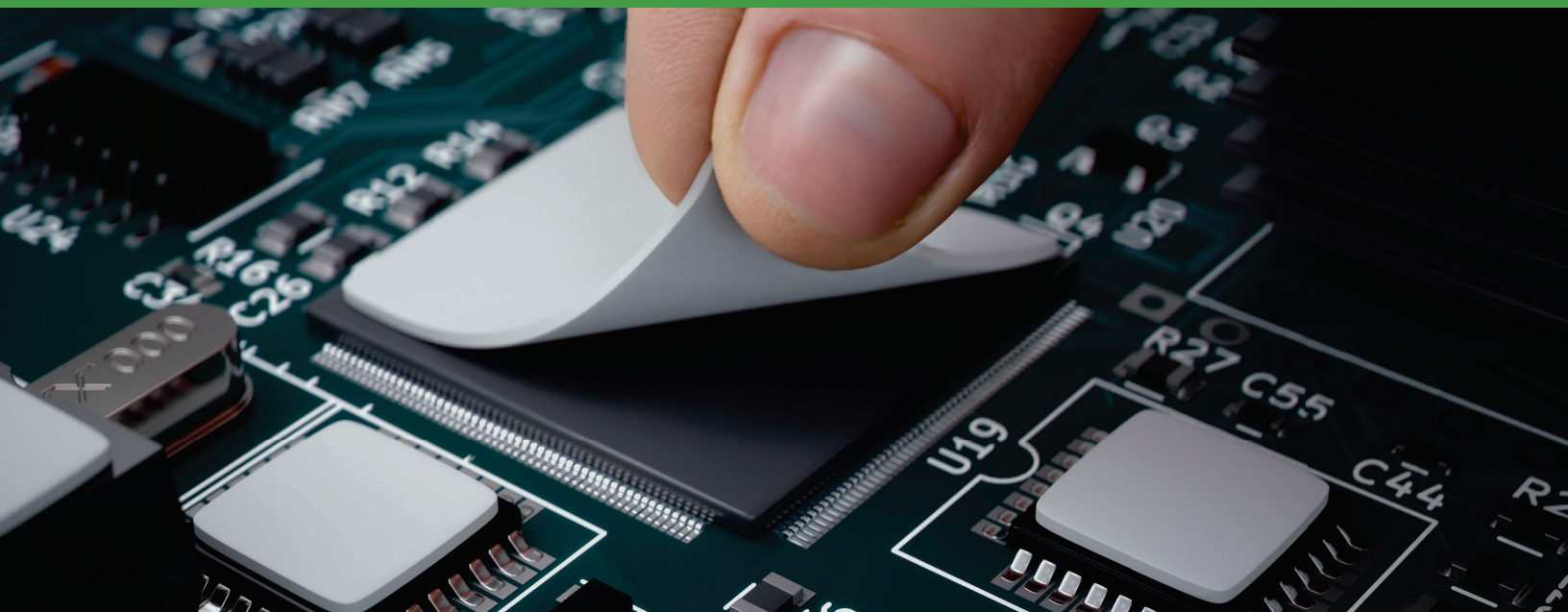
Our Liquid Cooled IMS® solutions offer a highly efficient method of reducing thermal resistance and enhancing overall cooling performance. These advanced designs integrate liquid cooling with a pin-fin or metal-foam cold plate and an IMS® PCB to maximize heat transfer to the cooling fluid. They are compatible with water cooling and can be further enhanced using TCLAD's proprietary liquid dielectric cooling fluid, delivering superior thermal performance for the industry's most demanding applications.



Integrated FR4 & IMS® Constructions

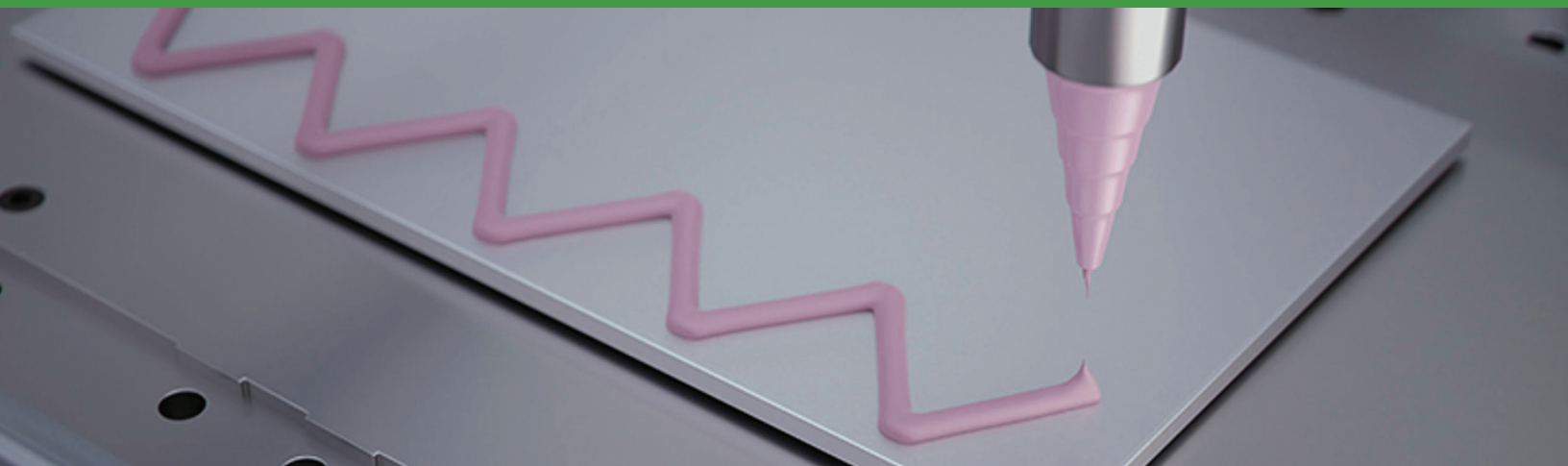
This hybrid thermal management solution combines the familiarity of FR4 with the advanced performance of IMS® technology. By maintaining standard FR4 layouts, this solution streamlines the transition to improved thermal performance with IMS®. The integration of Thermal Clad dielectric and base metal enhances heat dissipation, increases mechanical strength, boosts component reliability, and delivers effective EMI shielding.





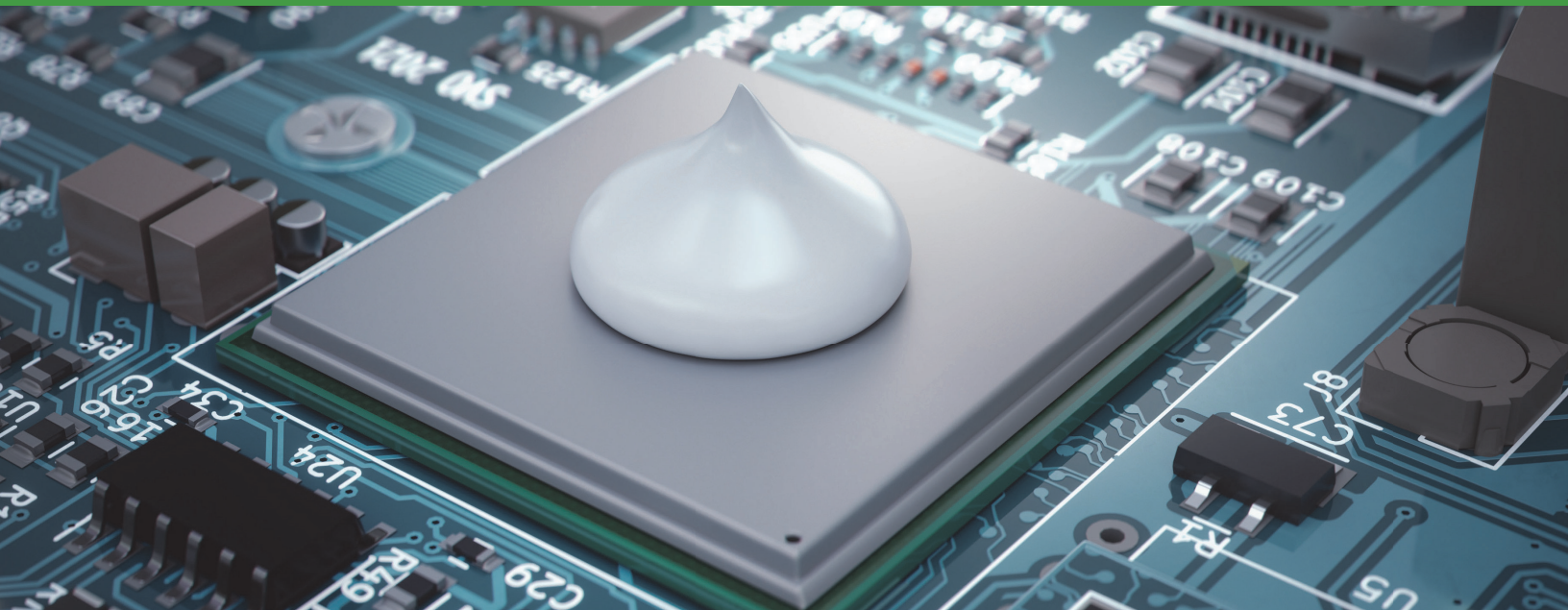
TCLAD Thermally Conductive Filler Pads (TCFPs) are soft, highly conformable, materials designed to absorb shock and vibration while effectively filling air gaps between uneven surfaces. Formulated with a silicone base and thermally conductive fillers, these pads deliver excellent thermal conductivity. Available in sheets or custom-cut shapes and a variety of thicknesses, our TCFP materials provide versatile and reliable solutions for diverse thermal management applications.

TCFP Pad Series	Typical Thickness (mm)	Thermal Conductivity (W/m-K)	Dielectric Constant (@1 GHz)	Shore Hardness
TCFP 2.0	0.5 - 10	2.0	6.5	30
TCFP 3.0	0.5 - 10	3.0	6.8	45
TCFP 5.0	0.5 - 10	5.0	7.3	50
TCFP 6.0	0.5 - 10	6.0	7.7	55
TCFP 8.0	0.5 - 10	8.0	8.1	55
TCFP 10.0	0.5 - 4	10.0	9.9	55
TCFP 12.0	0.5 - 4	12.0	9.9	55
TCFP 15.0	0.5 - 4	15.0	10.5	55



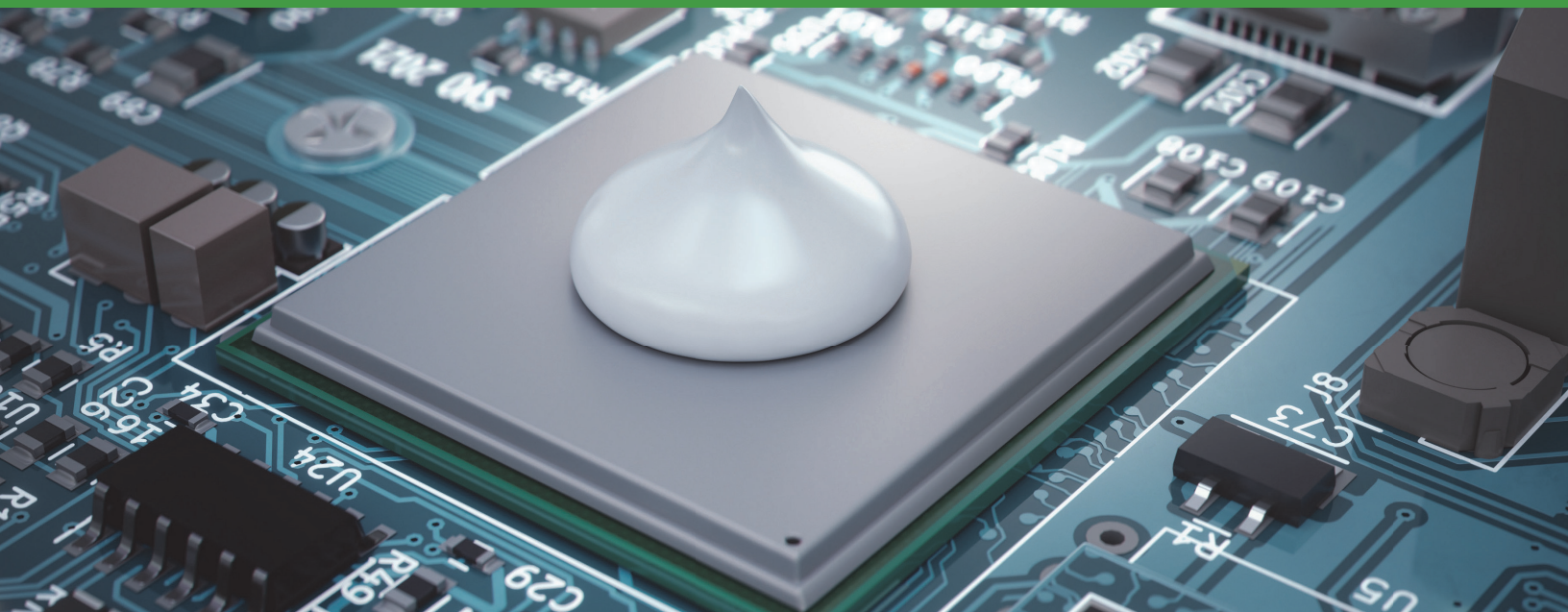
TCLAD Thermally Conductive Filler Liquids (TCFLs) are two-part liquid systems that are mixed prior to application. Once blended, the material is pressure-dispensed to eliminate air gaps, then cured into a solid form for long-term performance. In their liquid state, TCFLs are compatible with both automated and manual dispensing systems, conform easily to complex surface topographies, and provide excellent surface wetting. The TCFL-RW option is a reworkable formulation, allowing it to be easily peeled off after curing.

TCFLs	Viscosity Mixed (cP)	Thermal Conductivity (W/m-K)	Dielectric Constant (@1GHz)	Shore Hardness
TCFL 2.0	170,000	2.0	6.8	45
TCFL 2.0 LD	150,000	2.0	6.0	50
TCFL 3.5	250,000	3.5	7.5	50
TCFL 4.0	310,000	4.0	7.5	50
TCFL 5.0	280,000	5.0	8.0	60
TCFL 5.0 RW	350,000	5.0	8.0	50
TCFL 6.5	300,000	6.5	8.1	50
TCFL 8.0	450,000	8.0	8.3	60
TCFL 10.0	320,000	10.0	8.0	60
TCFL 14.0	420,000	14.0	9.0	60



TCLAD's Thermally Conductive Grease Series (TCGS) delivers excellent heat dissipation, minimal bondline thickness, and superior wet-out performance. Designed to provide low interfacial resistance and extremely low thermal impedance, these greases are ideal for high power density applications, where a thin bondline is essential for optimal thermal conductivity. TCGS require no curing and are compatible with both automated dispensing and screen-printing processes.

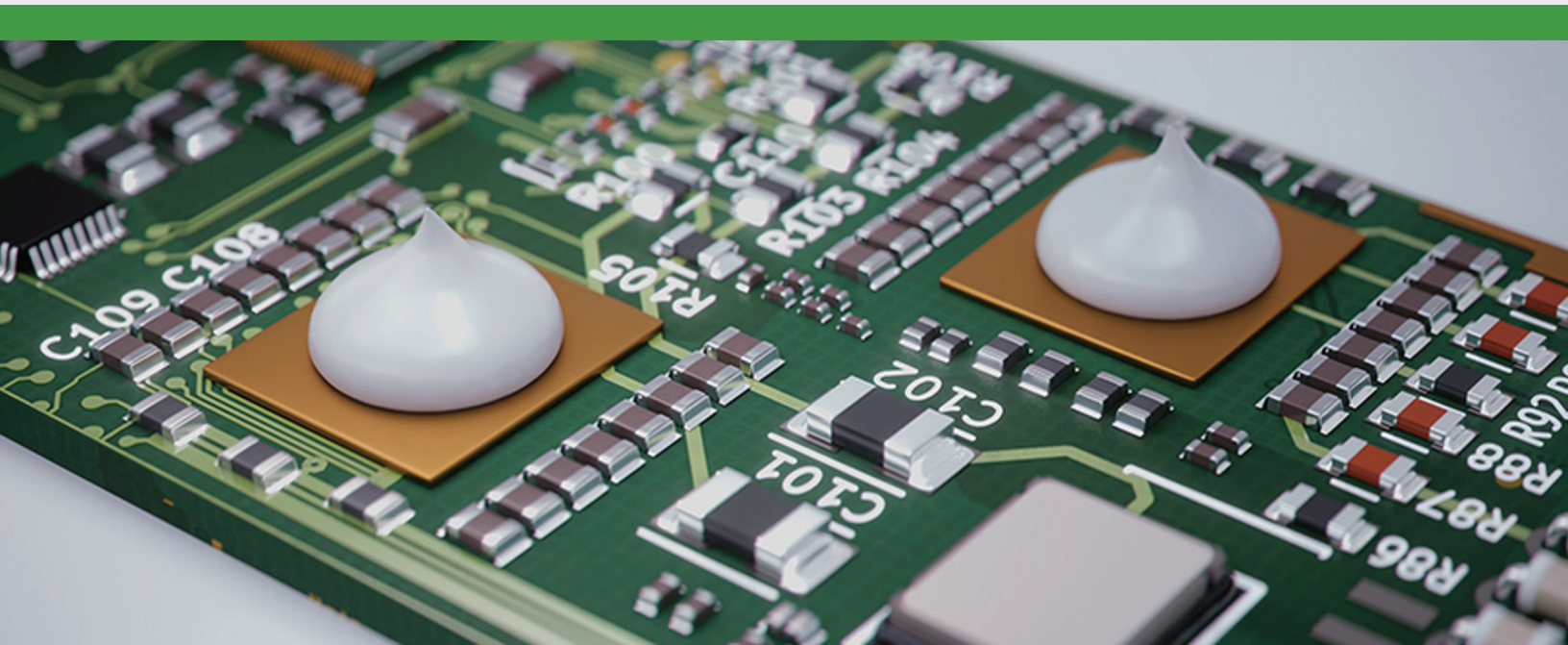
TCGS Grease Series	Viscosity (cP)	Thermal Conductivity (W/m-K)	Typical Application Thickness (μm)
TCGS 2.0	< 90,000	2.0	30
TCGS 3.5	< 220,000	3.5	45
TCGS 5.0	< 220,000	5.0	45
TCGS 6.0	< 350,000	6.0	50



TCLAD's Phase Change Materials (PCMs & HCAs) absorb and release thermal energy as they transition from a solid to a wax-like state, offering a cleaner, easier-to-handle alternative to thermal greases. They are simple to apply — just remove the liner from one side, place the material onto the target surface, peel off the second liner, and press the mating surface together.

Heat Conductive Adhesives (HCAs) are a type of PCMs with built-in adhesive strength, enabling both efficient heat transfer and component bonding without additional adhesive layers.

PCM Series	Typical Thickness (mm)	Thermal Conductivity (W/m-K)	Transition Temperature (°C)	Continuous Use Temp (°C)	Shear Strength (MPa)
PCM 3.5	0.127	3.5	50	-40 to 125	-
	0.205	3.5	50	-40 to 125	-
	0.254	3.5	50	-40 to 125	-
	0.381	3.5	50	-40 to 125	-
PCM 3.5P	0.02	3.5	50	-40 to 125	-
PCM 8.5	0.254	8.5	45	-40 to 130	-
HCA 2.0	0.254	2.0	60	-50 to 120	0.7
HCA 4.0	0.254	4.0	60	-50 to 120	0.3
HCA 5.0	0.254	5.0	60	-50 to 120	0.3



TCLAD Thermally Conductive Gel Liquids (TCGLs) are engineered for low-stress thermal management and offer easy rework and process flexibility. Ideal for assemblies with delicate components, these one-component, conformable gels are compatible with both automated and manual dispensing systems.

TCGL Gel Liquids	Minimum Bondline (cP)	Thermal Conductivity (W/m-K)	Dielectric Constant (@1 GHz)	Continuous Use Temp (°C)
TCGL 2.0 LP	0.06	2.0	3.7	-50 to 200
TCGL 2.0 RW	0.15	2.0	3.7	-50 to 200
TCGL 4.0	0.15	2.0	7.5	-50 to 200
TCGL 4.0A	0.04	4.0	7.5	-50 to 200
TCGL 4.0 LO	0.11	4.0	7.5	-50 to 200
TCGL 6.5C	0.14	6.5	8.0	-50 to 200
TCGL 7.0	0.1	7.0	8.0	-50 to 200
TCGL 10.0	0.12	10.0	9.8	-50 to 200
TCGL 12.0	0.12	12.0	10.0	-50 to 200



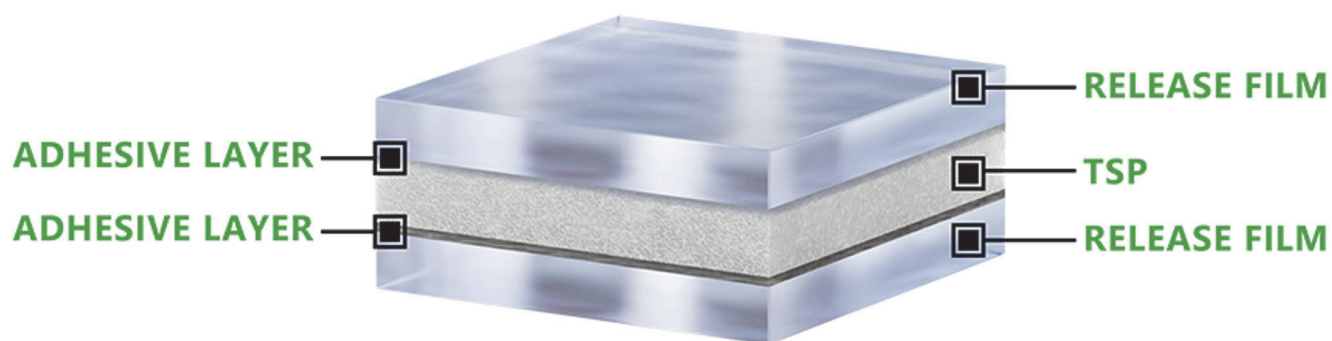
TCLAD Thermal Potting Materials (TPMs) are two-part systems, that once mixed and dispensed, function as both filler and encapsulant – protecting sensitive electronics from environment factors such as dust and moisture. Formulated to efficiently conduct heat away from components like power-transistors to a heat sink or heat spreader, they deliver excellent thermal dissipation while enhancing mechanical integrity.

TPM Potting Compound	Cure Time	Thermal Conductivity (W/m-K)	Dielectric Constant (@1 GHz)	Shore Hardness	Tensile Strength (MPa)
TPM 0.5	4 hrs @ 25°C 10 min @ 150°C	0.5	6.6	5 (C)	0.2
TPM 1.0	4 hrs @ 25°C 10 min @ 150°C	1.0	6.8	45 (A)	1.3
TPM 2.0	4 hrs @ 25°C 10 min @ 150°C	2.0	6.8	65 (C)	0.9
TPM 3.0	4 hrs @ 25°C 10 min @ 150°C	3.0	7.1	65 (C)	0.6
TPM 4.0	4 hrs @ 25°C 10 min @ 150°C	4.0	7.5	65 (C)	0.5



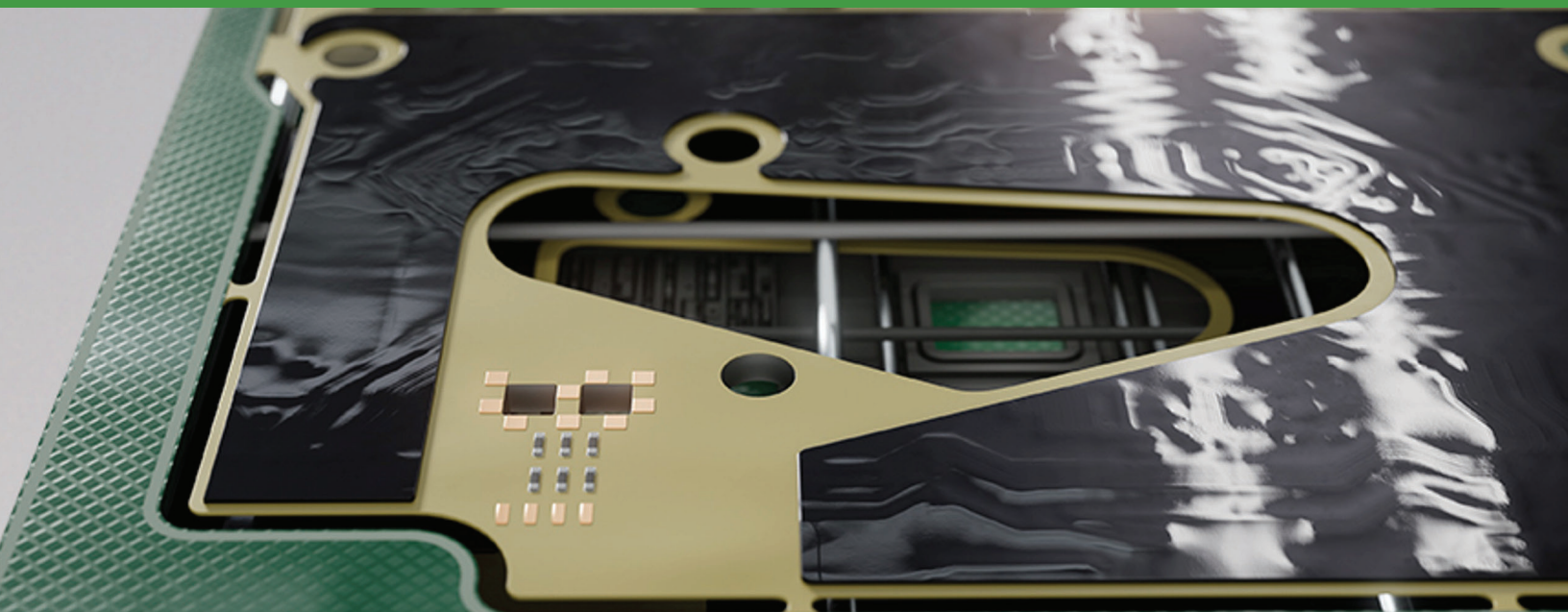
TCLAD Thermal Insulation Pads (TIPs) are highly flexible, silicone-based materials designed to improve heat transfer while providing effective electrical isolation and toughness. Typically clamped between heat generating components and a heatsink, TIPs help protect temperature-sensitive components by minimizing thermal resistance. These pads are ideal for power semiconductor applications where dielectric strength is important for withstanding high voltage.

TIP Insulation Pads	Typical Thickness (mm)	Thermal Conductivity (W/m-K)	Dielectric Constant (@1 GHz)	Flame Rating (UL 94)
TIP 1.0	0.23	1.0	6.0	V-0
TIP 1.6	0.2	1.6	6.0	V-0
TIP 3.5	0.25	3.5	6.0	V-0



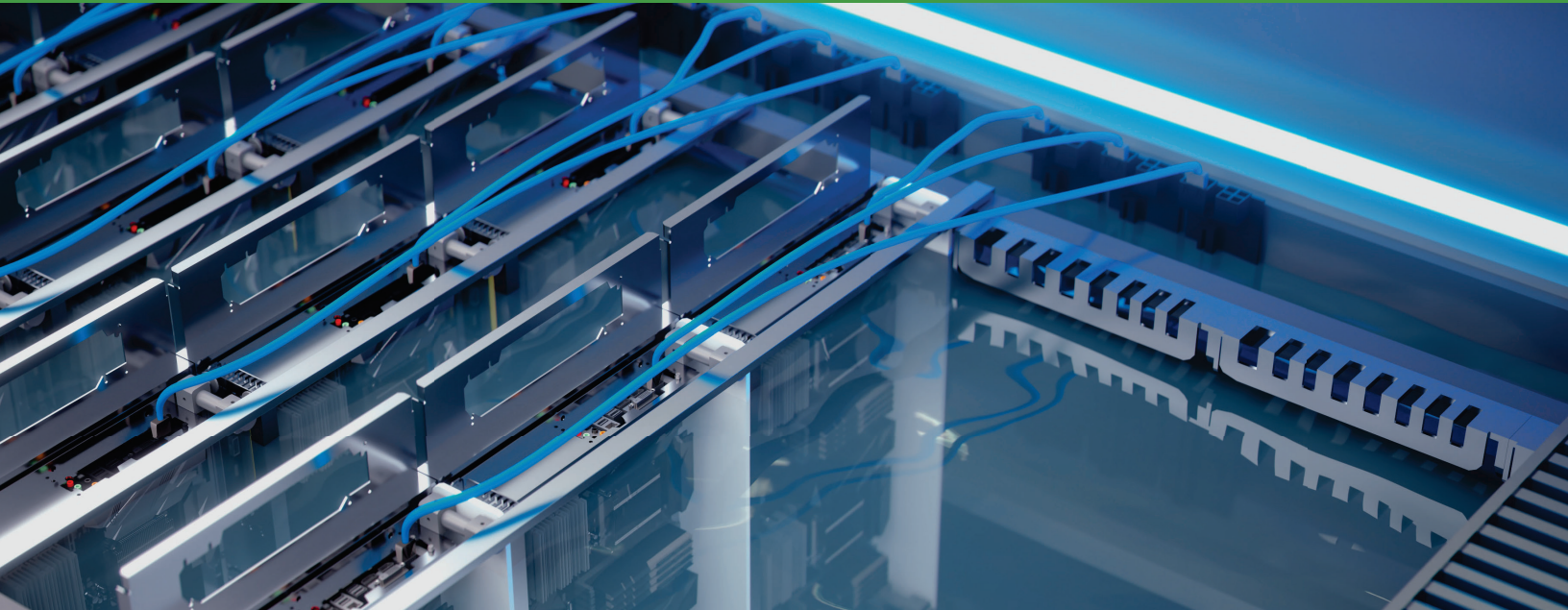
TCLAD Thermal Set Pads (TSPs & TSPF-H) are thermally conductive, electrically isolating materials that cure with heat to form strong, adhesive bonds. TSPs are epoxy-based while TSPF-H products are based on fluorine resin. Both types use high performance thermally conductive fillers. These thin materials are available in rolls, sheets or custom-cut shapes with adhesive on both sides for positioning between components to improve heat transfer. Packaging options include bulk, trays and reels to suit a range of production needs.

TSP Set Pads	Cure Time	Thermal Conductivity (W/m-K)	Peel Strength (kgf/cm)
TSP 3.0	5 min @ 120°C	3.0	> 1.2
TSP 8.0	5 min @ 120°C	8.0	> 1.2
TSP 12.0	5 min @ 120°C	12.0	> 1.2
TSPF-H	5 min @ 120°C	8.6	> 4.0



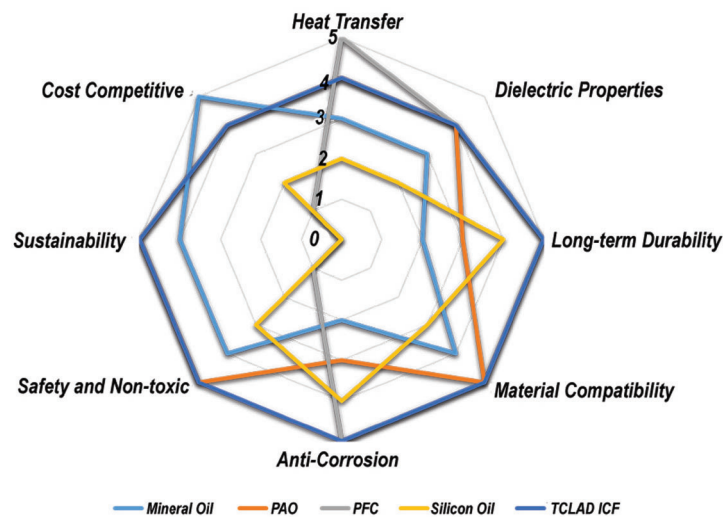
TCLAD Thermally Conductive Inks (TCIs) are epoxy-based resins in liquid form that combine excellent thermal conductivity and reliable electrical isolation. These inks are ideal for tight spaces and complex part geometries and are compatible with dispensing, stencil printing and spray-on thin coating processes for multiple, versatile applications.

TCI Printable Inks	Cure Time	Thermal Conductivity (W/m-K)	Operating Temperature Range
TCI-B-C40	1 hr @ 150°C	1.5	-40°C to 150°C
TCI-B-C160	1 hr @ 150°C	2.5	-40°C to 150°C
TCI-B-C260	1 hr @ 150°C	3.0	-40°C to 150°C
TCI-G-1000	1 hr @ 150°C	8.0	-40°C to 150°C
TCI-C60B-2K	90 min @ 90°C	1.5	-40°C to 150°C



Safe & Seriously Cool Immerision Fluids by TCLAD

TCLAD immersion cooling fluids are high-performance liquid dielectrics engineered for efficient thermal management of densely packed, high-heat generating electronic systems. These fluids do not conduct electricity and are non-corrosive, allowing safe submersion of electronic equipment and direct heat transfer at the source.



TCLAD Immersion Cooling Fluids (ICFs)

TCLAD's proprietary immersion cooling fluids provide an efficient, cost-effective and environmentally sustainable solution for managing high thermal loads in power-dense electronic systems. These advanced ester-based dielectric fluids are non-toxic, non-corrosive, and engineered for long-term operational reliability in mission-critical applications where sustainability is a priority.



By fully submerging heat-generating components in a thermally conductive, electrically insulating dielectric fluid, heat is removed directly at the source. As the fluid absorbs thermal energy, it becomes less dense and rises, creating a passive convection loop that circulates the fluid without pumps or moving parts. For applications requiring enhanced heat transfer, pumps can be added to accelerate fluid movement and cooling.

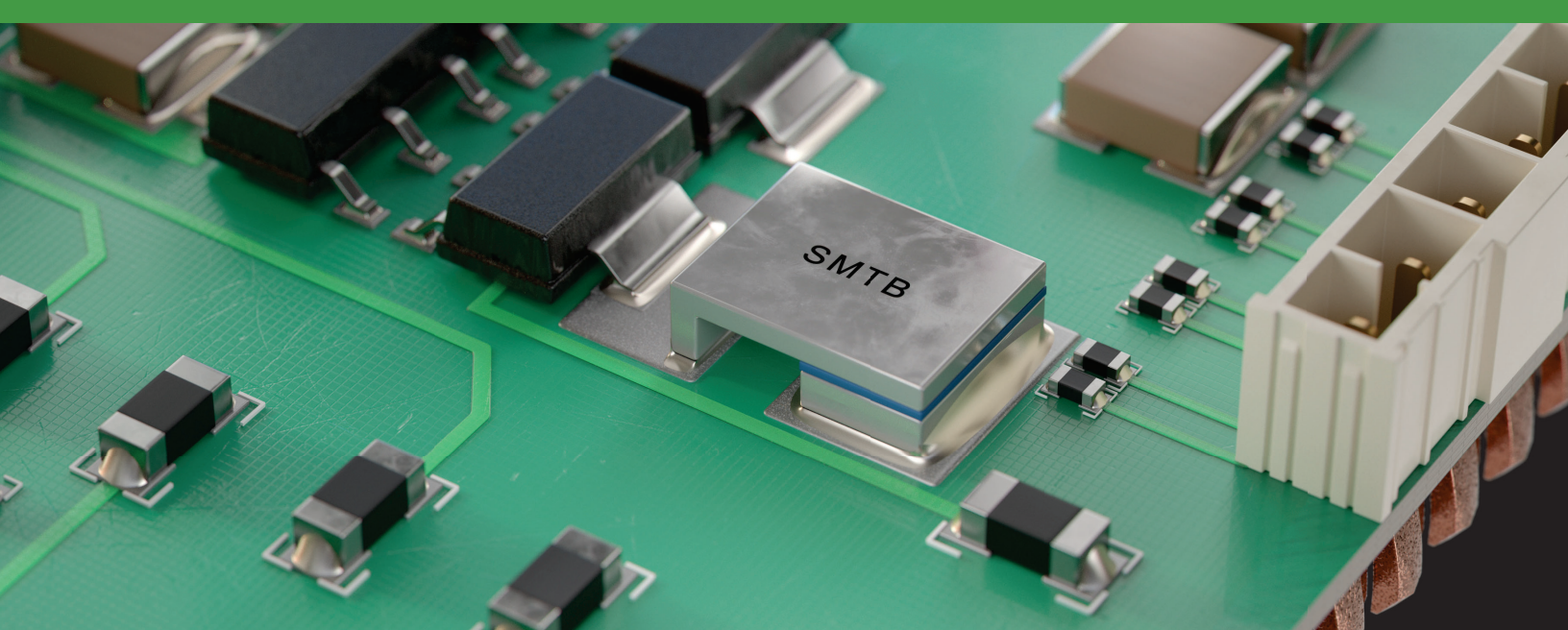
Due to their lower viscosity and higher density, TCLAD's ester-based immersion fluids outperform traditional alternatives such as mineral oil, polyalphaolefin (POA), perfluorocarbon (PFC), and silicon oil – offering superior thermal performance and environmental benefits in a single solution.

Where ICF Excels

- Data Centers, AI, Crypto Mining
- Energy Storage Systems, Batteries
- Transformers & Compressors
- Telecom & Datacom
- HVAC Systems

Key Benefits of TCLAD Immersion Cooling Fluids

- RoHS & REACH compliant, halogen-free, PFAS-free
- Non-toxic, recyclable raw material, nonflammable, sustainable chemistry
- Supports high-power, high-temperature applications
- Enables uniform temperature for higher operational efficiencies
- Compatible with a wide variety of materials
- Reduces energy usage

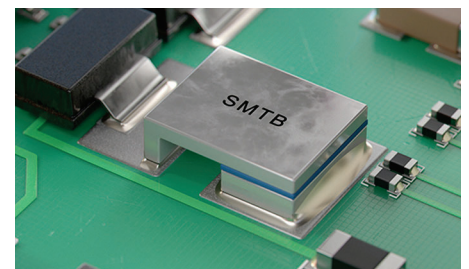


Innovative Thermal Bridge Devices by TCLAD

TCLAD's surface-mountable thermal bridge (SMTB) technology greatly improves heat spreading capacity across printed circuit boards (PCBs), reducing hotspots and enhancing overall thermal dissipation efficiency. This advancement enables designers to reduce system size and cost by eliminating the need for bulky heatsinks and complex thermal management methods.

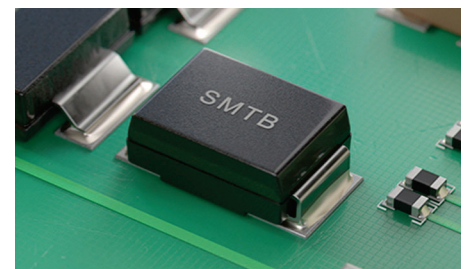
Lead Frame Surface Mount Thermal Bridge

Our open lead frame SMTB devices provide a compact and cost-effective method of efficiently channeling heat away from hotspots. Connected to a ground plane or chassis through PCB traces or grounding pads, these devices are ideal for dissipating heat in high-power, high-density printed circuit boards (PCBs).



Molded Surface Mount Thermal Bridge

Our molded SMTB devices combine a lead frame structure, a thermally conductive core, and high-performance polymer composites to serve as compact, efficient heatsinks. They efficiently draw heat away from hotspots, channeling thermal energy through PCB traces and grounding pads to a ground plane for dissipation.





Putting TCLAD Thermal Bridges to the Test

TCLAD surface-mountable thermal bridges (SMTBs) are engineered to divert heat away from critical hotspots in power electronics. Validated by independent testing, SMTBs deliver the heat-management performance critical electronics demand. Thermal Bridge solutions on FR4 boards alone can achieve 15–23°C temperature reduction in this study

Test Setup

An FR4 and SFL-12 test board were divided into four identical quadrants, each populated with four SOT-packaged, heat-generating components — ideal for simulating high thermal stress conditions.

Each quadrant featured a different SMTB configuration:

Quadrant 1 (Lower Left):

No thermal bridges (control)

Quadrant 2 (Upper Left):

Three SMTBs (P/N SMTB2114P30E)

Quadrant 3 (Upper Right):

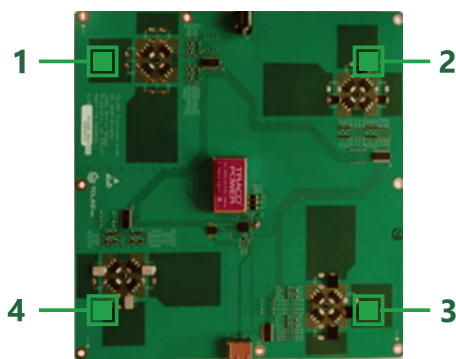
Three SMTBs (P/N SMTB3123P30E)

Quadrant 4 (Lower Right):

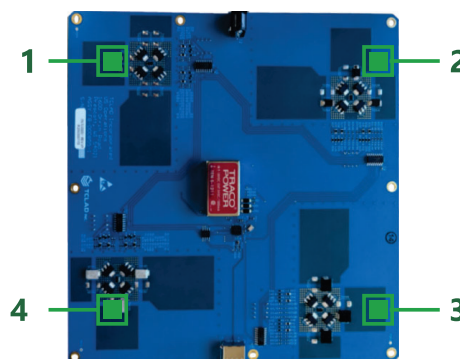
Three SMTBs (P/N SMTB2920P30M)

Thermal imaging was performed using a FLIR infrared camera, ensuring accurate, non-contact temperature measurements across all quadrants.

The Results

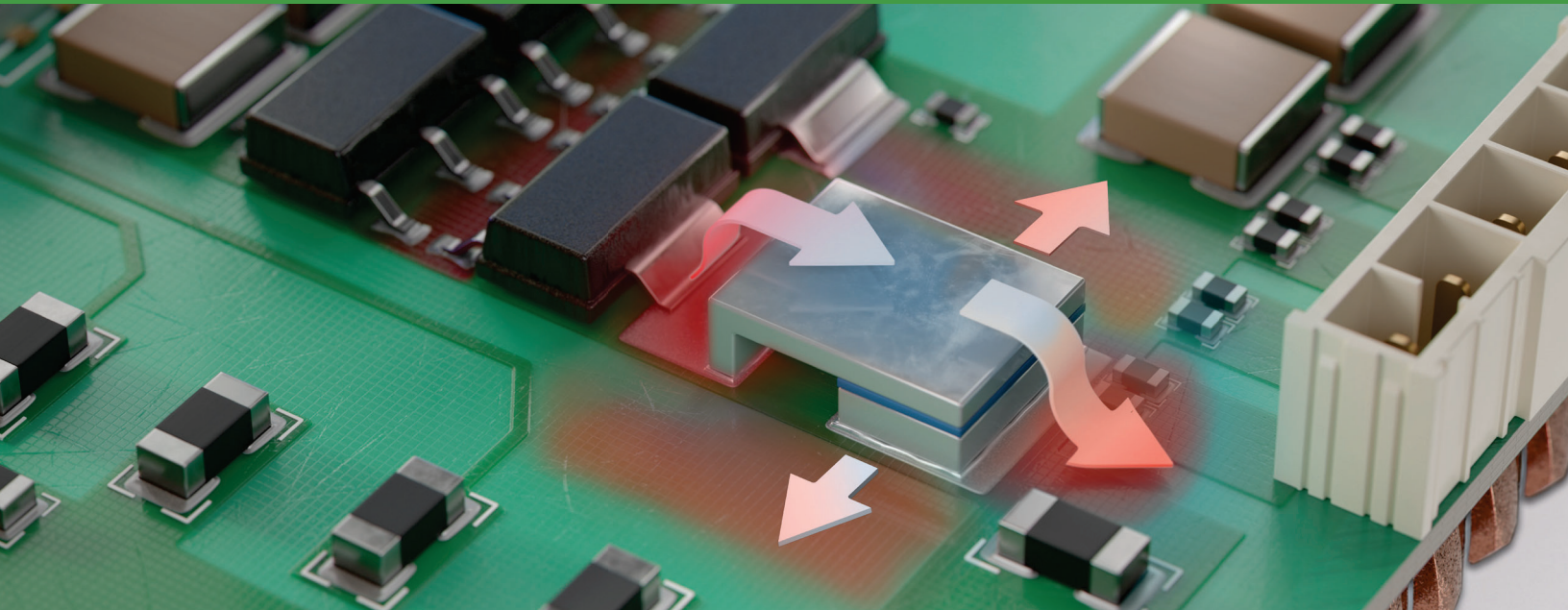


FR4 Test Board (6-layers, 4-quadrants)



SFL-12 Test Board (6-layers, 4-quadrants)

Quadrant	Max Temp FR4 test board	Max Temp SFL-12 test board	ΔT
1	279°F (137.2°C)	231°F (110.6°C)	-48°F (-26.6°C)
2	251°F (121.7°C)	224°F (106.7°C)	-27°F (-15.0°C)
3	245°F (118.3°C)	222°F (105.6°C)	-23°F (-12.7°C)
4	237°F (113.9°C)	215°F (101.7°C)	-22°F (-12.2°C)



TCLAD SMTBs: Reliable Thermal Control Under the Toughest Conditions

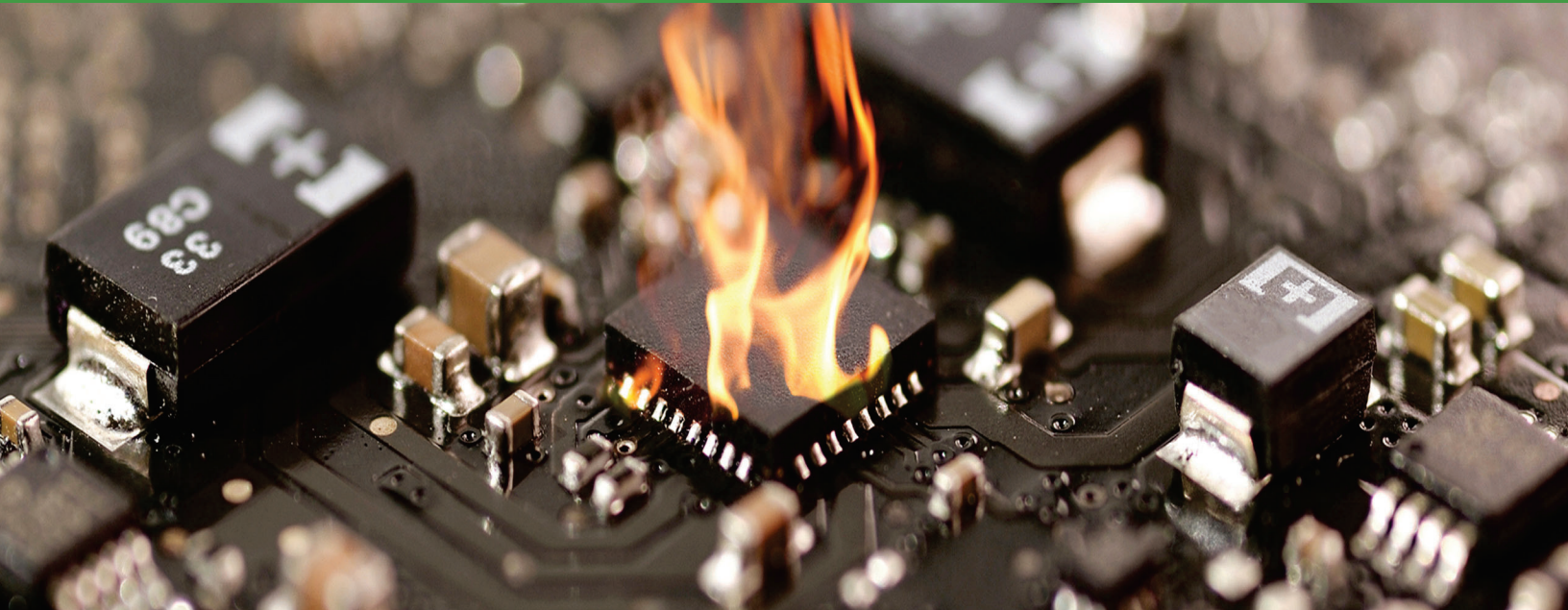
TCLAD surface-mountable thermal bridges (SMTBs) made a measurable impact – reducing component temperatures by up to 42°F (23.3°C) compared to the control quadrant without thermal bridges. Larger SMTB devices provided even greater cooling, with the large open lead frame (P/N SMTB2920P30M) showing the most significant effect.

Where TCLAD SMTBs Excel

- High-Power Electronics
- Power Supplies & Converters
- Pin & Laser Diodes
- Electric Motors
- Temperature Sensors
- High-Speed Computing

Key Benefits of TCLAD IMS®

- Compatible with Surface-Mount Technology & Processes
- Simple Integration into Standard PCB Layouts
- Wide Operating Temperature Range (-55°C to 150°C)
- High Voltage Withstand
- Low Thermal Resistance
- Low Capacitance/Ideal for High-Frequency RF Applications
- Tape & Reel Packaging for Automated Pick-and-Place Assembly

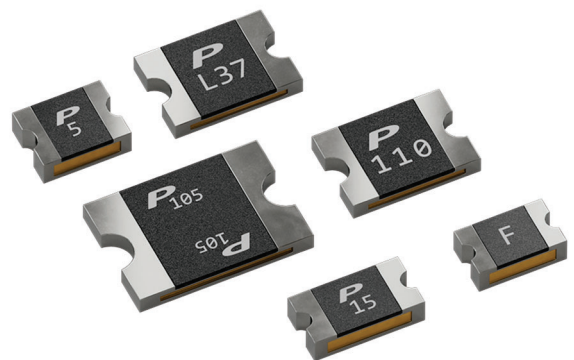


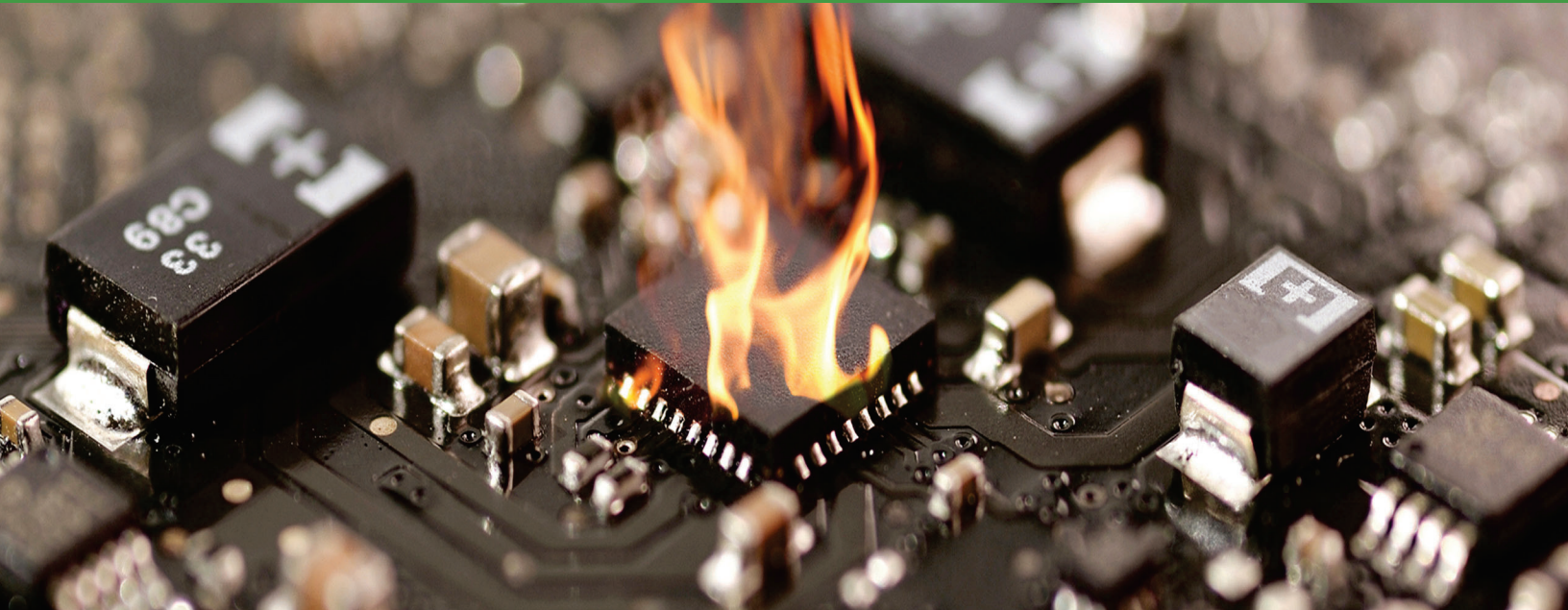
Circuit Protection That Goes Beyond Cooling

TCLAD offers a comprehensive portfolio of overcurrent protection devices, empowering Engineers to monitor load currents and respond quickly to potentially damaging electrical events. Trusted across a wide range of industries and applications, our circuit protection solutions enhance system reliability, improve efficiency and support user safety.

EVERFUSE PPTC Devices

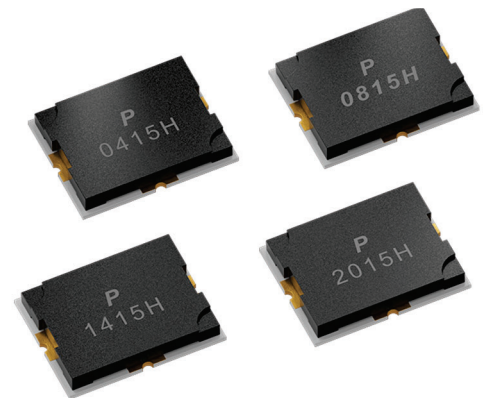
EVERFUSE devices are among the industry's smallest, surface-mount, self-resettable overcurrent protection fuses. They utilize positive temperature coefficient (PTC) material that rapidly increases in resistance (and temperature) when exposed to excessive current. Once the fault is cleared, the device cools down and returns to its low-resistance state, automatically restoring normal circuit operation.





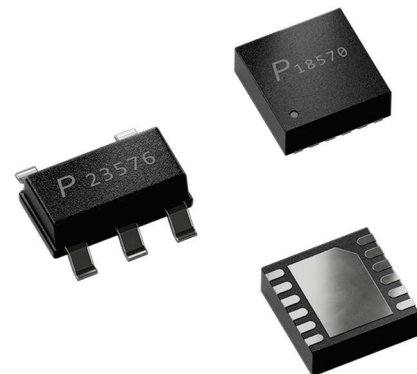
Current Limiting Module (CLM)

The CLM is a compact, surface-mount device designed to protect circuits from both overcurrent and overcharge conditions. It integrates a fuse element with a resistive heating element, which can be paired with an IC or FET for voltage detection. When an overvoltage condition is detected, the heating element activates, generating heat to trigger the fuse and interrupt current flow – effectively isolating the fault.



Electronic Fuses (eFuse)

The eFuse is an integrated circuit (IC) that delivers advanced protection for power systems and sensitive equipment. Using an internal MOSFET, it combines multiple safeguards – including overvoltage, overcurrent and overtemperature protection – into a single compact solution. This integration simplifies circuit design while enhancing control, accuracy, and response times, resulting in safer and more reliable system operation.



To learn more about TCLAD visit **tclad.com**



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Across the Board, Around the Globe, TCLAD is the most recognized IMS thermal management material for performance and reliability.

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