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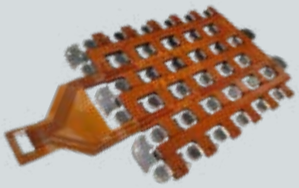
SOLUTIONS FOR
POWER MANAGEMENT

LAMINATED BUS BAR SOLUTIONS






MERSEN ANSWERS YOUR TOUGHEST ELECTRICAL APPLICATION CHALLENGE

MAXIMIZED PERFORMANCE WITH ENGINEERED BUSBAR SOLUTIONS, HIGH TECHNICAL EXPERTISE AND DEDICATED SUPPORT

Mersen integrates its extensive expertise in laminated busbars and power distribution architectures to enhance the efficiency, reliability, and robustness of power electronics systems. Our solutions are engineered to optimize electrical, mechanical, and electromagnetic performance while reducing system complexity and overall cost.

Mersen's engineering team is dedicated to supporting you at every stage. From identifying innovative bus bars solutions to co-designing performance parameters and even simulating your application before a prototype is built.

From identifying innovative bus bars solutions to co-designing with conductor geometry, insulation systems, and interconnection constraints, we work as a true technical partner.

With mastery of single- and multilayer busbar technologies, we deliver optimized power distribution solutions precisely tailored to each application.

QUALITY AND PERFORMANCE ACROSS DIVERSE MARKETS

Mersen has a keen understanding of the unique challenges customers face in each of the markets we serve. We deliver extensive product expertise and unbeatable applications support, enabling our customers to optimize their market performance. We are experts in designing, simulating, manufacturing and testing busbars solutions to serve AC and DC power electronics applications with specific technical challenges and high performance.

Our solutions support technologies ranging from silicon-based devices to Wide Band Gap semiconductors (SiC, GaN), where low inductance, high power density, and system reliability are critical. We are tailoring our solutions to the specific needs of the most demanding markets and applications:

- Industrial power conversion
- Rail, aerospace, and marine
- UPS and motor drives
- Renewable energy (wind and solar)
- Wide Band Gap (SiC, GaN) applications
- Military and defense
- Heavy-duty mobility (EV, HEV, mining, material handling)
- Electrical energy storage systems
- Telecommunications and data centers
- Power transmission and HVDC
- Medical equipment

GLOBAL COMPANY, LOCAL FOOTPRINT

With industrial operations in all major economic regions of the globe, Mersen offers global service with close-to-the-customer support. Each location brings in a specific product expertise. As a global company, Mersen has experts well-versed in both regional codes and international regulations, with quality processes recognized worldwide. Most of the Group's sites are certified for their management systems and adhere to additional industry standards.

Angers, France

Mersen's 5,000 m^2 Angers facility provides full design and manufacturing capability for laminated busbar solutions. It specialized in laminated busbars for Power Electronics (IGBT), Renewable energy and Energy storage applications, and for batteries interconnexion (Infinicell® technologie). IRIS certification strengthens its ability to meet the stringent requirements of the rail industry, ensuring high-quality, reliable power distribution systems for demanding applications across Europe and beyond.

Pontarlier, France

Mersen's Pontarlier facility, comprising 3,600 m^2 dedicated to manufacturing and warehousing, provides full design and production capabilities for laminated busbar solutions. The site specializes in busbars for power electronics (IGBT) and power distribution, serving demanding markets including traction, aeronautics, industry, and motor sport, delivering high-performance and reliable power systems across Europe.

Rochester, New York, North America

Mersen's 110,000 ft^2 North American facility is a fully integrated center for engineered laminated busbar solutions. With comprehensive design and manufacturing capabilities, AS9100C certification, and ITAR registration, it supports the stringent requirements of high-reliability power electronics across demanding industries.

Shanghai, China

Mersen's 6,500 m^2 Asian facility provides full design and manufacturing capability for laminated busbar solutions. Its comprehensive production infrastructure supports high-precision, high-volume requirements, ensuring consistent quality and reliable delivery for advanced power electronics applications across demanding regional and global markets.

Bangalore, India

Mersen's 3,720 m^2 Indian facility provides full manufacturing capability for laminated busbar solutions. Its integrated production processes ensure consistent quality, scalability, and reliability, supporting a wide range of power electronics applications and meeting the needs of both regional and global customers.

Angers, France	**Pontarlier, France**	**Rochester, New York, North America**	**Shanghai, China**	**Bangalore, India**
IRIS ISO 9001: 2015	ISO 9001* EN14001* *pending	ISO 9001 AS 9100	IATF 16949: 2016 ISO 9001: 2015	ISO 9001: 2015 IRIS

BUS BARS BUILT FOR THE REAL WORLD

WHAT IS LAMINATED BUS BAR?

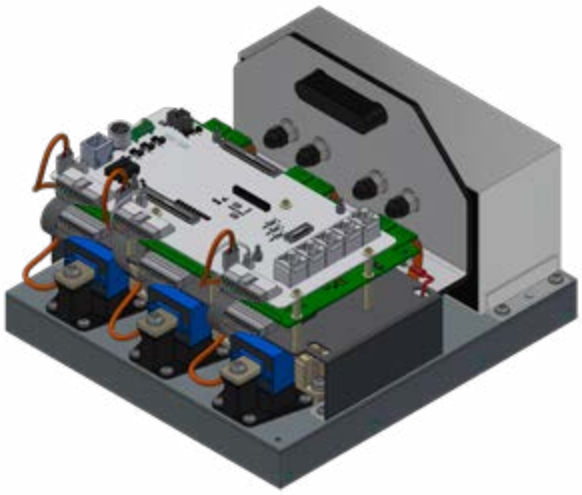
Laminated bus bar is an engineered component consisting of layers of fabricated copper or aluminium separated by thin dielectric materials, laminated into a unifi ed structure. Sizes and applications range from surface-mounted bus bars the size of a fi ngertip to multilayer bus bars that exceed 6 meters in length. Laminated bus bar solutions are rou-tinely used for low volumes of through tens of thousands per week.

WHY CHOOSE LAMINATED BUSBAR?

Bus bars reduce system costs, improve reliability, increase capacitance, and eliminate wiring errors.
They also lower inductance and lower impedance.
Plus, the physical structure of bus bars offers unique features in mechanical design. For example, complete power distribution subsystems can also act as structural members of a total system. Multilayer bus bars offer a structural integrity that wiring methods just can't match.

STRAIGHT TO THE OPTIMUM DESIGN

Mersen engineers can work with inverter manufacturers at very early stages of design to integrate the passive components such as cooling, bus bars and fuses within the inverter. Using a variety of Multiphysics simulation toolsets, they can evaluate the thermal and electrical performance of the heat sinks and bus bars within the overall inverter design. This integrated approach optimizes inverter design by combining cooling, busbar solutions, and semiconductor protection fuses from a single source



ENGINEERING SUPPORT AND TESTING FOR EACH DESIGN

MULTIPHYSICS MODELLING

Building a prototype is simply time consuming, due to the number of various specialized operations involved, and can sometimes be incompatible with the client deadline. Once the prototype has been finalized, running the test itself is not so easy, especially as the worst case scenario has to be investigated. High temperature, complex or high current electrical client conditions might not be easy to recreate.

Oversized constructions do not fit in a typical environmental chamber. The test can therefore turn out expensive and add unnecessary study time. That's why simulation is a handy tool to boost development processes.

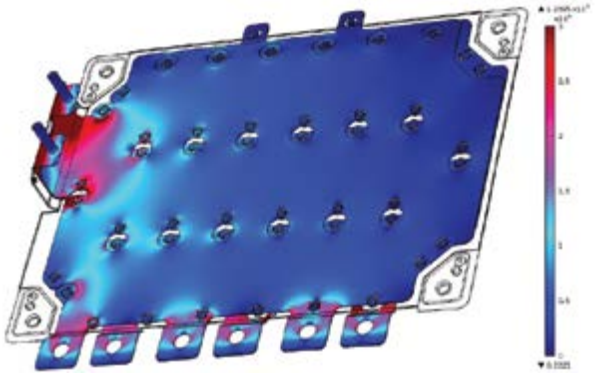
By adding pre-test steps in the conception phase, design flaws can be spotted and eliminated before going through the prototype manufacturing process. Overheating areas or overly thick plates are not always clear to determine by calculations.

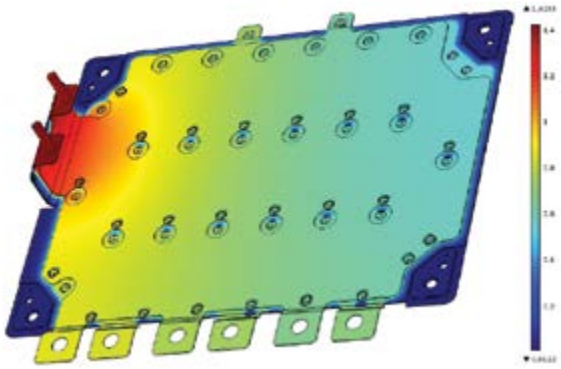
THERMAL AND ELECTRICAL SIMULATIONS

Mersen application engineers can conduct temperature rise simulation on the bus bar prototypes. This will ensure the most thermally efficient busbar design will go to production, providing our customers optimum product performance and lowest heat dissipation.
In addition to temperature rise simulations, prototype pieces can also be subjected to electrical current flow simulations, inductance values, and skin effect calculations. Mersen has perfected pre-design rules over many years of experience and can provide a very efficient design from the get go.

HI-POT AND PARTIAL DISCHARGE TESTING

Rigorous testing is completed on each part prior to shipment to ensure long term reliability. In addition to dielectric withstanding, or insulation breakdown testing (aka "HiPot"), Mersen performs Partial Discharge testing using the state-of-the-art Hipotronics PD test station. Mersen's engineering and quality team uses DFM (Design For Manufacturability) techniques such as FMEA (Failure Mode Analysis) to evaluate each order to assure smooth transition without failures throughout the process.





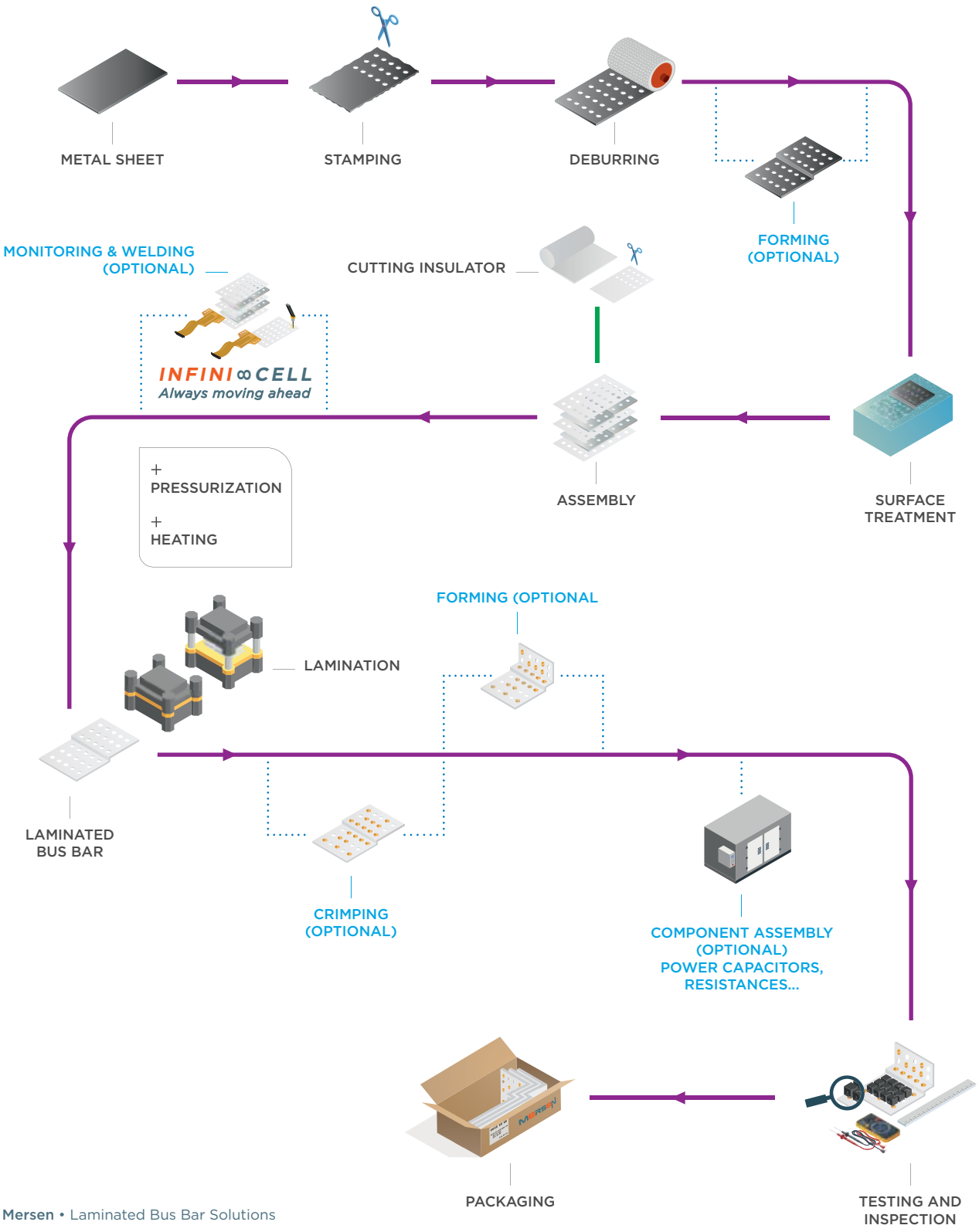
WE CAN HELP YOU WITH ANY DESIGNS OR SPECIFICATIONS

We at Mersen provide FREE consultation for our customers to be able to directly discuss their design requirements with our expert application and product specialists. We take pride in striving to provide fast response time, usually within one business day. We provide one-on-one design and engineering support to arrive at the best fit solution every time. Visit ep.mersen.com for contact information.

LAMINATED BUSBAR WITH OPTIONAL CAPACITOR INTEGRATION

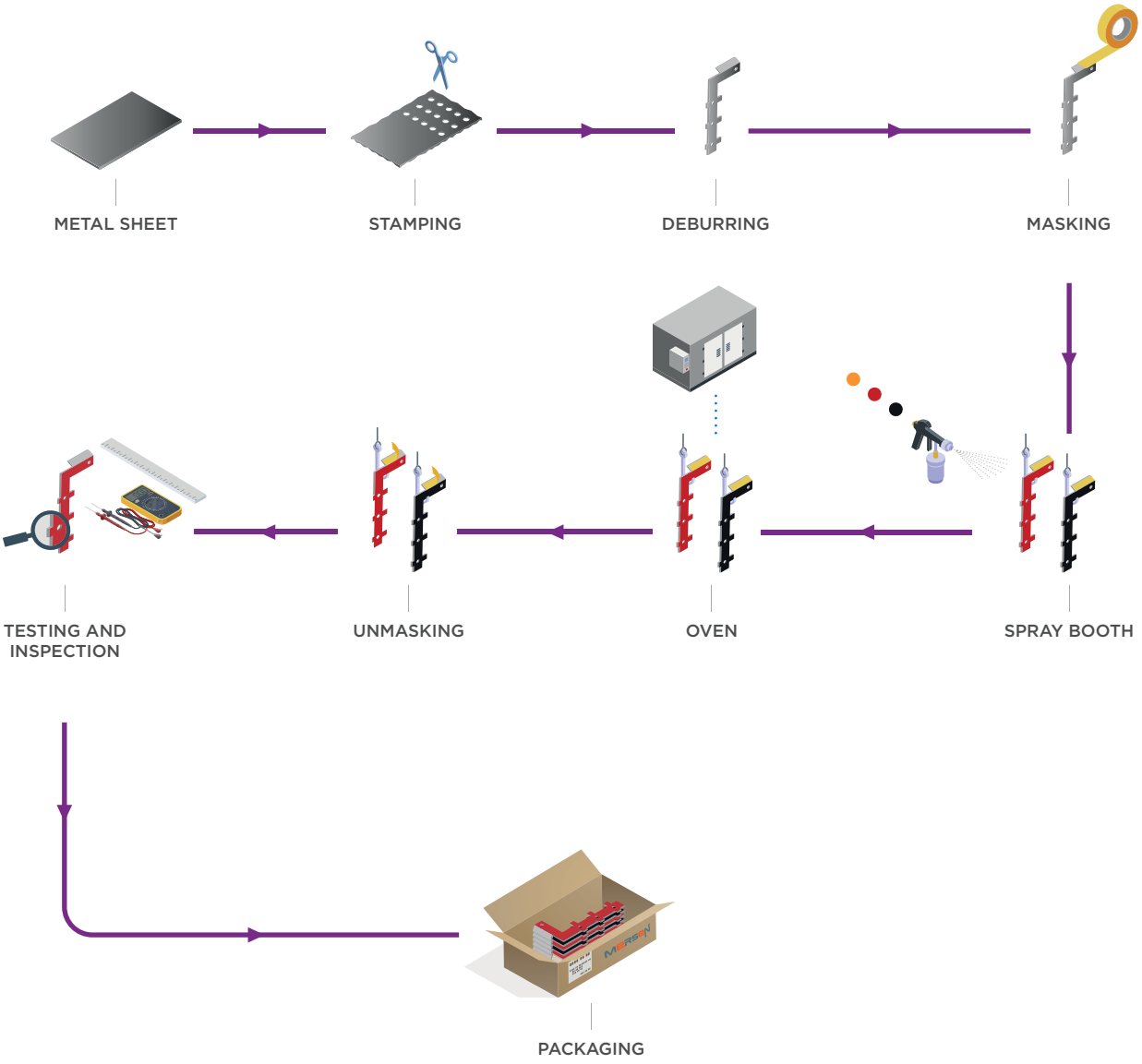
Busbars are produced through precision cutting, forming, and multilayer lamination using dielectric materials such as Nomex or Kapton, bonded under heat and cold processes for low inductance and high reliability.

Mersen also develops ultra-low-inductance busbar-capacitor assemblies using laser-welded connections, improving performance, reducing footprint, and increasing capacitance.



POWDER COATED BUS BAR MANUFACTURING

Powder-coated designs benefit from in-house electrostatic epoxy coating, delivering uniform insulation even on complex geometries and in harsh environments.



Mersen leverages decades of experience in designing and manufacturing laminated busbars, supported by a global R&D and production footprint that ensures industry-leading technical mastery.

CONDUCTOR

INSULATOR

MERSEN MONITORING LAMINATED BUSBARS ARE ENGIN

LAMINATED BUS BAR WITH MONITORING INTEGRATED

To cope with the growing demand of constant voltage and temperature monitoring in power electronics applications such as lithium-ion and ultracapacitors packs, Mersen has engineered an innovative concept that combines in a single customized device a laminated busbar, a flexible circuit, thermal sensors and other custom electronic components. It allows, with only one part, to make both the power connections and the signal collection from each cell independently, so the status of each cell is delivered to the Battery Management System via a custom connector.

This is a smart answer to the market need since it solves major problems of current technologies ordinarily used to make the power connections such as series of small copper bars, cables or PCBs. Indeed, Mersen InfiniCell® Bus Bar gives the user improved product quality providing easy handling, quick assembly time, voltage drop reduction, wiring errors suppression and, with the case of a PCB, improved current carrying capacity and enough flexibility to withstand the micro-movements of the cells during the charge/discharge process.

Moreover, common monitoring technologies generally use small wire harness attached manually to collect data on each cell, and then to carry the data to an outside processor. On the contrary, Mersen InfiniCell® Bus Bar includes a flex circuit directly integrated into the bus bar network, thereby eliminating the set-up time needed for attaching the wires harness.

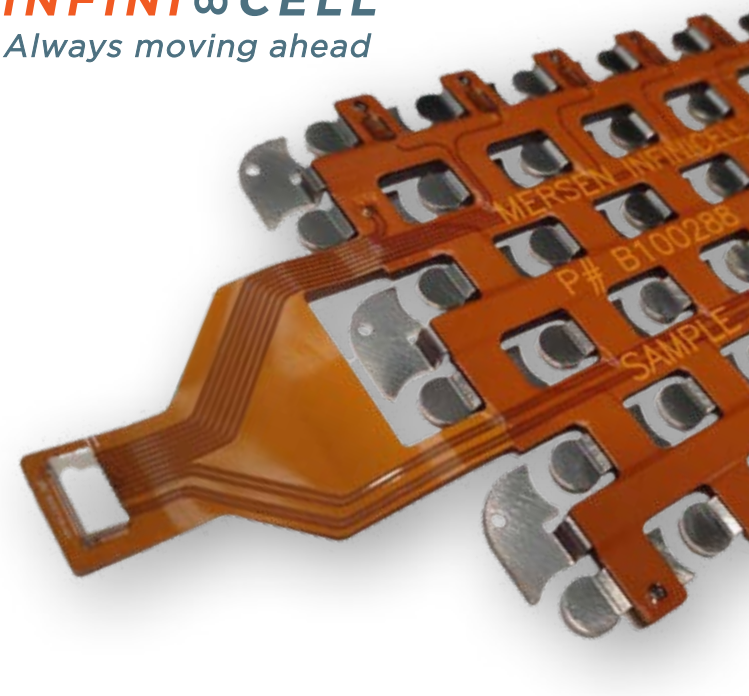
The Mersen InfiniCell® Bus Bar can also integrate a water-cooling pipe when thermal considerations exceed conventional means of heat dissipation. This prevents the system from overheating, and allows it to remain at the highest level of performance and safety.

CUSTOMER'S BENEFITS

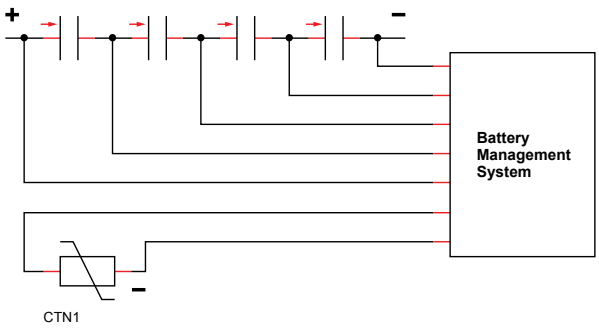
- Signal and power connections in one device.
- Improved inventory management.
- Faster assembly time.
- Withstanding of cells micro-movements during charge/discharge process.
- No wiring errors.
- Best signal quality by a highly engineered and precision controlled welding technique to reduce the voltage drop.
- Increased current carrying capacity.
- Possibility to integrate a water-cooling pipe.

INFINI∞CELL

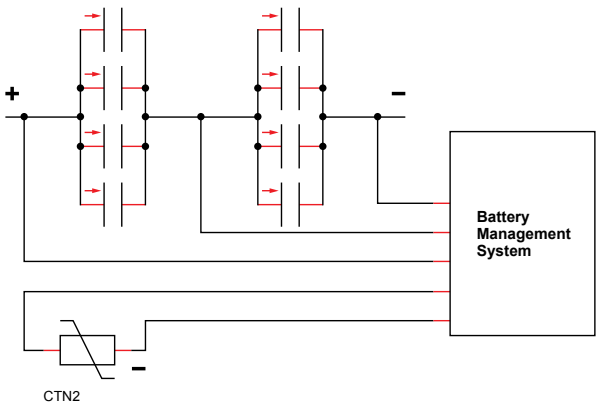
Always moving ahead



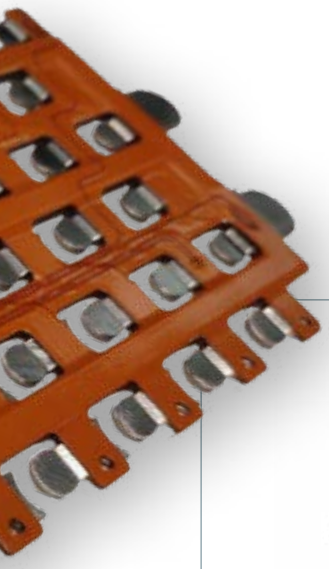
X Cells in serial with voltage and thermal management



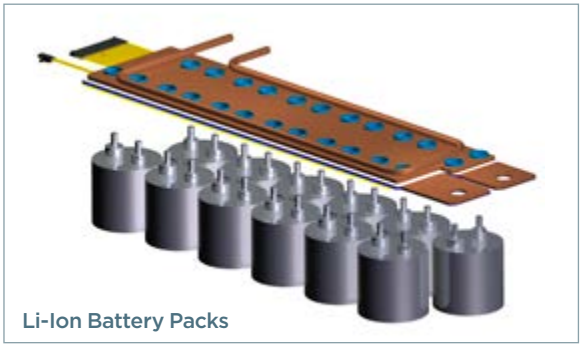
X Cells in serial and parallel with voltage and thermal management



NEERED TO MEET YOUR CUSTOM NEEDS



InfiniCell® laminated busbars solutions



Li-Ion Battery Packs

Supercapacitors

CONDUCTORS MATERIAL

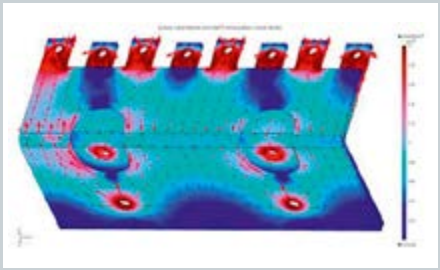
- Copper, aluminum, brass etc.
- Several plating options: Sn, Ni, Ag etc.
- Standard thicknesses (mm): 0.5; 0.8; 1; 1.5; 2; 2.5; 3; 3.5; 4.
- Possibility of custom thicknesses: less than 0.5 mm or more than 4 mm.

INSULATION MATERIAL

- Insulation selected according to your requirements of temperature, pollution degree, humidity rate and classification (UL, CSA...).
- Wide range: PET; Aramid paper; PEN; PVF; PI etc.

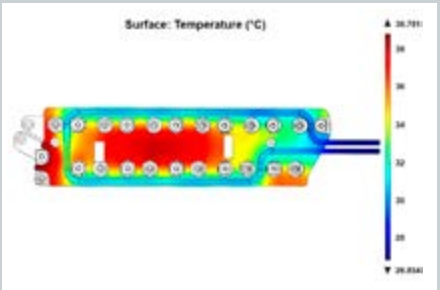
ELECTRICAL SPECIFICATIONS AND SIMULATION

- Voltage: up to 10 kVAC.
- Current: up to 2kA.
- Power range: 1kW ... 5MW.
- Above ranges can be adapted to fit specific requirements.
- Lower inductance and impedance.
- Possibility of current flow and inductance simulation.



THERMAL SPECIFICATIONS AND SIMULATION

- Working temperatures from -40°C up to 220°C.
- Possibility of thermal simulation.
- Possibility to integrate a cooling pipe for thermal management.



MONITORING SPECIFICATIONS

- Monitoring of voltage, charging state and temperature.
- Best signal quality thanks to a highly engineered and precision controlled welding technique.
- Thermal sensors integrated.
- Possibility to integrate other types of electronic components on request.
- Delivery of the data from each cell to a custom connector.

MERSEN'S WATER COOLED LAMINATED BUSBARS ARE EN

LAMINATED BUS BAR WITH COOLING INTEGRATED

To cope with the global increase of temperature and space reduction in power electronic applications, Mersen has engineered an innovative concept that combines in a single customized device a laminated busbar with a water cooling pipe designed to meet your thermal needs.

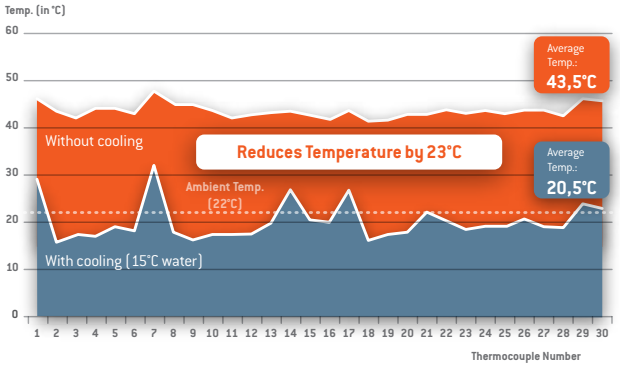
Indeed, thermal considerations often exceed conventional means of heat dissipation whenever high frequency or high current densities enter into play.
The "skin effect" created by the high frequency of the AC voltage and the high current densities reached because of space reduction make it essential to add water-cooling to the system to maintain a constant temperature and avoid overheating. Moreover, the water cooled laminated busbar also contributes to cool surrounding connected components such as IGBTs or capacitors, but can also act as an heating device with warm water to avoid breaking these components in environments where ambient temperature is very low.

Customer's benefits

- Higher power admissible
- Metal savings
- Hot spots suppression
- Global heat decrease close or below ambient temperature
- Custom path of the pipe to cool surrounding components
- Increased current density
- Possibility to inject warm water to heat surrounding components in low temperature environments

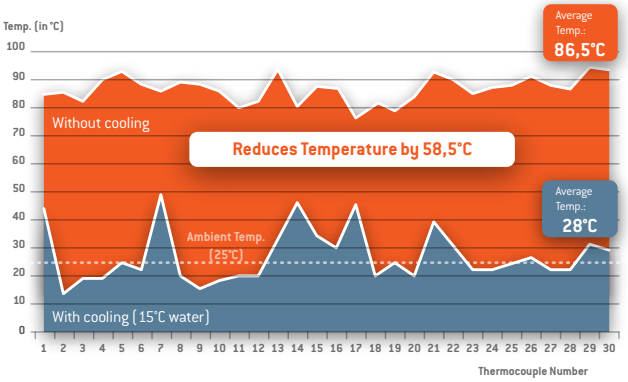
Copper 3mm

Comparison of the temperature (in °C) between 2 busbars of 3 mm with cooling & without cooling



Copper 0,8mm

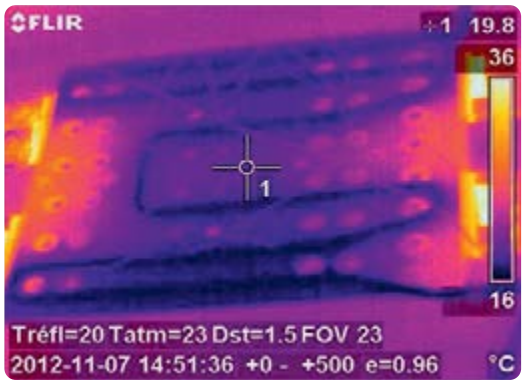
Comparison of the temperature (in °C) between 2 busbars of 0,8 mm with cooling & without cooling



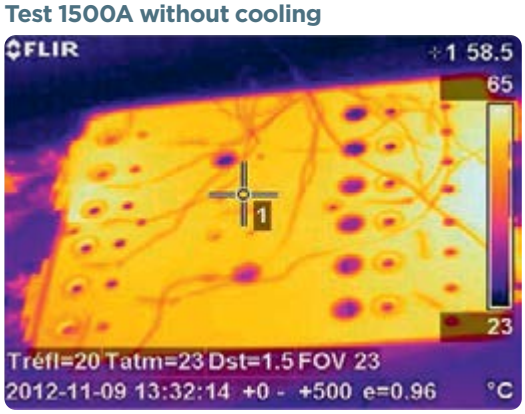
IGINEERED TO MEET YOUR THERMAL NEEDS

Comparisons with and without cooling

Test 1500A with cooling



Test 1500A without cooling



CONDUCTORS MATERIAL

- Copper, aluminum, brass etc.
- Several plating options: Sn, Ni, Ag etc.
- Standard thicknesses (mm): 0.5; 0.8; 1; 1.5; 2; 2.5; 3; 3.5; 4
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INSULATION MATERIAL

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- Wide range: PET; Aramid paper; PEN; PVF; PI etc.

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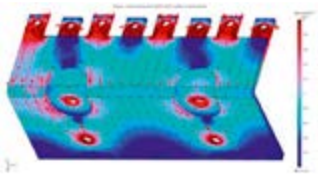
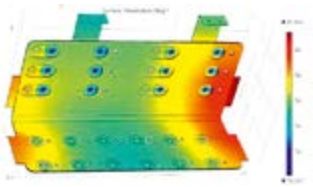


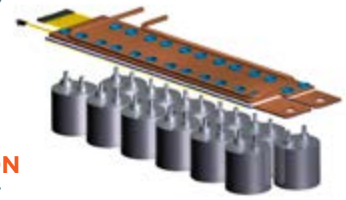
THERMAL SPECIFICATIONS AND SIMULATION

- Working temperature from -40°C up to 220°C
- Water cooled pipe soldered on the laminated busbar
- Thermal decrease up to 100°C and more in some high power applications
- Stops temperature increase in high temperature environment
- Possibility of thermal simulation
- Possibility to add a complementary cooling plate for surrounding components such as IGBTs



BATTERY

- Li-ion battery packs



CAPACITOR BANK

- DC-link capacitors
- Ultracapacitors

POWER CONVERSION

- On-board converter
- Sub-station converter
- Inverter
- Rectifier

POWER SUPPLY

- Power supply units
- UPS
- Power amplifier

DRIVES

- LV drive
- MV drive

INTEGRATED BUSBAR AND CAPACITOR SUBSYSTEM

A FULLY INTEGRATED, PRECISION-WELDED SOLUTION THAT SIMPLIFIES ASSEMBLY, REDUCES INDUCTANCE AND ENSURES PREDICTABLE SYSTEM PERFORMANCE.

Connecting capacitors to busbars is a critical challenge in high-performance power electronics. Poor interfaces increase parasitic inductance, reduce efficiency and introduce integration risks.

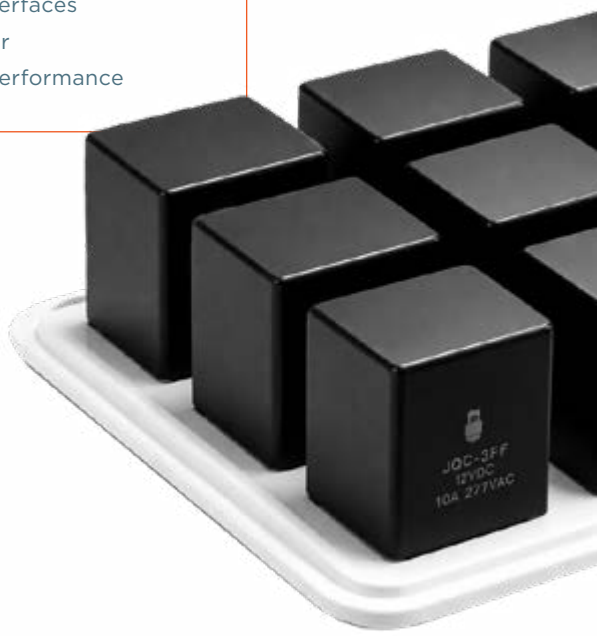
Mersen addresses this with a fully integrated, factory-assembled subsystem, combining laminated busbars and capacitors into a single, optimized and tested solution.

From fragmented assembly

- Separate components
- Complex integration
- Multiple suppliers
- Variable performance

To integrated subsystem

- One ready-to-use part
- Controlled interfaces
- Single supplier
- Guaranteed performance



GUARANTEED QUALITY & RELIABILITY

- Controlled and certified welding process
- In-house assembly and testing
- Compliant with IPC-A-610 standards
- Reduced variability and defects

ENHANCED PERFORMANCE AT SYSTEM LEVEL

- Minimized parasitic inductance
- Optimized current paths and geometry
- Improved energy efficiency and switching performance
- Validated on full system (not components only)

LOWER TOTAL COST OF OWNERSHIP (TCO)

- Fewer assembly steps
- Reduced scrap and rework
- Simplified supply chain
- Faster integration and time-to-market

PRECISION WELDING AND SYSTEM INTEGRATION EXPERTISE

PARASITIC INDUCTANCE: THE HIDDEN CONSTRAINT

Most electrical losses and performance limitations originate from connections between busbars and capacitors, not from the components themselves.

Key issues

- Long or imperfect connections
- Mechanical interfaces (screws, crimps)
- Uncontrolled geometry

Result

- Higher losses
- Thermal stress
- Slower system response

A SOLUTION DRIVEN BY PEOPLE AND EXPERTISE

This innovation reflects the combined capabilities of Mersen's

- Design engineers
- Process and industrialization teams
- Quality and certification experts

From concept to production, Mersen ensures controlled performance and reliable integration. Mersen redefines integration by elevating every level of the value chain:

Mechanical integration becomes
precision welding expertise

Low inductance becomes
controlled geometry and interfaces

Assembly becomes
system-level validation

Product becomes
end-to-end engineering capability

MERSEN'S ENGINEERING SOLUTION

CONTROLLED INTERFACE DESIGN

- Optimized contact zones for welding
- Reduced current loop length
- Fully defined geometry

PRECISION WELDING EXPERTISE

- Insulation removal locally controlled
- Certified, repeatable welding process
- High mechanical and electrical integrity

SYSTEM-LEVEL VALIDATION

- Complete subsystem tested (busbar + capacitors)
- Controlled interactions (EMC, coupling, resonance)
- Predictable performance in final application

MOVE FROM COMPONENTS TO FULLY ENGINEERED SUBSYSTEMS

✔ Simplify integration.

✔ Improve performance.

✔ Reduce risk.

MARKETS SERVED: POWER ELECTRONICS AND SILICON CARBIDE (SIC) APPLICATIONS

POWER ELECTRONICS

The higher switching speeds of modern IGBTs require a low-inductance power path, effectively achieved with Mersen laminated busbars. Mersen's advanced power electronics designs deliver optimized low-inductance DC distribution, ensuring efficient suppression of parasitic transients and reliable long-term operation. As a key element of the DC power circuit, the laminated busbar enables optimal performance between IGBTs and electrolytic or film capacitors, ensuring stable power delivery and system reliability.

MOTOR DRIVE BUS BAR

Thin copper conductors, separated by insulation material of only thousandths of an inch, provide the ultimate in low inductance for IGBT-based motor drives. Incorporating electrolytic capacitors into the same structure simplifies packaging and reduces the effects of transient overshoots. Note the addition of Snubber Capacitors and Resistors built into the laminated bus bar!

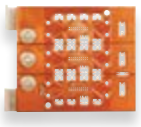
Size: 7″ x 9″ (25 mm x 228 mm) | Thickness: .040″ (1 mm) | Voltage: 475VDC | Current: 150A

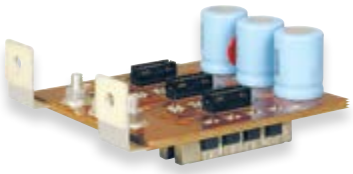
CAPACITOR BUS BAR FOR MOTOR DRIVE

Six electrolytic capacitors are easily connected to this edge-sealed, two-layer laminated bus bar providing a low inductance power path for a low horsepower, variable speed motor drive. Note the use of a bonded insulator strip along the length of the bus bar to provide additional "creepage" protection between the plus and minus terminals.

Size: 1.8″ x 6.3″ (46 mm x 160 mm) | Thickness: .040″ (1 mm) | Voltage: 480VDC | Current: 60A

A laminated bus bar assembly consisting of three power layers and one signal layer with a total of 59 conductors providing a very low inductance power path and complete gate drive circuitry all designed for a wave-solder assembly process. This bus bar is used in a system powered by 24 MOSFETs. It includes Electrolytic Capacitors, heatsinks, and MOVs.





Size: 5″ x 7″ (127 mm x 178 mm) | Conductors: .060″ (1.5 mm) (gate circuit: .025″ [.63 mm]) | Voltage: 28VDC | Current: 1000A peak

MOUNTING STRUCTURE FOR CAPACITOR BANK

Laminated bus bars provide a low inductance connection for capacitors.
The assembly was designed for an automated production process and the assembly is the DC capacitor bank used in conjunction with high-current, high-speed switching applications. Positive and negative layers are formed and laminated without outside insulation. This design includes two rows of capacitors soldered into position.

Length: 8″ (203 mm) | Width: 7.5″ (190 mm) | Voltage: 28V | Current: 100A

MARKETS SERVED: POWER ELECTRONICS AND SILICON CARBIDE (SiC) APPLICATIONS

SILICON CARBIDE (SIC) APPLICATIONS

Mersen is your solution partner for Silicon Carbide (SiC) applications. The next generation of Power Conversion Systems Enabled by SiC Power Devices is now a reality. As the global trends promote greener energy with more strict regulations and standards, newer and more efficient switching devices such as Silicon Carbide (SiC) devices are gaining acceptance in various markets from transportation to solar industries. Compared to silicon devices, SiC devices switching can exceed several 100s of kHz, offering substantial improvements in efficiency.

SiC devices also provide enhanced power density and higher operating temperature, making them a very attractive alternative to bigger and less efficient silicon family of devices. As SiC devices can operate at much higher switching frequencies, parasitic inductance and "skin effect" phenomena become crucial considerations for bus bar designs. Mersen engineering teams can work closely with customers to design bus bars to compensate for "skin effect" and to build the most efficiently cooled power bus bar solution.

HIGH-FREQUENCY WELDING

Connecting a complex network including Power IGBTs, Diodes, Resistors, and Film Capacitors, this multilayer epoxy edge-filled bus bar provides a compact low inductance solution. Thirty-two bushings are brazed into position and maintain tightly controlled coplanar mounting surfaces on both top and bottom. Alternating the plus and minus layers throughout the assembly counters the skin effect of high frequencies.

Size: 5″ x 9″ (127 mm x 229 mm) | Voltage: 115VDC | Current: 125A | Thickness: .030″ x .060″ (0.76 mm x 1.5 mm)

HIGH FREQUENCY INVERTER

High-frequency applications present a unique thermal challenge requiring the addition of water-cooling for efficient operation. When thermal considerations exceed conventional means of heat dissipation, one option is to add watercooling to the system. This design contains five cooling lines soldered directly onto the epoxy powder coated conductors to maintain a constant temperature. Due to the high frequency of the AC voltage, "skin effect" plays a big role in the heat created from the bus and without this additional cooling, the bus would surely overheat.

Size: 9″ x 32″ (228 mm x 813 mm) |
Thickness: .030″ and .060″ (0.76 mm x 1.5 mm) |
Voltage: 600V | Current: 700A

MARKETS SERVED: INDUSTRIAL

INDUSTRIAL

The rough and rugged world of the industrial environment demands a constant and consistent supply of quality products delivered right to the production floor. Mersen's industrial bus bar design solutions extend over half a century, delivering the ultimate in optimized, laminated bus bars to countless manufacturers of motor drives, fork lift trucks, welding machines, power generators, industrial testing machines, and much more. Mersen's laminated bus bar designs provide application specific characteristics, achieving a consistent level of performance that cannot be matched through wires, cables, or simple bars of copper.

RACK MOUNT POWER DISTRIBUTION

Mounted inside a circuit breaker power tray, individual bus bars are nested in a machined FR-4 frame to provide output connections. This assembly assures proper safety separation as well as single component installation.

Size: 6″ x 12″ (152 mm x 305 mm) | Voltage: 48V | Current: 280A | Conductors: .125″ (3.2 mm)

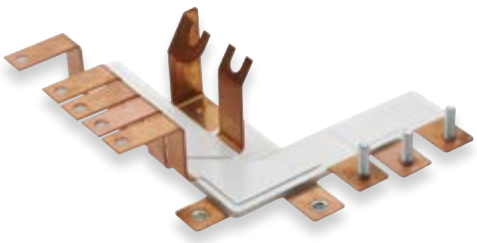
MEDICAL IMAGING

This space-saving design incorporates five conductors in two layers with clinch hardware at each end. Its laminated, edge-sealed construction is formed to stay out of the way within a tightly packaged medical testing device.

Size: 8″L x 7″W x 6″H (203 mm x 178 mm x 152 mm) | Voltages: 3.3V, 5V, 12V | Current: 75A | Conductors: .040″ (1 mm)

FORK LIFT TRUCK BUS BAR

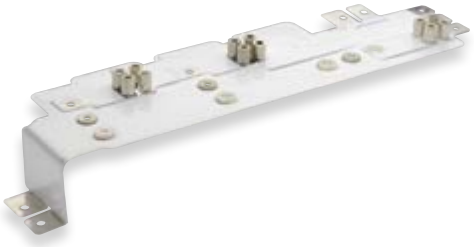
Six-conductor, laminated bus bar assembly combines DC and AC bus bars, as well as a fuse connection, all in one compact package! The system is designed to fit perfectly in a limited space and provides power to a variable speed motor in a rugged industrial environment.



Size: 7″ x 7″ (178 mm x 178 mm) | Current: 150A | Voltage: 42V | Conductors: .060″ (1.5 mm)

COMPACT IGBT BUS BAR

This unique laminated IGBT bus bar delivers low-inductance DC power within a confined area. The design also includes six separate bus bars arranged as AC output with in-line diode connections.



Size: 4″ x 19″ (102 mm x 483 mm) | Conductors: .050″ (1.3 mm) | Voltage: 600VDC/150VAC | Current: 120A (DC) / 220A (AC)

MARKETS SERVED: INDUSTRIAL

INDUSTRIAL INVERTER BUS BAR

Designed for low-inductance IGBT phase bus bar through 90 degree formed input connections, including raised top contact surfaces to accommodate snubber capacitors. High-temperature insulation material easily handles the demanding thermal requirements.

Size: 8″ x 12″ (203 mm x 305 mm) | Voltage: 475VDC | Current: 200A | Conductors: .080″ (2 mm)

FREQUENCY INVERTER BUS BAR

An excellent layout containing two large DC bus bars, along with the three AC output bus bars laminated directly on top making a complete laminated power distribution system all under a single part number! Note the inclusion of Faston tabs for current sensing and press-fit studs for balancing resistors.

Size: 13″ x 18″ (330 mm x 457 mm) | Current: 820A | Voltage: 550VDC | Conductors: .060″ and .125″ (1.52 mm and 3.2 mm)

VARIABLE FREQUENCY DRIVE

This simple yet complex design incorporates DC and AC bus bars, plus accommodations for three current sensors at the AC output points, all built into a flexible, geometric package designed to fit into a tight, confined operating area!

Size: 10″ x 15″ (254 mm x 381 mm) | Current: 100A | Voltage: 550VDC | Conductors: .040″ and .060″ (1 mm and 1.5 mm)

MARKETS SERVED: DEFENSE & AEROSPACE

DEFENSE & AEROSPACE

Uncompromising performance and reliability are a must for defense and aerospace systems. That is why laminated bus bars designed by Mersen are commonplace in a wide range of defense applications, including missile guidance equipment, phase-array radar systems, sonar and radar tracking stations, airborne equipment, tanks, submarines, and numerous space programs. Mersen's laminated bus bars offer other advantages for defense use, too. Their superior electrical characteristics help defense systems achieve maximum electrical performance and efficiency. Laminated bus bars are also known to provide the most compact means of packaging, achieving the highest overall system performance where physical space is a premium.

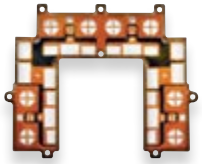
HIGH-CURRENT BOARD LEVEL

Dense packaging is a hallmark of laminated bus bars as shown in this 20-layer edge-filled design with Kapton insulation to withstand high temperatures from soldering. Made for a special defense application, the design distributes power through wide tabs inserted and soldered into a backplane. Power inputs are located at one end for easy connection with a cable assembly.

Size: 1.2" x 10" (30.48 mm x 254 mm) | Conductors: .020" (0.5 mm) per layer | Voltage: 12VDC | Current: 50A per conductor

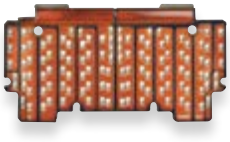
AEROSPACE POWER DISTRIBUTION

This complex, nine layer, low inductance laminated bus bar is engineered to perform at very high altitudes in a confined area. It interconnects custom power modules through brazed bushings and clinch-type hardware.
The high temperature Kapton insulation is entirely epoxy edge filled around each individual layer.

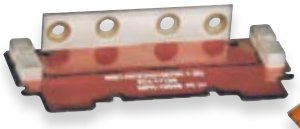


Size: 6" x 11" (152 mm x 279 mm) | Thickness: .025" (0.6 mm) per layer | Voltage: 300VDC | Current: 60A

SURFACE MOUNT FOR DEFENSE POWER ELECTRONICS

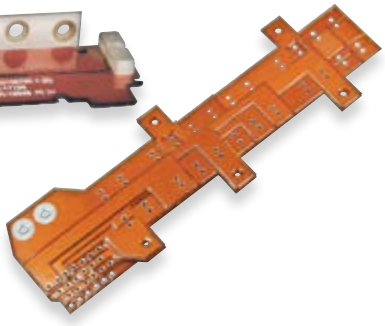


Used in tandem, one as a high-temp, high-current board for switching components and the other is densely populated with chip capacitors. The use of Kapton insulation allows full solderability for surface mount components. Both bus bars are epoxy edge filled and designed to withstand extremely demanding conditions of temperature and altitude.



Length: approximately 4" (102 mm) each | Voltage: 200VDC | Current: 260A | Conductors: .025" and .050" (0.63 mm and 1.27 mm)

LAMINATED POWER BACKPLANE



High-current power distribution is easily handled with this six layer, twenty-one conductor laminated bus bar. Designed to function as a "high-current backplane," a bank of special connectors are soldered directly to the bus bar, and used to distribute power within a turret control system.

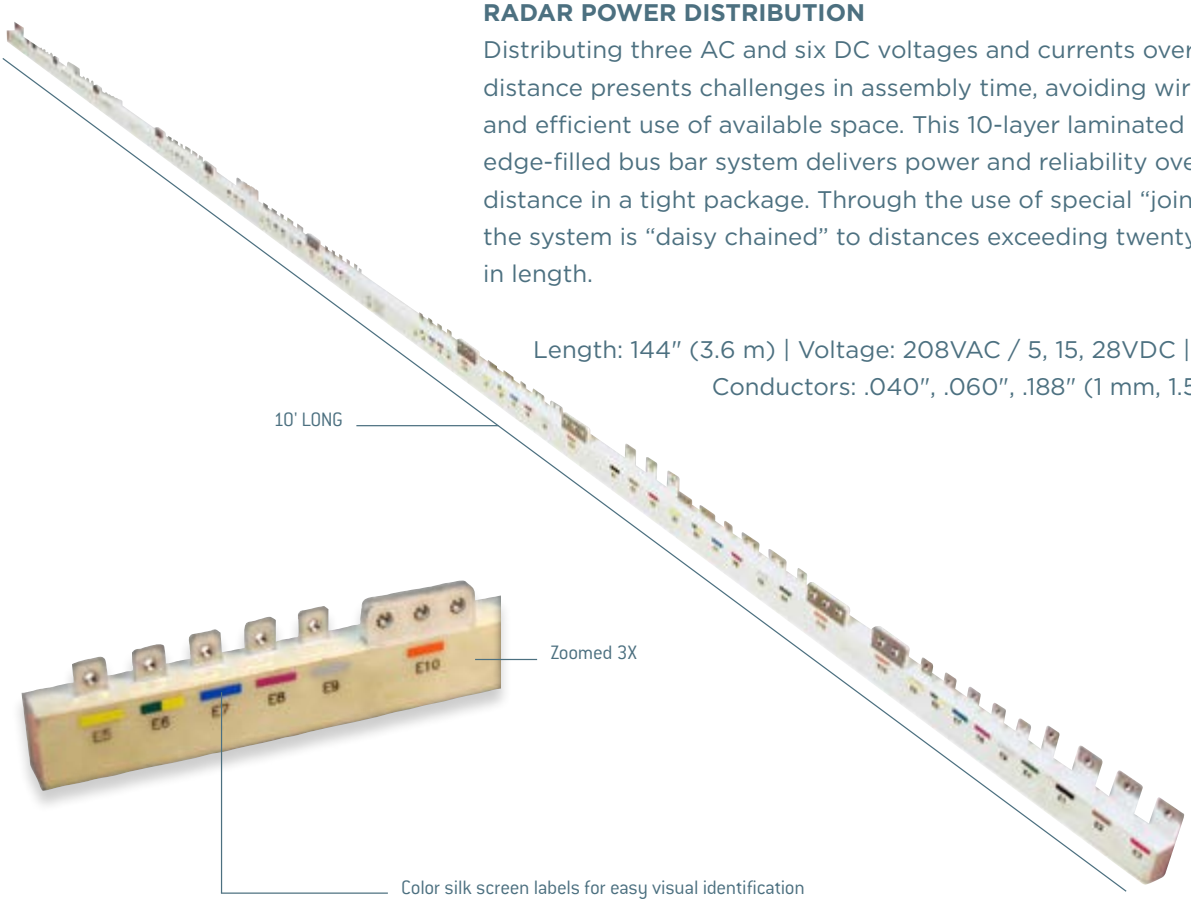
Size: 3" x 11" (76 mm x 279 mm) | Conductors: .030" (0.76 mm) | Voltage: 12VDC | Current: 30A

MARKETS SERVED: DEFENSE & AEROSPACE

RADAR POWER DISTRIBUTION

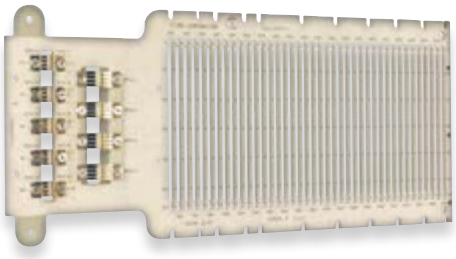
Distributing three AC and six DC voltages and currents over a long distance presents challenges in assembly time, avoiding wiring errors, and efficient use of available space. This 10-layer laminated and epoxy edge-filled bus bar system delivers power and reliability over a long distance in a tight package. Through the use of special "joiner bus bars," the system is "daisy chained" to distances exceeding twenty feet in length.

Length: 144" (3.6 m) | Voltage: 208VAC / 5, 15, 28VDC | Current: 25A | Conductors: .040", .060", .188" (1 mm, 1.5 mm, 4.8 mm)



MISSILE GUIDANCE SYSTEM

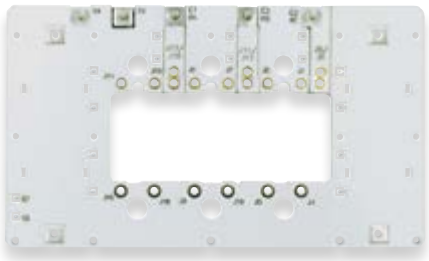
A complex and unique laminated bus bar design provides high-power distribution over a backplane with solder tabs for output connectors and gold plated input connections. This application for a laminated bus bar provides power within a Missile Guidance system. The pluggable input connections on this laminated bus bar are gold plated to provide low resistance and high reliability between the bus bar and its subsystem. Forty pairs of outputs from the bus bar to the backplane are made by solder connections. The bus bar is entirely encapsulated using epoxy edge fill provide a complete hermetic seal.



Size: 8" x 18" (203 mm x 457 mm) | Conductors: .040" (1.0 mm) | Voltage: 48V | Current: 190A

SPACECRAFT POWER INVERTER

This laminated bus bar design demonstrates excellent packaging efficiency. By designing all electrical connection points for the IGBTs, Capacitors, I/O, and monitoring devices in one clean bus bar, overall system reliability is improved and optimal electrical performance is assured.



Size: 16" x 28" (406 mm x 711 mm) | Thickness: .093" and .25" (2.4 mm x 6.35 mm) | Voltage: 480V | Current: 240A

MARKETS SERVED: TRANSPORTATION

TRANSPORTATION

Whether it's carrying the high current necessary to power heavy equipment, rail, and subway cars — or reducing weight and enhancing packaging efficiency for the latest aircraft and hybrid vehicles — Mersen laminated bus bars bring unique advantages to the transportation industry that are not available with traditional wiring or single conductor bars. A properly engineered laminated bus bar provides the lowest overall system inductance and the most balanced and distributed capacitance, making it the perfect match for the high demands of the transportation equipment industry. Mersen laminated bus bars help transportation equipment manufacturers achieve their reliability goals.

ALTERNATIVE FUEL SYSTEMS

Fuel cells and hybrid electric vehicles require rugged, reliable power distribution. Heavy duty construction with epoxy powder coating as a dielectric allows this laminated bus bar design to perform to specifications in harsh environments.

Size: 6″ x 14″ (152 mm x 356 mm) | Voltage: 600VDC | Current: 150A | Conductors: .125″ (3.2 mm)

TRACTION DRIVE

Modern traction drives combine high current and high voltage in highly confined spaces. Mersen's design experience utilizes individually laminated conductors, glass insulation spacers, and unique copper bushing "vias" to achieve an efficient, concentrated package with a minimum of special tools.

Size: 7″ x 11″ (178 mm x 279 mm) | Conductors: .040″ (1 mm) | Voltage: 1200VDC | Current: 250A

LOCOMOTIVE TRACTION

The laminated bus bar for train traction inverter combines high current and high voltage. Long term durability and continuous operation in hostile environments demand high quality and consistency. The laminated bus bar has 3 layers individually laminated with perfect sealed edges and fully insulated mounting holes, built and tested to meet customer partial discharge requirements.

Size: 24″ x 11.8″ (610 mm x 300 mm) | Voltage rating at 2100V | High Pot test at 5200VAC | Current: 900A

MARKETS SERVED: TRANSPORTATION

LOCOMOTIVE TRACTION DRIVE

High horsepower traction drives benefit from the low inductance power path made possible by Mersen laminated bus bars. Laminated bus bars are the essential component that connect IGBTs and capacitors together. By minimizing system inductance, transient over-shoots are reduced which greatly simplifies the need for complex snubber circuitry. Laminated bus bar designs for motor drives can contain a number of modular bus bars, linked together, to connect all of the system components into one complete system.

Length: 10.5″ (267 mm) | Width: 8″ (203 mm) | Voltage: 600VDC | Current: 650A

HIGH-END AUDIO / PCB BUS BAR

Uniquely designed two-layer, 18 conductor, PCB-style bus bar saves valuable board space while delivering low-impedance power to power semiconductors in automotive sound systems. All conductors are made of .025″ (.635 mm) copper, plated for solderability and the entire assembly is formed at a right angle.

Length: 10″ (254 mm) | Width: 1.5″ (38 mm) | Voltage: 12V | Current: 6A to 16A

MARKETS SERVED: EV/HEV AND ELECTRICAL ENERGY STORAGE (EES)

EV/HEV AND ELECTRICAL ENERGY STORAGE (EES)

Electric/Hybrid Electric Vehicles (EV/HEV) and Electrical Energy Storage (EES) are amongst the top fastest-growing industries in today's electrical energy markets. As these new technologies evolve, the need to keep pace with their technological advancements is critical for any manufacturer supplying into these markets. Mersen is committed to push boundaries and to introduce game-changing and disruptive technologies to make EV/HEV and EES applications safer and more reliable. Smart monitoring bus bars for battery applications in electric vehicles and energy storage can handle both high power and small control signals in a single battery connection solution.

MONITORING BUS BAR EXAMPLES FOR BATTERY CONNECTIONS

To cope with the growing demand of constant voltage and temperature monitoring in power electronics applications such as lithium-ion and ultra-capacitors packs, Mersen has engineered an innovative concept that combines in a single customized device a laminated bus bar, a flexible circuit, thermal sensors, and other custom electronic components. It allows, with only one part, to make both the power connections and the signal collection from each cell independently, so the status of each cell is delivered to the Battery Management System via a custom connector.

- Improved inventory management
- Faster assembly time
- Withstanding of cells micro-movements during charge/discharge process
- No wiring errors
- Best signal quality by a highly engineered and precision controlled welding technique to reduce the voltage drop
- Increased current carrying capacity

HYBRID VEHICLES

Designed with automotive reliability in mind, this two-layer, laminated bus bar joins parallel rows of batteries together in a hybrid vehicle application.

Size: 3″ x 4″ (76.2 mm x 101.6 mm) | Thickness: .093″ (2.36 mm) | Voltage: 60VDC | Current: 40A

MARKETS SERVED: EV/HEV AND ELECTRICAL ENERGY STORAGE (EES)

ELECTRIC VEHICLE POWER DISTRIBUTION

When power has to be routed through tight confines that twist and turn, Mersen's epoxy powder coating provides 100% dielectric protection. This two-conductor laminated assembly includes bonded ceramic chokes, nylon reinforced mounting holes, and floating clinch hardware for easy installation and optimized electrical performance in an automotive environment.

Size: 4″ x 9″ (102 mm x 229 mm) | Conductors: .125″ (3.2 mm) | Voltage: 150VDC | Current: 100A

ELECTRIC VEHICLE CHARGE PORT

Planar power technology is enhanced through laminating with thin dielectric materials which yields a sealed, rugged structure. This design is formed into a "U" shape and is electrically tested underwater to assure performance.

Size: 7″ (178 mm) square | Thickness: .020″ (0.5 mm) | Voltage: 140VDC | Current: 40A

ELECTRIC VEHICLE POWER ELECTRONICS

Individually laminated, this two-conductor bus bar connects electrolytic capacitors and IGBTs in a small, lightweight package for an EV Inverter.

Size: 3″ x 6″ (76 mm x 152 mm) | Conductors: .020″ (0.5 mm) | Voltage: 150VDC | Current: 60A

MARKETS SERVED: RENEWABLE ENERGY

RENEWABLE ENERGY

As the depletion of fossil fuels drives our attention towards renewable energy sources to power our daily lives, Mersen's laminated bus bars can be found in new, but familiar territory. Whether it's in Solar, Wind Power, or Fuel Cells, the creation of DC energy feeds directly through Mersen's low inductance laminated bus bars into an IGBT and capacitor circuit, delivering the safe and efficient power our customers demand. Mersen's quality-engineered laminated bus bars use state-of-the-art materials and manufacturing techniques that minimize weight and maximize simplicity!

SOLAR POWER

Multilayer, laminated bus bar used in a Photovoltaic Inverter application. Diodes, IGBTs, and Electrolytic Capacitors are all easily interconnected in one compact power distribution structure.

Size: 16″ x 28″ (406 mm x 711 mm) | Voltage: 48VDC | Current: 240A | Conductors: .050″ (1.3 mm)

MOUNTING STRUCTURE FOR CAPACITOR BANK

This rugged two-layer, four-conductor bus bar is production built for a Hybrid Transit Inverter application. The perimeter is a laminated sealed-edge construction. It shows the system simplicity of combining capacitors and IGBTs into a single bus bar system.

Size: 12″ x 18″ (305 mm x 457 mm) | Thickness: .125″ (3.2 mm) | Voltage: 475V | Current: 250A per layer

WINDMILL INVERTER

This laminated bus bar design demonstrates excellent packaging efficiency. By designing all electrical connection points for the IGBTs, Capacitors, I/O, and monitoring devices in one clean bus bar, overall system reliability is improved and optimal electrical performance is assured.

Size: 16″ x 28″ (406 mm x 711 mm) | Thickness: .093″ and .25″ (2.4 mm and 6.3 mm) | Voltage: 480V | Current: 240A

LAMINATED BUS BAR WITH HINGED CONNECTION JOINTS

Innovative laminated bus bar with hinged connection joints from Mersen allows ease of access to components such as IGBT and capacitors installed under the bus bars in tight assemblies such as inverters and drives. This robust and effective bus bar design reduces inverter stack assembly foot print as well as cutting down on maintenance time. Ease of access provides other benefits such as limiting the possibility of damaging the components being removed and eliminating cross wiring errors.

MARKETS SERVED: COMPUTERS

COMPUTERS

As data volume and broadband use continue to expand, performance demands increase for high-speed servers, blade servers, network backbone equipment, engineering work stations, and such data storage systems as disk arrays. Mersen laminated bus bars help these computer equipment designers meet that challenge, offering uncompromising electrical performance while minimizing EMI, RFI, and crosstalk. The low profile of a laminated bus bar provides computer equipment manufacturers with the ultimate package efficiency, ease of service, and consistent quality necessary to satisfy the most demanding customers. A properly engineered power distribution plan utilizing laminated bus bars can also include thermal management, with the bus bar acting as a heat sink. The bus bar's form-fitting designs can help increase the air flow within a system where space is at a premium.

PCB to PCB

Two bus bar examples for DC power connections between circuit boards. These assemblies use an edge-sealed construction and employ a special insulating washer that allows compression of the two conductors onto the board while insulating the fastener from the live conductor.

Size: 0.5″ x 2″ (12.7 mm x 50 mm) | Thickness: .030″ x .060″ (0.76 mm x 1.5 mm) | Voltage: 48V | Current: 35A

INFORMATION STORAGE SYSTEMS

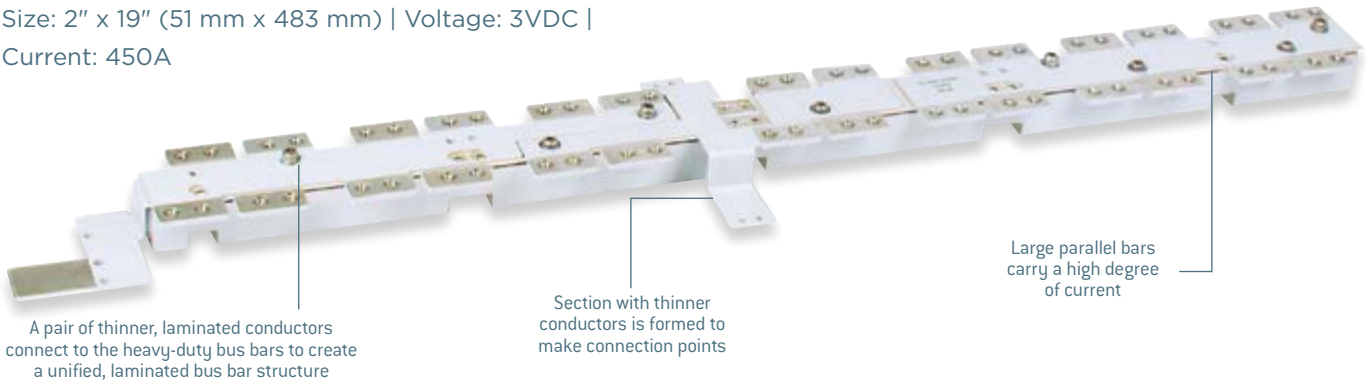
These bus bars are stamped, brazed, machined, and colored-coded epoxy powder coating dielectric insulation for differing voltages. Power interconnects directly from the power supply with included hardware so you get everything in one rugged package.

Size: 1.2″ x 19″ (30.5 mm x 482 mm)| Voltage: 48VDC | Current: 300A

SUPERCOMPUTER BUS BAR

Modern supercomputer systems operate at extremely low voltages and require a high concentration of current. This two-conductor bus bar assembly is constructed from machined, stamped, and soldered components that are insulated with a high-quality epoxy powder coating, then laminated together to provide a low inductance power path distributed across a large circuit board or backplane.

Size: 2″ x 19″ (51 mm x 483 mm) | Voltage: 3VDC | Current: 450A

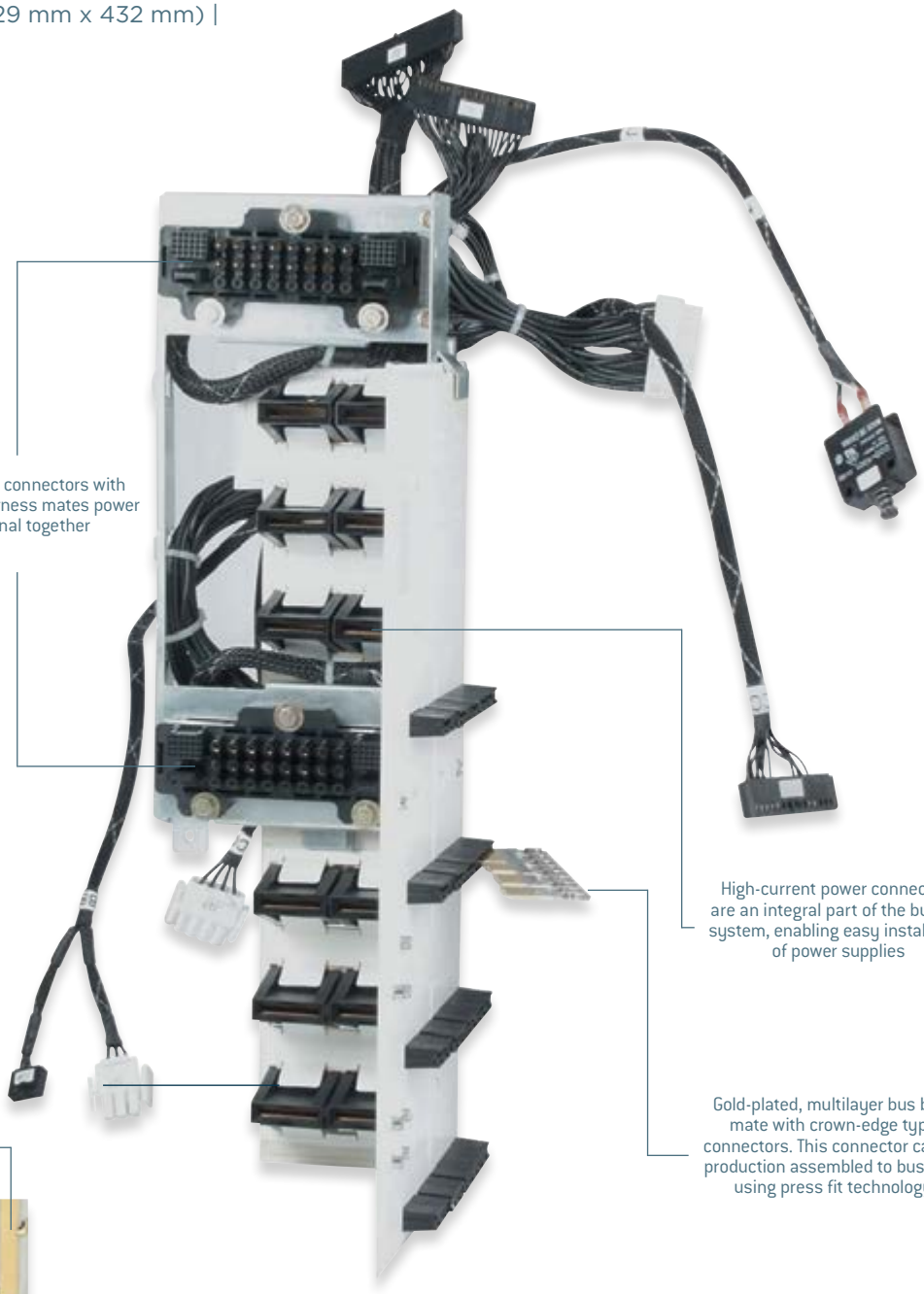


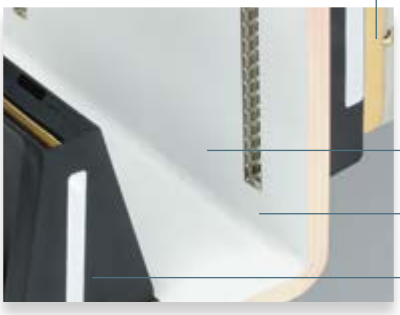
MARKETS SERVED: COMPUTERS

HIGH-END SERVERS IN DATA CENTERS

An excellent combination of value! This multilayer, laminated bus bar incorporates several different connectors for both power and signal, and through careful engineering, a wire harness is used for signal distribution. Mersen can engineer fully tested and serialized solutions to solve your power distribution challenge!

Size: 5″ x 9″ x 17″ (127 mm x 229 mm x 432 mm) |
Voltage: 48V | Current: 400A



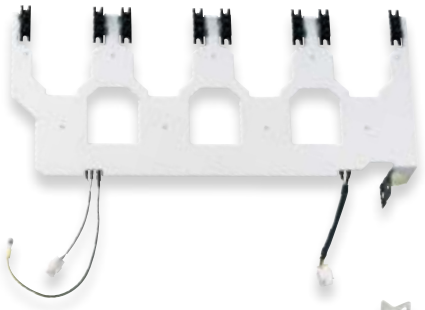


MARKETS SERVED: COMPUTERS

POWER BACK PLANE

Distributing power to eight blades in a large server is easily accomplished with this two-conductor laminated bus bar complete with blind mate power connectors. Short cable assemblies are built into the bus bar for system monitoring. Formed tabs at bottom accommodate in-line fuse connections.

Size: 16″ x 28″ (406 mm x 711 mm) | Voltage: 48VDC | Current: 240A | Conductors: .060″ (1.5 mm)



COMPUTER BACK PLANE POWER DISTRIBUTION

Epoxy powder coating allows multiple conductors, formed to differing geometries, to be assembled into a single unit. Insulated and bonded together, this assembly carries power to the backplane without adding costly and complex layers to the backplane.

Length: 14″ (356 mm) | Thickness: .060″ (1.5 mm) | Voltage: 3VDC and 5VDC | Current: 100A

COMPUTER BACK PLANE

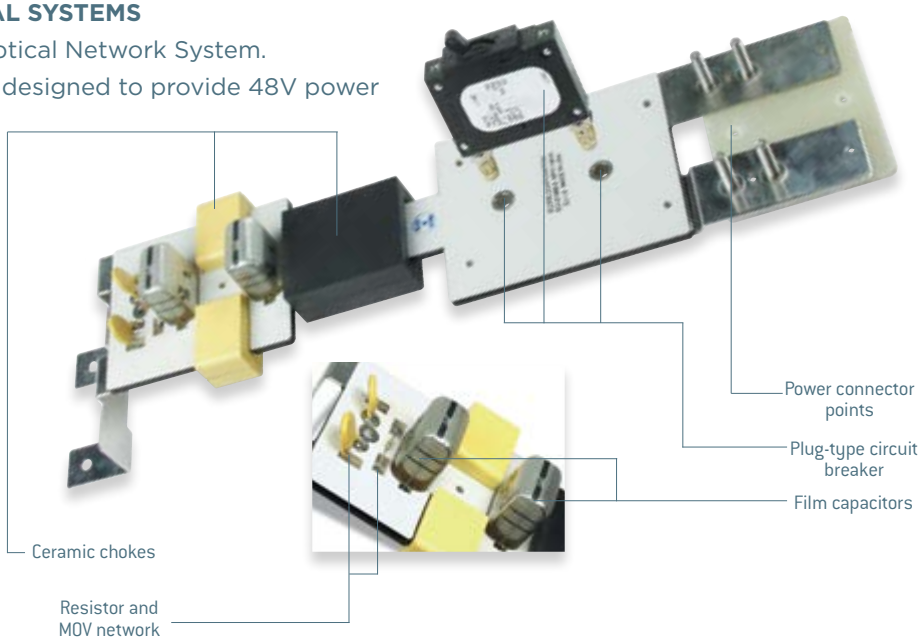
Redundant power supplies plug into this laminated bus bar design and feed high-current power into the computer backplane. Note the five glass (FR-4) mounting supports, which are bonded to the structure, to create a rigid, insulated mounting system. Nine “Crown Clip” high-current connectors distribute power from the power supply onto the backplane.

Size: 12″ x 9″ (305 mm x 229 mm) | Thickness: .125″ (3.2 mm) per layer | Voltage: 48V | Current: 250A per layer

POWER DISTRIBUTION FOR OPTICAL SYSTEMS

Power distribution bus bar used in Optical Network System. This efficient and compact bus bar is designed to provide 48V power onto a backplane from its power supply, through circuit protection, common and differential mode inductors, film capacitors, and resistors, all without the need for a separate PCB for the soldered connections of the resistors and capacitors!

Size: 5″ X 18″ (127 mm x 457 mm) | Voltage: 48VDC | Current: 75A | Conductors: .050″ (1.27 mm)



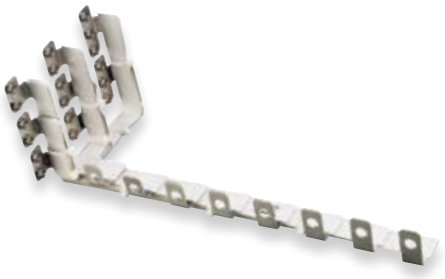
MARKETS SERVED: TELECOMMUNICATION

TELECOMMUNICATION

In the intensely competitive telecommunication market, manufacturers of equipment for Cellular Base Stations and Internet Routers must offer their customers exceptional performance and dependability. With their consistent quality, excellent electrical characteristics, minimal EMI, RFI, and crosstalk, Mersen laminated bus bars provide the perfect solution! Mersen laminated bus bars offer telecommunications equipment manufacturers many other advantages too — including ease of assembly, superior thermal management, reduced weight, packaging efficiency, and overall cost effectiveness over alternative means of power distribution.

CELLULAR BASE STATION POWER DISTRIBUTION

An economical design that carries power from multiple power supplies onto the backplane within a Base Station Cabinet. Individually laminated and assembled together reducing a complex wiring scheme to a simple component, saving both space and assembly time.



Size: 7″ x 7″ x 19″ (178 mm x 178 mm x 483 mm) | Voltage: 48VDC | Conductor thickness: .060″ (1.5 mm) | Current: 125A

ROUTER BACKPLANE DISTRIBUTION

Two-conductor laminated bus bars designed to distribute DC power from dual power supplies across the backplane of an internet router. The insulation system uses a molded-edge seal around the perimeter as a cost-effective means of providing the proper creepage distance between the two conductors while protecting the individual conductors from dust and contaminants. Due to the low voltage of the system, Mersen engineers assure that the design has sufficient cross sectional area for a minimal voltage drop.

Size: 12″ x 18″ (305 mm x 457 mm) | Voltage: 48VDC | Current: 250A | Conductors: .090″ (2.3 mm)

INTERNET ROUTER

This two-conductor bus bar distributes DC power within an internet router. The laminated structure utilizes tabs with offset forms and clinch hardware to mount directly onto the mid-plane, while allowing for proper airflow. High-current pluggable connectors are mounted directly to the bus bar for interchangeable power supplies.

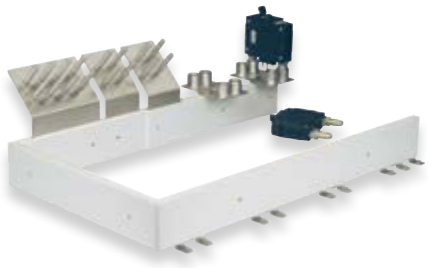
Length: 18″ (457 mm) | Width: 12″ (305 mm) | Voltage: +5V, -5V | Current: 110A

MARKETS SERVED: TELECOMMUNICATION

INTERNET BUS BAR SYSTEM

U-shaped, with angled power input tabs, feeding around a rack-mounted frame. The unit also has plated, soldered bushings for bullet-style circuit breakers.

Size: 5″ x 9″ x 17″ (127 mm x 229 mm x 432 mm) | Voltage: 48V | Current: 400A | Conductors: .060″ (1.5 mm)



REDUNDANT POWER INPUT

When system requirements call for redundant power supplies, laminated bus bars are ideal! This two-layer design utilizes press-fit sockets for power supply input and mates downstream with a custom power distribution network.

Size: 3.5″ x 8″ (89 mm x 203 mm) | Voltage: 48VDC | Current: 50A | Conductors: .125″ (3.2 mm)

BACK PLANE POWER DISTRIBUTION

Sixteen-layer laminated bus bar distributes +48V and return across a back plane in a rack system for a network routing application. Heavy-gauge clinch hardware and anti-rotation tabs accommodate cable connections. The entire assembly is hermetically sealed using epoxy edge fill.

Size: 1″ x 18″ (25 mm x 457 mm) | Conductors: .032″ (0.76 mm) | Current: 75A per layer | Voltage: 48VDC

TELECOMMUNICATIONS BOARD LEVEL POWER DISTRIBUTION

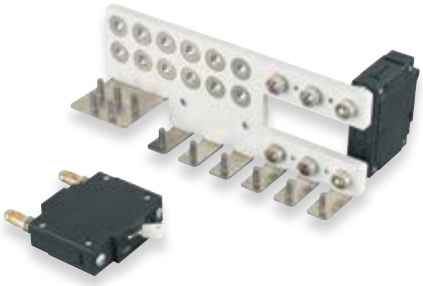
When board space is at a premium, laminated bus bars provide the perfect space-saving solution. The bus bar is designed to be soldered into a PCB and includes an integrated connector, which allows for interchangeability of either the power supply or PCB.

Size: 0.6″ x 10″ (15.2 mm x 254 mm) | Conductors: .050″ (1.27 mm) | Current: 80A | Voltage: 60VDC

CIRCUIT BREAKER BUS BAR

This seven conductor, nickel-plated assembly receives filtered input power, routed through pluggable breakers and directed to output terminals within a rack-mounted system. Such compact routing offers improved packaging and improved air flow—both key benefits of laminated bus bars.

Size: 3″ x 6″ (76.2 mm x 152.4 mm) | Voltage: 48VDC | Current: 75A | Conductors: .060″ (1.5 mm)



BUSFLEXX STATIC AND DYNAMIC CONFORMING BUS BAR CONNECTIONS

BusFLEXX™ CONNECTORS

Electrical connections utilizing bus bars and other mechanical fixtures often face challenges of thermal expansion, tight tolerances and the stress of vibration based on the environment they are deployed in. This can negatively affect the performance, reliability, and longevity of the application. Mersen's BusFLEXX line of conforming connectors is custom designed to help eliminate these challenges. A large variety of unique flexible and conforming connection features can be strategically designed into our bus bars to meet customers' specific requirements.

Mersen's innovative BusFLEXX connectors allow for connectivity of cables to bus bars, electrical/electronic components to bus bars and even bus bar to bus bars wherever there is a need for mechanical gap tolerances and/or thermal compensation. The connectors can have static or +/-1mm dynamic properties up to three rotational axis (X,Y and Z) and provide a cost effective yet long lasting connection methods. Mersen design engineers can work closely with customers to solve their specific design needs for custom-made conforming connectors. In addition, connectors can be designed with certain amount of flexibility and spring tension, reducing the harsh effect of vibration/harmonics on hard connections.

The following table highlights some of the many existing designs possible. Contact Mersen for more information.

Connectors		Connection Type	Dynamic Axis	Unique Feature	Benefit for users	Typical application examples
Concept A - Key Lock Bushing		Bolted Thru	X,Y	Characteristics of conventional bushings but with axial movement (x,y).	- Field replaceable - Moves freely on bus bar, until bolted connection is made - No soldering required	Power Module/ Capacitor Connection
Concept B - Ball Socket		Bolted	X,Y,Z	Pivots, Ball & Socket Feature.	- Compensates for Angular Mismatch - Moves freely on bus bar, until bolted connection is made	Orbital Interface Connection
Concept C - Articulating Plate		Bolted	Axial Z	Louver band technology to keep electrical connection thru hinge. 0 to 90 degree connections possible.	- Dynamic Motion Possible - Compensates for Height and Angularity Mismatch - Potential situations involving harmonics & vibration	Power Distribution
Concept E - Sliding Plate		Bolted	X,Y,Z	Louver band technology to keep electrical connection thru Press fit bushings.	- Dynamic Motion in Z Axis Possible - Floating Nut Allows for Compensation in X & Y directions until bolted connection is made	Power Distribution
Concept I - Crush Bushing		Bolted Thru	X,Y,Z	Conformable.	- Makes Bushing Conformal to misalignment in the Z axis - Helps compensate for angularity mismatch between Connections - No soldering required	Power Module/ Capacitor Connection
Concept L - Flex Bridge (Eiffel Tower)		Bolted	X,Y,Z	Spring Copper Alloy.	- Dynamic Compensation for misalignment in X, Y, & Z Axis - Design can be modified for different heights, amperages, and connections types - Can be used in High Resonance Applications	Power Distribution
Concept M - Conformal Tab		Bolted	X,Y,Z	Can be soldered on or fabricated directly into conductor depending on conductor thickness.	- Will conform to mating terminals - Floating nut will allow movement in x,y directions	Power Module/ Capacitor Connection
Concept O - Captive Thread Bushing		Bolted Thru	X,Y	Characteristics of conventional bushings but with axial movement (x,y).	- Field replaceable - Moves freely on bus bar, until bolted connection is made - No soldering required	Power Module/ Capacitor Connection
Concept S - Floating Bushing		Bolted Thru	Z	Louver band technology to keep electrical connection thru soldered bushing. Slight Axial movement possible.	- Z Axis Mobility - Dynamic Applications possible	Power Module/ Capacitor Connection
Concept T - Louver Band Washer		Contact Washer	Z	To replace washers used by customers to take up gaps in assemblies. Fills gaps in planar connections.	- High Current interface between 2 flat conductors - Highly flexible - Dynamic Applications - Compensates for expansion and contraction	Power Distribution

MHI-T™ LAMINATED BUS BARS FOR HIGH TEMPERATURE APPLICATIONS

BUILT TO TAKE THE HEAT!

Today's customers are turning to Wide Band Gap (WBG) technologies such as SiC and GaN based power modules to increase power densities in their drives and inverters designs. Due to their inherent nature, WBG modules in turn introduce an increased level of heat into their laminated bus bars connectors. Increased temperature rises on standard laminated bus bars may cause partial or complete breakdown of the bonding agent (glue) of the insulation, causing the insulation to lift and separate from the conductor surface, creating potential unsafe shock or short circuit faults. Mersen aims to address this increased temperature rise in WBG power modules by designing bus bars with higher temperature tolerances.

Using a combination of polyaramid dielectric insulation and high temperature adhesive, and through a long series of testing and qualification steps, today's Mersen MHi-T High Temperature Bus Bars are designed and manufactured to respond to an increasing demand for higher power levels in power converters.

While traditional laminated bus bars are limited to a working temperature of 105°C, Mersen MHi-T bus bar line up allows for an increased working temperatures up to 130°C and 180°C.

Features and Benefits

Insulation materials expertise and qualification procedure cycle used across all Mersen bus bar sites

- Three solutions already available @ 105, 130 & 180°C:
  - MHi-T105™
  - MHi-T130™
  - MHi-T180™
- A fully qualified and standard compliant insulation film offer:
  - REACH and RoHS
  - CTI (400V)
  - UL94 - Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances V0 certified
  - EN45545-2 - Fire testing of materials and components for trains, Certified HL3 Class for R1 and R7

Electrical performances

- Electrical breakdown: >8kV

High operating temperature

- Operating temp.: -50°C to 180°C (Up to 200°C peak)
- According to UL tests: Insulation film RTI (220°C)

Applications

- Motor Drives, Rail, Photovoltaic, Wind, Aeronautics, UPS and Oil & Gas

HIGH SPEED FUSES FOR OVERCURRENT PROTECTION DEVICES IN AC/DC SYSTEMS

QUALITY AND PERFORMANCE FOR VARIOUS MARKETS

Although standards may vary from one country to another, the need for safe and reliable electrical protection in semiconductor applications remains universal. Mersen supports OEM designers and equipment maintenance personnel with a comprehensive range of high speed fuses, offering protection solutions that meet all major international standards. This portfolio includes Protistor® square body ceramic semiconductor fuses developed for worldwide compliance, as well as additional product families designed to address specific market requirements such as North American round fuses, IEC cylindrical, NH DIN (German), and British BS88 standard fuses.

- Power Conversion (Rectifiers, Inverters, ...)
- Renewable Energies (Solar, Wind, ...)
- Process Industries
- Transportation (Railway, Marine, ...)
- UPS
- Data Centers
- Electrical Energy Storage
- Charging Station (EV & Heavy Duty)

HIGH SPEED FUSES FROM MERSEN ARE DESIGNED TO:

- Limit the thermal energy (I^2t) let-through
- Interrupt very high potential fault currents in extremely short times
- Limit the let-through current in case of a fault
- Ride through normal transient overload conditions
- Withstand heavy duty cycling capabilities

HIGH SPEED FUSES ARE DIFFERENT FROM REGULAR STANDARD FUSES

There is hardly an electric powered product that exists today that does not rely on semiconductor technology to some degree. That means extending electrical protection to IGBTs, Silicon Carbide (SiC), GaN, thyristors, triacs, diodes, and a host of other solid-state components, and providing a wide range of voltage requirements, unique mounting configurations, and special protection characteristics. High speed fuses differ vastly from standard fuses in performance and purpose, as indicated in the table below:

	Overcurrent protection	Standards	Safety standards	Ratings	Type of protection	Purpose	Location
Semi conductor and special purpose fuses	Power Semiconductor	IEC or UL recognized component	Internationally harmonized (UL/IEC/CSA/CCC)	Non-Standard	Ultra-fast and low-energy	Sensitive component topology protection	Inside the application
Standard fuses	Cable/overload protection	IEC or UL listed component	Local-specific	Defined by Standards	Short circuit and overload	Provides general protection to power sources and AC loads	Outside the application

UNIQUE EXPERTISE IN AIR, PHASE CHANGE, AND LIQUID-COOLED HEAT SINKS

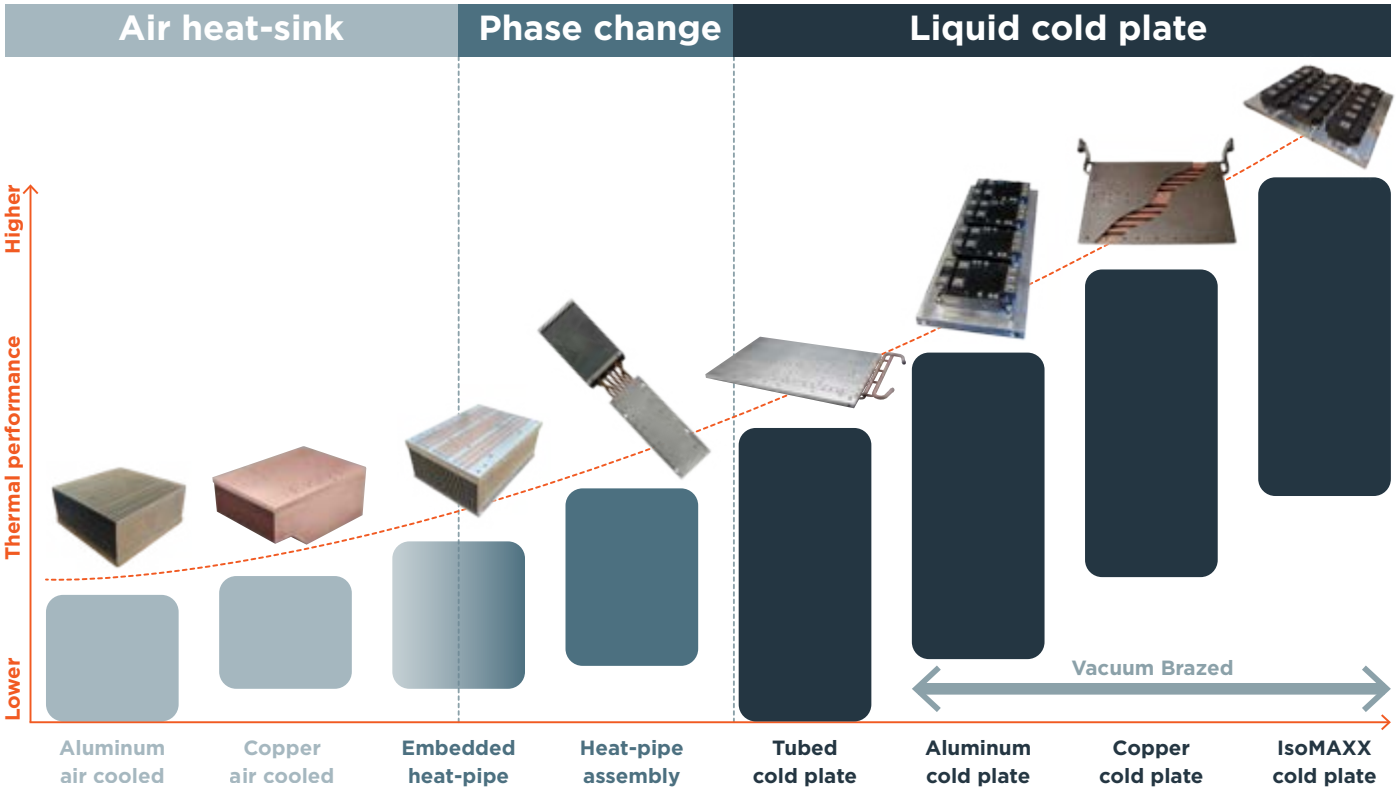
MERSEN ANSWERS YOUR TOUGHEST THERMAL APPLICATION CHALLENGE

We are experts in designing, simulating, manufacturing and testing cooling solutions to serve AC and DC power electronics applications where Wide Band Gap (SiC, GaN) and Silicon (IGBT, Thyristors) technologies are used for power conversion. We are tailoring our solutions to the specific needs of the most demanding markets and applications:

- Industrial Power Conversion
- Rail, aero, marine
- UPS and Motor Drives
- Renewable Energy (wind and solar)
- Silicon Carbide (SiC) Applications
- Military and Defense
- Heavy Duty (EV, HEV, Stradle carrier, mining)
- Electrical Energy Storage
- Telecommunication and data center
- Power transmission / HVDC
- Medical

Mersen integrates its extensive cooling expertise and patented heat sink technology into semiconductor applications and battery systems to make them more efficient, reliable and profitable. Mersen's engineering team is dedicated to supporting you at every stage, from identifying innovative cooling solutions to co-designing performance parameters and simulating your application before a prototype is built.

Mersen is capable of completing thermal testing for all air-cooled products and heat pipe assemblies in-house to ensure our customers' performance needs are met.



STANDARD & CUSTOM-MADE CAPACITORS FOR DEMANDING APPLICATIONS

POWERING PERFORMANCE: MERSEN CAPACITORS FOR HIGH-EFFICIENCY AND RELIABLE ENERGY SYSTEMS

Understanding the role and characteristics of DC capacitors is essential for designing efficient and reliable power conversion systems.Mersen is one of the few manufacturers who produce all of their products in Germany – for quality reasons. Short distances between development and production ensure efficient processes and enable close coordination with our customers.

In addition to standard capacitors in small and medium-sized quantities, Mersen also offers special custom-made products for demanding applications:

- Aeronautics & Defense
- Medical
- Renewable energies
- Welding technologies
- Railway
- Flash applications

Mersen brings proven expertise in the design of aluminum electrolytic and film capacitors, delivering optimized solutions tailored to your specific requirements.
Our many years of success are based on the products we developed in cooperation with our customers.
We invite you to put our expertise and flexibility to the test.

Aluminum Electrolytic Capacitors

Film Capacitors

Capacitor Banks

MERSEN, FTCAP, LECLANCHÉ CAPACITORS... IT'S ALL THE SAME

Mersen has 130+ years' experience in electrical power and advanced materials.
Fischer & Tausche was founded 1948 in Husum and has generations of experience designing and manufacturing aluminum electrolytic and film capacitors.
In 2004, the German manufacturer acquired Leclanché Capacitors, the Swiss company specializing in manufacturing film capacitors.
In 2018, Mersen acquired both companies: FTCAP and Leclanché Capacitors
Mersen expanded its existing range of ultra-fast fuses, cooling and laminated bus bars with capacitors.
All these products are key components in the design of efficient and high-performance power electronics systems.
FTCAP facilities in Germany are now Mersen's unique center of expertise for capacitors.

POWER STACK DESIGN, MANUFACTURING & TESTING - EVALUATION KITS

MERSEN SIC POWER STACK REFERENCE DESIGNS HELP INVERTER DESIGNERS

Save time and confusion in selecting individual components.

As a key partner for power electronics manufacturers, Mersen offers state-of-the-art solutions to improve system performance, efficiency and reliability or to capture the value of various new technologies. One of these achievements is the new SiC 150 kVA Power Stack Evaluation Kit V2.0. It aims at helping everyone taking quickly benefits of SiC while developing a new power conversion project.

When it comes to designing power inverters, our customers require power stages or power stacks with enhanced power density (kW/liter) while minimizing conversion losses (Efficiency %), reducing cost ($/kW) and shrinking size and weight of the overall system.

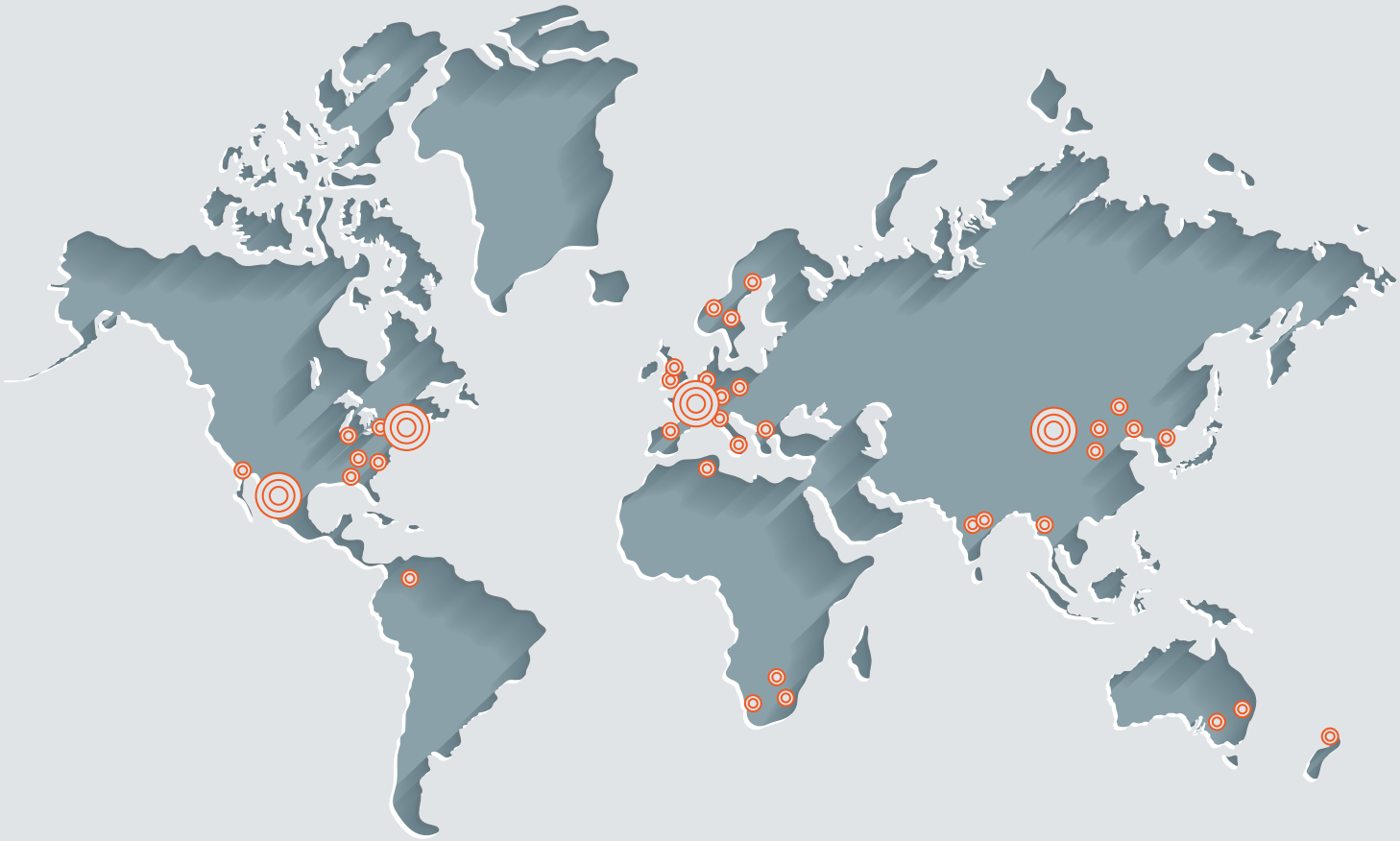
Thanks to its undisputed reputation in bus bar, cooling, high-speed fuses, capacitor design, and manufacturing, Mersen is your preferred partner to assist you during the development phase of your Silicon, Gallium Nitride, or Silicon Carbide-based Inverter/Stack, bringing a technical cross-expertise on these 4 key products to push the optimization to the limit.

150 kVA SiC Eval Kit V2.0: a pre-configured solution that streamlines development

The fully programmable Mersen SiC Power Stack Evaluation Kit enables inverter designers to accelerate their product development by relying on a pre-designed, pre-qualified industrial Power Stack. Augmented by imperix® control and development environment, the Power Stack can easily be programmed and operated, reducing the product development cycle.

150 kVA – 1.2 kV SiC Power Stack
Evaluation Kit V2.0

WITH MERSEN HELP, DESIGNERS CAN GREATLY BENEFIT FROM A SOLUTION THAT IS OPTIMALLY PREDESIGNED FOR THEIR SPECIFIC APPLICATION.



MERSEN
Expertise, our source of energy

MERSEN IS A GLOBAL EXPERT IN ELECTRICAL POWER AND ADVANCED MATERIALS

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