Ferraz Shawmut | Eldre | Idealec | FTCAP

SOLUTIONS FOR
POWER MANAGEMENT
AC & DC
HIGH SPEED
FUSES SOLUTIONS

SAFE AND RELIABLE PROTECTION IN TWO DISTINCT PRODUCT CATEGORY OFFERINGS

Mersen offers a broad and comprehensive line of protective devices for the protection of power electronics and DC applications. This brochure provides the reader a product line overview, classified into two distinct categories:

OVERCURRENT PROTECTION DEVICES FOR AC & DC SYSTEMS - IEC-60269-4

High speed fuses are used to protect sensitive loads against overcurrent conditions in power electronic equipment.

STANDARD POWER CONVERTER PROTECTION

FUNCTION

- Protection of power modules in converter, inverter and rectifier

PRODUCT FAMILIES

- Square Body Fuses. p.7
- North American Round Body Fuse. . . . p.8
- Standard Cylindrical Body Fuse p.9
- NH DIN and BS88 Fuses. . . . . .p.10 & 11
- Miniature Body Fuses. p.12
- Industrial DC Protection Fuses. p.19

RAILWAY AND TRACTION CONVERTER PROTECTION

FUNCTION

- For installation in heavy or light rail applications
- For protection of main electrical feed and the power conversion

PRODUCT FAMILIES

- DC high performance Square & Round Power Fuses p.13
- Cylindrical Auxiliary DC Fuses. p.16

APPLICATION-ENGINEERED CONVERTER PROTECTION

FUNCTION

- Protection of highly demanding and specific applications

PRODUCT FAMILIES

- Low Inductance Square Body p.14
- High Performance Square Body p.15

OVERCURRENT PROTECTION DEVICES FOR DC SYSTEMS - IEC-60269-7

Overcurrent Protection Devices (OCPD) are specially designed to safely clear both high and low DC fault currentsfor today's demanding Electrical Energy Storage, DC fast charging stations and new renewable applications.

ENERGY STORAGE AND CHARGING SYSTEMS FUNCTION

FUNCTION

- Protection for DC batteries and inverters
- Protection of battery charging systems and other DC components like relays and contactors

PRODUCT FAMILIES

- ABAT fuses for battery modules, rack, PCS. p.18
- Industrial DC Protection fuses p.19

HIGH SPEED FUSES THAT MEET EVERY MAJOR STANDARD

Standards may change from country to country, but the need for safe, reliable electrical protection for semiconductor applications is the same the world over. That's why Mersen offers the best protection solutions on the market today and the widest range of high speed fuses that meets every major International Standard.

HIGH SPEED FUSES ARE DIFFERENT FROM REGULAR STANDARD FUSES

High speed fuses are used to protect semiconductor devices and batteries against overcurrent conditions. They are specifically designed to reduce the I^2t, peak let-through current and arc voltages during a fault condition. 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
SEMICONDUCTOR 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 and 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

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-thru current in case of a fault
- Ride through normal transient overload conditions
- Withstand heavy duty cycling capabilities

HIGH SPEED FUSE SOLUTIONS

Mersen supports OEM designers and equipment-maintenance personnel with a comprehensive line of high speed fuses. Product lines, such as Protistor® PSC Square Body ceramic semiconductor fuses, have been developed to meet worldwide standards and also match every market with complete lines of North American style round semiconductor fuses, IEC Cylindrical, NH DIN German and British BS88 Standards fuses.

TYPICAL APPLICATIONS

- Protection of Power Inverters, Converters and rectifiers, AC and DC drives
- DC common bus
- Reduced voltage motor starters
- Railway
- UPS systems
- Energy Storage Systems Battery systems
- EV charging stations
- Protection of Capacitor banks
- Switchboard and control panels
- DC grids
- Transit Current Collectors

MARKETS AND APPLICATIONS

Mersen dedicated solutions are used in various markets around the globe. We work closely with our customers to better understand their application needs and improve their productivity.

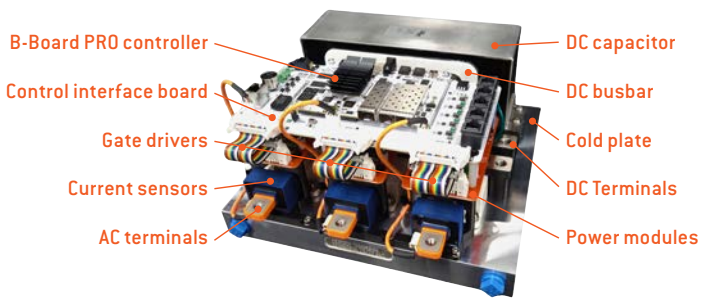
PRODUCTS' SERIES	British Standard BS88 Cylindrical Body Fuse	Standard Cylindrical Body Fuse	Miniature Fuse	NH DIN and British Standard BS88 Square Body Fuse	North American Round Body Fuse	Square Body Fuse
PHOTOS						
OPERATING CLASS	aR, gR	aR, gR, gLB	FA/FB/FC SA/SB HA	aR, gR, gS	High speed	aR, gR
VOLTAGE RANGE	250 - 690VAC 240 - 700VDCC	500 - 690V AC 440 - 660V DC*	125 - 1000V AC	250 - 1000VAC 320 - 600VDC	150 - 1200VAC 150 - 700VDC*	400 - 1300VAC 350 - 1200VDC*
CURRENT RATINGS	5 - 800A	0,1 - 250A	0,04 - 30A	16A - 1000A	1 - 6000A	20A - 5000A
INTERRUPTING RATING	Up to 200kA	Up to 200kA	Up to 200kA	Up to 200kA	Up to 200kA	Up to 200kA
PAGE	Page 11	Page 9	Page 12	Page 10	Page 8	Page 7

*Varies by rating – Consult Mersen for more details
** Typical Application – Consult Mersen for further application examples

APPLICATION ENGINEERING SUPPORT & DESIGN CONTROL

The Mersen Application Engineering Team is a dynamic force driving innovation to meet the specific needs of your applications. With a deep understanding of industry challenges and a commitment to customer success, our team of experts collaborates closely with clients to deliver tailored solutions that enhance safety, reliability, and efficiency. Dedicated to providing expert support in selecting or designing the most suitable solution, our engineers bring a wealth of experience and cutting-edge knowledge to every project.

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 to push the optimization to the limit.
To reduce design time and to optimize performance specifications, Mersen engineering teams provide state of the art simulations for fuses, heat sinks, and bus bars. These simulations will greatly improve prototype design considerations and reduce manufacturing lead times.



ENGINEERING SUPPORT • CUSTOM DESIGN • TESTING

High Performance Square Body Fuse	Low Inductance Square Body Fuse	Industrial DC Protection fuses	ABAT Fuses	Cylindrical Auxiliary DC Fuse	DC High Performance Square and Round Body Fuse	Special Application Fuse
						
aR	aR	aR, aBat	aBat	gR	aR, gR	aR, gR
750 - 3800V AC	Up to 12500VAC Up to 10000VDC	700 - 1000V DC	Up to 1500VDC	1000 - 4000VDC	350 - 4200V DC	Consult Mersen
400 - 10000A	Consult Mersen	50 - 600A	500 -1600A	0,8 - 100A	6 - 1000A	Consult Mersen
Up to 200kA	Up to 80kA	Up to 100kA	Up to 250kA	Consult Mersen	Consult Mersen	Consult Mersen
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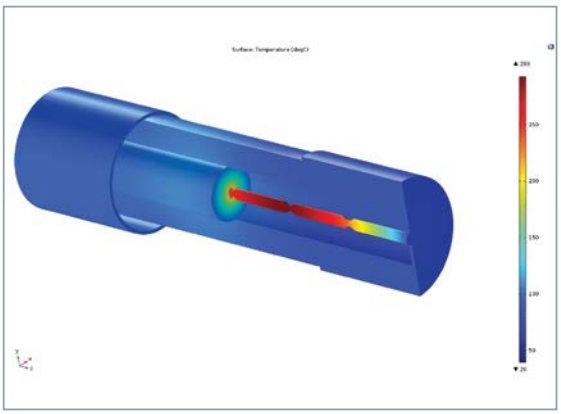
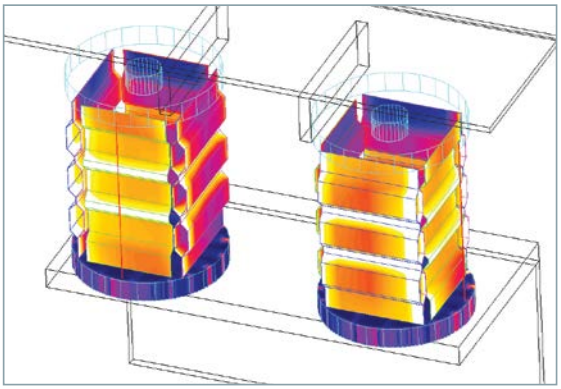
MERSEN HIGH-POWER FUSETEST LABS

Mersen offers our customers global test capabilities for testing products in North America (Newburyport, Massachusetts), in Asia (Shanghai) and in Europe (Saint Bonnet de Mure, France). Our labs can conduct fuse performance testing in AC and DC applications under UL/CSA or IEC standards guidelines. We utilize state-of-the-art instruments and software to provide accurate run-testing services and in-depth analysis. For more information on our test capabilities, please contact Mersen.

The labs also play a critical role in custom-fuse development, enabling us to test prototypes quickly and efficiently to keep pace with your development schedule. These labs play a crucial and fundamental role in our quality control program for Mersen's electrical protection products.





A GLOBAL REPUTATION FOR QUALITY

Mersen's reputation for outstanding technical expertise, product quality, and engineered safety is the result of over a century of design and manufacturing knowledge, coupled with state-of the-art equipment in various ISO-9001 and ISO-14001 registered facilities around the world.

High speed fuses
and Overcurrent Protection Devices
Design and Manufacturing Locations Worldwide

Newburyport, MA, USA
Design and Test
ISO9001 & ISO14001

Saint-Bonnet-De-Mure, France
Design, Test & Manufacturing
ISO9001 & ISO14001
IRIS & ISO 17025

Shanghai, China
Changxing, China
Manufacturing
ISO9001 & ISO14001

Juarez, Mexico
Manufacturing
ISO9001 & ISO14001

Tunis, Tunisia
Manufacturing
ISO9001 & ISO14001, OHSAS 18001

Bangalore, India
Manufacturing
ISO9001 & ISO14001

PROTISTOR® SQUARE BODY FUSES

Mersen Protistor® square body fuses provide maximum flexibility in equipment design and ultimate protection for today's power conversion equipment. These square body fuses are available in eight different body sizes, each size having more than seven worldwide acceptable mounting styles. The different mounting styles and body sizes along with a broad range of ampere ratings allow greatest flexibility in equipment design.

Mersen Protistor® square body fuses have been engineered to provide state-of-the-art protection for semiconductor devices. They have die-cut elements embedded in solidified sand, which helps control arcing characteristics for low I^2t and high interrupting rating. All contact surfaces are silver plated and all hardware is non-magnetic. Many square body fuses are equipped with a trip-indicator. This trip indicator can operate a field-mountable micro-switch which is easily mounted directly onto the fuse.

Highlights:

- Ultra-fast AC/DC acting for quickest protection of power conversion equipment and coordinated grid protection
- Very low I^2t for improved semiconductor protection, preventing your electrical equipment from destructive damage
- Current-limiting protection to minimize thermal & mechanical stresses and ensure coordination / selectivity
- Mechanical mounting flexibility by design, meeting worldwide standards
- Tested cycling capability to meet your current application profile

Applications:

- Rectifiers
- Inverters
- AC Drives
- UPS systems
- Semiconductors

Approvals:

- UL recognized file E76491
- CSA certified
- IEC 60269-4 certified
- CCC approved

PROTISTOR - SQUARE BODY FUSE RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (V) IEC/UL		MAXIMUM INTERRUPTING RATING IR		MOUNTING
			AC	DC	AC	DC	
30 31 32 33 2x31 2x32	aR	50-2500A** 2x3X up to 5000A	Up to 690V AC (IEC) / 700V AC (UL)*	Up to 600V DC	200kA*	100kA*	Flush-end, PressPack
30 31 32 33							Blade
70 71 72 73 2x72 2x73		20-1800A** 2x7X up to 3600A	Up to 1250V AC (IEC) Up to 1300V AC (UL)	Up to 1200V DC			Flush-end, PressPack, Brackets
70 71 72 73							Blade
70 71 72 73	gR	50A - 1000A	690VAC	Up to 600V DC (IEC) Up to 650V DC (UL)	150kA		Flush-end, Blade

* May vary by rating – Consult Mersen technical support

** May vary by mounting

Fuse holders available – Contact Mersen for more information

AMP TRAP® NORTH AMERICAN STYLE ROUND BODY FUSES

The Amp-Trap Round Body high speed fuses were designed for the protection of semiconductor devices. This product line encompasses a wide variety of voltage ratings and performance, making it ideal for protecting a wide variety of power electronic applications.

Highlights:

- Fast acting
- Current limiting
- Low I^2t
- Indicator options available
- Various mounting types

Applications:

- EV Charging
- Battery protection

Approvals:

- CSA certified (consult Mersen)
- CE/UK certified (consult datasheet)

AMP-TRAP NORTH AMERICAN ROUND BODY FUSES RATINGS

SIZE/SERIES:	OPERATING CLASS/ RANGE	AMPERE RATING* I_N (A)	RATED VOLTAGE (V) IEC	INTERRUPTING RATING - TESTED		MOUNTING
				AC	DC	
A15QS	Partial Range	20A - 6000A	150V AC/DC	100kA	50kA	Hockey Puck, Bolt-in Blades
A30QS		1A - 6000A	300V AC/DC	200kA	100kA	Ferrule, Hockey Puck, Bolt-in Blades
A50QS		35A - 1200A	500V AC/DC	200kA	87kA	Bolt-in Blades
A50P		10A - 1200A	500V AC 450V DC	100kA	79kA	Ferrule, Bolt-in Blades
A60X		1A - 2000A	600V AC	200kA	n/a	Ferrule, Hockey Puck, Bolt-in Blades
A70QS		35A - 800A	700V AC/DC	200kA	100kA	Bolt-in Blades
A70P		10A - 2000A	700V AC 650V DC	100kA	100kA	Ferrule, Hockey Puck, Bolt-in Blades
A70Q		35A - 600A	700V AC 650VDC	200kA	100kA	Bolt-in Blades
A100P		15A - 2000A	1000V AC 750VDC	100kA	100kA	Ferrule, Bolt-in Blades
A120X		½A - 30A	1200V AC 1000V DC	100kA	100kA	Ferrule
A150X		1A - 1000A	1500V AC/ 1000V DC	100kA	100kA	Ferrule, Bolt-in Blades

*For other ratings, consult Mersen technical support

Fuse holders available – Contact Mersen for more information

STANDARD POWER CONVERSION PROTECTION - STANDARD CYLINDRICAL BODY

STANDARD CYLINDRICAL BODY FUSES

Mersen's Standard Cylindrical fuses provide an extremely high interrupting ratings offering power semiconductor applications the ultimate in electrical protection. The Protistor IEC semiconductor fuses offer is comprised of 2 different classes of protection:

- The gR range is a fast acting fuse with full-range protection. It protects high short-circuit currents and small overload currents.
- The aR range is a high performance, ultra-fast acting fuse for superior short-circuit protection only.

Highlights:

- Extremely fast acting
- Current limiting
- Extremely low I^2t
- High breaking capacity
- Excellent cycling capability
- Modular fuse holder

Applications:

- Capacitor discharge, high dI/dt disconnection
- Small inverters
- Motor Drives
- UPS systems

Approvals:

- UL recognized file E76491
- CSA certified (consult Mersen)
- IEC 60269-4 certified
- CCC certified (consult Mersen)

PROTISTOR - IEC CYLINDRICAL FUSE-LINKS RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (V) IEC/UL		MAXIMUM INTERRUPTING RATING IR		MOUNTING
			AC	DC	AC	DC	
10X38 mm	gR	1A - 32A	690V AC (IEC) 700V AC (UL)*	500VDC (UL)	160kA (IEC) 200kA (UL)	50kA (UL) IR	Ferrule
14X51 mm		1A - 63A					
22X58 mm		12A - 135A					
27X60 mm		8A - 110A	800V AC (IEC)		90kA (IEC)		
14X51 mm	aR	6A - 63A	690V AC (IEC) 700V AC (UL)*	500VDC (UL)	160kA (IEC) 200kA (UL)	50kA (UL) IR	
22X58 mm		25A - 135A					
27x60 mm		63A - 250A					

* May vary by rating – Consult Mersen technical support
For DC applications, consult Mersen technical support"

AMP TRAP - CYLINDRICAL FUSE RATINGS

SERIES	SIZE	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (V) IEC/UL		MAXIMUM INTERRUPTING RATING IR		MOUNTING
				AC	DC	AC	DC	
A15QS	1-1/2" x 13/32" - 10X38 mm	partial	1A - 30A	150VAC	150VDC	100kA	50kA	Ferrule
A60Q	1-1/2" x 13/32" - 10X38 mm	partial	5A - 40A	600VAC	600VDC	200kA	100kA	
A70QS	2"x9/16" - 14x51 mm	partial	6A - 50A	690VAC	700VDC	200kA	100kA	
	2-1/4"x13/16" - 22x58 mm	partial	10A - 100A					

Fuse holders available – Contact Mersen for more information

STANDARD POWER CONVERSION PROTECTION - NH DIN AND BRITISH STANDARD SQUARE BODY

PROTISTOR® - NH DIN AND BRITISH standard BS88 SQUARE BODY FUSES

Mersen's DIN and BS88 Square Body Fuses offer an extremely high interrupting rating, providing the ultimate electrical protection for power semiconductor applications.

Highlights:

- Compact fast acting
- Current limiting
- High breaking capacity
- Low I^2t

Applications:

- Rectifiers
- Inverters
- AC Drives
- UPS systems

Approvals:

- UL recognized file E76491
- CSA certified
- cURus Recognized Component
- IEC 60269-4 certified
- CCC approved

PROTISTOR - NH DIN AND BS88 SQUARE BODY FUSE RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (V) IEC/UL		MAXIMUM INTERRUPTING RATING IR		MOUNTING
			AC	DC	AC	DC	
000	aR	75A - 400A	690VAC (IEC)*	500VDC (UL)	Up to 200kA (IEC)	100kA (UL) IR	BS88 blade w/wo trip indicator
000, 00	aR	16A - 400A	690VAC - 1000VAC				DIN80/110 blade w/wo trip indicator
NH 000, 00, 0, 1, 2, 3	aR	16A - 1000A	Up to 690V AC (IEC) Up to 700VAC (UL)*				Plain Blades
NH 000, 00, 1, 2, 3	gS	16A - 630A					Plain Blades

* May vary by rating – Consult Mersen technical support

For DC applications, consult Mersen technical support

Fuse holders available – Contact Mersen for more information

STANDARD POWER CONVERSION PROTECTION - BRITISH STANDARD CYLINDRICAL BODY

PROTISTOR® - BRITISH standard BS88 CYLINDRICAL BODY FUSES

Mersen's Protistor Fuse line offers an extremely high interrupting rating, affording power semiconductor applications the ultimate in circuit protection while meeting the British Standard BS88 in a round fuse format.

Highlights:

- Compact fast acting
- Current limiting
- High breaking capacity
- Low I^2t

Applications:

- Rectifiers
- Inverters
- AC Drives
- UPS systems

Approvals:

- IEC 60269-4 certified
- UL Recognized File: E76491

PROTISTOR - BS88 CYLINDRICAL BODY FUSES RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (VAC)		RATED VOLTAGE (VAC)		MOUNTING
			AC	DC	AC	DC	BS88 BLADE
10X28 mm	aR/gR	5A - 32A	250 VAC (IEC)*		100kA (IEC)*		Blade wo trip indicator
17X27 mm	aR/gR	7A - 180A	250 VAC (IEC)*	600 VDC (UL)	100kA (IEC)	100kA (UL)	Blade w/wo trip indicator
36x55 mm	aR/gR	50 - 525A	250 VAC (IEC)*	240 VDC (IEC)	100kA (IEC)	50kA (IEC	Blade w/wo trip indicator
17x49 mm 2X17X49 mm	aR	16A - 160A	690VAC* (IEC)	600VDC (UL)	200kA (IEC)*		Blade w/wo trip indicator
17X49 mm	gR	75A - 800A					Blade w/wo trip indicator
36x55 mm 2X36X55 mm	aR	75A - 800A		450VDC (IEC)		50kA (IEC) UL	Blade w/wo trip indicator

* May vary by rating – Consult Mersen technical support

For DC applications, consult Mersen technical support

Fuse holders available – Contact Mersen for more information

STANDARD POWER CONVERSION PROTECTION – MINIATURE BODY

PROTISTOR® - MINIATURE BODY FUSES

Mersen's Semiconductor Miniature Fuses are engineered to deliver rapid protection for sensitive electronic components. They offer robust and reliable performance, making them suitable for a wide array of high-voltage applications. The axial leads are intended to be soldered directly onto a printed circuit board (PCB) or connected to other electronic components, enabling easy integration into various electronic systems.

Highlights:

- Extremely current limiting
- High breaking capacity
- Worldwide acceptability

Applications:

- Converters with semi-conductors, diodes, thrysistors, triacs
- Printed Circuit Board (PCB)
- Other electronic component

Approvals:

- UL recognized E76491
- UL recognized E90660
- IEC 127-2 Standard Sheet 1

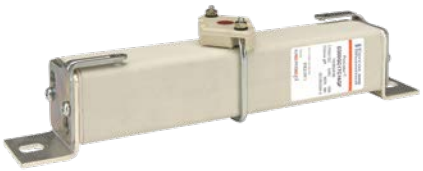
PROTISTOR - MINIATURE BODY FUSES RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (VAC) IEC/UL	MOUNTING
5X20 mm	Very Fast Acting (FA/FB) or Fast Acting (FC)	14A - 20A	125VAC*	Ferrule or Axial Leads
		0,04A - 12,5A	250VAC*	
		0,04A - 4A	400VAC*	
		0,63A	500VAC*	
		5A	300VAC*	
6X32 mm	Very Fast Acting (FA/FB) or Fast Acting (FC)	25A - 30A	125VAC*	
		0,04A - 20A	250VAC*	
		0,05A - 20A	400VAC*	
		2A	440VAC*	
		0,04A - 16A	500VAC*	
		0,1A - 2A	690VAC*	
		0,5A	1000VAC*	
		10A	600VAC*	
5X20 mm	Medium Time Lag (SA/SB) or Time Lag (SC)*	14A - 16A	125VAC*	
		0,04A - 12,5A	250VAC*	
		0,04A - 3,15A	400VAC*	
6X32 mm		25A - 30A	125VAC*	
		0,04A - 20A	250VAC*	
		0,05A - 10A	400VAC*	
		0,1A - 10A	500VAC*	
		1,6A	600VAC*	
6x46 mm	Very Fast Acting (FA)	0,1A - 1,25A	1000VAC*	

Fuse holders available – Contact Mersen for more information
* May vary by rating – Consult Mersen technical support

PROTISTOR® - DC HIGH PERFORMANCE SQUARE & ROUND POWER FUSES

Mersen DC high performance power fuses were developed to provide superior protection for railway power circuits. These fuse-links are typically operated at more elevated temperatures than other fuse types. They have lower I^2t to minimize damage to components in case of short circuits, and have lower watts loss and longer life.



PROTISTOR - DC HIGH PERFORMANCE SQUARE & ROUND BODY POWER FUSE RATINGS

SIZE/ SERIES	OPERATING CLASS/ RANGE	AMPERE RATING* I_N (A)	RATED VOLTAGE (VDC) IEC/UL	MAXIMUM INTERRUPTING RATING IR DC	MOUNTING	FORM
120	gR	50A - 160A	750VDC*	Consult Mersen technical support	Flush-end or blade	Square
121		200A - 250A				
122		250A - 500A				
123		500A - 800A				
2X122		500A - 1000A			Flush-end	
2X123		1000A - 1600A				
70	aR	20A - 125A	1200VDC*		L-bracket	
72		160A - 420A				
2X72		400A - 840A				
120	aR	20A - 215A	Up to 2000VDC*		L-bracket	
122		160A - 400A				
2X122		500A - 800A				
300	gR	6A - 125A			L-bracket or blade	
302		100A - 280A				
2X302		200A - 560A			L-bracket	
300	aR	20A - 180A	2400VDC*		L-bracket	
302		160A - 400A				
2X302		400A - 800A				
600	gR	6A - 125A	Up to 4000VDC*		L-bracket or blade	
602		100A - 180A			L-bracket	
2X602		200A - 560A				
600	aR	10A - 150A	Up to 4200VDC*			
602		200A - 375A				
2X602		400A - 750A				

* Consult Mersen technical support

** Nominal line voltage (railway)

Fuse holders available – Contact Mersen for more information

Highlights:

- Extremely fast acting
- Current limiting
- Very low I^2t
- Worldwide acceptability
- Superior cycling ability

Applications:

- Light rail (metro/tram): 600/ 750VDC
- Suburban lines: 1,5kVDC
- Suburban lines: 3kVDC
- Railway 15 / 25 KVAC

Approvals:

- UL recognized file E76491
- CSA certified
- IEC 60269-4 certified
- IEC 60077-5 compliance (consult Mersen)
- CCC approved (consult Mersen)

APPLICATION ENGINEERED PROTECTION - LOW INDUCTANCE SQUARE BODY

PROTISTOR® - LOW INDUCTANCE SQUARE BODY POWER FUSES

Mersen is a unique player in protection against capacitor discharge and high di/dt faults. Our extensive knowledge base was acquired from our direct partnerships with key customers that resulted in the development of Square Body. This experience has given us the ability to create a dynamic product that has the capability to disconnect within tens of microseconds to prevent collateral damage from a fault condition.

Highlights:

- Extremely fast acting
- Extremely current limiting
- Very low I^2t
- Worldwide acceptability
- Superior cycling ability

Applications:

- Rectifiers
- Inverters
- Low and Medium Voltage Drives
- High Power Generation, Conversion and Transmission
- Semiconductors

Approvals:

- Consult Mersen Technical Support

PROTISTOR - LOW INDUCTANCE SQUARE BODY FUSE RATINGS

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (V) IEC/UL		MOUNTING
			AC	DC**	
2X15X27 single body	aR	up to 325A	5000VAC*	5000VDC**	L-brackets terminals
2X15X27 multiples bodies		*		*	
2X15X27 single body		up to 250A	7200VAC*	7200VDC**	
2X15X27 multiples bodies		*		*	
2X15X27 single body		up to 170A	10000VAC*	10000VDC**	
2X15X27 multiples bodies		*		*	
2X15X27 single body		up to 135A	12500VAC*	*	
2X15X27 multiples bodies		*		*	

* Consult Mersen technical support

** DC (VSI) Voltage Source Inverter

Fuse holders available – contact Mersen for more information

PROTISTOR® - HIGH PERFORMANCE SQUARE BODY POWER FUSES

Mersen provides state-of-the-art protection for large, high-power applications of power generation, transmission, and conversion of electrical energy. Mersen High Performance Square Body fuses are fully customizable to fit our customer's requirements. Our expertise in fast acting technology has led to the development of an optimized protection solution with the lowest I^2t and the highest breaking current capacity while keeping the best cycling capability. The High Performance Square Body fuses have pure silver fuse elements embedded in solidified sand. All contact surfaces are plated and all hardware is non magnetic. All fuses come standard with a blown fuse indicator. This indicator can operate a microswitch which is easily mounted directly onto the fuse in service.

Highlights:

- Extremely fast acting
- Current limiting
- Very low I^2t
- Worldwide acceptability
- Superior cycling ability

Applications:

- Large rectifiers
- LV & MV High Power Drives
- High Power UPS Systems
- Substation
- Semiconductors

Approvals:

- UL recognized file E76491
- CSA certified
- IEC 60269-4 certified
- CCC approved (consult Mersen)

PROTISTOR - HIGH PERFORMANCE SQUARE BODY FUSES RATINGS

SIZE/SERIES	OPERATING CLASS/ RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE VN (V) IEC/UL	MAXIMUM INTERRUPTING RATING IR	MOUNTING
				AC	
44	aR	1250A - 6200A	750VAC*	230kA tested* 350kA estimated*	Flush-end, PressPack
2X44		2400A - 10000A	700VAC*		Plates, PressPack
73		800A - 2400A	1250VAC*		Flush-end, Plates, Blades
2X73		1800A - 4200A	1150VAC*		Plates, Omega bar
83, 84		630A - 4200A	1500VAC*		Flush-end, Plates, Blades, PressPack
2X83, 2X84		900A - 8400A	1450VAC*		Plates, PressPack
93, 94		525A - 3600A	1800VAC*		Flush-end, Plates, Blades, PressPack
2X93, 2X94		1050A - 7200A	1800VAC*		Plates, PressPack
123,124		630A - 2900A	2500VAC*		Flush-end, Plates
2X123, 2X124		800A - 4100A	2500VAC*		Plates, PressPack
173,174		400A - 1500A	3800VAC*	150kA tested* 300kA estimated*	Plates, PressPack
2X173, 2X174		800A - 3100A	3600VAC*		Plates

*may vary by rating – Consult Mersen technical support

Fuse holders available – Contact Mersen for more information

CONVERTER PROTECTION – CYLINDRICAL AUXILIARY DC FUSE

PROTISTOR® - CYLINDRICAL AUXILIARY DC FUSE

Mersen DC high performance power fuses were developed to provide superior protection for railway power and auxiliary circuits. They have lower I^2t to minimize damage to components in case of short circuits, and have lower watts loss and longer life.

Highlights:

- Extremely fast acting
- Current limiting
- Very Low I^2t
- Worldwide acceptability
- Superior cycling ability

Applications:

- Rectifiers
- Inverters
- AC Drives
- Traction Auxiliary Circuits
- UPS Systems,
- Reduced voltage motor starters

Approvals:

- UL Recognized file E76491
- Consult Mersen Technical Support

PROTISTOR - CYLINDRICAL AUXILIARY DC FUSE RATINGS

SIZE/SERIES	OPERATING CLASS/ RANGE	AMPERE RATING I_N (A)	RATED VOLTAGE (VDC) IEC/UL	MAXIMUM INTERRUPTING RATING IR	MOUNTING
			DC	DC	
14X51 mm	gL	2A - 50A	440VDC	100kA	Ferrule
22X58 mm		50A - 100A			
27X60 mm		125A - 160A			
27X60 mm	gR	0,8A - 110A	660VDC	50kA	
20X127 mm	gR	6A - 63A	1000VDC	100kA	
		1,5A - 25A	1500VDC	30kA	
20X190 mm	gR	6A - 32A	1500VDC	60kA	
36X127 mm	gR	25A - 100A	1000VDC	100kA	
36X190 mm	gR	40A - 100A	1500VDC	up to 100kA	
36X250 mm	gR	0,8A - 40A	2000VDC	30kA	
36X400 mm	gR	0,8A - 20A	4000VDC	30kA	

Fuse holders available – Contact Mersen for more information

SEMICONDUCTOR FUSE MAPPING DEFINITIONS

SEMICONDUCTOR FUSE TECHNOLOGY

Semiconductor fuses are used to protect against catastrophic semiconductor failure. Because of their ability to operate quickly during high fault current, semiconductor fuses help to significantly limit short circuit current to downstream components. Each different technology type of semiconductor fuse is defined by the fuse size, shape, and the type of termination:

- Cylindrical fuses can have bladed or non-bladed electrical contacts. Ferrule style fuses have caps crimped or affixed to the body. The body construction material is either made of ceramic or GMG (Glass Melamine Glass).
- Square body fuses have terminals that are screwed to the body.

  The body material is made of ceramic.

REGIONAL STANDARDS

Semiconductor fuses are covered by regulatory standards. The mechanical connections represented by the standards shown in this brochure follow these regional practices. Here are general descriptions of these regional practices:

- US - North American: Ferrule type, round body, or square body fuses with closed slot blades or end contacts with UNC tapped holes.
- FR - IEC Europe: Ferrule type and square body fuses with open slot blades or end contacts with metric tapped holes.
- DIN - German: Round body and square body fuses with brackets and wedge shaped contacts according to DIN43620 and DIN 43653 standards.
- BS - British: Round body and square body fuses with brackets according to BS88-4 standards.
- SP - Special Purpose: Fuses with mounting arrangements determined by application needs.

ABAT FUSES FOR MODULE, RACK, PCS

EES is a battery-based technology to manage and regulate electrical power generated by heterogeneous non-permanent sources (e.g. renewables Wind & Solar). It also acts as a buffer to compensate Production-Consumption discrepancies. It is a key component of “Smart Grid” concept. Mersen, specialist for safety of electrical energy, is constantly working on solutions to answer the extreme demands on protection systems.

Mersen now offers protection for the entire Battery system: module, rack, section and container.

With the ABAT product series, Mersen introduces innovative protection systems that are optimized for the fluctuations inherent in renewable energy applications.

Highlights:

- Designed for DC applications
- Dedicated to battery protection
- Compact design
- Several terminals can be provided

Applications:

- Electrical Energy Storage (EES)
- Battery Module
- Battery Racks
- Battery Section/Container
- Power Conversion Systems
- Hybrid Inverters
- DC Distribution Systems

Approvals:

- IEC 60269-7 compliance
- cURus Recognized - UL 248-13

ABAT5M - FUSES FOR BATTERY MODULE

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING IN (A)	RATED VOLTAGE (VDC) IEC/UL	MAXIMUM INTERRUPTING RATING IR	MOUNTING
			DC	DC	
20G	aBat	60A - 150A	500 VDC	30 kA	Bolted blades
25G		100A - 250A			
30G		150A - 400A			
38G		300A - 600A			
45G		400A - 800A			

ABAT15A - FUSES FOR BATTERY RACK

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING IN (A)	RATED VOLTAGE (VDC) IEC	MAXIMUM INTERRUPTING RATING IR	MOUNTING
			DC	DC	
ABAT15AA	aBat	100A - 250A	1500 VDC	250 kA	Offset blades, Bolted blades
ABAT15AD		200A - 500A		250 kA	

ABAT12E, ABAT15C - FUSES FOR SECTION OR CONTAINER

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING IN (A)	RATED VOLTAGE (VDC) IEC/UL	MAXIMUM INTERRUPTING RATING IR	MOUNTING
			DC	DC	
ABAT12E	aBat	800A - 1800A	1200 VDC	130 kA	Offset blades, Bolted blades
ABAT15C		500A - 1250A	1500 VDC	250 kA	
-Upcoming-		Up to 5000A	1500 VDC	250 kA	-

INDUSTRIAL DC FUSES FOR POWER PROTECTION

Electrification in construction, marine, agriculture, manufacturing, mining, and other industries, in addition to transportation, is a critical trend incleaner energy. These fuse series is Mersen's next evolution for high-power conversion applications protection for those industries shifting to Direct Current (DC) systems today.These fusesare specifically designed to reduce the I2t, peak let-through current, and arc voltages during fault conditions. Along with the ability to withstand heavy duty cycling and low power losses improving system reliability and efficiency, it makes them ideal for charging systems, UPS, and DC power conversion equipment.

Highlights:

- Lower I^2t performance
- Superior cycling ability for long, reliable life on high cyclic loading
- Low watts losses
- High Interrupting rating for optimal short circuit protection

Applications:

- EV Charging Stations
- Backup protection for DC relay/disconnect
- UPS and Inverters

Approvals:

- UL Recognized, UL File: E60314
- Power Cycling & Vibration

INDUSTRIAL DC PROTECTION FUSES

SIZE/SERIES	OPERATING CLASS/RANGE	AMPERE RATING IN (A)	RATED VOLTAGE (VDC) IEC/UL	MAXIMUM INTERRUPTING RATING IR	MOUNTING
			DC	DC	
D70QS	High Speed	50A - 600A	700Vdc	20kA	Bolted blades
D100QS	High Speed	50A - 300A	1000Vdc	100kA	Bolted blades
D100A	aBat	150 - 600A	1000VDC	100kA	Bolted blades

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

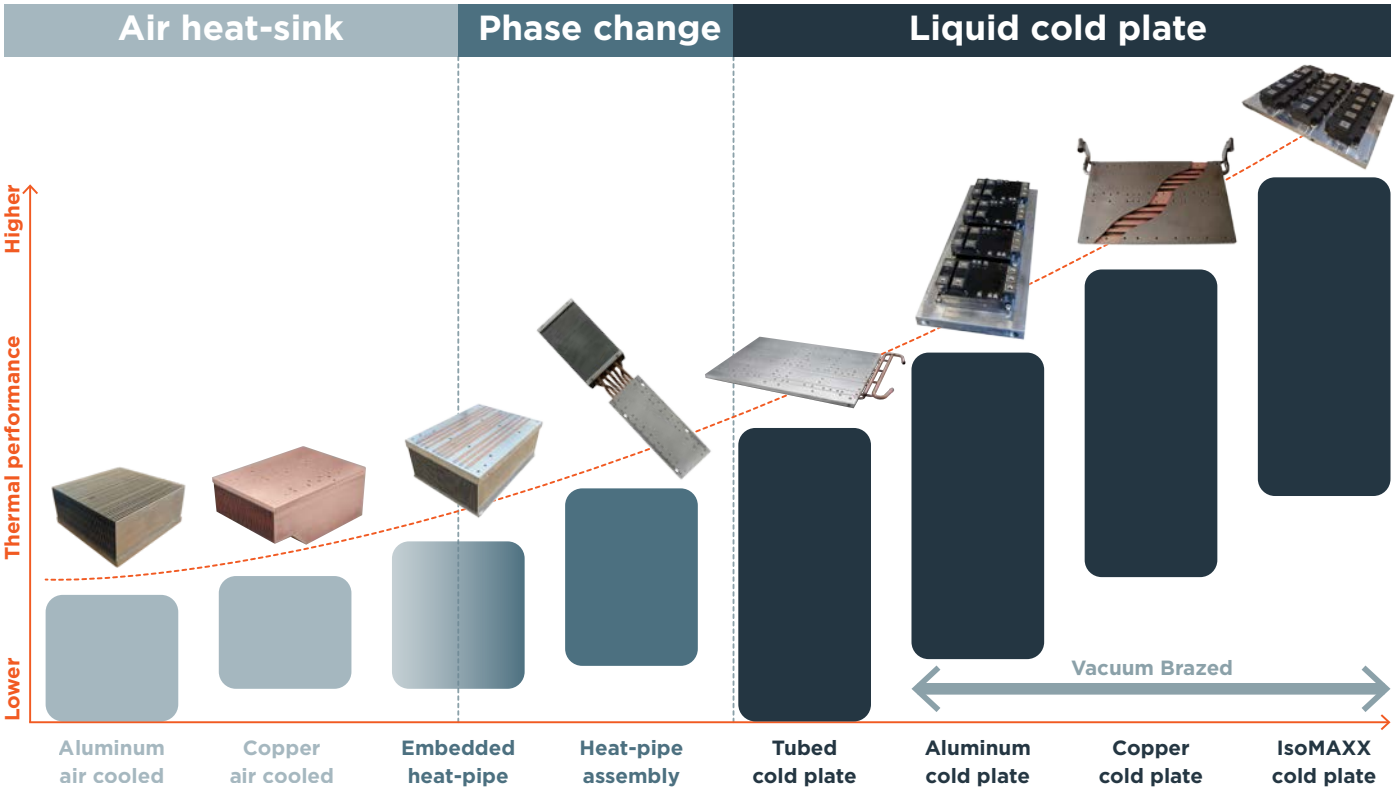
MERSEN ANSWERS YOUR TOUGHEST THERMAL APPLICATION CHALLENGE

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.

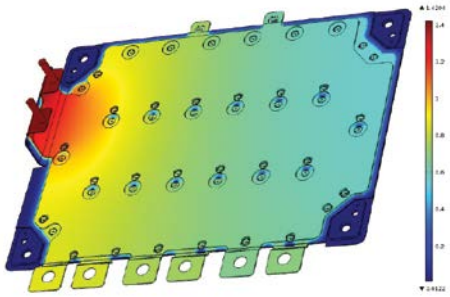


INDUSTRY LEADING LAMINATED BUS BAR DESIGN & MANUFACTURING

QUALITY AND PERFORMANCE FOR VARIOUS 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 bus bar 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 and battery-related applications. We cater to the unique needs of many markets and applications:



- Power electronics
- Industrial
- Defense & aerospace
- Transportation
- EV/HEV & Energy storage
- Wind & solar energies
- Computers & telecommunications

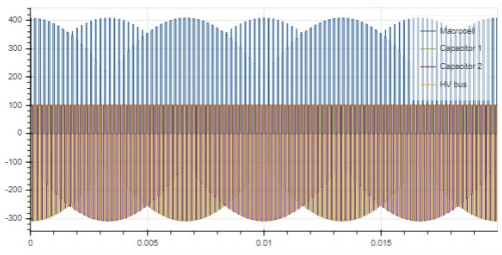
ENGINEERING SUPPORT AND TESTING FOR EACH DESIGN

Building and testing prototypes is costly and time-consuming, especially when dealing with complex conditions or oversized designs that don't fit standard testing equipment. To streamline the development process, Mersen uses thermal and electrical simulations to identify and correct design flaws before manufacturing. These simulations include temperature rise analysis, current flow, inductance, and skin effect calculations, ensuring optimal performance and efficiency. Mersen also conducts rigorous Hi-Pot and Partial Discharge testing to guarantee product reliability. Mersen experts offers personalized engineering support to help customers achieve the best design solutions quickly.

Bus Bar *CALCULATOR*

LAMINATED BUS BAR SIZING TOOL

Bus Bar Calculator ® is a free-access web-solution to precisely compute the key electrical specifications of laminated bus bars in the context of power converter design. Bus Bar Calculator ® provides all the values to help designer make bus bar in a wide variety of converters. More info on **mersen.com.**



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.

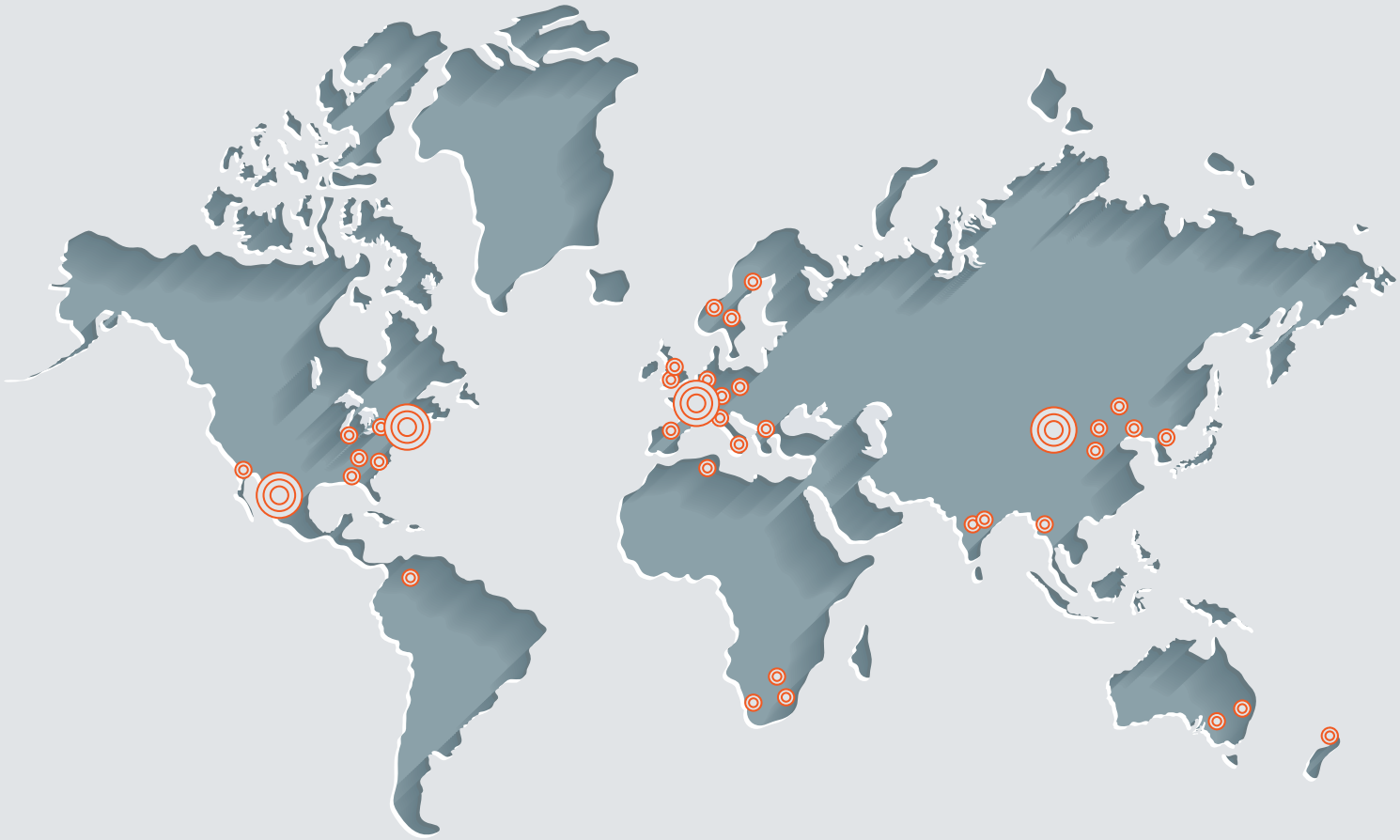
Thanks to its undisputed reputation in bus bar, cooling, high-speed fuses, capacitor design, and manufacturing, Mersen is your preferred partner to assist you during the development phase of your Silicon, Gallium Nitride, or Silicon Carbide-based Inverter/Stack, bringing a technical cross-expertise on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

GLOBAL EXPERT
IN ELECTRICAL POWER
AND ADVANCED MATERIALS.

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