

# Innovative high power solutions

High Power Rectifier

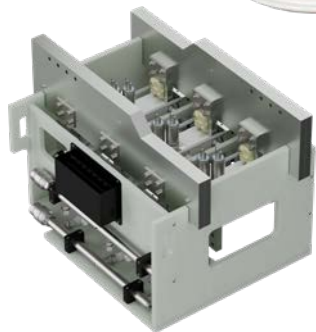
Switches and Crowbars

MMC

H<sub>2</sub>



Infineon Technologies Bipolar



**High efficiency:**

- Air-cooled 3 MW rectifier stack
- Thyristor disc for double-side cooling
- Water-cooled 5 MW rectifier stack

## Big meets beautiful

Our system combines lowest operational costs with long life time and compact modular design

Charging larger trucks, mining vehicles and even ships in the harbor requires power ranges exceeding 1 MW. The same applies for DC arc furnaces in metallurgical industry and also for the emerging water electrolysis.

These High Power Rectifiers use highly efficient, cost effective and reliable thyristors on air or water-cooled heat sinks. Double-side cooling reduces size and our modular design makes each project highly scalable.

For grid compliance, additional On-Load Tap Changers (OLTCs) as well as active and passive filters have been state-of-the-art for decades.

Our modular stack portfolio covers ranges for multiples of 5 MW, using water-cooling to squeeze these 5 MW for the single unit into a design space of less than 0.5 m<sup>3</sup>.

Forced-air cooled B6 rectifier stacks can reach 3 MW for a line voltage of 1 kV.

High Power Rectifier

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**Reliability:**  
 Freewheeling diodes  
 Press Pack IGBT  
 Half bridge stack with Press Pack IGBTs

## Extreme energy. Ultimate run.

Modular Multilevel Converter from 10 MW to more than 10 GW

The Modular Multilevel Converter (MMC) was first proposed in 2003 by Marquardt for High Voltage Direct Current transmission (HVDC). This new converter topology solved many of the problems caused by the former Line Commutated Converter (LCC).

After years of success in HVDC, other applications like Flexible AC Transmission Systems (FACTS) and Medium Voltage Drives (MVD) began migrating towards MMC. The majority of applications use Plastic Module IGBTs (PMI) but Press Pack IGBTs (PPI) are preferred for higher current levels.

Designs using PMI very often require additional thyristors to protect them in case of failure. These thyristors can be omitted when PPIs with or without internal freewheeling diodes (FWD) are used.

We offer a full portfolio of protection thyristors ranging from 3.3 kV up to 6.5 kV blocking capability. In MMC topologies beyond 2 kA DC current, our Press Pack IGBTs with and without internal FWD are the optimal choice.

The family of ultra-soft-switching external FWDs, capable of 5 kA/μs at 4.5 kV, is the perfect match with our PPI without internal FWD.





**Robustness:**  
Air-cooled 2.5 MW static switch  
60 mm half-bridge thyristor module  
70 mm single thyristor module

## When failsafe is a must

Our multi-cycle and single-shot crowbars protect your system from collateral damage

Static Transfer Switches (STS) and Static Bypass Switches (SBS) have to handle large loads in milliseconds with low loss and require robust semiconductors, preferably thyristors.

The same applies for crowbars which mitigate surge currents by diverting them through themselves, giving fuses enough time to disconnect, staying fully functional even after multiple events.

Classical fuses are often not available for higher power levels. Our optimized thyristors take over this role, failing safely and remaining short while preventing further damage to the system by absorbing the destructive energy until the circuit breaker takes over: We call them “single-shot crowbars”.

Forced-air cooled Static Switch stacks are available up to 2.5 MW with best-in-class power density.

For multi-cycle crowbars, pressure-contacted, isolated modules can be used as well as thyristor disc devices available up to 8000 V. The single-shot crowbar comes as a tower stack able to withstand around 100 kA surge current using only 0.02 m<sup>3</sup> space.





## The best of both worlds – For your success and our future

### **Innovative high-power semiconductors for energy systems**

Mastering the challenges of transforming energy and efficiently shaping the digital revolution are two of the greatest tasks we face today. Infineon Technologies Bipolar provides leading-edge semiconductor solutions as the foundation for meeting both of these challenges. We are the worldwide leader in innovation and quality for bipolar semiconductors. As an independent subsidiary of the globally deployed corporations Infineon and Siemens, we have combined their comprehensive expertise since 2007 with the objective of making life easier, safer and greener. For a better future.

### **Focus on your growth**

Our bipolar high-power semiconductors ensure the efficient transmission, storage, control and use of electrical energies. They form the foundation for a wide variety of highly advanced system technologies in application areas like wind, hydrogen, industrial drives and uninterrupted power supplies.

Our extensive knowledge of these areas means we can deliver the solution that precisely fits your specific requirements. We transform our expertise into long-lived, high-performance products and scalable growth. Focused, sustainable and reliable – for your success.





## Technology and partnership in step with today

### **At home in Europe – In the lead worldwide**

Infineon Technologies Bipolar offers you broadest possible portfolio of bipolar semiconductors. Working at our sites in Warstein and Cegléd, we set worldwide standards in the field of semiconductor technology.

Over 500 employees from twelve countries work together every day to bring you the best solutions and service at the highest levels of technology. We continuously expand our manufacturing facilities to ensure our ability to meet all the market's requirements.

### **Driven by your success**

We see ourselves as your partner on equal terms. We'll find exactly the right solution for you – and go the extra mile to power your growth and give you a competitive edge.

**We'll join you to create a better, more efficient future.**



## Where to Buy

Infineon Technologies Bipolar Webshop:

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Infineon Distribution Partners and Sales Offices:

[www.infineon.com/WhereToBuy](http://www.infineon.com/WhereToBuy)

## Technical & Sales Support

- Multilingual sales and technical support
- Design-in support directly from leading manufacturer

## Worldwide Shipping

- Over 600 most common thyristors/diodes and stacks
- Fast delivery across Europe directly from production site

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