

Bodo's Power Systems[®]

Special Feature

July 2020



PCIM Europe digital days
7. - 8. July 2020



Bodo's Power Systems Special Feature

PCIM 2020 – A leading Event for Innovations in Power Electronics Industry

By Leo Lorenz; ECPE
Conference Director PCIM



The first time in the more than 40 years PCIM history we have to re-schedule the event due to the COVID-19 Pandemic. The PCIM today is the leading technology platform for Power Electronics Professionals from Industry, Academia and public Organizations from across the globe engaged in moving power electronics industry ahead in the whole value added chain from

new materials to the next generation of power components, advanced packaging technology, full digital controlled power converters up to high level integrated Power Electronic Building Blocks (PEBB). Power Electronic itself is the driving technology for key elements of the global Megatrends e.g. Urbanization, Climate change and Digitalization. Further urbanization depends very strong on Smart home & office (DC-Grid) and full scale integrated transportation systems incl. electric and autonomous driving. To stop the Climate Chance we have to enforce the further development of sustainable Energy Supply by Renewables, to improve the energy efficiency in the whole chain of energy flow incl. the consumer equipment and go for a full Electric Society. The digitalization of our society contributes significantly to self-learning systems in our aging population, factory automation, safe and reliable power supply infrastructure from state grid to smart homes, shopping centers as well as the tremendous increase in data centers and health monitoring in all power electronic systems. To serve all of this fields of applications power electronics has become a very innovative technical discipline and thus very attractive for engineer's and the whole power electronics industry. Initiated and directed by these new fields of applications within the last 2 decades we had a complete renewal of power electronics industry and from 2010 to 2019 nine consecutive years of more than 10% annual growth rate. Last year there was a slow down due to political reasons –like trade negotiations between USA and China, Brexit outcome, etc. - and this year we are suffering from an impact of COVID-19 pandemic.

Today we see the first sign that the economy is picking up again. From the history we know that any economic slowdown is triggering new innovations which will be launched in the market during the next upturn. The power semiconductor market prognosis is always a mirror for the power electronics industry. Nevertheless starting from this year the forecast up to 2030 of all market research Institutions show a very nice development of the power semiconductor market revenue. In the next decade the power semiconductor devices based on Si material is having a growth rate of more than 60 % - from 27 Bill US \$ today up to 38 Bill in 2030. It's also interesting to see that Si-based devices are still having a nice further development potential and many companies investing in new production facilities such as the 300mm Wafer fabs. Si based devices will remain the driving force for most application in power

electronics mass market. Of course – and this is also a mirror of this year's PCIM conference - WBG Devices are on top of the technology development. In the meantime we see many emerging applications for WB Devices with outstanding performance and cost benefits on the system level. According the market forecast within the next decade we will have an increase in the revenue by a factor of 12 from 250 Mill US \$ today up to 3 Bill in 2030. 2/3 will be SiC Components and 1/3 GaN Devices.

In addition we have to learn that some segments we are serving with power electronics components and systems are strong governmental regulated e.g. renewable energy generation and E-Mobility. The first push in E-mobility is driven by governmental bonus payments. The free open market will depend very strong on the availability of charging infrastructures, driving range of the car, lifetime of energy storage device and mass production of affordable cars.

For this year PCIM conference again we have seen an increase in the number and quality of papers submitted, and selected the best and most important for inclusion in the program of oral and poster presentations. At this year's event, special focus is paid on technologies for future energy supply systems, E-Mobility including the infrastructure and SMART Battery Management Systems, advanced power converters driven by efficiency and power density. The drivers for these applications include advanced power semiconductor devices based on Si and WBG materials, new materials to improve device and system reliability, and pioneering research on managing parasitic effects in the package and circuit set up. Presentations on intelligent driving of these ultrafast switching devices, digital controlled power converter topologies and control techniques in intelligent motion systems form the backbone of the PCIM Europe Conference. More than 40% of the presentations are covering WBG devices and related emerging application of these. Advanced integrated cooling concepts with new materials on the one side to match the CTE and on the other side with significant elevated operating temperatures. A hot topic this year will be the discussion on ruggedness and reliability of power devices. The first time we implemented a special session on additive manufacturing and 3D printed electronics for ECU's (electronic control units). A special highlight will be Energy storage systems including Battery Management systems and strategies for Battery Lifetime Maximization.

I am convinced that with its high level technical program and discussion platform this year's PCIM Europe Conference will provide you with an overview of the key technology development trends in power electronics and inspire you to pursue new business opportunities.

I wish you an enjoyable and successful conference packed with new ideas for your future business.

*Take care and stay healthy,
Prof. Dr. Lorenz*



Explore our virtual booth
www.infineon.com/pcim

Experience the difference in power!

Our PCIM virtual booth has opened its doors

With the broadest power device portfolio in the industry – spanning silicon, silicon carbide (CoolSiC™) and gallium nitride (CoolGaN™) technologies – we continue to set the pace for power solutions that support innovative design and meet the expectations and demands of modern designers.

- > Visit our virtual booth at www.infineon.com/pcim
- > Scroll through 25 demo stations
- > Sign up for our live sessions on 1-3 July



We are looking forward to welcoming you online!
www.infineon.com/pcim



Detailed Statistics on the PCIM Europe 2019

An increase of visitors and exhibitors as well as high satisfaction rates on all sides confirm that the PCIM Europe, the leading international Exhibition and Conference for Power Electronics and its applications, was a great success.

With 12,182 visitors and 515 exhibitors, this year's PCIM Europe that took place on 7 - 9 May in Nuremberg registered another record result. As far as the Conference is concerned, the numbers were on the same level as the previous year, showing a slight upward trend with 804 international delegates.

More than half of this year's exhibiting companies are based outside of Germany; the number of American enterprises was a remarkable 14%. Furthermore, China, Italy, Great Britain, France and Japan were strongly represented. 76% of the exhibitors rated the PCIM Europe "good" or "very good" and they praised, in particular, the quality of trade visitors at their booths as well as the organization of the event.

The international trade visitors (46%) predominantly came from German-speaking countries, but also from Italy, Great Britain, France and the USA, the large proportion of

decision-makers (79%) mirroring the superior quality of the clientele. 93% of the visitors would recommend the PCIM Europe to others and 75% of them intend to attend the exhibition again next year. Information on new products and trends was the most frequently mentioned objective (74%), followed by exchanging knowledge and experiences (62%), gaining an overview of the market (61%) and maintaining existing / establishing new business relations (57% and 55% respectively).

25,000 m²
Exhibition Area

12,182
Visitors

515
Exhibitors
54% International

Figures
2019

pcim
EUROPE

Save the Date
05 - 07 May 2020

804
Conference Participants

333
Lectures
Conference, Tutorials, Workshops

107
Forum Presentations

mesago
Messe Frankfurt Group

Individual Solutions for Your Success

What you would have seen at PCIM in Nuremberg

TIGRIS 
Elektronik GmbH



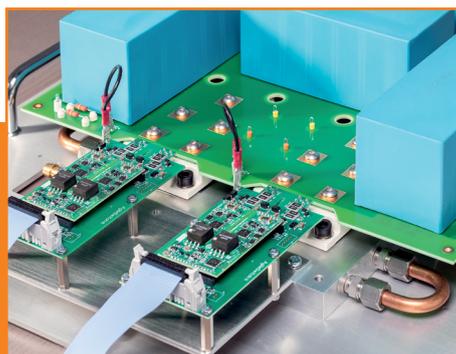
We are focused on individual solutions, tailored to the specific needs of our customers from medicine and industry. **Our work begins with listening.** We develop a detailed understanding of your application. We design and manufacture Power Electric Systems optimally suited to your application. **With commitment and team spirit.** From several watts up to the 1MW range. From a few units per year up to several 1000 units per year. We are certified to ISO 9001 and ISO 13485.

In this ad, you find some examples of our current work. You will find out more on our **special pages** at <http://messe.tigris.eu>, which will be released on July 7, 2020. Welcome to our virtual booth!

What can we do for you?

Just talk to us.
Call us on +49 30 76 88 083 - 0

The team that would have been at the PCIM booth looks forward to your call.



SiC-based converter stage for applications in inductive heating, using advanced SiC half bridge modules from Star Power. The ultra low switching loss of these modules allows efficient operation at higher switching frequencies.



GaN-based output stage for RF surgery applications, with output power up to 150W at 475 kHz. The unique efficiency of the GaN devices enables smaller and quieter surgery equipment.



Medium frequency converter module for advanced welding processes in battery cell production for electric vehicles. 4 of these modules in multiphase operation (600 kW output power each) deliver 2.4 MW with negligible ripple current.

Discover this year's highlights in Si and SiC power modules



CM1200DW-34T

LV100 for industrial and renewable applications, Dual type 7th Generation 1200A/1700V IGBT module with SLC technology

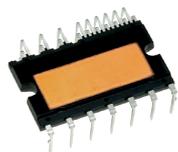
LV100 is the Next Generation Standard Module package for high power. The LV100 package has been optimized for the requirements of industrial and renewable applications. An optimized solution is realized by the utilization of: efficient 7th Gen IGBTs with 1200V and 1700V ratings, thermal cycle failure free SLC (SoLid Cover) package technology, and advanced package layout with the advantages of low stray inductance, easy paralleling and symmetrical current sharing.



N-series 1200V SiC-MOSFET

New discrete SiC MOSFET in TO-247 package

Mitsubishi Electric added the new N-series SiC MOSFETs to the product portfolio. The line-up is divided into three ratings ($R_{DS(on)} = 22\text{ m}\Omega, 40\text{ m}\Omega, 80\text{ m}\Omega$) in the TO-247 package with a blocking voltage of 1200V, which are optionally qualified according to the AEC-Q101 standards. The N-series SiC MOSFETs can be used in applications like solar inverters and on-board chargers for electromobility.



SLIMDIP-W

DIPIPM with RC-IGBT in SLIMDIP package

The high-switching frequency optimized SLIMDIP-W module for home appliances has been released. The integrated drivers and protection functions combined with the RC-IGBT offer a reliable and compact solution for a short time-to-market. The module has a rated 600V blocking voltage and a rated current of 15A.



FMF1200DXZ-24B

2nd generation Dual type 1200A/1200V SiC MOSFET with RTC short-circuit protection

The 2nd gen SiC MOSFET Industrial module for 1200V and 1700V for several applications such as auxiliary supply, elevator, UPS, PV, CT, MRI etc has been released. Mitsubishi Electric's proven 2nd gen planar SiC MOSFET with 2nd gen SiC Schottky barrier diode (SBD) in parallel has been employed to the module. The module is equipped with Real Time Control (RTC) to provide short-circuit protection. The line-up for 1200V has been expanded from 300A up to 1200A widely for several application.

Join our digital
round table
presentations:

Mitsubishi Electric's highlights
of Si and SiC power modules
in a wide range of applications
for a greener tomorrow.

Tue, 07.07.2020, 11:00 am

- 3.3kV and 6.5kV; high power modules with SiC technology
- 7th gen industrial IGBT modules: delivering excellent performance and high reliability
- SLIMDIP-W, a fully integrated motor driver for high switching frequencies
- SiC technology – when the future becomes a reality

Wed, 08.07.2020, 11:00 am

- Power modules for high power and high voltage applications. Continuously striving for perfection
- Industrial LV100, the next generation standard for high power
- DIPIPM product family; green power devices for white goods
- SiC discrete power devices as a flexible and efficient solution for modern applications technology, overview of portfolio

A Lifetime in Power Electronics

My interest in electronics started with the my brother's electric train set – when I was a five years old! That was in the middle of the last century. After becoming an engineer, I spent a quarter of a century in electronic design and applications. During that time I signed on to serve and support PCIM Europe as an advisory board member. I had a great time, starting in the 80s, working with Gerd and Christine Zieroth, the owners and organizers of the Conference and Show, including the PCIM Europe magazine.

My first contact with PCIM Europe was in the very early days in Munich at the Hilton Hotel. The conference was with simultaneous translation into the local languages of attendees. The exhibitors were on a few dozen table tops in the car park of the hotel. Shortly after that PCIM Europe stopped moving around; Nuremberg became the permanent place for PCIM Europe, and that has continued for more than three decades. Since these early days the conference language has been English. The few table tops have expanded to fill four auditoriums.



Power Electronics has become increasingly important, and an emphasis has emerged on improving efficiency. MOSFETs largely replaced bipolar transistors, and then IGBTs were a key innovation in the early 80s. Module packaging development evolved to better serve system requirements. Great improvements have been realized in system efficiency.

During this time I worked for RCA - that became GE, then Harris Semiconductor. We introduced the IGBT into Europe. RCA had called the new device a COMFET, which was in many ways a very apt name, but a joint Committee (JEDEC) compromised on "IGBT". The first volume design that I assisted in (also a first for the world) was a 10 amp device in a variable speed motor drive for a household kitchen appliance at Braun. That technology was based on silicon and is very much still in use.



Now, wide band gap devices show more potential to reduce losses. We have gallium-nitrate (GaN) covering the voltage range up to about 1000 volts and silicon-carbide covering a range from 1000 volts up to several kilo volts. The emphasis in Power Electronics is moving on from silicon - a sea-change is underway.

But PCIM Europe remains as the place for engineers to come together to discuss these technologies, and the progress in system implementation. PCIM Europe, started by Myron Miller in 1979, gave power electronics an identity. Before PCIM, the main interest of the semiconductor industry was focused on the functionality of IC designs.

We all have to work for a better World for our children. Modern electronics helps pave the way in this. The challenges in life are always unknown. The corona virus has taught the world to minimize physical contact, so large events have been cancelled, including PCIM Europe.

For the first time after many decades we will not meet personally in Nuremberg for the Conference and Show. The plan by the current PCIM Europe organizer is a virtual conference and show in July.

I will have my podium discussion, that was planned for May, now virtually in July. Stay tuned to attend the session about wide-band-gap devices – it will be on

Wednesday, the 8th of July

at 12:00 -12:45 for SiC and
at 12:45 -13:30 for GaN.

I am looking forward to “getting together” with you – yes the format is a new challenge, but technology change is an eternal subject.

Continuing through Corona-times, my magazine will present information, always on time, in print and digitally. Bodo's magazine is delivered by postal service to all places in the world. It is the only magazine that spreads technical information on power electronics globally on a monthly basis. You will find all of our content optimized for mobile devices on www.bodospower.com.

Best regards Bodo

Cutting-edge solutions for industrial and automotive applications – powered by ROHM Semiconductor



ROHM Semiconductor Europe was looking forward to welcoming you at its booth at PCIM Europe. Even though we won't be able to meet up personally, we would like to present our cutting-edge solutions for industrial and automotive applications to you.

Our virtual booth provides you with the highlights:

- **Next Generation SiC MOSFETs:** ROHM is shaping the power solutions of the future. Our advanced SiC technology boosts the performance of power systems.
- **GaN HEMT:** GaN devices for the next generation of power devices are in development – extending the offer of high-performance solutions.
- **Gate Drivers for SiC MOSFETs:** The new series of Isolated Gate Driver ICs for power MOSFETs offers new solutions to increase flexibility while improving the design of industrial and automotive power systems.
- **New Super Junction MOSFET Line-up:** ROHM's R6xxxKNx & R6xxxENx series consist of 650V and 600V high-speed switching Super Junction MOSFET products. Both series achieve a higher efficiency via high-speed switching.
- **Automotive IGBT:** ROHM's RGS series consists of an automotive graded switching IGBT with high robustness against short circuit failure.
- **600V IGBT Intelligent Power Module (IPM):** ROHM's BM63xxxS series is an Intelligent Power Module composed of gate drivers, bootstrap diodes, IGBTs, and freewheeling diodes.

Register for our exclusive webinars via our virtual booth:

Tuesday, 7th July, 2pm CEST
ROHM IGBTs – The best fit for HV heaters and e-compressors

Felipe Filsecker, Application Engineer for Power Devices at ROHM Semiconductor Europe, speaks about ROHM's solutions for electric vehicle air-conditioning systems. The webinar targets OEMs that are now thinking of expanding their portfolio to new products, such as high-voltage heaters and e-compressors.

Wednesday, 8th July, 2pm CEST
Gate driving of SiC power devices and ROHM solution

Vikneswaran Thayumanasamy, Application Engineer for Gate Drivers at ROHM Semiconductor Europe, explains SiC power device gate driving challenges and the corresponding solutions ROHM provides.

Start your virtual ROHM tour!



12:00 — 12:45

8 July '20

SiC-Devices - The Game Changers

Language: ENG

*30 mins. Presentation
+ 15 mins. Live Q&A Session*

Efficiency is the most important game changer in systems. Wide Band Gap power semiconductors have paved the way. 16 experts from leading Industry will be part of the presentations and discussions about usage of Wide Band Gap power Semiconductors. 8 experts will present About SiC for the first session and another 8 experts will do the GaN. Efficiency is what counts first in the game.

Invited speakers:

Guy Moxey, Wolfspeed

Anup Bhalla, UnitedSiC

Hugo Guzmán, Littelfuse

Eugen Stumpf, Mitsubishi Electric

Aly Mashaly, ROHM

Andrei Mihaila, ABB

Peter Friedrichs, Infineon

Jan Huijink, WeEn

Subject to changes without notice

12:45 — 13:30

8 July '20

GaN-Devices - The Game Changers

Language: ENG

*30 mins. Presentation
+ 15 mins. Live Q&A Session*

Efficiency is the most important game changer in systems. Wide Band Gap power semiconductors have paved the way. 16 experts from leading Industry will be part of the presentations and discussions about usage of Wide Band Gap power Semiconductors. 8 experts will present About SiC for the first session and another 8 experts will do the GaN. Efficiency is what counts first in the game.

Invited speakers:

Alex Lidow, EPC

Philip Zuk, Transphorm

Tim McDonald, Infineon

Stephen Oliver, Navitas

Balu Balakrishnan, Power Integrations

Jim Witham, GaN Systems

Eric Moreau, Exagan

Ran Soffer, VisIC

Subject to changes without notice

NEXPERIA POWER LIVE EVENT 2-3 JULY

Register now:
nexperia.com/power-event



Automotive



Industrial



GaN



Packaging

Join Nexperia's Power Live Event and watch our resident power experts present a **series of on-demand demonstration videos** across a number of topics in Automotive, Industrial, Gallium Nitride (GaN) and Power packaging. Engage with like-minded people in **live sessions** to discuss common challenges and demands.

▶ **All live sessions and demo content available as recordings following the event at nexperia.com/power-event**

SEE YOU ALSO AT

pcim
EUROPE *...digital days*

nexperia

EFFICIENCY WINS.

PCIM Asia 2020 Postponed to November

The organisers of PCIM Asia have confirmed that the 2020 edition of the fair will now take place from 16 – 18 November due in part to disruptions to international travel resulting from the COVID-19 outbreak. Scheduled to take place in early July in Shanghai, the exhibition and conference for power electronics, intelligent motion, renewable energy and energy management will now be held four months later, remaining at the Shanghai World Expo Exhibition and Convention Center.



Mr Louis Leung, Deputy General Manager of Guangzhou Guangya Messe Frankfurt Co Ltd commented on the decision: “We have been working tirelessly over the last few months to try to keep the original July date, but

after consulting with our stakeholders, we believe it is best to delay the fair until later in the year to minimise the risk, while the autumn timing will help to facilitate the industry’s recovery. Especially given the worldwide profile of the exhibitors and conference speakers, postponing the fair until November gives us more confidence that we can host a well-rounded, international event at this time. These extra few months will ensure that more of our overseas stakeholders can travel to Shanghai at this time. Furthermore, given PCIM Europe 2020 will now take place digitally from 7 – 8 July, we feel it’s important to provide a meeting place this year to further assist with the industry’s recovery.”

PCIM Asia is a specialised event for power electronics, intelligent motion, renewable energy and energy management. In 2019, the fair hosted 81 exhibitors and 6,358 visitors from around the world, while 46 papers were presented to 407 attendees at the concurrent PCIM Asia Conference. Mr Leung continued: “Earlier in the year both the exhibitor and visitor registrations for the fair were tracking around 15-20% ahead of last year, while we also expected the conference participation to increase, however with the COVID-19 outbreak the situation will now be different. We are still confident however that the November date will be a success as the industry will be looking to bounce back as things return to normal later in the year.”

IEEE 2nd Global Power, Energy and Communication Conference

Online Conference

October 20-23, 2020

Organizers

Technical Co-Sponsors

Important Dates

Full Paper Submission:	July 17, 2020
Notification of Acceptance:	August 30, 2020
Final Paper Submission:	September 18, 2020

IEEE GPECOM2020 - www.gpecom.org/2020 - info@gpecom.org



IXYS
A Littelfuse Technology



POWER SEMICONDUCTOR SOLUTIONS FOR YOUR MOST CHALLENGING DESIGNS

We Can Help

Your single source for the broadest portfolio of advanced power semiconductor technologies.

- Customizable solutions to fit your needs
- Global product and applications support
- 90+ years of innovation and engineering expertise



Littelfuse can help you design the right power semiconductor solution for your application.

Request a Design Consultation at:
[Littelfuse.com/requestconsultation](https://www.littelfuse.com/requestconsultation)

SEE US AT PCIM EUROPE DIGITAL DAYS | July 7-8

The higher standard of DC/DC power supplies.



**Low Ripple
High Stability
High Efficiency
Competitive Pricing**

Outputs up to 6kV @ 30W
Lead times stock to 3 weeks
Samples are available now

Dean Technology's new UMR Collection of high voltage power supplies is a **form-fit-function replacement** for industry standard modules at a competitive cost. UMR performance meets and often exceeds similar offerings, making them the **best value available**.

The first UMR Collection includes three full product series in two package sizes, as biasing or capacitor charging variations.

**Contact DTI today to discuss
your high voltage design.**

DEAN
TECHNOLOGY

+1.972.248.7691 || www.deantechnology.com



Vincotech

JOIN US AT **PCIM** **DIGITAL DAYS** ON JULY 7-8th

You're there, we're here, but we can still chat over a cup of java.

If we can't meet in person, then **let's talk online at the PCIM Digital Days** about bringing your best ideas to life, fast and flexibly. Whatever your application may be – motion control, solar, power supply – our experts will be standing by to help you find a solution that fits. **Let's talk shop at PCIM!**

Visit our website at www.vincotech.com/PCIM to have us send a bag of Vincotech coffee straight to your home, free of charge.

**CHECK
OUT!**

www.vincotech.com/flow-S3

THE NEW BASEPLATE-LESS,
MEDIUM-POWER flow S3



EMPOWERING YOUR IDEAS