

# ETG

ENERGY TECHNOLOGY  
SOCIETY OF VDE

International Conference

PROGRAM

## CIPS 2002

Second International  
Conference on  
Integrated Power Systems

- June 11 – 12, 2002
- Hotel Maritim, Bremen, Germany

<http://www.vde.com/cips2002>



# VDE

## CIPS 2002, June 11-12, 2002

2<sup>nd</sup> International Conference on Integrated Power Systems  
Bremen, Germany

### Organized by

The conference is organized by ETG, the Energy Technology Society of VDE, sponsored by

- IEEE German Section
- Bremen Center of Mechatronics (BCM),  
Microsystem Center Bremen (MCB), (University of Bremen)
- VDE/VDI Society Microelectronics, Micro- and Precision  
Engineering (GMM)
- Infineon Technologies AG, Munich
- Power Electronics Europe (PEE), Munich

VDE, the Association for Electrical, Electronic & Information Technologies is one of the largest technical and scientific associations in Europe with more than 35,000 members.

Not only engineers belong to the VDE but also scientists of various other disciplines, students and over 1.200 companies in the electrical, electronic and information technology industry, the electric utilities, federal authorities and institutions.

### Chairmen's Message

We are pleased to invite you to CIPS 2002, the second International Conference on Integrated Power Systems in Bremen.

Power electronics development during the next two decades will be driven by requirements for intelligent energy management, improved power quality and system miniaturization at a high level of reliability. This will be achieved by the high technology level in monolithic and hybrid system integration, as well as new power semiconductor concepts and new ideas on packaging.

Power electronics represents a strategically important prerequisite for innovations and competitiveness in industrial electronic home appliances, automotive electronics and high density power conversion.

The intelligent actuator with communication modems requires integration of highly sophisticated microelectronics with optimised power electronic components integrated in a mechanical system. While the system integration in automobile application



has already achieved a high level, we are right at the beginning concerning system integration in industrial applications.

A completely new approach, with many different applications is the monolithic integration of circuit topologies in the voltage range up to 600V. The preferred solution for high power systems is the hybrid integration of optimised power components and microelectronic ICs.

This new Conference on Integrated Power Systems (CIPS) should become a platform where experts, working in these areas, have the chance to discuss their results and get new ideas for future ways of system integration. To meet the high requirements of CIPS we asked experts working in the field of

- power electronic system development
- power semiconductor development
- IC design
- mechanical engineering

to give their statements and to present their suggestions for future developments.

The conference will cover four **main topics**:

- Integration of Power Electronic Systems at High Power Densities
- Power Integration Technologies
- Integration of Power Electronic Systems in Medium and Low Power Motor Drive Units
- Hybrid or Monolithic Integrated Power Electronic Systems in Automotive Applications

Beside papers showing key technologies, there is a strong focus on panel discussions. In CIPS 2002 the "Rap Session" will especially focus on technologies for High Power Densities.

Participants of the conference are invited to present their ideas and experience in the area of system integration.

The Program Committee and the organisers are pleased to welcome you at the second International CIPS Conference 2002 in Bremen.

Leo Lorenz  
Vice General Chairman

Dieter Silber  
Technical Chairman

## General Chairman

J. Daan van Wyk, Virginia Polytechnic Institute and State University (USA)

## Vice General Chairman

Leo Lorenz, Infineon Technologies (D)

## Technical Chairman

Dieter Silber, University of Bremen (D)

## International Technical and Scientific Committee

<i>Gehan A. J. Amaratunga</i>	University of Cambridge (GB)
<i>Josef Avenwedde</i>	Miele (D)
<i>A. Binder</i>	University of Darmstadt (D)
<i>R. W. De Doncker</i>	University of Aachen (D)
<i>Taylor Efland</i>	Texas Instruments (USA)
<i>Tatsuhiko Fujihira</i>	Fuji Electric (J)
<i>Rupprecht Gabriel</i>	D-Tech (D)
<i>Phil Hower</i>	Texas Instruments Unitrode (USA)
<i>André Jaecklin</i>	ABB/ETH Zürich (CH)
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<i>Leo Lorenz</i>	Infineon Technologies (D)
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<i>Peter Mutschler</i>	University of Darmstadt (D)
<i>Satoshi Mori</i>	Melco (D)
<i>Akio Nakagawa</i>	Toshiba (J)
<i>Bernhard Piepenbreier</i>	University of Erlangen (D)
<i>Erio M. Reniero</i>	Elektrolux (I)
<i>Eberhard Schmid</i>	Bosch (D)
<i>Dirk Schröder</i>	University of Munich (D)
<i>Ayman Shibib</i>	Agere Systems (USA)
<i>Dieter Silber</i>	University of Bremen (D)
<i>Roland Sittig</i>	University of Braunschweig (D)
<i>Michael Stoisiek</i>	University of Erlangen (D)
<i>Hans-Dieter Stölting</i>	University of Hannover
<i>Hiroshi Tadano</i>	Toyota Central (J)
<i>Bernhard A. Thomas</i>	DaimlerChrysler (D)
<i>Werner Tursky</i>	Semikron (D)
<i>Holger Vogt</i>	Fraunhofer Institute (D)
<i>Armin Wagner</i>	BMW (D)
<i>Albert Wick</i>	Siemens (D)
<i>Richard K. Williams</i>	Advanced Analogic Techn. (USA)
<i>Eckhard Wolfgang</i>	Siemens (D)

## Conference topics

### First topic:

#### **Integration of Power Electronic Systems at High Power Densities**

- Power converter topologies for high power density
- Ultracompact power electronic systems
- System packaging concepts for high power density DC/DC converters
- High density integration of passive components
- High temperature power electronics
- Modularisation and integration trends

### Second topic:

#### **Power Integration Technologies**

- New developments in Silicon-on-Insulator smart power integration
- Development aspects of integrated components
- Joining technology with improved reliability

### Third topic:

#### **Integration of Power Electronic Systems in Medium and Low Power Motor Drive Units**

- Developments for white goods applications
- Developments in intelligent power products
- IGBT driver concepts
- Aspects on integrated inverter motors

### Fourth topic:

#### **Hybrid or Monolithic Integrated Power Electronic Systems in Automotive Applications**

- System-on-Chip power ICs for automotive applications
- Key features of smart power technology for automotive electronics
- Advanced electronic systems for middle and upper class cars
- Intelligent power ICs and surge protection ICs
- Developments towards electric vehicles



## RAP Session

Technologies for high power densities

### Who should attend

The conference will be a technical and scientific forum for engineers engaged in

- System development
- Component development
- Research
- Application

## Venue

The "Maritim Hotel and Congress-Centrum Bremen" presents first-class congress facilities, just three minutes' walk away from the main railway station. The international airport is linked to major european cities.

As the "Bürgerpark" and the "Altstadt" (Old Town of Bremen) are within view, it is convenient to start for a relaxing walk in between. A visit to the historical Market Square and a tour through the picturesque alleys of the "Schnoor" district are just two examples of the varied cultural attractions Bremen has to offer.

In the past 1.200 years, Bremen has played a major role among the towns of the medieval Hanseatic League and became city republic in the tradition of an important trading centre.

Further information may be obtained from:  
[www.Bremen-tourism.de](http://www.Bremen-tourism.de)

## ACTUATOR 2002

In parallel to CIPS 2002 ACTUATOR 2002 the 8<sup>th</sup> International Conference on New Actuators and the 2<sup>nd</sup> International Exhibition on Smart Actuators and Drive Systems takes place at the same venue. This is an unique chance to experience theoretical discussions and practical applicaton side by side and between researchers and field engineers.

- The 8th International Conference on New Actuators provides a major meeting place for the exchange of information on new results from the research and development of high-technology actuators and their implementation into new products.
- The 2<sup>nd</sup> International Exhibition on Smart Actuators and Drive Systems will present components, system approaches and applications of smart actuators, low-power electromagnetic drives and related topics. The enlarged range of topics also includes measurement techniques, control concepts and units, system integration, CAD tools etc.
- Further information may be obtained from the organiser:

MESSE BREMEN GmbH  
 Bürgerweide  
 D-28209 Bremen, Germany  
 Phone: +49 (0421) 35 05-363  
 Fax: +49 (0421) 35 05-340  
 E-mail: [actuator@messe-bremen.de](mailto:actuator@messe-bremen.de)  
 Internet: <http://www.actuator.de>

Registered participants of CIPS 2002 may take advantage of a 50 percent discount when wising ACTUATOR 2002.

**Tuesday, June 11, 2002**

- 8:30 – 8:45**     **Conference Opening**  
*J. Daan van Wyk, Virginia Polytechnic Institute and State University, USA*
- Session 1**     **Integration of Power Electronic Systems at High Power Densities 1**
- 8:45 – 9:30**     **Keynote paper:**  
**Modularization and Integration as a Future Approach for Power Electronics Systems**  
*F. C. Lee, J. Daan van Wyk, D. Boroyevich, P. Barbosa, Virginia Polytechnic Institute and State University, USA*
- 9:30 – 10:00**     **Review:**  
**Ultracompact Power Electronics**  
*J. W. Kolar, ETH Zurich, CH*
- 10:00 -10:30**     **Review:**  
**Review of the Development of High Density Integrated Technology for Electromagnetic Power Passives**  
*J. D. van Wyk, J. T. Strydom, L. Zhao, R. Chen, Virginia Polytechnic Institute and State University, USA*
- 10:30 – 11:00**     **Coffee break**



**Session 2      Integration of Power Electronic Systems  
at High Power Densities 2**

- 11:00 – 11:30    *Review:***  
**Three-Dimensional Integration based on  
Power Module Technology**  
*J. A. Ferreira, M. B. Gerber,  
Delft University of Technology, NL*
- 11:30 – 12:00    *Review:***  
**High Temperature Power Electronics:  
Challenges and Chances**  
*E. Wolfgang, Siemens AG, München, D*
- 12:00 – 12:25    An Integrated Resonant Module for a  
100 kW 800 V 3-Phase ZCT Inverter**  
*L. Zhao, J. T. Strydom, J. D. van Wyk, Virgi-  
nia Polytechnic Institute and State University,  
USA*
- 12:25 – 12:50    Power Supply Technology for  
High Power Density**  
*R. Weger, M. Schlenk, Minibea, Augsburg, D*
- 12:50 – 14:20    Lunch**

**Session 3      Power Integration Technologies**

- 14:20 – 14:45    Optimization of Planar Inductors**  
*E. van Jaarsveld, W. A. Cronje, I. W. Hofsaier,  
Rand Afrikaans University, RSA*
- 14:45 – 15:10    Integrated Power Filters Utilizing  
Skin- and Proximity Effect Based  
Low-Pass Interconnects**  
*J. D. van Wyk Jr., W. A. Cronje, Rand  
Afrikaans University, RSA, J. D. van Wyk,  
P. J. Wolmarans, Virginia Polytechnic and  
State University, Blacksburg, USA, C. K.  
Campbell, McMaster University, CA*
- 15:10 – 15:35    High Voltage Smart Power IC's with  
Dielectric Isolation**  
*R. Lerner, U. Eckholdt, X-Fab Semiconductor  
Foundries AG, Erfurt, J. Knopke, alpha micro-  
electronics GmbH, Frankfurt/Oder, D*

- 15:35 – 16:00** **New Level Shift Transistors in 600 V-Smart Power ICs using Thin-Film SOI-Technology**  
*R. Rudolf, V. Boguszewicz, R. Buckhorst, F. Michalzik, D. Priefert, Hanning Elektro-Werke, Duisburg, D*
- 16:00 –16:25** **Low Temperature Joining Technique for Improved Reliability**  
*C. Mertens, R. Sittig, Technical University Braunschweig, D*
- 16:25 – 16:50** **Coffee break**
- 16:50 – 18:15** **Rap Session: Technologies for High Power Densities**  
*Chairman: G. Amaratunga, University of Cambridge, UK*
- 19:30 – 21:00** **Welcome Reception**

## Wednesday, June 12, 2002

### Session 4 **Integration of Power Electronic Systems in Medium and Low Power Motor Drive Units**

- 8:15 – 8:40** **Characteristics and Benefits of Variable Speed Drives Applied to Domestic Refrigerator Compressors**  
*M. G. Schwarz, R. Rengel, embraco, BR*
- 8:40 – 9:05** **New 600 V Compact Intelligent Power Modules Econo IPMs**  
*H.Thomas, Fuji Electric GmbH, Frankfurt, D, D. Y. Kusunoki, N. Matsuda, M. Watanabe, T. Fujihira, Matsumoto Branch, Fuji Hitachi Power Semiconductor Co, Ltd, Nagano, J*
- 9:05 – 9:30** **New IGBT-Driver with Independent  $dv/dt$ - and  $di/dt$ -Feedback-Control for Optimized Switching Behavior**  
*C. Dörlemann, J. Melbert, Ruhr-University Bochum, D*



**9:30 – 9:55 Thermal Aspects on Integrated Inverter Motors**

*E. Schimanek, M. März,  
Fraunhofer Institut IIS-B, Erlangen, D*

**9:55 – 10:20 Active and Integrated Power – Agile Solutions for Low Power Drives Systems**

*M. Tønnes, Danfoss Low Power Drives,  
P. Thøgersen, Danfoss Drives, Graasten,  
F. Blaabjerg, Aalborg University, DK*

**10:20 – 10:50 Coffee break**

**Session 5 Hybrid or Monolithic Integrated Power Electronic Systems in Automotive Applications 1**

**10:50 – 11:30 *Review:***

**Advanced Automotive SOC (System On Chip) Power IC's**

*T. R. Efland, R. Teggatz, J. Devore, Texas Instruments, Dallas, USA*

**11:30 – 11:55 Surge Protection IC for the Switch Interface of ECUs**

*K. Yoshida, S. Kiuchi, T. Ichimura, N. Yaezawa, S. Furuhata, T. Fujihira, Fuji Hitachi Power Semiconductor Co., Ltd, Nagano, J*

**11:55 – 12:20 SOI Intelligent Power IC Technology for Automotive Electronics**

*M. Iida, DENSO Corporation, Aichi-ken, J*

**12:20 – 12:45 Key Features of a Smart Power Technology for Automotive Electronics**

*J. Busch, M. Denison, G. Groos, H. Gruber, R. Hofmann, A. Meiser, P. Nelle, W. Schwetlick, R. Weeger, M. Stecher, Infineon Technologies, München, D*

**12:45 – 14:20 Lunch**

**Session 6      Hybrid or Monolithic Integrated Power  
Electronic Systems in Automotive  
Applications 2**

- 14:20 – 14:45    Sensorless Current Mode Control for  
Automotive Applications**  
*K. Kaschani, Infineon Technologies,  
München, D*
- 14:45 – 15:10    A 42V Powernet Concept for Soft Hybrids,  
Next Step towards the Electric Vehicle**  
*S. Bolz, R. Knorr, G. Lugert,  
Siemens Automotive AG, D*
- 15:10 – 15:35    Optimal Rating of the Electric Drive in a  
Hybrid Vehicle**  
*A. Kleimaier, D. Schröder, Technical University  
Munich, D*
- 15:35 – 16:00    Evolution of Door Electronic for Middle-  
and Upper Class Cars and how  
Semiconductor Companies Cope with  
these Challenging Requirements**  
*H. Sax, STMicroelectronics GmbH,  
Grasbrunn, D*
- 16:00            End of Sessions**

## General information

### Registration

For registration, participants incl. authors are requested to use the attached registration form and to send it to the secretariat's address mentioned below. To enjoy the early bird registration fee and to appear on the list of the participants, the registration must be received before May 24, 2002. To register, each form must be accompanied by the corresponding credit card information. When applying for reduced fees please add copy of membership card/student certification.

### Conference Secretariat

VDE – Conference Department

Stresemannallee 15

60596 Frankfurt

Germany

Phone: +49 (069) 63 08-477 and 202

Fax: +49 (069) 96 31-52 13

E-mail: [vde-conferences@vde.com](mailto:vde-conferences@vde.com)

Internet: <http://www.vde.com>

### On-site Registration

Conference registration on-site opens on Tuesday, June 11, 2002 at 7:30 h. The registration desk will be located at the entrance of the conference area.

### Opening Hours of the Conference Office

Tuesday 7:30 – 18:15 h

Wednesday 7:30 – 16:00 h

### Venue

Messe Bremen GmbH

Bürgerweide

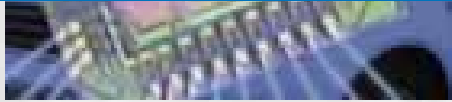
D-28209 Bremen

Germany

Phone: +49 (0421)-3505 230

Fax: +49 (0421)-3505 340

Internet: <http://www.messe-bremen.de>



**Registration fees**

	Reg. before May 24, 2002	Reg. from May 24, 2002
Member of VDE/EUREL/IEEE	€ 550.–	€ 650.–
Corporate VDE-Member	€ 580.–	€ 680.–
Non member	€ 610.–	€ 710.–
Member of University*, Author	€ 280.–	€ 330.–
Student	€ 50.–	€ 70.–
VDE-Young Member (no proceedings)	free of charge	
Additional copy of proceedings incl. CD-ROM	€ 30.–	€ 40.–

\*Member of VDE only

**The full conference registration fee includes:**

- Admission to all technical sessions.
- One copy of the CIPS 2002 proceedings incl. CD-ROM.
- Coffee breaks
- Lunch
- The Welcome Reception.

Student and VDE-Young Member fees include admission to all technical sessions, but not the proceedings and CD-ROM.

Participants of ACTUATOR 2002 may take advantage of a 50 percent reduction on the registration fee. Please add copy of registration of Actuator 2002 when registering for CIPS 2002.

**Payment**

Payment for registration must be made in Euro (€). The conference fee has to be fully paid in advance by credit card. On-site registrations have to be paid by Credit-card, cheque or cash in Euro.

**Cancellation**

Cancellations by written notice notified before May 24, 2002, may receive a full reimbursement of paid registration fees with deduction of € 50.– for handling costs. After this date no refund will be granted. Proceedings and CD-ROM will then be sent to the registrant after the conference.

**Proceedings**

Each participant will receive a printed copy of the proceedings incl. CD-ROM on-site. Additional copies of the proceedings will be on sale during and after the conference.

### **Badges**

A badge will be issued to each participant, which gives access to the conference sessions. It shall be worn throughout the conference period and during all social events.

The badges, the lists of participants and the proceedings will be available one hour before the conference begins in the conference office.

### **Conference languages**

The conference language is English.

### **Accommodation**

Accommodation will be available in the Hotel Maritim adjacent to the conference centre and other hotels of various categories close to the venue.

A limited number of rooms has been reserved at the Hotel Maritim Bremen. As participants of the exhibition "Actuator" require hotel capacity during this period it is advisable to book well in advance.

Accommodation may be ordered through  
Bremer Touristik Zentrale GmbH  
Hillmannplatz 6  
D-28195 Bremen  
Germany  
Phone: +49 (0421)-30 80 00  
Fax: +49 (0421)-30 800 89  
E-mail: [btz@bremen-tourism.de](mailto:btz@bremen-tourism.de)  
Internet: <http://www.bremen-tourism.de>

Hotel reservations shall be made not later than May 12, 2002 to ensure that rooms will be available in the required category. The hotel registration form included in this booklet shall be mailed or faxed directly to the hotel agency.

### **Car parking**

Parking space is available around the venue.

### **Liability/Insurance**

The organiser cannot assume responsibility whatsoever for damage or injury to persons or property during the conference. It is recommended to arrange for your own travel and health insurance.

### **Formalities/Visa**

Some foreign nationals may require entry visas to Germany. Please check this matter right in time with the German Embassy or German Consulate in your country. They will help you to complete the required entry formalities.

The VDE Conference Department will issue a "Confirmation of Registration" after having received a completed registration including full payment. Please note, that VDE or the organising bodies cannot issue any "Invitation".

### **Weather**

Weather in June is moderate, with daily temperatures between 15 and 25°C. However, evenings are cool sometimes. Rain is not uncommon, so be prepared!

### **Messages for Conference participants**

Messages destined to CIPS 2002 participants, may be made from June 11 to 12 from 8:00 to 18:00 h by:

Phone/Fax: +49 (0421)- 3789-710

E-mail: [VDE\\_Tagungen@compuserve.com](mailto:VDE_Tagungen@compuserve.com)

### **Electricity/Phone Patch**

The mains power supply is 230 VAC, 50 Hz. Authors presenting from their laptop are kindly asked to have suitable connectors available for the mains. Phone patch may be made by using Texas or TAE 6 (German Phone Standard) to connect the phone net. Connectors are available at most international airports or department stores.

### **Audio/Visual Equipment**

For presentations of the authors OH-projectors and beamer are available. Please check your equipment (laptops, chargers etc.) right in advance to avoid delays in presentations.

### **Important Addresses**

Pre-registration CIPS 2002 Secretariat

VDE – Conference Department

Stresemannallee 15

60596 Frankfurt

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Phone: +49 (0 69)-63 08-477 and 202

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[vde-conferences@vde.com](mailto:vde-conferences@vde.com)

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### **Conference Office for ACTUATOR 2002**

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### **Tourist Information**

Bremer Touristik Zentrale GmbH  
Hillmannplatz 6  
28195 Bremen  
Germany  
Phone: +49 (0421)-30 80 00  
Fax: +49 (0421)-30 800 89  
btz@bremen-tourism.de  
<http://www.bremen-tourism.de>

### **Welcome Reception at Historic Town Hall**

On Tuesday, June 11, 2002, 19:30 - 21:00 hrs, the Minister of Commerce of Bremen invites all registered participants of CIPS 2002 and ACTUATOR 2002 for a reception at the Historic Town Hall. Snacks and beverages will be served.