Foreword

Foreword to Special Issue on Power Devices

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The advance of electronics technology through semiconductor ICs has brought about great changes in all our lives, for instance making it possible to obtain information instantly from all over the world. In the car as well, the application of electronics technology also has progressed, so that now a car cannot be built without it.

Originally, the car was a moving vehicle whose main functions were running, turning and stopping, accomplishing this mainly with a combustion energy source. Now, electronics technology makes it possible for the car to move more safely and comfortably because of the accuracy and the exactness of the electric control systems. The automatically driven car will no longer be merely a dream in the near future.

On the other hand, not only to control the car but also to control the energy used by the car, electronics has become to be used. This is especially true in a hybrid electric vehicle where one of the power sources driving the car is an electric motor. This fact shows that the semiconductor devices have expanded from supporting roles in control mechanisms to leading roles in the car, now directly handling the energy. Electrical energy has the advantages of good controllability and handling efficiency, and has become indispensable in the car. Electrical energy supplied to not only many actuators but also to the ITS system, safety systems, and other systems, is the "*Blut*" of the car, so to speak. In turn, it can be said that the power semiconductor device that sends off the electrical energy to control systems is the "*Herz*".

Recently, the environment-friendly hybrid vehicle "Prius" is gaining a place in markets all over the world because of the rise everywhere in concern for the environment. Its place in markets now is not as a special car but rather as a high performance car with two energy sources. The development of this high performance hybrid electric vehicle was made possible by new power semiconductor devices. Development of power electronics in the car has just started, and it is expected to develop further in the future. The hybrid electric vehicle should keep developing into a still more pleasant vehicle to drive and ride, and a vehicle still more friendly to the environment, for this reason.