Special Feature Director in Charge of Research and Development Speaks with Engineers

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Initiatives to accelerate innovation to become a major global player

Personal roles and experiences within ROHM

Hattori I am a Product Marketing Engineer (PME) of power management ICs for automotive and consumer/industrial equipment. My main job is to assess market and customer needs to conduct product and strategy planning such as determining what products should be released to the market at what time, and what kind of products with specific strengths we can plan by utilizing ROHM's technologies and resources. The main issue that I am facing right now is how to depict a winning story in the product field that I am in charge of, as it is becoming a commodity with no major differences from our competitors in terms of product characteristics, and prices are becoming the deciding factor in many cases.

I felt I grew most when I was transferred to ROHM's sales office in Germany. For seven years from 2015, I was in charge of development projects with overseas customers in Germany and technical support work. I had been doing the same work for many years in Japan, but at the beginning my language ability was insufficient and there were also differences in how people approach work and their values, so I really struggled to communicate with customers and local team members. By frequently engaging in communication and carefully conveying my thoughts and feelings, I think I was able to gradually earn their trust. The experience of launching projects after overcoming various hardships became a source of great confidence.

Takei I am in charge of the development of the BCD line, which is our main manufacturing line for analog power IC products. Because the power conversion and control required for ROHM's mainstay ICs such as power supplies and motors need to transmit power externally, power wiring technology for the conductor section is also an important technology. There were two challenges in developing the copper wiring and wireless flip chip package. First, both technologies were extremely susceptible to thermal stress, which made the chips prone to cracking. In addition, because two different departments work on the chip manufacturing process and the assembly process, it was difficult to determine which was the cause when cracks occurred. When cracks occurred during initial development, sure enough it was a problem to figure out which section was the cause. However, the team at this time straddled the manufacturing department on the plant side and the assembly department on the package side. Therefore, the perspective on the problem was not which side was to blame, so each side did what they could to make improvements: the package side changed the resin and frame structure, while the chip side changed the wiring structure and established restrictions in the design rules. In this way, we were able to establish a robust technology that exceeded the temperature cycle test required by the "AEC-Q100" test standard for automotive electronic components several times over. I was so happy when it was decided that the product which used this technology would enter mass production, and it was a special experience in which we were able to achieve our goal as one team.

Nakaoka I work in the Product Development Division where I develop isolated gate driver IC products for traction inverters used in electric vehicles and hybrid vehicles. I am deeply moved whenever I see a vehicle that is equipped with the IC that I developed, and it is a moment in which I feel a sense of purpose in my work. This is because during the development of the IC, malfunctions occurred due to switching noise in the SiC power device. I was unable to determine what path the noise was propagating along and what kinds of voltage and current fluctuations were occurring, and I had a hard time solving it. I believe that overcoming that hardship and reaching mass production was very important for my growth.

Tateishi PMEs, such as Mr. Hattori, are focused on customers, which originates from the fact that solving customer problems is most important. However, what is difficult about this approach is that if, for example, you make a custom product according to what a customer specified, you will find yourself in a situation where you cannot sell that product to other customers. The customers are also competing with each other, and they have similar requirements, so it is most desirable to support different requirements with the same product. If you can find commonalities among individually different requirements and create a good plan, perhaps it will be worth doing. In addition, an understanding of overseas culture is important as we aim to become a major global player by 2030. I myself have experience working overseas for about four and a half years. Each country has completely different ways of thinking, and it is difficult to convey polite expressions and nuances in a foreign language. I think that, if possible, you should go overseas and accumulate such experiences, and I hope to promote such opportunities at ROHM. As Mr. Takei mentioned, I think that engineers working together is extremely important. I tell employees that they should also understand skills that are adjacent to their own expertise so as to be able to hold a discussion with engineers. When explaining what you would like them to do, you will not be able to convey your desires unless you use the right words. That is even more true overseas and it is essential for ROHM to become a major global player. ROHM has been supported by Superman employees who know everything, but now there is a movement to develop human resources with enhanced expertise. In such a case, gaps will appear between areas of expertise, so I would like to consider how we can fill those gaps with employees. Finally, the joy of social implementation that Ms. Nakaoka mentioned is the real thrill of manufacturing. That is what it means to "contribute to the advancement and progress of culture," which is our Company Mission. The ability to engage in such work is a privilege for engineers, and I will also strive to create such an environment.

Nakaoka You mentioned that it is desirable to support different requirements with the same product, but when it comes to cost competition, for example, I think that the survivor will be the one who can reduce functions to the extreme and win on cost competitiveness. What is your opinion, Mr. Tateishi?

Tateishi The answer to that is extremely clear. The number one priority is to lower the cost, and I think that we should limit the included functions to a minimum. However, our goal is to satisfy the requirements of many customers. If we have customers A, B, and C, then they each have their own requirements, and we probably won't be able to sell the product if we include everything. That is because the price will increase. In fact, the key to solving their common problems may lie in what the three customers requested. Market requirements are also market challenges, so in that respect, each customer is saying, "If we could do this, then the problem will be solved," so that is why they are asking us to make the product. The root of the problems are the same, and in some cases, the challenges that the market is currently facing will emerge. If the solution that you come up with meets the requirements of customers A, B, and C, then that will become an amazing product and plan. Market requirements do not refer to individual requirements, and you must determine what the real challenge is. I think that a company that can create products without overlooking that fact will become stronger.

What values does ROHM create and what social issues does ROHM face?

Takei ROHM's Management Vision states that we "solve social problems by contributing to our customers' needs for "energy savings" and "miniaturization" of their products." ROHM's wide range of products help improve energy efficiency, reduce the environmental load, and improve safety through robot automation and vehicle electrification, and they all provide energy savings and miniaturization. Although my job is not about products but building process lines, I conduct my work based on the idea that all of the products that we are developing solve social problems.

Nakaoka Isolated gate driver ICs, which I am now developing, are important components for electric vehicles and hybrid vehicles, so it can be said that the product development itself is helping to solve global warming, air pollution, and other environmental problems. I also think that in order to contribute to energy savings and miniaturization as stated in our Management Vision, the establishment of switching technologies that can maximize the performance of power devices in particular makes isolated gate driver ICs valuable technologies. We are now confronting social issues by developing such technologies.

Hattori When it comes to the power management ICs that I am in charge of, their power consumption is increasing year by year due to the electrification and higher functionality of vehicles. Therefore, I believe that my mission is to plan devices with higher efficiency and lower power consumption and supply them to the market. In recent years, ROHM has leveraged its IDM strengths to create and expand the Nano power supply series. Going forward, I hope to produce unprecedented technologies and products that leverage ROHM's strengths through the continued unification of development and manufacturing.

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Tateishi President Matsumoto often says that for a company, sales are the total amount of its social contribution. Sales increase because there are people who need the products, and it can be said that increasing sales is one form of social contribution. The three of you are in charge of power-related products, and as the world becomes increasingly electrified, it can be said that the development that each of you is engaged in is connected to energy saving because motors are often used in power consumption. Technological progress is connected to resource and energy saving from a sustainable perspective as well. Therefore, I would like engineers to realize that all of their work is connected to social contribution.

Corporate culture and personnel systems that produce innovation

Tateishi In order to produce innovation, I am thinking as a member of the board that I would like to train more engineers with a higher level of expertise than we have now. As I mentioned earlier, engineers that can do anything like Superman are certainly amazing, but some jobs suit people while others do not. My job is not to provide the same career path to every employee but to prepare various career paths and offer an environment that accepts diverse human resources and lets them decide which direction they want to take. They can choose to thoroughly investigate one area or broadly learn all of the technologies and then decide what they can do. Naturally, they can also be a Superman type of engineer who can handle anything. I would like us to have various types of engineers in order to consider how we can combine technologies to produce better products. When experts in the same field gather together, their perspective tends to narrow. In some cases, innovation is created by asking questions from a completely different field with a different point of view. I think that it is important to create an environment where experts can connect with one another and give each other advice based on different ideas.

Nakaoka As Mr. Tateishi mentioned, I think that it is a very good idea to experience everything and discover what you are good at. I believe that innovation might be something that is first discovered when seriously facing problems and issues that are encountered in customer and internal interactions. From my younger days, I have been given the chance to experience meetings and in-person tests with customers and confronted many problems. I believe that thinking seriously and solving the issues together in such situations led to innovation. Going forward, I hope that ROHM will continue to be the kind of company where employees can experience various situations.

Hattori I also think that we should further increase the number of engineers with a high level of expertise. For roughly 10 years after joining the company, I was in charge of designing power management ICs, but at the time there were no specialized positions such as PMEs or FAEs, and all of the designers were in charge of everything from product planning to customer support after mass production. I was able to gain a broad range of knowledge and experience through various duties, but I myself was unable to pursue one area to the point where I could say that I was an expert. To beat the competition in terms of technology and product appeal in the future, I believe that we need to nurture engineers who have developed a higher level of expertise in each field.

Takei I think that there are two important points. First, I think that we should increase and hire more Ph.D.s with high-level expertise. Next, we need to build an organization for them to create innovation. As Mr. Tateishi mentioned, innovation is not created from homogeneity. If we can bring together people who possess various types of expertise with other people who conversely know and can connect a broad range of technologies and build an organization that can trigger a chemical reaction like a crucible, then innovation may spring up on its own.

Tateishi I think that innovation is created because there are various ways of thinking, and if we do not accept diversity, the chances of finding a direction that matches oneself will decrease. Working with a sense of enjoyment extends one's capabilities, and I think that there are many instances in which work actually becomes enjoyable, so I would like to provide various directions for all of the employees. However, it is not easy to cultivate experts. For example, even if someone studies technology at a university, the specialized courses last for two years. Considering the fact that even if someone joins the company and works for two years, we still cannot say that they are an expert. I wonder how much time it takes to cultivate a true expert. At the same time, there are many people who unexpectedly find their work enjoyable once they start and continue doing it for a long time. After all, it is important to provide various chances, so I hope to increase diversity going forward. As Ms. Nakaoka mentioned, innovation is created from solving problems. Solving problems makes yourself happy as well as the customers. That is the true nature of work. In some cases, solving a problem can take one or two years. In such a case, I think it would be a good idea, for example, to transfer to R&D for a year or two to solve the problem and then return to the LSI business unit. We have received such proposals from R&D, and I feel that it would be good to have such employees. The cause of the cracking problem that Mr. Takei described can be largely understood by conducting a thorough stress analysis. An expert within the LSI business unit could undertake that stress analysis, but it would be good to have diversity by having R&D undertake such work. Increasing fluidity in terms of regions such as Japan and overseas and cross-organizational fluidity within the company would likely increase opportunities for growth, so I hope that ROHM will move in such a direction.

Career vision for becoming a major global player

Takei The semiconductor industry is a B2B business, and because in my case I am in charge of developing elements and lines for product manufacturing, while I am not specifically involved in finished products, it can also be said that I am involved in every finished product. It is important that PMEs like Mr. Hattori carefully listen to market and customer opinions, and that Ms. Nakaoka's department determines the necessary characteristics and specifications to turn those requirements into a specific product, and communicate that information to our departments. At that time, we must proceed with the development in the spirit of making what the customer requires instead of what ROHM is capable of making. We will need to build that system. I am the type of person who wants to understand technology broadly rather than dig deeply into one topic, so I would like to contribute to the company and society as an engineer and leader with a broader range of skills than now.

Nakaoka Going forward, I would like to continue to be engaged in the product development of isolated gate driver ICs. With the increasing demand for SiC power devices, I would like to develop isolated gate driver ICs that can produce even greater performance. My goal is to become an engineer that customers think of first when they have a problem with isolated gate driver ICs. Therefore, I wish to continue to work with our customers to solve the problems that they face.

Hattori I hope to further increase my expertise as a PME and be involved in planning and strategizing products and technologies that leverage ROHM's strengths. Although I've said it before, when it comes to the power management ICs that I am currently in charge of, I see that they are becoming commodities with no major differences in terms of characteristics and functions with products from our competitors, and in an increasing number of cases the deciding factors are the variety of product lineups and the price. To escape from this situation, I am working every day to find a new path to victory. Furthermore, in April we absorbed LAPIS Technology Co., Ltd., which was a wholly owned subsidiary. I expect that collaborative plans with their technologies and products will emerge in the future, and I hope to be involved in the creation of such new products and technologies for ROHM. In addition, to achieve ROHM's goal of becoming a major global player and reaching net sales of one trillion yen, I hope to be posted overseas again, apply my experiences and knowledge, and help increase our overseas sales through business and product planning for overseas customers.

Tateishi Engineers tend to concentrate on organic growth, and sometimes it is difficult to ask them what else they can do. However, there are also competitors in a product line who appear from an unexpected direction. While there is a tendency to create something new as an extension of a technology that you already have, in many cases when we lose, a formidable opponent suddenly appears from a completely different direction with a similar but different technology. The flip chip mentioned by Mr. Takei is precisely a small example of that phenomenon. Wire bonding was used for many years in assembling packages when all of a sudden, the flip chip technology appeared. Despite improvements in wire bonding technology with the introduction of copper wire, we are no longer competitive. Engineers must be strongly aware that such game-changing technologies will invariably appear. When a disruptive technology emerges, it is very difficult to continue winning with a continuous technology. As digital technologies appear going forward, there will be some domains where we cannot win with analog control alone. POL power supplies for servers are a field where digital technologies are quickly introduced, and it is an issue that ROHM has not been able to provide support even though the market is growing. I expect innovation to be created through synergistic effects between the digital technologies of LAPIS Technology, which is now part of ROHM, and the analog technologies possessed by ROHM. However, what is concerning is the fact that the technologies are strong because they are continuous. In other words, determination has become important. Determining how far we can go with continuous technologies and where different technologies may emerge from is the job of PMEs like Mr. Hattori. Solving customer needs is certainly important, but if that is all we are doing, a good proposal may be produced by one of our competitors and they may simply take our customers. There's nothing unusual about that. We need to not only solve needs but also create innovation with seed technologies and deploy a solution proposal-based business. I want the engineers to be aware that continuous and disruptive technologies always come by turns. When engineers are dropped into a different environment, even if they are bewildered at first, they may think up something amazing after about two years. We need to think about placing people in such non-organic environments and accelerating innovation to become a major global player.