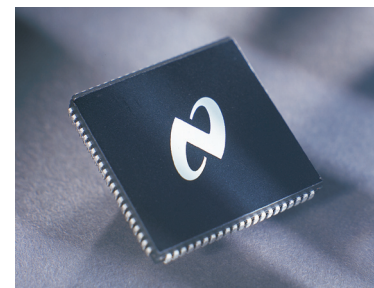




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NATIONAL SEMICONDUCTOR



CHALLENGE

Help high-technology manufacturing operations use Six Sigma methodology to reduce variation among processes, reduce waste and extend tool life.

SOLUTION

Use JMP to allow all levels of practitioners to perform analyses easily and consistently to contribute to the Six Sigma effort.

RESULTS

Dramatic breakthroughs in manufacturing performance that saved the company thousands of dollars and led to subsequent Six Sigma efforts using JMP throughout the company.

MORE INFORMATION

www.jmp.com
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**STATISTICAL
DISCOVERY.™
FROM SAS.**

National Semiconductor Corporation

JMP® software, National Semiconductor Corporation and Thomas A. Little Consulting align to achieve significant results from Six Sigma® initiative

The practice of Six Sigma® really works. It takes an organization that is willing to dedicate time and resources to the cause, a consultant with a fundamental understanding of the business challenge coupled with a comprehensive Six Sigma curriculum aimed at the right people, and a versatile statistical analysis tool that provides the methods and details to generate results.

Fifty-two projects result in multi-million dollar savings

National Semiconductor Corporation's (National) manufacturing arm is known as the Central Technology & Manufacturing Group (CTMG). Comprised of three wafer fabs (Texas, Maine, United Kingdom), three international assembly sites (Singapore, Malaysia, China), and the CTMG group at headquarters in Santa Clara, Calif., National's manufacturing organization reported multi-million dollar savings to the bottom line, and tens of millions in soft dollar savings (cost avoidance, incremental revenue) at the conclusion of its Six Sigma initiative. During the first wave, 52 projects were completed to achieve a 72% project success rate. Sixteen black belts and 62 green belts, who led and contributed to these projects, were trained and supported by Thomas A. Little Consulting (TLC).

JMP® chosen for superior analytics

National's various product offerings reflect its focus on analog chips, which transform physical information—light, sound, pressure, and radio waves – into data that electronic systems, such as cell phones, flat-panel displays and computers, can use. National's chips include stand-alone devices and sub-systems in the areas of power management, display drivers, audio, amplifiers and data conversion.

During production of each of these products, JMP® software, a statistical analysis package, helps National analyze and understand what drives performance by identifying product sensitivities and the root cause of manufacturing inefficiencies. JMP provides a unique environment that allows Six Sigma practitioners to customize the software and adapt it to meet the widely varying needs of the people working in the organization.

"JMP's analytical component is superior to the other software packages we considered," said Mark Seay, Director of Quality for National. "We analyzed the same data with several statistical analysis packages and found that JMP provided a more comprehensive solution for our needs." Seay added, "Now

“JMP speeds up the overall deployment of Six Sigma as well as simplifies and standardizes many of the steps used in Six Sigma data analysis.”

Tom Little
President of Thomas A. Little Consulting

all of our manufacturing sites are using JMP, and we found that deployment was faster from both an ease-of-use and technical standpoint.”

“JMP software’s ease-of-use and analytical power makes it the ideal analytical engine to use for Six Sigma,” said Tom Little, President of Thomas A. Little Consulting. “JMP speeds up the overall deployment of Six Sigma as well as simplifies and standardizes many of the steps used in Six Sigma data analysis.”

Challenges became opportunities for success

National wanted quick penetration and results from its Six Sigma initiative. To achieve success, there were three challenges that required attention. First, each CTMG site had its own continuous process improvement approach, but the business processes were not tracked and measured consistently across facilities. With the help of TLC, it was determined that there was upwards of 30%–50% waste in some of the critical CTMG processes. Second, challenges persisted to secure dedicated resources to manage the Six Sigma projects and maintain the discipline and rigor of following and reviewing new business practices. Finally, the value of Six Sigma to the organization had to be proven.

Six Sigma® training key to first wave results

Thomas A. Little Consulting worked with National to set up the infrastructure for its Six Sigma initiative in the CTMG organization. The consultants developed the roadmap for deploying Six Sigma across multiple CTMG sites, and provided the training, status updates, and

management support to bring each project to completion. TLC conducted the management overviews, Champion training, DMAIC training, and provided direct Master Black Belt project support. Software training for features like JMP Design of Experiments (DOE) and JMP Scripting Language (JSL) were also part of the implementation.

Using JMP’s unique DOE capabilities, National experienced dramatic breakthroughs in performance. The results were increased throughput, speed and operating efficiency of its machines, all while maintaining equal or better quality products. DOE experiments saved the company thousands of dollars by reducing variation among processes and extending tool life.

As part of the implementation, TLC generated scripts using JSL to standardize and automate reports in the Improve and Control phases of Six Sigma. The scripts simplified tasks and helped novices perform analyses easily and consistently.

“TLC did a fantastic job deploying wave one of our Six Sigma initiative,” said Mark Seay. “Its team was very knowledgeable and applied the software and Six Sigma methodology very quickly in the context of our own projects, which adds value for our engineers.”

The projects launched in wave one focused on ways CTMG could streamline processes, increase productivity, use equipment more efficiently, extend the life of the product, and control costs. Certain projects identified ways in which CTMG could reduce defects and increase yield. “With the help of TLC, we’re using JMP in areas we would have never thought to apply it,” Mark

Seay said. “In a data-rich environment, it is sometimes hard to make sense of all the information. This is where JMP’s depth of features is great.”

Michael Haslam, Master Black Belt, said, “JMP’s speed is spectacular. It provides instant gratification by helping us identify more yield improvement opportunities. JMP provides better exploration of data, and as a result we were able to break a barrier and improve yields by one percent in the first wave of our Six Sigma implementation.”

Collaboration streamlines problem solving

Thomas A. Little Consulting and JMP software help National Semiconductor understand its manufacturing process variability and core process capabilities through Six Sigma projects. TLC is the expert at helping National define the problem and prioritize tasks to generate the most immediate return on investment. Once the areas for improvement have been isolated, JMP drives performance by providing the statistical analysis tools needed to diagnose the root cause of inefficiencies and help reduce process variability.

“A consultant’s success is often determined by the flexibility and support of the client management team,” said Tom Little, President of TLC. “The management of National Worldwide Quality Network supported our efforts by reinforcing the need to embrace the same strategy and toolset across the organization. The benefits of Six Sigma are far reaching, and it requires everyone involved to work towards a common goal.”

It is this progress that reinforces the advantages of Six Sigma and furthers the support and commitment from other divisions, like National's Audio Products Group, maker of the Boomer™, sound drivers and audio amplifiers. This group plans to select several products and conduct a Six Sigma pilot program in fiscal year 2005 that streamlines the process for its New Product Phase Review System, or NPPRS. Results will be presented at the end of the 2005 fiscal year with a goal of then implementing the Six Sigma program across other product lines.

Customers benefit from improved quality

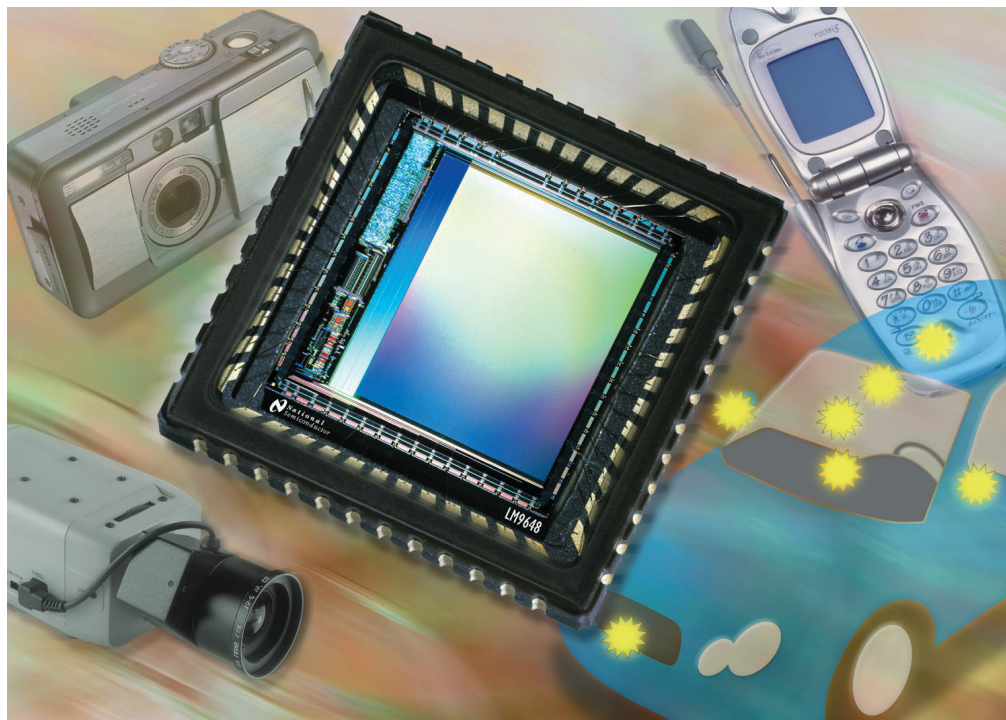
National Semiconductor's Six Sigma initiative gives the company an edge over its competition. The focus on quality positions National as a forerunner in customer satisfaction in terms of product packaging, including features, services, performance and overall product availability.

"We've designed JMP to help companies discover their potential," said John Sall, Founder of JMP, a business unit of SAS, "and with the expertise of consultants like TLC, the possibilities for breakthrough advances are countless. We are proud of JMP's contribution to the savings announced by National during wave one and look forward to supporting their ongoing needs."

Looking ahead

Wave two of National's Six Sigma initiative launched in March 2004. Fifty-six projects are scheduled, four of which are aimed at global improvements and nine that will target customer satisfaction and quality. The goal is continued improvement in manufacturing and a migration into Six Sigma for transactional processes. A pilot project is also under way in product engineering to evaluate prototypes and determine which designs to pursue for commercial release.

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