

Prapagorn Dangbunjong 2010: Defect Reduction in Wire Bond Process by Applying the Design of Experiment : A Case Study in a Semiconductor Factory.

Master of Engineering (Industrial Engineering), Major Field: Industrial Engineering, Department of Industrial Engineering. Thesis Advisor: Associate Professor Prapaisri Sudasna-na-Ayudhya, Ph.D. 161 pages.

According to the semiconductor factory, there are a lot of defects in the wire bond process. The objective of the paper is to apply the design and analysis of experiment for studying factors that cause a rejection of UTLP product. At present, the UTLP product has the highest rejection rate. After the preliminary analysis of rejection products, we found that damage caused by BNS (Bump ball non-stick on bond pad) has the highest rejection about 3,500 ppm. The target of the improvement is to be lower than 1,000 ppm. The design of experiment was conducted to find the most appropriate parameter setting to gain the higher value of bond shear strength in wire bond process by the Taguchi method at significance level of 0.05. The result indicated that factors affect bond shear strength are Force Base, Loop Base, Power Base, Ball Offset and Time Base. The 5 factor significant factors are then investigated further using  $3^5$  Factorial Design to find the optimal factors values.

The new parameter settings result in the real production improvement and the new mean of bond shear strength is 53.261 grams which can produce the quality product within the specification. From the result of this study, the rejection of BNS was reduced from 2,150 ppm to 747 ppm.

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