

COMPARISON OF 2K FACTORIAL AND TAGUCHI METHOD TO OPTIMIZE DESIGN PARAMETERS FOR QFN STACKED DIE

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ABSTRACT

Several optimization techniques are available in the literature and most of them are based on statistical treatments. Optimization technique helps to identify optimal design parameters in design work. This study used the 2k factorial method to determine optimised design parameters. The control factors used in this study comprise of bottom die thickness, bottom die are, a top die thickness and top die area. Finite Element Analysis (FEA) was used as the simulation tool to simulate responses. The result was then compared to another study based on Taguchi method. The comparison shows that the 2k Method give better optimised parameters.

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REFERENCES

- [1]. S. Gordon and S. Robert, (1970); Optimization: Theory and Practice, *Mc-GrawHill Inc.*
- [2]. S. Andradottir, (1990); A New Algorithm for Stochastic Approximations, *Proceedings of The 1990 Winter Simulation Conference*, pp 1364-1366.
- [3]. S. Andradottir, (1991); A Projected Stochastic Approximation Algorithm, *Proceedings of The 1991 Winter Simulation Conference*, pp 954-957.
- [4]. V.L. Vysypkov, Y.A. Merkur'-ev and L.A. Rastrigin, Optimization of Discrete Simulation Systems, *Avtomatikai Vycheslitel'naya Tekhnika*, pp13-25.
- [5]. A. Gaivoronski, Optimization of Stochastic Discrete Event Dynamic Systems: A Survey of Some Recent Result, *Proceedings of the Workshop on Simulation and Optimization*, pp 24-44.
- [6]. R. Sen and T. Swaminathan,(1997); Application of Response Surface Methodology to Evaluate the Optimum Environmental Conditions for The Enhanced Production of Surfactin, *Applied Microbiology Biotechnology*, pp 358-36.
- [7]. J. Lau and C. Chang, (2000); Taguchi Design of Experiment for Wafer Bumping by Stencil Printing, *2000 Electronic Components and Technology Conference*. Pp 1705-1711.
- [8]. S.M. Xavier and C. Yvan, (1992); Wire Bonding Machine Optimization Using Taguchi Method, *IEEE/ISHM '92 IEMT Symposium-Germany*, pp 74-83.
- [9]. G.B. Robert and E.E. Matthew, Robust Design: An Experiment-Based Approach to Design for Reliability.
- [10]. J.L. Lin, K.S. Wong, B.H. Yan and Y.S. Tarng, Optimization of The Electrical Discharge Machining Process Based on The Taguchi Method with Fuzzy Logic, *Journals of Materials Processing Technology*, pp 48-55.

- [11]. T.Y. Tee, H.S. Ng, J.E. Luan, X. Zhang, K.Y. Goh, A.M. Grech, and R. Duca, (2005) 4-Dimensional Design Analysis and Optimization of System-in-Package. *2005 Electronics Packaging Technology Conference*.
- [12]. S.G. Jagarkal, M.M Hossain and D. Agonefer, (2004); Design Optimization and Reliability of PWB Level Electronic Package, *204 Inter Society Conference on Thermal Phenomena*, pp 368-376.
- [13]. R. Plieninger, M. Dittes and K. Pressel, (2006); Modern IC Packaging Trends and their Reliability Implications, *Microelectronic Reliability*, pp 1868-1873.
- [14]. C.C. Ng and G. Govindasamy, (2005); Thermal Simulation and Transient CFD Analysis of Stacked Die QFN Package, *5th ASEAN ANSYS User Conference 2005*, pp. 179-186.
- [15]. T.Y. Tee, H.S. Ng and J.L. Diot, (2002); Comprehensive Design Analysis of QFN and Power QFN Packages for Enhanced Board Level Solder Joint Reliability, *2002 Electronics Components and Technology Conference*, pp 985-991.
- [16]. M.M. Hossain, Y. Lee, R. Akhter and D. Agonofer, (2006); Reliability of Stack Packaging Varying the Die Stacking Architectures for Flash Memory Application, *22nd IEEE SEMI-THERM Symposium*, pp 222-230.
- [17]. A. Mertol, (May 2000); Application of the Taguchi Method to Chip Scale Package (CSP) Design, *IEEE Transaction on Advanced Packaging*, Vol. **23**, No. 2, pp 266 – 276.