

**WARPAGE AND WIRE SWEEP ANALYSIS OF QFN MOLDED ARRAY STRIP  
USING MODELING AND EXPERIMENTAL METHODS**

I. Abdullah, I. Ahmad, M. Z. M. Talib, N. N. Bachok,  
U. Mokhtar and A.E. Said

*Faculty of Engineering, Universiti Kebangsaan Malaysia  
43600 UKM Bangi, Selangor*

**ABSTRACT**

In this paper, both experimental and modeling works were resorted to analyze the warpage and wire sweep of QFN molded strip. The effect of QFN package size was investigated to provide the relation between warpage and metal to mold compound ratio. Design guideline for optimum metal to mold compound ratio has been obtained. Nonlinear large deformation of finite element analysis has been performed to investigate the effect of die size and mold compound material properties on the warpage and stress induced. Thermal loading was applied to simulate the cooling process after molding stage. For wire sweep analysis, full factorial design is performed by using three factors, i.e. transfer time, transfer force, and two types of mold compound. The detailed result was shown that the new mold compound induced lower die stress but slightly higher wire sweep than current material.

<http://journal.masshp.net/wp-content/uploads/Journal/2008/Jilid%202/I.%20Abdullah%20153-163.pdf>

**REFERENCES**

- [1]. G. Kelly, C. Lyden, W. Lawton, and J. Barrett, (1996); Importance of Molding Compound Chemical Shrinkage in the Stress and Warpage Analysis of PQFP's, *IEEE Trans-CPMT*, **19**, 296-300.
- [2]. C.C. Ng, and M.Z. Meor Talib, (2006); Thermo-Mechanical Stress Analysis of Power QFN Package, 6<sup>th</sup> *ASEAN ANSYS User Conference*, Singapore.
- [3]. C.C. Ng, (2001); Approximations and Limitations of Finite Element Analysis in Electronic Packaging, *International Conference on Advances in Packaging*, Singapore, 202-209.
- [4]. K. Oota, and K. Shigeno, (1995); Development of Molding Compounds for BGA, 45<sup>th</sup> *Electronic Components and Technology Conference*, USA, 78-85.
- [5]. D.C. Montgomery, (2002); 5th Edition Design and Analysis of Experiments, *John Wiley & Sons, Inc.*, 242 – 244.