

**STRUCTURAL ANALYSIS OF LEAD FRAME DESIGN OF DUAL
ROW QUAD FLAT NO LEAD PACKAGE (QFN) USING ANSYS**

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ABSTRACT

This study presents the mechanical characteristics on the stress of the Dual Row Quad Flat No Lead (DR-QFN) of a 44 lead DR-QFN package on the staggered lead frame design and 48 lead DR- QFN package on the inline lead frame design. The steady-state structural analysis of DR-QFN package with different lead frame design is performed using ANSYS software. Reducing the lead frame thickness is the other technique presented in this study. This is to analyze the stress behavior in the DR-QFN package. The 3D models used in this study were built using finite element method with SOLID 70 and MESH 200 element types. From the study, results show that thinner lead frame gives a smaller value of stress. DR-QFN package with lead frame thickness of 0.15 mm has about 6% smaller value of stress compared to package with lead frame thickness of 0.20 mm. For lead frame configuration analysis, staggered and inline lead frame design, the staggered configuration has about 0.55% smaller value of stress compared to inline configuration.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The technology especially in the mobile applications is becoming faster than we can imagine as the consumers nowadays are getting more particular in the size and weight that is not only on the cost and functionality of electronic gadgets. Quad flat no lead is one of the package types that usually be used in the electronic industry. The QFN is the future generation technology for non-consumer electronic that is suitable with the concern of reliability and others [2]. As a low-cost solution for electronics applications, the QFN packages are always being used because they have low pin-count requirement and it is one of the package technologies that is made with planar copper lead frame substrate [4, 15].

The QFN package is also in the group of Quad Flat Package (QFP) but the difference is the QFN doesn't have the leads that extend out from the package sides. This is the advantage for the QFN but it also can be the disadvantage because it is difficult to hand-solder. A QFN is very similar to a Ball Grid Array (BGA) but the QFN has the different that uses landing pads, and solder paste are required to mount a QFN package onto package onto the PCB. For BGA-package, it does not require any solder because the balls will melt and make the connection with the PCB [4].