VIBRATION ANALYSIS FOR CIRCUIT BOARDS ON HAND-HELD POWER TOOLS

Francisco López Jiménez

ABSTRACT

Although the main concern for reliability in electronic design has traditionally been the thermal effects related to heat dissipation, vibration and other mechanical ways of excitation are becoming a serious source of failure. The growing use of electronics in industry and its application to new work enviroments expose the PCBs to harsh vibration and shock conditions, so especial care must be taken during the design stage.

The different standards available provide with the different testing requirements for electronic structures, but not with the ways to assure their fulfillment. This thesis intends to be the starting point of a reference guide for the proper design of printed circuit boards from the point of view of their mechanical reliability, focusing on both vibration and shock.

The contents of this guide include basic theoretical foundations of the mechanical process involved, as well as the different techniques available for the increase of reliability. Experimental testing has been conducted to support some of the theoretical results, including the validation of a simple but effective dynamic model for PCBs. The thesis also outlines the future work suggested to complete the usefulness of the guide from the point of view of a company.

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