

Data Envelopment Analysis for Optimizing Multi-Response Quality Problems in IC Packaging Process

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ABSTRACT

The Integrated-Circuit (IC) industry is one of the most important industries for economic growth in many countries. The IC packaging process plays a key role to improving the IC product quality. The quality response for the IC packaging process is multi-dimensional. How to effectively investigate the multi-response quality problem for finding an optimum parameter combination in the IC packaging process is a challenging and valuable task.

In this study, the multi-response quality problem is analyzed for the IC packaging process for setting up control factors and response variables. The Taguchi parameter design method is then used to provide a robust experimental design. Eighteen parameter combinations for this experiment are adapted to perform experiments for obtaining multiple quality responses. Then a super-efficiency data envelopment analysis model is provided for completely ranking each parameter combination.

Real-world experiment data from a local IC packaging foundry is provided to implement the proposed approach. The proposed DEA model is used to solve the multi-response quality problem and obtain an optimum parameter combination using these experiment data. Results from this study indicate that the developed approach can provide a better parameter combination with highly quality level for multiple response variables.

Keywords: Data envelopment analysis, Multi-response quality problem, IC packaging process.