

CHARACTERIZATION OF IDC FEF FINGERS FOR PH SENSOR

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ABSTRACT

This paper presents a study of making a pH sensor by using planar fringing field effect. This FEF sensor study is carried out by using Inter Digital Capacitor (IDC) technique on Printed Circuit Board (PCB). The main objective is to investigate the effectiveness of using IDC in order to reduce the cost of making pH sensor. This study focused on the effect of using different number of width between finger, length of finger, medium, and effect of ground. This paper also presents simulation and experimental data to characterize the sensor. In addition, the effect of series the IDC also been studied experimentally. The results show that the trend pattern of both simulation and experiment are similar and for the series IDC, the capacitance is decreasing as the number of series IDC increased.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

In past five decades, Inter Digital Capacitor (IDC) has been involved in many sensing applications. Properties of the IDC also have been studied by many authors and have shown high performance when being used as sensors involved with many scientific applications [1]. For example, interdigitated sensors are used in telecommunications, biotechnology, chemical sensing, dielectric imaging and acoustic sensors applications.

The simple method of realizing a capacitor in a coplanar wave guide is by providing a slot in the middle of the conductive strip. This will act like a parallel plate capacitor; the capacitance of a parallel plate capacitor is a direct function of the cross sectional area of the conductor, cross sectional area of the strip line of the coplanar wave guide is very small, so it is not possible to realize required value of capacitance using this method [2]. The area of interaction can be improved by incorporating a comb structured electrode in between the strip. Fig. 1 shows the basic structure of comb structured electrode applied to IDC.

PCB is an electronic assembly which is plugged into the main frame assembly of a complex electronic device or which may be used as the principle element of a simple electronic device. [3]. PCBs are inexpensive, and can be highly reliable. They require much more layout effort and higher initial cost than either wire wrap or point-to-point construction, but are much cheaper and faster for high-volume production [4].