

Dedication

.... I dedicate this work to

My parents

My wife

My daughter

Siddiek

Kardaman and his family

And to all

those I love

Acknowledgement

To my supervisors, to the staff of the laser institute, to all those who had been of great help to me through my studies, whatever kind of helps I would like here to express my gratitude and appreciation for their aid and guidance

Abstract

In this work, the I-V characteristics of the silicon diode were investigated by applying 5W from CW Nd: YAG laser for 10, 20, and 30 seconds, respectively. The results showed that different exposure times changed the biasing voltage of the diode from 0.7V to 0.65V only. In case of silicon transistor and operational amplifier, the results also showed that the output signal did not changed or distorted, although they were exposed to high power from CW Nd:YAG laser reached to 70W.

Trimming of fixed carbon resistors using the same Nd:YAG laser with powers of 20,25, and 30W and exposure times of 1,2,,3,5, and 10 seconds for several times, gave different resistance values .

The results illustrated that low power and long exposure time (longer than 10 seconds) changed the resistor value gradually so it can be controlled to reach the value that is suitable for specific application.

الخلاصة

في هذا البحث تم فحص خصائص الجهد والتيار للثنائي السيليكوني بتسليط قدرة قدرها 5 واط من ليزر النديميوم- ياك المستمر (1.064 مايكرومتر) بأزمان تعريض مختلفة قدرها 10, 20, و 30 ثانية على التوالي .

النتائج المتحصل عليها أظهرت تغيرا في جهد الانحياز الأمامي للثنائي السيليكوني من 0.7 فولت الي 0.65 فولت فقط مما يعني عدم وجود تأثير محسوس للليزر في هذه الحالة.

في حالة الترانزستور (يعمل كمكبر) و المكبر التشغيلي أوضحت نتائج التشعيع بنفس الليزر أن اشارة خرج كل من الترانزستور و المكبر التشغيلي لم تتغير أو يحدث بها تشوه على الرغم من أن قدرة الليزر المسلطة على كل منهما وصلت الي 70 واط.

تشذيب المقاومات الكربونية الثابتة باستخدام نفس ليزر النديميوم- ياك المستمر بقدرات 20, 25, و 30 واط وازمان تعريض (أو تشعيع) 1, 2, 3, 5, و 10ثواني أعطي قيم مختلفة للمقاومة.

أوضحت النتائج ان اسخدام قدرة قليلة من الليزر (20 واط) وزمن تعريض أطول من 10 ثواني يغير قيمة المقاوة تدريجياً بحيث يمكن التحكم بقيمة المقاومة وصولاً الي القيمة المناسبة للتطبيق المعين .

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