

應用於植入式人工視網膜晶片之CMOS影像
感測技術及電極改良與設計

THE DESIGN AND IMPROVEMENT OF ELECTRODES
WITH CMOS IMAGE SENSOR FOR IMPLANTED
SUBRETINAL PROSTHESES

專 題 生： 莊櫟

指導教授：吳重雨

Institute of Electronics and Department of Electronics
Engineering
National Chiao Tung University
Hsinchu, TAIWAN

OUR RESULT

Motivation

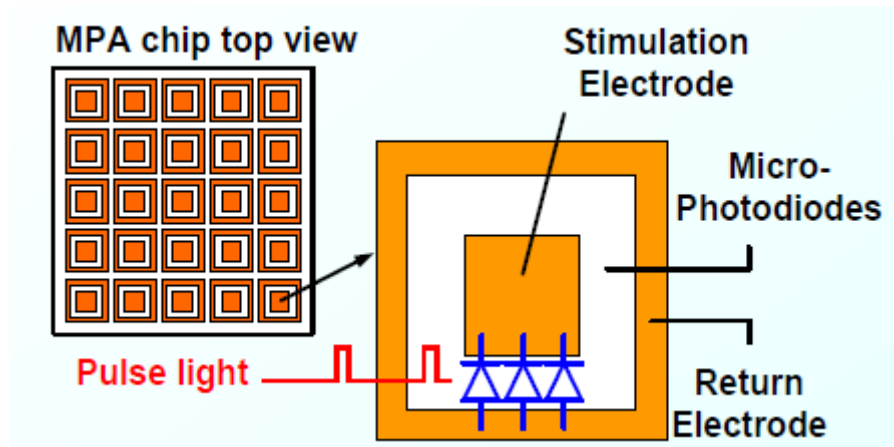
■ Enter the laboratory

- We're interested in biomedical electronics, especially implanted subretinal prostheses

■ Improve and design electrodes

- Area of the original electrodes is large.
- The shape of the original electrodes is like “回”.

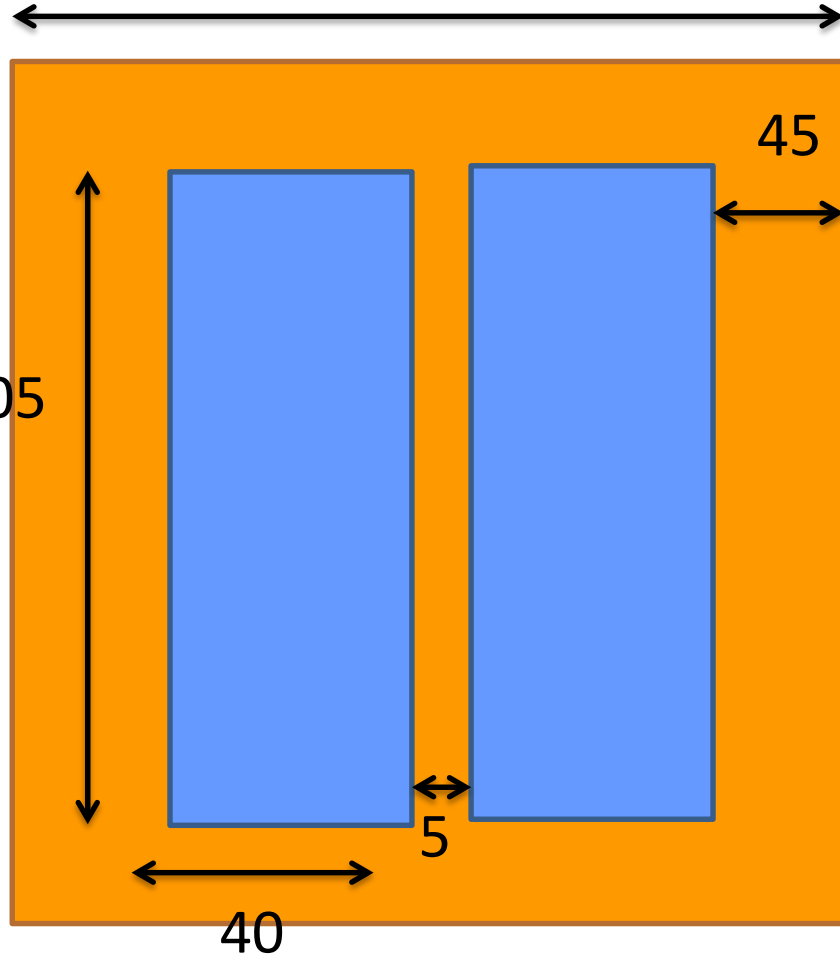
That would make the current of stimulation electrode and return electrode unequal.



OUR RESULT

.Our design of electrodes

■ Design #1 175

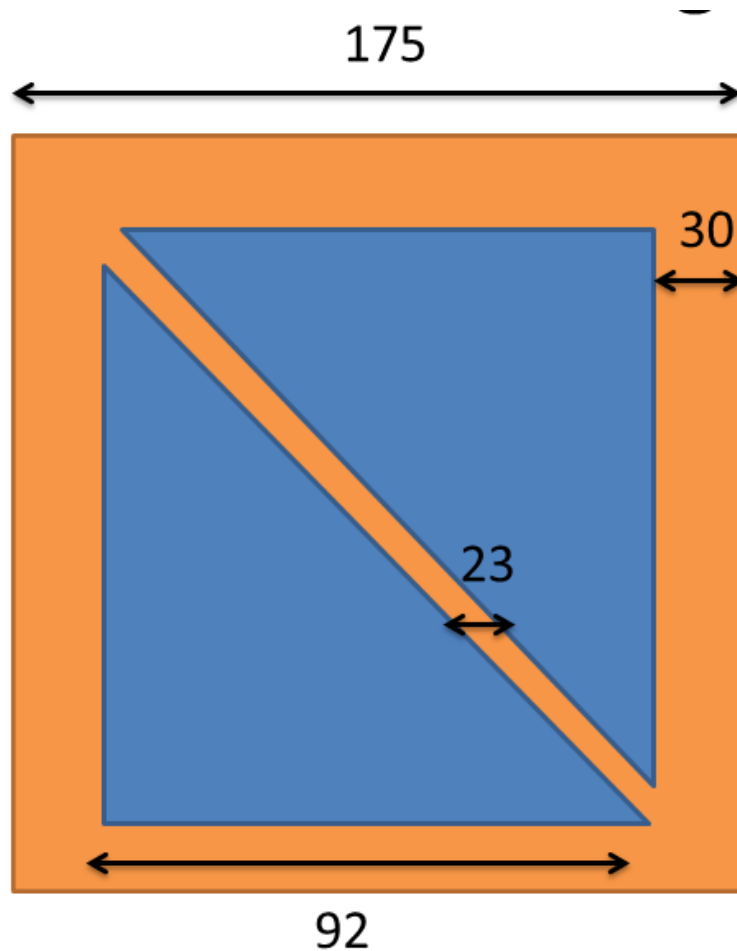


Pixel width	175 μm
Diode area	22185 μm^2
Electrode width	40 μm
Electrode length	105 μm
Gap of electrodes	5 μm
Area	4220*2 μm^2

III. OUR RESULT

Our design of electrodes

■ Design #2

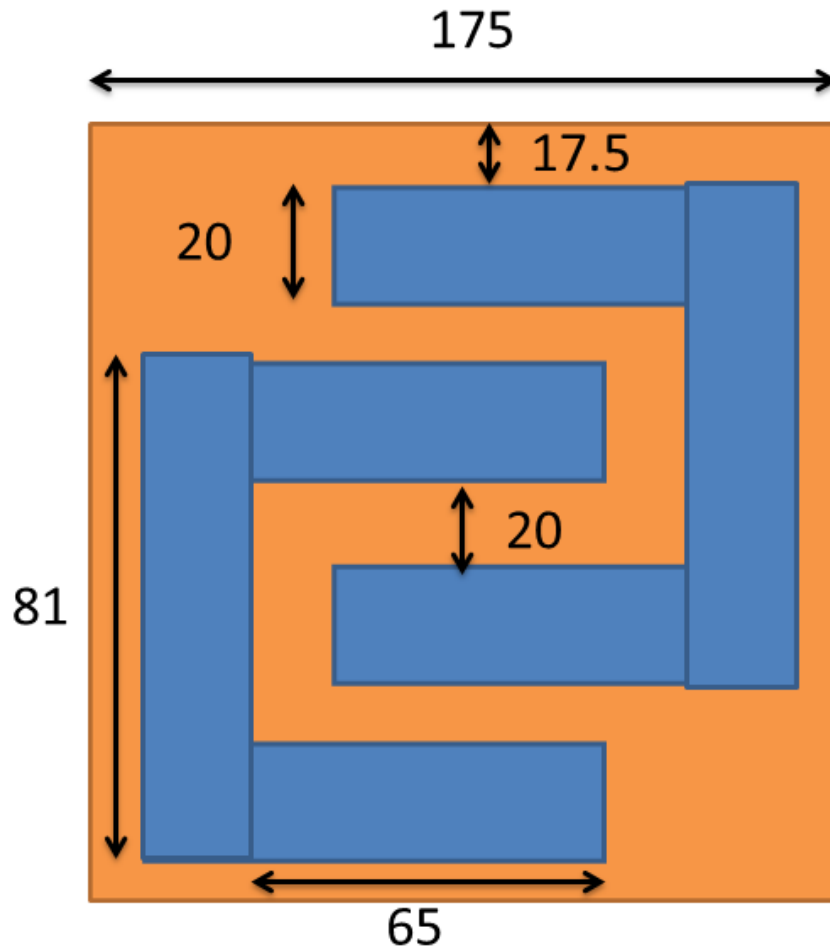


Pixel width	175 μm
Diode area	22161 μm^2
Electrode length	92 μm
Gap of electrodes	23 μm
Area	4232*2 μm^2

III. OUR RESULT

Our design of electrodes

■ Design #3

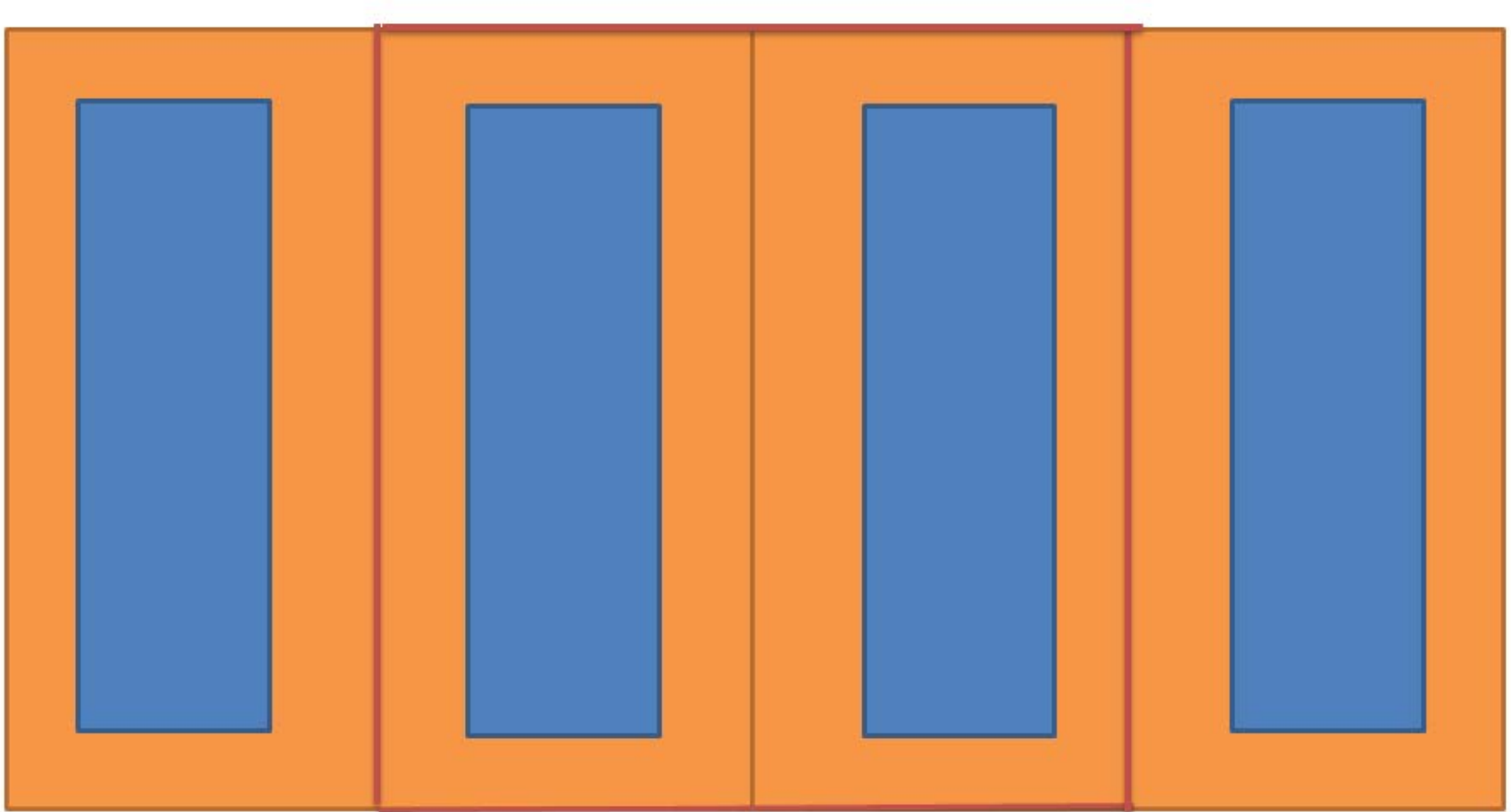


Pixel width	175 μm
Diode area	22185 μm^2
Electrode width	20 μm
Gap of electrodes	20 μm
Area	4220*2 μm^2

III. OUR RESULT

Our design of electrodes

- **New Idea**



III. OUR RESULT

Our design of electrodes

■ New Idea

- Reason:

- Original:

- N area of pixel \Rightarrow 2N electrodes \Rightarrow N pixels

- New idea:

- N area of pixel \Rightarrow 2N electrodes \Rightarrow 2N-1 pixels

- \cong 2N pixels