IHEP ATLAS HGTD Phase-II upgrade	Standard Operating Procedure	
	SOP No.:	101
	Title:	**Sensor C-V test**
	Revision:	v1
	Date:	September 12, 2019

Document Revision History

Revision	Date	Editor	Contents
v1	2019.08.27	Lianyou Shan and Xin Shi	Created document

Abstract

Describes the procedures to test sensor CV on a probe station. The procedure takes place in the IHEP MB-B106 clean room.

Contents

I. Scope

This is a regular part in the testing process of silicon pixel pad at IHEP.

II. Purpose

scan the C-V surve of HGTD LGAD sensors to find out the good one, ispecially after radiation.

III. Definitions

IV. Equipment

- Probes: Probe station with upto 6 probes, vaccum-bottom plate, lights-microscope, 3D-positioning and cables.
- SourceMeter (bias Adaptor): 100V direct current power with an adapter for Alternatting current up to 100kHz.
- Precision LCR meter : capacity meter at pF level
- Laptop : python scripts to scan C-V

They (except for Laptop) are connected as Fig.1.

V. Procedure

- Power on
  1. Switch the main patch panel on the floor to ON
  2. SourceMeter with ON at the Terminal of REAR, then the LCR meter (in order). (Fig.2)
- Touch the bottom probe
  1. Fix the sensor and touch one probe onto the bottom plate.
- Setup the LCR meter
  1. Select $C_p - R_p$ by cursor-coving the row of FUNC after button MeasSetup. (Fig. 3)
  2. Define 100mV as the amplitude of AlternatingCurrent by cursor-covering the row of LEVEL. (Fig.4)
  3. Correct the FREQ to OFF by CORRECTION button (restore CORRECTION by rebutton MeasSetup) (Fig.5)
  4. Button MeasOpen after cursor-covering the row of OPEN to start. (Fig.6)

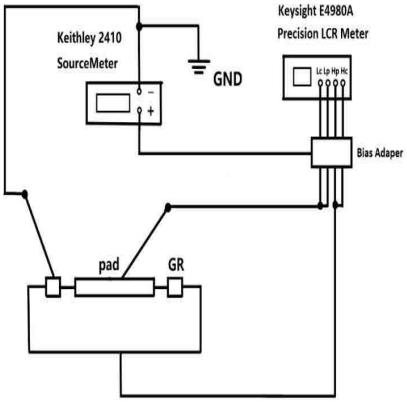

Figure 1: Layout of cables and equipments

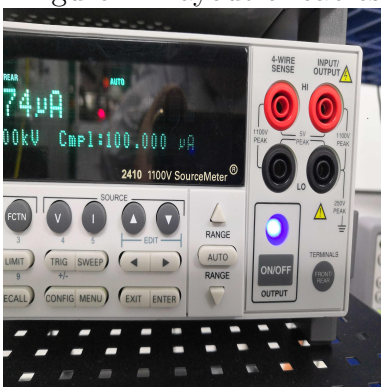

Figure 2: Rear term on SourceMeter

- Initialize the SourceMeter, for HPK sensors to a range of 50V.
    1. Switch the OUTPUT from zero to ON
- Locate/touch the 2'nd probe onto the anode of the sensor.
- Perform scanning with a python script on a laptop
    1. start an power-shell application within Windonw, cd sensor-Test folder in this session.
    2. vim scanCV.py to specify the frequency of power (10kHz, 8, 5, 3 downto 1kHz)
    3. python scanCV.py to act, fowlloed with plot.C for a C-V curve.

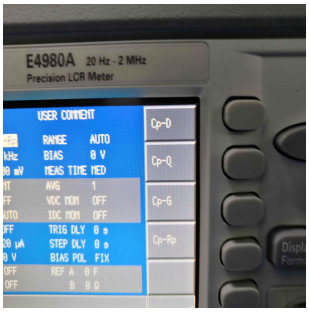

Figure 3: $C_p - R_p$ selection

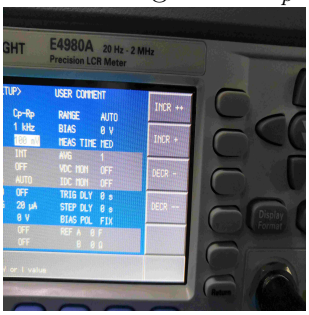

Figure 4: AC level

Figure 5: Correct FREQ to OFF

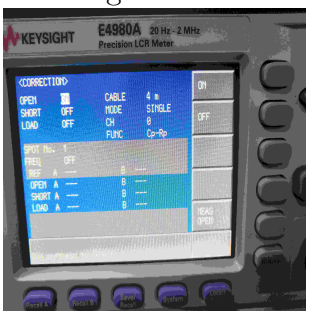

Figure 6: start measurement