Testing First 130 L2 Production Sensors

R. Lipton and H. Mao

- IV and CV tests of 130 sensors finished except for L2-253CV, 262CV, 298CV & IV (due to mechanical measurements)
- IV Summary results (2 sensors behave abnormally: L2-227 and 279)
- Compare FNAL FDV and IV to HPK
- Discussion
- Long Term Stability Test Results (on Prototype Sensors)

Aug. 21 2003
All Data at

http://d0server1.fnal.gov/users/lipton/www/asptest(sensor_test.html)

or

\d0server6\projects\Silicon\Probing\FNAL2b\L2-Jul3103
Here are the last 10 sensors’ IV curves. Tested with good light cover.
Compare HPK and FNAL IV Data

- Last 10 sensors compare to HPK
- Current measured by HPK mostly larger than at FNAL
20 Other IV Comparisons (Early Morning)

Iv of (HPK-FNAL) 20sensor L2-239 to 265
Tested 4:00-6:30am 8/8/03 Plot 8/10/03

Bias Voltage (v)

I (nA) of (HPK-FNAL)
Discussion of IV Scan Results

- FNAL currents mostly smaller than HPK values.

- Our test station can get sunshine during the day. We found IV curves are sensitive to changes in external lighting conditions due to sunshine and clouds, although the black cover was used.

- So, eliminating light leakage is very important. That is why tests were performed in the early morning. Or else make a very good light cover.
Sometime Sun Shine, Sometime Cloudy

L2-312 lv 1st-test 129nA(350v) Sun-rise-down
8/13/03
2 Sensors (227 and 279) Misbehave

L2-227 Iv of HPK and FNAL (break 480v) 8/7/03 Cut

L2-279 Iv 4-tests 8/8, 13/03
L2-279 bad

L2-269 to 279, IV of 10 sensors 8/10/03

I(A)

V(V)
HPK and FNAL Currents at 150 and 350v

L2 Compare Iv of HPK & FNAL at 150 350v 8/15/03

Serial Number

I(nA)
HPK and FNAL Currents at 150v

L2 lv Compare HPK & FNAL 150v 8/15/03

I-HPK-150v
I-FNAL-150v

Sensor Serial No.
HPK and FNAL Currents at 350v

L2 lv compare HPK & FNAL 350v 8/15/03

I(nA) vs Sensor Serial No.
Current Difference (HPK-FNAL) at 350v

lv of (HPK-FNAL) at 350v(except 279)
Current Difference (HPK-FNAL) at 150v
FDV Measured at HPK and FNAL

L2 FDV of HPK & FNAL and diff(HPK-FNAL) 8/15/03

FDV diff

Sensor Serial No.
Discussion

Second IV test is much different than first test at low voltage
CV test: discharge important

2nd test is not discharged. FDV will be smaller.

6th test -- cover open
FDV very large (light leakage).
CV test sensitive to light leakage

- Bottom plot has open black cover, but still some cover there.
- The FDV in bottom plot is much bigger than top plot due to light leakage.
Long Term Stability Test

L2-84 and 66 current increasing

Then after gas off, currents rise dramatically, fall and then increase again
• Current rising for sensor L2-084, and then suddenly drops down (cause unknown) and then resumes upward climb
Long-Term Dew Pt and IV

- Humidity is important
IV Scans after Long Term Stability Test

- Gas Off, at Holder, IV scans for five sensors after completion of long-term stability test