

Results of ABCD3T barrel modules

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for many other contributors

- **ABCD3T modules at KEK**

0170200003 - 1st ABCD3T module and irradiated

0170200011 - ABCD3T “Double-decker”

0170200022 - 1st ABCD3Tm “Thin Metalized”

- **Reports on selected aspects**

Trim range

Gain and input noise

Stability

Data at room temperature and at -15 °C (beamline in-situ)

ABCD3T modules at KEK

- **0170200003 - 1st ABCD3T module and irradiated (k03)**

Wafer ID = 5

Baseline k4 barrel hybrid

Hamamatsu B2 sensors <100>

- **0170200011 - ABCD3T “Double-decker” (k11)**

Wafer ID = 5

Vcc, Vdd bypass capacitors (100nF) are doubled by overlaying two caps

Hamamatsu B2 sensors <100>

- **0170200022 - 1st ABCD3Tm “Thin Metalized” (k22)**

Wafer ID= 2

Baseline k4 barrel hybrid

Hamamatsu B2 sensors <100>

Trim range

- **At room temperature**

k03, k11, k22 - all trim ranges settable

Examples of trimming and best (rms*trimmable) target

- **At cold temperature (-15 °C in the beamline)**

k11, k22 - all trim ranges settable

Gain and input noise

- **Beamline in-situ, cold**

k11 double-decker - response curves, example

With “chokes”

Evaluation at 2fC

mod	Gain [mV/fC]	Noise [mV]	ENC [e]
k3103	58.45	12.08	1293
k11	52.44	11.65	1388
k22	55.52	11.17	1258

- **Room temperature**

k3103	~1500
k11	1586
k22	1592
k03 pre-irrad	~1600

Without “chokes”

k11	1845
k22	1710

Stability

- **Beamline in-situ, 15 °C, or Room temperature**

k3103, k11, k22 Plots

k3103 - still no hint of instability

k11 double decker - no hint of instability

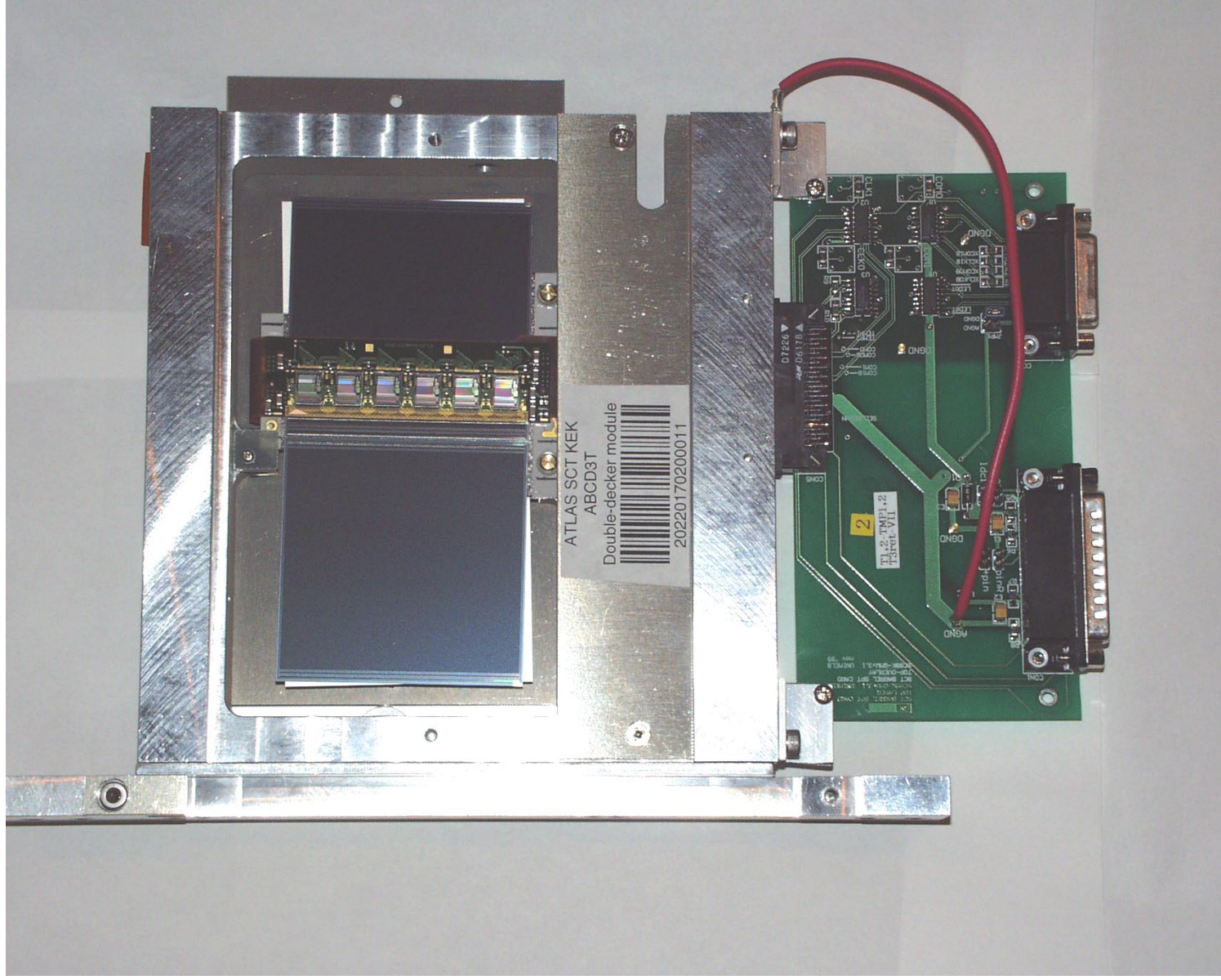
k22 thin metalized - instability hint in the negative threshold

Summary

- **Pre-irradiation characteristics**
- **All trim ranges are able to be set in the room or the cold temperature (-15 °C)**
- **Noise is temperature dependent:**
 - ~1300 e at -15°C (environment)
 - ~1600 e at +18 °C (“)
 - > $300 \text{ e}/30 \text{ °C} = 10 \text{ e/°C}$
- **Thin metalized chip module**

showed “jump” in the negative threshold,
similar to the thick non-metalized “baseline” module
- **Double decker module**

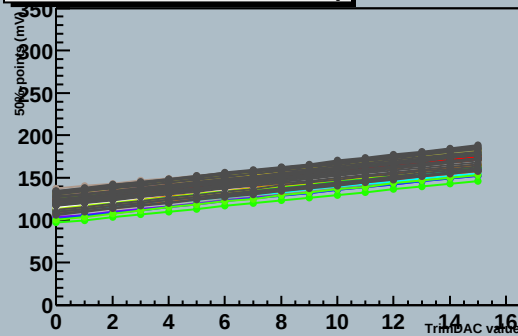
noise slightly higher(at cold)
no “jump” in the negative threshold, as same as k3103



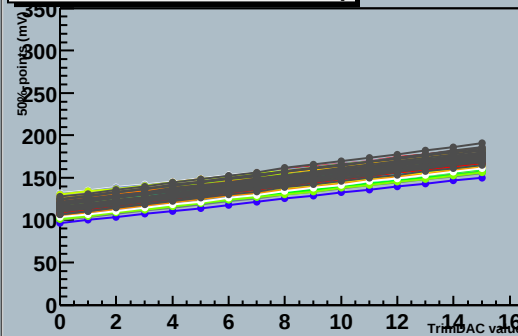
ATLAS SCT Module Test - Wed Oct 18 23:34:31 2000
Unknown - Module 0170200003
Run 1693 Trim Scans Module 0 Link 0 TrimR 0

Target value to be 140 mV
This gives 1534 trimmable channels

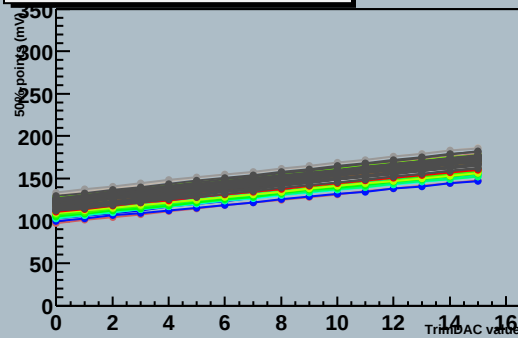
TrimDAC characteristics, chip0



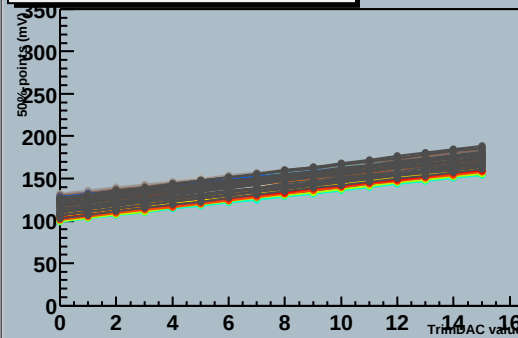
TrimDAC characteristics, chip1



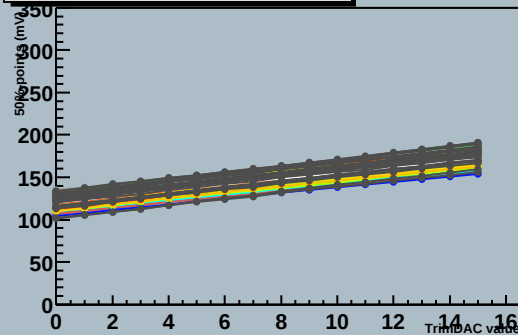
TrimDAC characteristics, chip2



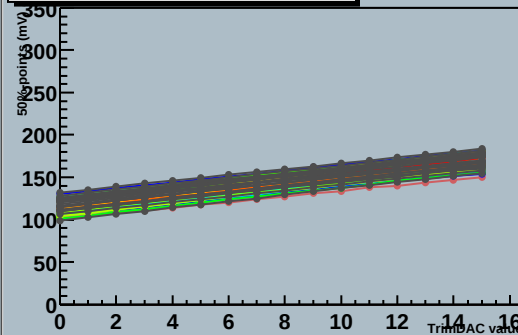
TrimDAC characteristics, chip3



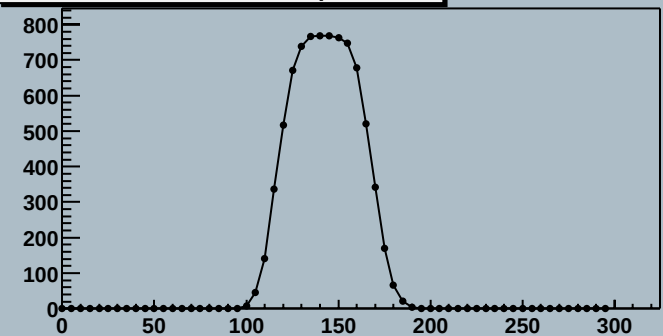
TrimDAC characteristics, chip4



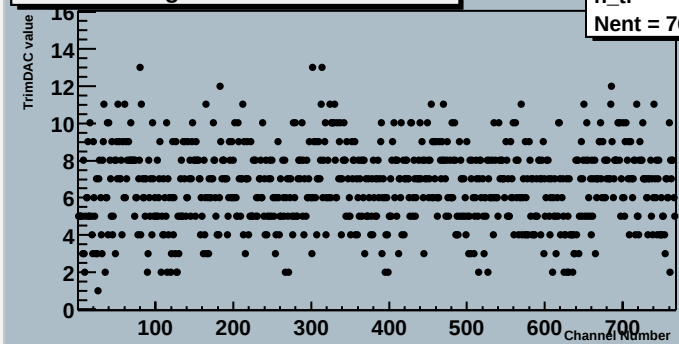
TrimDAC characteristics, chip5



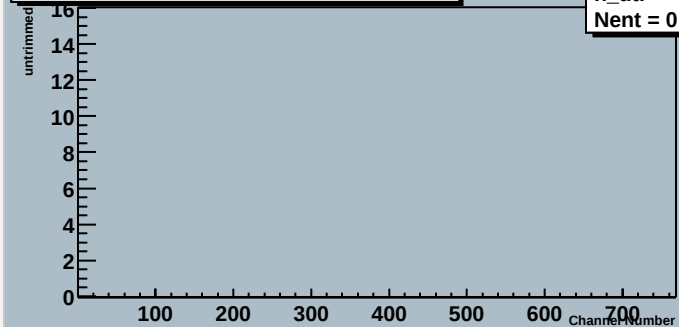
Trimmable channels, chip 0 to 5



Trim Setting - Trimmable Channels



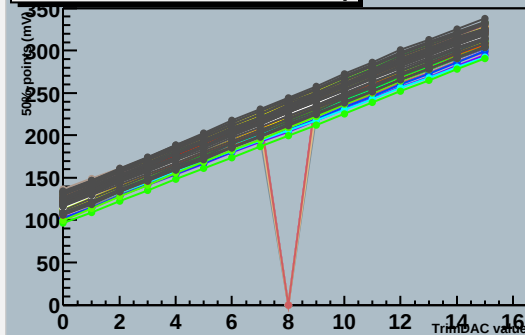
Trim Setting - Untrimmable Channels



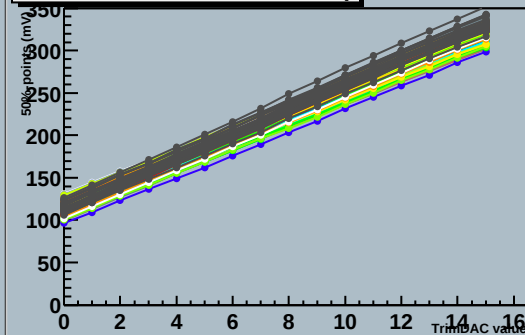
ATLAS SCT Module Test - Thu Oct 19 11:33:01 2000
Unknown - Module 0170200003
Run 1695 Trim Scans Module 0 Link 0 TrimR 3

Target value to be 140 mV
This gives 1536 trimmable channels

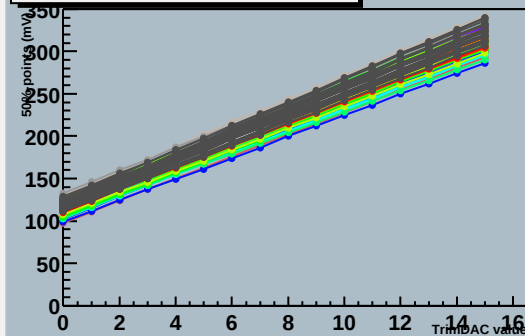
TrimDAC characteristics, chip0



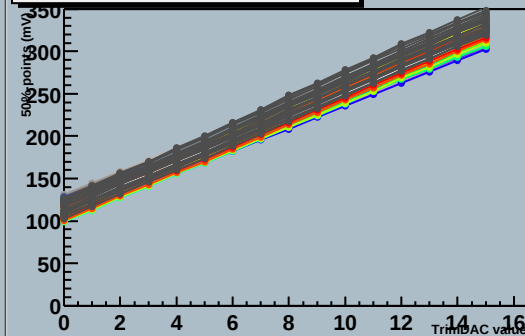
TrimDAC characteristics, chip1



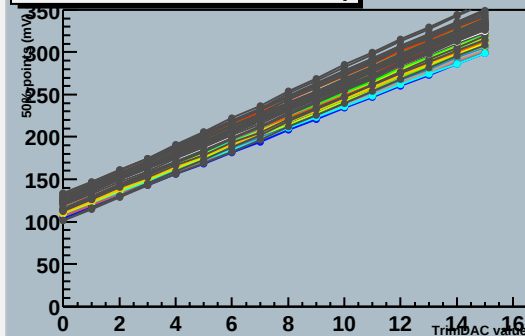
TrimDAC characteristics, chip2



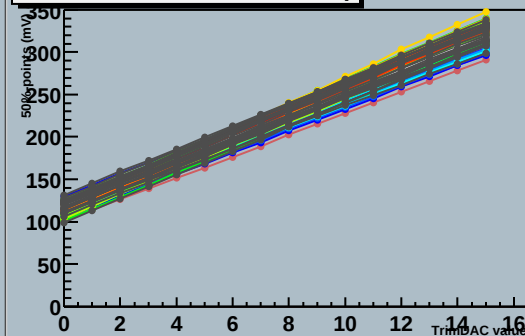
TrimDAC characteristics, chip3



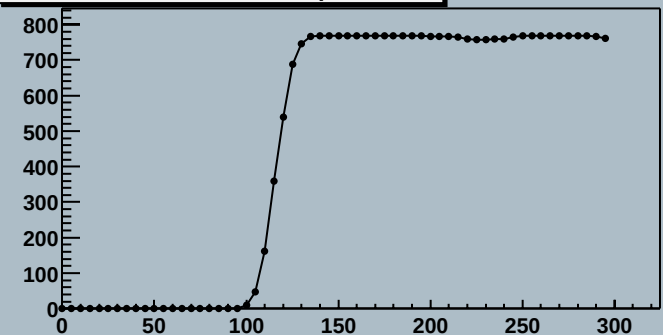
TrimDAC characteristics, chip4



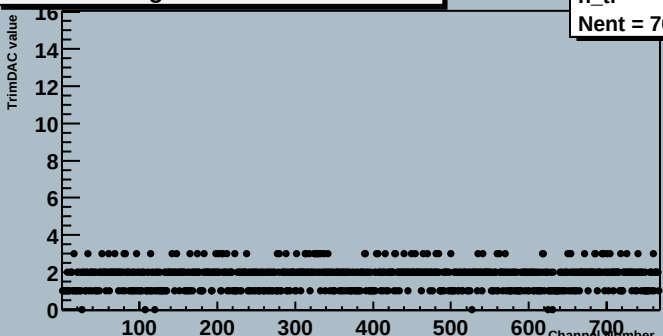
TrimDAC characteristics, chip5



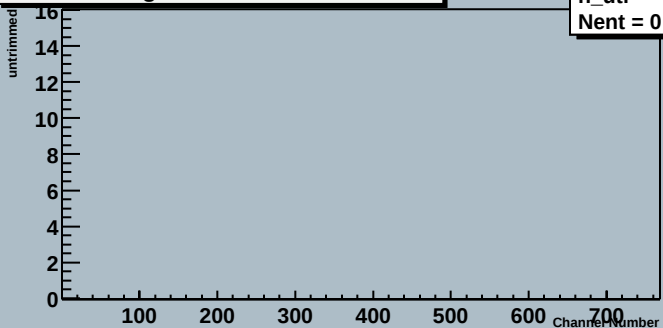
Trimmable channels, chip 0 to 5



Trim Setting - Trimmable Channels

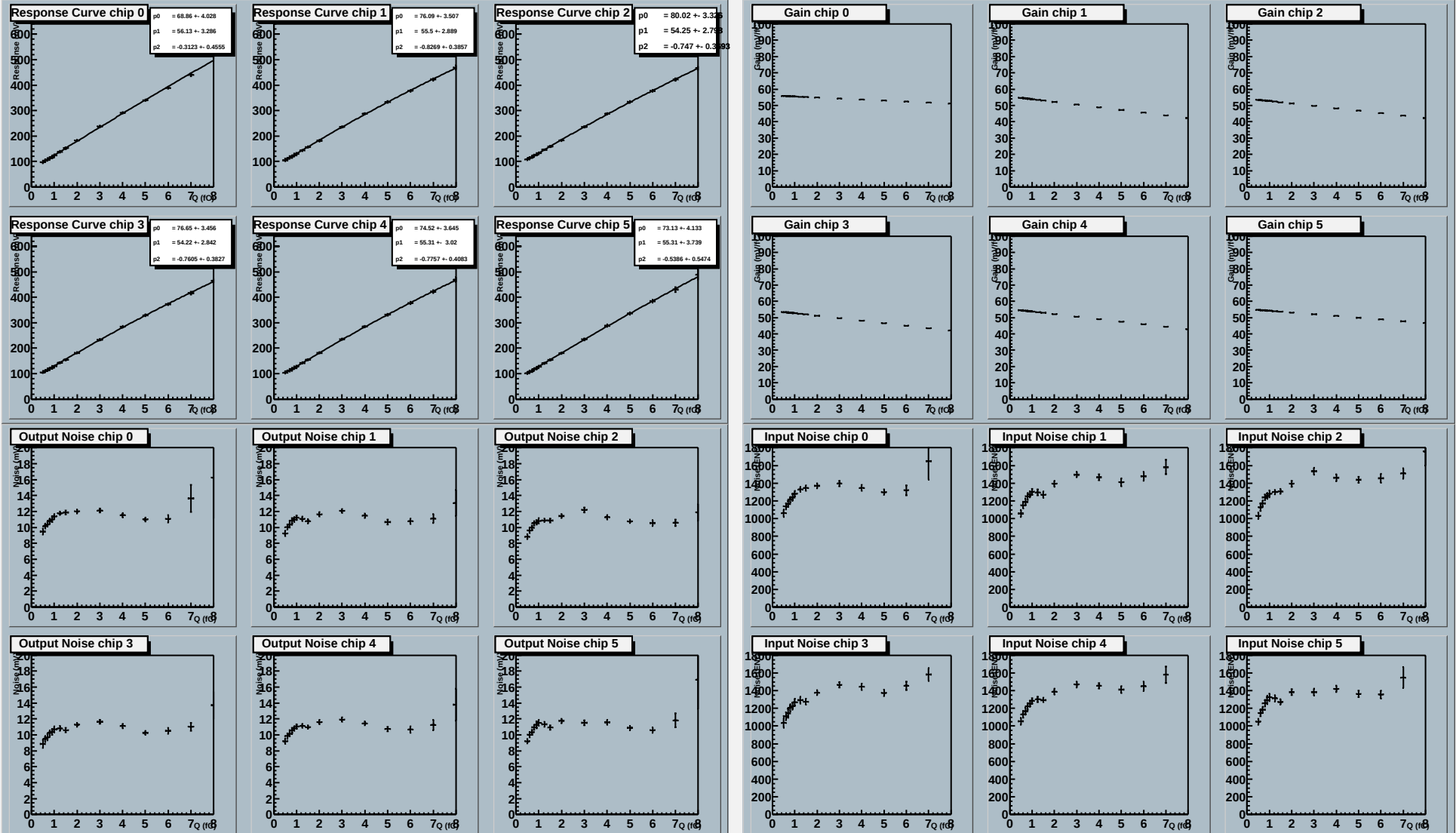


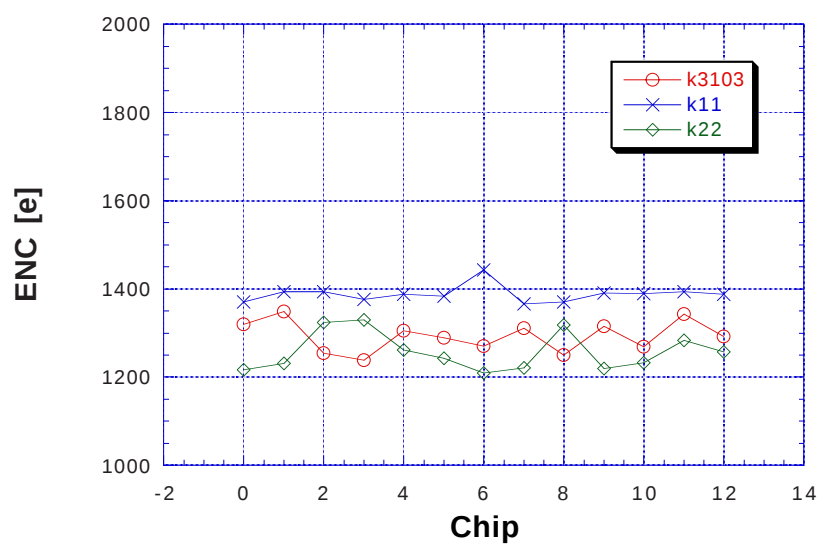
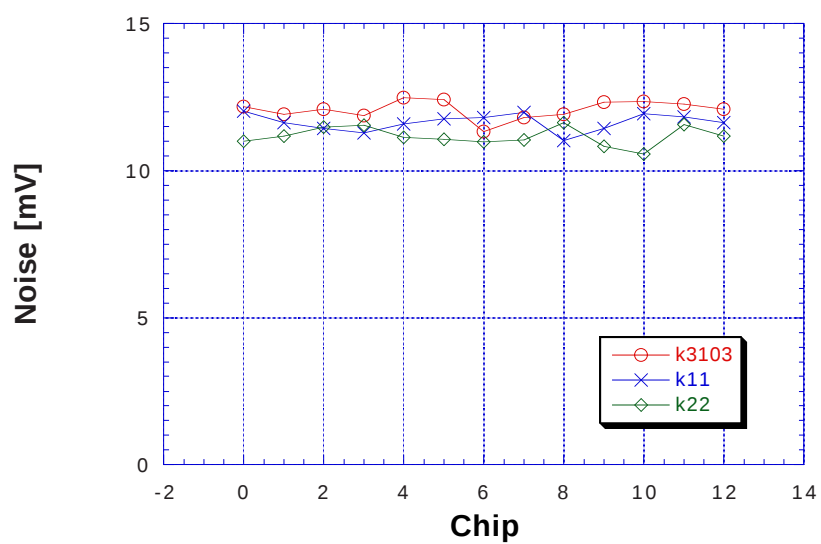
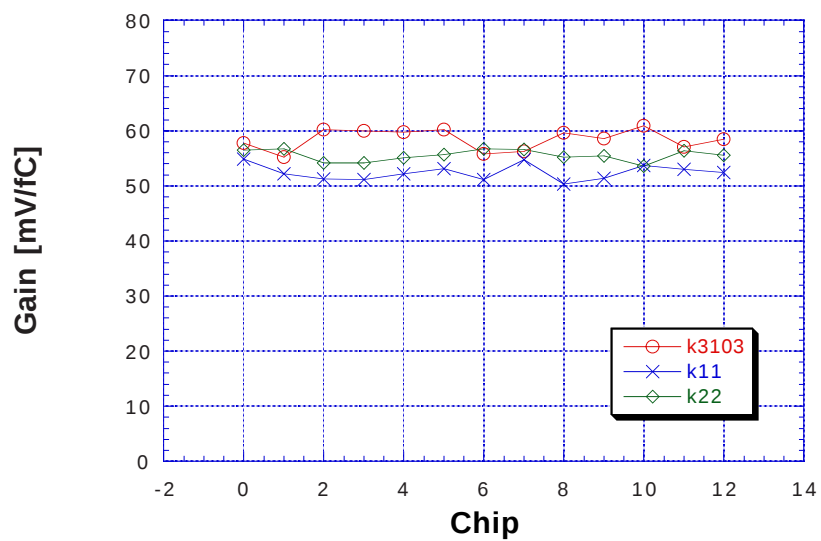
Trim Setting - Untrimmable Channels



ATLAS SCT Module Response Curve - Sat Dec 02 21:59:26 2000 - Unknown - Module 0170200011b220s30q2t175r1 - ABCD2T - Polynomial fit

Run 2081 Scans 6 - 9 Charges 0.50 - 8.00 fC Module 1 Stream 0

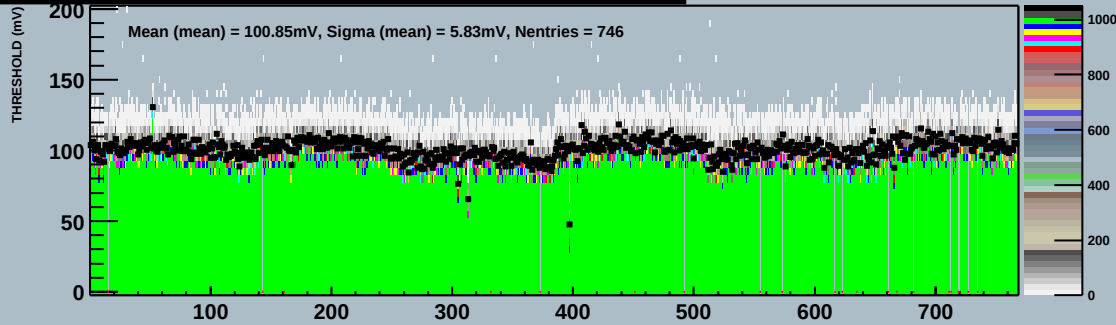




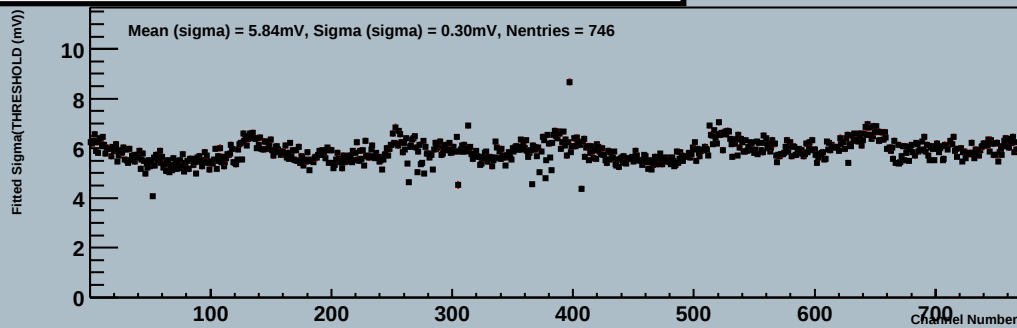
ATLAS SCT Module Test - Sat Dec 02 21:40:39 2000 - Unknown - Module k3103mq2t200

Run 2081 Scan 1 Module 0 Stream 1 Scan type: THRESHOLD (mV)

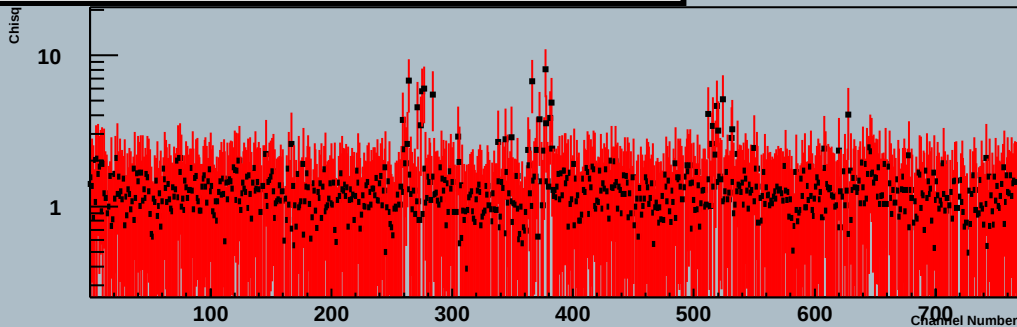
Module 0 k3103mq2t200 Stream 1 THRESHOLD (mV) Scan



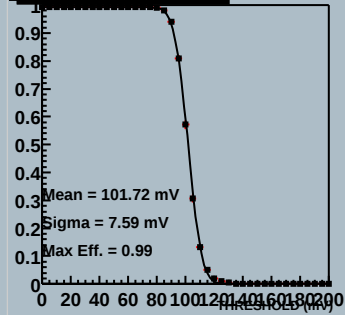
Fitted Sigma



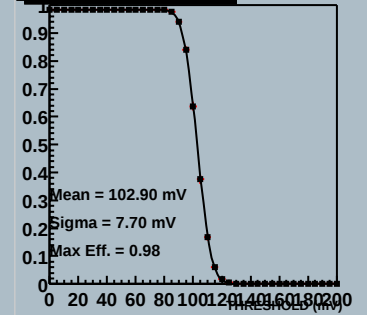
Chisq/NDF



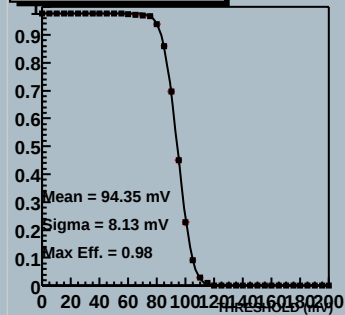
Efficiency, chip 0



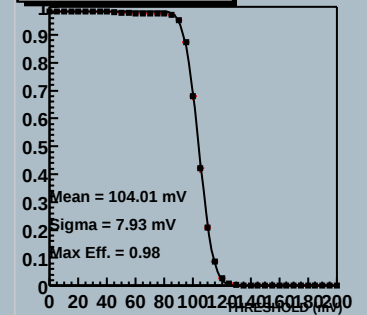
Efficiency, chip 1



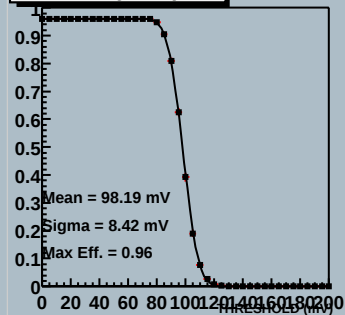
Efficiency, chip 2



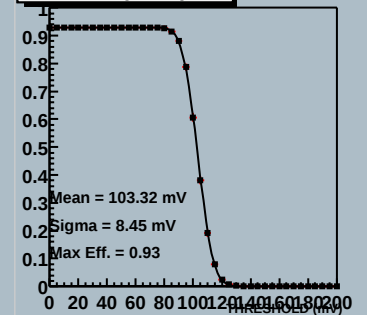
Efficiency, chip 3



Efficiency, chip 4



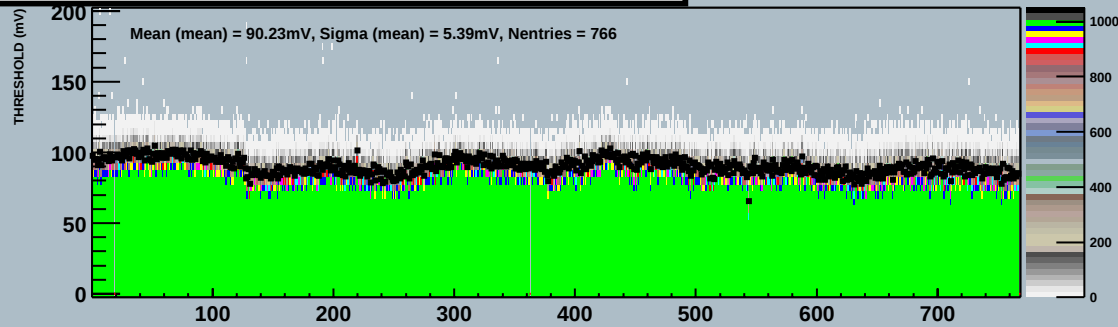
Efficiency, chip 5



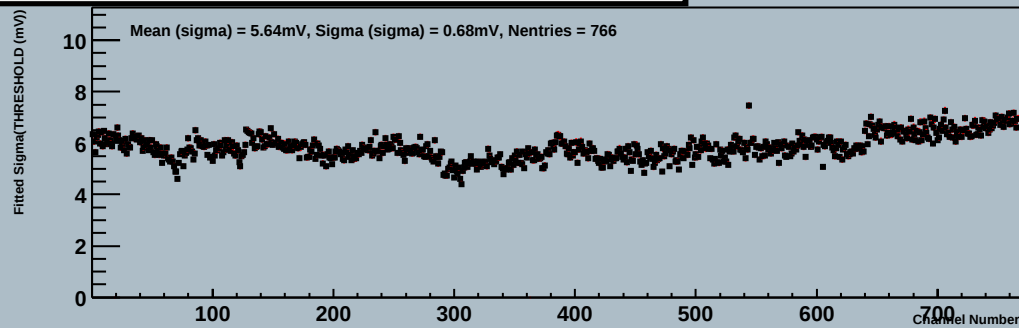
ATLAS SCT Module Test - Sat Dec 02 21:40:39 2000 - Unknown - Module 0170200011b220s30q2t175r1

Run 2081 Scan 1 Module 1 Stream 1 Scan type: THRESHOLD (mV)

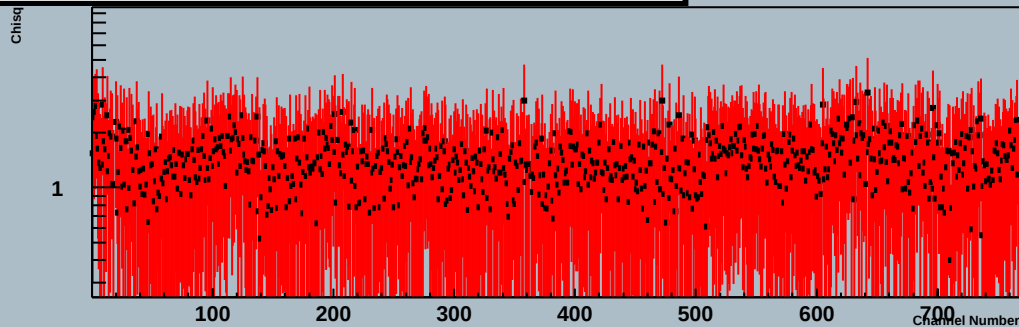
Module 1 0170200011b220s30q2t175r1 Stream 1 THRESHOLD (mV) Scan



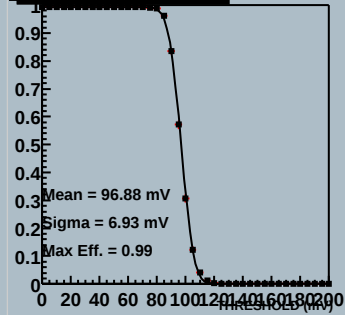
Fitted Sigma



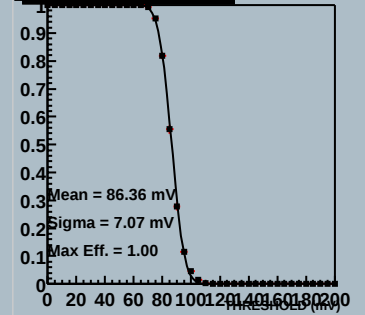
Chisq/NDF



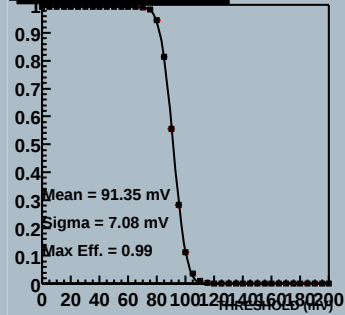
Efficiency, chip 0



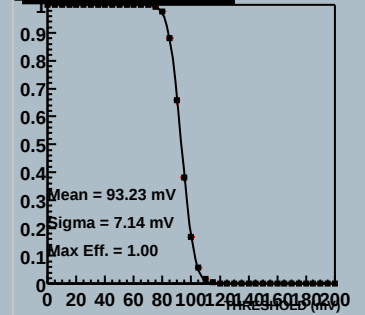
Efficiency, chip 1



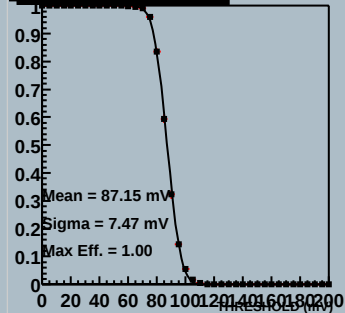
Efficiency, chip 2



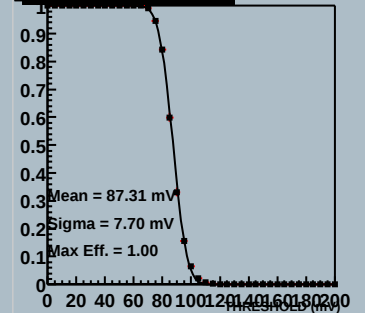
Efficiency, chip 3



Efficiency, chip 4



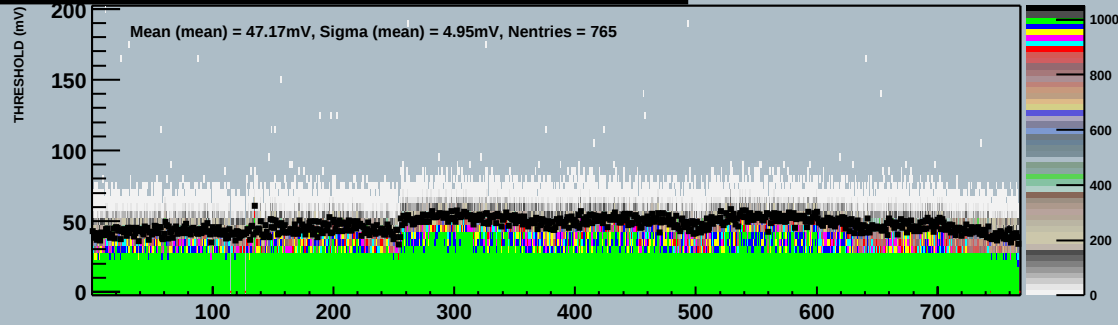
Efficiency, chip 5



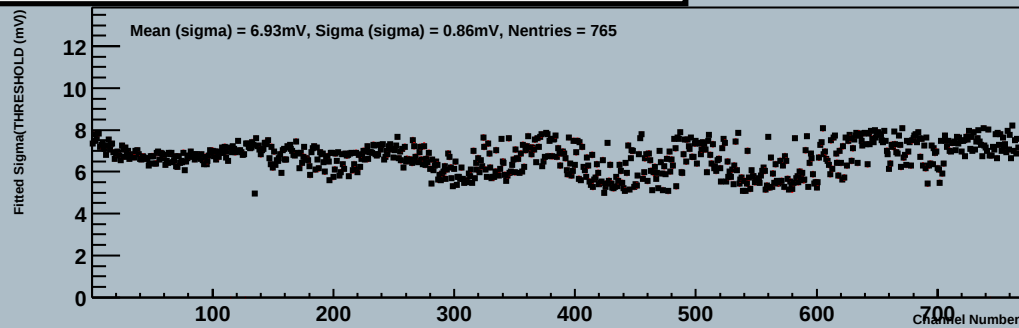
ATLAS SCT Module Test - Sat Dec 02 21:40:39 2000 - Unknown - Module 0170200022s30q2t155r0

Run 2081 Scan 1 Module 2 Stream 1 Scan type: THRESHOLD (mV)

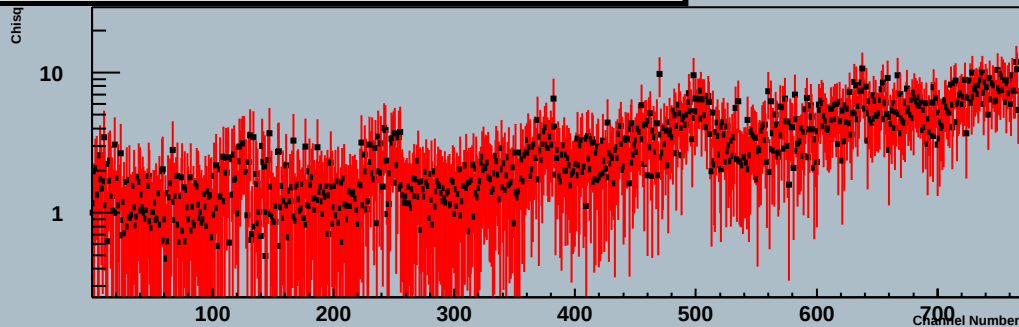
Module 2 0170200022s30q2t155r0 Stream 1 THRESHOLD (mV) Scan



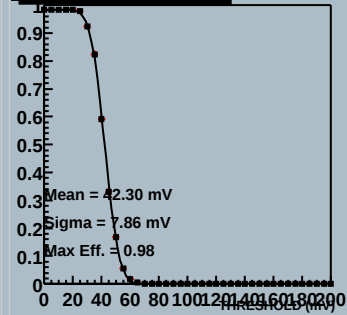
Fitted Sigma



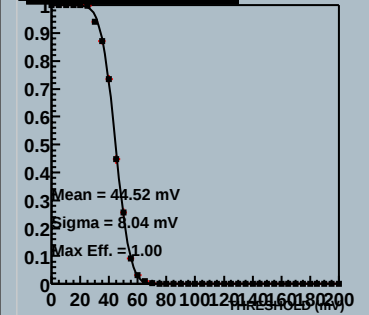
Chisq/NDF



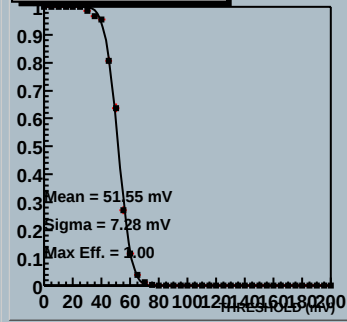
Efficiency, chip 0



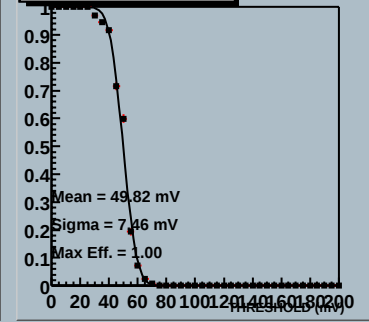
Efficiency, chip 1



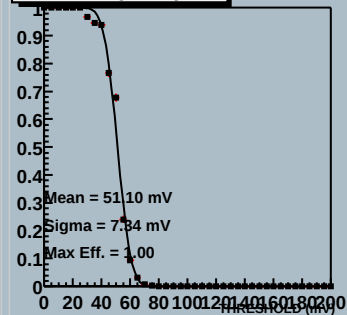
Efficiency, chip 2



Efficiency, chip 3



Efficiency, chip 4



Efficiency, chip 5

