

Measurements of ASIC V2.

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Measurements in h-mode.

Overview.

Test01

- ▶ GOAL: Test uniformity of channel response when pulses are injected.
- ▶ MEASUREMENT: Loops over all the channels. Only one channel is powered up at each time, and pulses are injected only on this channel.

Test02

- ▶ GOAL: Test linearity of channel over a range of test-charges.
- ▶ MEASUREMENT: Loops over all the channels. Only one channel is powered up at each time. For this channel, loop over several pulse-amplitudes. For each pulse-amplitude, inject N pulses.

Test03

- ▶ GOAL: Test peak-time agreement with its nominal value.
- ▶ MEASUREMENT: Loops over all the channels. Only one channel is powered up at each time. For this channel, loop over several pulse-widths, fixed pulse-amplitude. For each pulse-width, inject N pulses.

Test04

- ▶ GOAL: Perform indirect measurement of the energy threshold.
- ▶ MEASUREMENT: Loops over all the channels. Only one channel is powered up at each time. For this channel, loop over the energy threshold. Inject N pulse for each energy threshold.
- ▶ Repeat for several pulse amplitudes.

| Testing | | | | |
|---------|--------|------|-----------|--------------------------------|
| Board 2 | | | | |
| Chip | | Mode | Threshold | Test |
| 1 | slave | hole | 0x90 | Test01, Test02, Test03, Test04 |
| 5 | - | hole | 0x90 | Test01, Test02, Test03, Test04 |
| 9 | - | hole | 0x90 | Test01, Test02, Test03, Test04 |
| 13 | master | hole | 0x90 | Test01, Test02, Test03, Test04 |

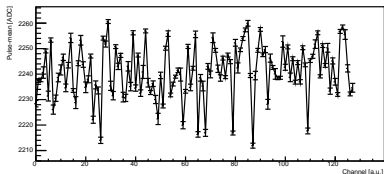
Summary of results.

| Board 2* | | | | | | |
|----------------|------------|----------|----------|-----------|-----------|-----------|
| | Nominal | Chip1 | Chip5 | Chip9 | Chip13 | |
| Test01 | | | | | | |
| Pulse mean | [ADC] | - | 2241 | 2232 | 2252 | 2236 |
| Pulse std.dev. | [ADC] | - | 1.198 | 1.24 | 1.223 | 1.272 |
| Pulse counts | [a.u.] | 1024 | 1024 | 1024 | 1024 | 1024 |
| Test02 | | | | | | |
| Y-intercept | [ADC] | 204.8 | 226.5 | 217.7 | 236.3 | 210.6 |
| Slope | [ADC/eV] | - | 6.168e-5 | 6.172e-5 | 6.175e-5 | 6.192e-5 |
| Test03 | | | | | | |
| Peak time | [μ s] | 7 | \sim 7 | \sim 7 | \sim 7 | \sim 7 |
| Test04 | | | | | | |
| Slope | [eV/DN] | 24.7 keV | 2.37e+4 | 2.366e+04 | 2.371e+04 | 2.385e+04 |

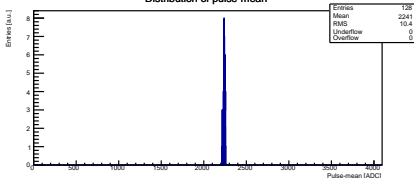
* - no floating connections.

Chip1 - h-mode - Test01.

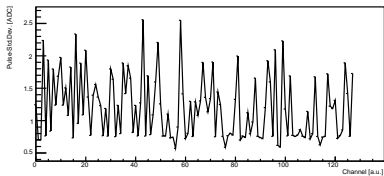
Pulse-mean vs channel



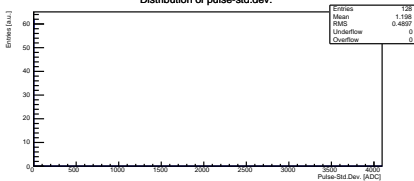
Distribution of pulse-mean



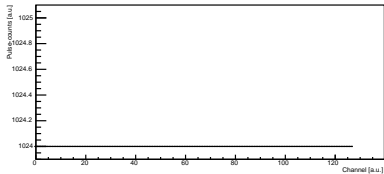
Pulse-Std.Dev. vs channel



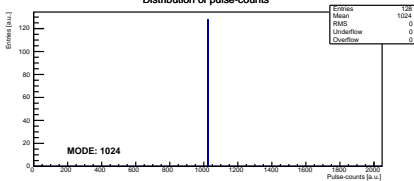
Distribution of pulse-std.dev.



Pulse-counts vs channel

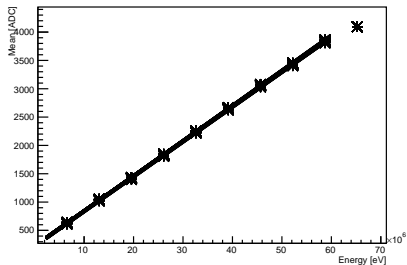


Distribution of pulse-counts

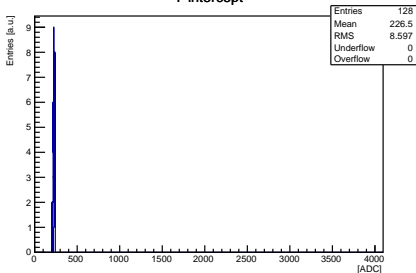


Chip1 - h-mode - Test02.

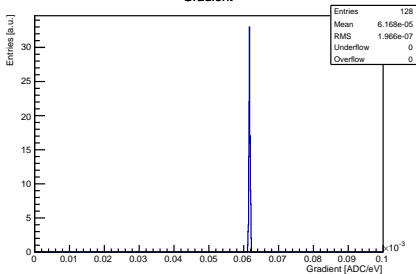
ADC vs injected charge



Y-intercept

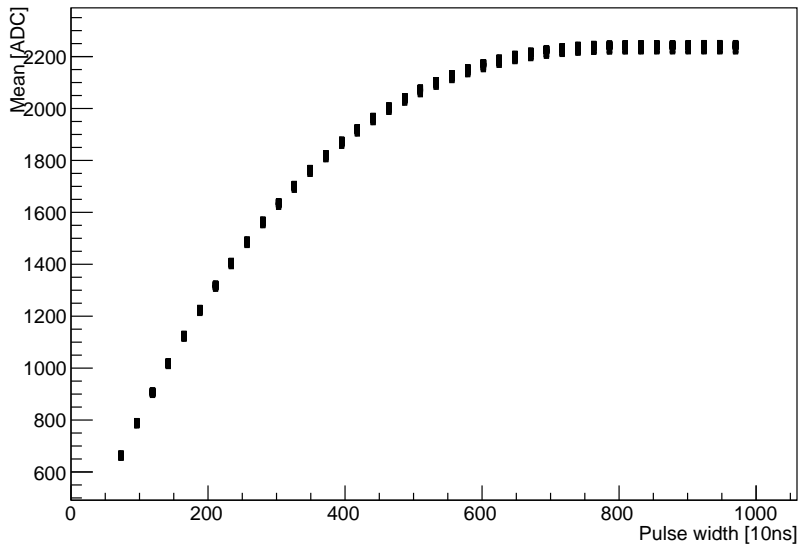


Gradient



Chip1 - h-mode - Test03.

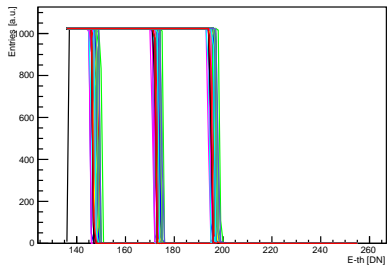
Peak time



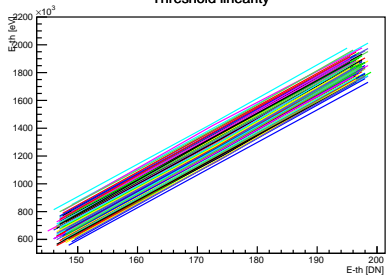
Nominal peak-time is 7 μ s.

Chip1 - h-mode - Test04.

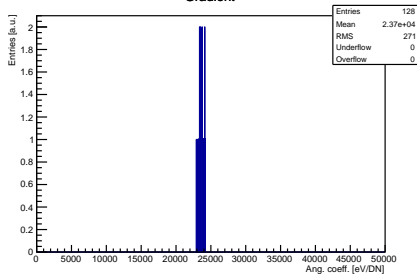
S-curves



Threshold linearity

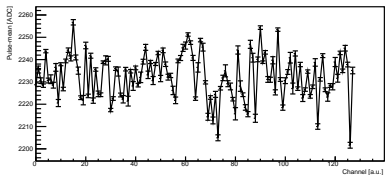


Gradient

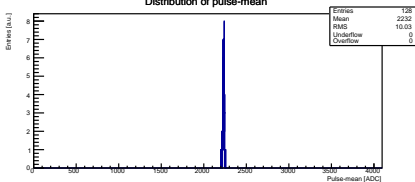


Chip5 - h-mode - Test01.

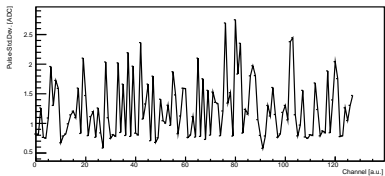
Pulse-mean vs channel



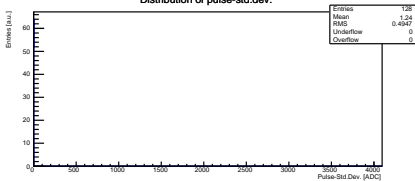
Distribution of pulse-mean



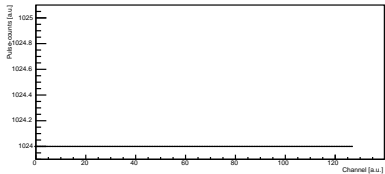
Pulse-Std.Dev. vs channel



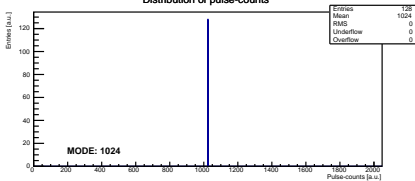
Distribution of pulse-std.dev.



Pulse-counts vs channel

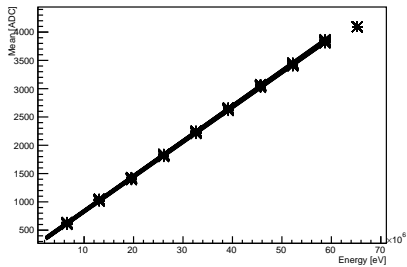


Distribution of pulse-counts

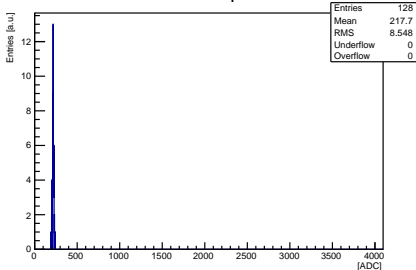


Chip5 - h-mode - Test02.

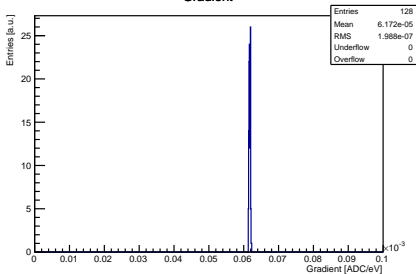
ADC vs injected charge



Y-intercept

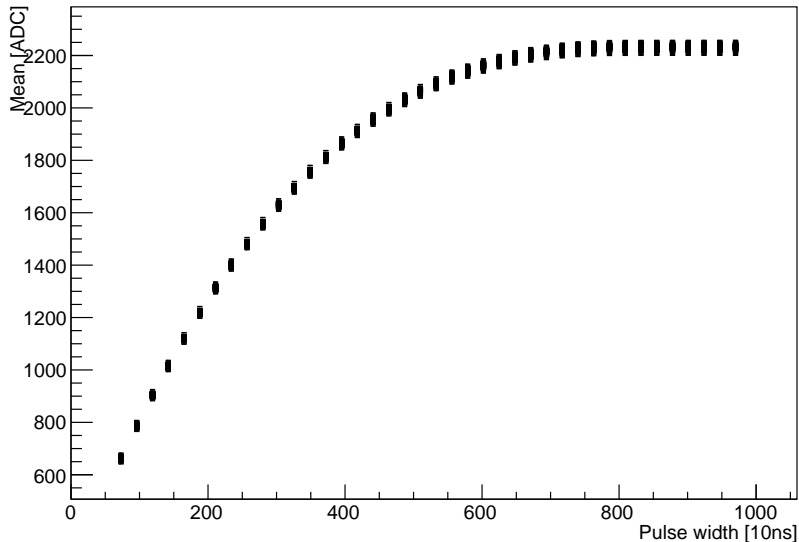


Gradient



Chip5 - h-mode - Test03.

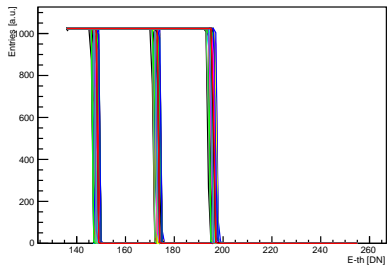
Peak time



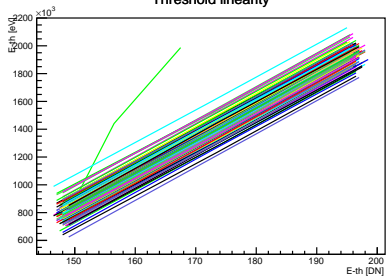
Nominal peak-time is 7 μ s.

Chip5 - h-mode - Test04.

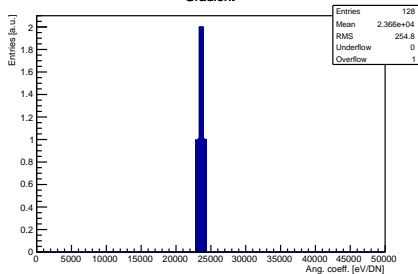
S-curves



Threshold linearity

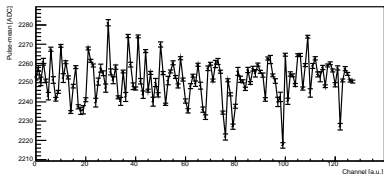


Gradient

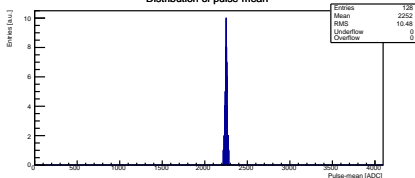


Chip9 - h-mode - Test01.

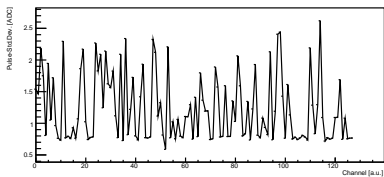
Pulse-mean vs channel



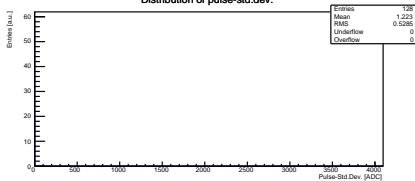
Distribution of pulse-mean



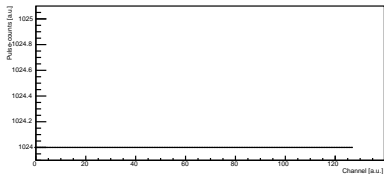
Pulse-Std.Dev. vs channel



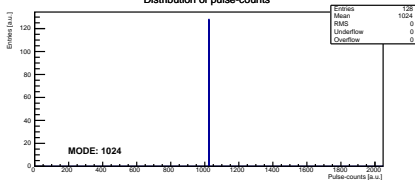
Distribution of pulse-std.dev.



Pulse-counts vs channel

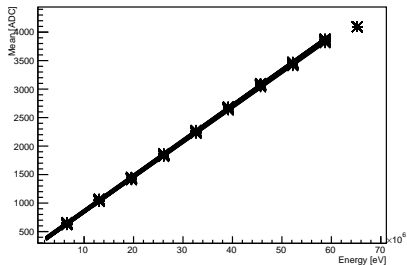


Distribution of pulse-counts

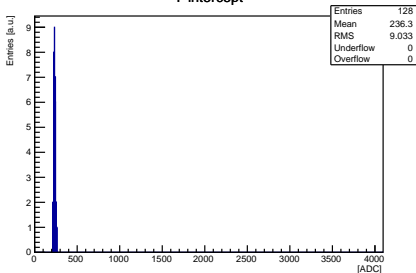


Chip9 - h-mode - Test02.

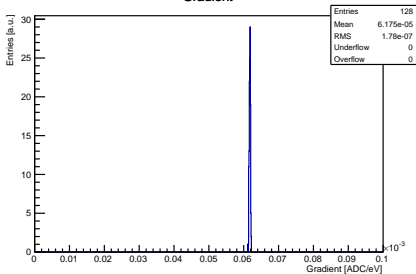
ADC vs injected charge



Y-intercept

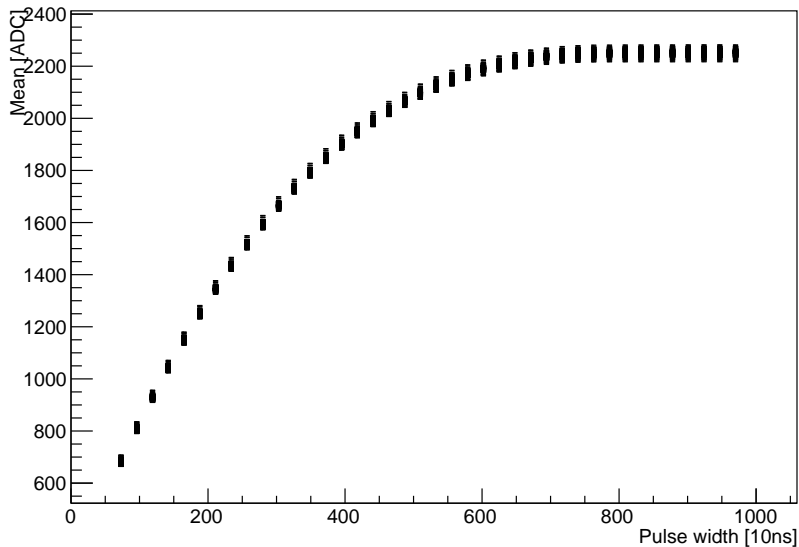


Gradient



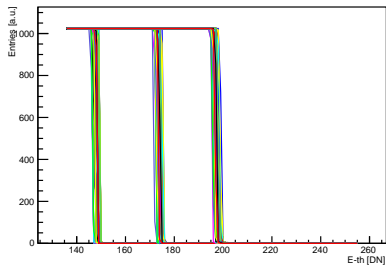
Chip9 - h-mode - Test03.

Peak time

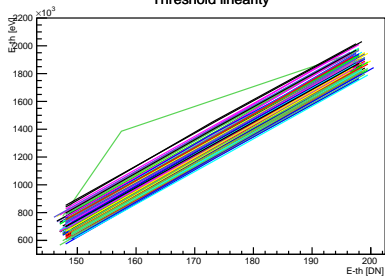


Chip9 - h-mode - Test04.

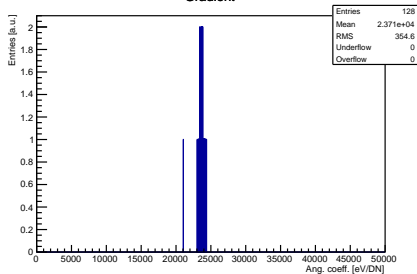
S-curves



Threshold linearity

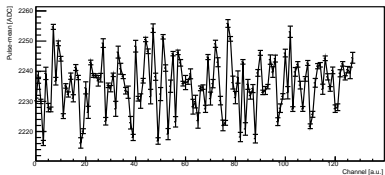


Gradient

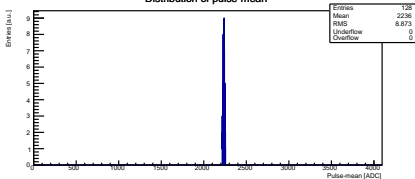


Chip13 - h-mode - Test01.

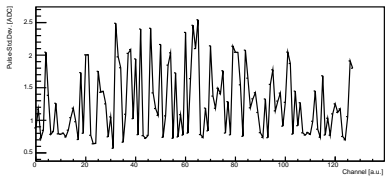
Pulse-mean vs channel



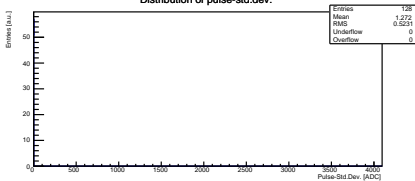
Distribution of pulse-mean



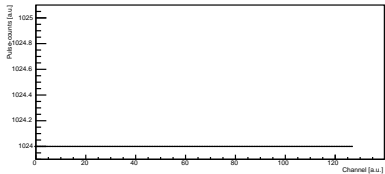
Pulse-Std.Dev. vs channel



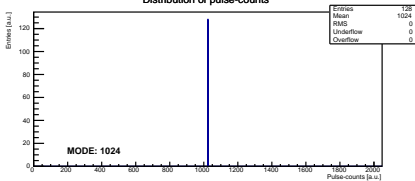
Distribution of pulse-std.dev.



Pulse-counts vs channel

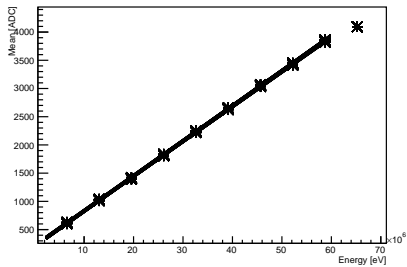


Distribution of pulse-counts

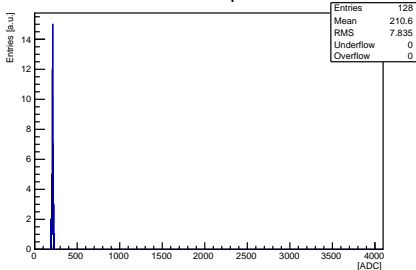


Chip13 - h-mode - Test02.

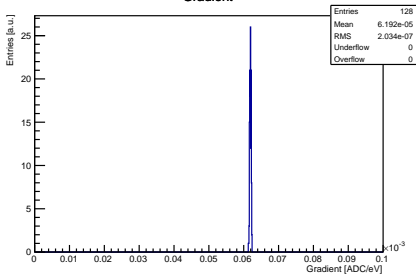
ADC vs injected charge



Y-intercept

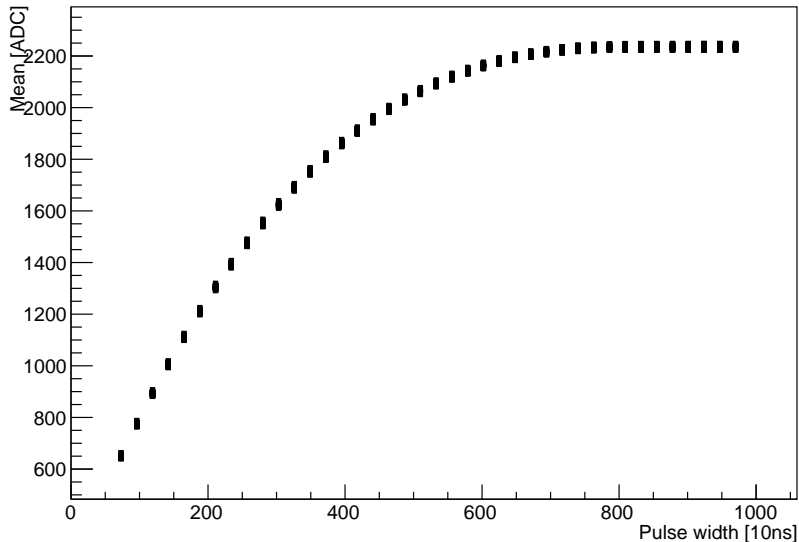


Gradient



Chip13 - h-mode - Test03.

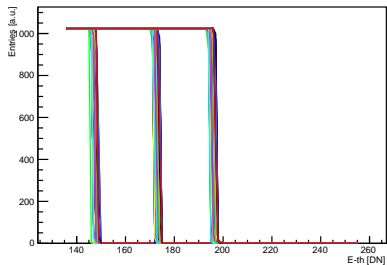
Peak time



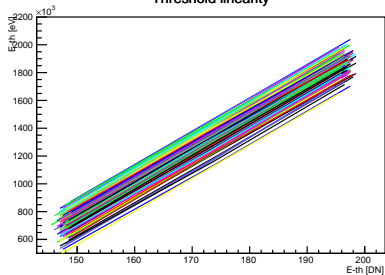
Nominal peak-time is 7 μ s.

Chip13 - h-mode - Test04.

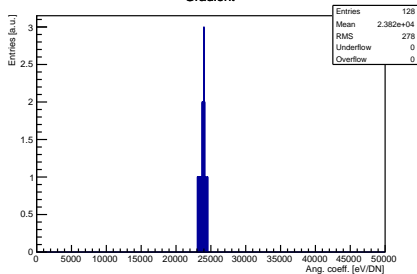
S-curves



Threshold linearity



Gradient



Back-up.

| |
|--|
| 2014-07-21-Test01-Side1-Chip1-Vcall0.5-Vcalh1.0.txt |
| 2014-07-21-Test01-Side1-Chip5-Vcall0.5-Vcalh1.0.txt |
| 2014-07-21-Test01-Side1-Chip9-Vcall0.5-Vcalh1.0.txt |
| 2014-07-21-Test01-Side1-Chip13-Vcall0.5-Vcalh1.0.txt |

| |
|--|
| 2014-07-21-Test02-Side1-Chip1-Vcall0.5-Vcalh1.5-StepN10.txt |
| 2014-07-21-Test02-Side1-Chip5-Vcall0.5-Vcalh1.5-StepN10.txt |
| 2014-07-21-Test02-Side1-Chip9-Vcall0.5-Vcalh1.5-StepN10.txt |
| 2014-07-21-Test02-Side1-Chip13-Vcall0.5-Vcalh1.5-StepN10.txt |

| |
|--|
| 2014-07-21-Test03-Side1-Chip1-Vcall0.5-Vcalh1.0-StepN40.txt |
| 2014-07-21-Test03-Side1-Chip5-Vcall0.5-Vcalh1.0-StepN40.txt |
| 2014-07-21-Test03-Side1-Chip9-Vcall0.5-Vcalh1.0-StepN40.txt |
| 2014-07-21-Test03-Side1-Chip13-Vcall0.5-Vcalh1.0-StepN40.txt |

| |
|---|
| 2014-07-21-Test04-Side1-Chip1-PulseWidth30.txt |
| 2014-07-21-Test04-Side1-Chip5-PulseWidth30.txt |
| 2014-07-21-Test04-Side1-Chip9-PulseWidth30.txt |
| 2014-07-21-Test04-Side1-Chip13-PulseWidth30.txt |

| |
|---|
| 2014-07-22-Test04-Side1-Chip1-PulseWidth70.txt |
| 2014-07-22-Test04-Side1-Chip5-PulseWidth70.txt |
| 2014-07-22-Test04-Side1-Chip9-PulseWidth70.txt |
| 2014-07-22-Test04-Side1-Chip13-PulseWidth70.txt |

| |
|--|
| 2014-07-25-Test04-Side1-Chip1-PulseWidth110.txt |
| 2014-07-24-Test04-Side1-Chip5-PulseWidth110.txt |
| 2014-07-24-Test04-Side1-Chip9-PulseWidth110.txt |
| 2014-07-24-Test04-Side1-Chip13-PulseWidth110.txt |