TCT Results of LGAD Run7062 from CERN SSD

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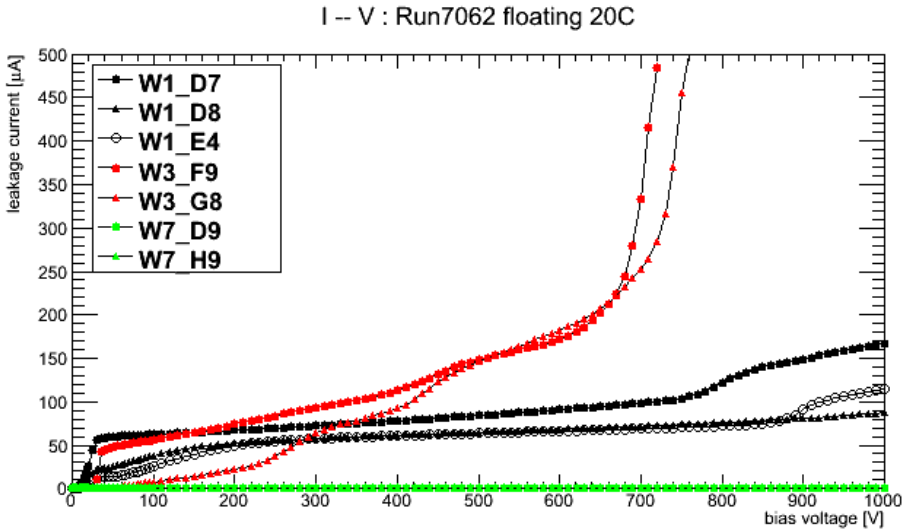
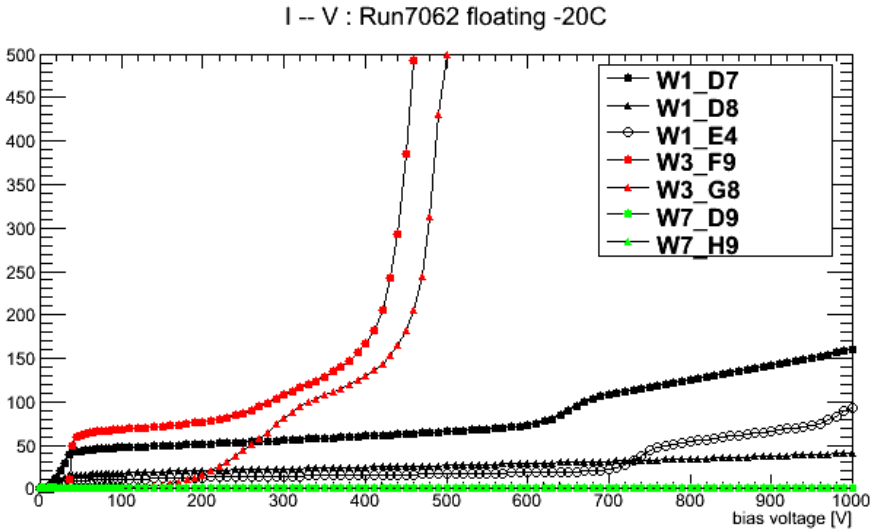
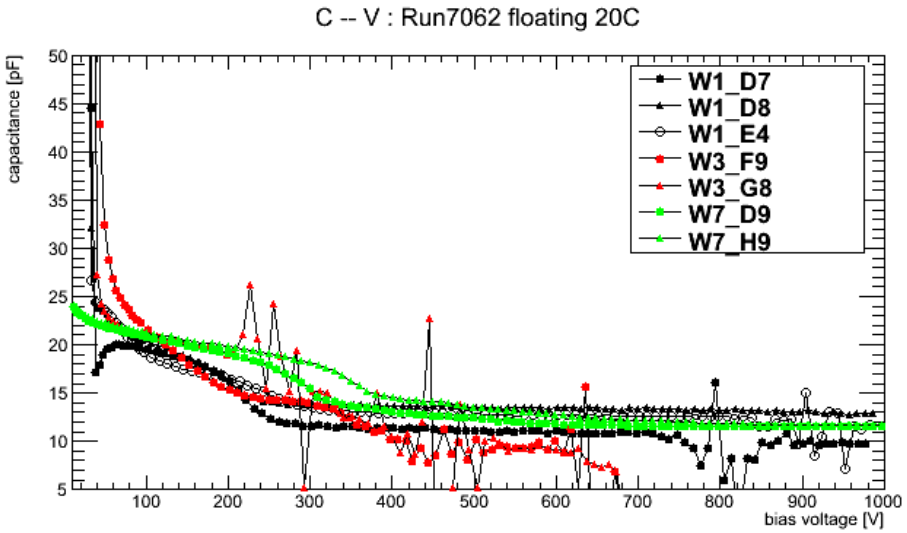
List of samples

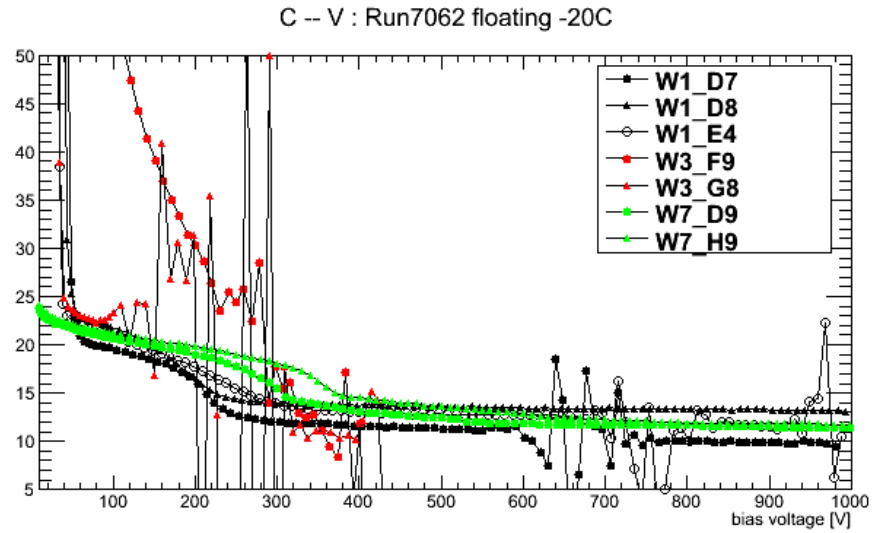
- Run 7062 W1 (doping 1.6E13)
  - D7
  - D8
  - E4
- Run 7062 W3 (doping 2.0E13)
  - F9
  - G8
- Run 7062 W5 (doping 2.2E13)
  - F8
  - D7
- Run 7062 W7 (PIN)
  - D9
  - H9

CV/IV measurements (I)

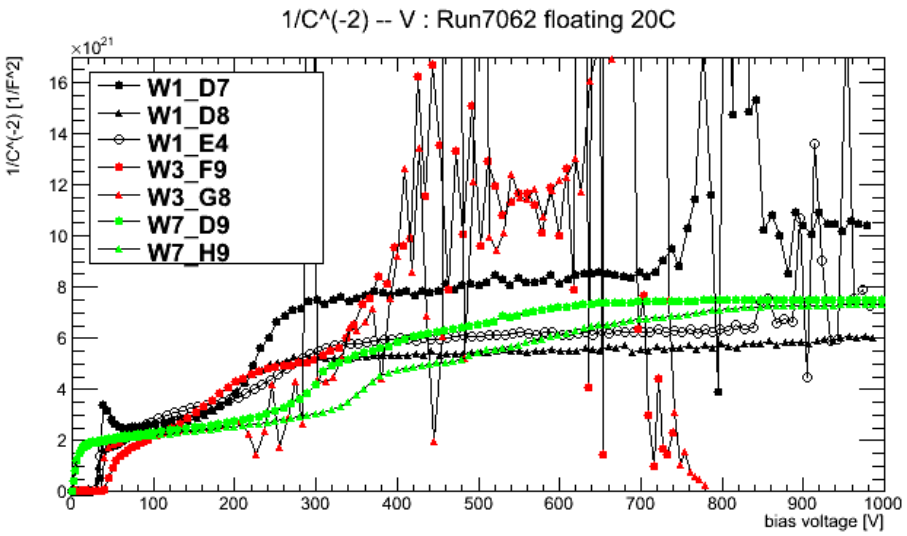


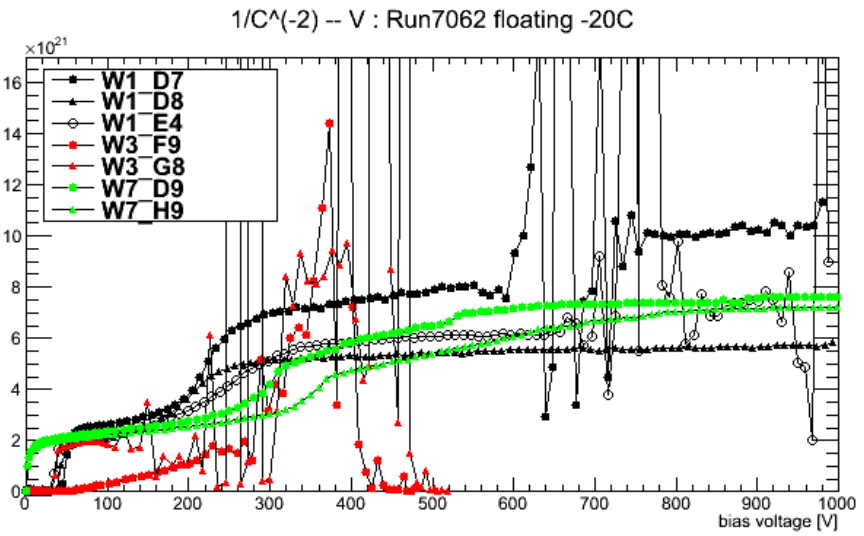






CV/IV measurements (II)





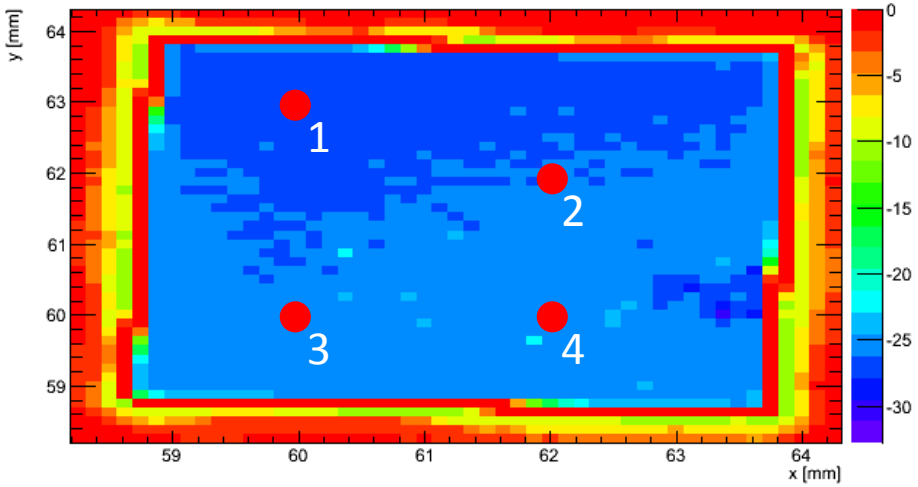
	V_foot	V_fd	V_bd	C_end	Noise
W1_D7	30V	100V	---	10pF	800V
W1_D8	29V	100V	---	13pF	---
W1_E4	28V	100V	---	13pF	900V
W3_F9	35V	110V	650V	10pF	450V
W3_G8	35V	110V	700V	11pF	250V, 450V
W7_D9	---	30V	---	11.5pF	---
W7_H9	---	30V	---	11.5pF	---

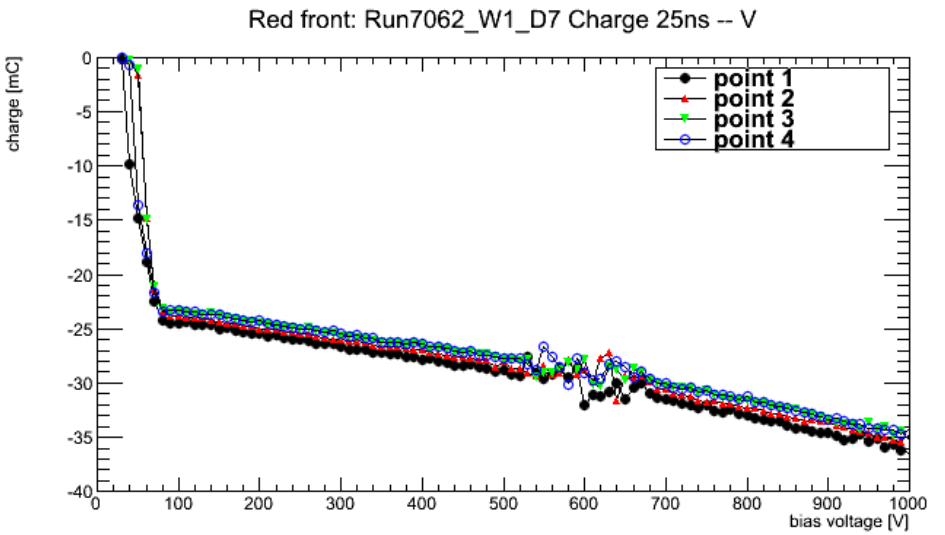
	V_foot	V_fd	V_bd	C_end	Noise
W1_D7	40V	100V	---	10pF	650V
W1_D8	32V	100V	---	13pF	---
W1_E4	29V	100V	---	13pF	750V
W3_F9	55V	110V	400V	10pF	250V
W3_G8	30V	110V	450V	11pF	150V, 250V
W7_D9	---	30V	---	11.5pF	---
W7_H9	---	30V	---	11.5pF	---

W1 D7

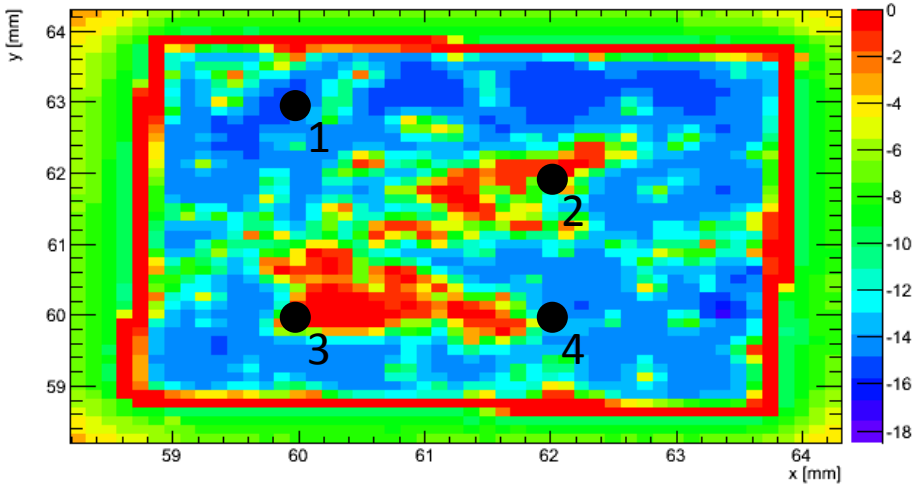
W1_D7 red front

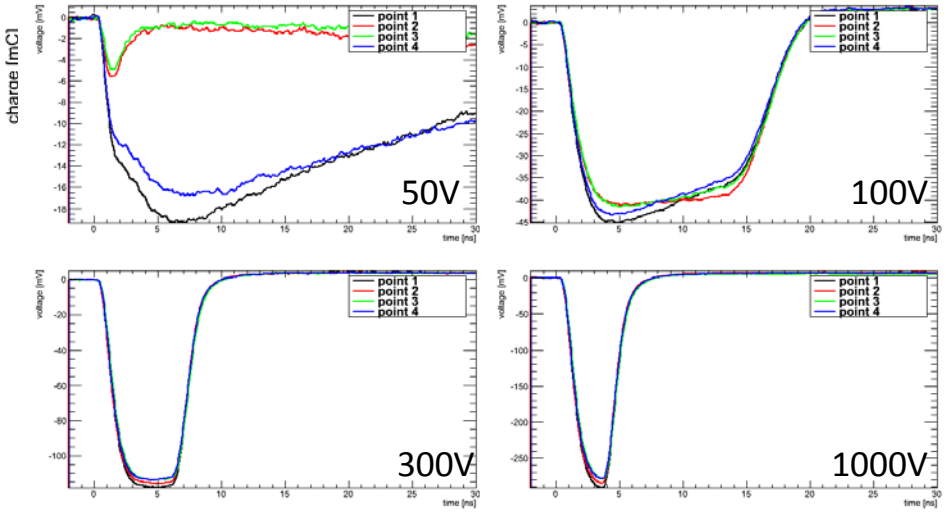
bias voltage: 300V





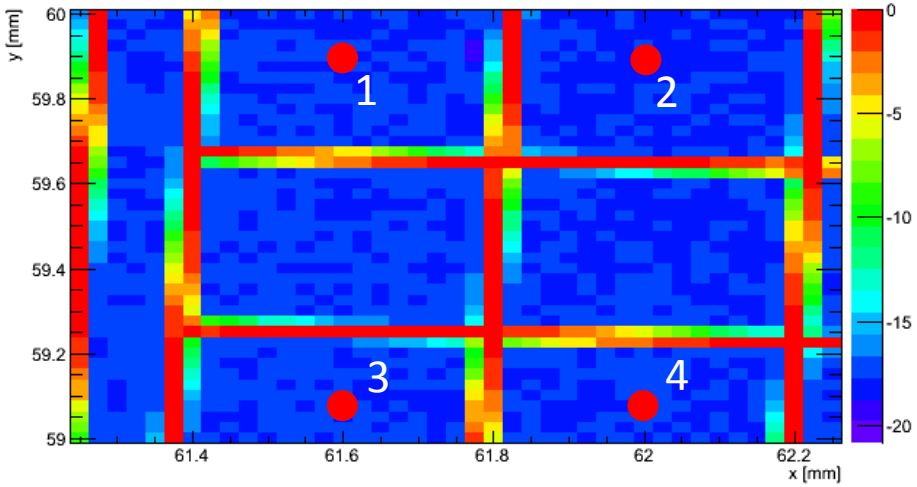
bias voltage: 50V

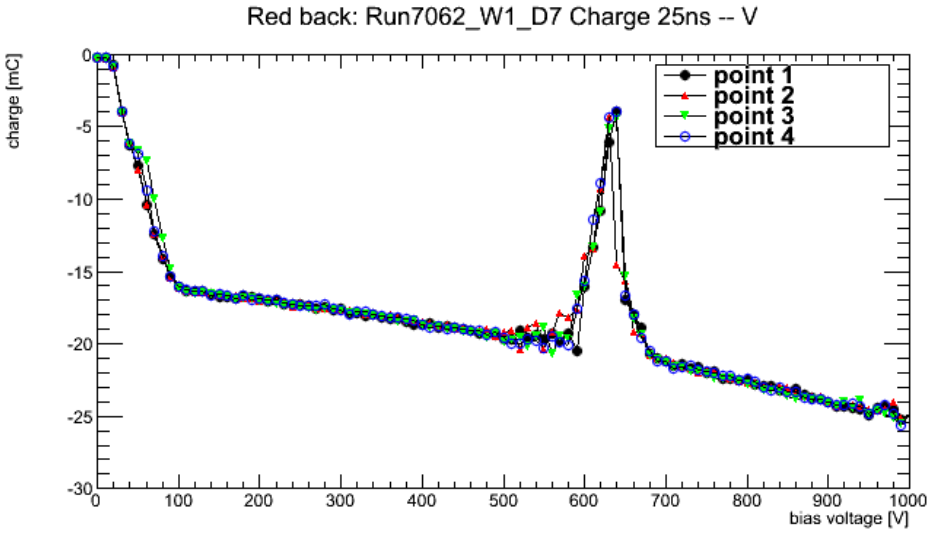




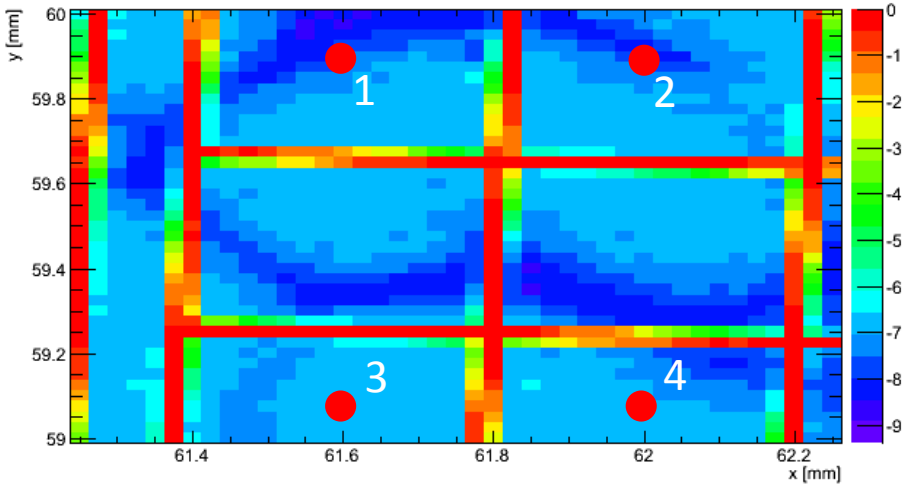
W1_D7 red back

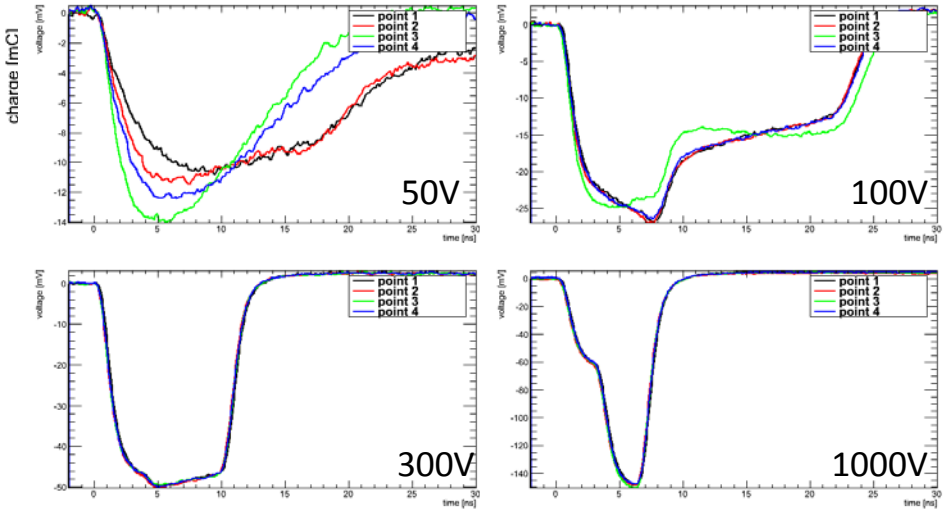
bias voltage: 300V





bias voltage: 50V

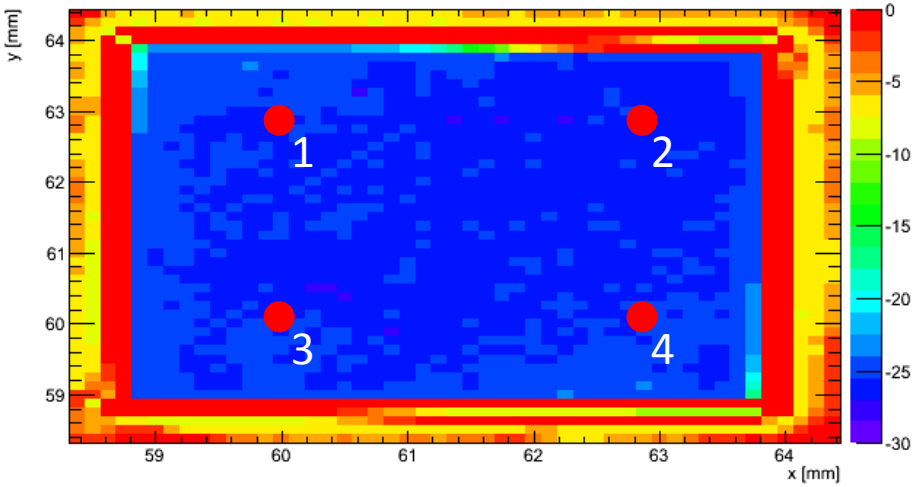


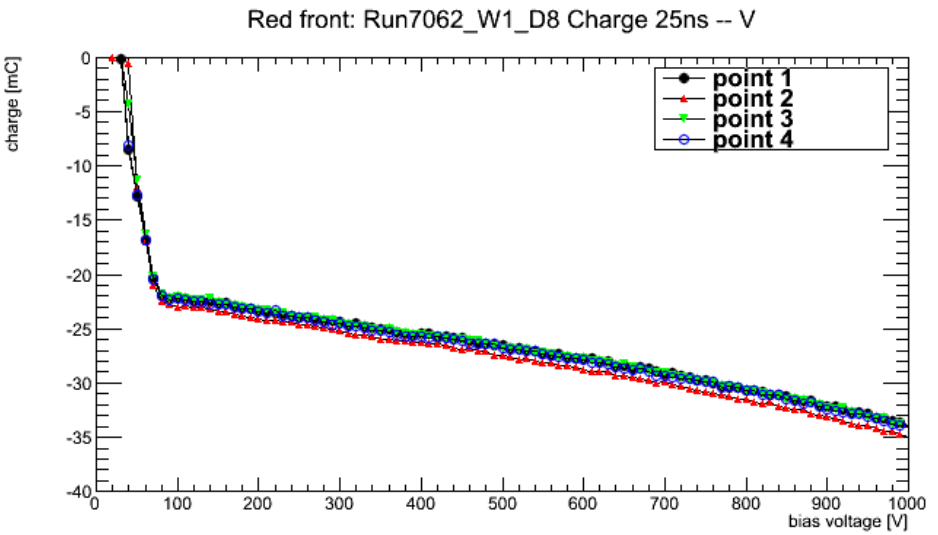


W1 D8

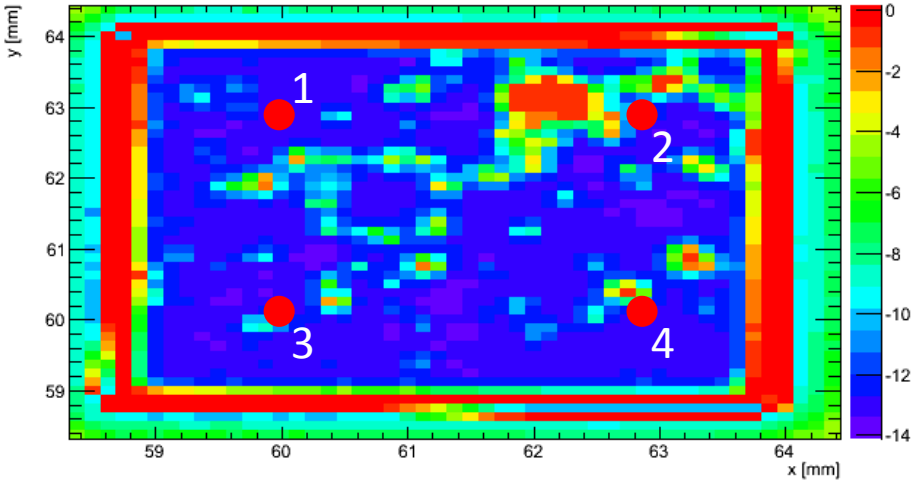
W1_D8 red front

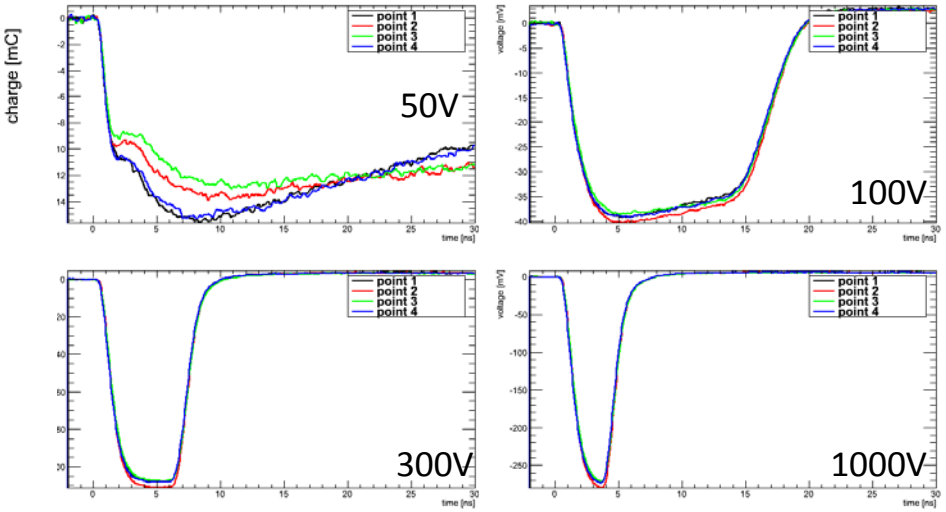
bias voltage: 300V





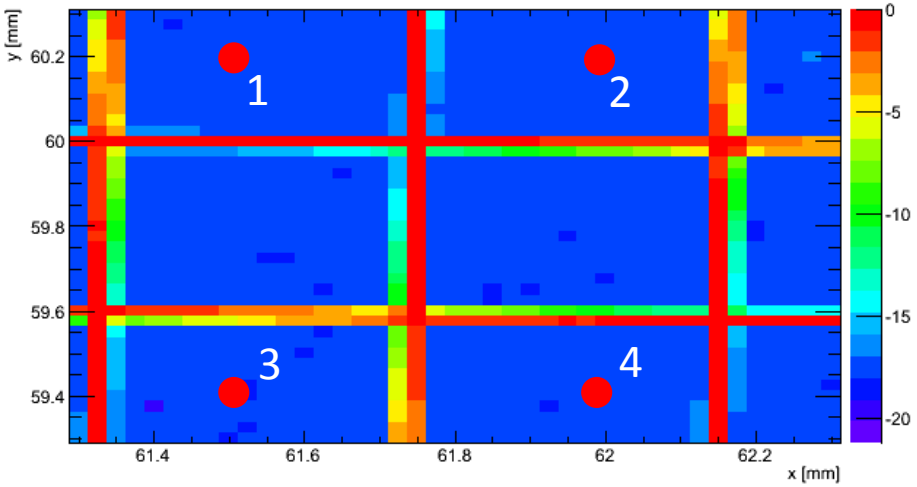
bias voltage: 50V

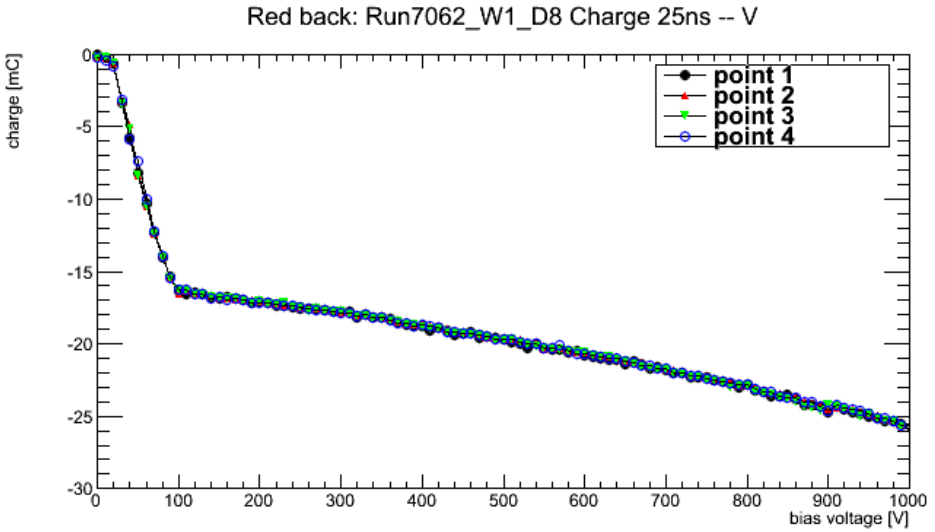




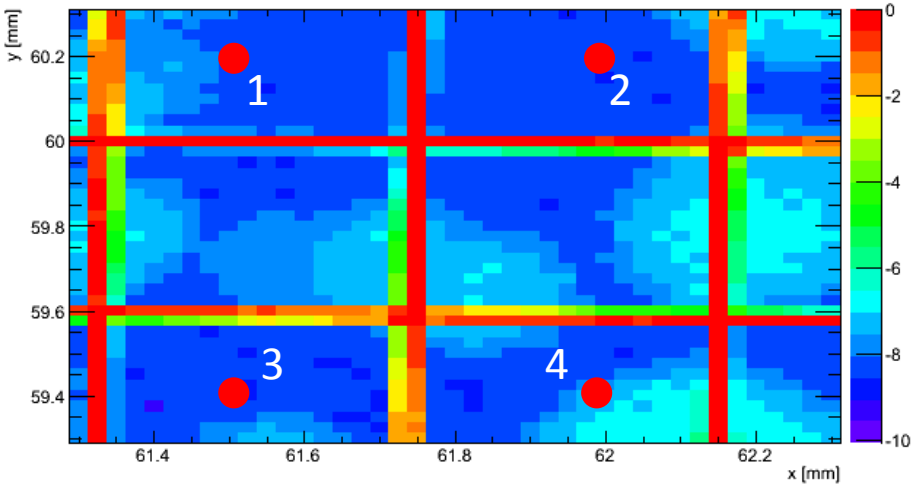
W1_D8 red back

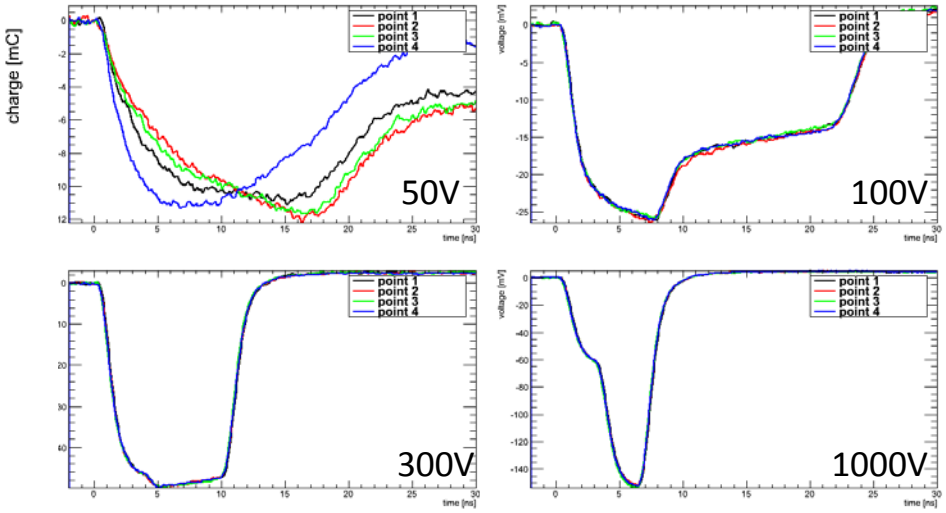
bias voltage: 300V





bias voltage: 50V

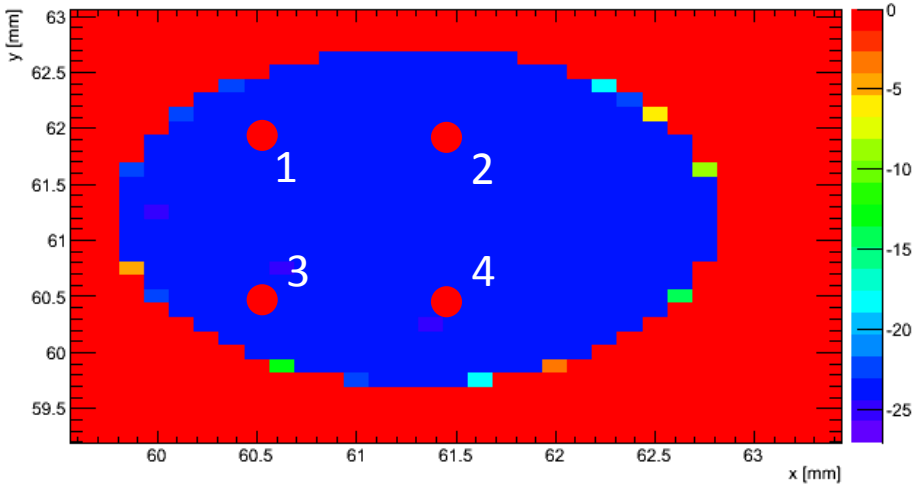


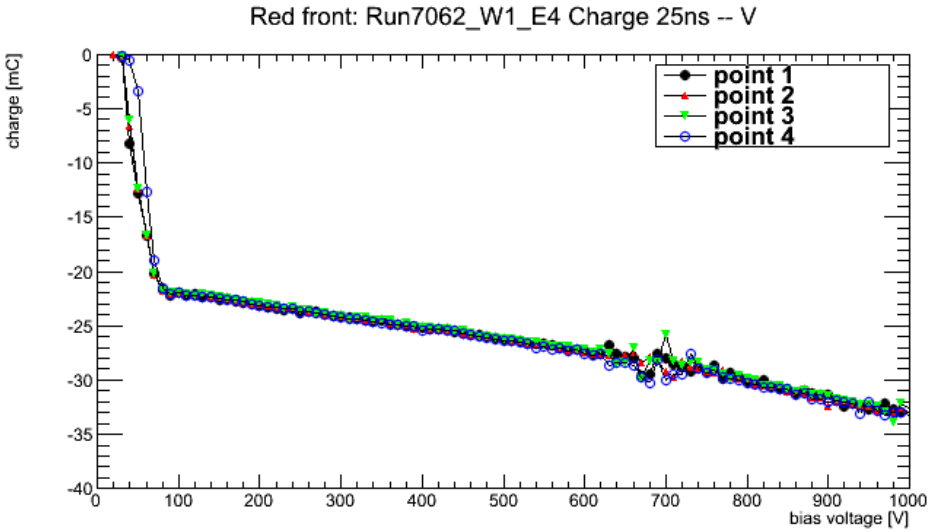


W1 E4

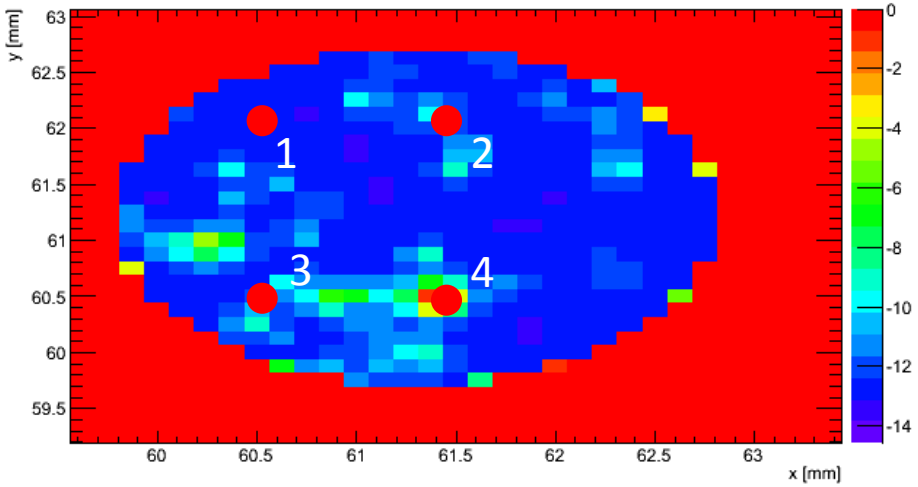
W1_E4 red front

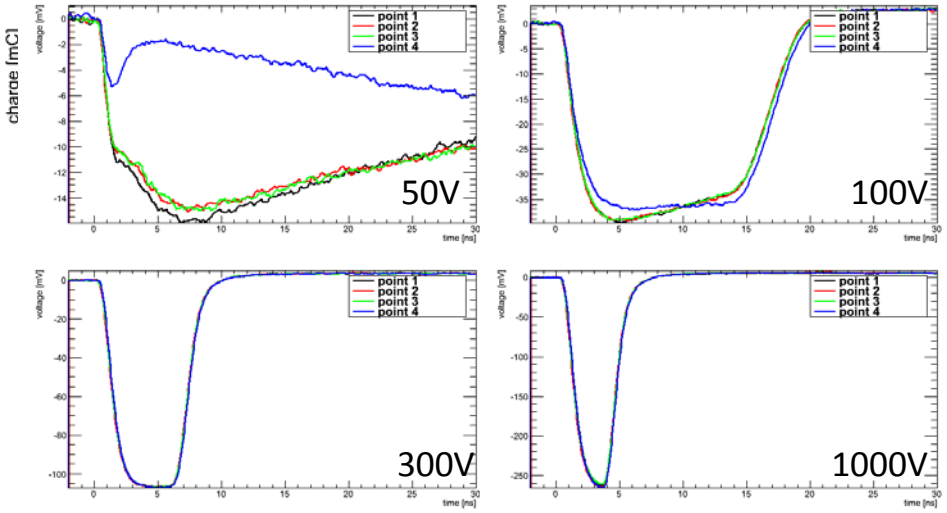
bias voltage: 300V





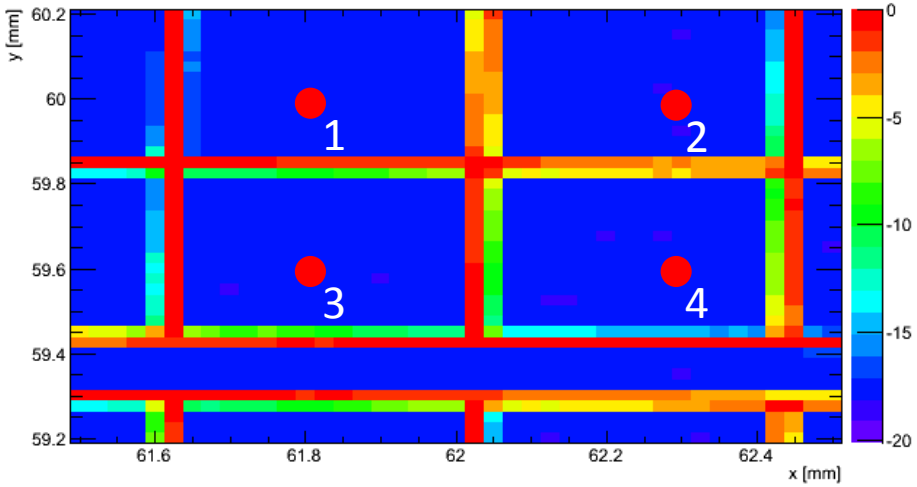
bias voltage: 50V

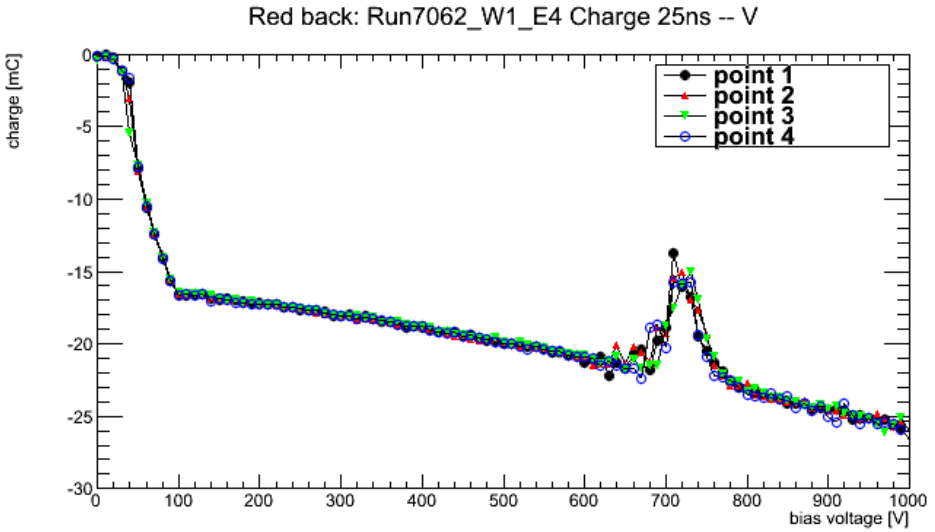




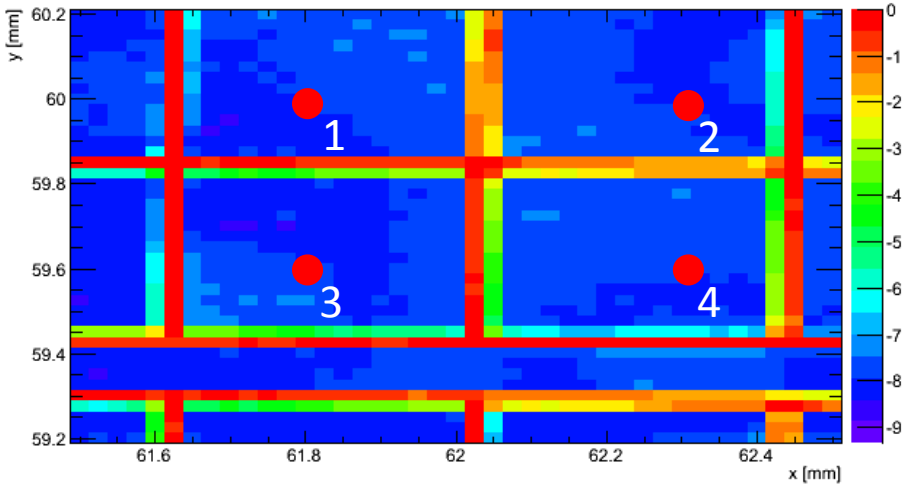
W1_E4 red back

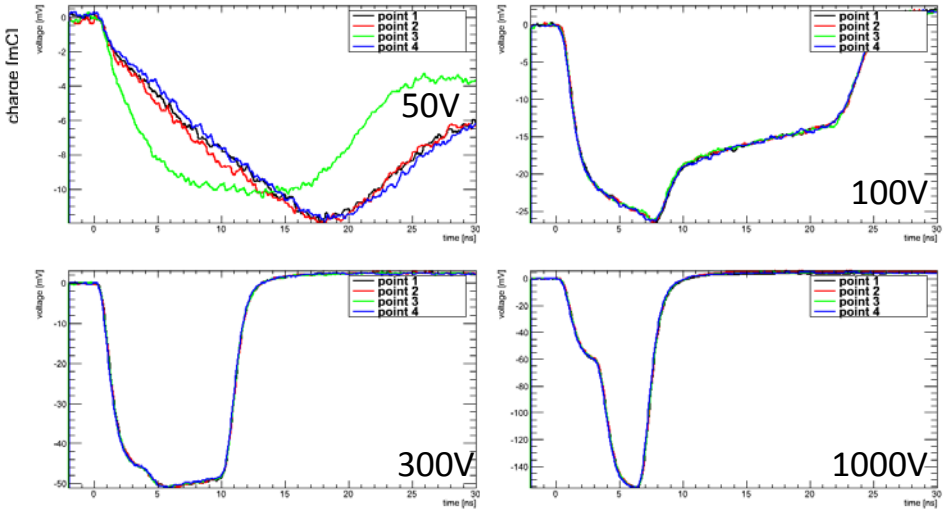
bias voltage: 300V





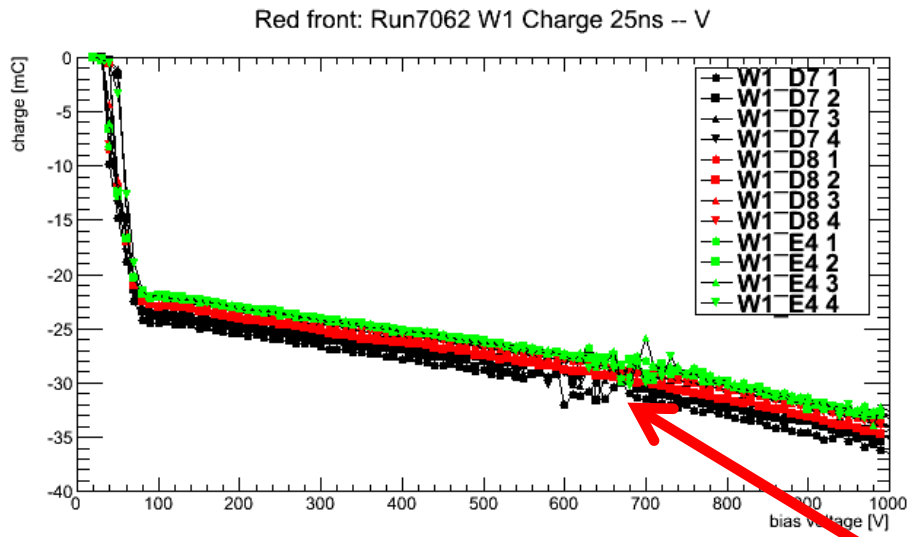
bias voltage: 50V

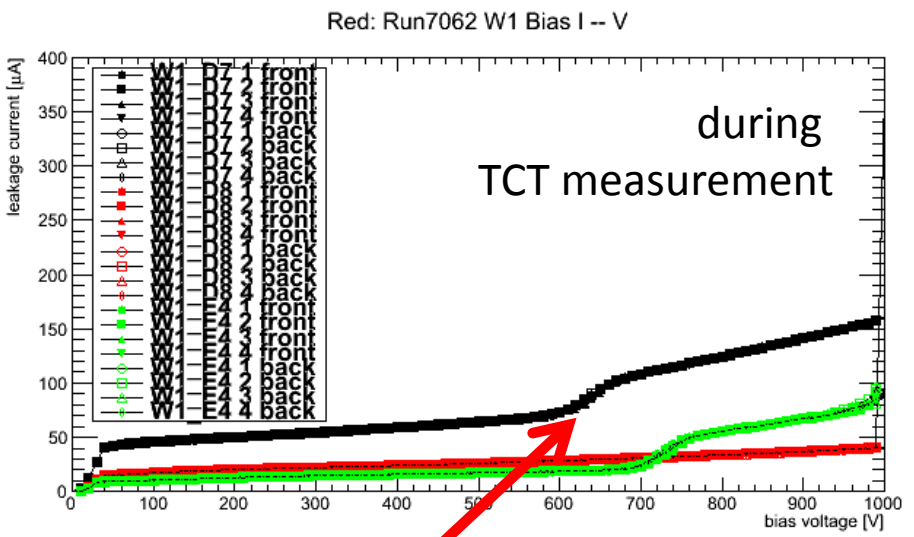


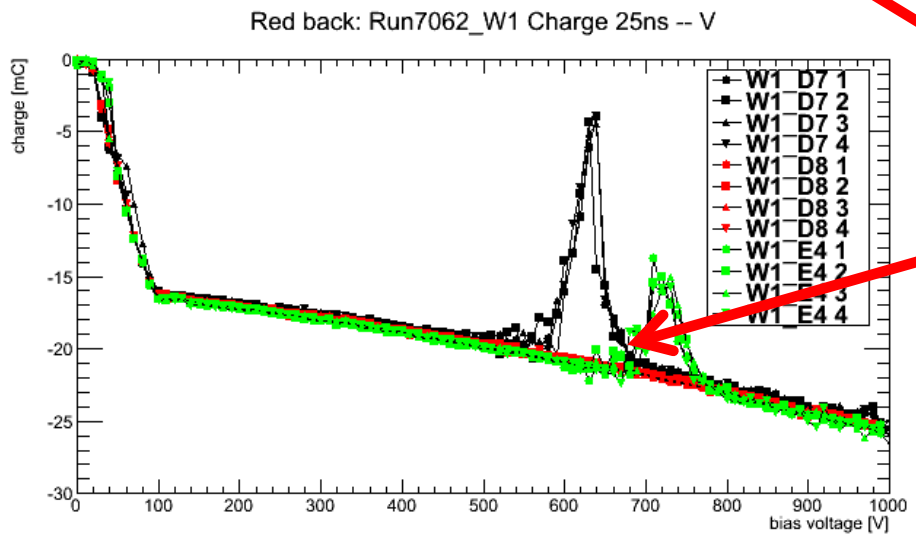


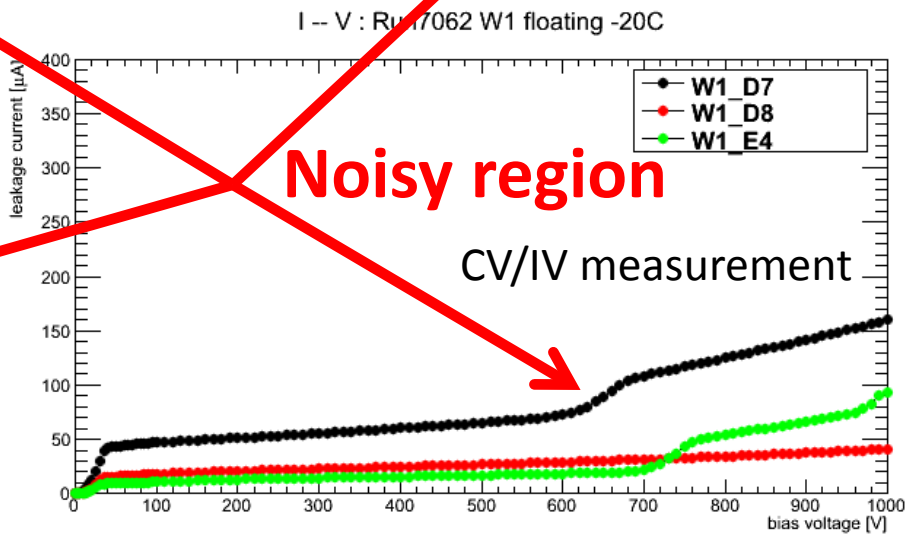
Summary W1

Summary W1


Red front: Run7062 W1 Charge 25ns -- V
charge [mC]
bias voltage [V]
W1_D7 1
W1_D7 2
W1_D7 3
W1_D7 4
W1_D8 1
W1_D8 2
W1_D8 3
W1_D8 4
W1_E4 1
W1_E4 2
W1_E4 3
W1_E4 4


Red: Run7062 W1 Bias I -- V
leakage current [μA]
bias voltage [V]
during
TCT measurement

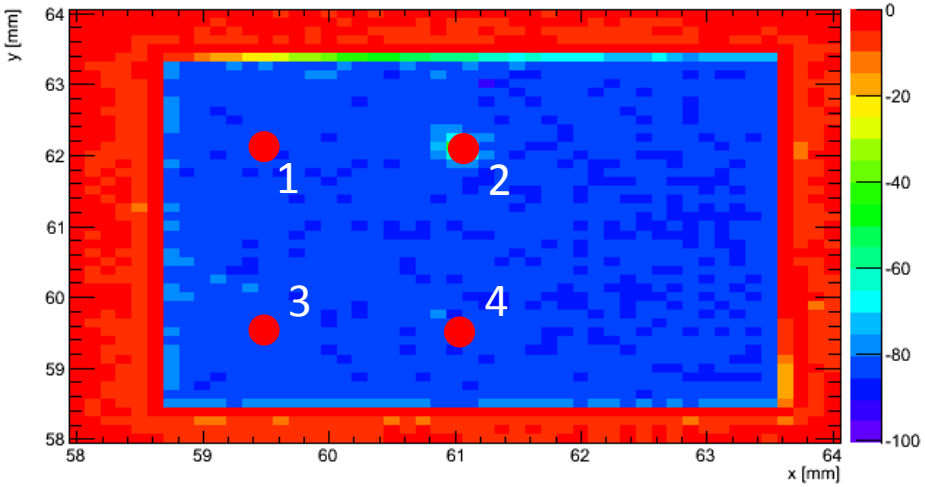

Red back: Run7062_W1 Charge 25ns -- V
charge [mC]
bias voltage [V]
W1_D7 1
W1_D7 2
W1_D7 3
W1_D7 4
W1_D8 1
W1_D8 2
W1_D8 3
W1_D8 4
W1_E4 1
W1_E4 2
W1_E4 4

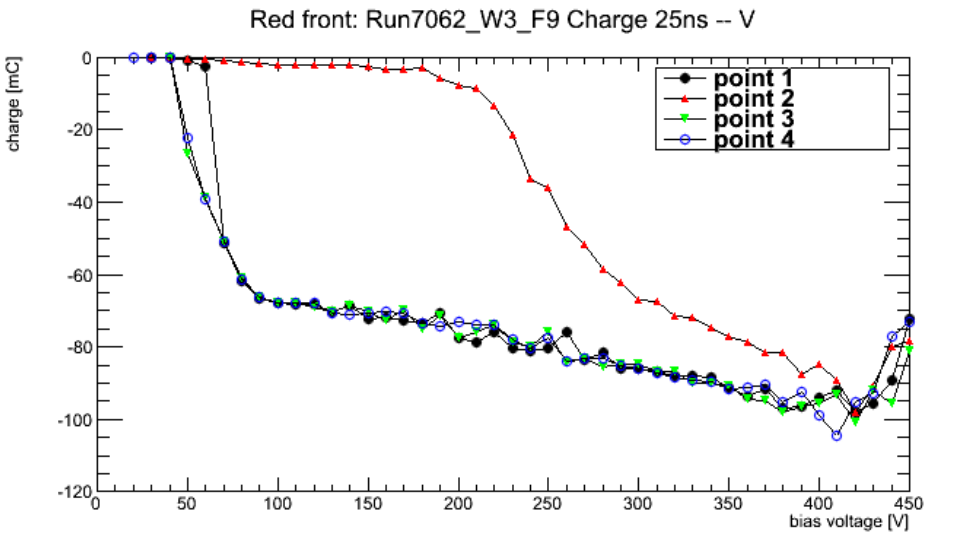

I -- V : Run7062 W1 floating -20C
leakage current [μA]
bias voltage [V]
W1_D7
W1_D8
W1_E4
Noisy region
CV/IV measurement

W3 F9

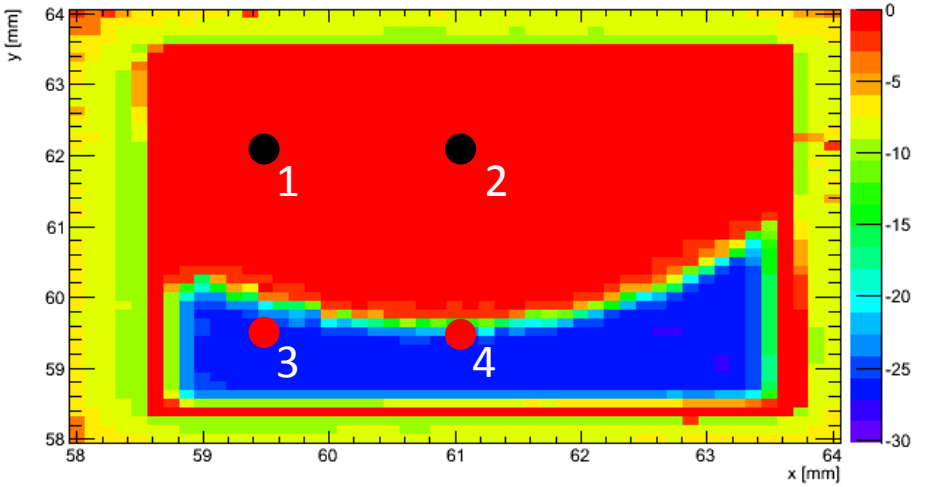
W3_F9 red front

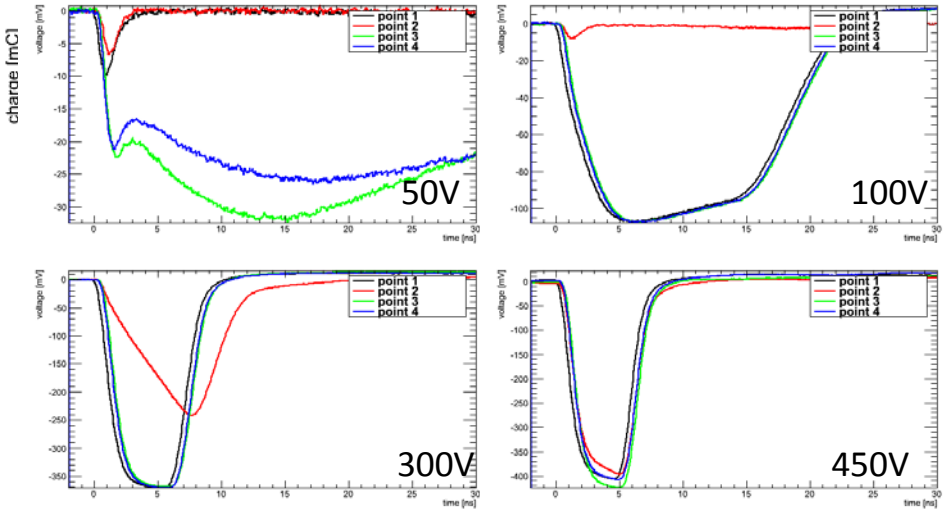
bias voltage: 300V





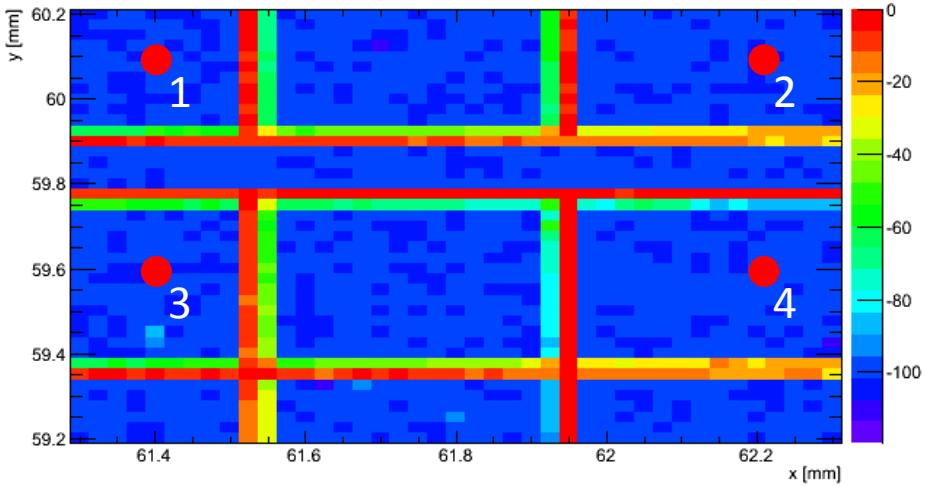
bias voltage: 50V

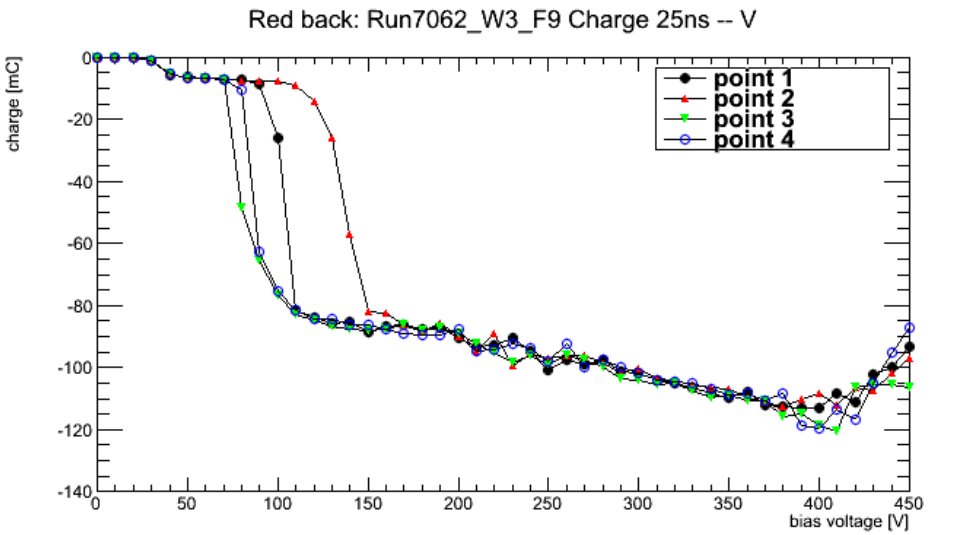




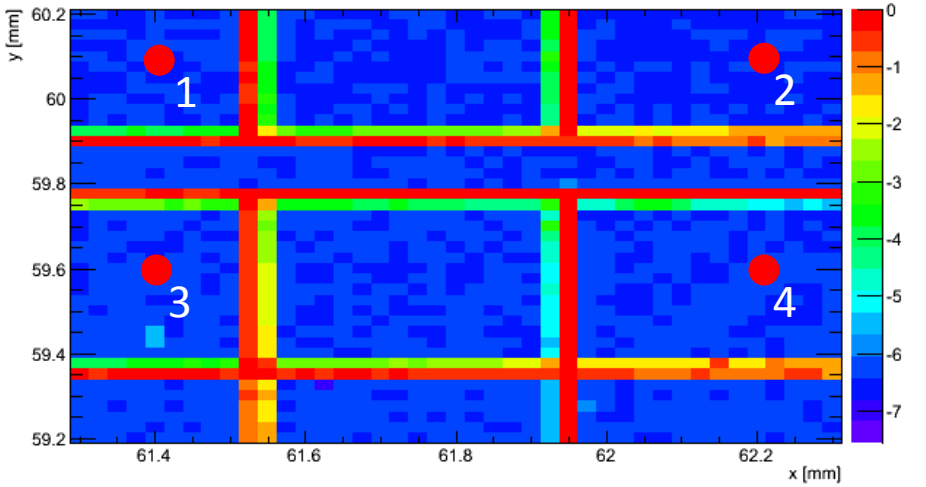
W3_F9 red back

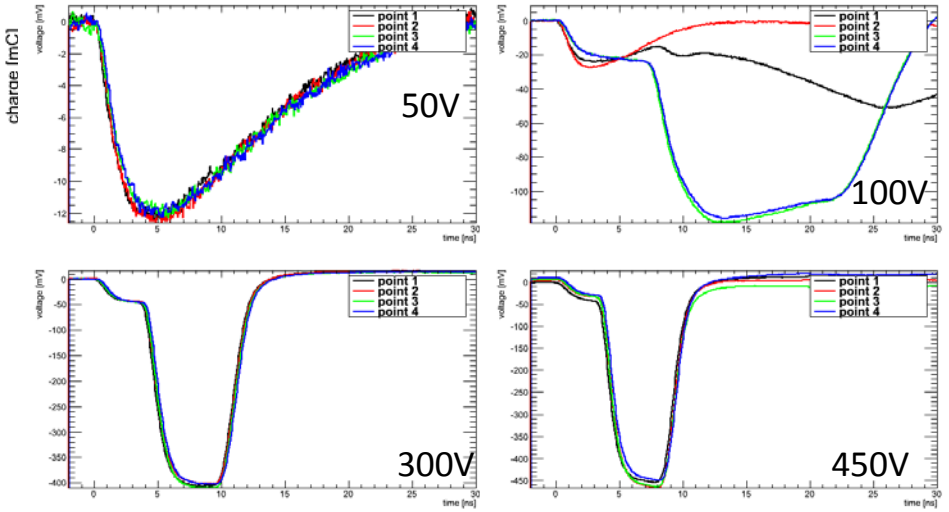
bias voltage: 300V





bias voltage: 50V

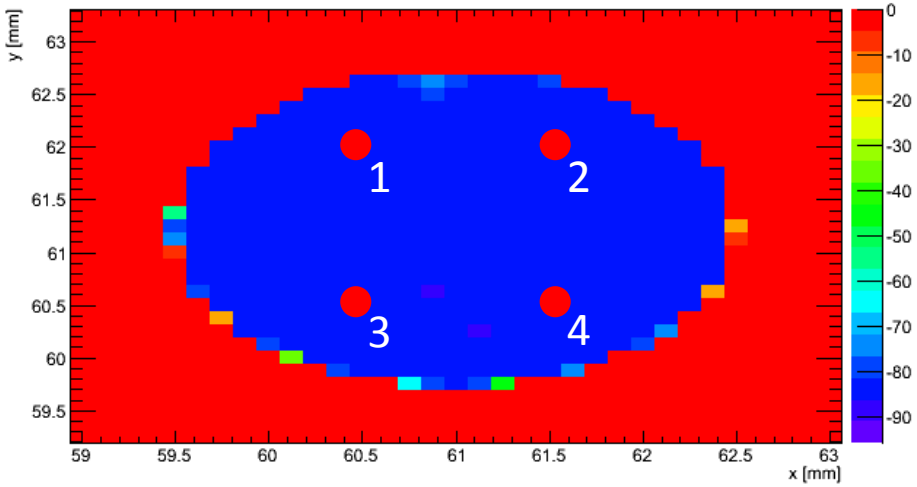


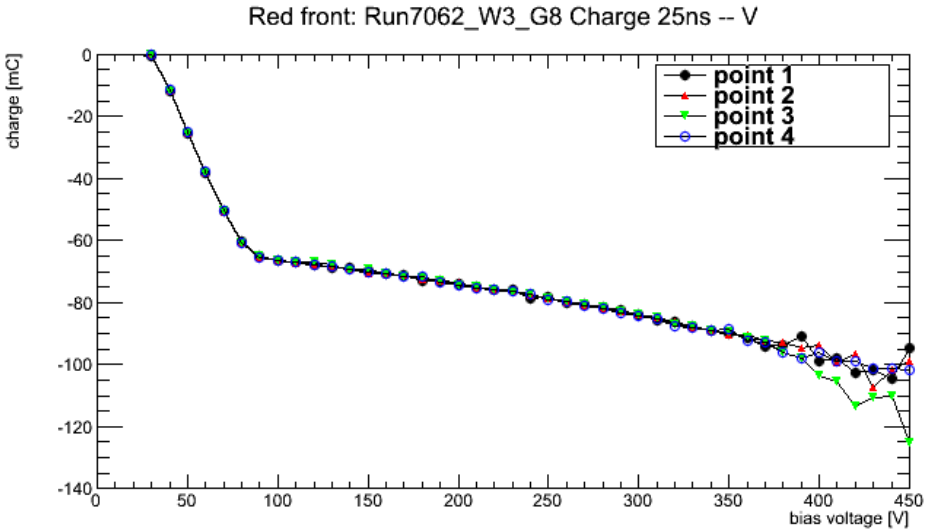


W3 G8

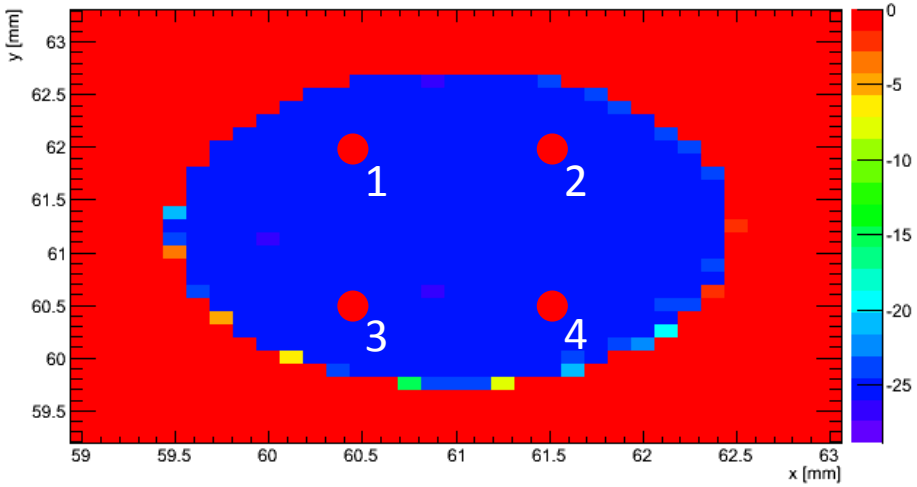
W3_G8 red front

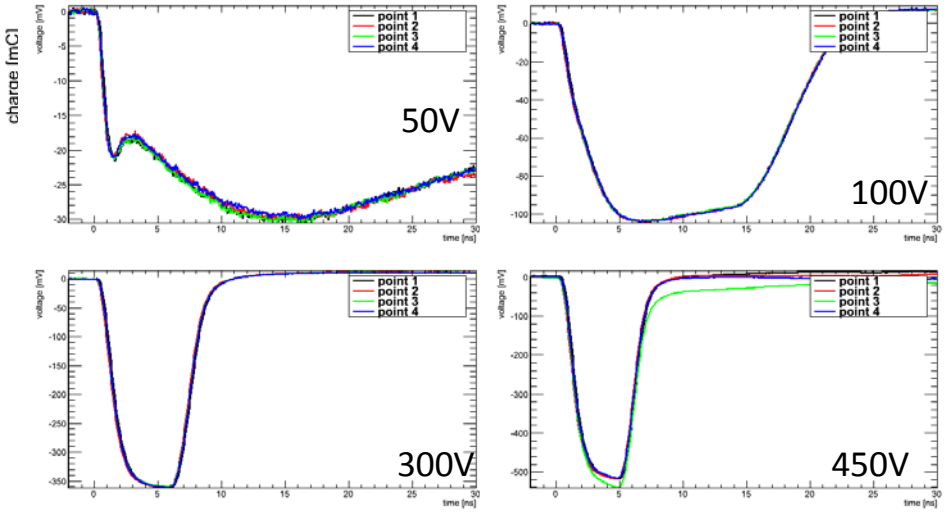
bias voltage: 300V





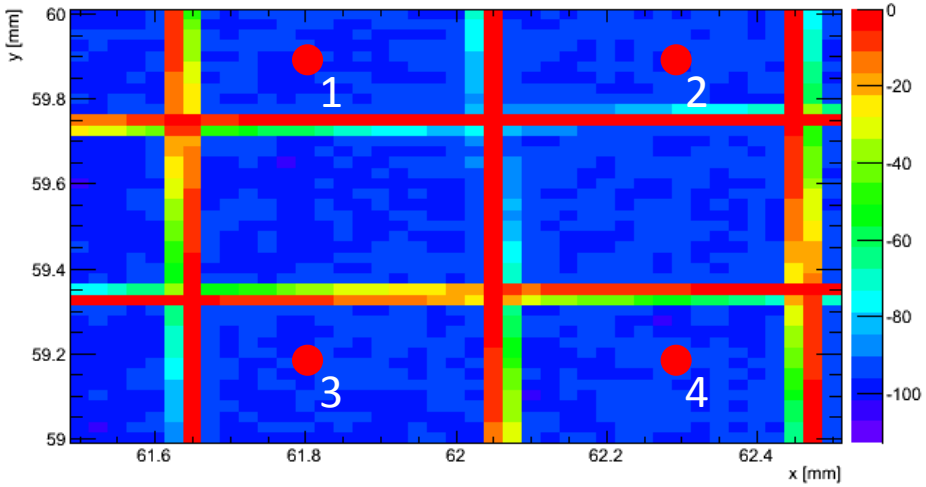
bias voltage: 50V

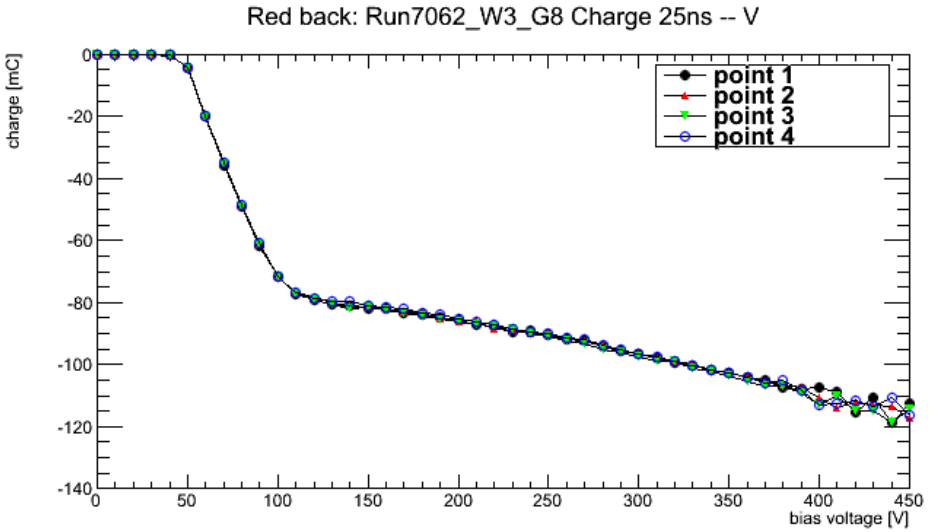




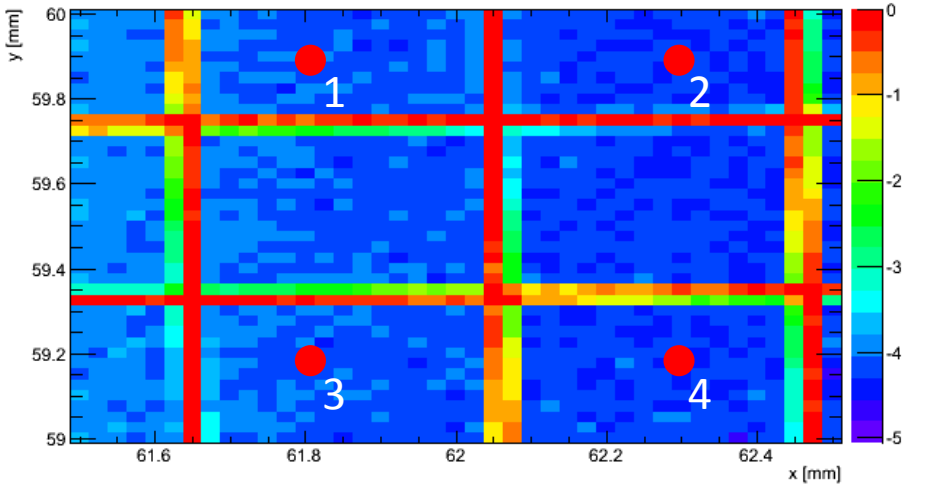
W3_G8 red back

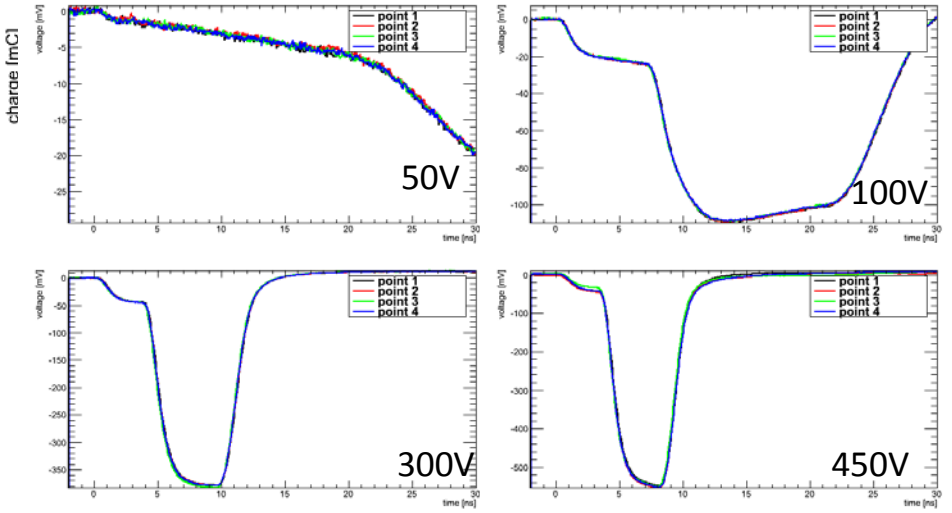
bias voltage: 300V





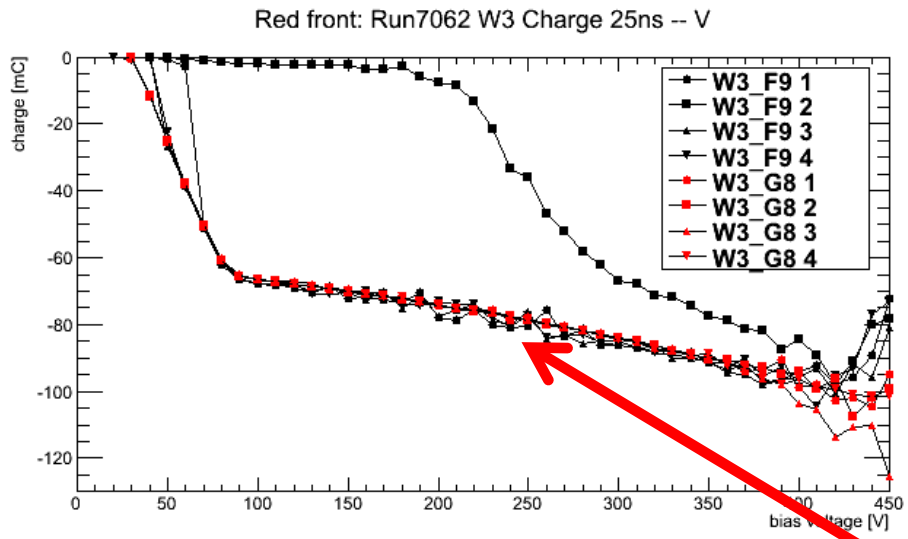
bias voltage: 50V

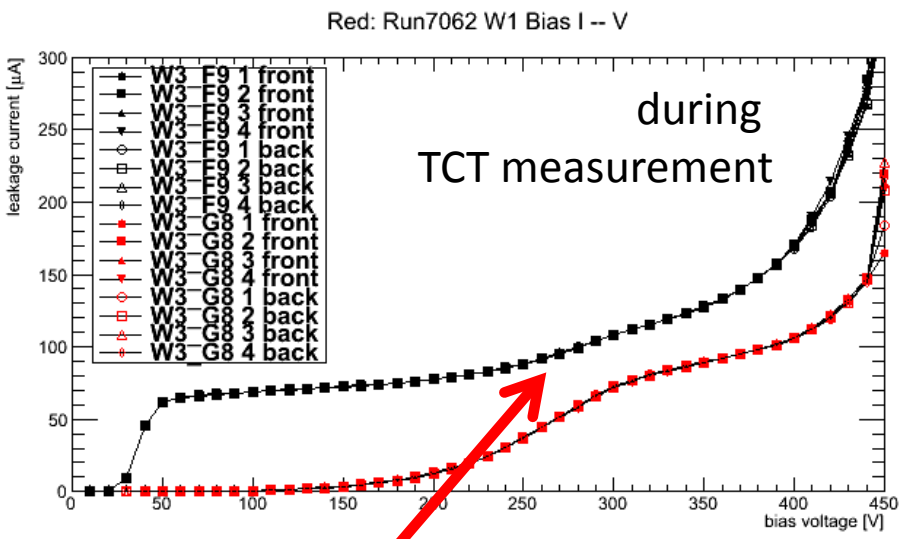


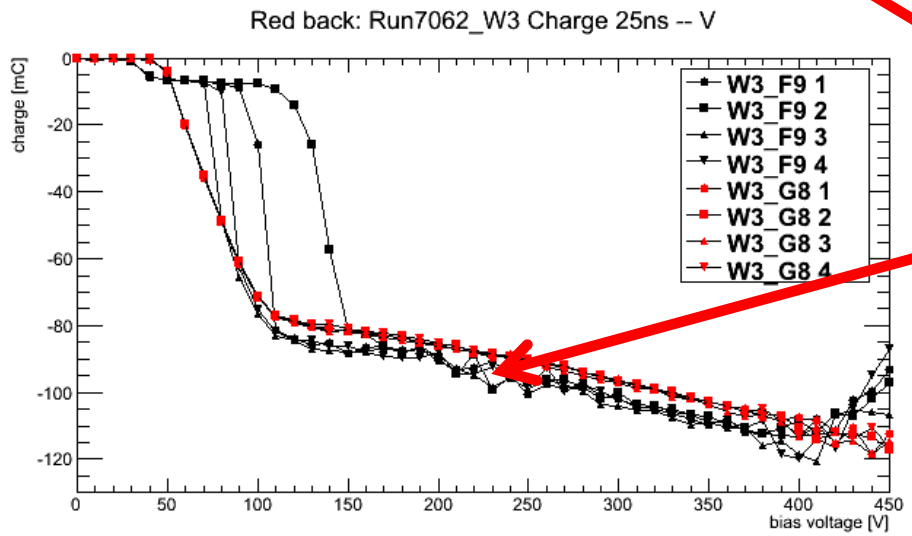


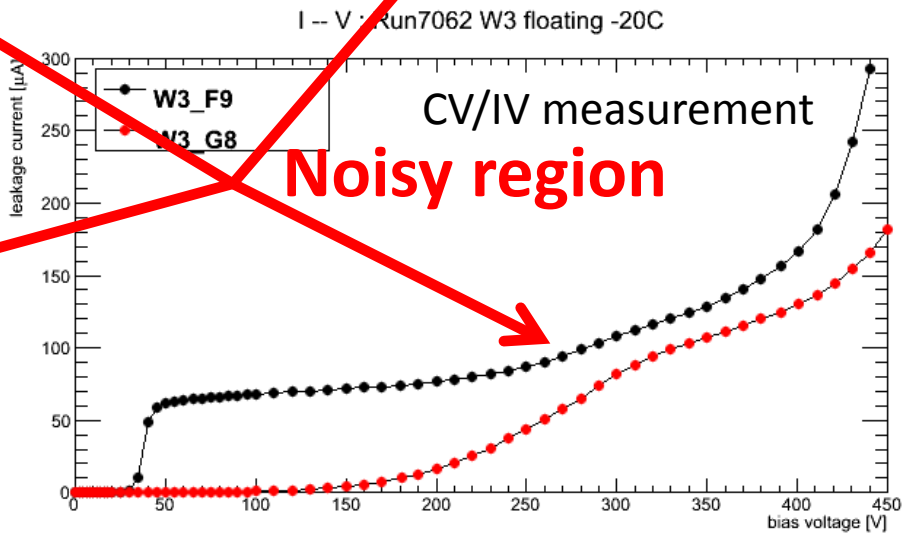
Summary W3

Summary W3


Red front: Run7062 W3 Charge 25ns -- V
charge [mC]
bias voltage [V]
W3_F9 1
W3_F9 2
W3_F9 3
W3_F9 4
W3_G8 1
W3_G8 2
W3_G8 3
W3_G8 4


Red: Run7062 W1 Bias I -- V
leakage current [μA]
bias voltage [V]
W3_F9 1 front
W3_F9 2 front
W3_F9 3 front
W3_F9 4 front
W3_F9 1 back
W3_F9 2 back
W3_F9 3 back
W3_F9 4 back
W3_G8 1 front
W3_G8 2 front
W3_G8 3 front
W3_G8 4 front
W3_G8 1 back
W3_G8 2 back
W3_G8 3 back
W3_G8 4 back
during
TCT measurement

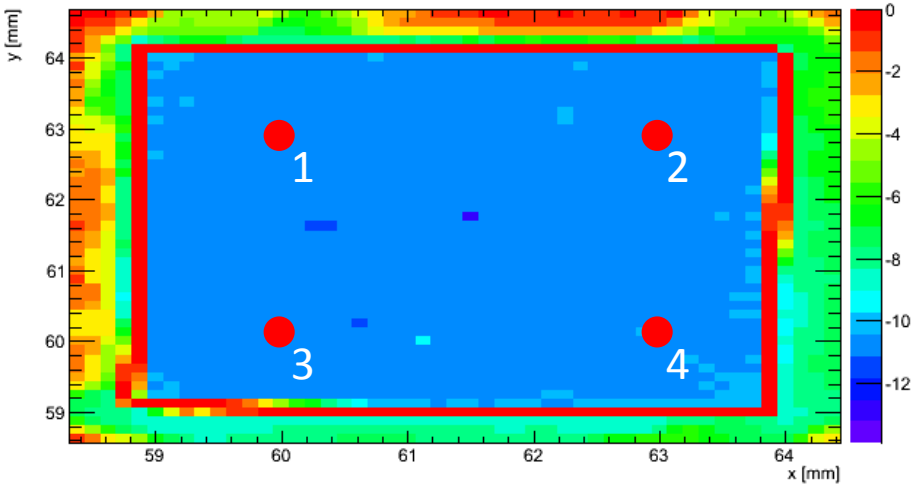

Red back: Run7062_W3 Charge 25ns -- V
charge [mC]
bias voltage [V]
W3_F9 1
W3_F9 2
W3_F9 3
W3_F9 4
W3_G8 1
W3_G8 2
W3_G8 3
W3_G8 4

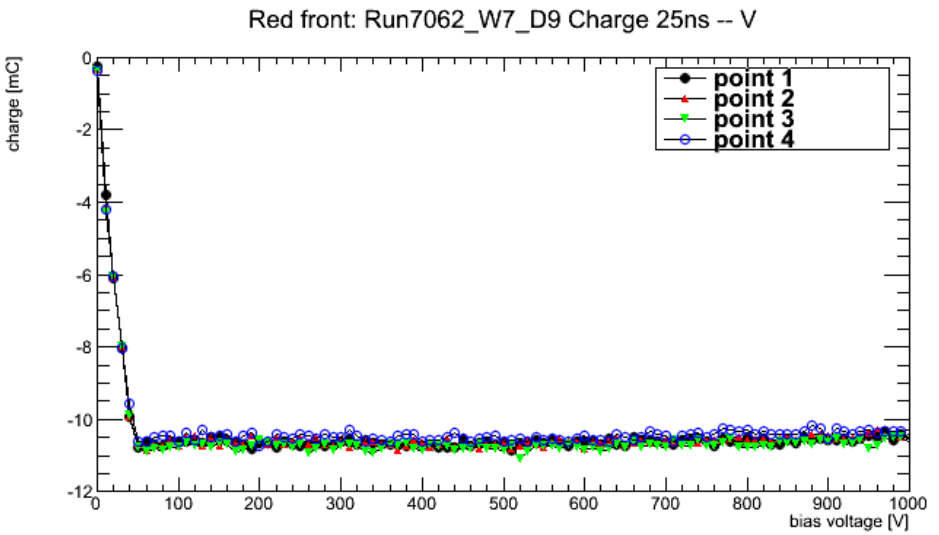

I -- V : Run7062 W3 floating -20C
leakage current [μA]
bias voltage [V]
W3_F9
W3_G8
CV/IV measurement
Noisy region

W7 D9

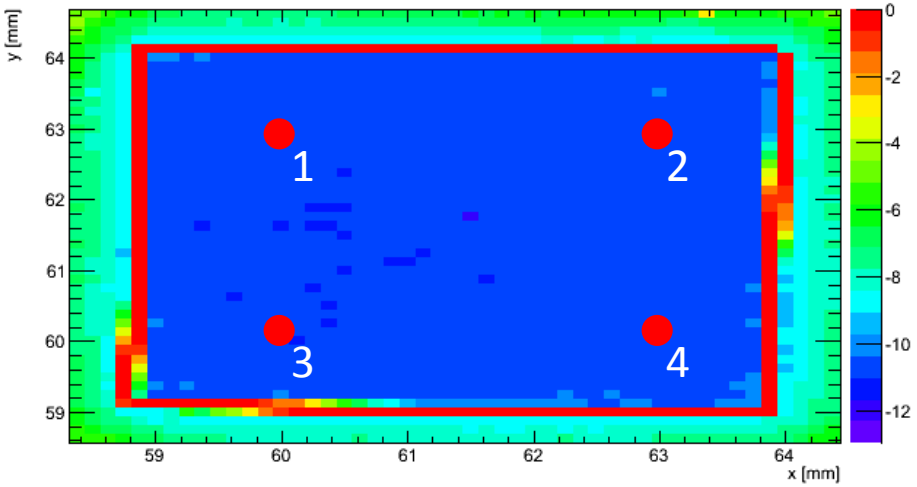
W7_D9 red front

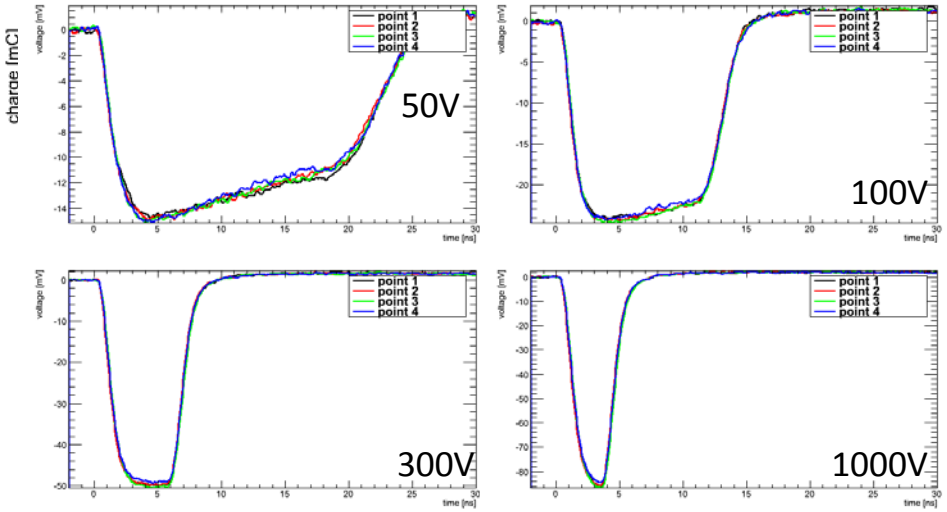
bias voltage: 300V





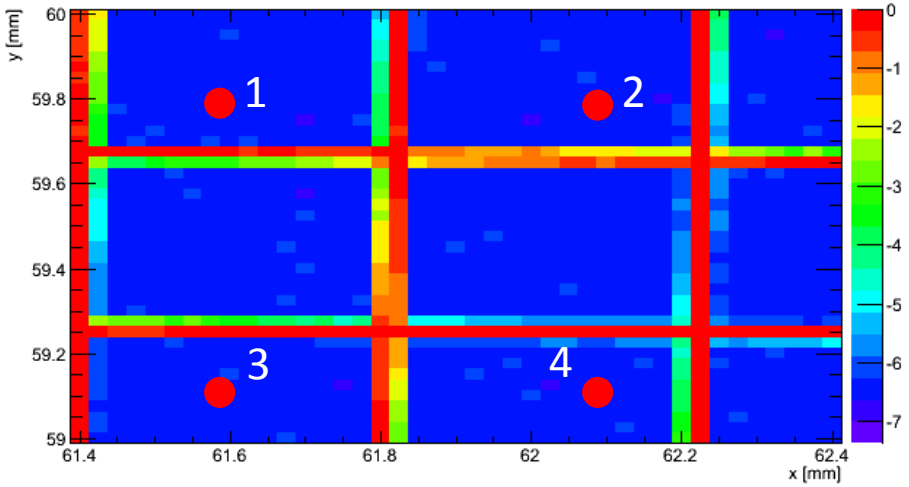
bias voltage: 50V

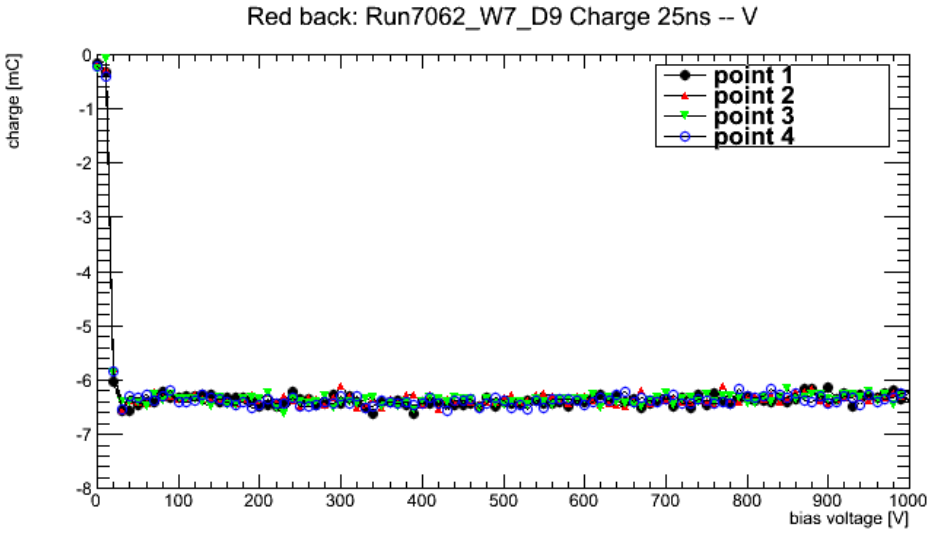




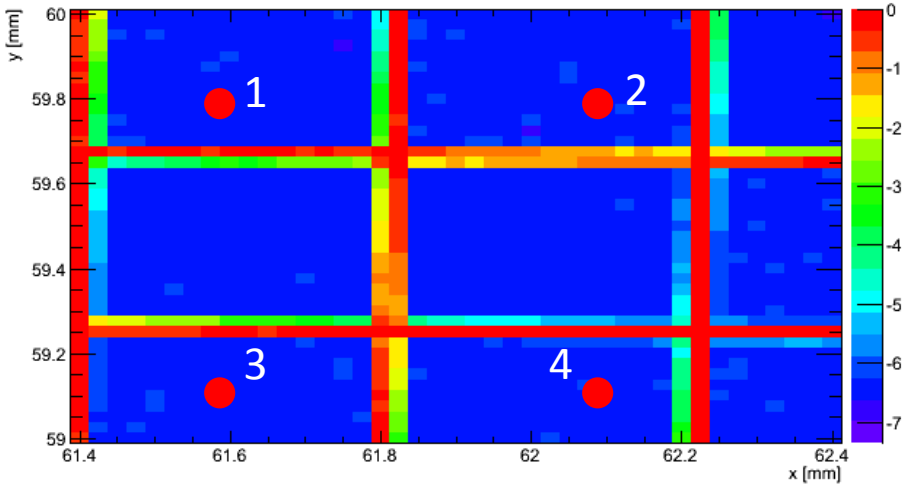
W7_D9 red back

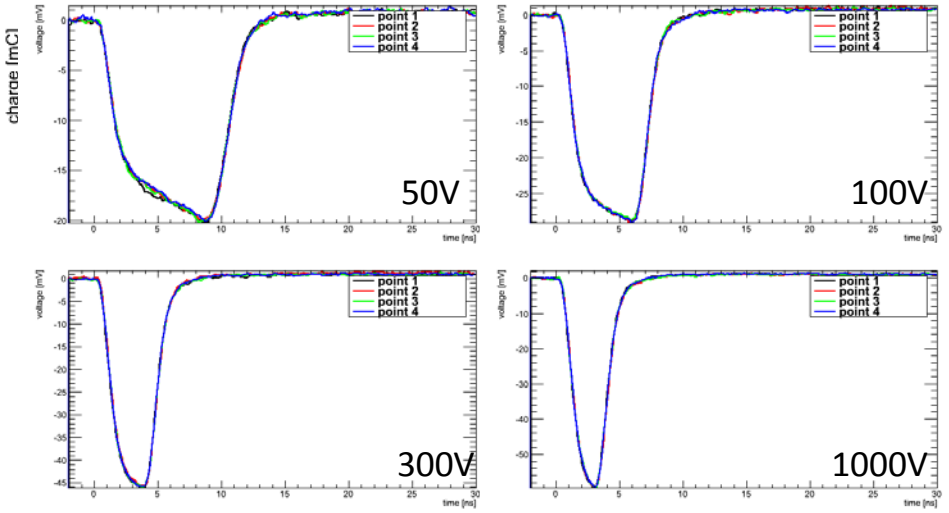
bias voltage: 300V





bias voltage: 50V

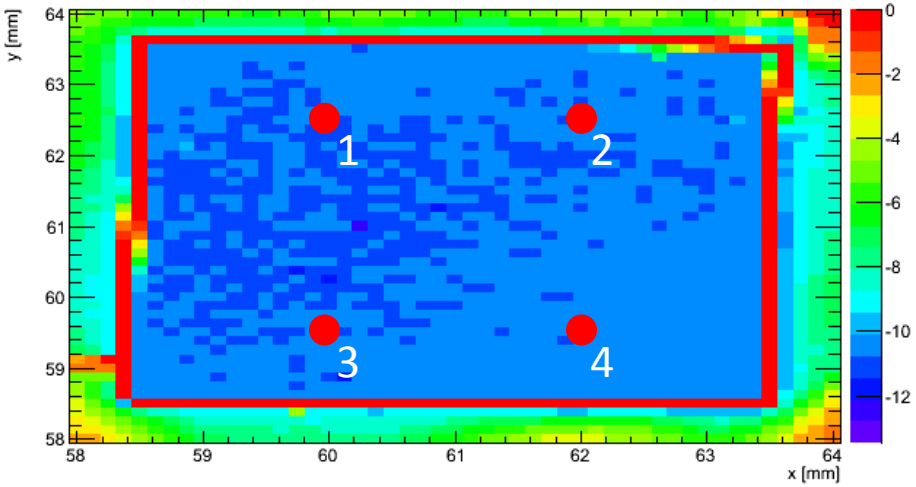


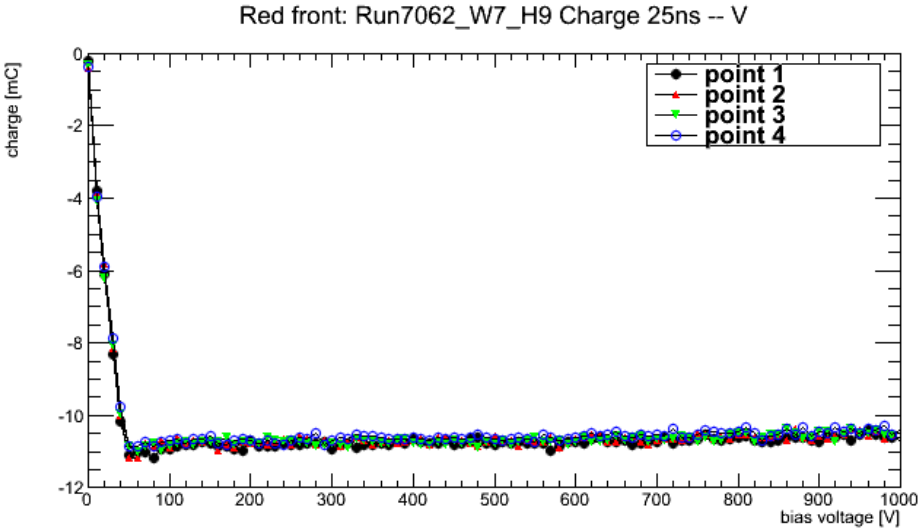


W7 H9

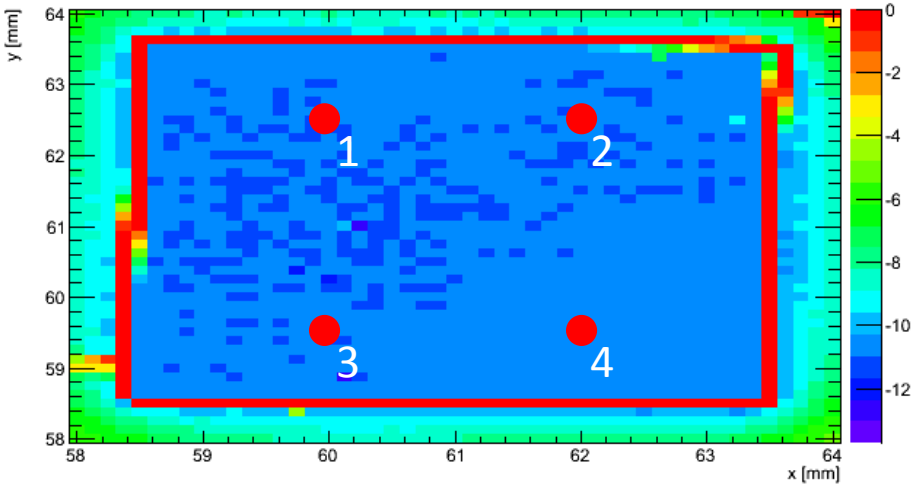
W7_H9 red front

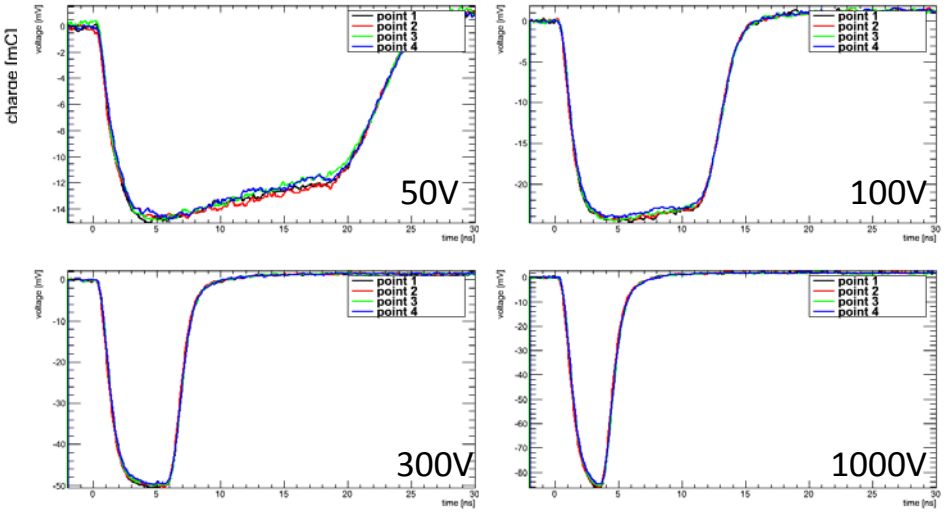
bias voltage: 300V





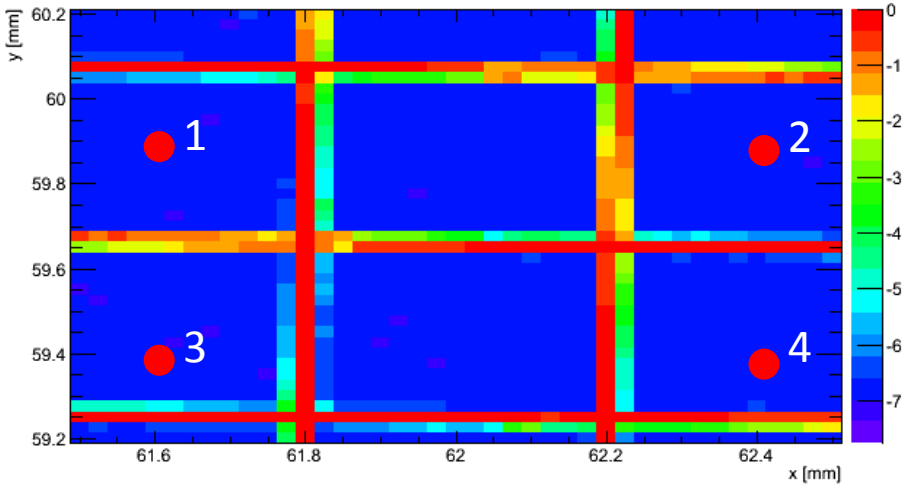
bias voltage: 50V

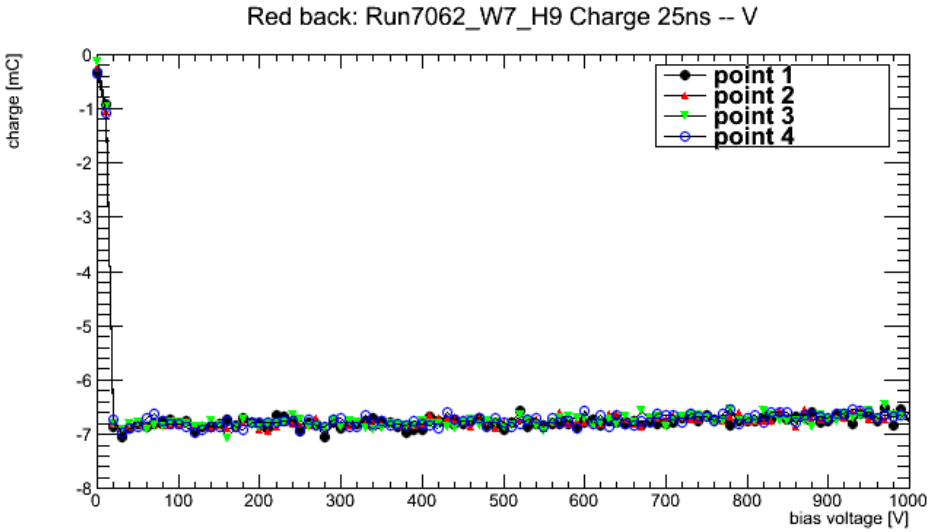




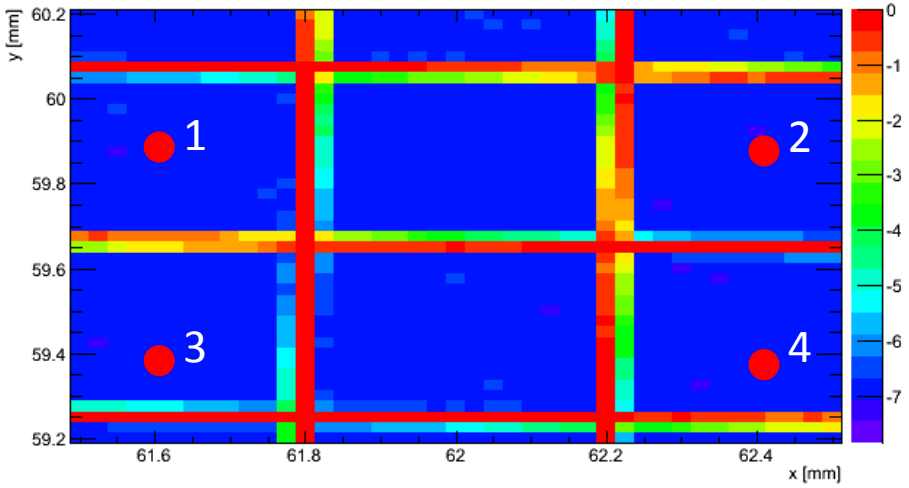
W7_H9 red back

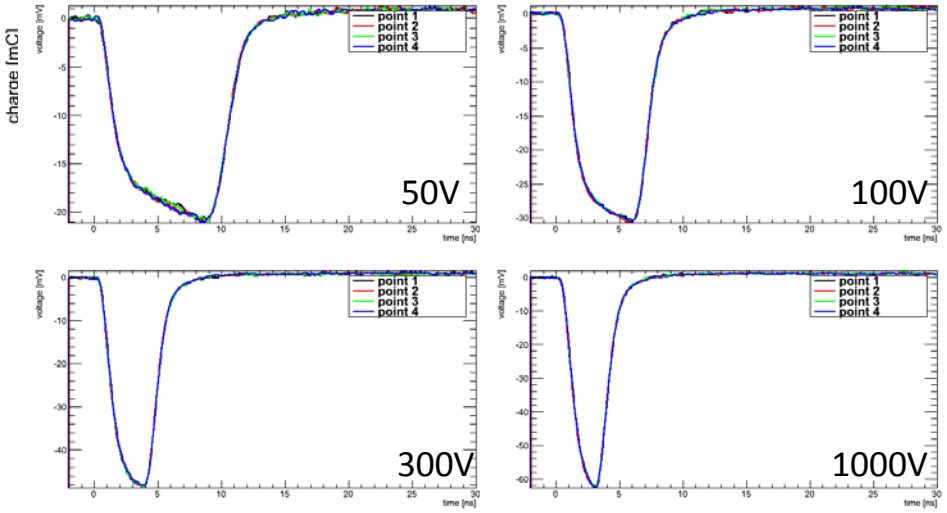
bias voltage: 300V





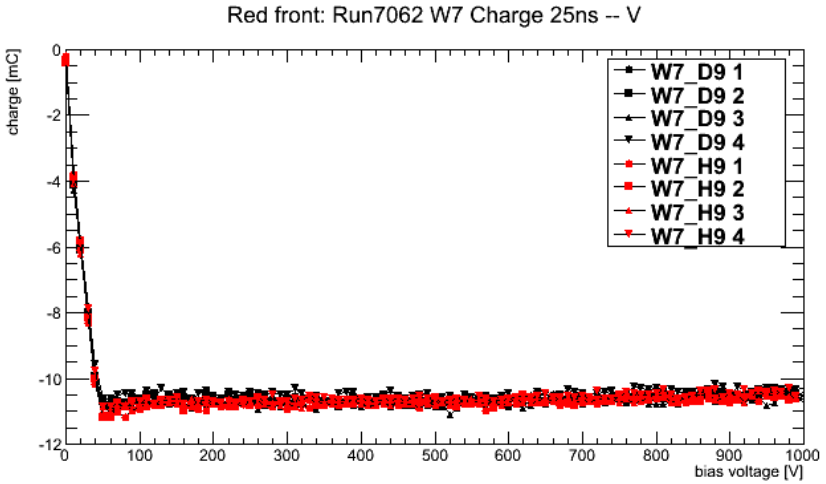
bias voltage: 50V

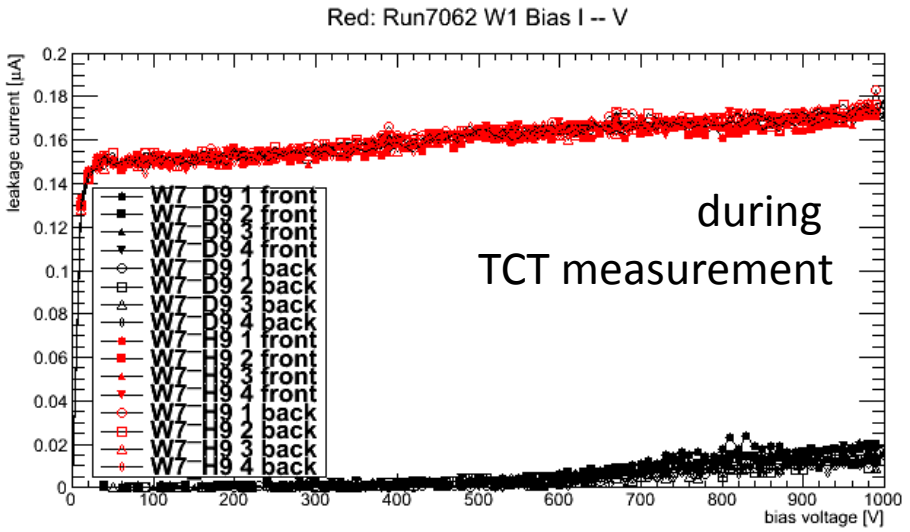


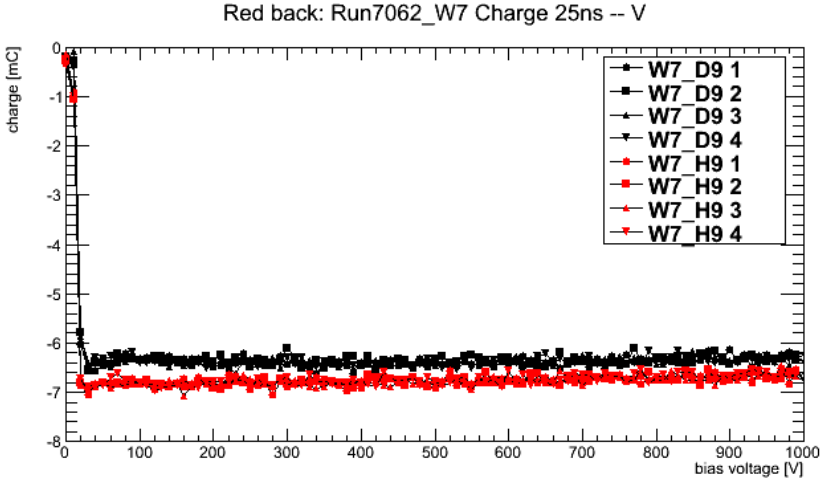


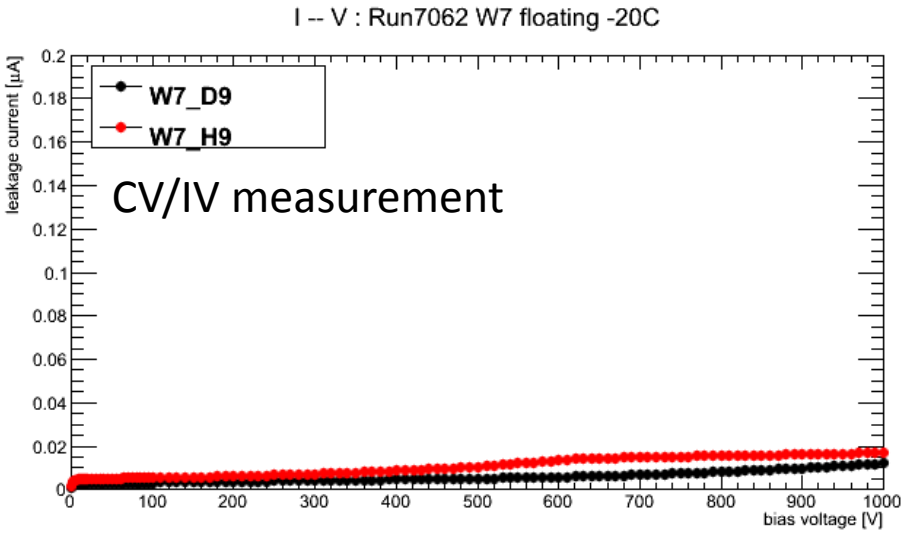
Summary W7

Summary W7


Red front: Run7062 W7 Charge 25ns -- V
charge [mC]
bias voltage [V]
W7_D9 1
W7_D9 2
W7_D9 3
W7_D9 4
W7_H9 1
W7_H9 2
W7_H9 3
W7_H9 4


Red: Run7062 W1 Bias I -- V
leakage current [μA]
bias voltage [V]
W7_D9 1 front
W7_D9 2 front
W7_D9 3 front
W7_D9 4 front
W7_D9 1 back
W7_D9 2 back
W7_D9 3 back
W7_D9 4 back
W7_H9 1 front
W7_H9 2 front
W7_H9 3 front
W7_H9 4 front
W7_H9 1 back
W7_H9 2 back
W7_H9 3 back
W7_H9 4 back
during
TCT measurement

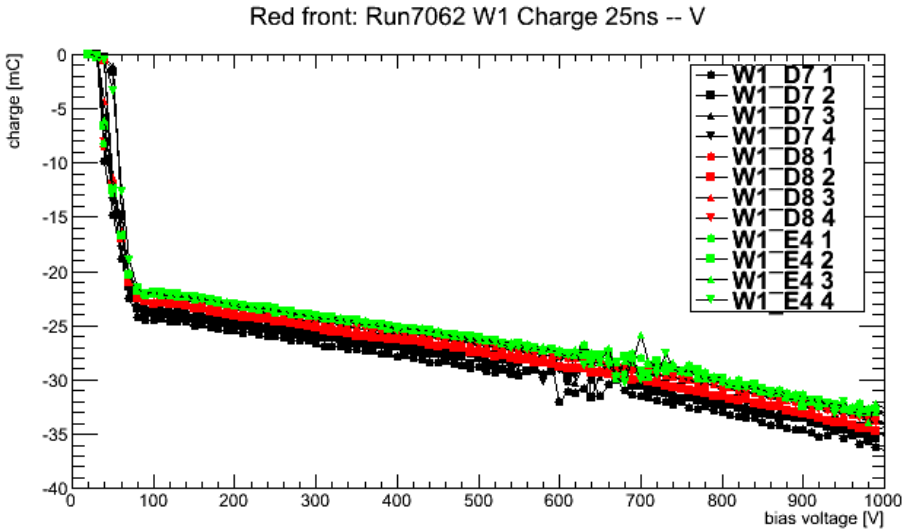

Red back: Run7062_W7 Charge 25ns -- V
charge [mC]
bias voltage [V]
W7_D9 1
W7_D9 2
W7_D9 3
W7_D9 4
W7_H9 1
W7_H9 2
W7_H9 3
W7_H9 4

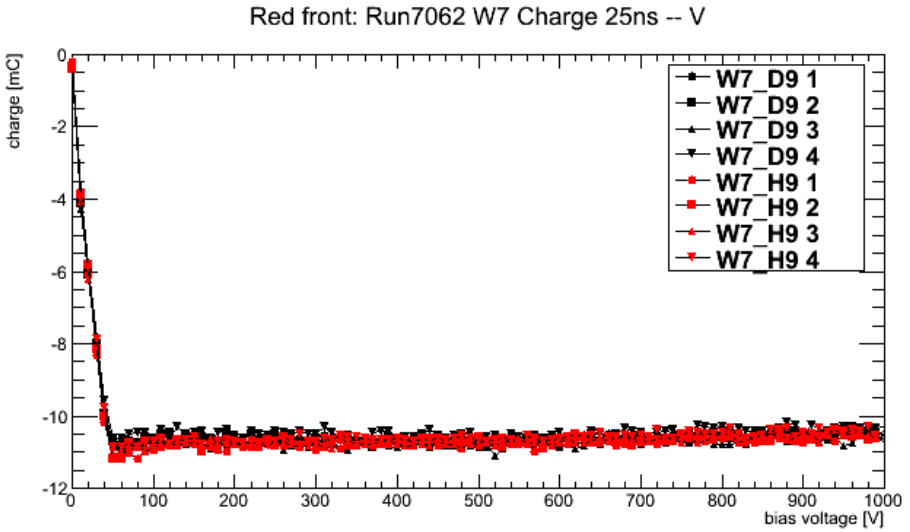

I -- V : Run7062 W7 floating -20C
leakage current [μA]
bias voltage [V]
W7_D9
W7_H9
CV/IV measurement

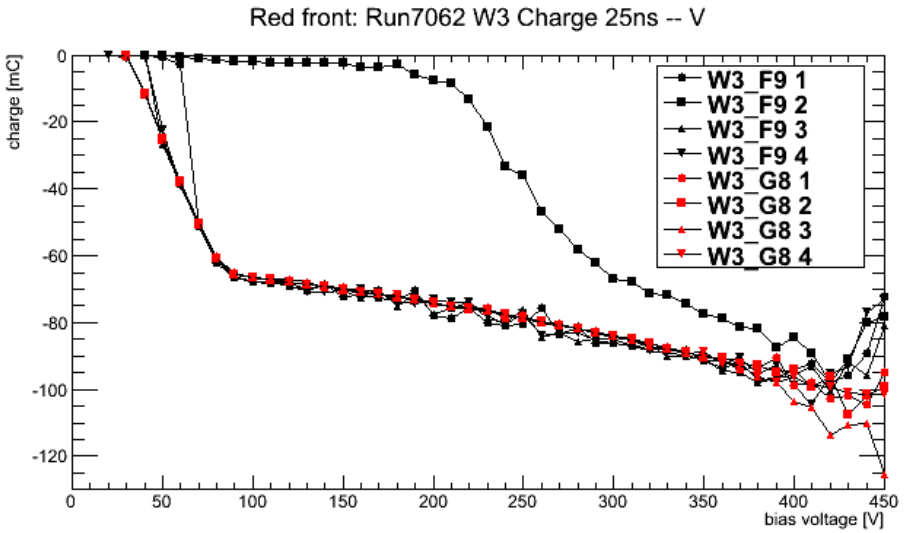
TCT measurement

Gain analysis

TCT measurement - Red front

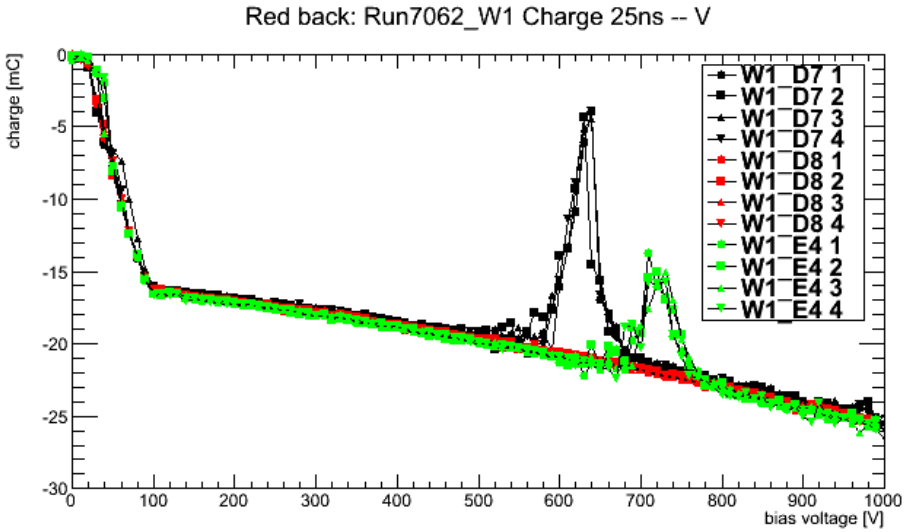


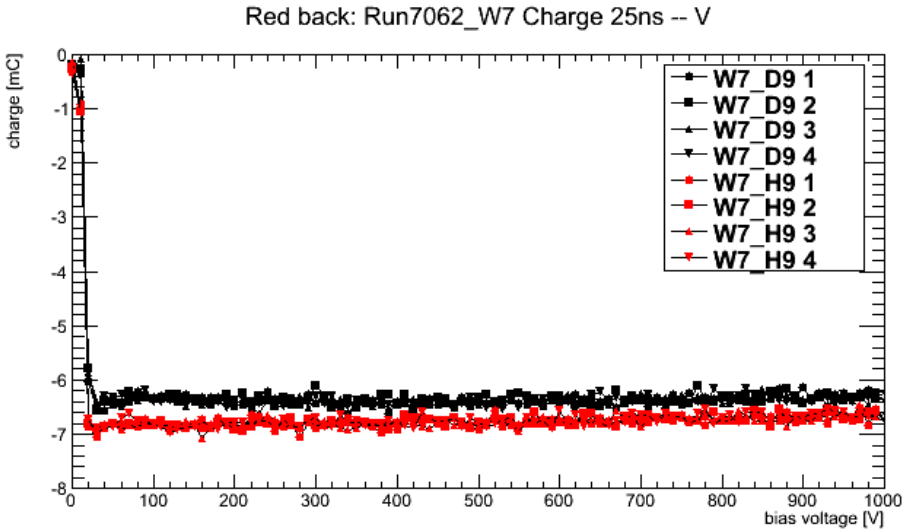


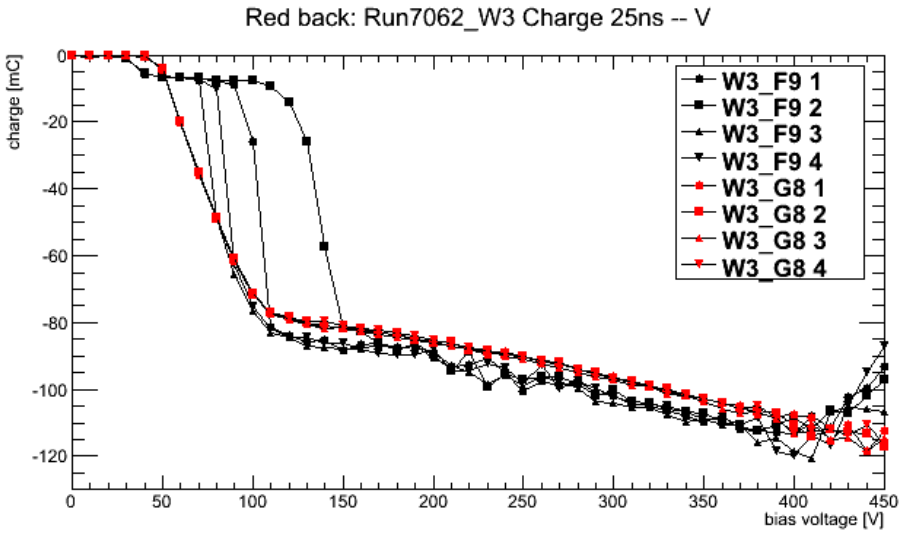


	200V	400V	700V	1000V
W1	24mC	26mC	30mC	35mC
W3	75mC	95mC	---	---
W7	11mC	11mC	11mC	11mC
		Gain		
W1	2.18	2.36	2.73	3.18
W3	6.82	8.64	---	---

TCT measurement - Red back







	200V	400V	700V	1000V
W1	17mC	18mC	21mC	25mC
W3	85mC	110mC	---	---
W7	6.5mC	6.5mC	6.5mC	6.5mC
		Gain		
W1	2.62	2.77	3.23	3.85
W3	13.08	16.92	---	---