

Production status of Japan

- Production and QC steps
- Results of ASIC Hybrids
 - Yield summary
- Results of Modules
 - Mechanical
 - Electrical: Leakage current, defective channels
- Yield summary

Production and QA steps

- Site Qualification completed - Dec. 01
- Production started - Feb. 02
- ASIC hybrid assembly in industry
- Module assembly in industry
- ASIC hybrids, Modules QA at KEK

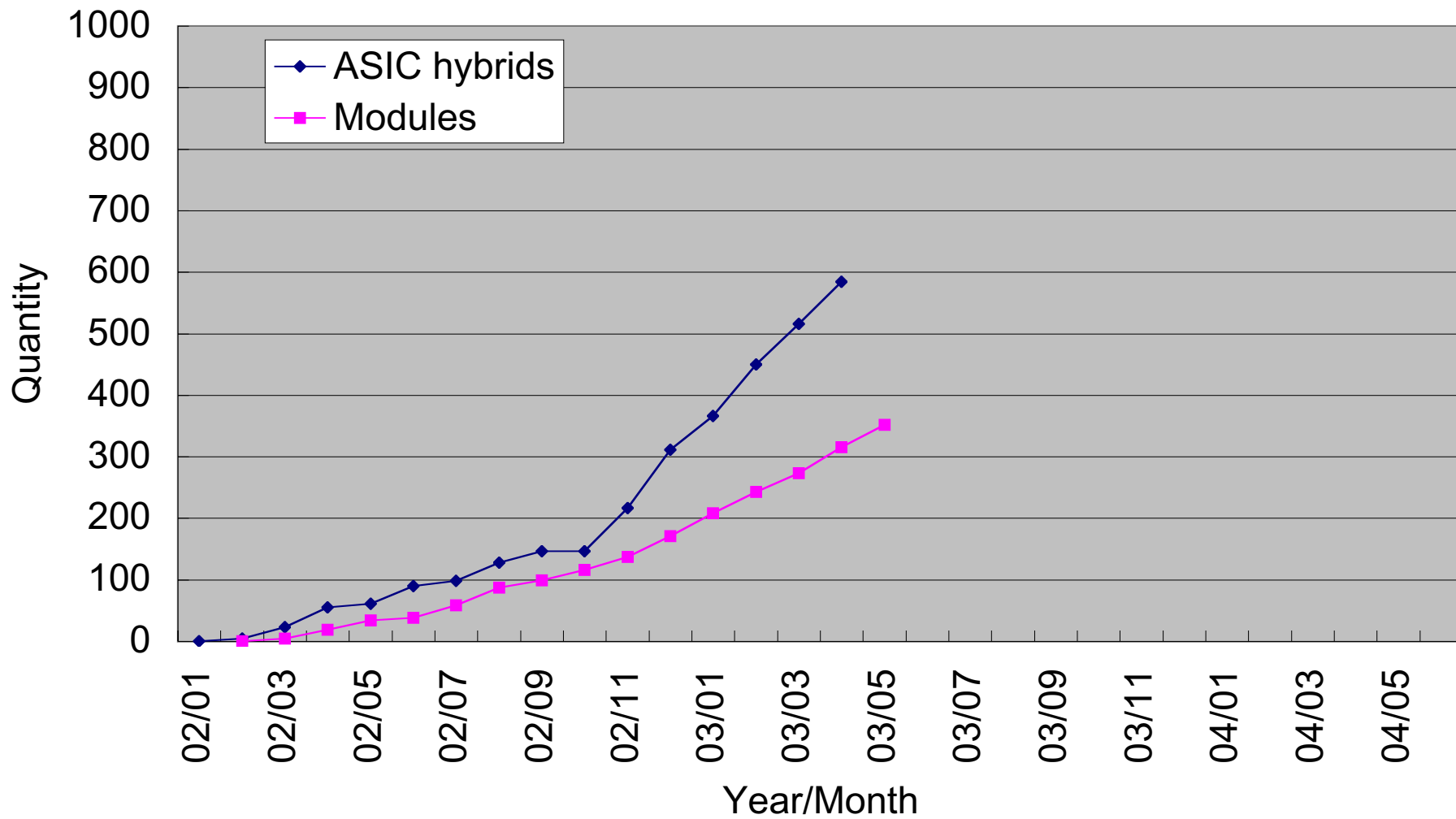
QA steps

- ASIC-hybrids
 - Backend wire-bondings (~500 wires)
 - DAQ test at KEK (cf. defective ASIC's)
 - OK, then Frontend wire-bondings (~1540 wires)
 - Thermal cycling+Long-term test (90hr (initial 100 hybrids)/10 hr Hot & 10 hr Cold) with DAQ tests (cf. defective channels)

QA steps

- Module assembly in industry
 - Sensor-Baseboard sandwich: Metrology
 - After completion: Metrology+IV+DAQ
- Module QA at KEK
 - Reception test: Metrology+IV+DAQ
 - Thermal cycling+Long-term test
 - Metrology+DAQ(Warm & Cold)

Series production Japan



Summary of Defective ASIC's

	01/02/02 - 25/09/02	26/09/02 - 26/11/02	29/11/02 - 21/02/03	24/02/03 - 08/04/03	All
Total # of Hybrids	113	102	216	89	520
# of Hybrids with defective ASIC's	20	19	22	8	69
# of defective ASIC's	20	20	27	8	75
Rate (Hybrids)	17.7%	18.63%	10.19%	8.99%	13.27%
Rate (ASIC's)	1.47%	1.63%	1.04%	0.75%	1.11%

Breakdown of Defective ASIC's

	No.
DEAD	14
STUCK CELL	5
Large gain spread	29
Trim DAC loading failed	2
Negative offset	14
High offset	4
Low gain	2
Abnormal calibration line	5
Total	75
Rate(ASIC's)	1.11%

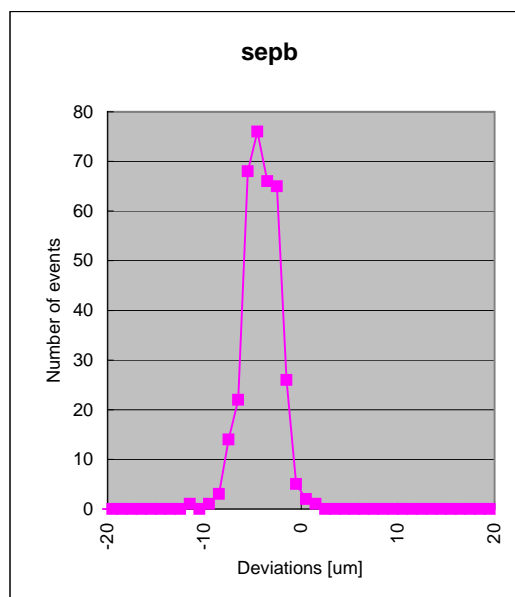
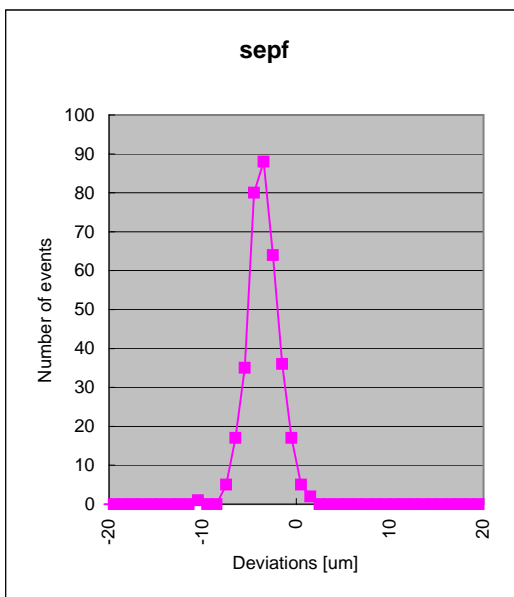
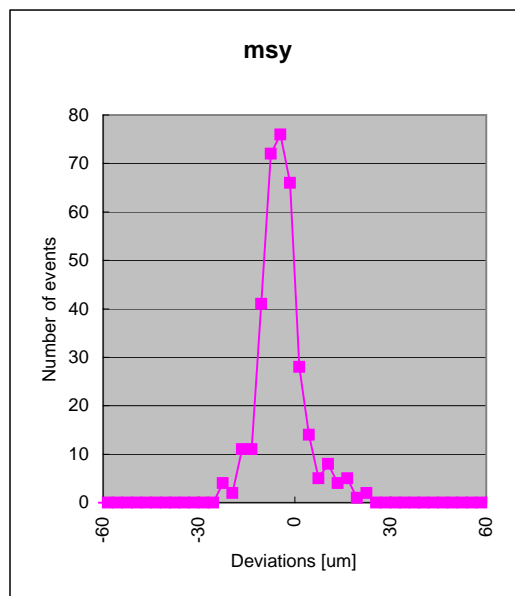
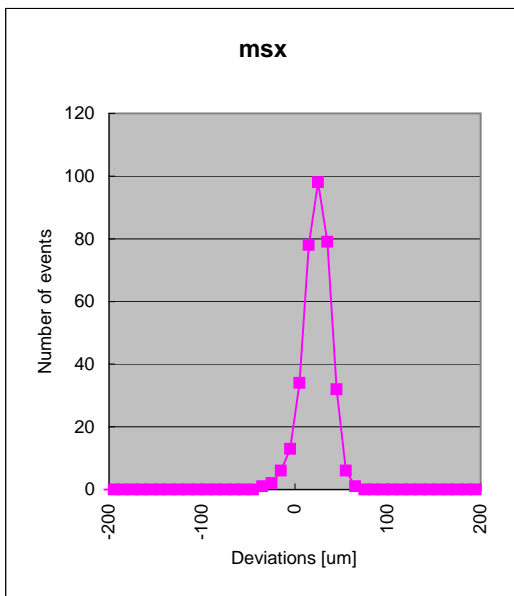
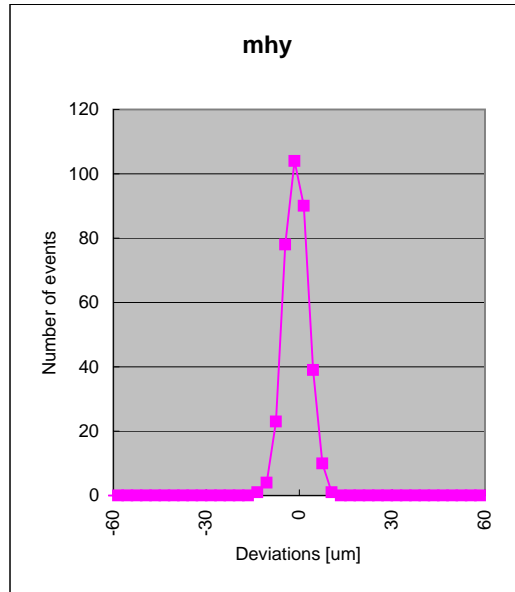
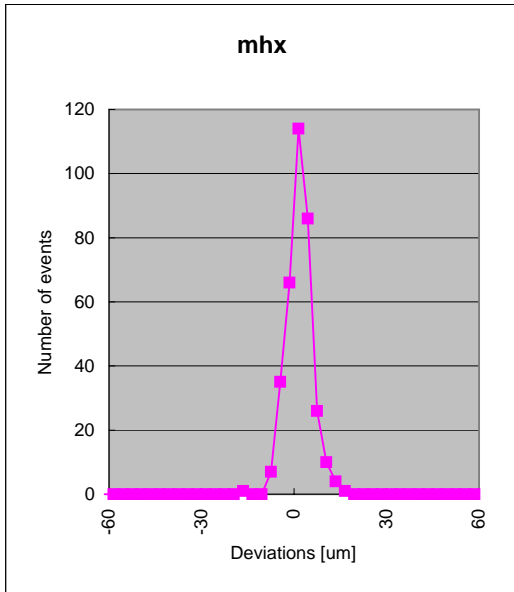
Summary of Defective Channels in Hybrids

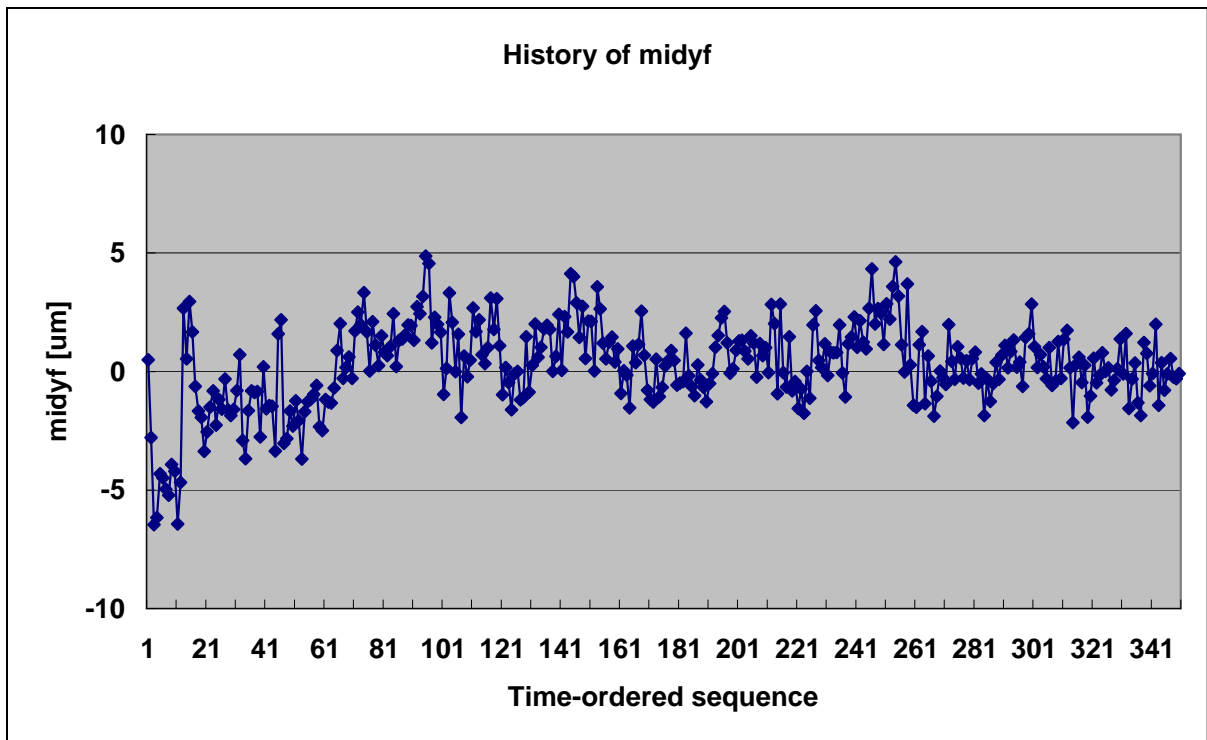
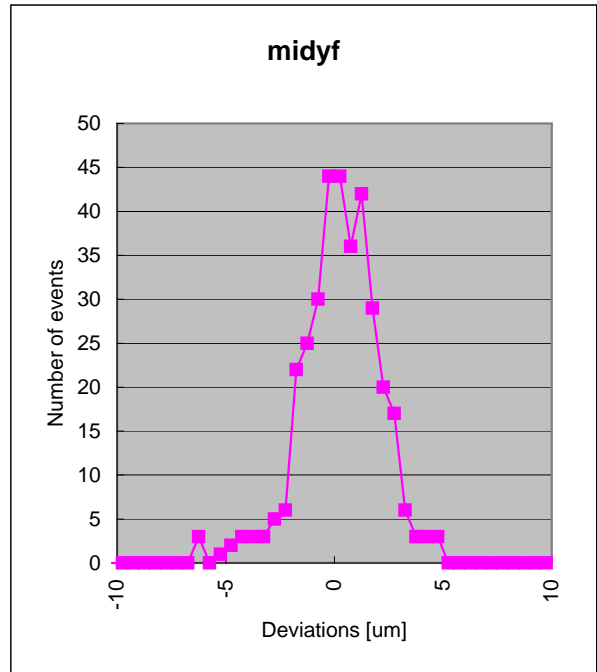
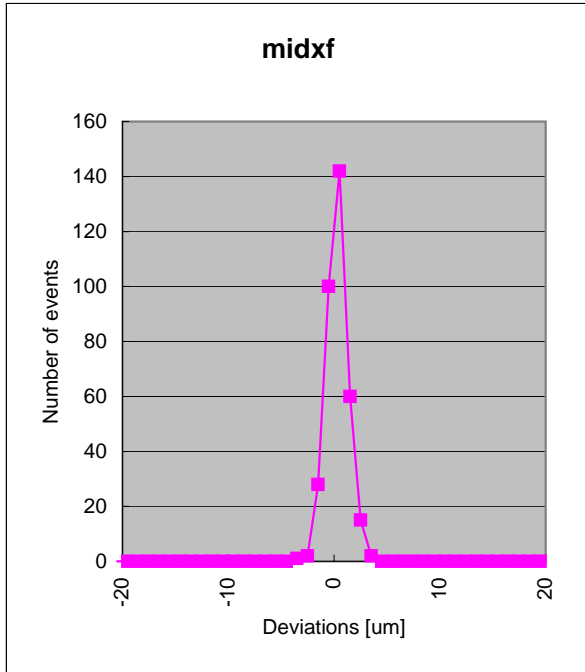
	01/02/02 - 25/09/02 (1-165)	26/09/02 - 26/11/02 (166-244)	29/11/02 - 21/02/03 (245-343)	24/02/03 - 08/04/03 (344-429)	All (1-429)
# of Hybrids (w/o def ASIC's)	137	77	95	85	394
Pipeline(ch)	2	4	0	1	7
DEAD(ch)	2	9	0	0	11
STUCK(ch)	3	13	0	1	17
Noisy(ch)	29	15	18	5	67
Total(ch)	36	41	18	7	102
Average(ch) per Hybrid	0.26	0.53	0.19	0.08	0.26

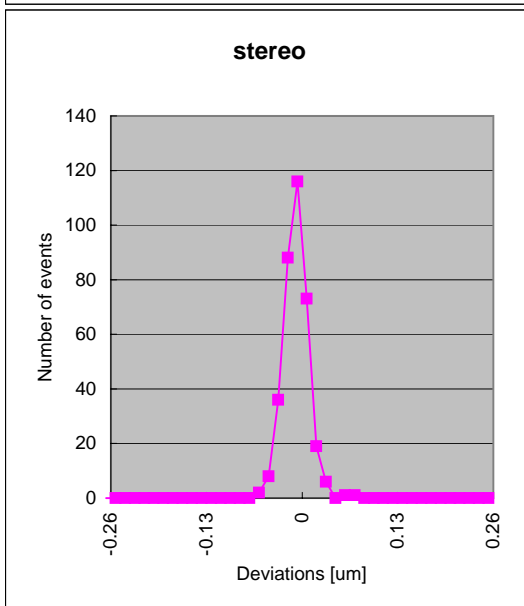
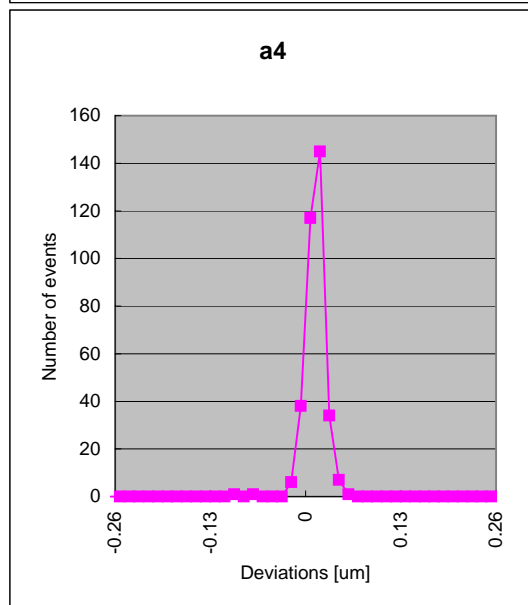
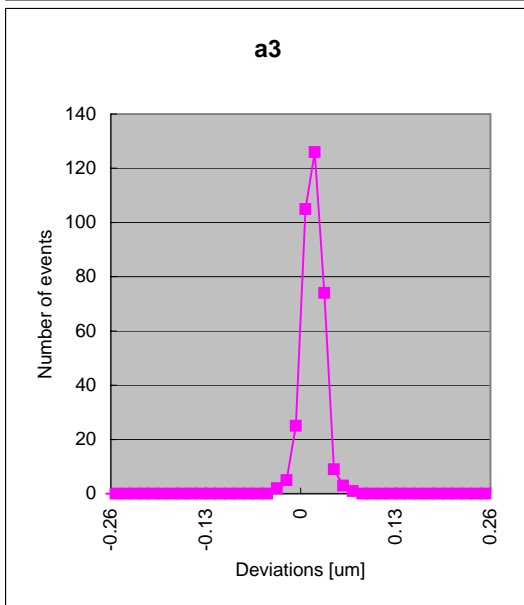
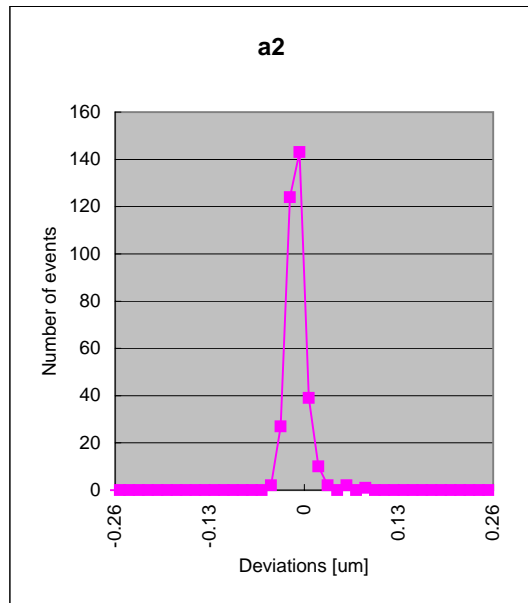
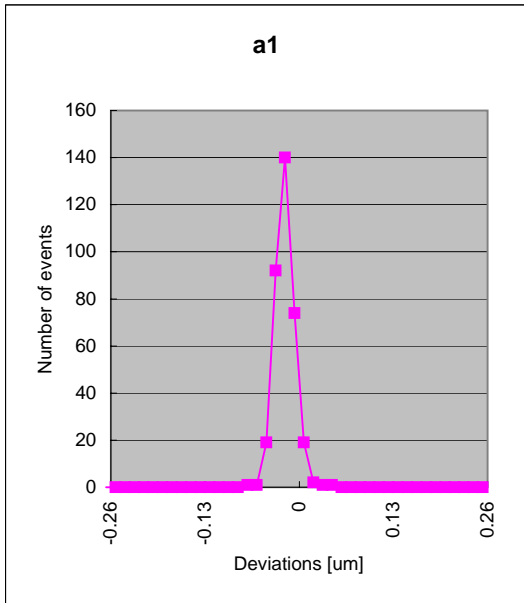
Module categories

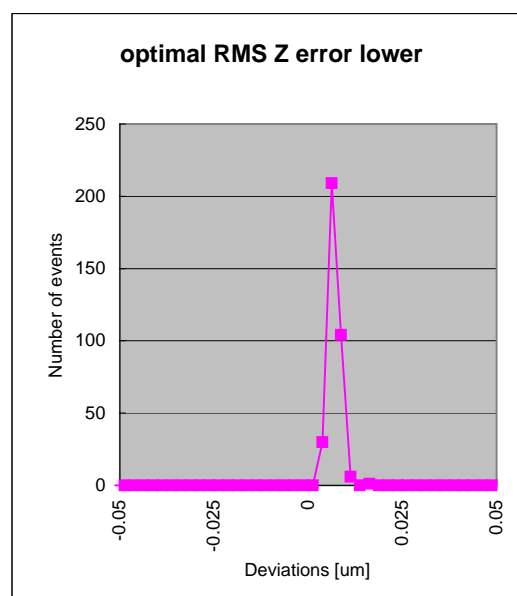
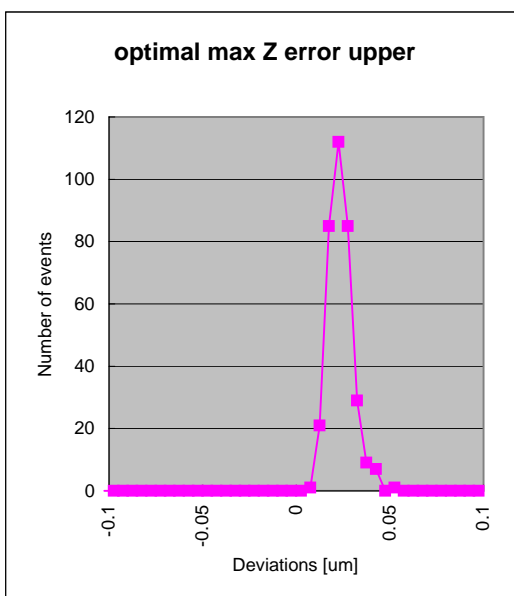
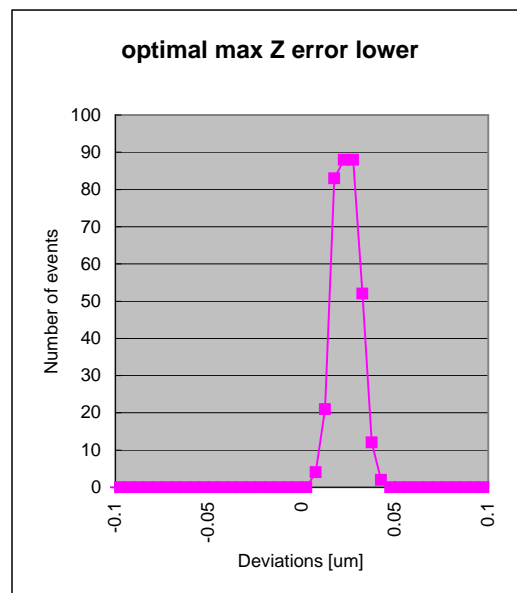
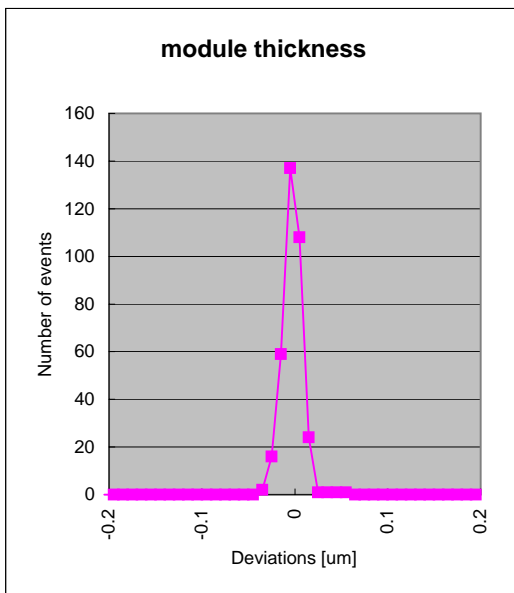
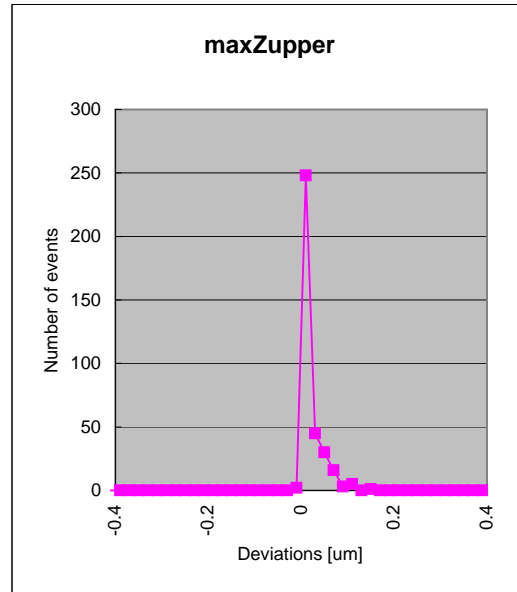
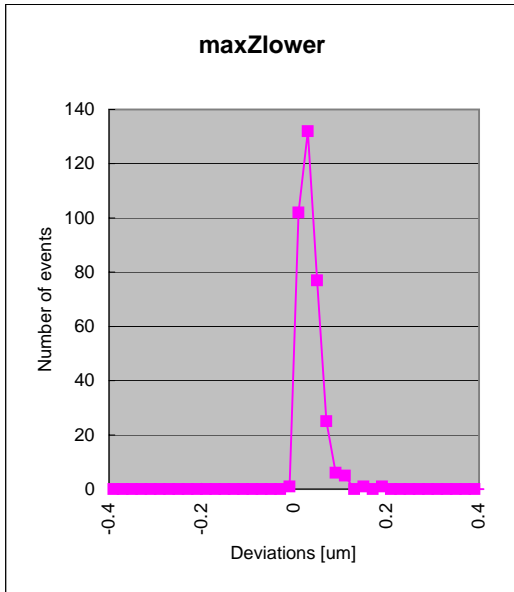
(The values are including measurement errors)

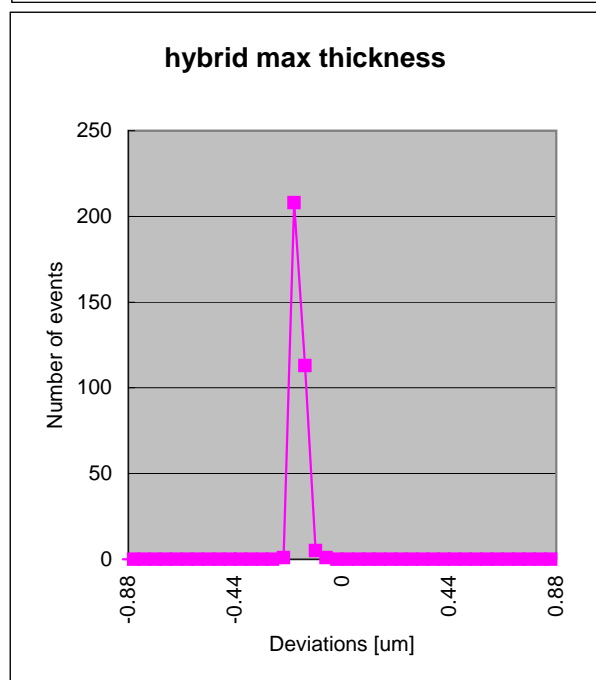
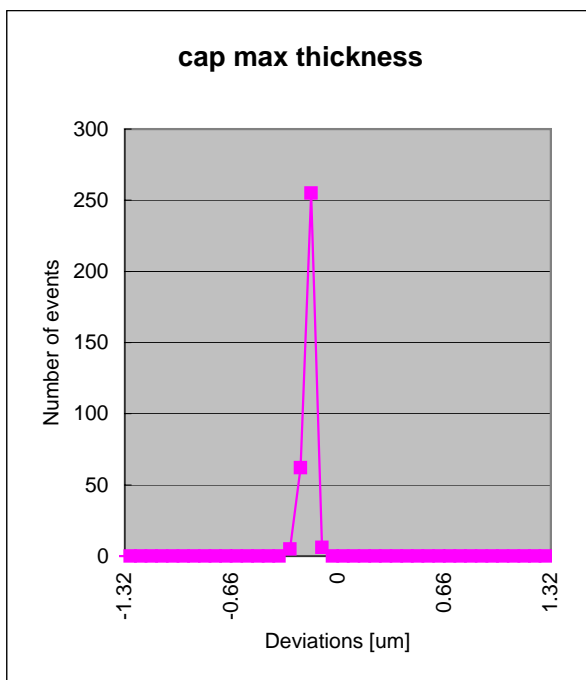
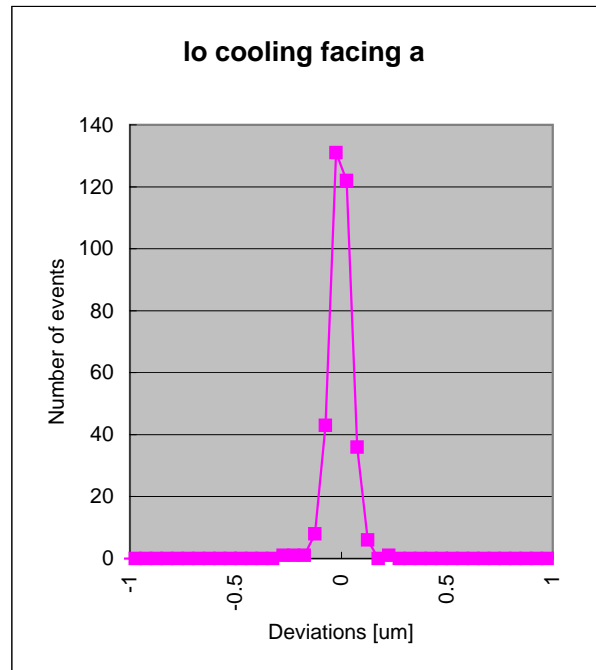
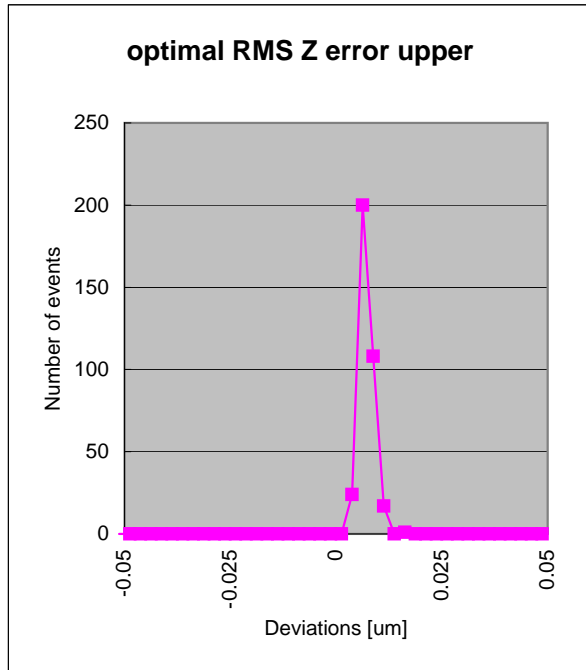
Parameters	Good	Pass	Hold
mhx [um]	+/-30	+/-40	>+/-40.000
mhy [um]	+/-30	+/-40	>+/-40.000
msx [um]	+/-100	+/-140	>+/-140.000
msy [um]	+/-30	+/-40	>+/-40.000
sepf [um]	+/-10	+/-20	>+/-20
sepb [um]	+/-10	+/-20	>+/-20
midxf [um]	+/-10		>+/-10
midyf [um]	+/-5	+/-8	>+/-8
a1 [mrad]	+/-0.13		>+/-0.13
a2 [mrad]	+/-0.13		>+/-0.13
a3 [mrad]	+/-0.13		>+/-0.13
a4 [mrad]	+/-0.13		>+/-0.13
stereo [mrad]	+/-0.13		>+/-0.13
maxZlower [mm]	-0.2		>-0.2
maxZupper [mm]	0.2		>0.2
moduleThickness [mm]	+/-0.1		>+/-0.1
optimalMaxZerrorLower [mm]	0.05	0.07	>0.07
optimalMaxZerrorUpper [mm]	0.05	0.07	>0.07
optimalRMSZerrorLower [mm]	0.025		>0.025
optimalRMSZerrorUpper [mm]	0.025		>0.025
loCoolingFacing a [mrad]	+/-0.5		>+/-0.5
b [mrad]	+/-3	+/-5	>+/-5
loCoolingFacingConcavity [mm]	+/-0.03		>+/-0.03
capMaxThickness [mm]	6.44		>6.44

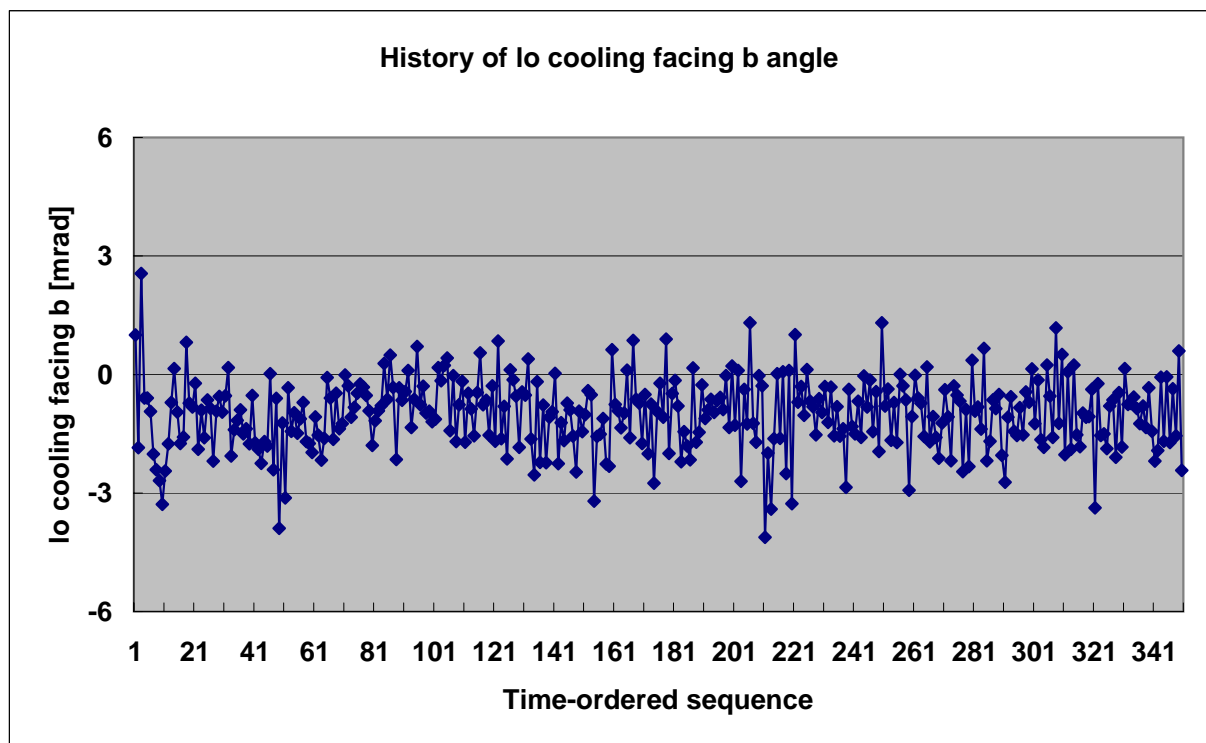
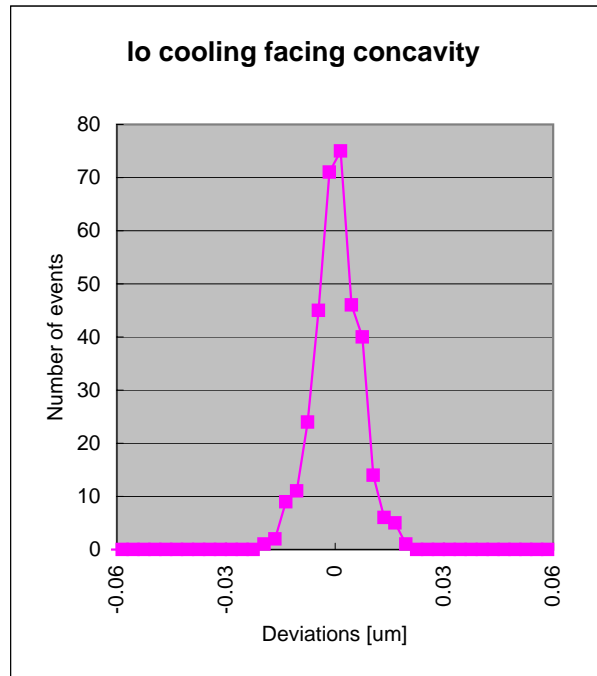
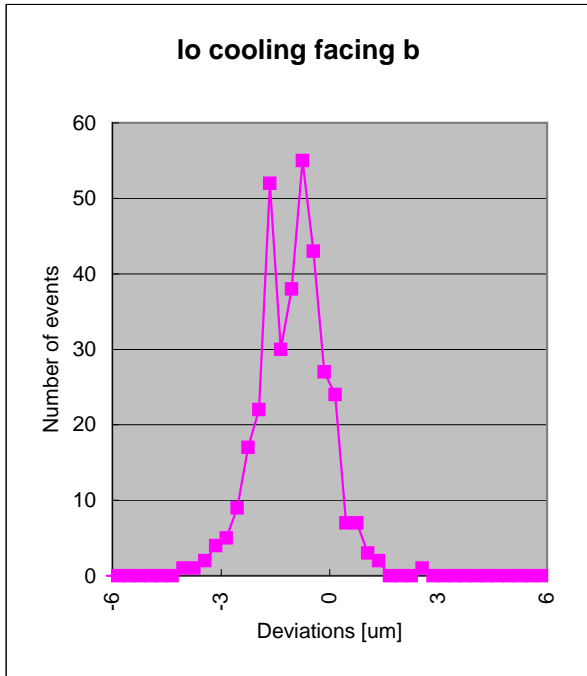








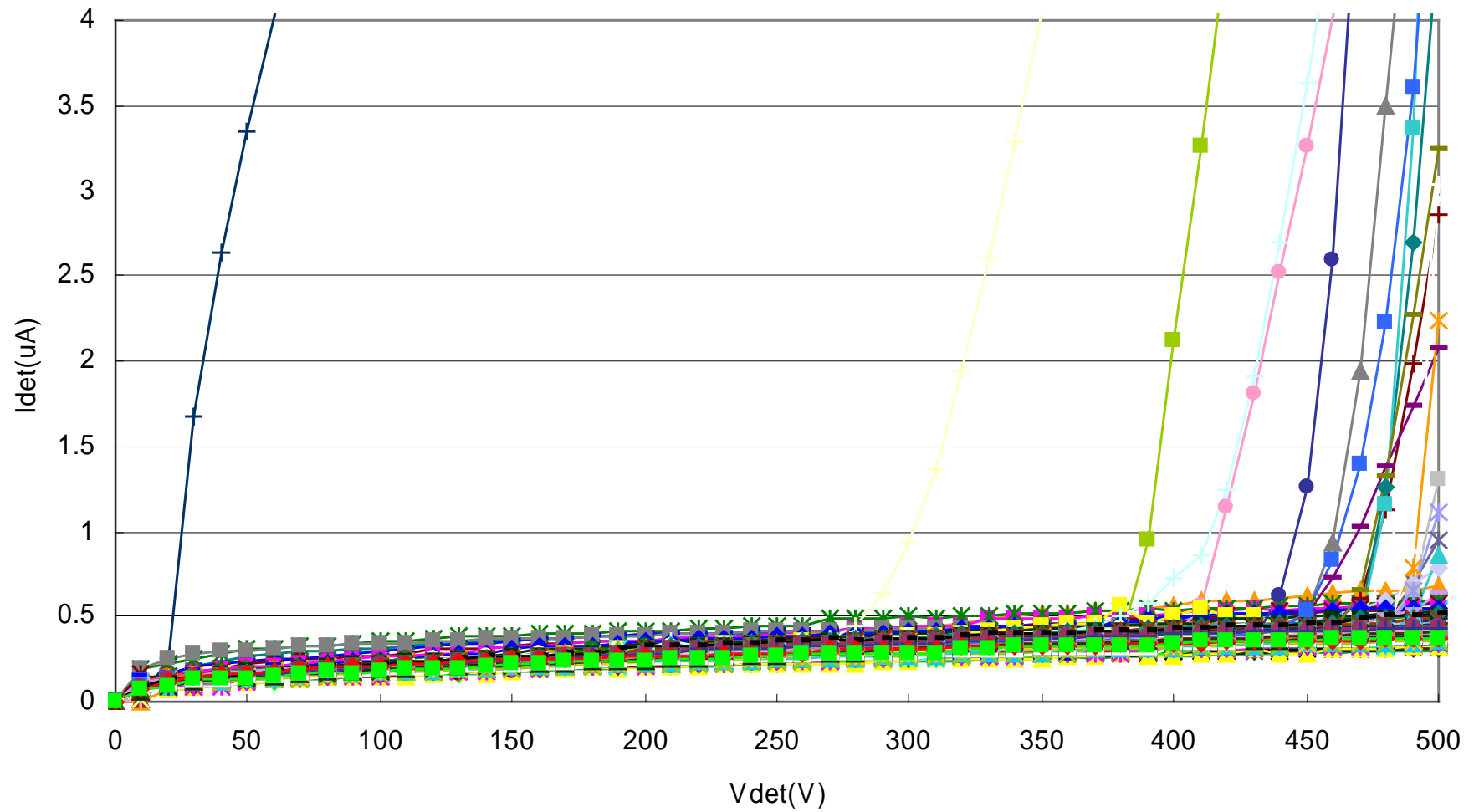




Leakage Current Measurement

IV curve_mDaqLT_@20°C

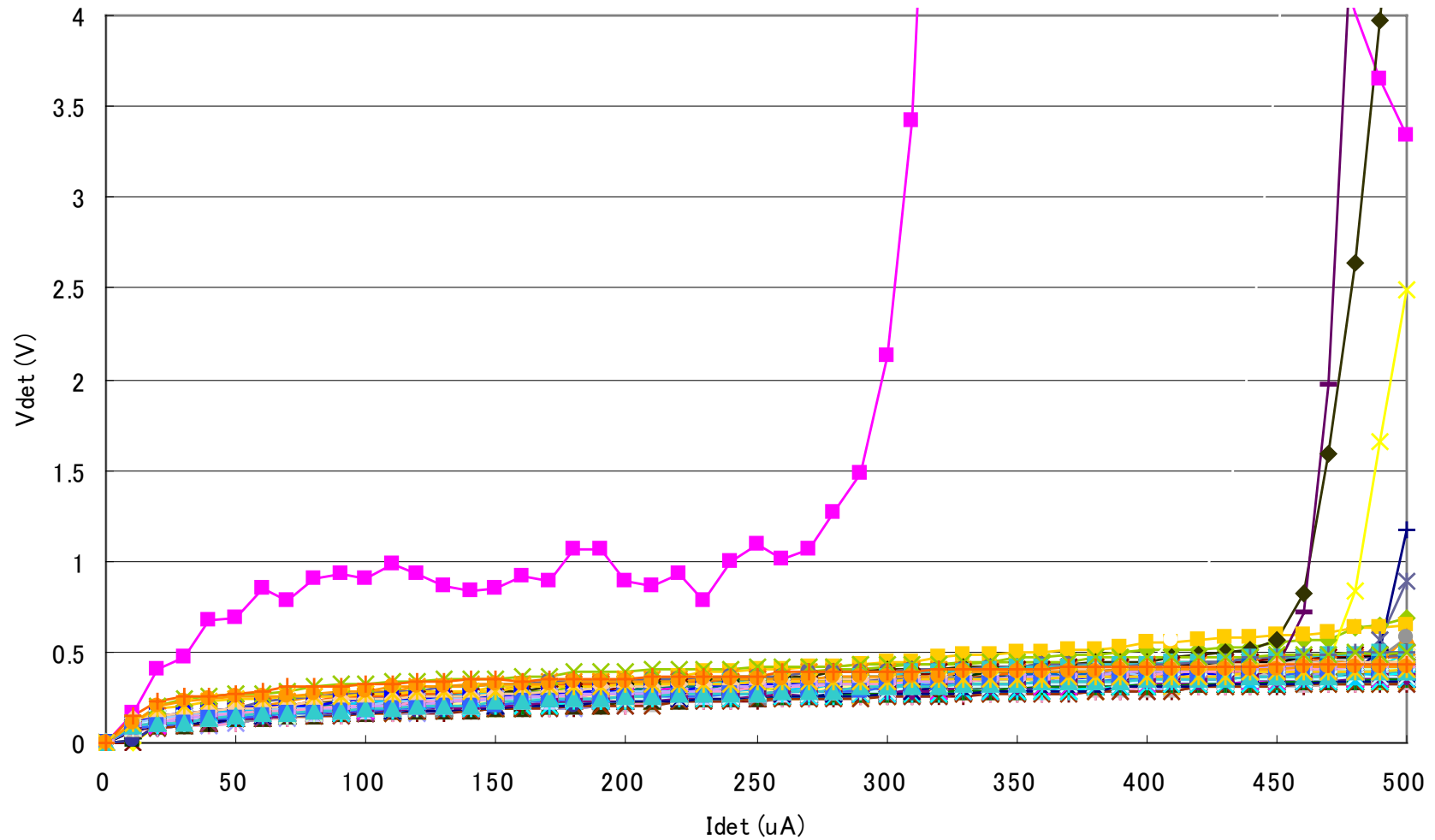
Modules #1 - #200

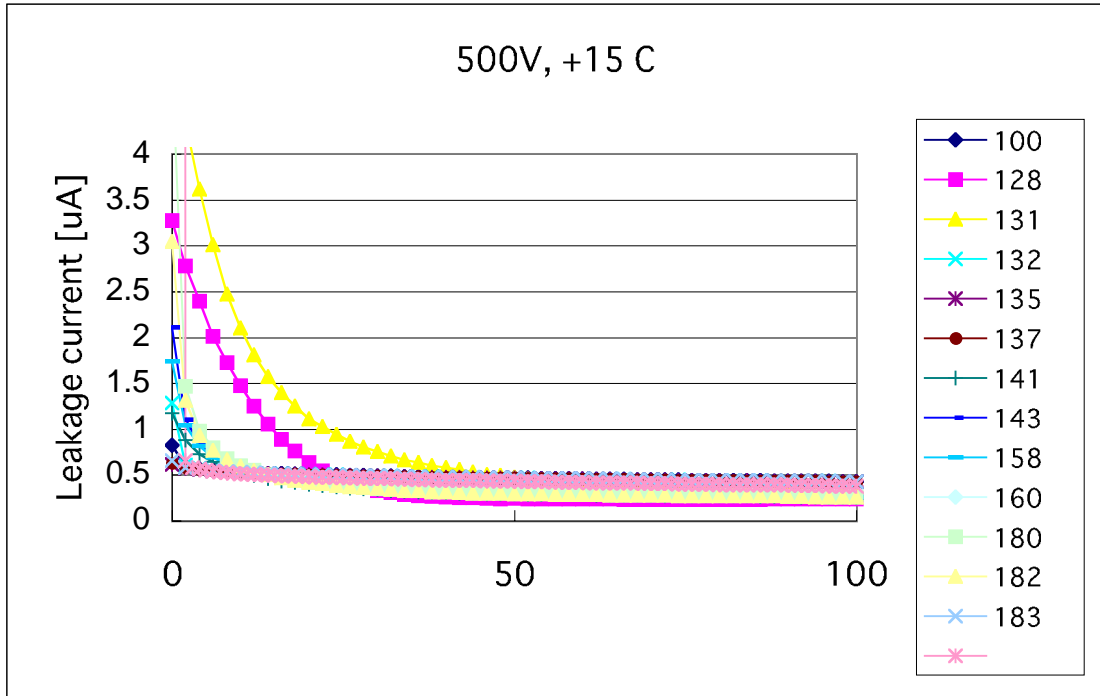
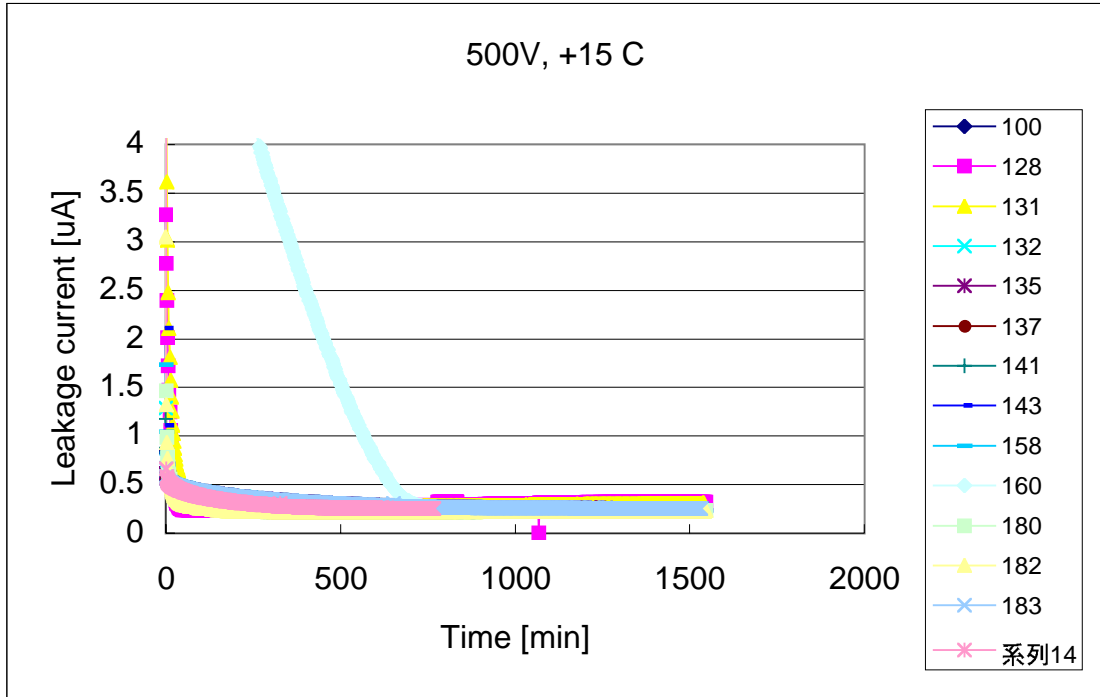


Leakage Current Measurement

IV curve_mDaqLT_@20°C

Modules #200 - #374



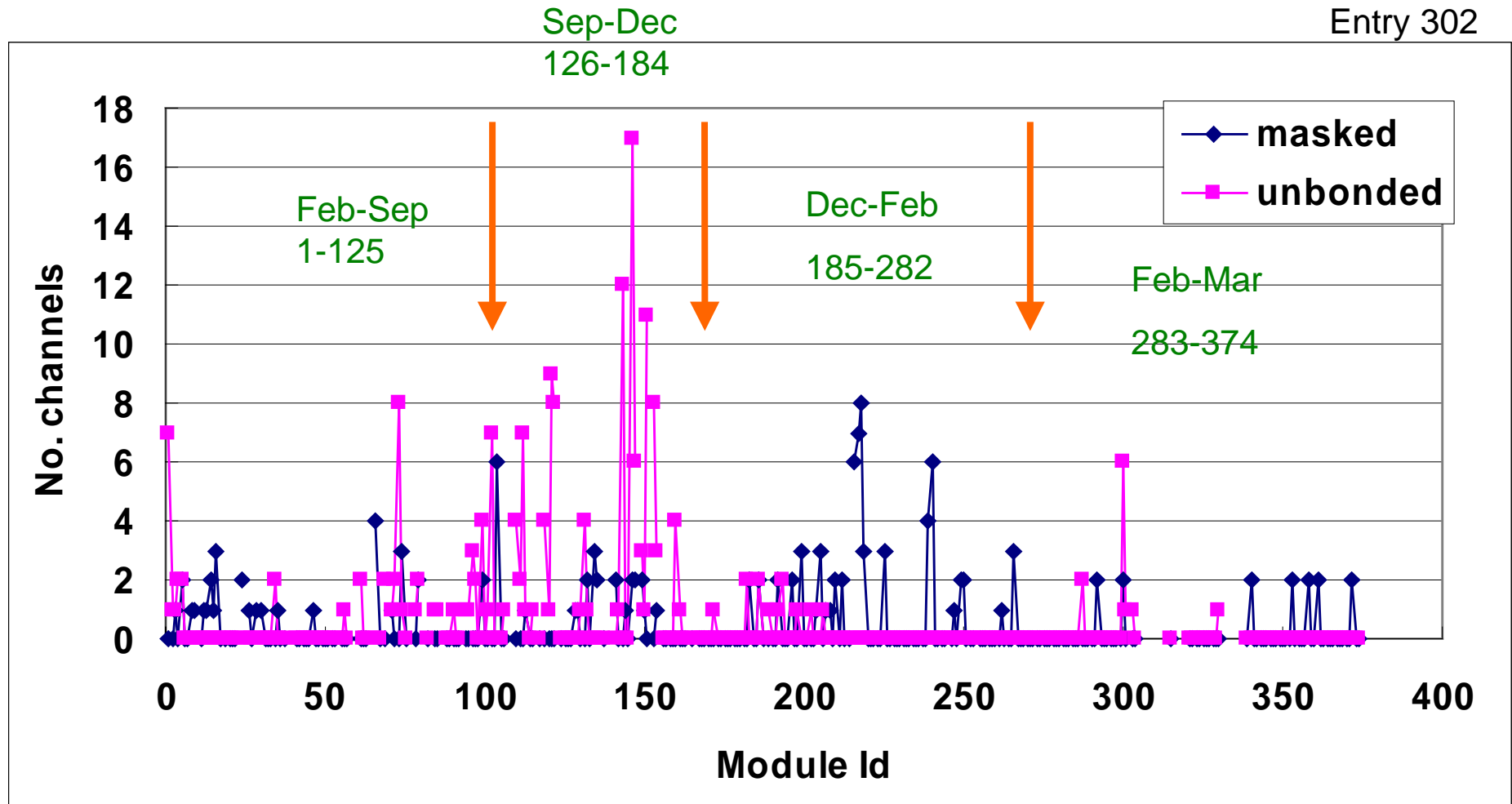


Summary of Defective Channels in Module

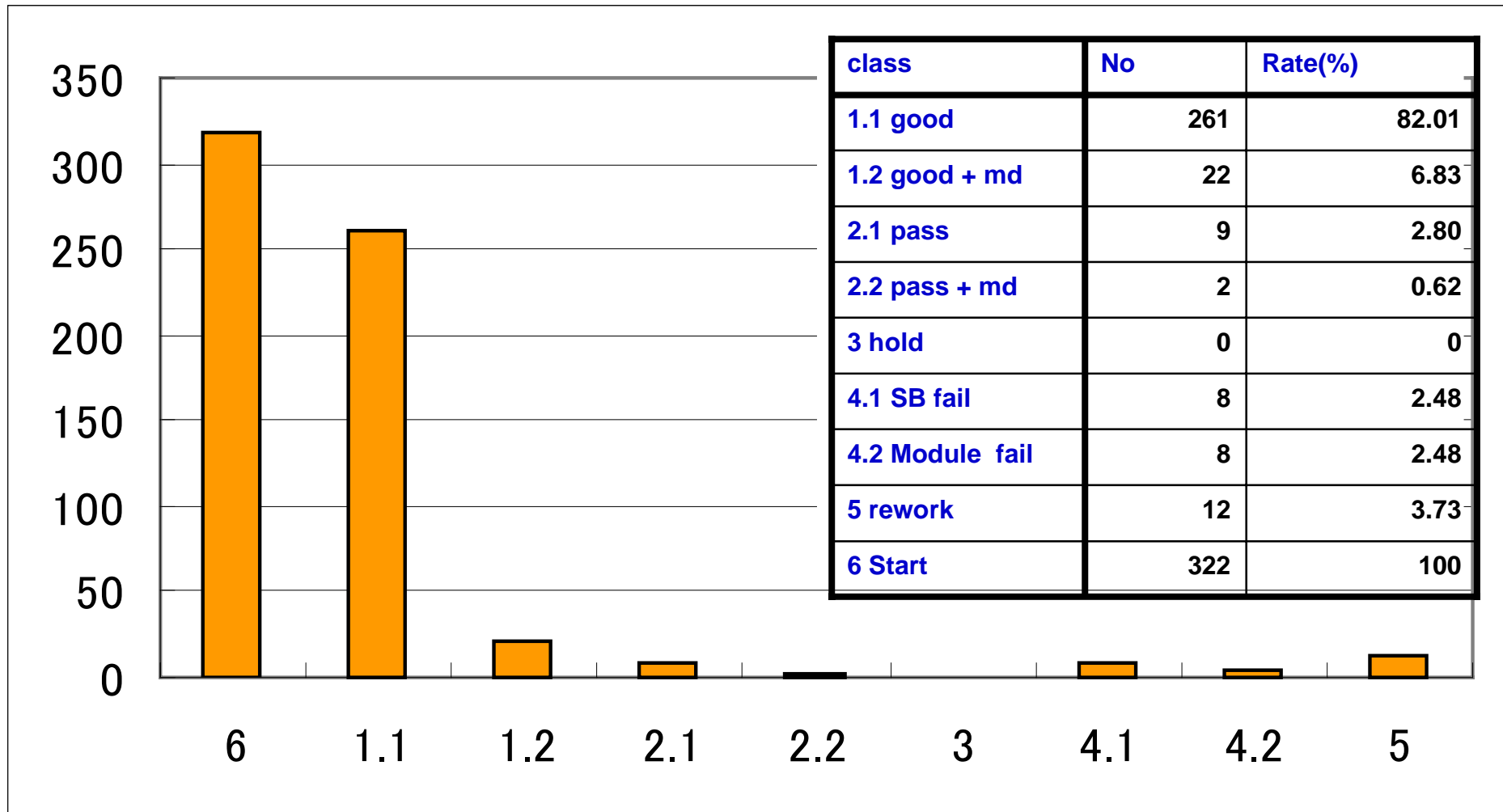
	01/02/02 - 25/09/02 (1-125)	26/09/02 - 26/11/02 (126-184)	29/11/02 - 21/02/03 (185-282)	24/02/03 - 08/04/03 (283-374)	All (1-374)
# of Modules	95	50	90	67	302
Pipeline(ch)	1(1)	1(1)	4(4)	0(0)	6(6)
DEAD(ch)	2(2)	0(0)	9(9)	0(0)	11(11)
STUCK(ch)	3(3)	0(0)	13(13)	0(0)	16(16)
Noisy(ch)	32(17)	25(14)	40(19)	14(22)	111(72)
unbonded(ch)	95	76	9	11	191
Total(ch)	133	102	75	25	335
Average(ch) per Module	1.4	2.0	0.8	0.4	1.1

* (Hybrid)

Defective Channels in Modules



Module Class Categories



Failure Modules

Module ID	Reason
20220170200018	facing scratch
20220170200025	IV
20220170200029	sensor scratch
20220170200034	IV
20220170200146	# of unbonded 16
20220170200160	IV
20220170200188	sensor surface distortion
20220170200202	IV

Rework Modules

Module ID	Reason
20220170200010	ASIC to replace
20220170200023	ASIC to replace
20220170200038	ASIC to replace
20220170200040	ASIC to replace
20220170200054	WB damaged due to miss handling
20220170200090	WB damaged due to miss handling
20220170200155	link1 (PA-ASIC) half-unbonded
20220170200230	Hybrid connector to repair
20220170200231	Hybrid connector to repair
20220170200233	Hybrid connector to repair
20220170200245	Hybrid connector to repair
20220170200254	Hybrid connector to repair
total	12

Summary of production rate

- As of 1st May, 356 modules delivered
 - 2 mods/day since Dec. 02
 - plan to 3 mods/day from ~August
- ~700 modules by the end of Dec. 03
- ~900 modules by the end of Mar. 04