

AW PCM SYSTEM

AW PCM System is designed for semiconductor fab or lab to automatically do:

- (1) PCM (process control module) testing. (PCM TEST SELECT)
- (2) 100% IC die on wafer probing. (IC TEST SELECT)
- (3) Inline instrument testing. (INLINE TEST SELECT)

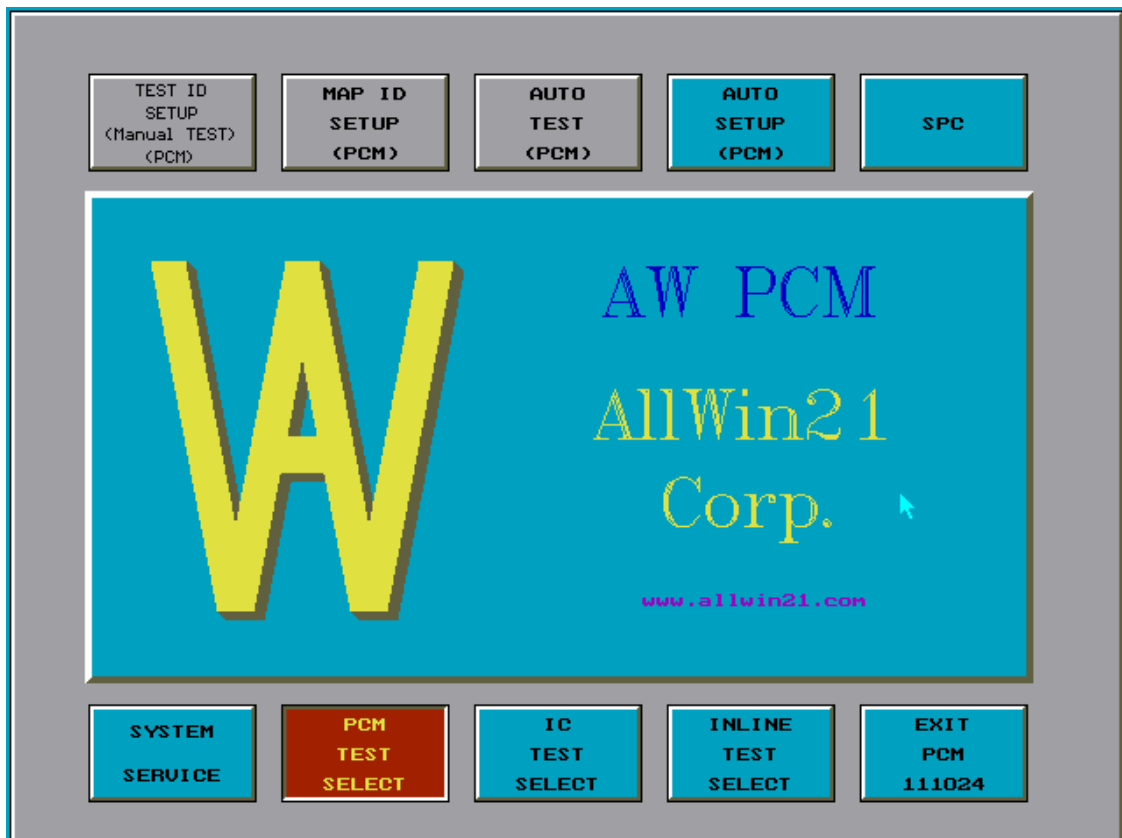
For PCM testing, there are DC, RF, LCR, C-V testing. AW PCM can control auto prober like EG2001, EG1034 etc, and characteristic parameter tester like HP4142 (DC), HP4145A (DC), HP4145B (DC), HP4141 (DC), HP4062 (DC with switch matrix, LCR meter), HP4275A (LCR and C-V), HP4280A (C-V), HP4084A (LCR and C-V), HP8772C (RF, Microwave), HP4085M switch matrix, Keithley S280, S350 etc.

For IC 100% die on wafer probing, AW PCM can control auto prober like EG2001, EG1034 etc, and characteristic parameter tester like HP4142, HP4145B, HP4141, HP4062, S350 and HP4085 switch matrix.

For inline instrument testing like metrology tools: m-gage or Sonagage, alpha-step, Rudolph elepisometer, Nanospec AFT, wafer thickness meter etc.

It can save auto alignment info for each mask

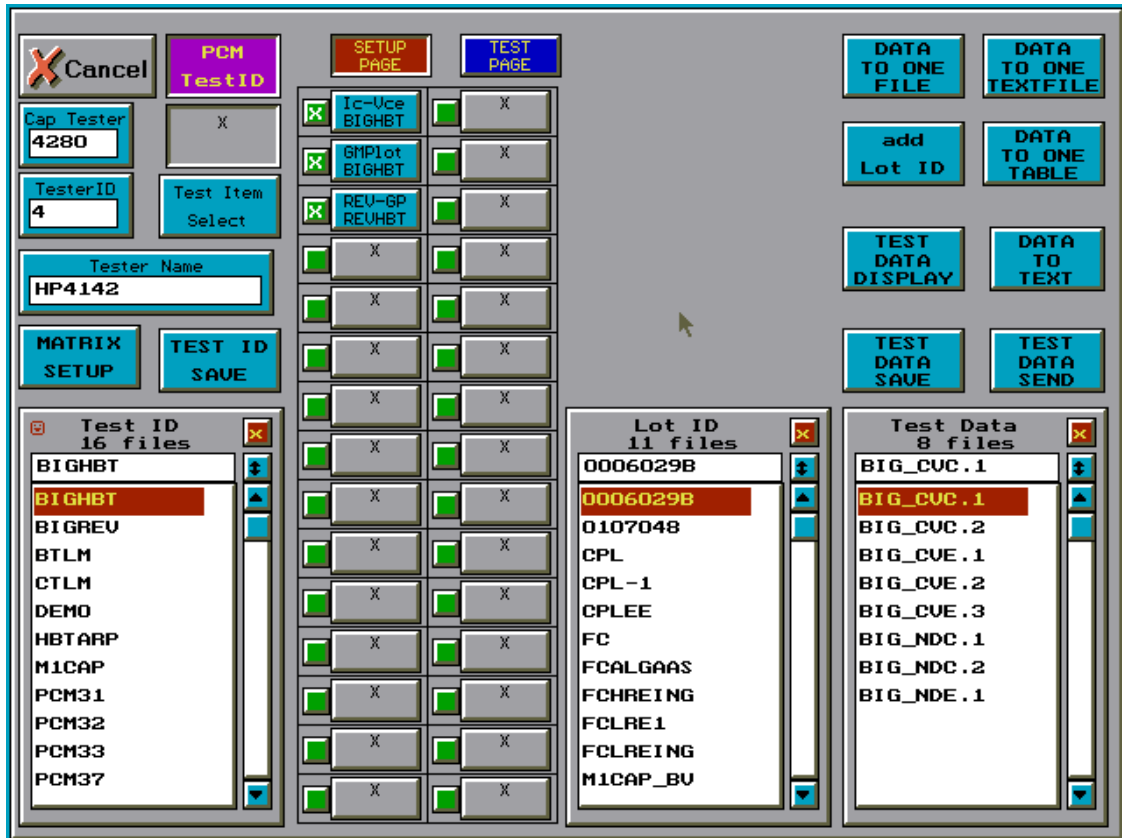
The testing data will be automatically real time sent to the server. Some data can be transfer to text file or excel file.



For PCM MAP TEST, there are 3 setups for auto map probing:

- (1) Test ID (Manual Test) Setup,
- (2) Map ID setup, and
- (3) Auto ID setup.

1.1 Test ID (Manual Test) Setup.



This menu can do test ID setup and also can do manual test without auto probing. You can select test ID and input or select Lot ID, save the data in the lot in the “Test Data” Dialog.

You can save test ID with file name in the Test ID dialog.

1.2 Test Item Select

You can put up to 90 kinds of different testing methods in the testing table. For each test ID setup, you can have up to 30 different test items in one test ID.

Delete All Test ID BIGHBT		Head=3 Len=459	Cancel		Test ID EDITOR	Select Group 1	Select Group 2	Select Group 3		
1	Ic-Uce BIGHBT	fr=0 a=5, v=1	16	X		X	GMP1ot PCBIG	Id-Uds MESFET	PCM1 PCM1	CAP M1CAP
2	GMP1ot BIGHBT	fr=255 a=2, v=3	17	X		Ic-Uce SPLIT	REV-GP REVHBT	gm-Ug MESFET	PCM5 PCM5	N-d C BIGHBT
3	REV-GP REVHBT	fr=357 a=2, v=3	18	X		Ubrk SPLIT	Urud HBTARSM	Ubrk MESFET	PCM10 PCM10	N-d E BIGHBT
4	X		19	X		Urud SPLIT	Urud HBTARS	Ieat MESFET	PCM16 PCM16	PCM31 PCM31
5	X		20	X		Re SPLIT	GMP1ot HBTAP2	ISO-on MESFET	PCM37 PCM37	PCM32 PCM32
6	X		21	X		RecRbb SPLIT	Urud HBTAP2	ISOoff MESFET	OP-SHT M1CAP	PCM33 PCM33
7	X		22	X		Rc SPLIT	GMP1ot HBTARP	MESFET	CAP BMCAP	VIACHN2 VIACHN2
8	X		23	X		GMP1ot SPLIT	Ic-Uce HBTARP	MESFET		
9	X		24	X			Ubrk HBTARP	MESFET		RF C1 RF MIM
10	X		25	X		Tdm Tdm	Urud HBTARP	MESFET	Cbc 6C CB C	BTLM BTLM
11	X		26	X		Pth Pth	Urud HBTARPM		Cbc 6C CB C	CTLM CTLM
12	X		27	X		Rth BIGHBT	REV-GP BURNIN			RTLm RTLm
13	X		28	X		GMP1ot BIGHBT	GMP1ot BURNIN			ETLM ETLM
14	X		29	X		Ic-Uce BIGHBT	Uce PCMSPC		C-U C BIGHBT	C-U Re 6C CE
15	X		30	X		Ubrk BIGHBT	Ubrk PCMSPC		C-U E BIGHBT	I-U M1CAP S21 6C CE

1.3 Test Item Setup

For each test item, you can setup curve number, parameter var number, data points, sweep start point, end point, step. Switch matrix setup, compliance setup, parameter var name, unit, min, max limit and filter limits.

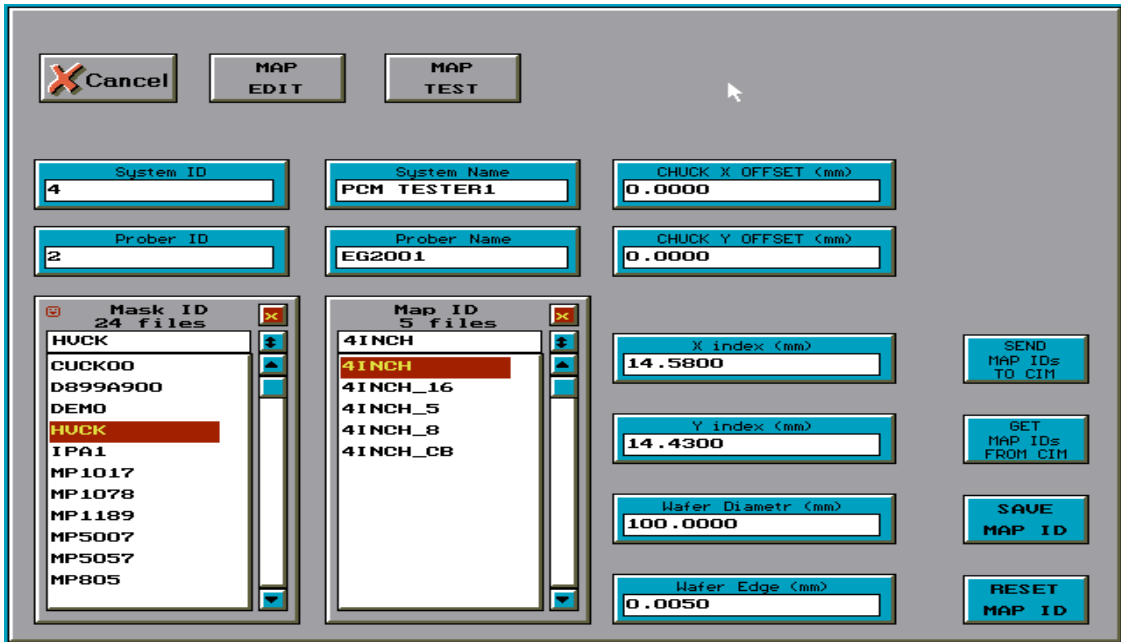
AlGaAs		Cancel		GMP1ot BIGHBT SAVE	GMP1ot BIGHBT RESET	PIN-SMU SETUP	
Var Num 3	HEAD MODE=1 ARR=2	Integ Time 1	X Var 1 (U) -0.600	DelayTime(sec) 0	PIN2 0	PIN1 3	SMU1 COMPLIANCE 0.100
Curve Num 5	HEAD PT0=0x7	Compliance(A) 0.100	X Var 2 (U) -1.600	Resistor(mR) 0	PIN4 0	PIN3 1	SMU2 COMPLIANCE 0.100
Step Num 50	hnum=3 Num=459 HS=12	Ubc(U) 0.500	X step (U) -0.020	Production 0	PIN6 0	PIN5 2	SMU3 COMPLIANCE 0.100
EXCLUDE 0	SHAP 0	SMU2 (U) 0		Test/Calc 0	PIN8 0	PIN7 0	SMU4 COMPLIANCE 0.100
VAR1 NAME βmax	VAR1 UNIT	VAR1 MIN 50.00	VAR1 MAX 120.00	VAR1 L_limit 30.00	VAR1 H_limit 400.00		
VAR2 NAME β1.25	VAR2 UNIT	VAR2 MIN 15.00	VAR2 MAX 70.00	VAR2 L_limit 5.000	VAR2 H_limit 400.00		
VAR3 NAME Ic	VAR3 UNIT A	VAR3 MIN 2.00E-06	VAR3 MAX 8.00E-06	VAR3 L_limit 1.00E-11	VAR3 H_limit 0.001		

2.1 Map ID Setup

Map ID setup is very convenient and flexible tools for setting up PCM mapping, 100% IC on wafer probing even with different dies.

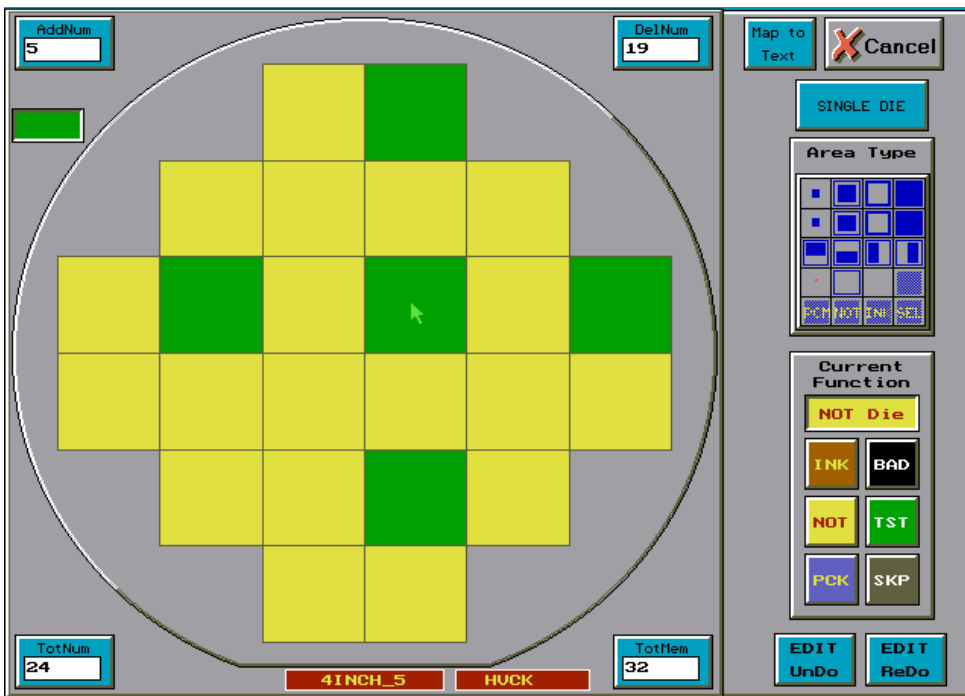
You can configure prober in this menu. You can select English or metric system, using Z-limit or edge sensor or profiling etc.

For map setup, you just input, wafer diameter, x index, y index and edge removed dimension and then edit the testing dies



2.2 Map ID Edit

It is very easy to edit wafer mapping with selecting “area type” and color function for Testing, Not testing etc. Green color is to be tested die; Yellow color is not to be tested. There are many convenient methods for IC probing setup.



3.1 Auto Setup

3.1.1 MASK ID setup

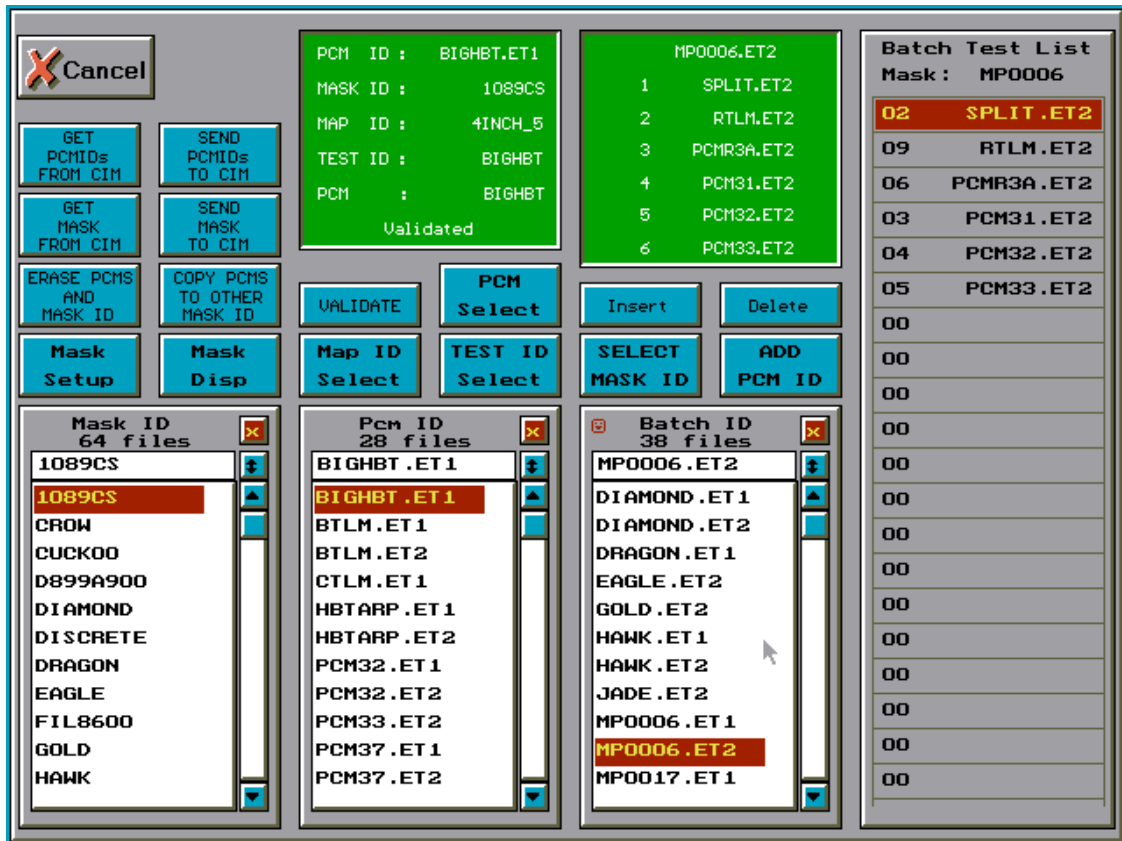
Input mask name, PCM pattern coordinate. Die size in X and Y directions, different die size information.

3.1.2 PCM ID setup

PCM Id includes Map ID, Test ID and PCM pattern

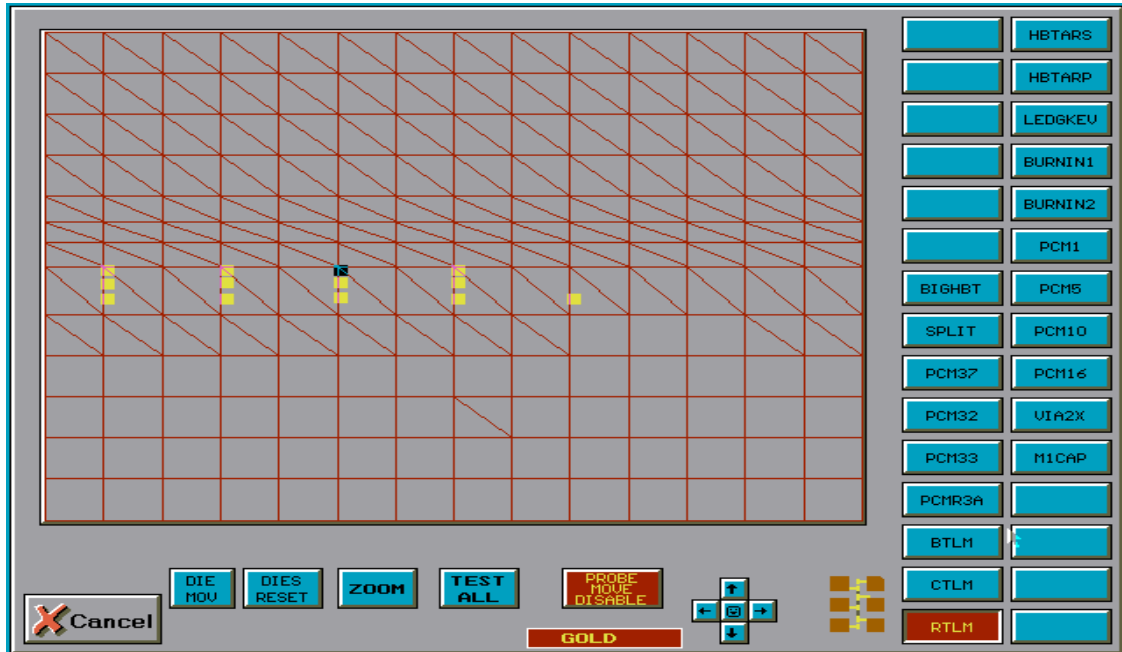
3.1.3 Batch ID setup

Batch ID can do batch test with different PCM pattern and testing method. It can automatically to do batch PCM ID test one after another.



3.2 One reticle Mask Display

You can setup mask map for different die size in one reticle. You can align on any know PCM pattern and move to any other PCM pattern with clicking PCM name button.



4.1 Auto test

4.1.1 Single PCM test

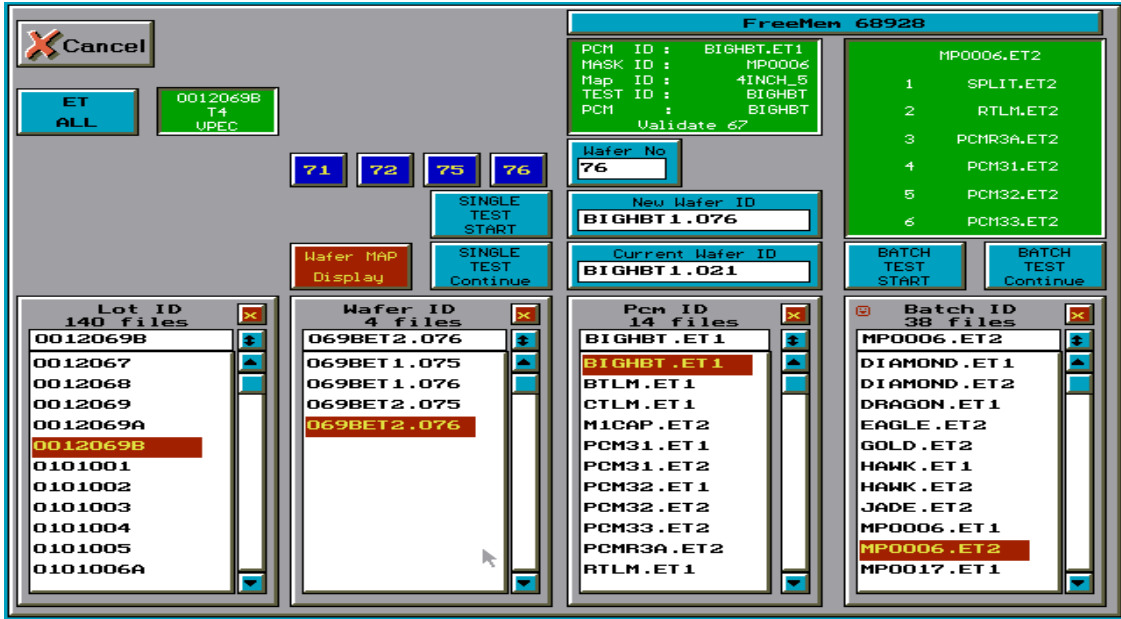
Input or select LOT ID, Select one PCM ID and press “Single TEST Start”

4.1.2 Batch PCM test

Input or select LOT ID, Select one Batch ID and press “Batch TEST Start”

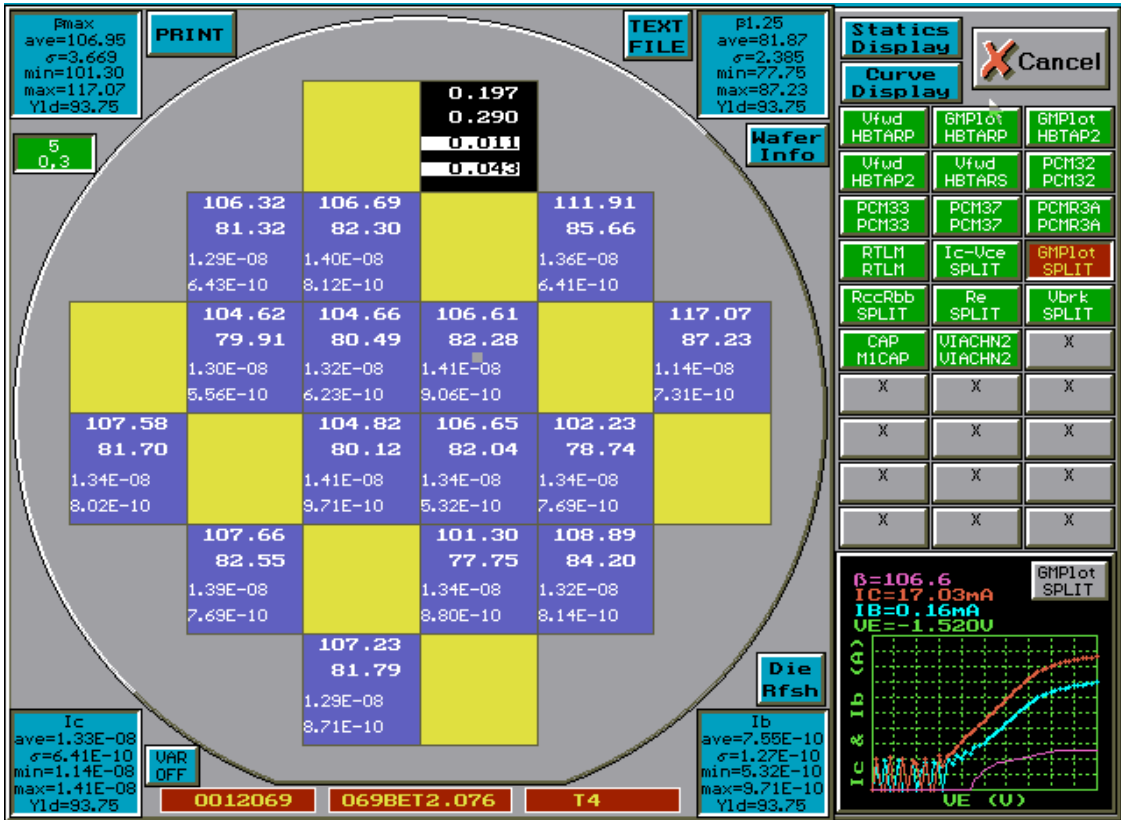
Test Data is automatically saved on the Data ID and is to be sent on the server if the PCM system connected to the network

For EG2001, it can save the system parameter for EG2001 and storage auto align information for different mask, so you don't need to do alignment when you got the wafer, which already aligned before.



4.2 Auto test map data display

You can display tested data in the Data ID dialog. After testing you merge all single testing data together in one file.



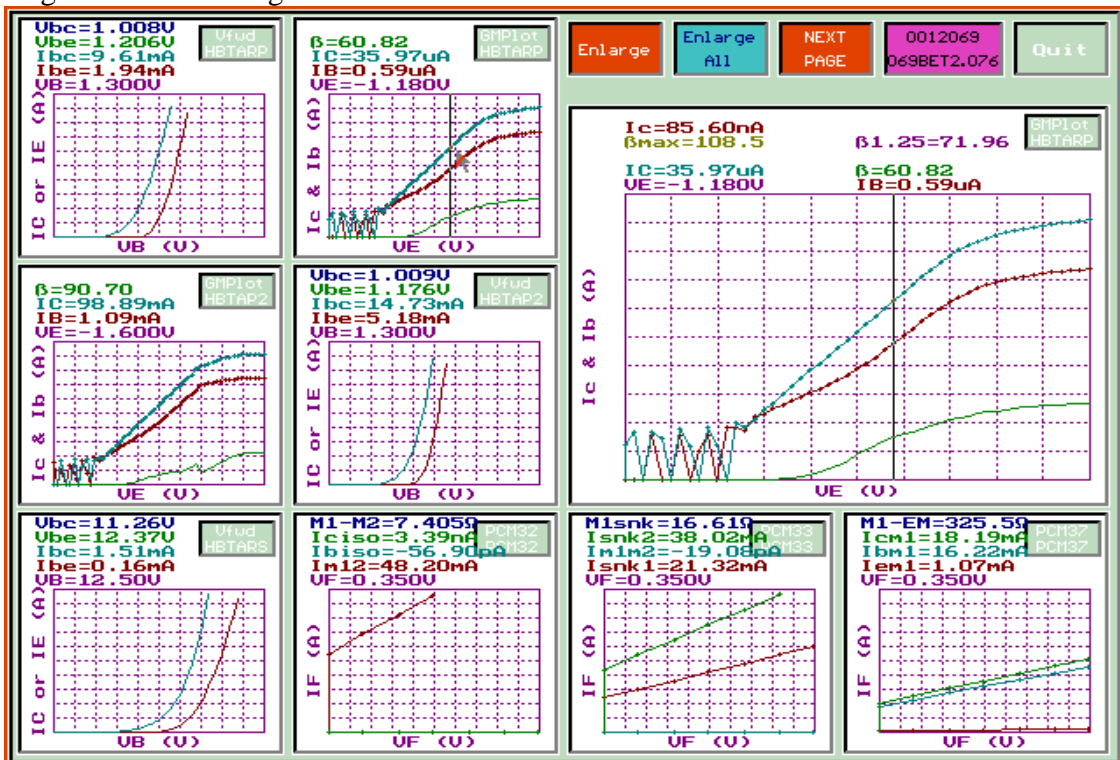
4.3 Test data statistics for one wafer

You can display the statistics data for the wafer. The color shows different yields

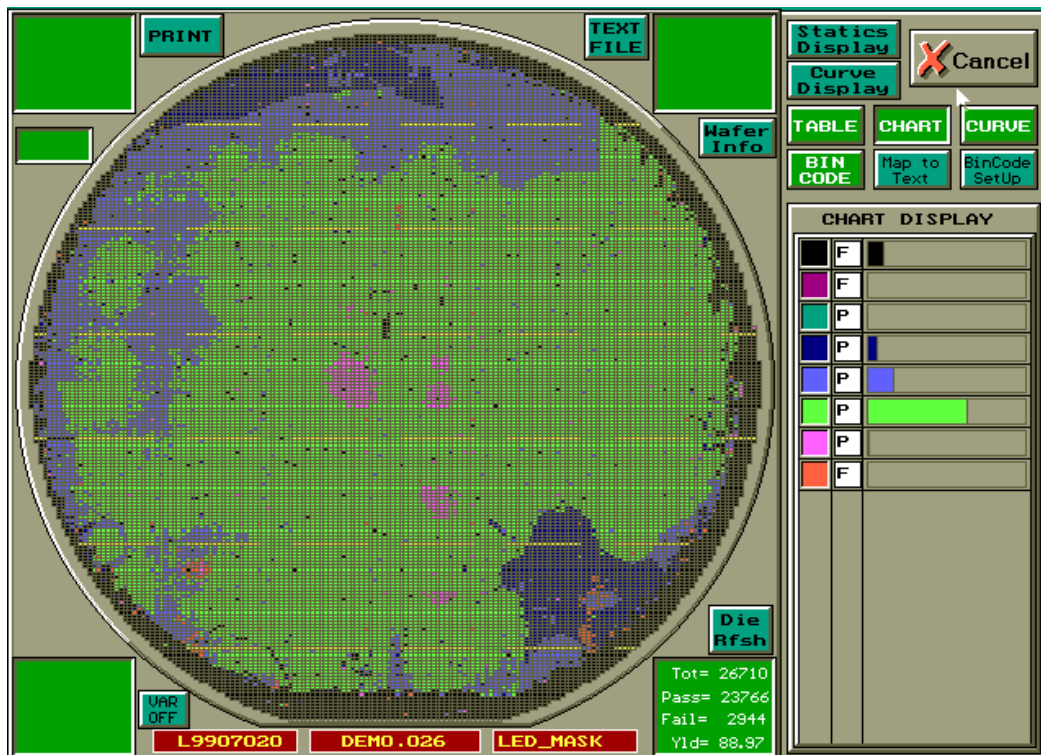
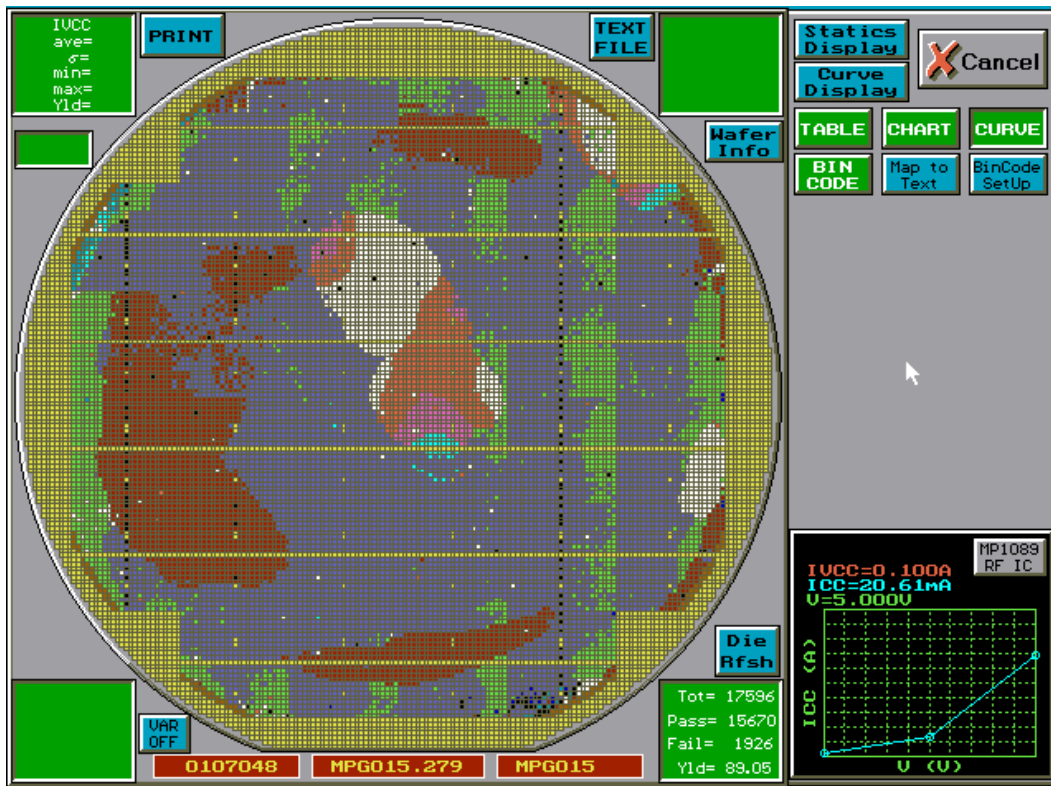
PCM	Name	Unit	Average	sigma	Min.	Max	Yield	LLimit	HLimit
HBTARP	Ube	V	1.254	0.159	1.206	1.780	91.67	1.160	1.260
HBTARP	Ubc	V	1.008	0.003	1.002	1.012	91.67	0.960	1.080
HBTARP	Ubc2	V	1.472	0.093	1.441	1.780	91.67	1.401	1.499
HBTARP	Ubc2	V	1.359	0.001	1.356	1.362	91.67	1.321	1.419
HBTARP	βmax		105.86	4.087	98.87	113.43	91.67	80.00	130.00
HBTARP	β1.25		17.34	3.356	54.13	74.75	91.67	50.00	100.00
HBTARP	Ic	A	7.54E-08	2.14E-08	4.95E-09	8.57E-08	91.67	4.00E-08	1.50E-07
HBTAP2	βmax		88.99	5.159	78.44	96.26	83.33	80.00	130.00
HBTAP2	β1.25		42.88	1.523	40.05	44.82	0.000	50.00	100.00
HBTAP2	Ic	A	2.19E-07	5.43E-08	2.07E-09	2.43E-07	0.000	4.00E-08	1.50E-07
HBTAP2	Ube	V	1.177	0.0007	1.176	1.178	100.00	1.160	1.260
HBTAP2	Ubc	V	1.004	0.013	0.964	1.014	91.67	0.960	1.080
HBTAP2	Ubc2	V	1.370	0.019	1.363	1.433	8.333	1.401	1.499
HBTAP2	Ubc2	V	1.301	0.001	1.299	1.303	0.000	1.321	1.419
HBTARS	Ube	V	12.37	0.006	12.36	12.38	100.00	11.00	13.00
HBTARS	Ubc	V	11.24	0.030	11.17	11.28	100.00	10.00	12.00
HBTARS	Ubc2	V	14.33	0.049	14.20	14.38	100.00	13.00	15.00
HBTARS	Ubc2	V	13.64	0.015	13.62	13.68	100.00	12.00	14.00
PCM32	M1-M2	Ω	7.501	0.355	7.283	8.703	100.00	3.500	13.50
PCM32	BI50	Ω	6.63E+09	4.94E+09	3.12E+09	2.05E+10	100.00	1.00E+08	1.00E+12
PCM32	CI50	Ω	1.01E+08	9.43E+06	6.66E+07	1.09E+08	100.00	1.00E+06	1.00E+10
PCM33	M1snk	Ω	17.21	1.418	16.51	22.62	100.00	10.00	25.00
PCM33	M1M2	Ω	4.77E+10	1.16E+11	5.25E+09	4.96E+11	100.00	1.00E+08	1.00E+12
PCM33	M2snk	Ω	9.394	0.429	8.619	10.51	100.00	5.000	25.00
PCM33	M2M2	Ω	0.000	0.000	0.000	0.000	0.000	1.00E+08	1.00E+12
PCM37	M1-EM	Ω	336.53	12.48	324.07	366.15	100.00	250.00	550.00
PCM37	M1-BM	Ω	21.73	0.275	20.98	22.26	100.00	5.000	45.00
PCM37	M1-CM	Ω	19.35	0.226	18.89	19.74	100.00	3.500	36.50
PCM37	RT-2u	Ω	547.05	12.21	527.80	564.24	100.00	400.00	600.00
PCM37	RT-3u	Ω	540.40	6.427	532.85	551.79	100.00	400.00	600.00
PCM37	RT-5u	Ω	533.31	4.390	526.07	537.93	100.00	400.00	600.00
RILM	Rsh	Ω/D	52.69	0.755	51.19	54.02	100.00	45.00	55.00
RILM	rc	Ωcm ²	5.45E-08	2.12E-08	1.11E-08	9.89E-08	100.00	1.00E-12	1.00E-06
SPLIT	Vos	V	0.200	0.0001	0.200	0.200	93.75	0.120	0.280
SPLIT	βmax		106.95	3.669	101.30	117.07	93.75	80.00	120.00
SPLIT	β1.25		81.87	2.385	77.75	87.23	93.75	60.00	100.00
SPLIT	Ic	A	1.33E-08	6.41E-10	1.14E-08	1.41E-08	93.75	4.00E-09	2.40E-08
SPLIT	Ib	A	7.55E-10	1.27E-10	5.32E-10	9.71E-10	93.75	1.00E-13	1.20E-08
SPLIT	Rcc	Ω	35.86	2.717	33.74	44.42	100.00	28.00	45.00
SPLIT	Rbb	Ω	139.90	4.951	135.71	154.02	100.00	120.00	200.00

4.4 Test data curve display for one dot on the map

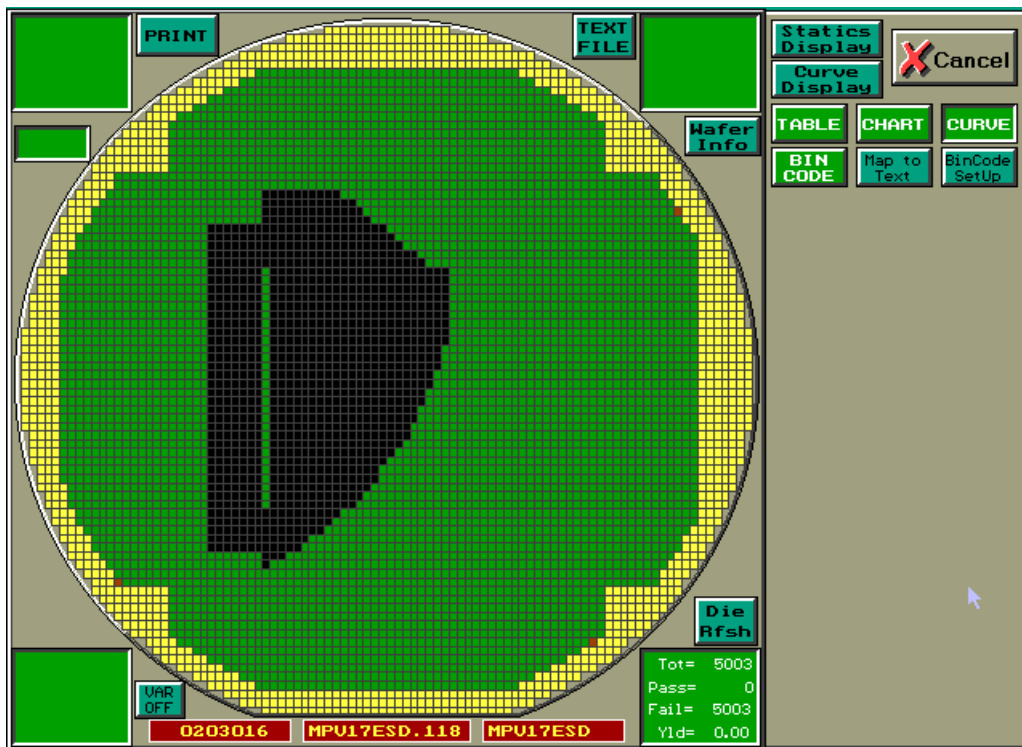
You can display all curves in the same dot on the map even tested in the different single PCM ID testing.



4.5 100% IC on wafer probing map data display

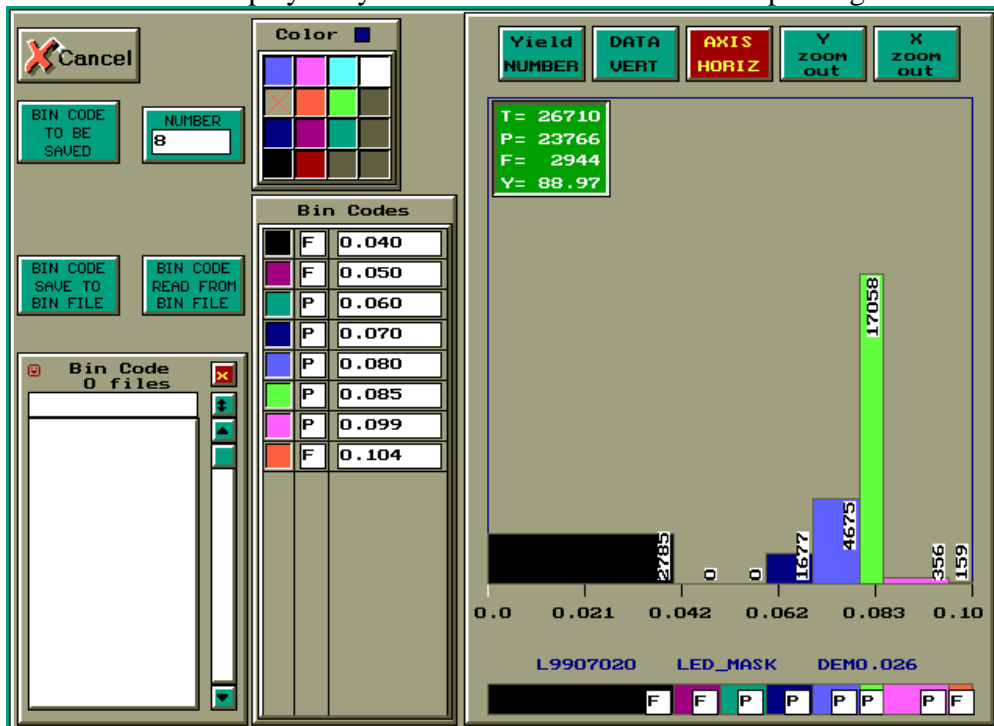


4.6 You can test broken piece wafer with edge sensor



4.7 100% IC on wafer probing bin data display

You can display bin yield data for 100% IC on wafer probing.



5.1 SPC Table for all parameters

Test:ET2		Total Wafers Tested:307							
F1(▲) Up	Lot	0101001	0101002	0101003	0101004	0101005	0101006	0101007	
F2(▼) Down	Mask	MP1189	MPG011	MP1089	MP1089	MPU17ESD	MPT5	MPU2BAES	
PCM Name	WNum	4	2	2	2	4	2	4	
HBT1	βmax	132.22	132.71	134.84	135.95	105.20	103.69	110.29	
HBT1	β1.25	110.96	110.28	110.78	112.75	81.74	81.67	85.06	
HBT1	Ic	1.29E-08	1.49E-08	1.40E-08	1.33E-08	1.39E-08	1.42E-08	1.48E-08	
HBT1	Ib	4.57E-10	2.20E-09	2.76E-10	6.55E-10	8.15E-10	8.71E-10	8.76E-10	
HBT1	Re	16.64	16.03	18.86	15.92	7.127	7.127	8.255	
HBT1	bU	0.088	0.084	0.090	0.086	0.088	0.081	0.078	
HBT1	Rcc	37.38	39.31	36.91	36.62	42.16	36.36	33.08	
HBT1	Rbb	149.33	154.03	155.55	148.59	150.95	170.48	153.11	
HBT1	BVebo	8.797	8.866	8.953	8.875	8.900	8.479	8.891	
HBT1	BVcbo	23.19	22.86	23.33	22.88	23.83	23.55	23.78	
HBT1	BVceo	10.00	10.36	10.00	33.000	33.495	33.997	33.000	
HBT1	Vos	0.200	0.200	0.200	0.200	0.227	0.207	0.201	
P_N_P	Ube	1.208	1.202	1.207	1.205	1.205	1.200	1.204	
P_N_P	Ubc	1.012	0.991	0.991	1.009	0.990	1.010	1.002	
P_N_P	Ube2	1.479	1.467	1.488	1.469	1.437	1.450	1.443	
P_N_P	Ubc2	1.372	1.361	1.362	1.367	1.363	1.369	1.356	
P_N_P	βmax	128.58	120.59	123.30	127.26	108.85	109.58	110.06	
P_N_P	β1.25	86.76	77.30	90.09	79.46	76.36	83.43	75.45	
P_N_P	Ic	9.58E-08	9.71E-08	8.36E-08	8.43E-08	8.98E-08	1.37E-05	9.16E-08	
PCM32	M1-M2	8.269	8.128	7.815	7.719	7.932	7.484	7.807	
PCM32	BISO	7.72E+09	1.03E+10	3.98E+09	4.02E+10	3.62E+09	4.79E+09	3.09E+09	
PCM32	CISO	5.74E+07	8.92E+07	7.99E+07	1.12E+08	9.62E+07	5.21E+08	9.19E+07	
PCM33	M1snk	17.75	18.38	18.09	16.90	17.60	15.99	17.55	
PCM33	M1-M2	1.73E+10	6.77E+09	2.21E+12	2.18E+10	3.59E+10	3.30E+10	2.35E+10	
PCM33	M2snk	12.94	13.31	13.26	16.20	10.86	13.11	13.92	
PCM37	M1-EM	436.81	370.79	427.86	392.52	417.94	359.23	436.33	
PCM37	M1-BM	23.34	23.00	24.04	22.63	23.63	22.10	23.47	
PCM37	M1-CM	19.46	21.12	19.50	19.16	13.99	17.46	19.18	
M1CAP	CAP	9.993		9.486		9.976	9.746		
M1CAP	Q	322.27		36.92		173.62	470.44		
M1CAP	I								
RTL	Rsh	51.99	53.30	49.47	51.44	49.05	51.39	47.88	
RTL	rc	4.23E-08	8.05E-08	5.74E-08	5.11E-08	4.23E-08	1.61E-06	6.33E-08	
PCMR3A	RT-2u	565.18	500.86	527.46	506.34	536.70	495.61	520.41	
PCMR3A	RT-3u	540.34	557.40	509.51	508.31	509.08	505.05	497.75	
PCMR3A	RT-5u	525.12	552.84	494.52	509.89	489.49	506.90	481.01	
VIACHN2	IACH	2.808	2.787			2.801	2.794	2.820	
VIACHN2	IACH	2.757	2.796			2.762	2.787	2.946	

5.2 SPC Table for single parameter

5.3 SPC curve display

