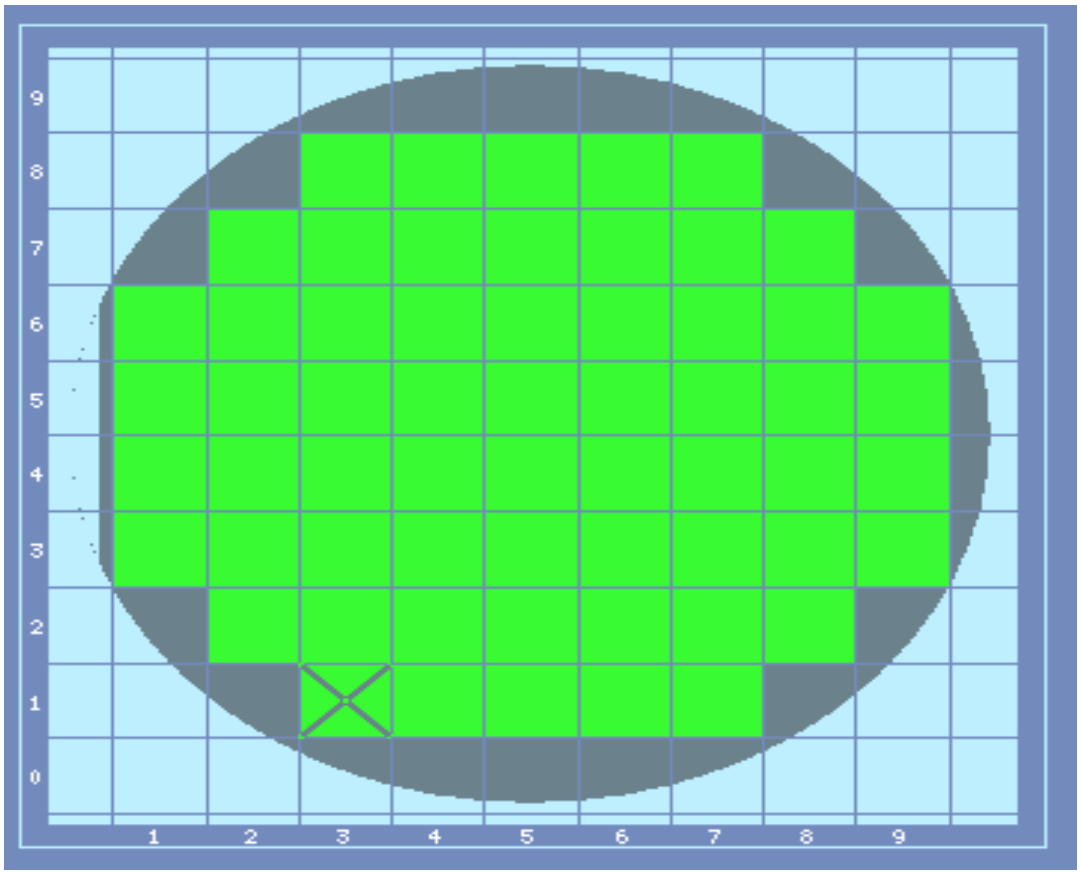
SKW
854 METAL 1
ELECTRICAL TEST
Lot 01-21-04

Wafers Labeled

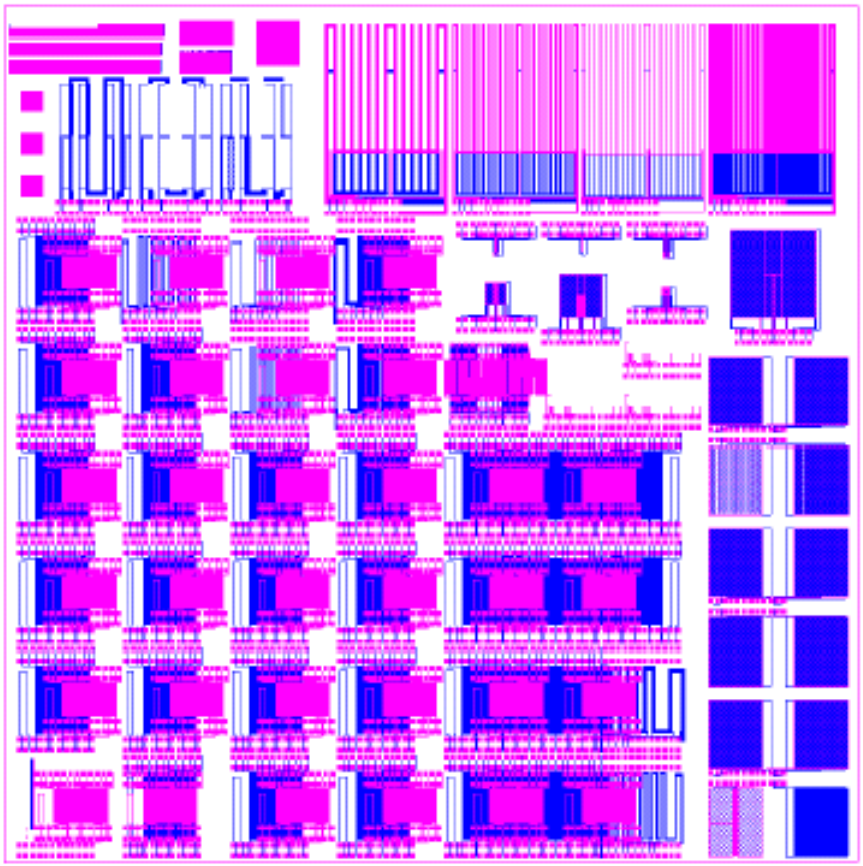
SWA1 & SWE3

WAFER LAYOUT

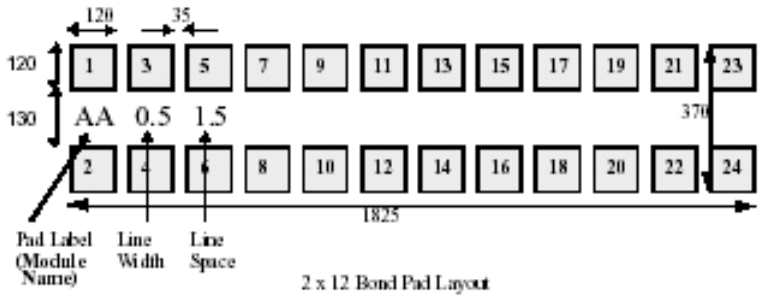


60 full die locations are tested. Wafer notch is at the right

TEST CHIP LAYOUT



MIT 854 AZ
Cu/low-K CMP
characterization
test mask



2 x 12 Bond Pad Layout

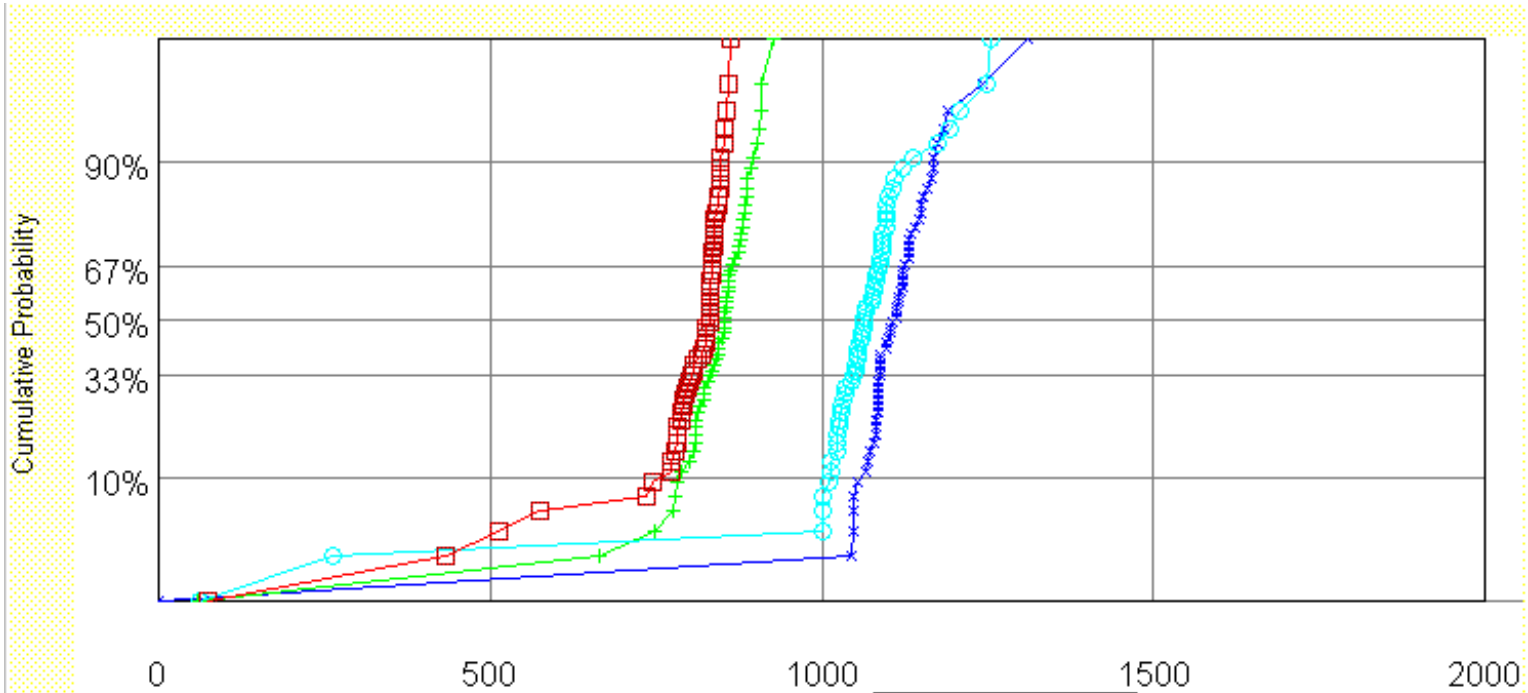
M1 Pattern Kelvin Resistors

- Measurement is made with a 4-terminal Kelvin resistors
- For structures with Lw < 5 um, a current of 0.1mA is forced; the resulting voltage is measured and resistance is calculated. For Lw < 50 um, 1mA is the forced current and for Lw = 50um, 10 mA is used.

Kelvin Resistor Test Structure

CA_DUT1	0.2	Iso	M1 Lw0.18/Ls0.18/P0.36/D50/Half/SerpResist Serpentine resistance
CA_DUT4	0.2	0.2	
DA_DUT1	0.3	Iso	M1 Lw0.25/Ls0.25/P0.5/D50/Half/SerpResist Serpentine resistance
DA_DUT4	0.3	0.3	
BC_DUT1	0.5	Iso	M1 Lw0.5/Ls0.5/P1/D50/Half/SerpResist Serpentine resistance
BC_DUT4	0.5	0.5	
BE_DUT1	0.5	Iso	M1 Lw0.5/Ls1.5/P2/D25/Half/SerpResist Serpentine resistance
BE_DUT4	0.5	1.5	
AC_DUT1	1	Iso	M1 Lw1/Ls9/P10/D90/Half/SerpResist Serpentine resistance
AC_DUT4	1	9	
CC_DUT1	1	Iso	M1 Lw1/Ls1/P2/D50/Half/SerpResist Serpentine resistance
CC_DUT4	1	1	
CE_DUT1	1	Iso	M1 Lw1/Ls3/P4/D25/Half/SerpResist Serpentine resistance
CE_DUT4	1	1	
BG_DUT1	1.5	Iso	M1 Lw1.5/Ls0.5/P2/D75/Half/SerpResist Serpentine resistance
BG_DUT4	1.5	0.5	
DC_DUT1	2	Iso	M1 Lw2/Ls2/P4/D50/Half/SerpResist Serpentine resistance
DC_DUT4	2	2	
DE_DUT1	3	Iso	M1 Lw3/Ls1/P4/D75/Half/SerpResist Serpentine resistance
DE_DUT4	3	3	
DG_DUT1	5	Iso	M1 Lw5/Ls1/P6/D83/Half/SerpResist Serpentine resistance
DG_DUT4	5	5	
AI_DUT1	7	Iso	M1 Lw7/Ls3/P10/D70/Half/SerpResist Serpentine resistance
AI_DUT4	7	7	
AK_DUT1	9	Iso	M1 Lw9/Ls1/P10/D90/Half/SerpResist Serpentine resistance
AK_DUT4	9	1	
BI_DUT1	10	Iso	M1 Lw10/Ls10/P20/D50/Half/SerpResist Serpentine resistance
BI_DUT4	10	10	
BK_DUT1	50	Iso	M1 50/50/P100/D50/Half/SerpResist Serpentine resistance
BK_DUT4	50	50	
GC_DUT1	100	Iso	M1 100/100/P200/D50/DualR/Serp Resistance
GC_DUT4	100	100	

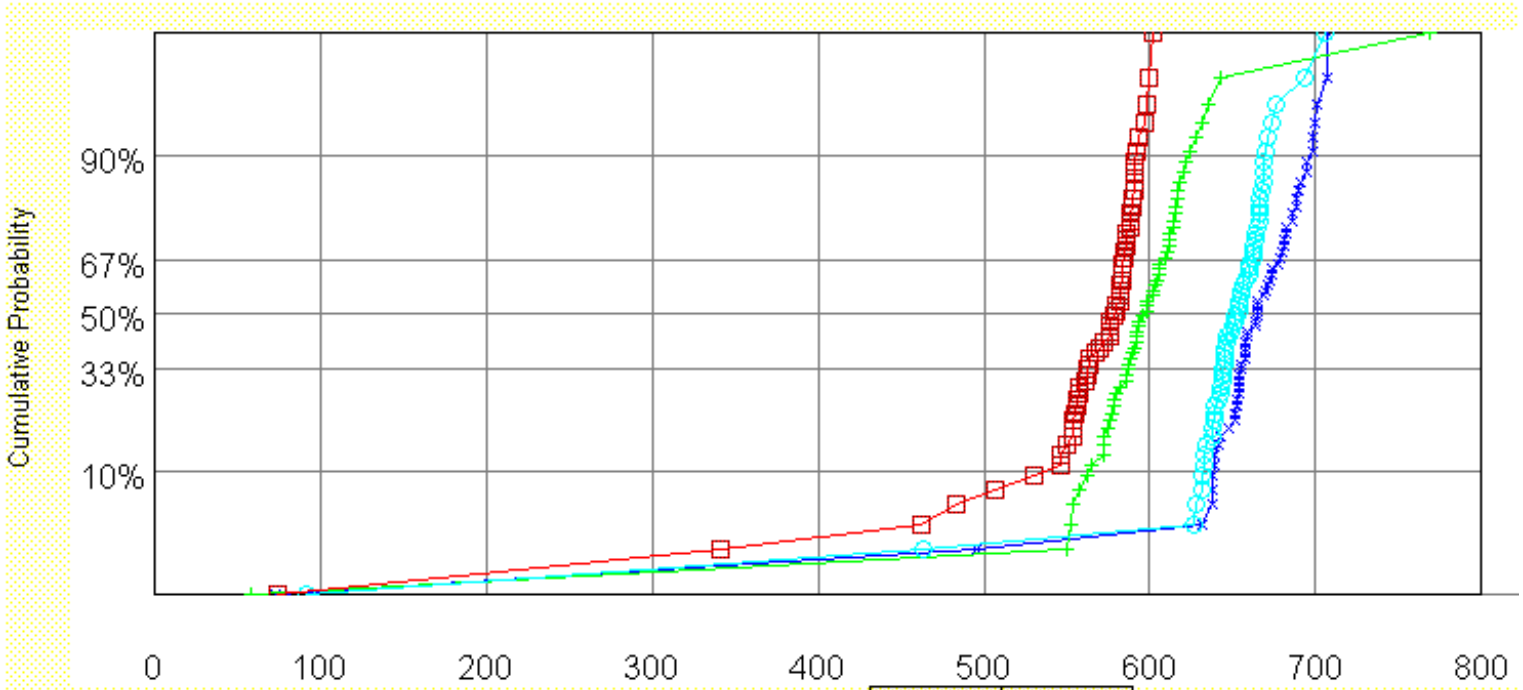
Lw = 0.18 um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	CA_DUT1,swa1	60	1109	0.0%
	S	CA_DUT4,swa1	60	853.0	0.0%
	S	CA_DUT1,swe3	60	1063	0.0%
	S	CA_DUT4,swe3	60	830.1	0.0%

Ω

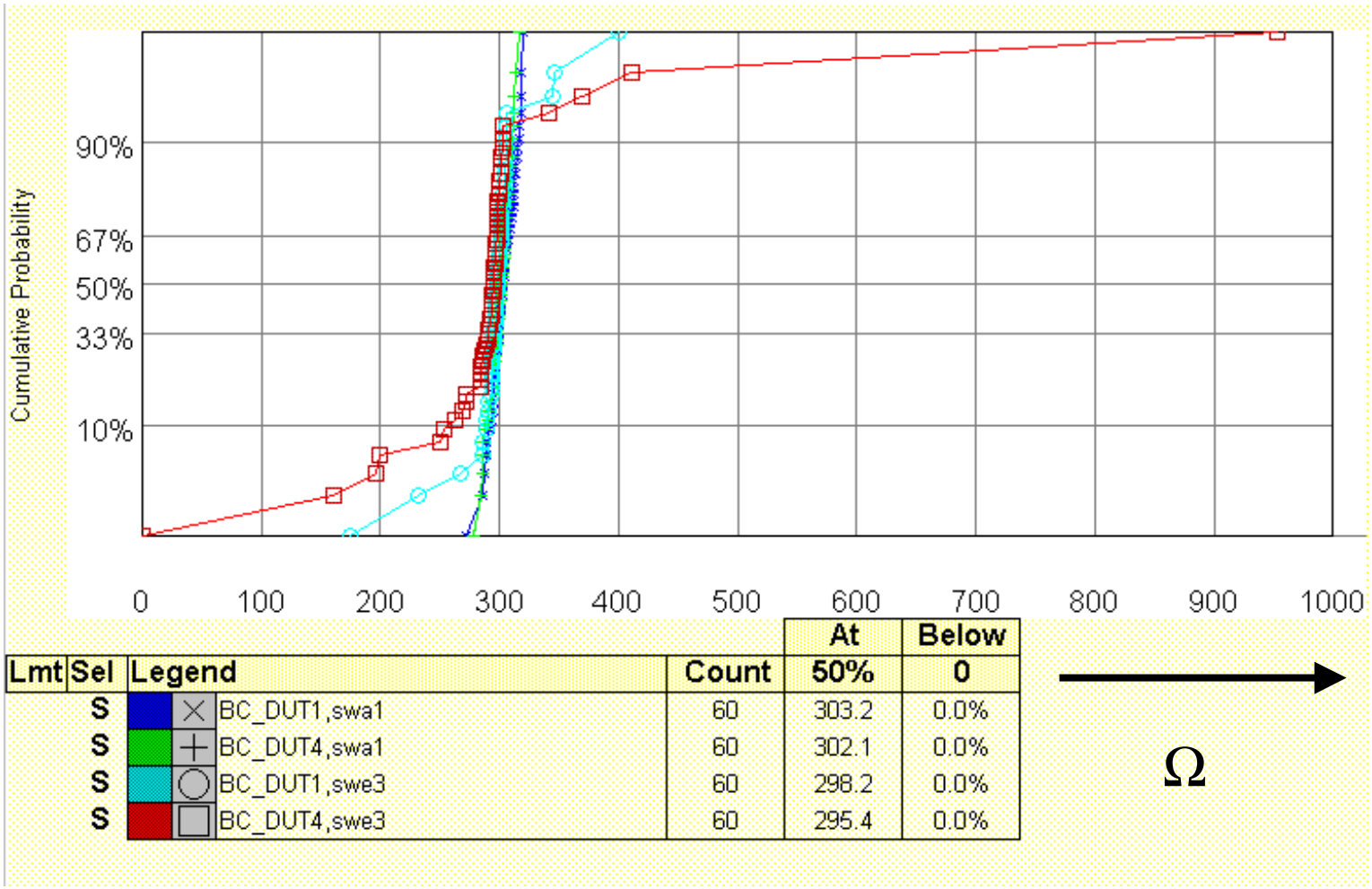
Lw = 0.25um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	DA_DUT1,swa1	60	664.9	0.0%
	S	DA_DUT4,swa1	60	596.4	0.0%
	S	DA_DUT1,swe3	60	652.5	0.0%
	S	DA_DUT4,swe3	60	579.0	0.0%

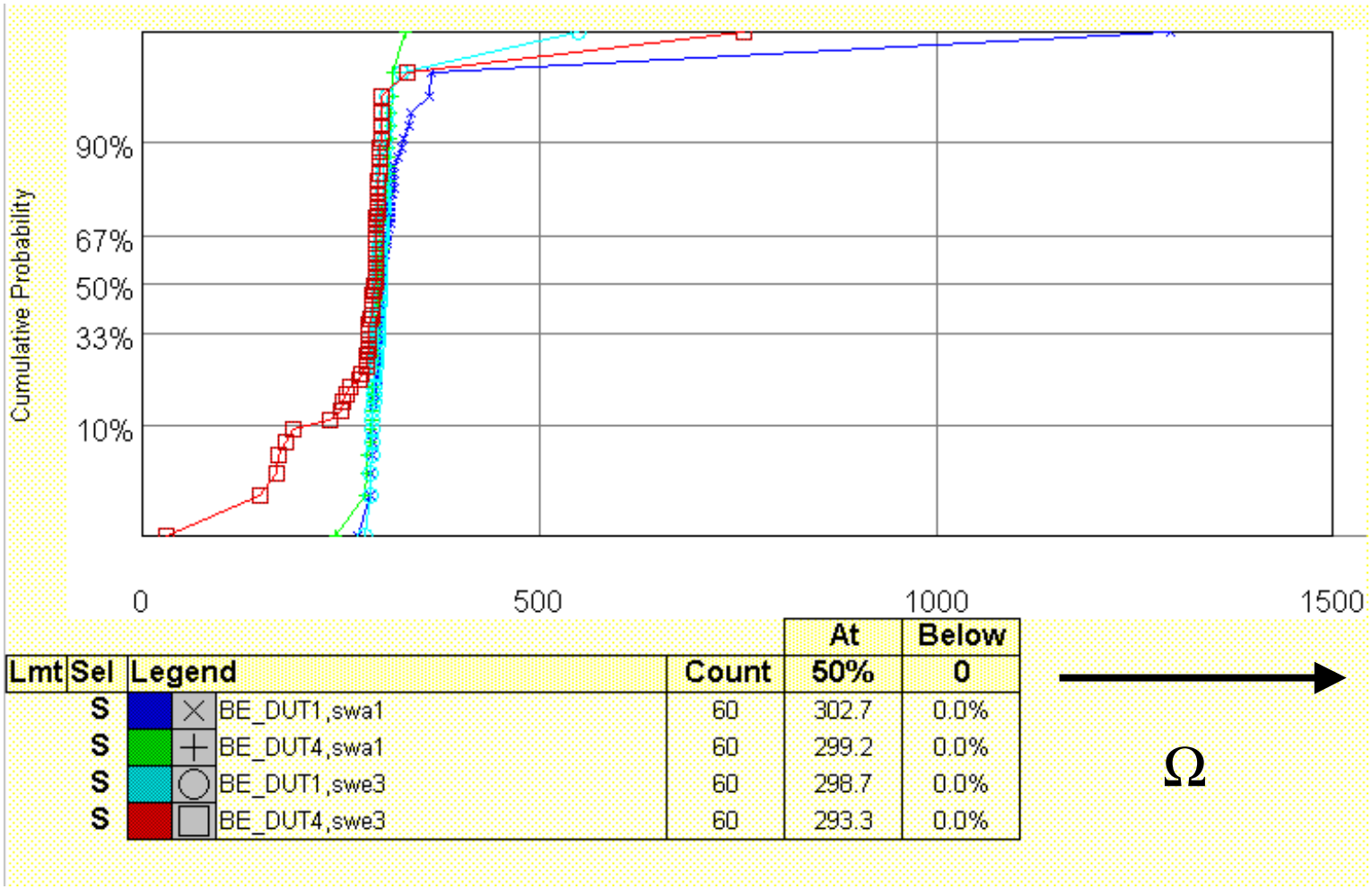
Ω

Lw = 0.5 um; Ls = 0.5 um



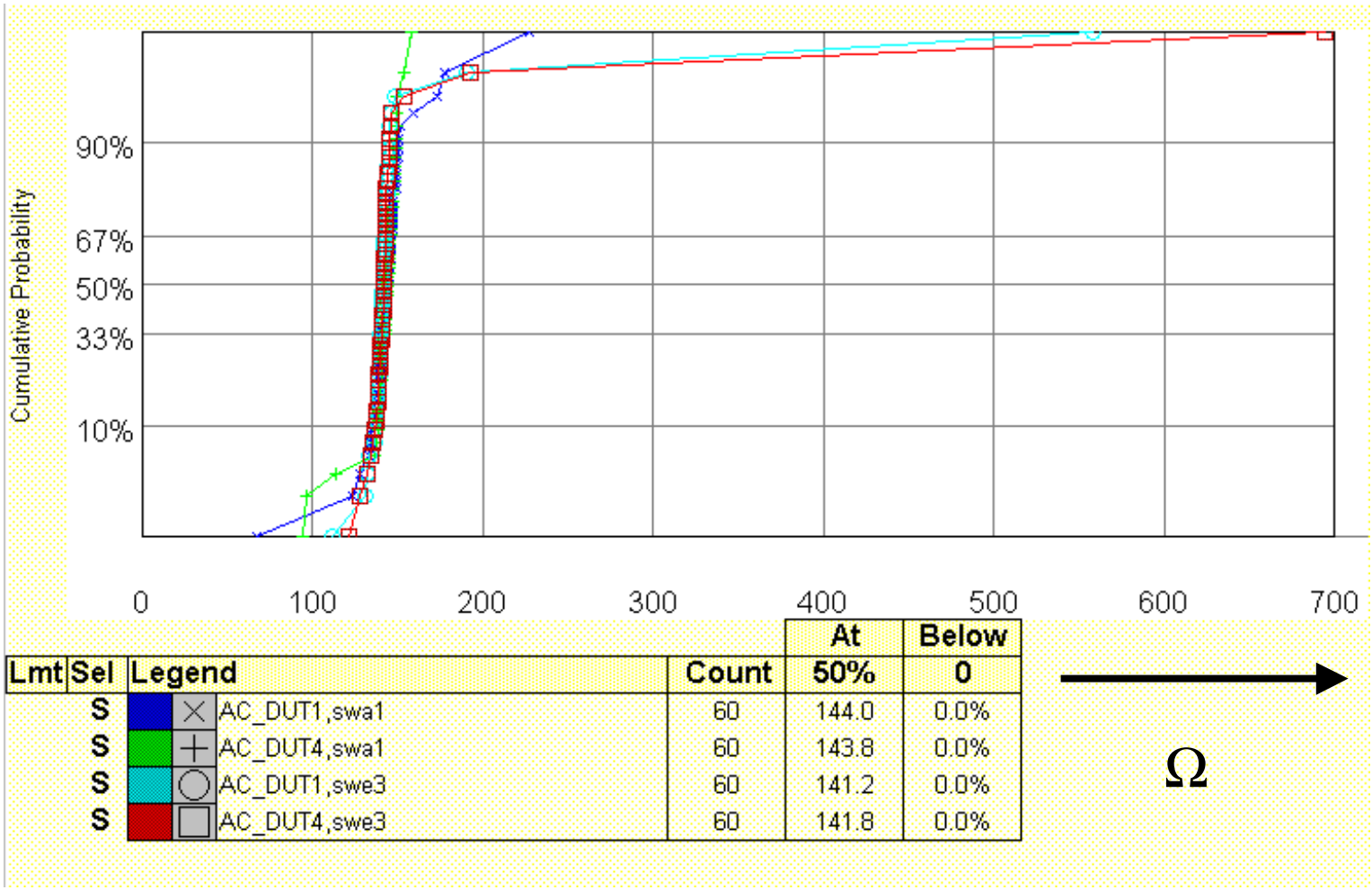
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	BC_DUT1,swa1	60	303.2	0.0%
	S	BC_DUT4,swa1	60	302.1	0.0%
	S	BC_DUT1,swe3	60	298.2	0.0%
	S	BC_DUT4,swe3	60	295.4	0.0%

Lw = 0.5 um; Ls = 1.5 um



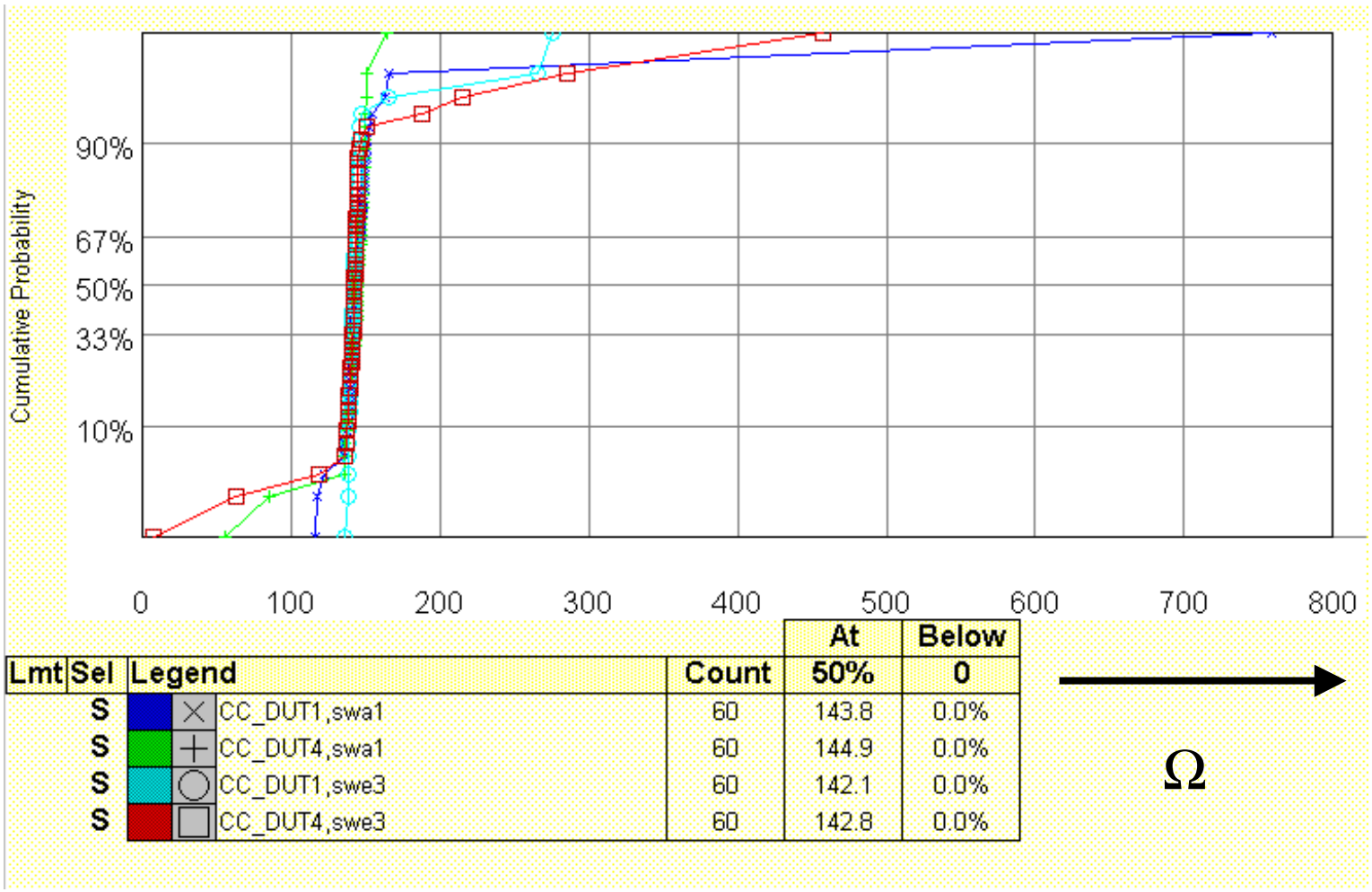
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	BE_DUT1,swa1	60	302.7	0.0%
	S	BE_DUT4,swa1	60	299.2	0.0%
	S	BE_DUT1,swe3	60	298.7	0.0%
	S	BE_DUT4,swe3	60	293.3	0.0%

Lw = 1um; Ls = 9 um



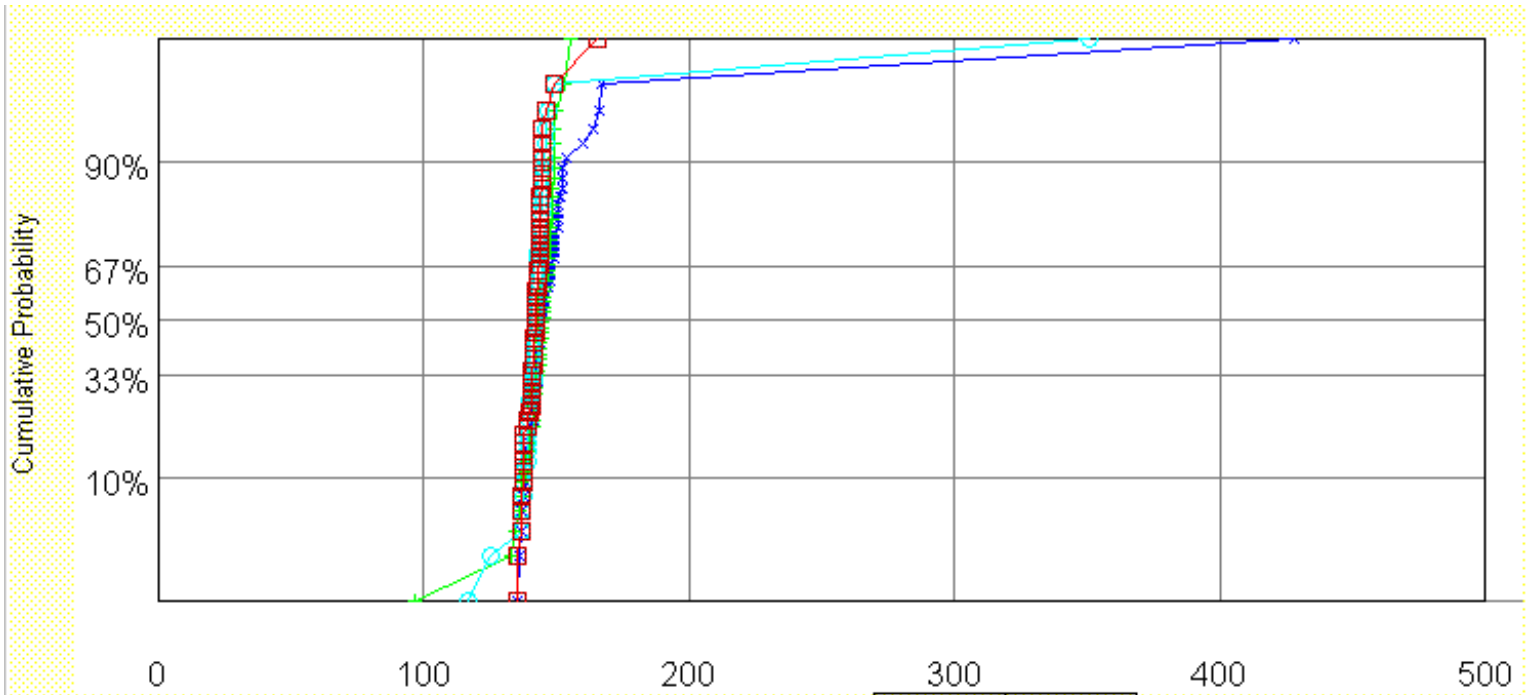
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	AC_DUT1,swa1	60	144.0	0.0%
	S	AC_DUT4,swa1	60	143.8	0.0%
	S	AC_DUT1,swe3	60	141.2	0.0%
	S	AC_DUT4,swe3	60	141.8	0.0%

Lw = 1um; Ls = 1 um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	CC_DUT1,swa1	60	143.8	0.0%
	S	CC_DUT4,swa1	60	144.9	0.0%
	S	CC_DUT1,swe3	60	142.1	0.0%
	S	CC_DUT4,swe3	60	142.8	0.0%

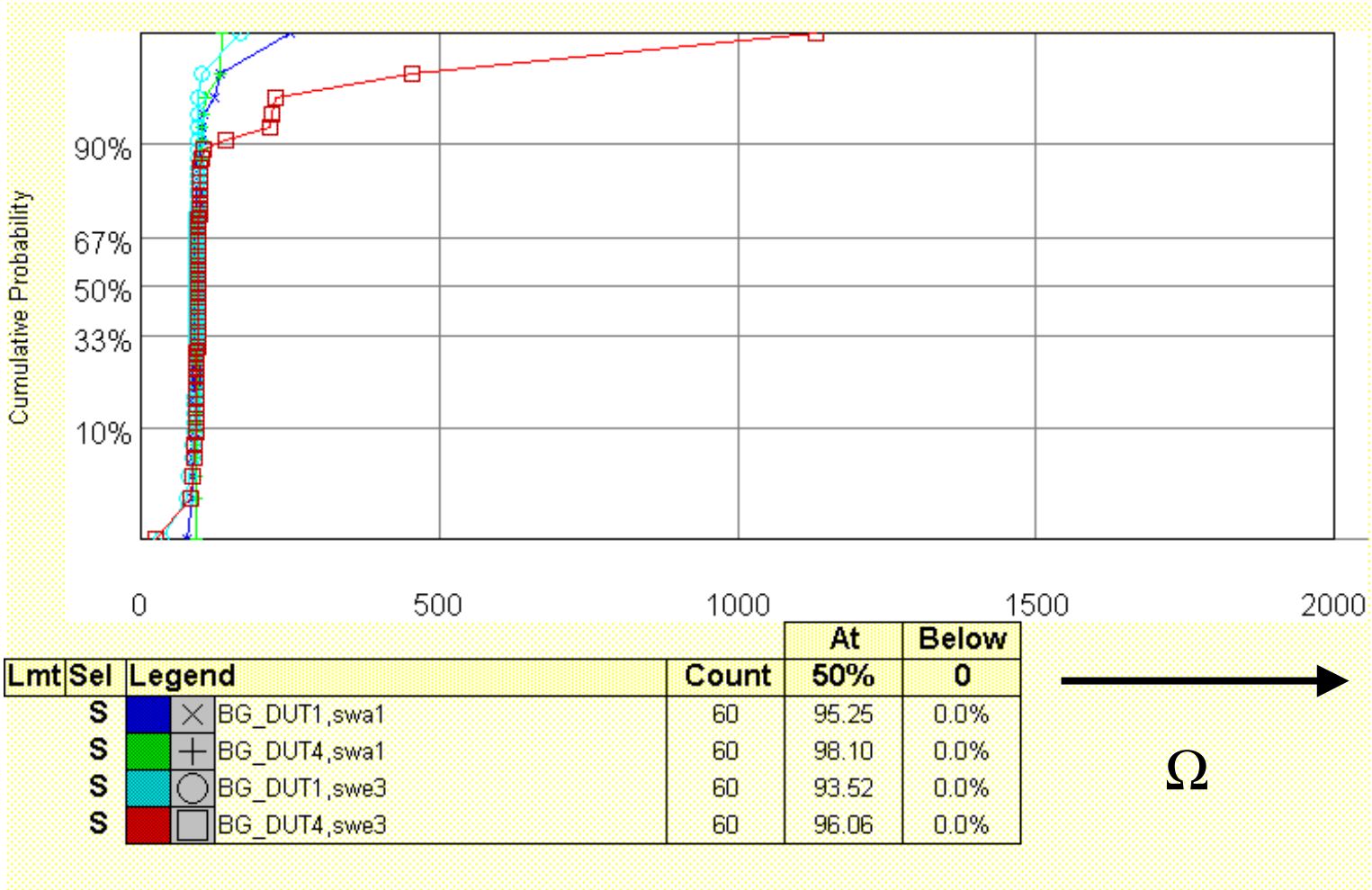
Lw = 1um; Ls = 3 um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	CE_DUT1,swa1	60	144.1	0.0%
	S	CE_DUT4,swa1	60	144.9	0.0%
	S	CE_DUT1,swe3	60	141.9	0.0%
	S	CE_DUT4,swe3	60	142.1	0.0%

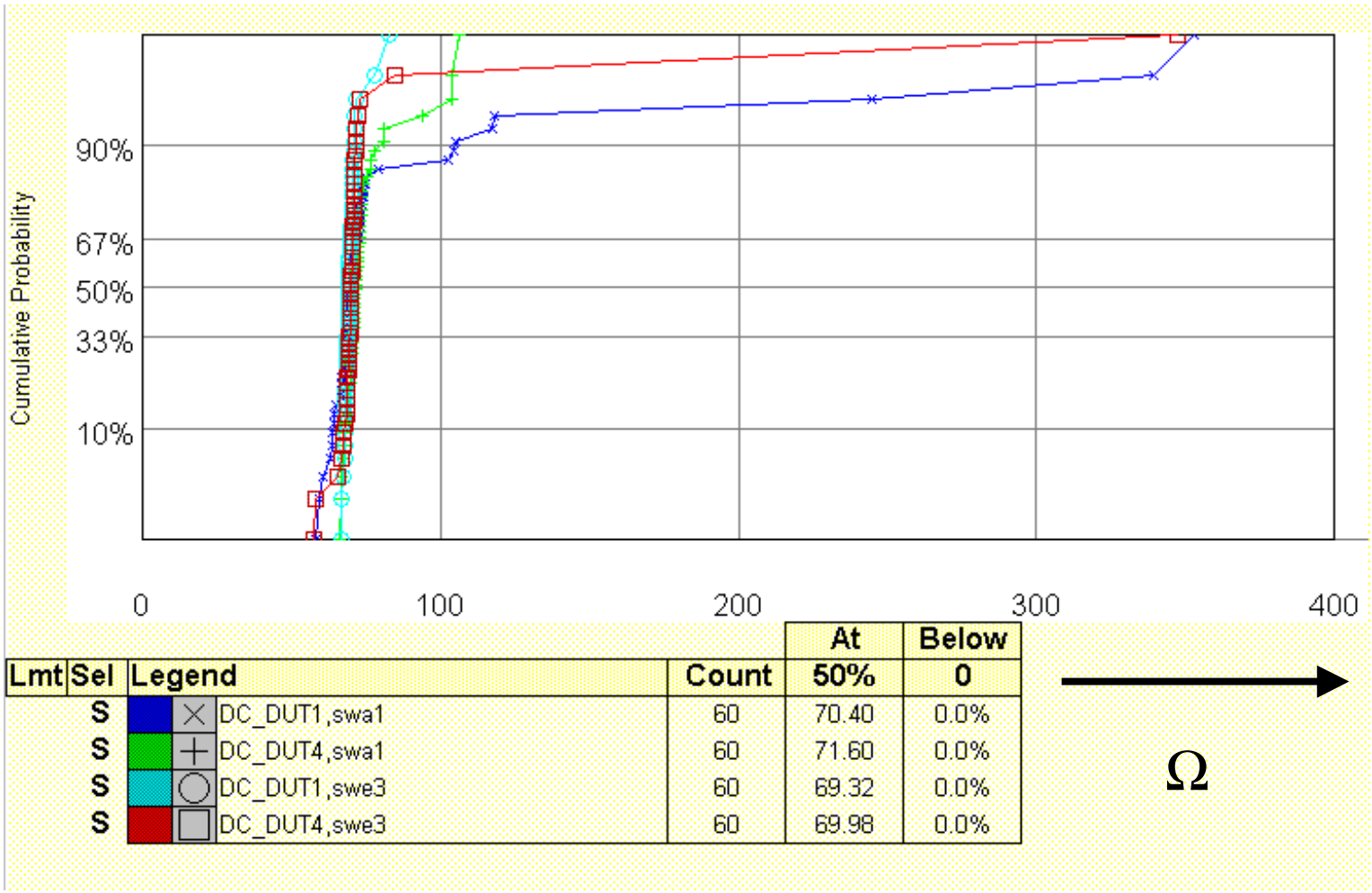
Ω

Lw = 1.5um



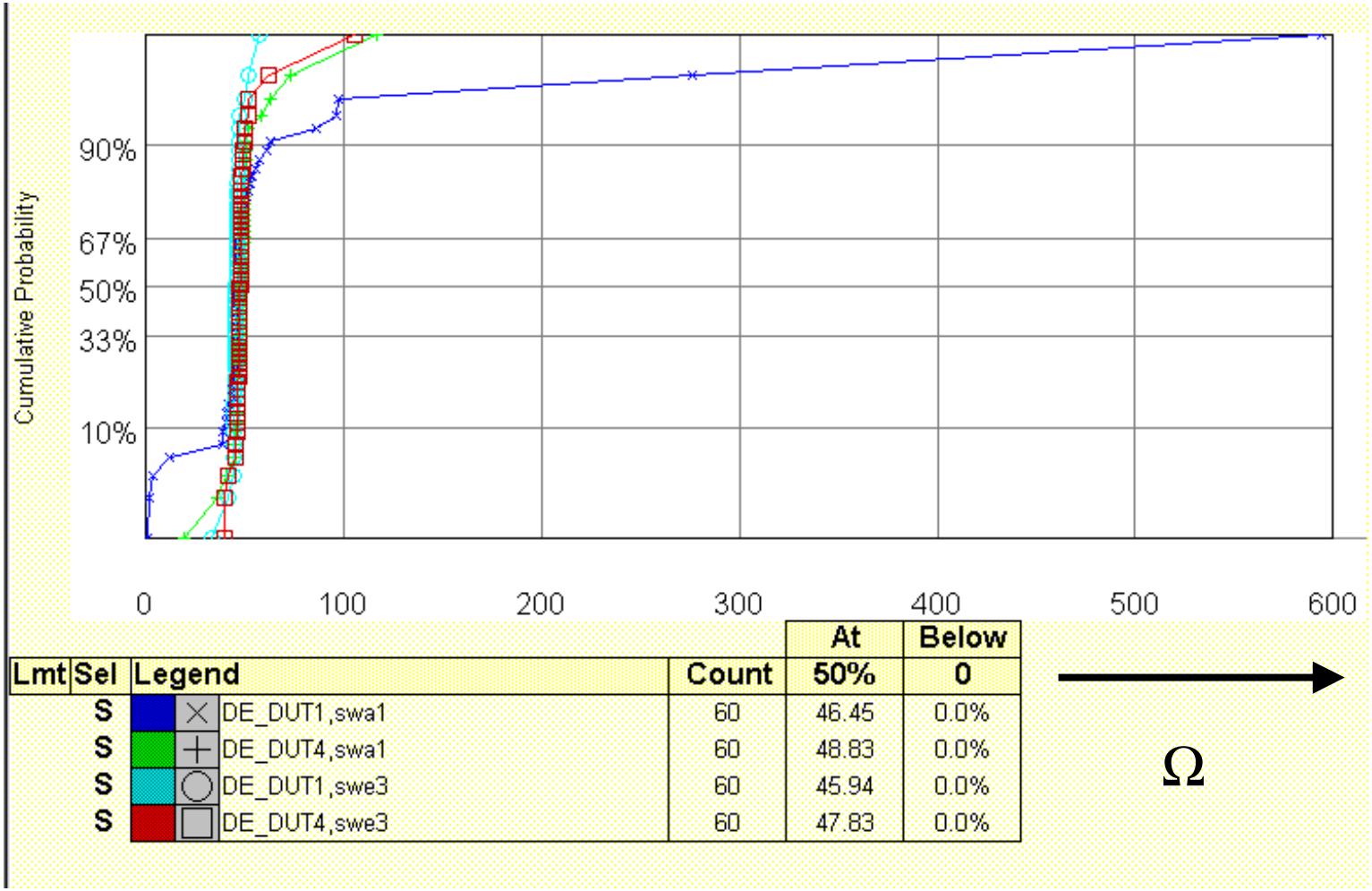
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	BG_DUT1,swa1	60	95.25	0.0%
	S	BG_DUT4,swa1	60	98.10	0.0%
	S	BG_DUT1,swe3	60	93.52	0.0%
	S	BG_DUT4,swe3	60	96.06	0.0%

Lw = 2um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	DC_DUT1,swa1	60	70.40	0.0%
	S	DC_DUT4,swa1	60	71.60	0.0%
	S	DC_DUT1,swe3	60	69.32	0.0%
	S	DC_DUT4,swe3	60	69.98	0.0%

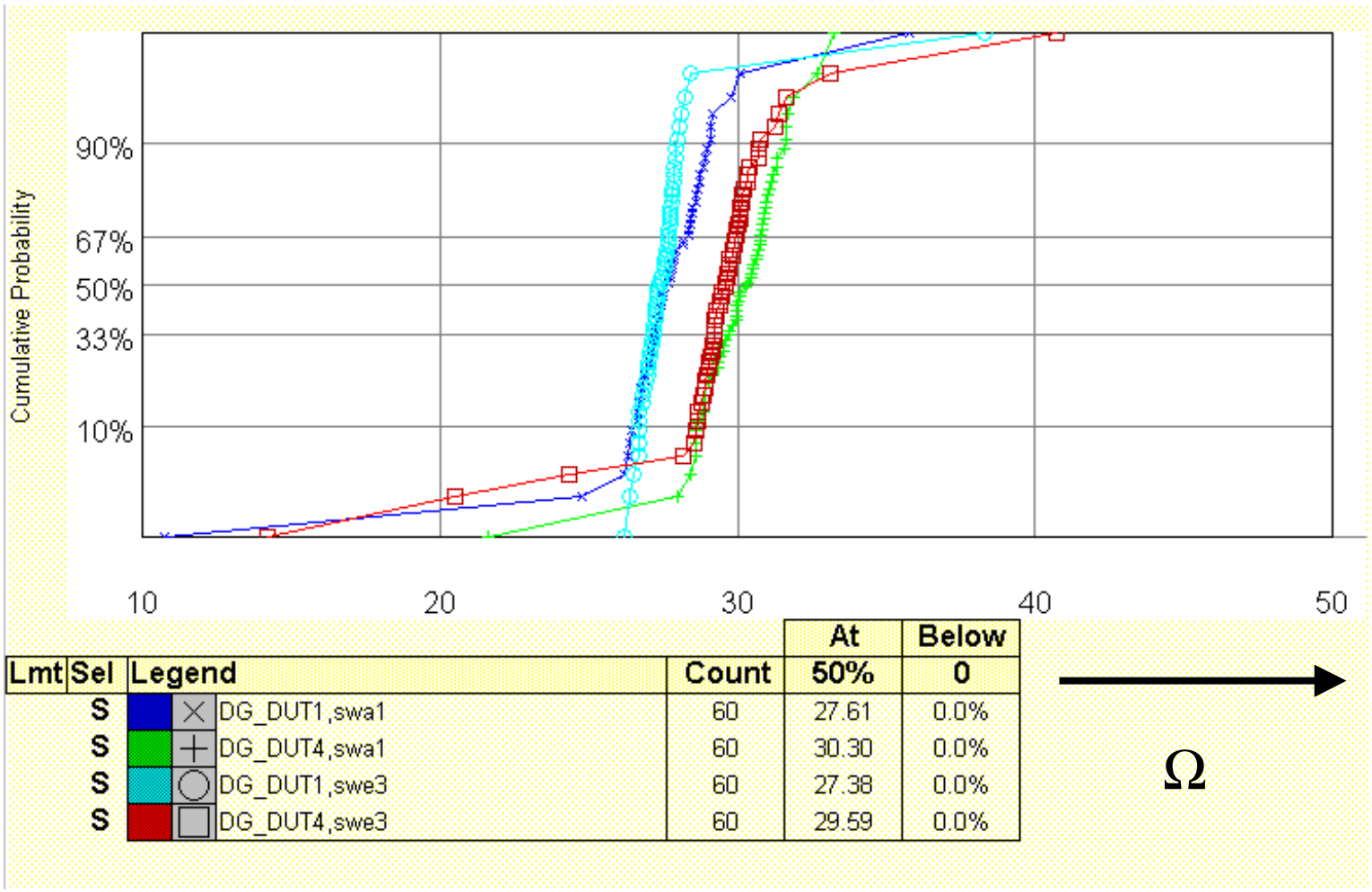
Lw = 3um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	DE_DUT1,swa1	60	46.45	0.0%
	S	DE_DUT4,swa1	60	48.83	0.0%
	S	DE_DUT1,swe3	60	45.94	0.0%
	S	DE_DUT4,swe3	60	47.83	0.0%

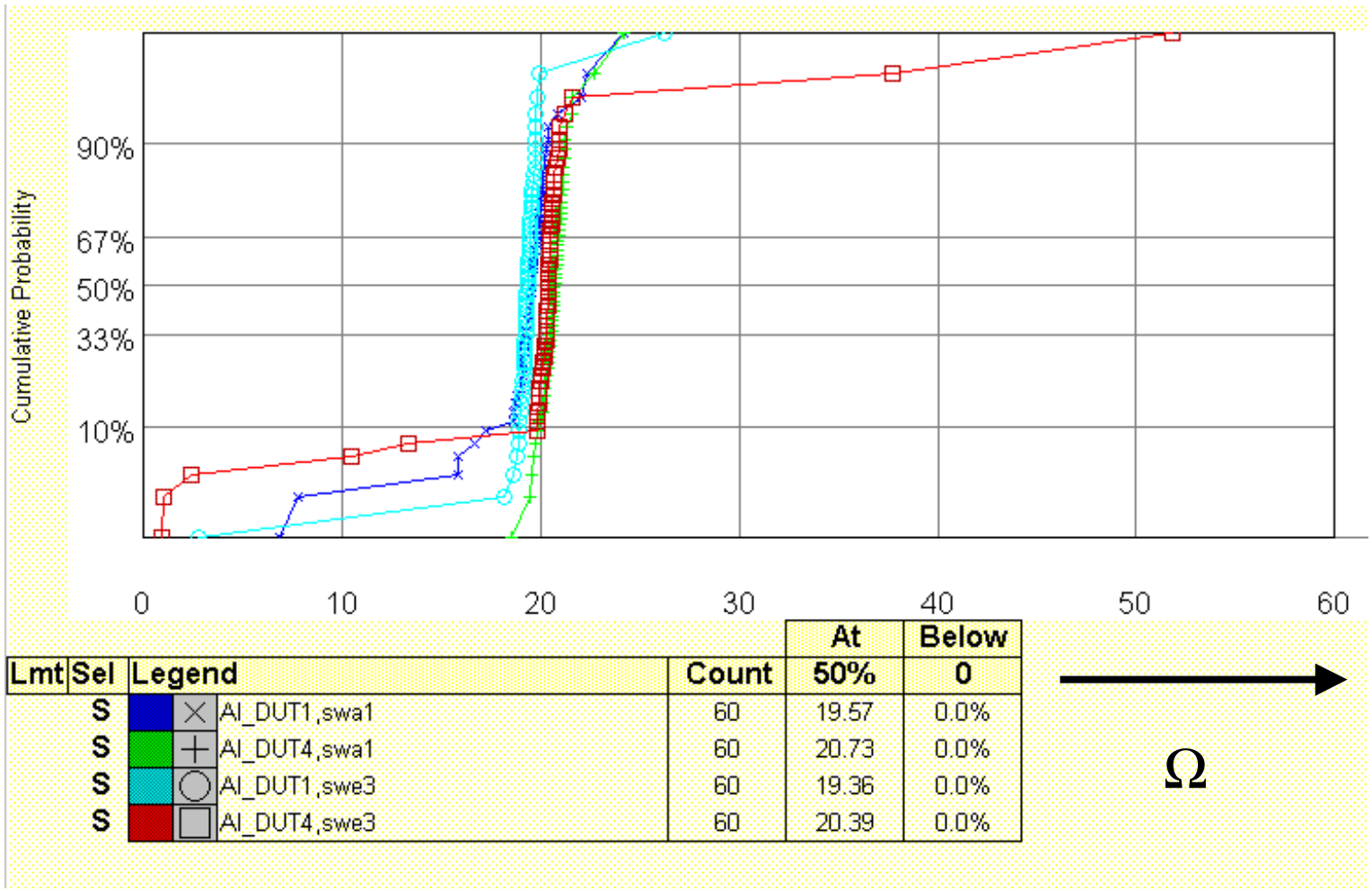
Ω

Lw = 5um



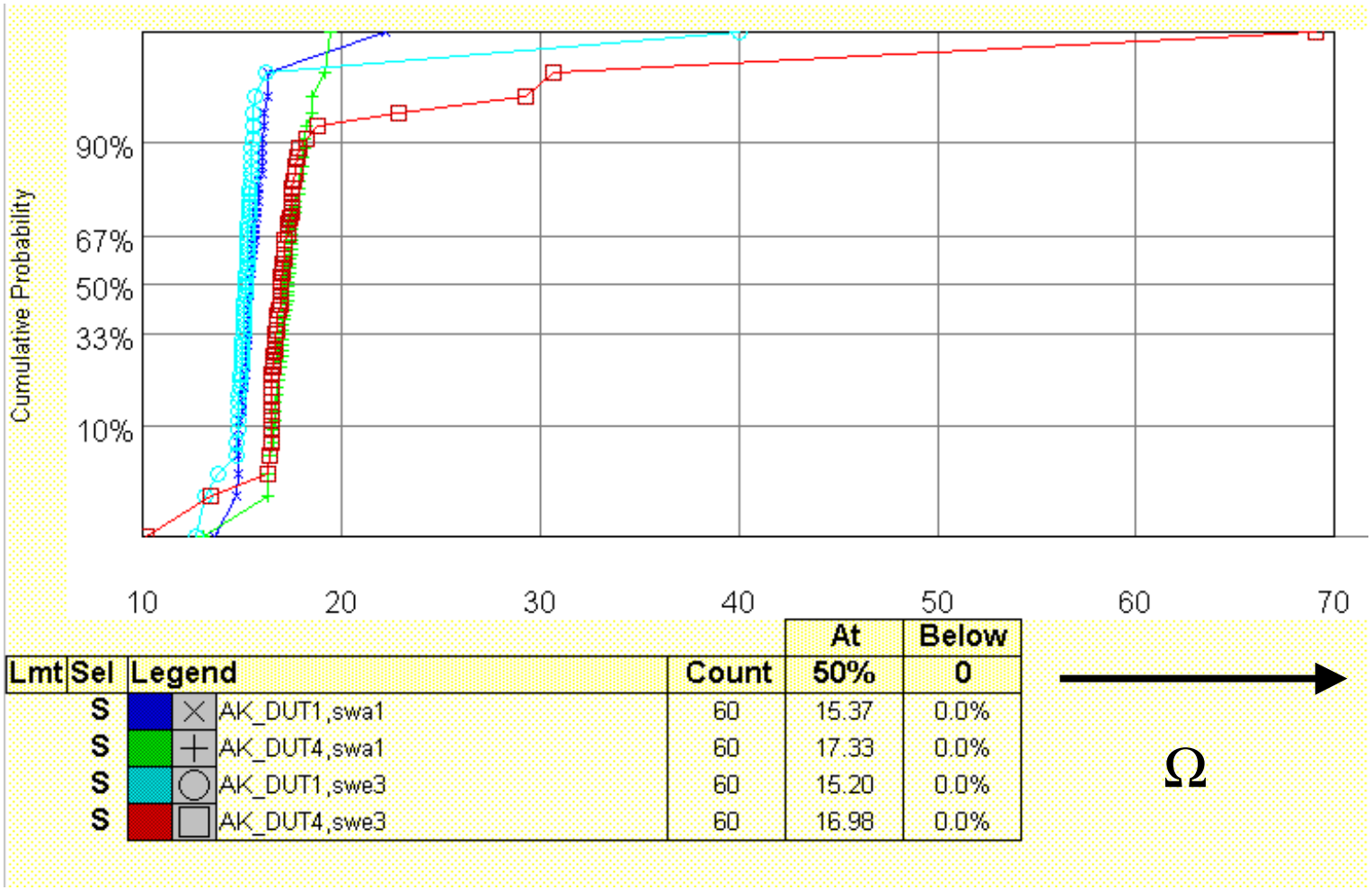
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	DG_DUT1,swa1	60	27.61	0.0%
	S	DG_DUT4,swa1	60	30.30	0.0%
	S	DG_DUT1,swe3	60	27.38	0.0%
	S	DG_DUT4,swe3	60	29.59	0.0%

Lw = 7um



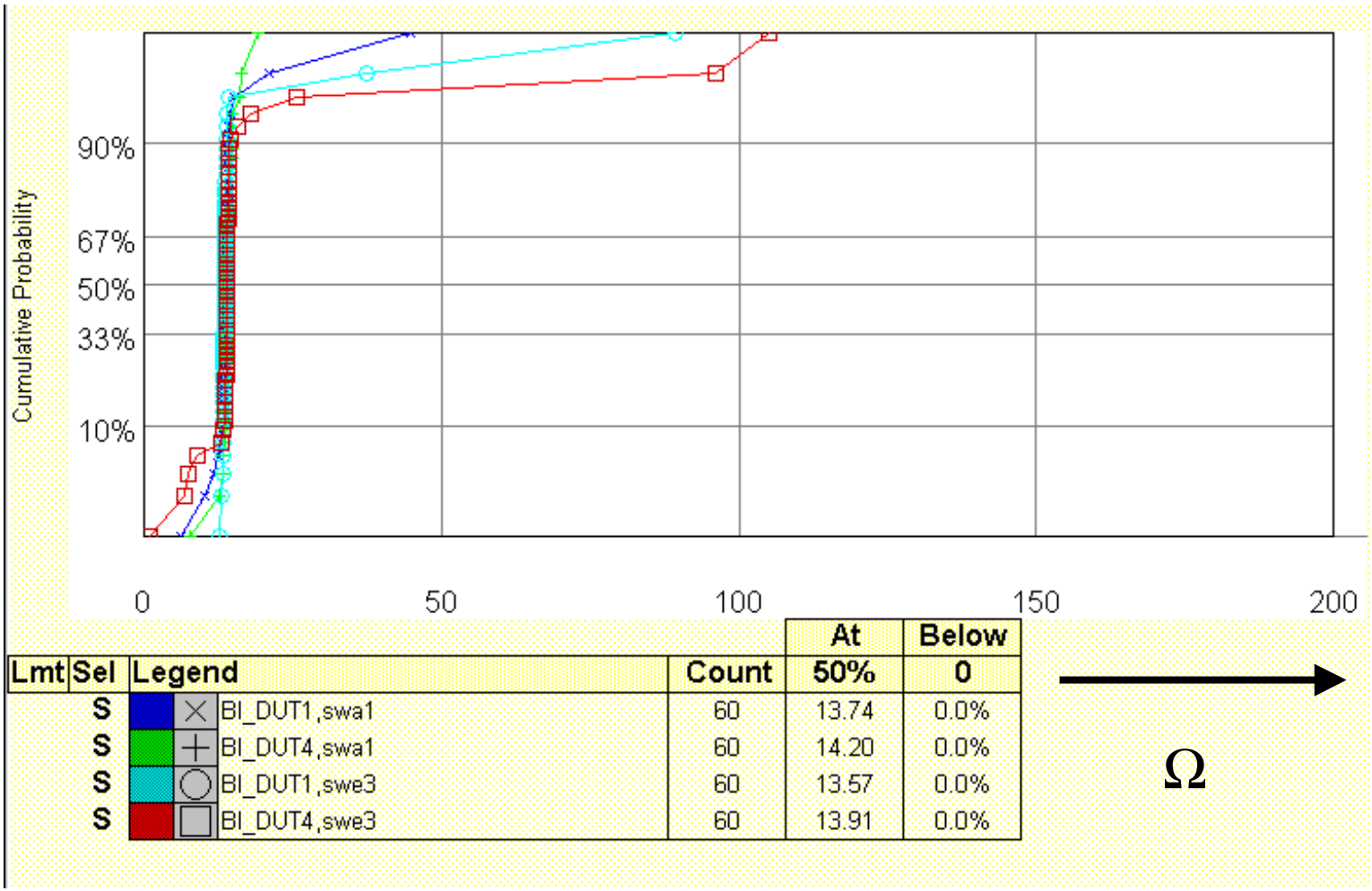
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	Al_DUT1,swa1	60	19.57	0.0%
	S	Al_DUT4,swa1	60	20.73	0.0%
	S	Al_DUT1,swe3	60	19.36	0.0%
	S	Al_DUT4,swe3	60	20.39	0.0%

Lw = 9 um



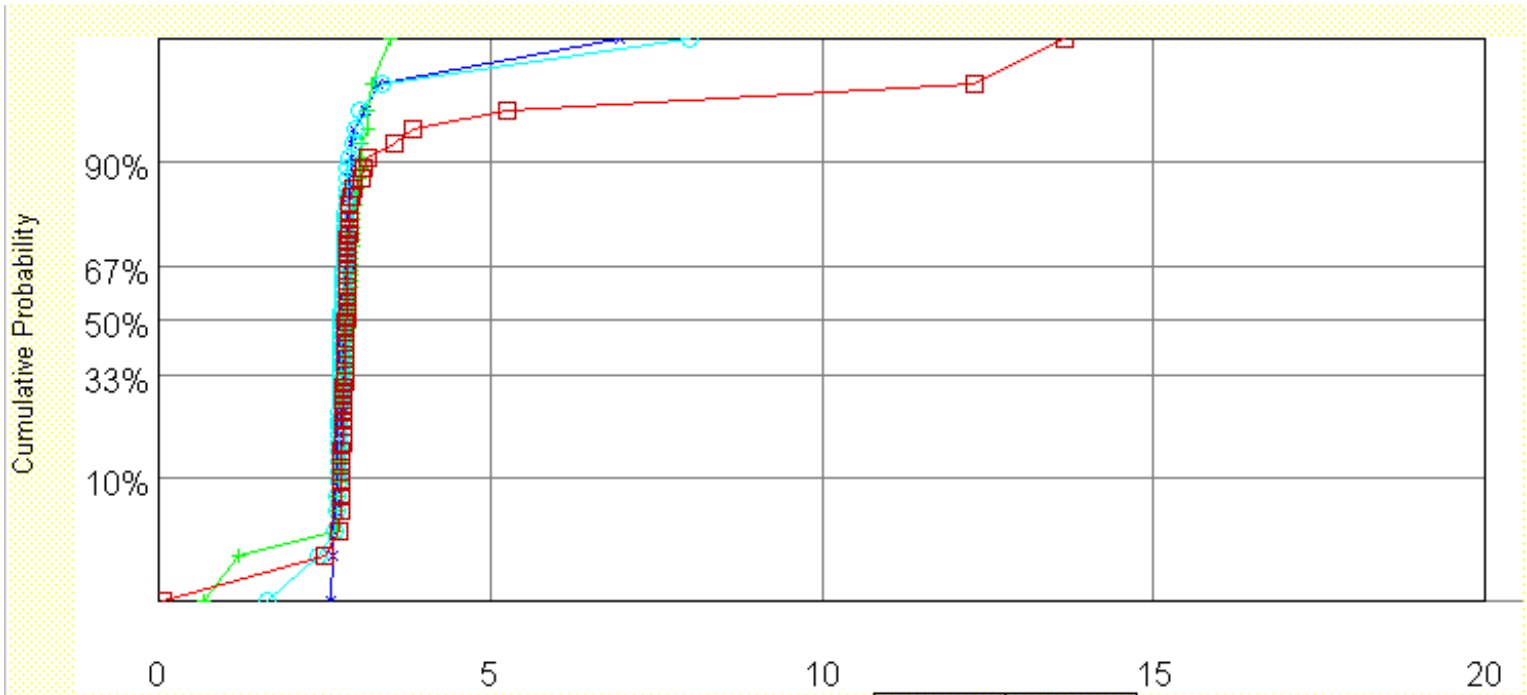
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	AK_DUT1,swa1	60	15.37	0.0%
	S	AK_DUT4,swa1	60	17.33	0.0%
	S	AK_DUT1,swe3	60	15.20	0.0%
	S	AK_DUT4,swe3	60	16.98	0.0%

Lw = 10um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	BI_DUT1,swa1	60	13.74	0.0%
	S	BI_DUT4,swa1	60	14.20	0.0%
	S	BI_DUT1,swe3	60	13.57	0.0%
	S	BI_DUT4,swe3	60	13.91	0.0%

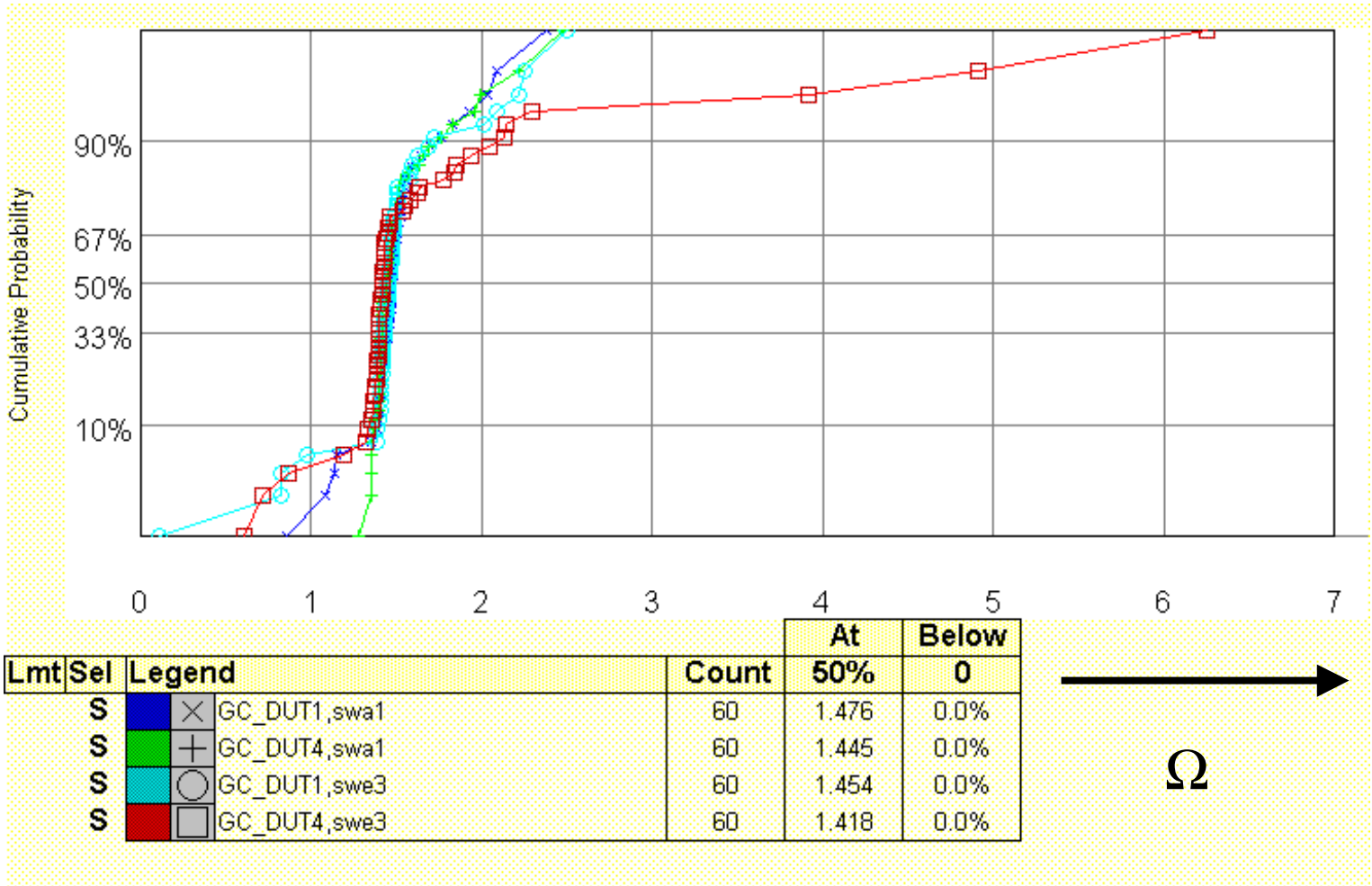
Lw = 50um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	BK_DUT1,swa1	60	2.811	0.0%
	S	BK_DUT4,swa1	60	2.863	0.0%
	S	BK_DUT1,swe3	60	2.765	0.0%
	S	BK_DUT4,swe3	60	2.829	0.0%

Ω

Lw = 100 um



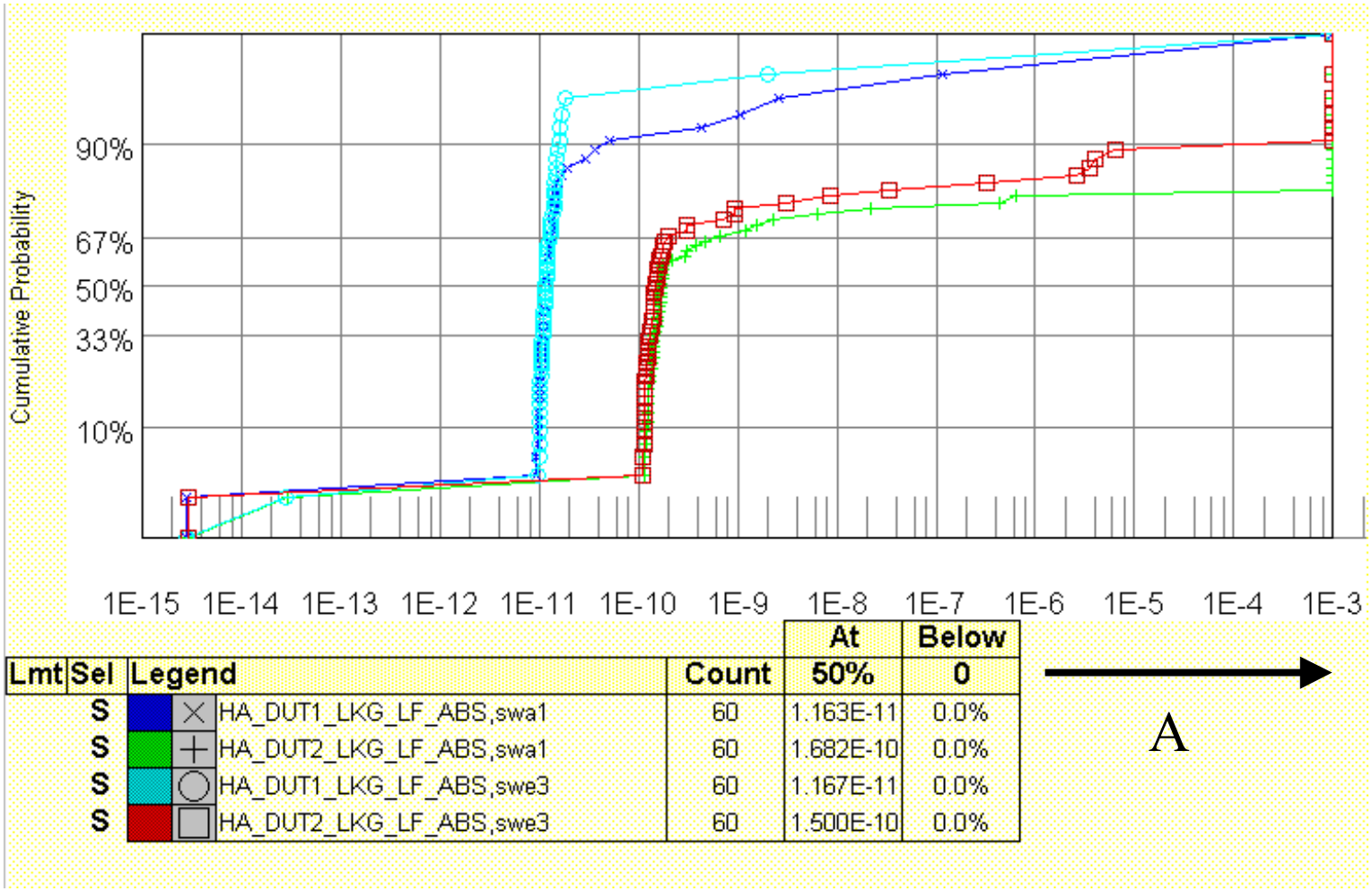
Lmt	Sel	Legend	Count	At 50%	Below 0
	S	GC_DUT1,swa1	60	1.476	0.0%
	S	GC_DUT4,swa1	60	1.445	0.0%
	S	GC_DUT1,swe3	60	1.454	0.0%
	S	GC_DUT4,swe3	60	1.418	0.0%

M1 Pattern Comb Capacitance Structures

- Lateral comb capacitance is measured at 100 kHz; leakage is measured at 0.2 MV/cm

HA_DUT1_LKG	0.18	0.18	M1 Pattern-Cap/0.18_0.18/EdgeLatCombLeakage
HA_DUT2_LKG	0.18	0.18	M1 Pattern-Cap/0.18_0.18/CenterLatCombLeakage
HA_DUT3_LKG	0.25	0.25	M1 Pattern-Cap/0.25_0.25/EdgeLatCombLeakage
HA_DUT4_LKG	0.25	0.25	M1 Pattern-Cap/0.25_0.25/CenterLatCombLeakage
HA_DUT5_LKG	0.25	0.25	M1 Pattern-Cap/0.25_0.25/EdgeLatCombLeakage
HA_DUT6_LKG	0.25	0.25	M1 Pattern-Cap/0.25_0.25/CenterLatCombLeakage
HA_DUTB	0.25	0.25	M1 Pattern-Cap/0.25_0.25/EdgeLatCombCap
HA_DUTC	0.25	0.25	M1 Pattern-Cap/0.25_0.25/CenterLatCombCap
HB_DUT1_LKG	0.5	0.5	M1 Pattern-Cap/0.5_0.5/EdgeLatCombLeakage
HB_DUT2_LKG	0.5	0.5	M1 Pattern-Cap/0.5_0.5/CenterLatCombLeakage
HB_DUT3_LKG	1	1	M1 Pattern-Cap/1_1/EdgeLatCombLeakage
HB_DUT4_LKG	1	1	M1 Pattern-Cap/1_1/CenterLatCombLeakage
HB_DUT9	0.5	0.5	M1 Pattern-Cap/0.5_0.5/EdgeLatCombCap
HB_DUTA	0.5	0.5	M1 Pattern-Cap/0.5_0.5/CenterLatCombCap
HB_DUTB	1	1	M1 Pattern-Cap/1_1/EdgeLatCombCap Capacitance
HB_DUTC	1	1	M1 Pattern-Cap/1_1/CenterLatCombCap

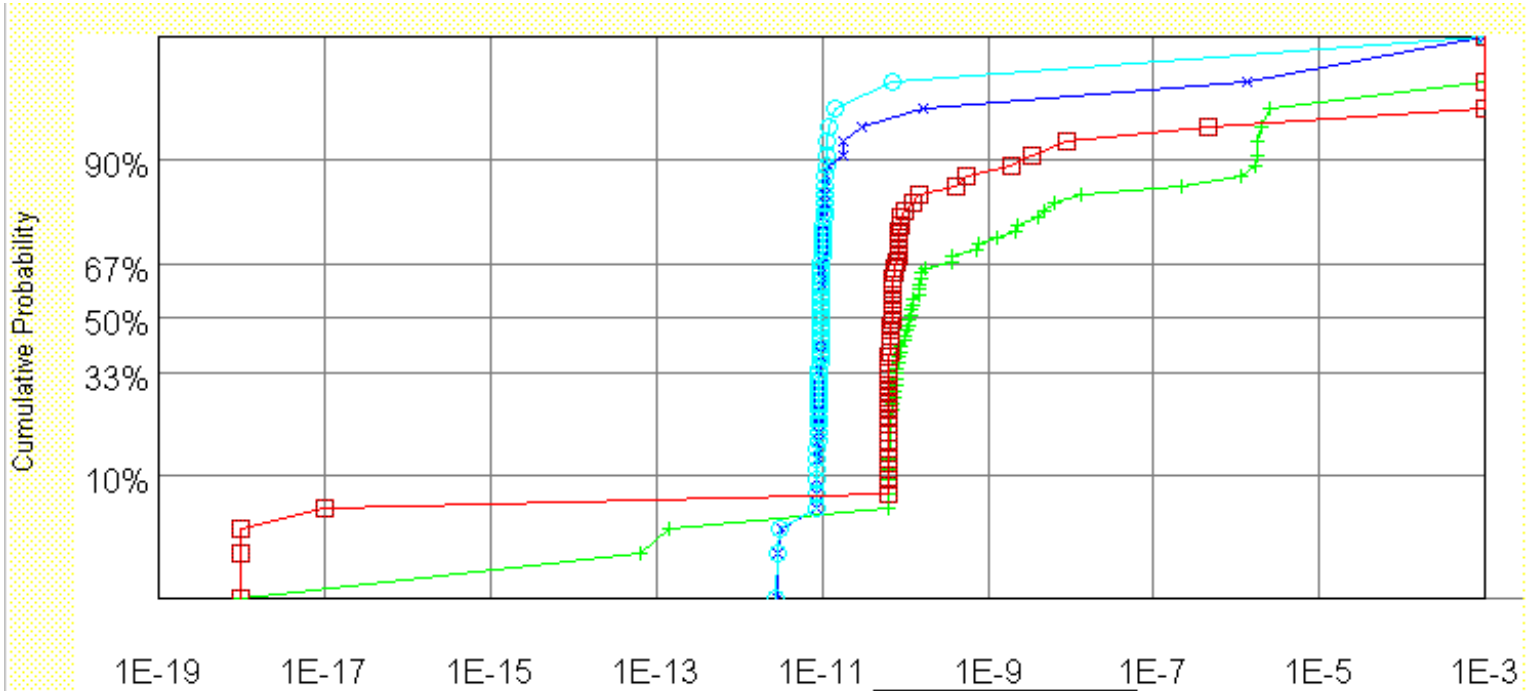
Pattern Comb Capacitance Leakage: 0.25um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HA_DUT1_LKG_LF_ABS,swa1	60	1.163E-11	0.0%
	S	HA_DUT2_LKG_LF_ABS,swa1	60	1.682E-10	0.0%
	S	HA_DUT1_LKG_LF_ABS,swe3	60	1.167E-11	0.0%
	S	HA_DUT2_LKG_LF_ABS,swe3	60	1.500E-10	0.0%

A

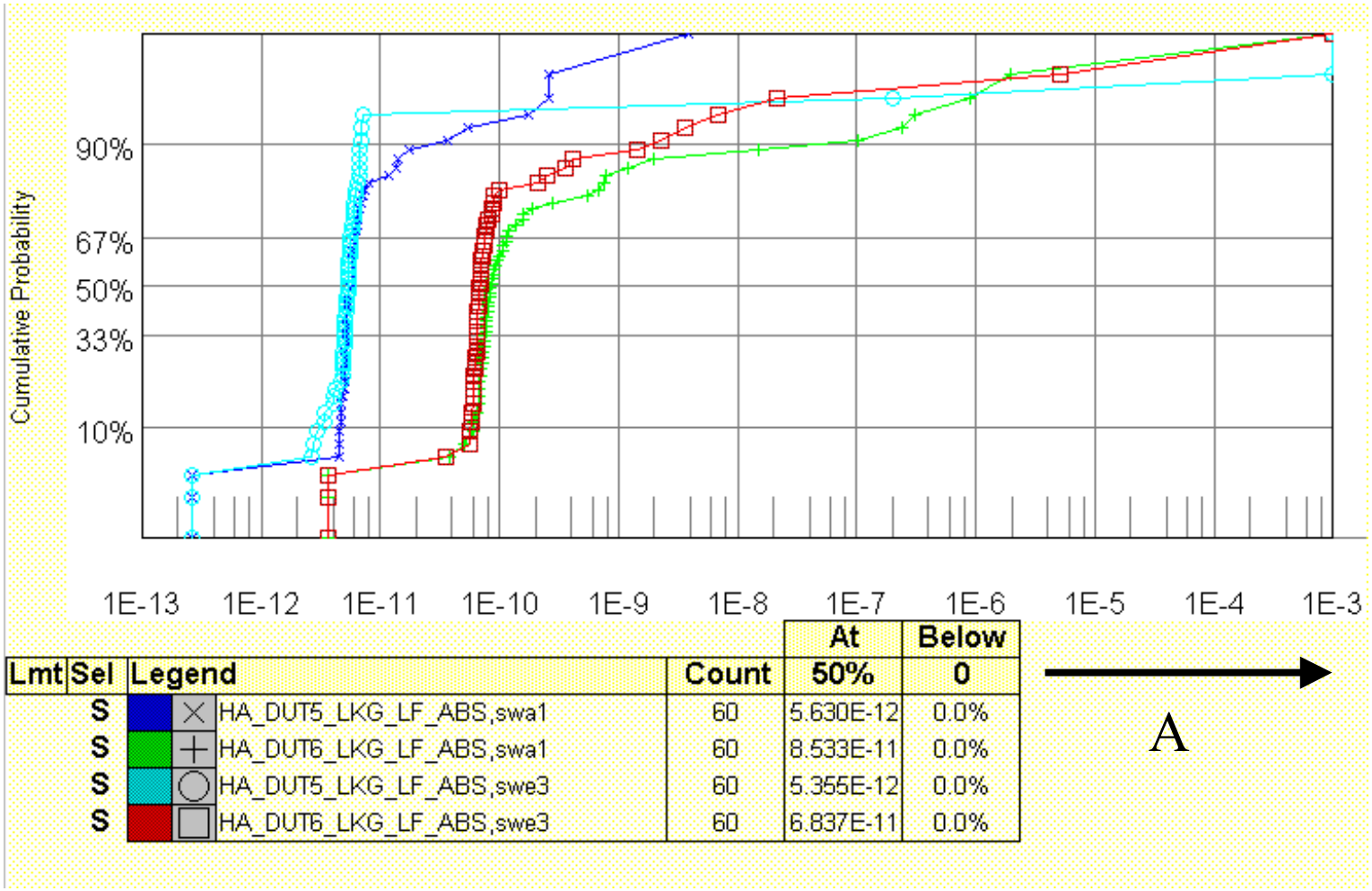
Pattern Comb Capacitance Leakage: 0.25um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HA_DUT3_LKG_LF_ABS,swa1	60	9.773E-12	0.0%
	S	HA_DUT4_LKG_LF_ABS,swa1	60	1.171E-10	0.0%
	S	HA_DUT3_LKG_LF_ABS,swe3	60	9.646E-12	0.0%
	S	HA_DUT4_LKG_LF_ABS,swe3	60	6.928E-11	0.0%

A

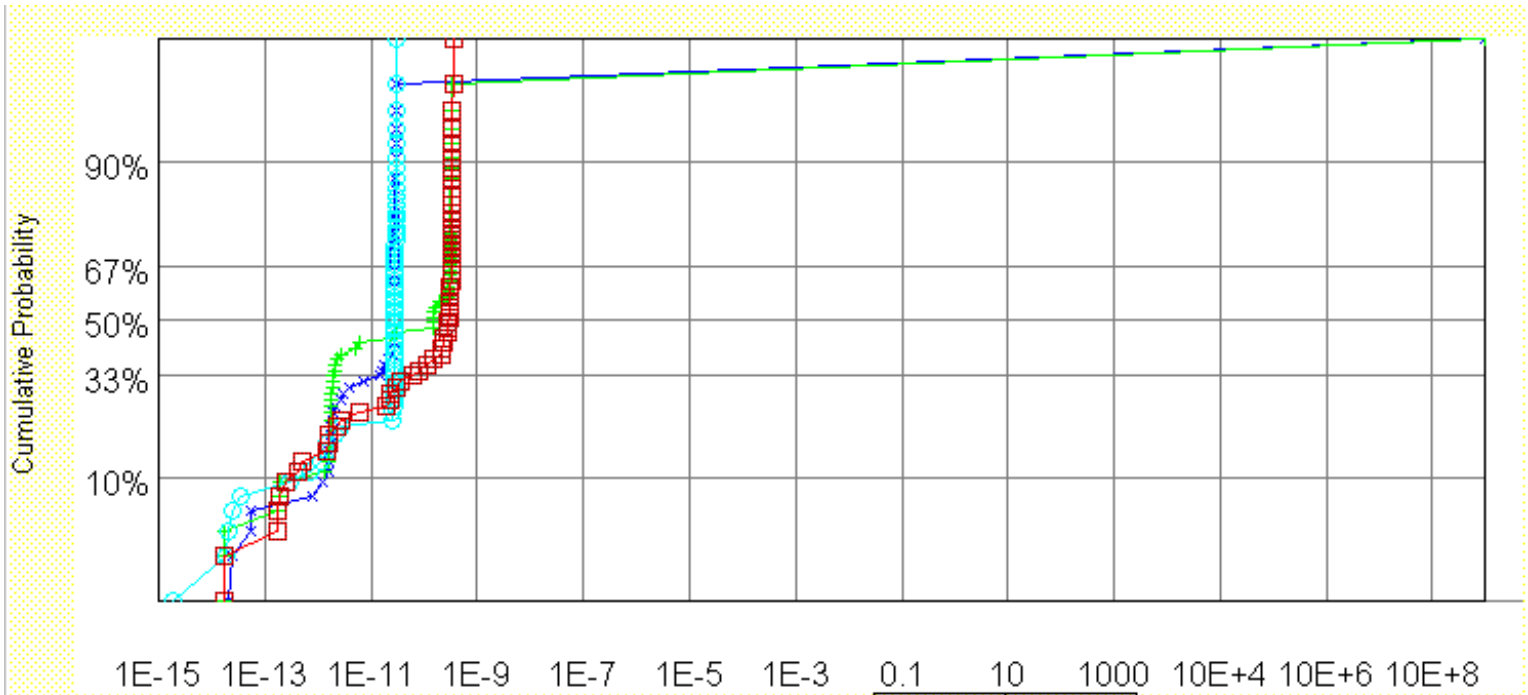
Pattern Comb Capacitance Leakage: 0.25um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HA_DUT5_LKG_LF_ABS,swa1	60	5.630E-12	0.0%
	S	HA_DUT6_LKG_LF_ABS,swa1	60	8.533E-11	0.0%
	S	HA_DUT5_LKG_LF_ABS,swe3	60	5.355E-12	0.0%
	S	HA_DUT6_LKG_LF_ABS,swe3	60	6.837E-11	0.0%

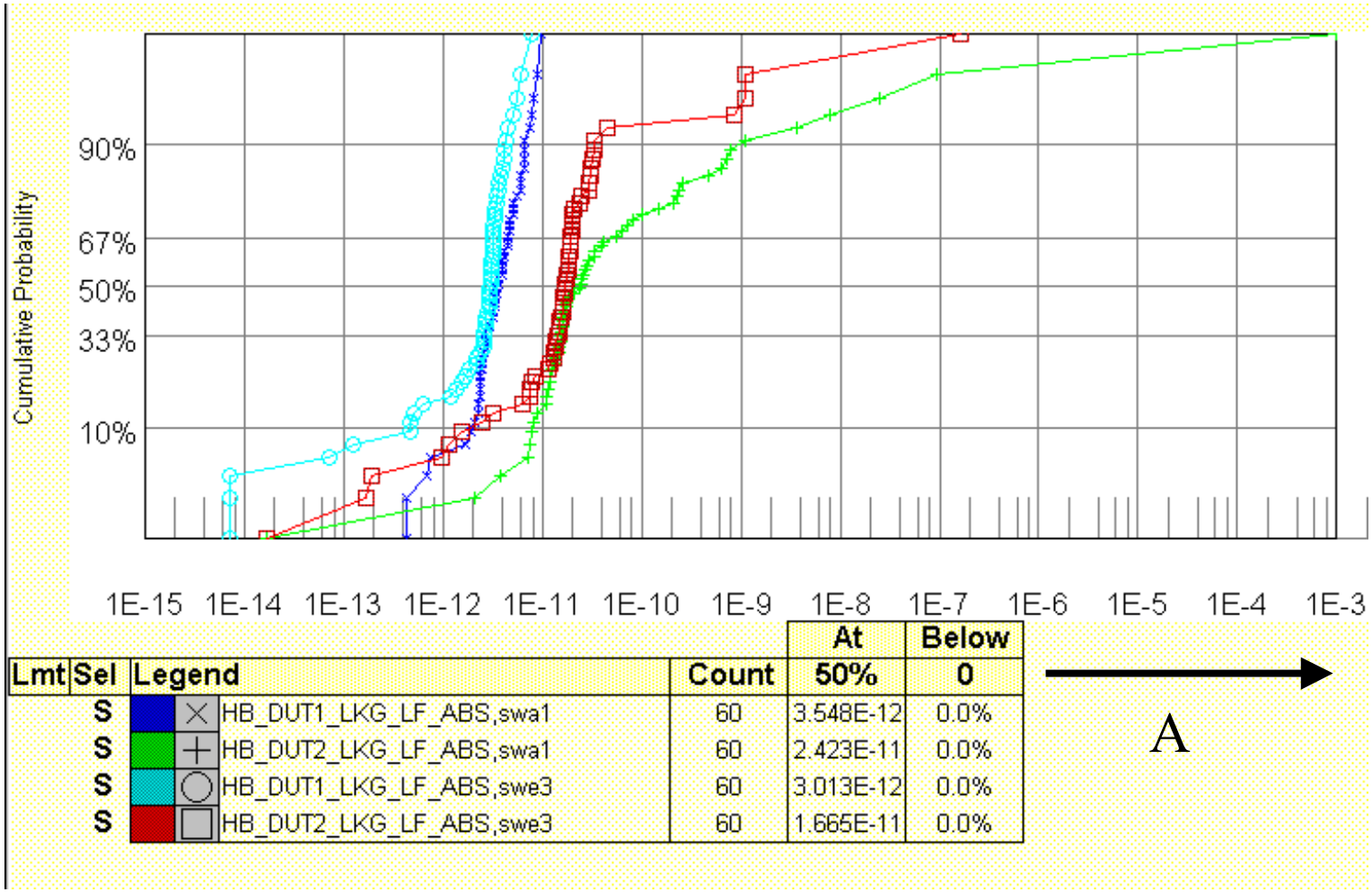
A

Pattern Comb Capacitance – 0.25um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HA_DUTB_ABS,swa1	60	2.767E-11	0.0%
	S	HA_DUTC_ABS,swa1	60	1.475E-10	0.0%
	S	HA_DUTB_ABS,swe3	60	2.862E-11	0.0%
	S	HA_DUTC_ABS,swe3	60	3.015E-10	0.0%

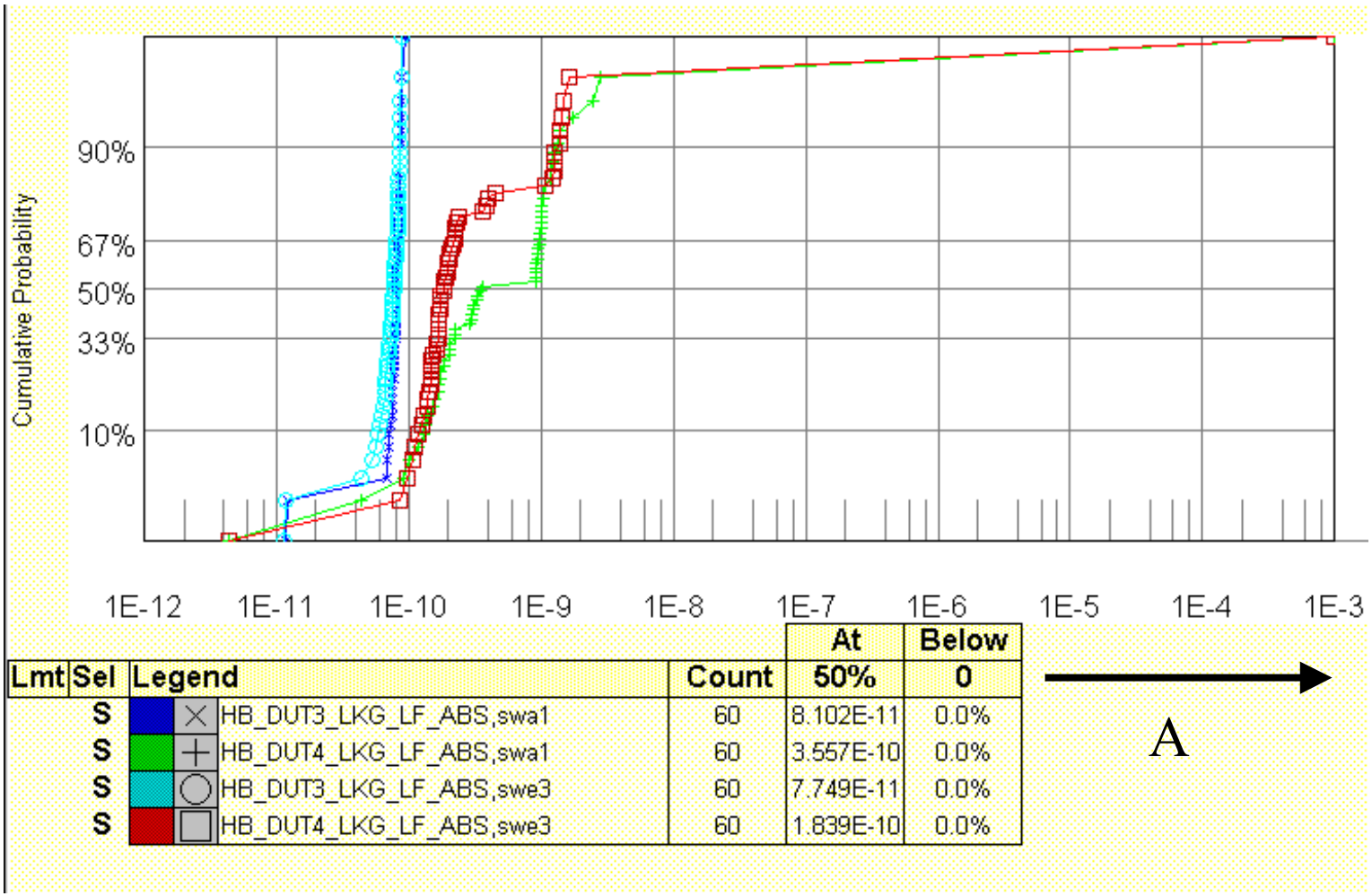
Pattern Comb Capacitance Leakage: 0.50 um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HB_DUT1_LKG_LF_ABS,swa1	60	3.548E-12	0.0%
	S	HB_DUT2_LKG_LF_ABS,swa1	60	2.423E-11	0.0%
	S	HB_DUT1_LKG_LF_ABS,swe3	60	3.013E-12	0.0%
	S	HB_DUT2_LKG_LF_ABS,swe3	60	1.665E-11	0.0%

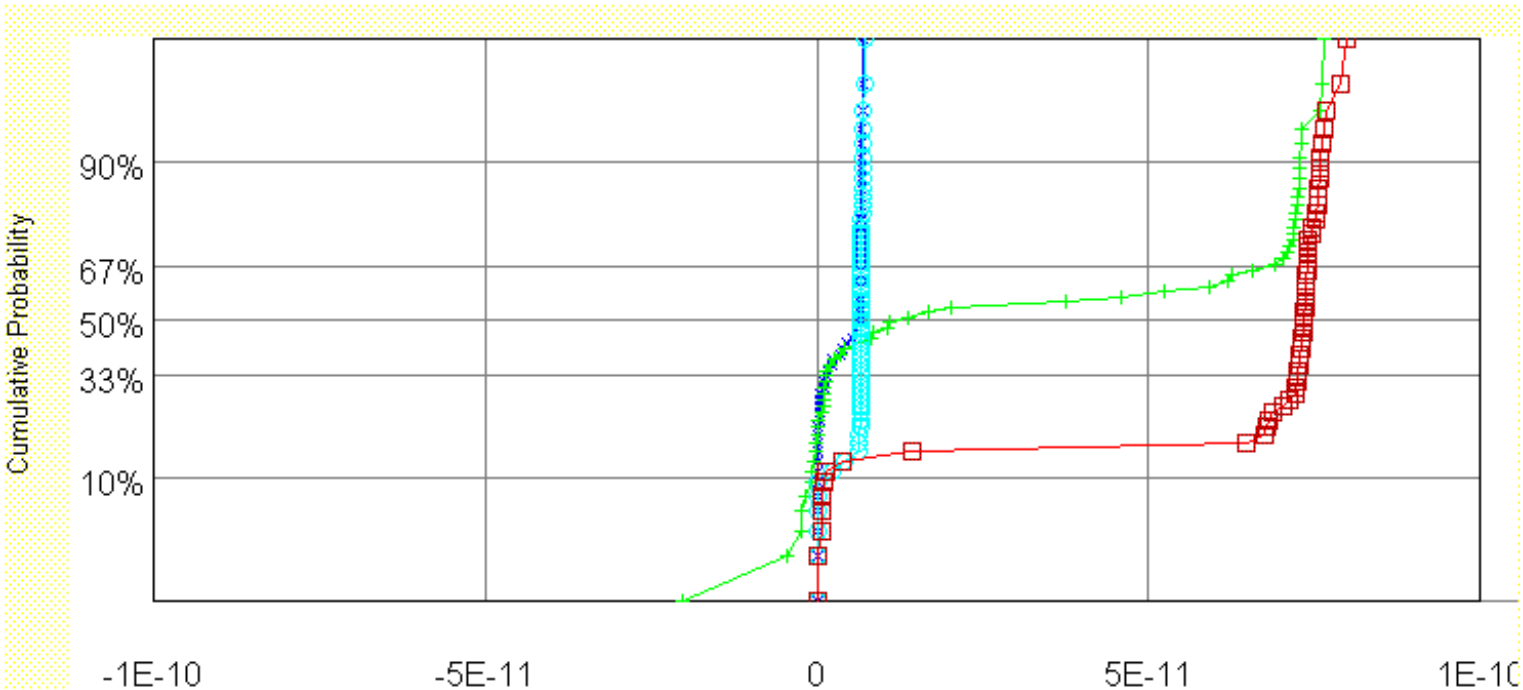
A

Pattern Comb Capacitance Leakage: 1um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HB_DUT3_LKG_LF_ABS,swa1	60	8.102E-11	0.0%
	S	HB_DUT4_LKG_LF_ABS,swa1	60	3.557E-10	0.0%
	S	HB_DUT3_LKG_LF_ABS,swe3	60	7.749E-11	0.0%
	S	HB_DUT4_LKG_LF_ABS,swe3	60	1.839E-10	0.0%

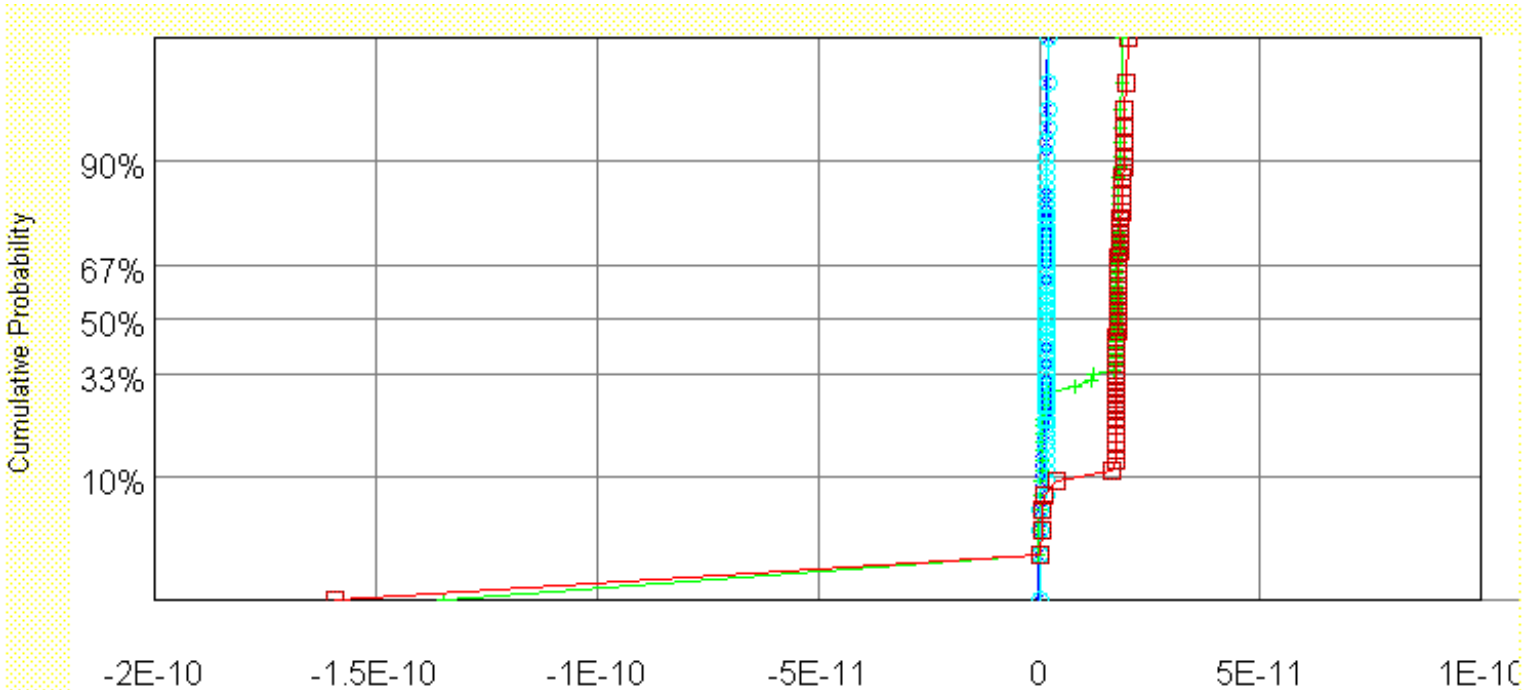
Pattern Comb Capacitance – 0.50um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HB_DUT9,swa1	60	6.342E-12	0.0%
	S	HB_DUTA,swa1	60	1.232E-11	16.7%
	S	HB_DUT9,swe3	60	6.625E-12	0.0%
	S	HB_DUTA,swe3	60	7.344E-11	0.0%

F

Pattern Comb Capacitance – 1 um



Lmt	Sel	Legend	Count	At 50%	Below 0
	S	HB_DUTB,swa1	60	1.667E-12	3.3%
	S	HB_DUTC,swa1	60	1.739E-11	5.0%
	S	HB_DUTB,swe3	60	1.696E-12	0.0%
	S	HB_DUTC,swe3	60	1.765E-11	1.7%

F

SKW
854 METAL 1
ELECTRICAL TEST

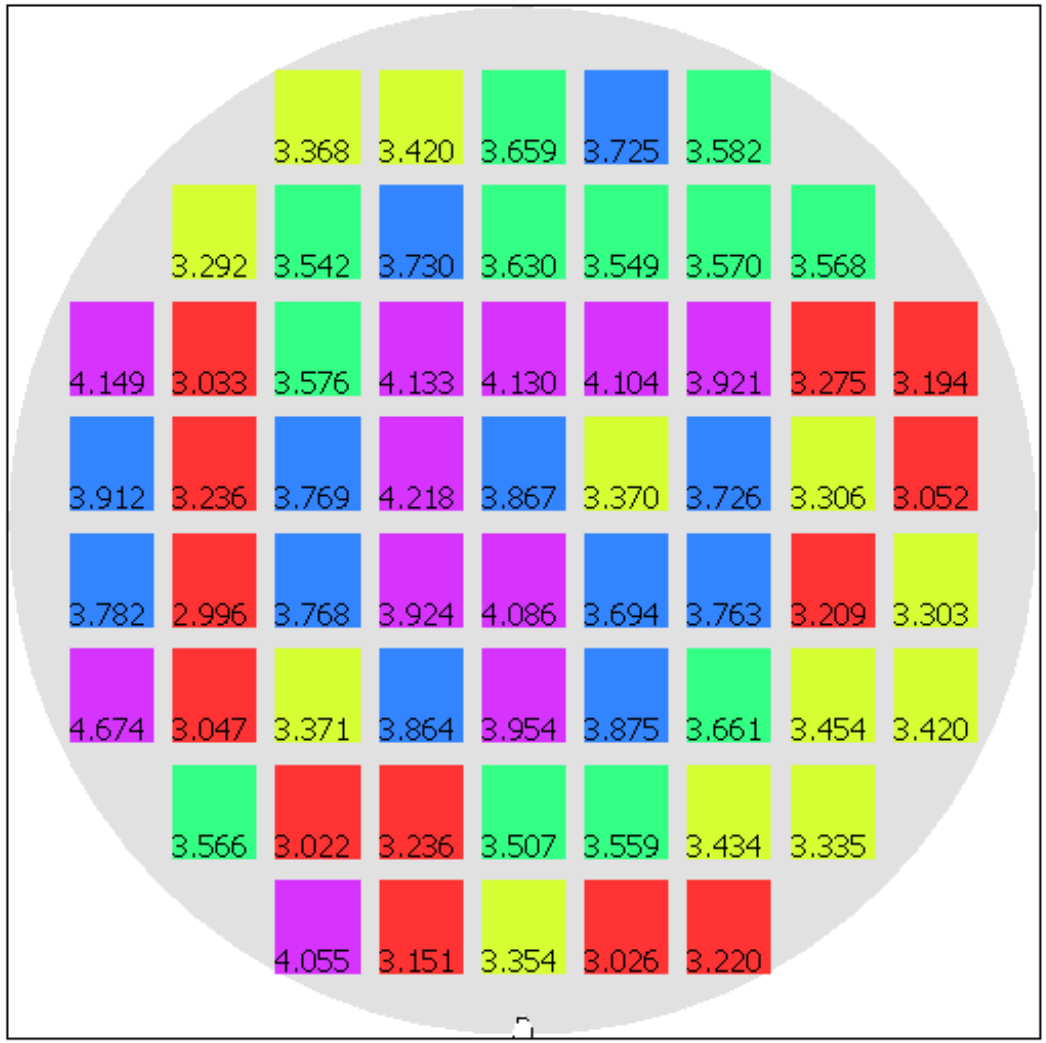
0.18um Sheet Rho Wafer Maps
lot031704

Split A vs. Split B

RHO_CA_DUT1

Split “A”

L_w = 0.18um

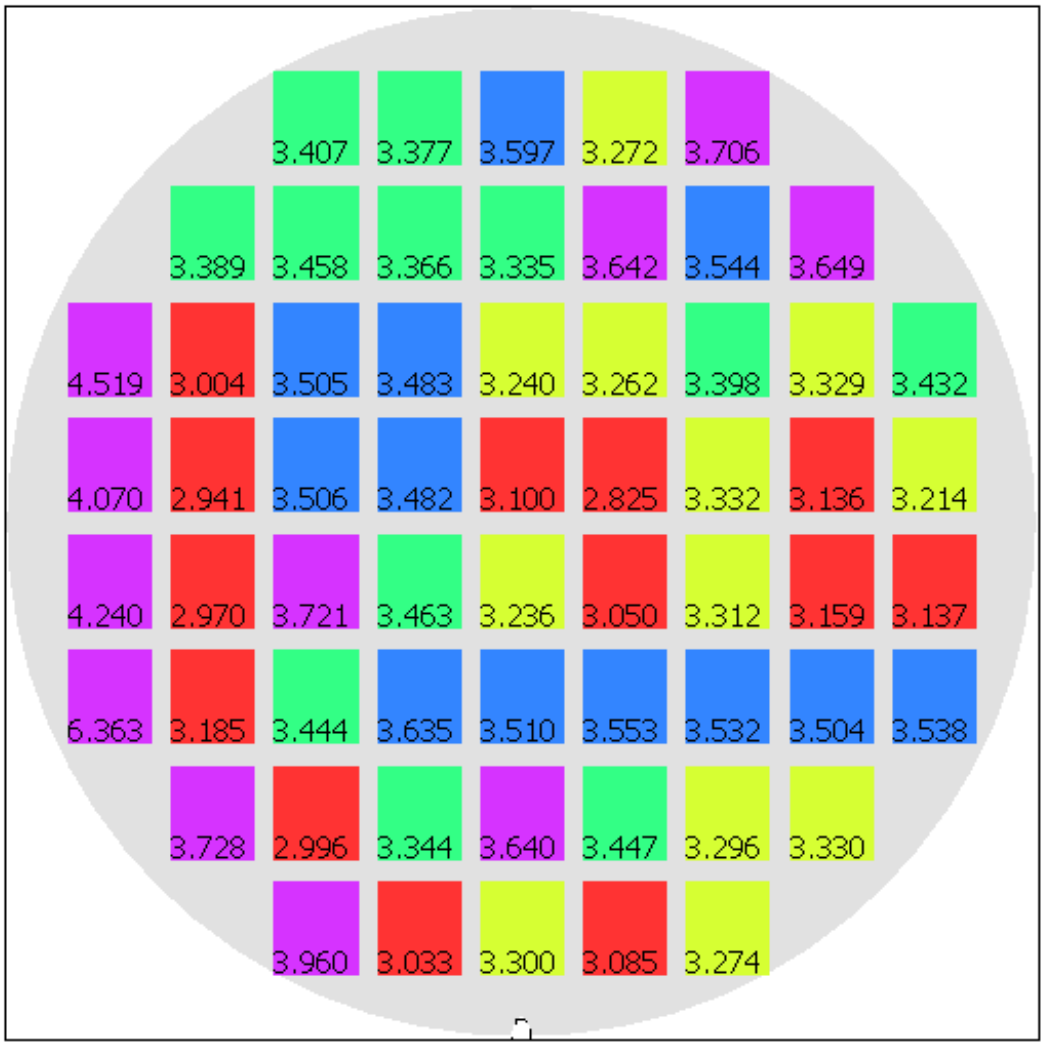


Wf:0swb3

RHO_CA_DUT1

Split “A”

L_w = 0.18um

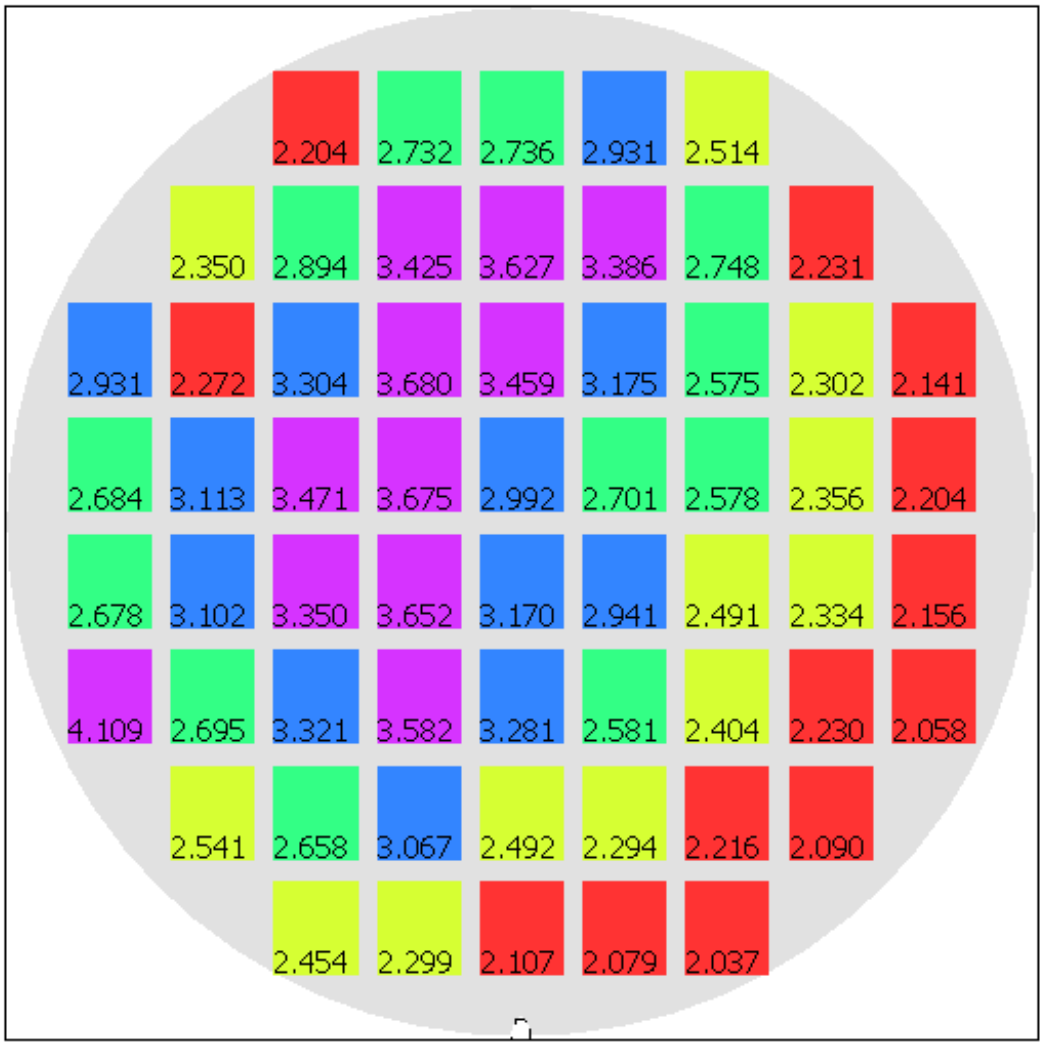


Wf:7swe4

RHO_CA_DUT1

Split “A”

L_w = 0.18um

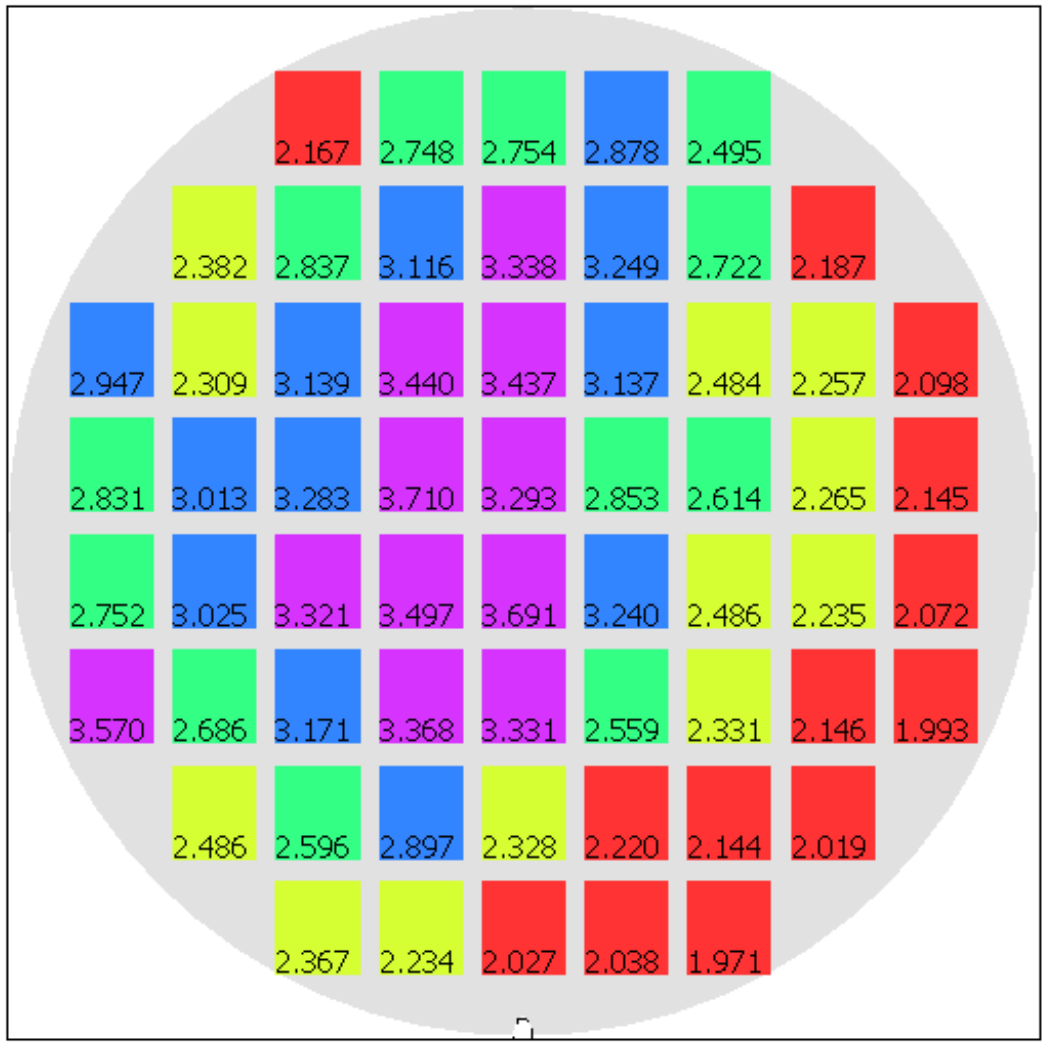


Wf:6swa2

RHO_CA_DUT1

Split “A”

L_w = 0.18um

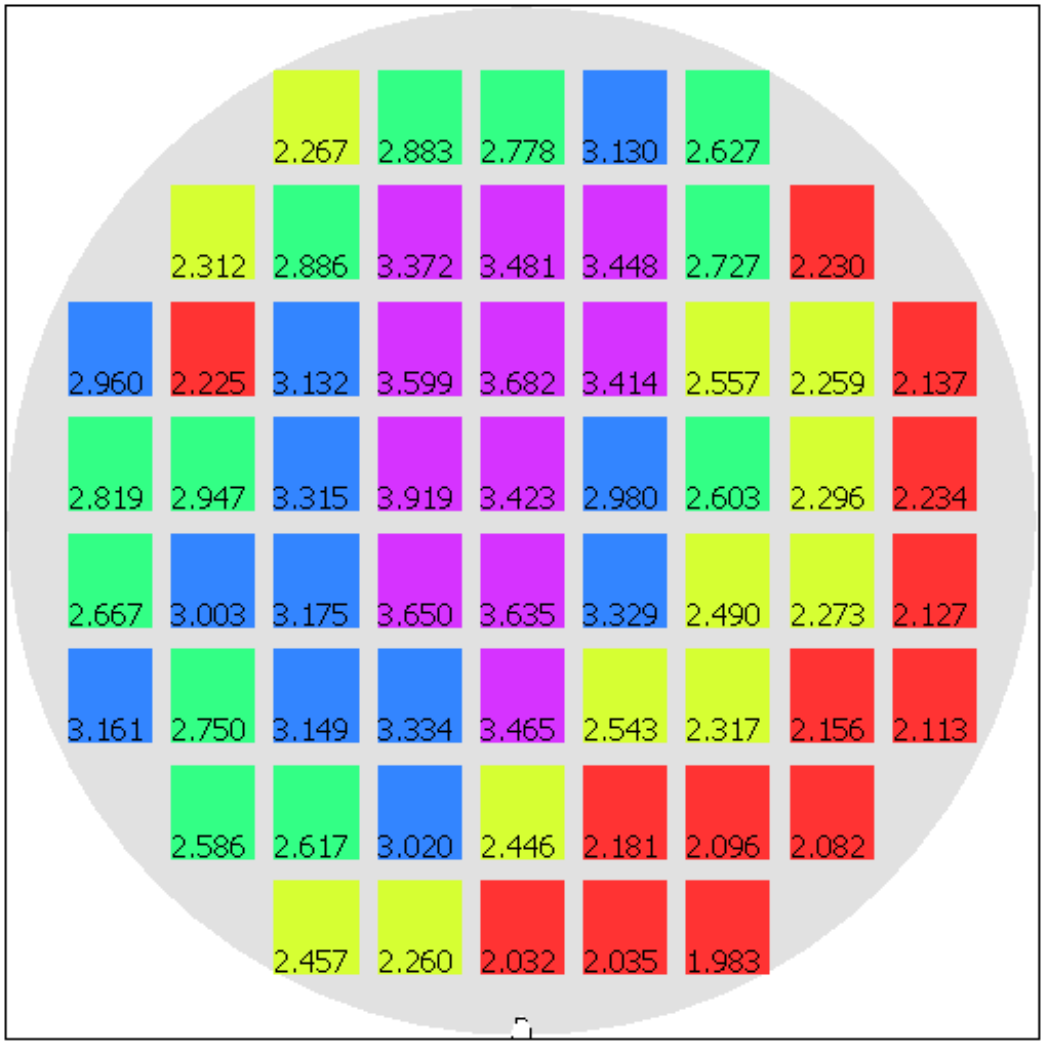


Wf:4swg4

RHO_CA_DUT1

Split “A”

L_w = 0.18um

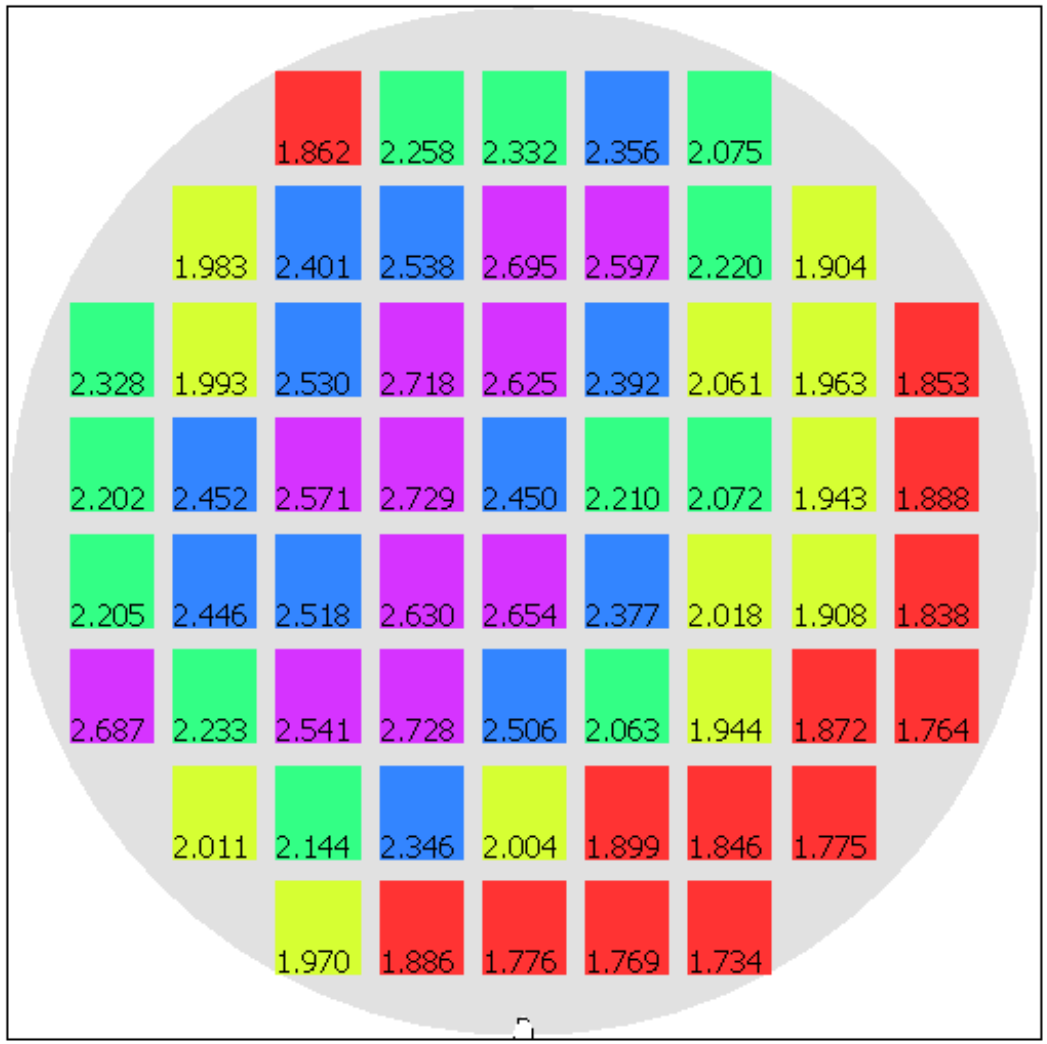


Wf:8swb3

RHO_CA_DUT1

Split “B”

L_w = 0.18um

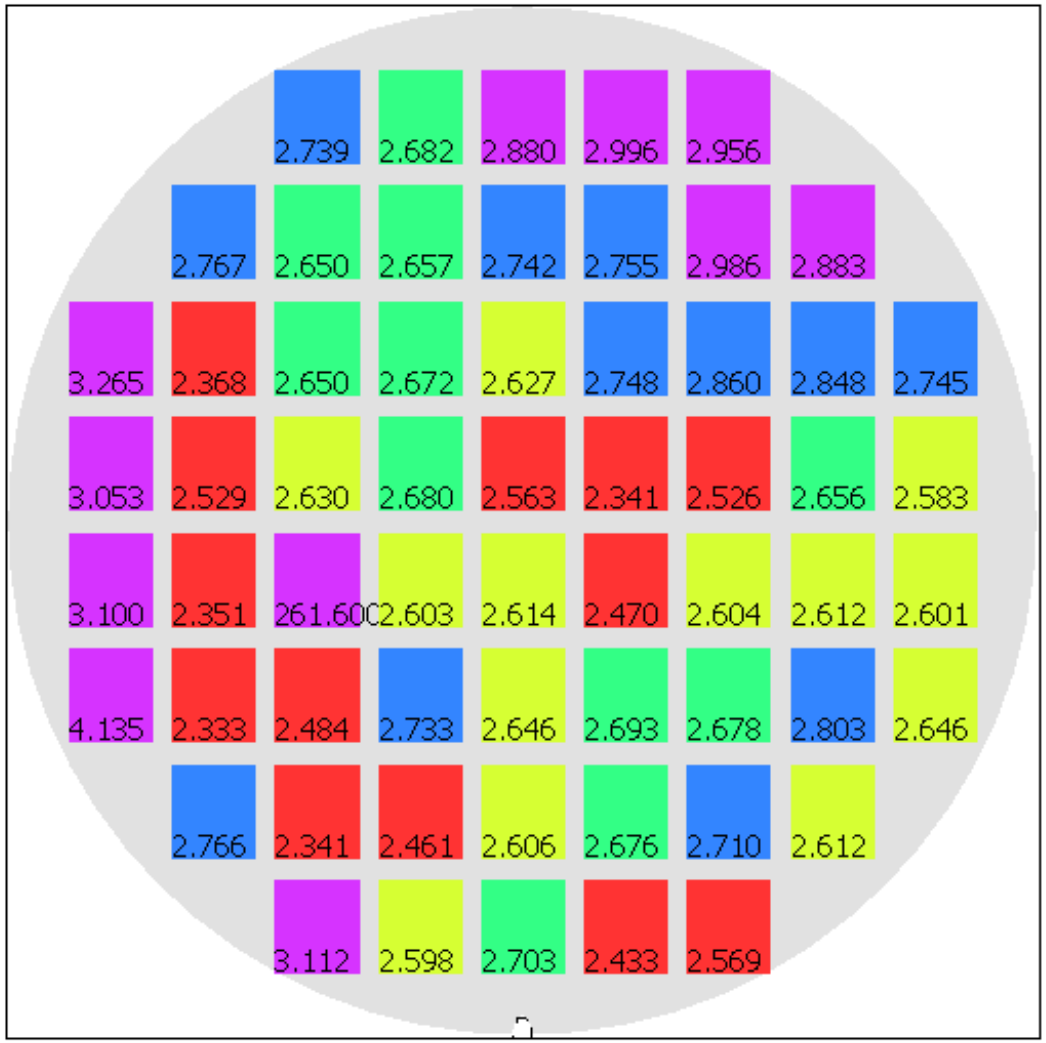


Wf:1swb1

RHO_CA_DUT1

Split “B”

L_w = 0.18um

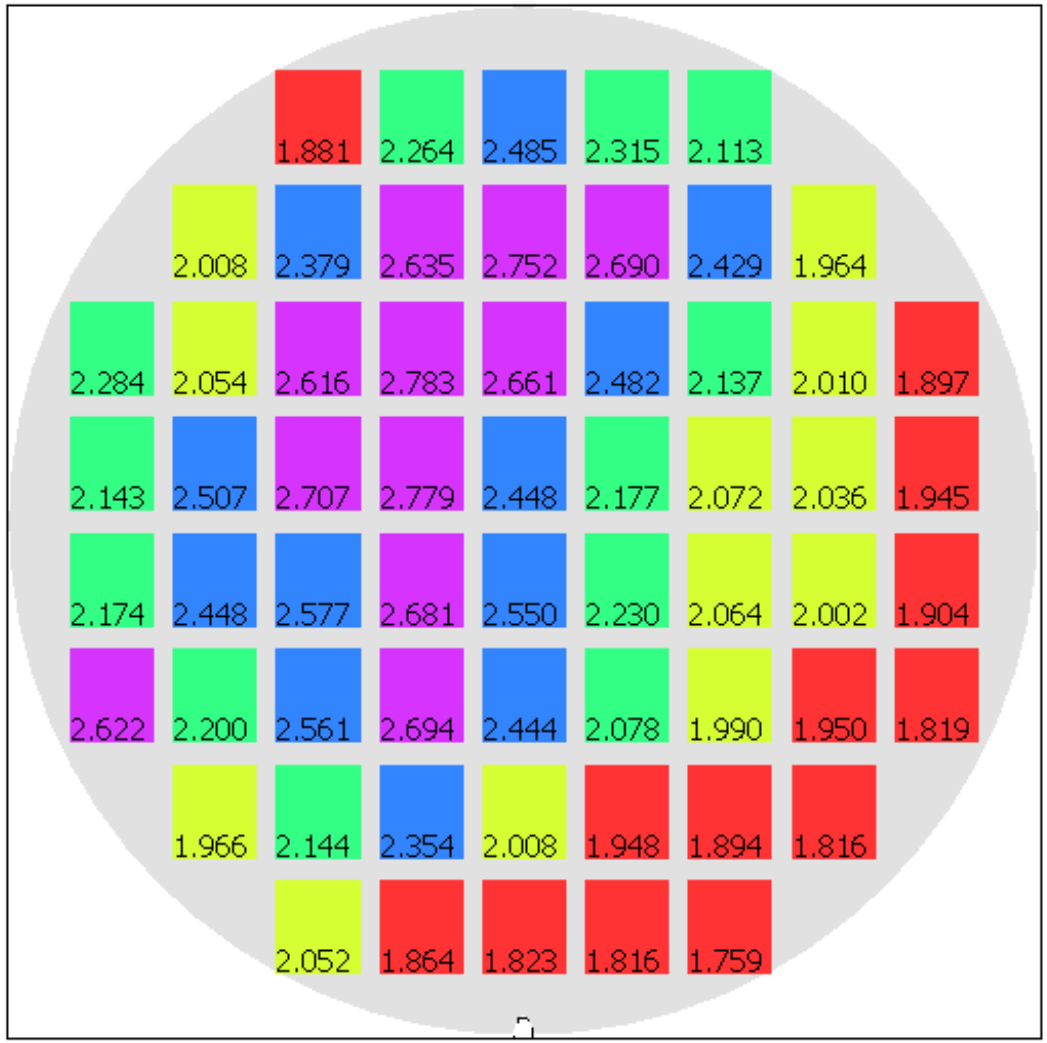


Wf:5swd3

RHO_CA_DUT1

Split “B”

L_w = 0.18um

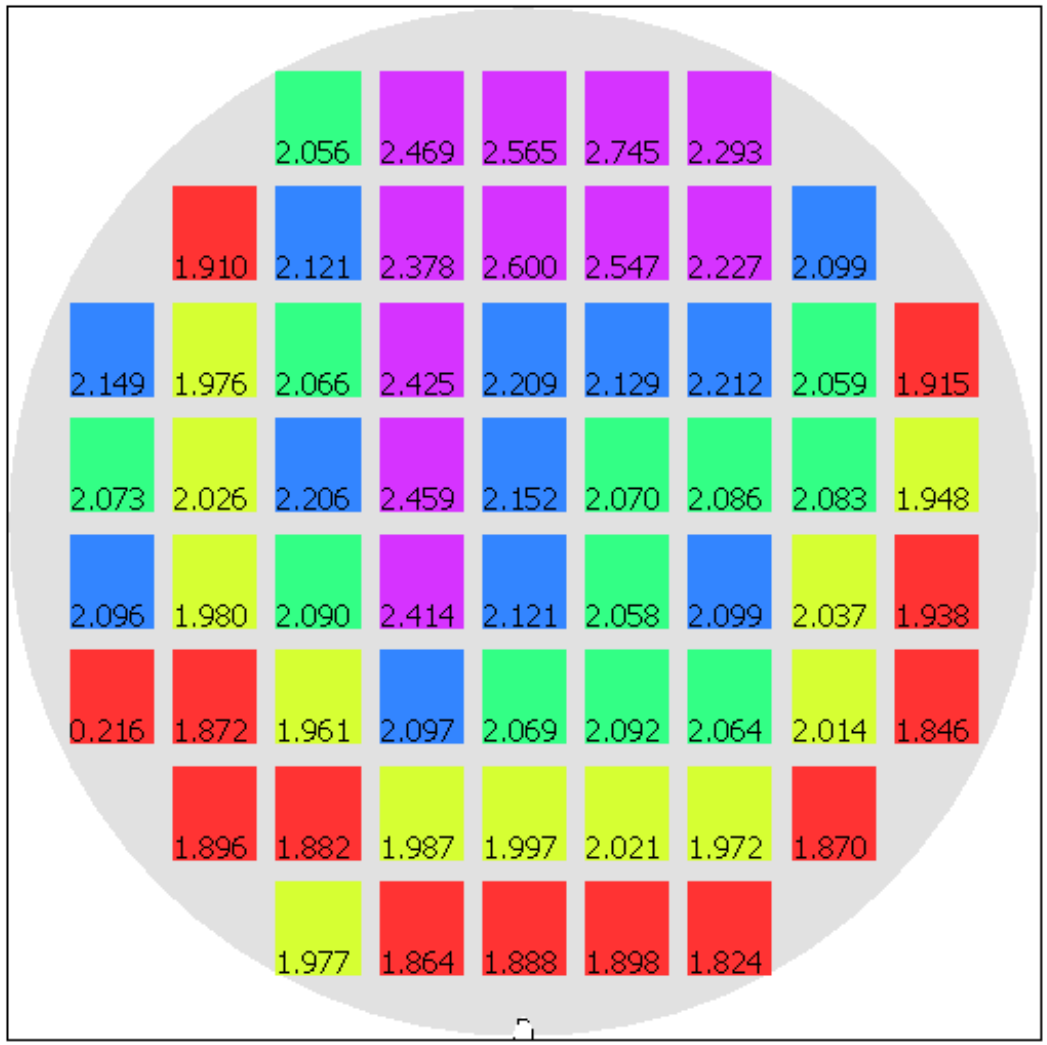


Wf:8swe2

RHO_CA_DUT1

Split “B”

L_w = 0.18um

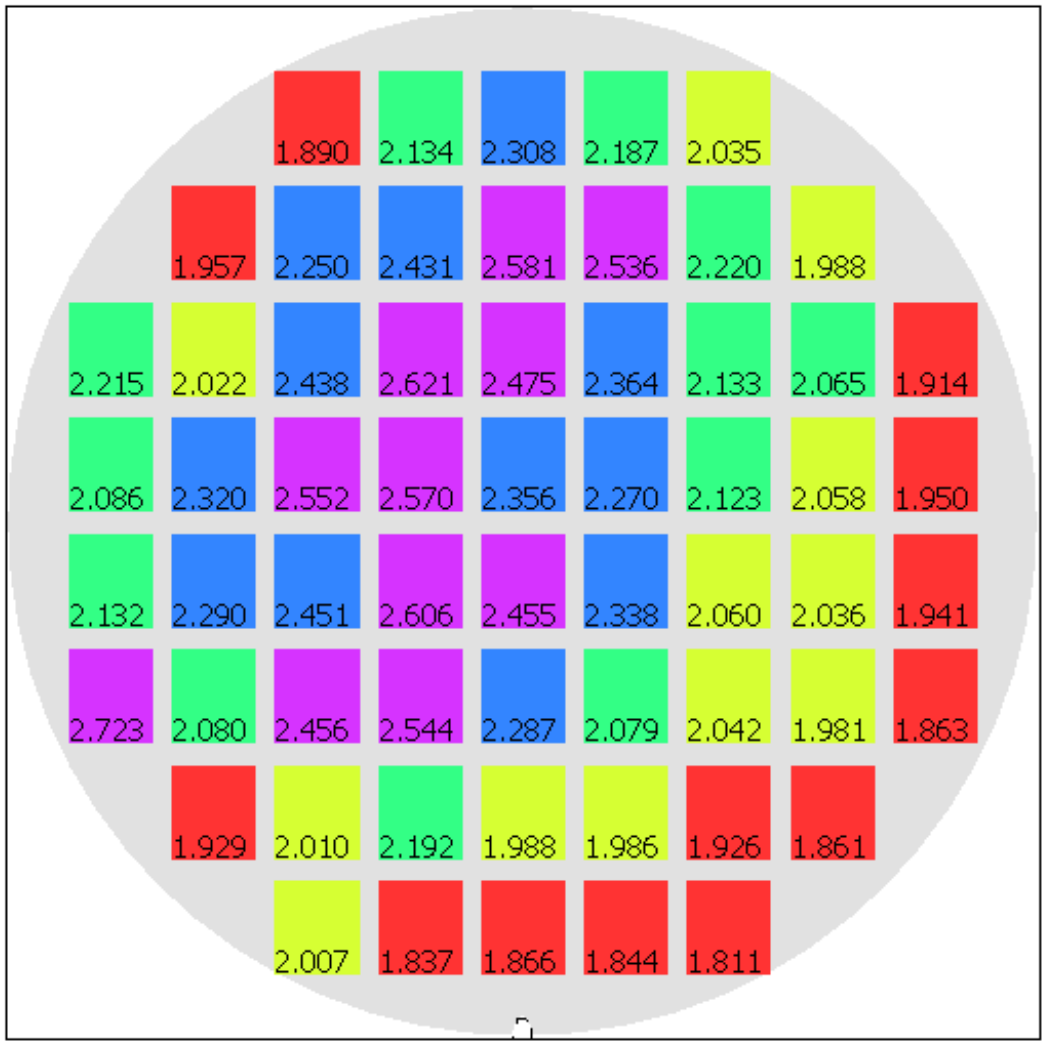


Wf:7swa0

RHO_CA_DUT1

Split “B”

L_w = 0.18um

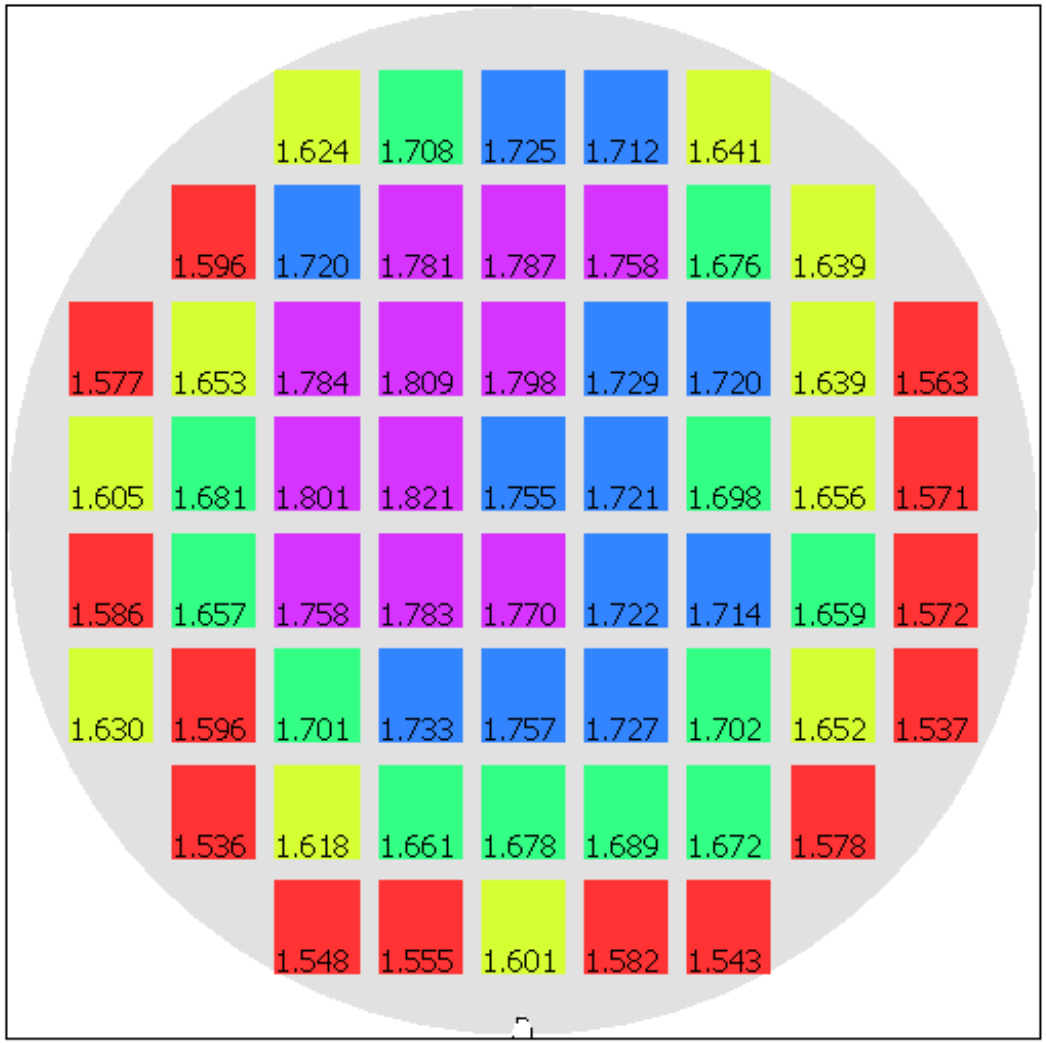


Wf:1swd1

RHO_CA_DUT4

Split “A”

L_w = 0.18um

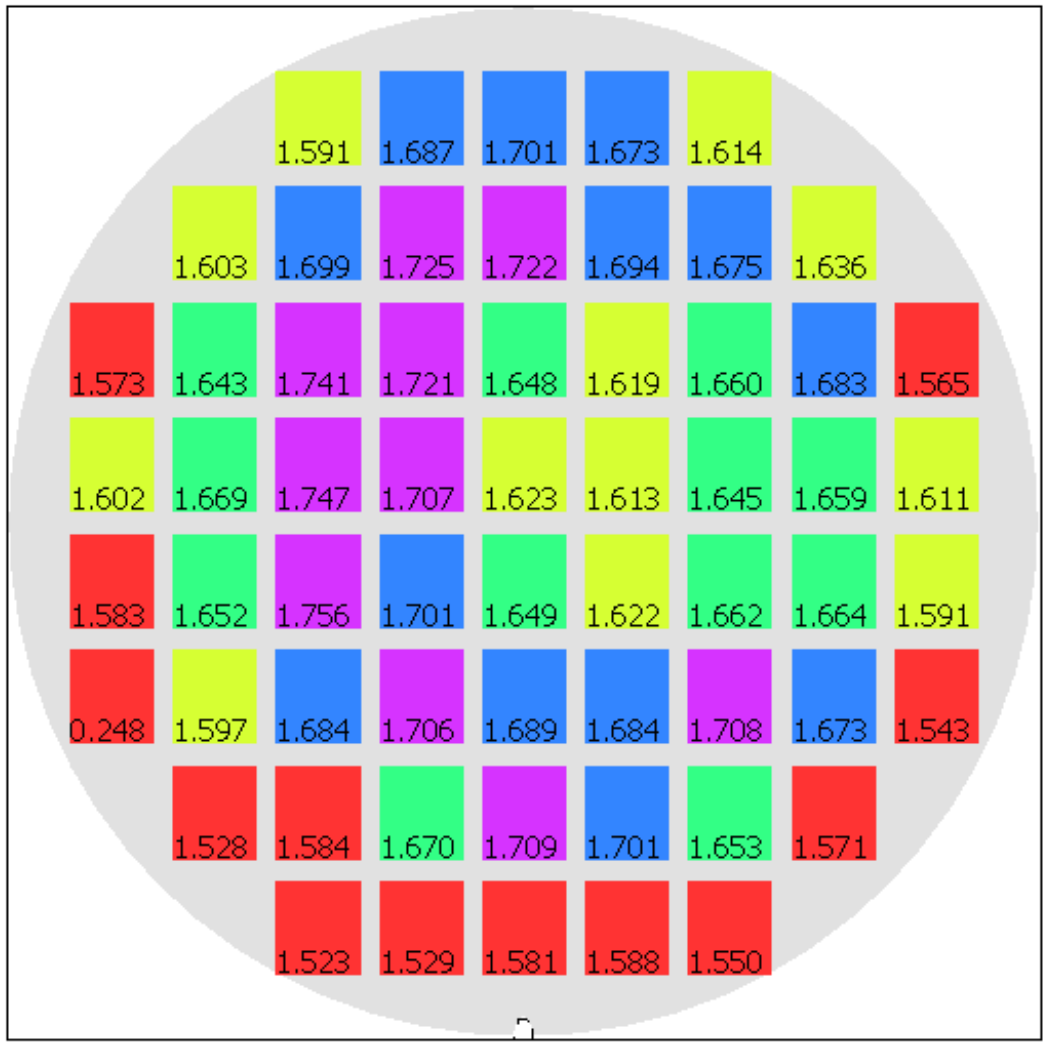


Wf:0swb3

RHO_CA_ DUT4

Split “A”

L_w = 0.18um

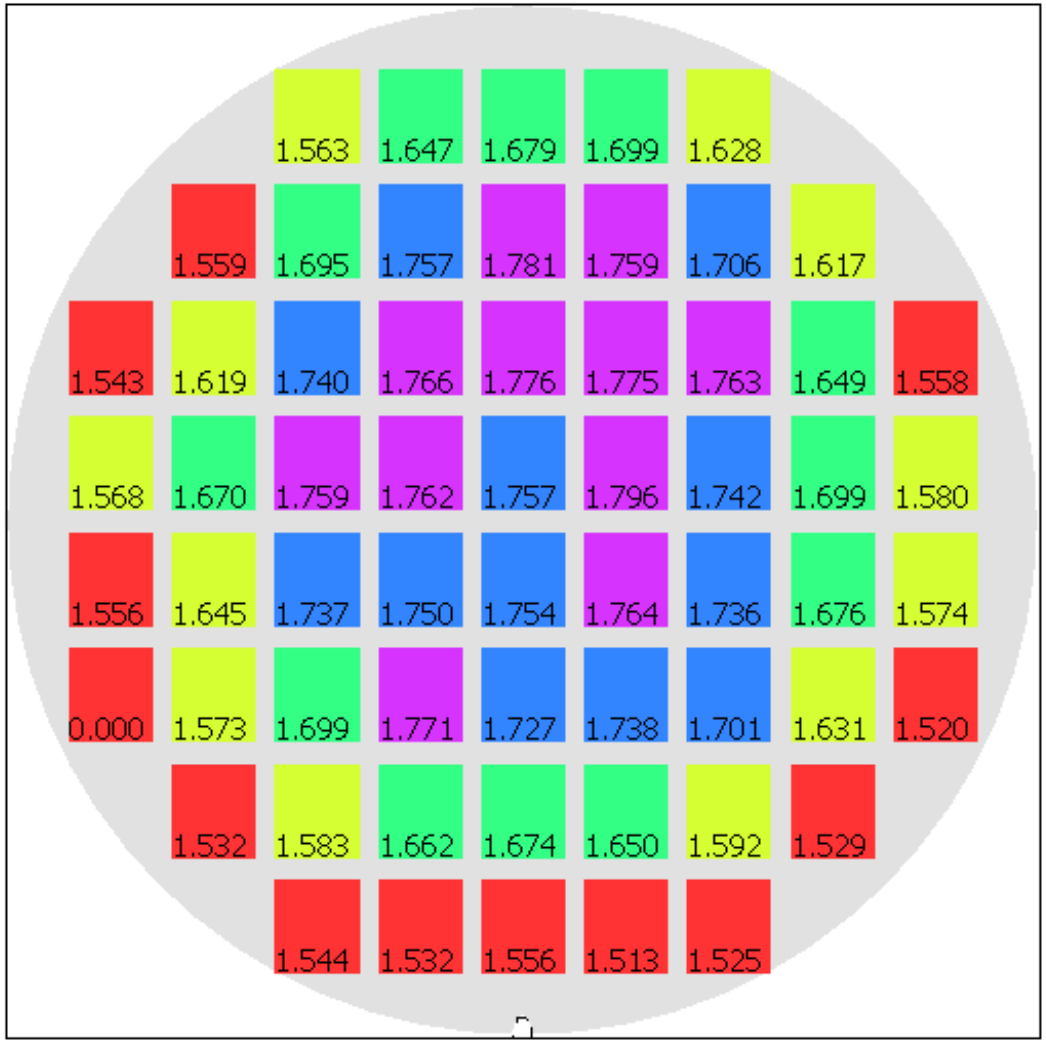


Wf:7swe4

RHO_CA_ DUT4

Split “A”

L_w = 0.18um

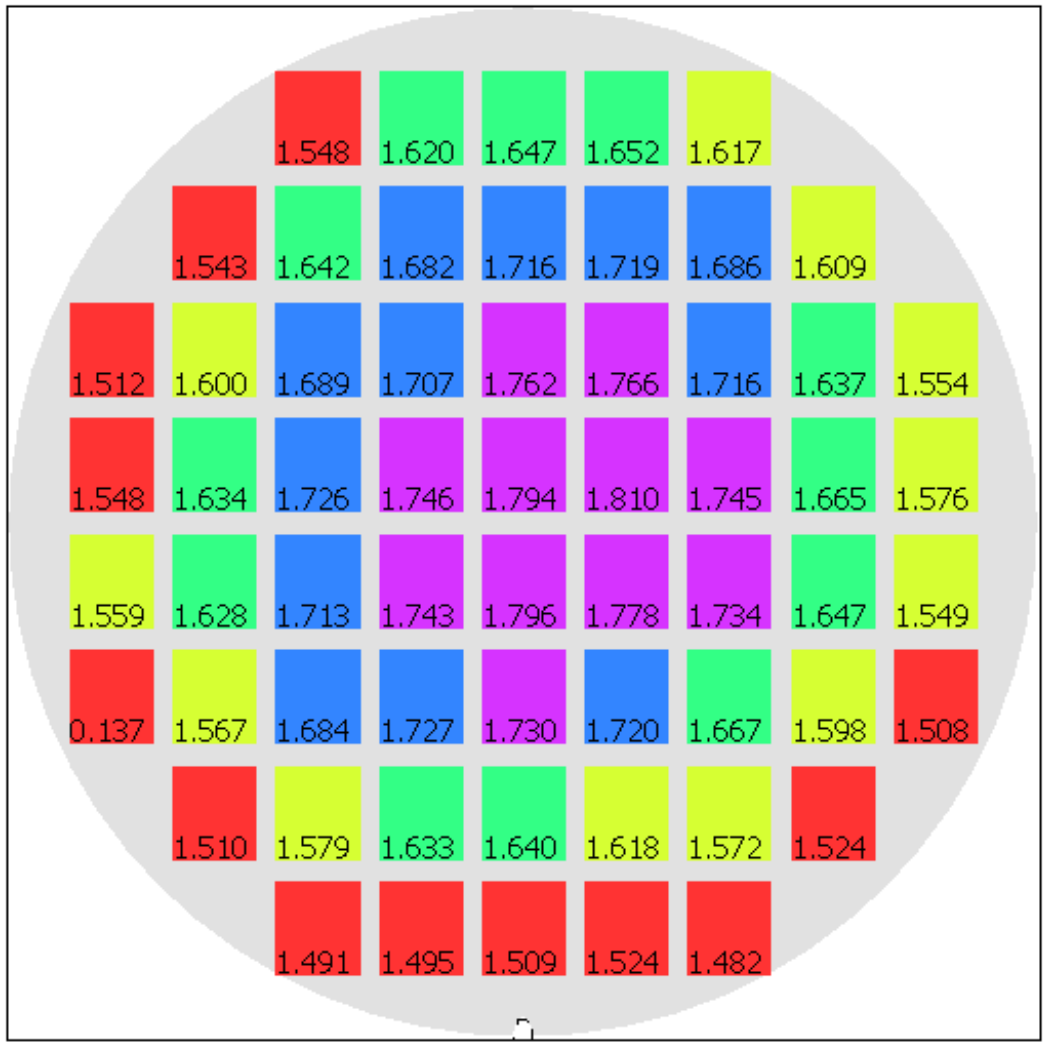


Wf:6swa2

RHO_CA_ DUT4

Split “A”

L_w = 0.18um

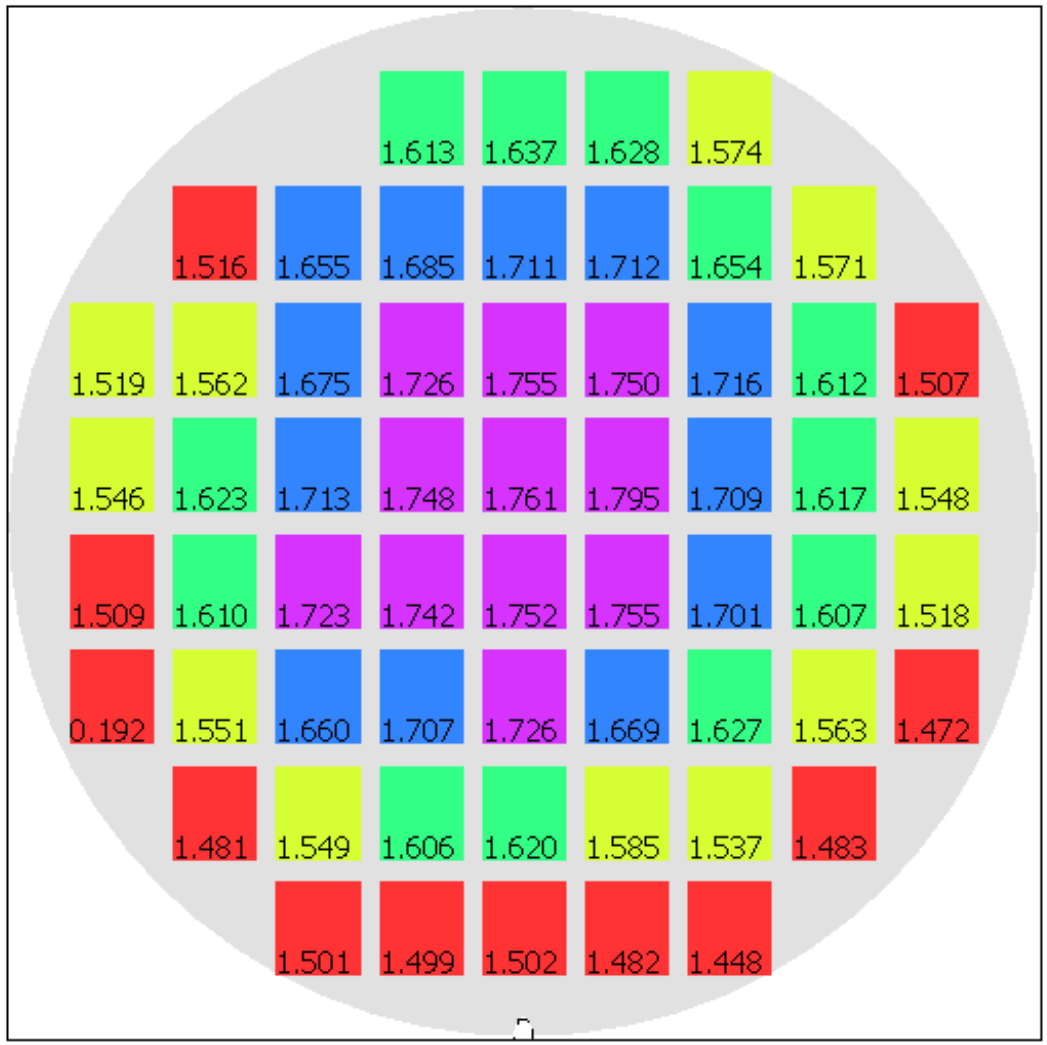


Wf:4swg4

RHO_CA_ DUT4

Split “A”

L_w = 0.18um

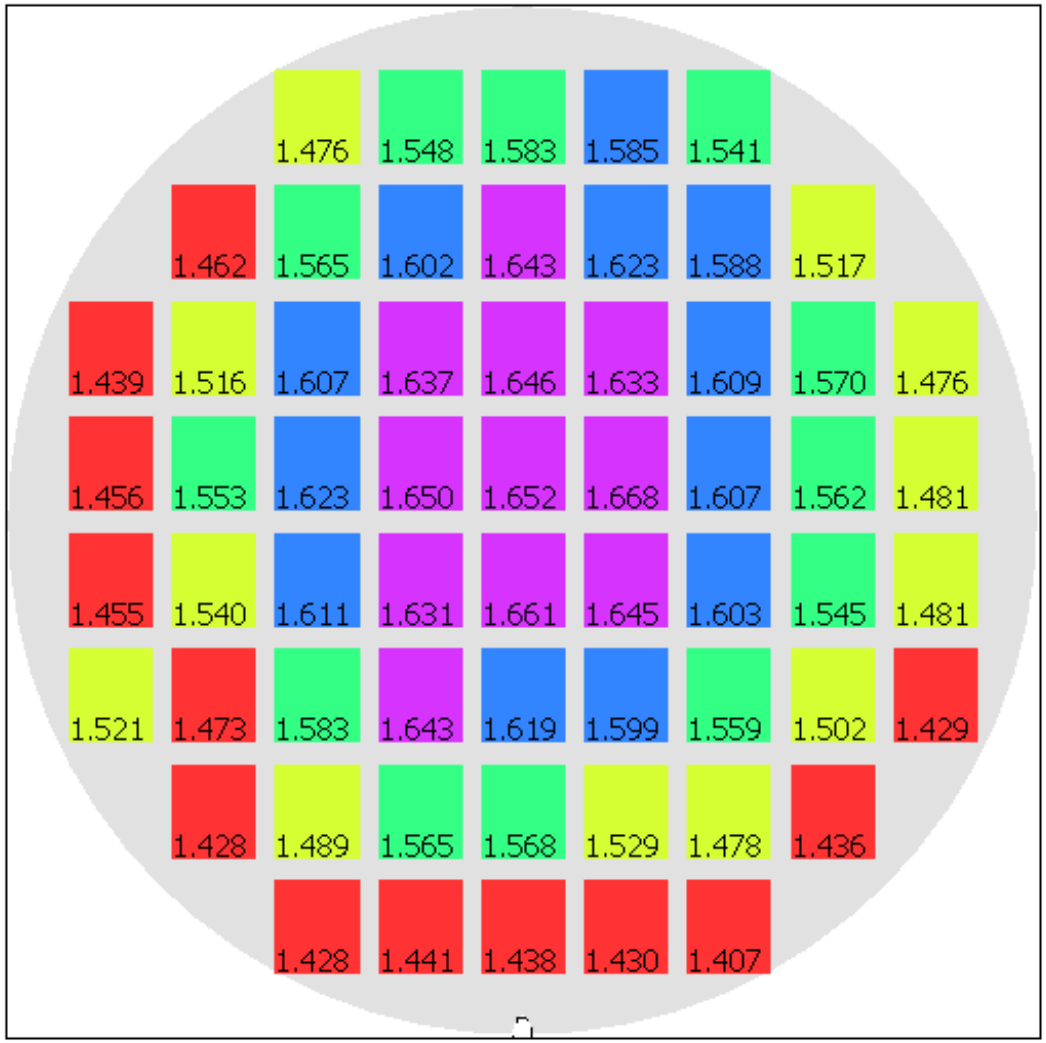


Wf:8swb3

RHO_CA_ DUT4

Split “B”

L_w = 0.18um

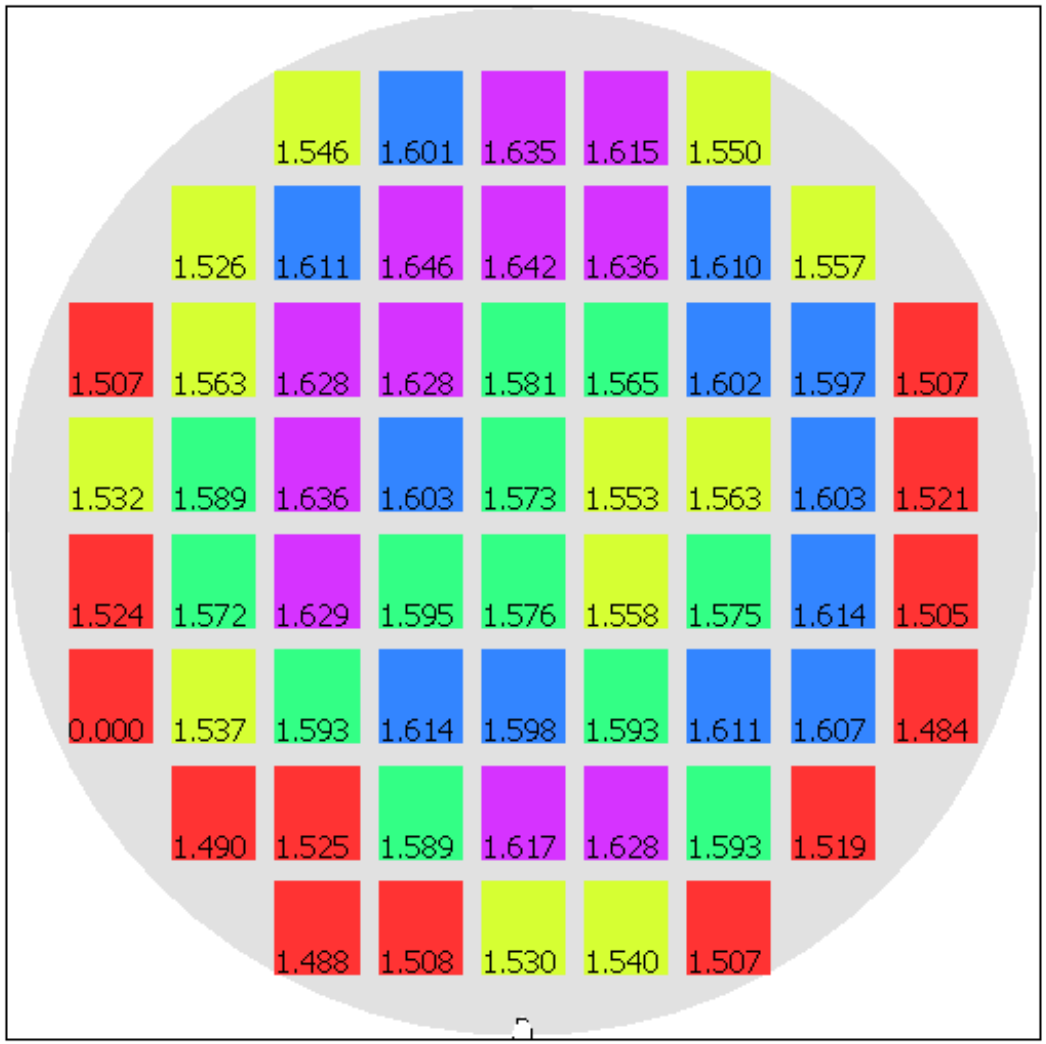


Wf:1swb1

RHO_CA_ DUT4

Split “B”

L_w = 0.18um

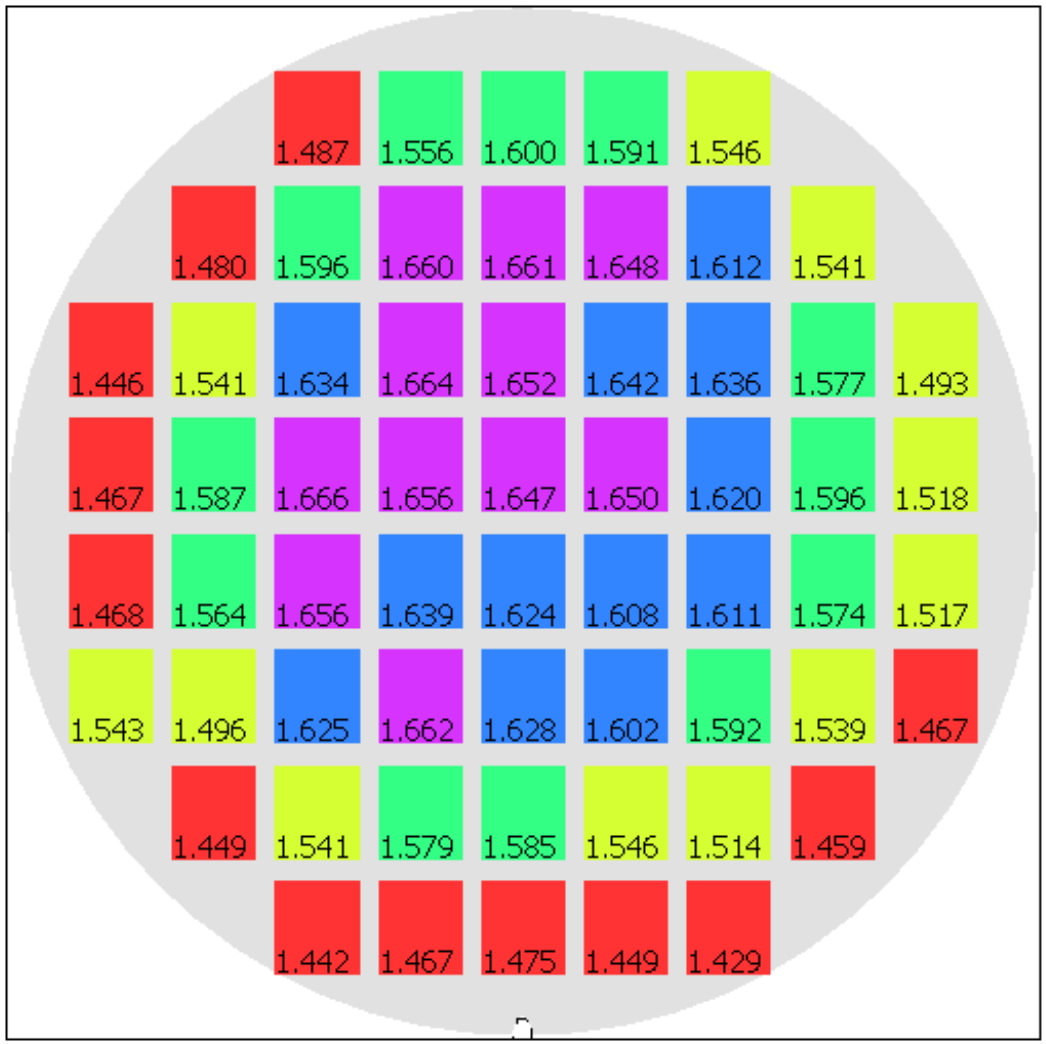


Wf:5swd3

RHO_CA_ DUT4

Split “B”

L_w = 0.18um

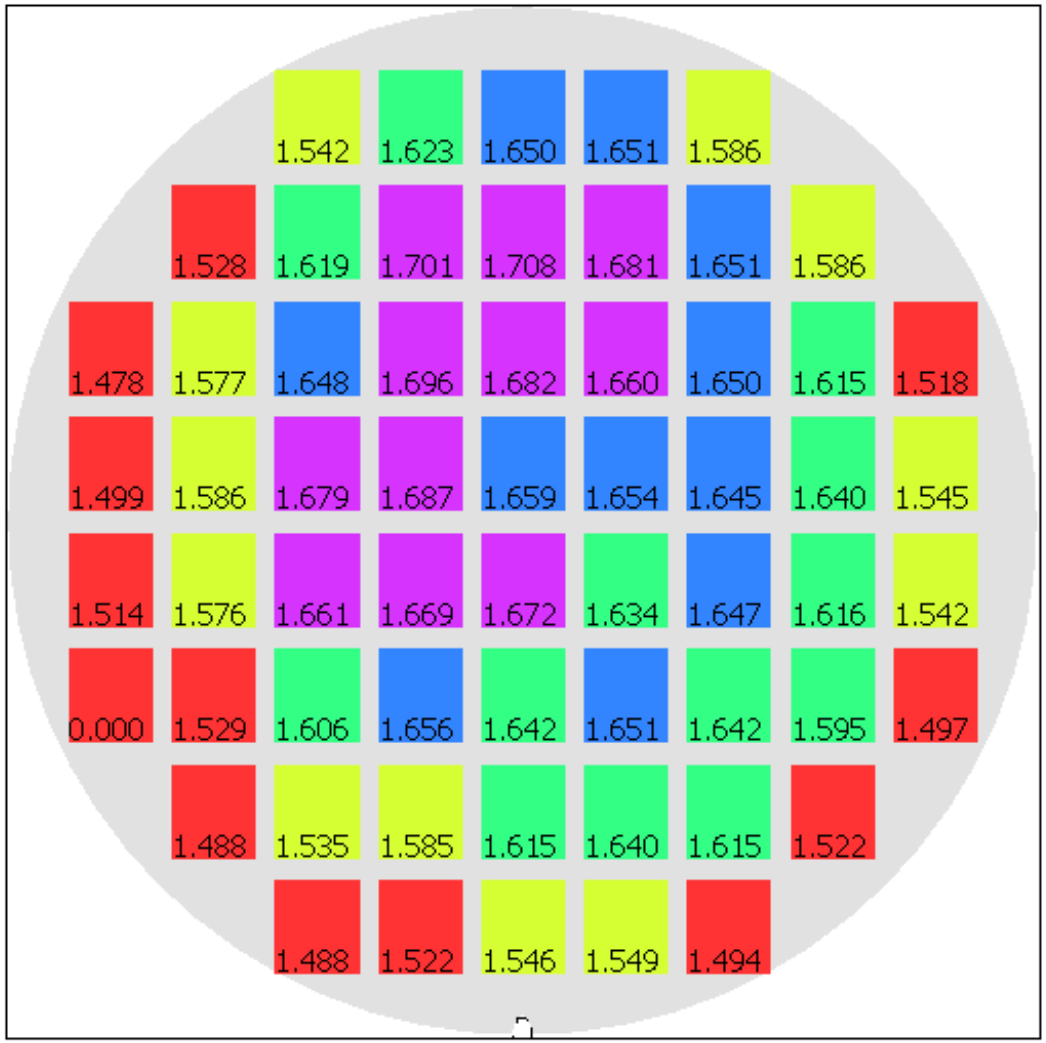


Wf:8swe2

RHO_CA_ DUT4

Split “B”

L_w = 0.18um

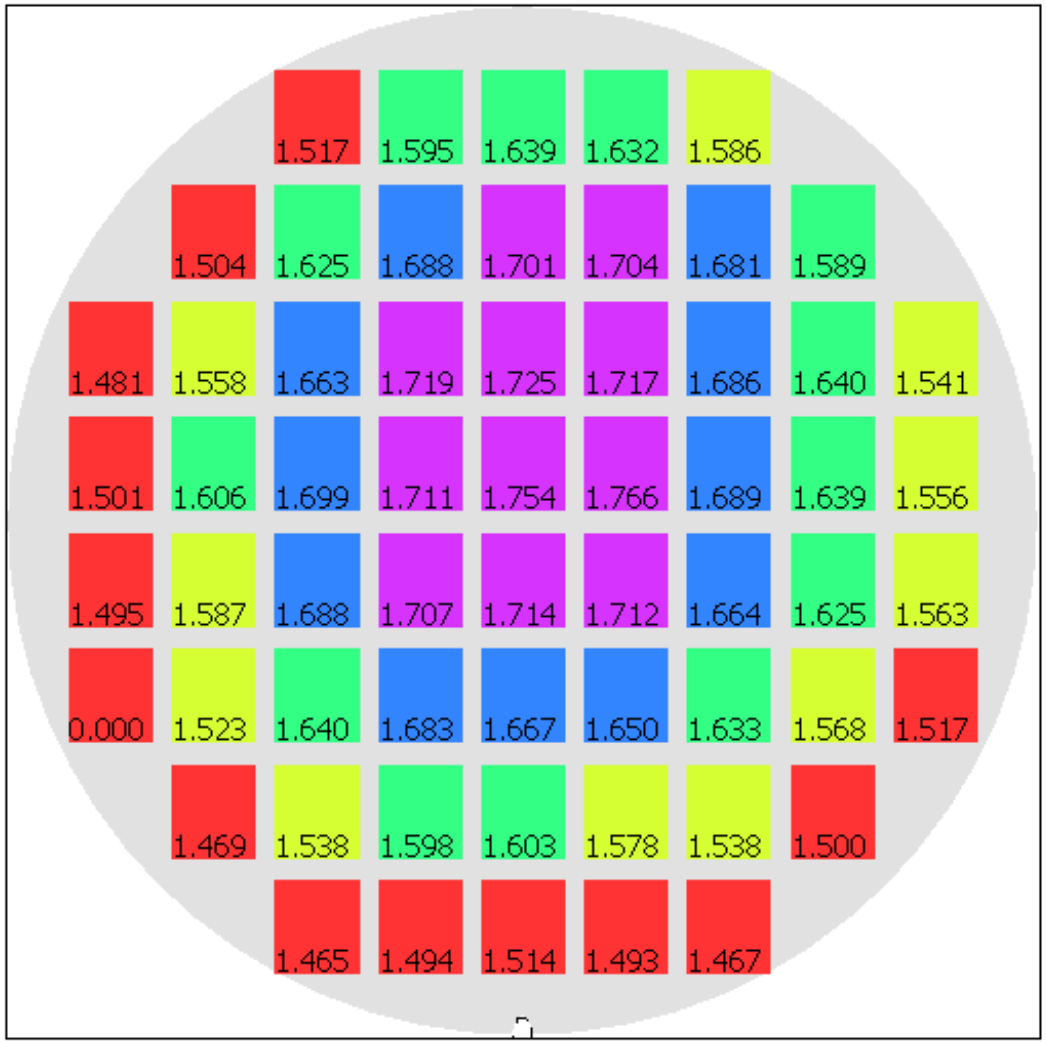


Wf:7swa0

RHO_CA_ DUT4

Split “B”

L_w = 0.18um



Wf:1swd1