

100nm depth oxide HM (L50P100) Line & Space navigation & results Dec 26, 2022

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<https://AMAGnm.com>

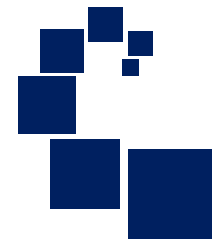
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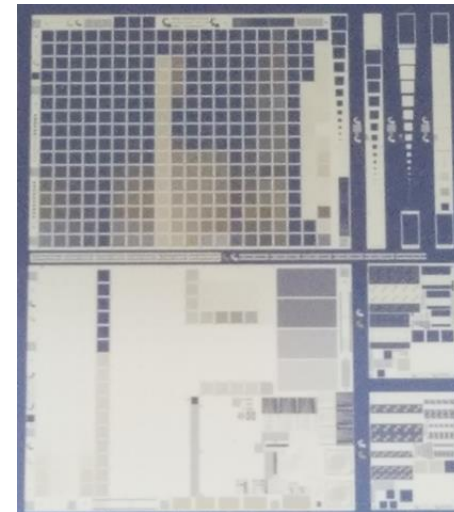
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AMAG7 CD metrology modules



- Full die repeat size is 27.000mm x 33.000mm (exactly).
- All panes of AMAG7 are included. Full Field.

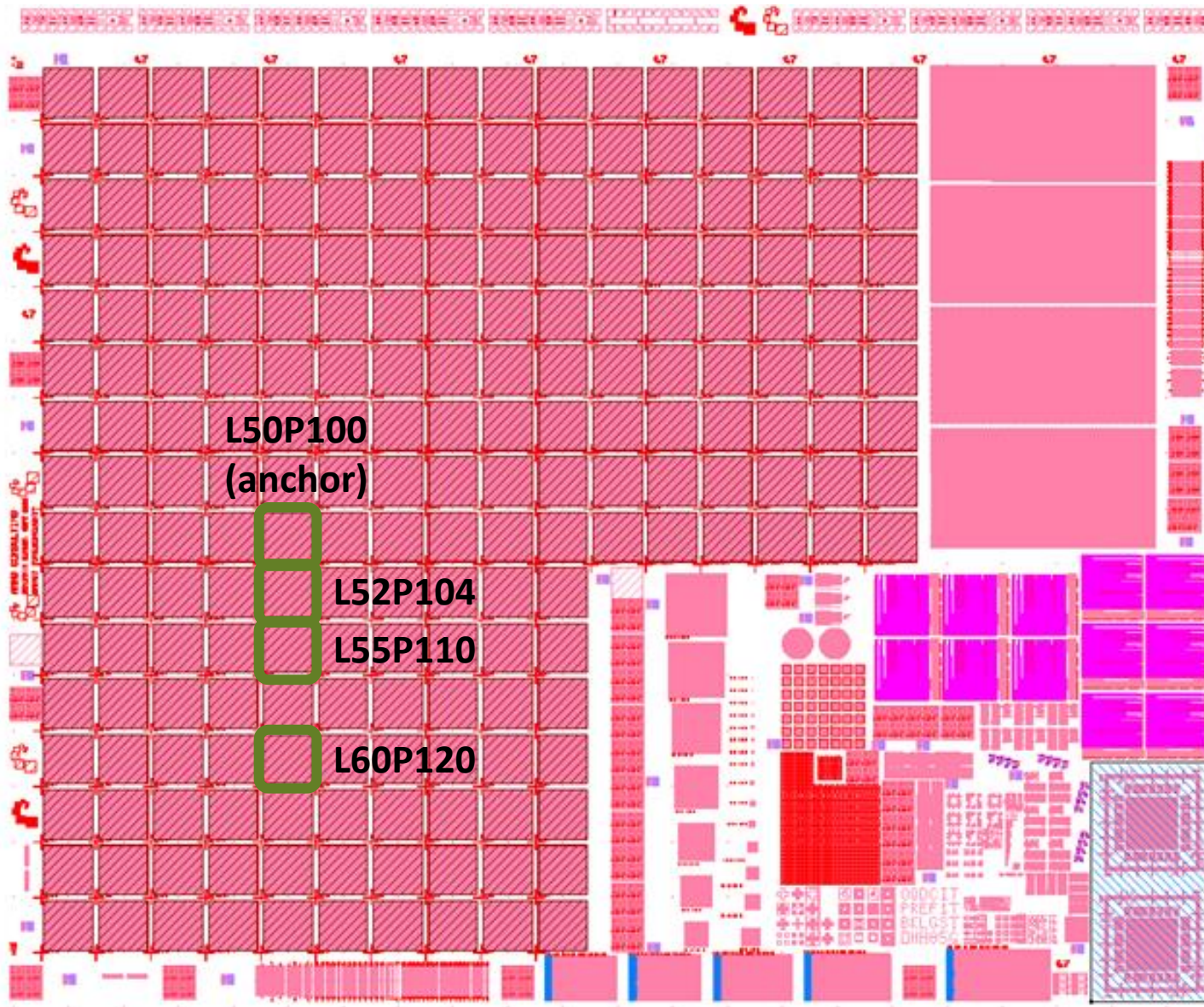
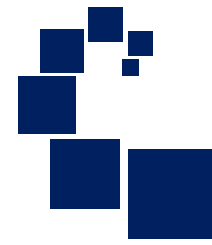


33.000 mm

27.000 mm

Photograph of Line & Space pattern

AMAG7B Pane CD metrology modules



**L50P100
(anchor)**

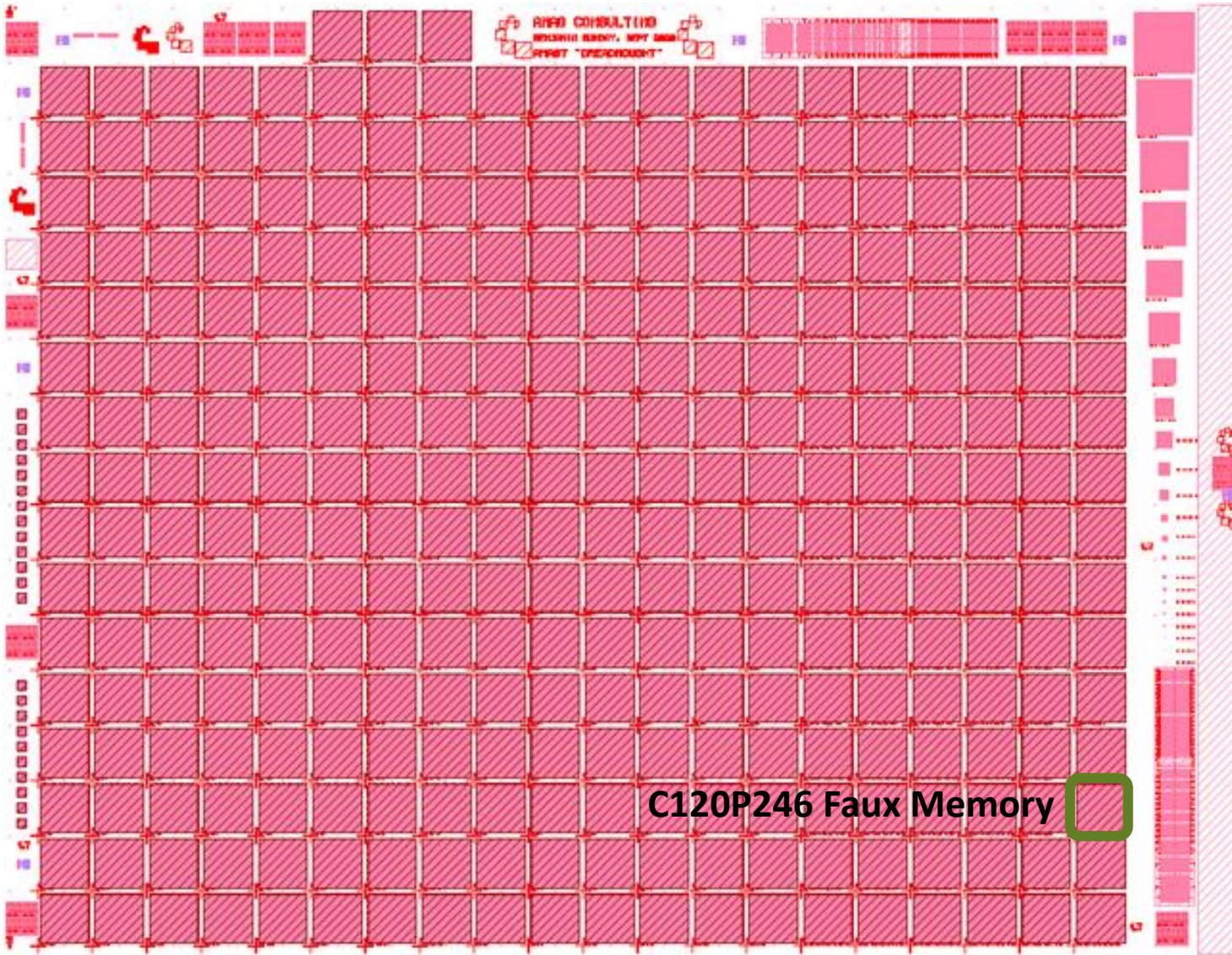
L52P104

L55P110

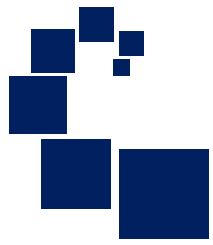
L60P120

AMAG7A Pane

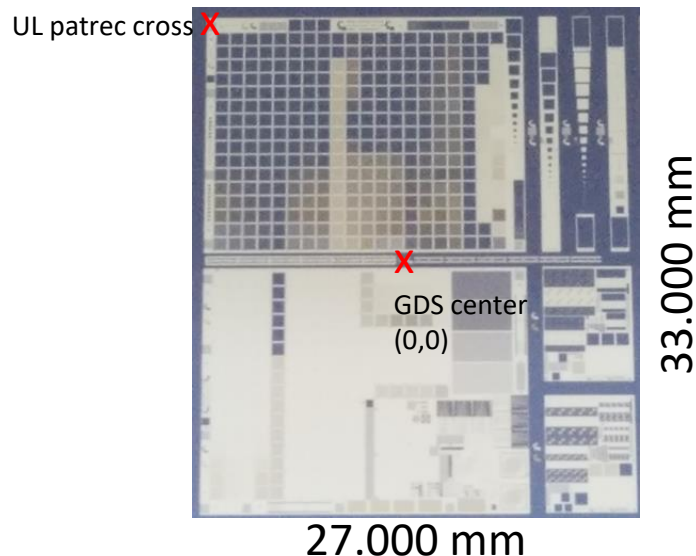
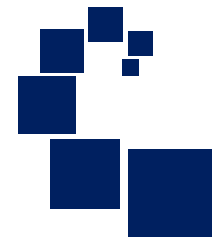
UL corner patrec mark



C120P246 Faux Memory



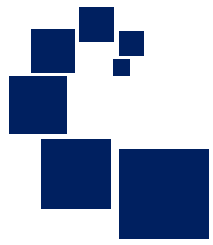
AMAG7 Full Field Pattern for Line&Space



Photograph of Line & Space pattern

Pattern	Wafer Type	x [um]	y [um]	Tile coordinates (each tile has location in GDS)
UL pattern rec cross--top left corner of die	100HM Line&Space	-12920	15938	left of A-00
AMAG7 L50P100 grating (anchor target, 800um pad)	100HM Line&Space	-8400	-8300	E-25
L52P104 grating (800um pad)	100HM Line&Space	-8400	-9200	E-26
L55P110 grating (800um pad)	100HM Line&Space	-8400	-10100	E-27
L60P120 grating (800um pad)	100HM Line&Space	-8400	-11900	E-29
C120P246 Faux Memory grating (800um pad)	100HM Line&Space	5100	2900	T-14
GDS center (cartesian coordinates)	no feature	0	0	~center of middle scribe lane

Line & Space HM100 wafer-level CD results

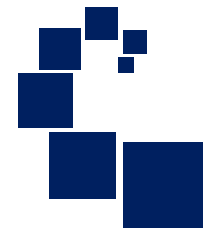


- This report shows the wafer-level averages and variation for each wafer of the first lot of the Line & Space product.
- Specific maps for each wafer including the average & 1sigma and SEM images of all-die of L50P100 and few sites of each of the secondary targets.
- CD values convey bottom CD of the lines.
 - For C120P246 Faux Memory, two values represent the holes nearest trench and holes further from trench.

Lot ID:

Purpose: AMAG7, Pane B (bladed), Line and space, 100nm oxide thickness. Anchor feature = L50 P100

		Final CDSEM measurements (nm)								
		recipe = DNVA1FAMAG7ACDU1			recipe = DNVA1FAMAG7ACDU2			recipe = DNVA1FAMAG7ACDU3		
Slot	Wfr ID	L50 P100 (XLS) All die			L52 P104 (NHL) 11 die	L55 P110 (BCH) 11 die	L60 P120 (NVL) 11 die	C120 P246 MEM (ECH) CD1, 11 die	C120 P246 MEM (ECH2) CD2, 11 die	
		CD	1-sigma	LWR	CD	CD	CD	CD	CD	
1	46JVS181SJH0	46.97	1.70	2.92	50.0	53.5	56.8	102.8	101.9	
2	46JVS180SJC6	47.79	1.69	2.94	50.8	54.1	57.3	102.7	100.7	
3	46JVS179SJH0	45.90	2.12	2.93	49.1	52.3	55.6	104.4	103.7	
4	46JVS177SJF7	47.44	1.93	2.90	50.5	53.9	57.2	102.2	101.4	
5	46JVS176SJB5	47.46	1.78	3.00	50.7	54.0	57.3	102.1	101.7	
6	46JVS125SJE3	47.84	1.83	2.92	50.9	54.3	57.5	101.4	100.8	
7	46JVS151SJA7	47.47	1.67	2.93	50.5	53.8	57.1	102.6	102.0	
8	46JVS152SJF1	47.81	1.68	2.94	50.8	54.2	57.4	101.7	101.2	
9	46JVS153SJC0	47.60	1.79	2.91	50.7	54.0	57.2	102.1	101.5	
10	46JVS154SJG2	47.97	1.75	2.89	51.1	54.4	57.6	101.1	100.7	
Lot	Averages	47.43	1.79	2.93	50.51	53.85	57.10	102.3	101.57	



46JVS181SJH0 (2240EMEM002 slot 1) Reference Data

L50P100 Anchor Target

Oct 2022

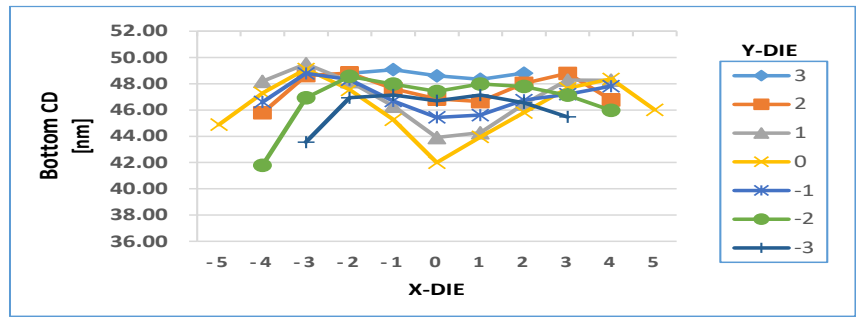
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	46.97	nm
Full wafer 1sigma CD:	1.70	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.27	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

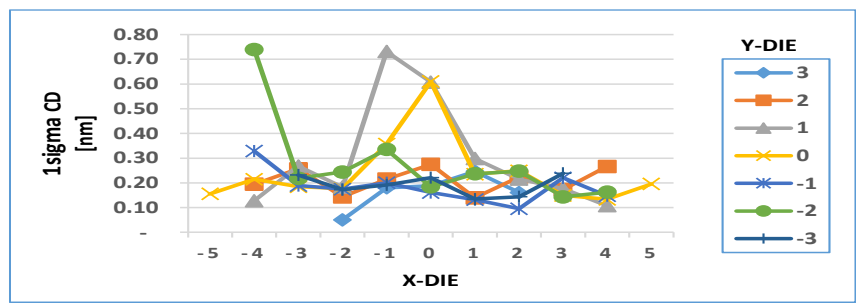
L50P100 Anchor Target Avg CD (line)

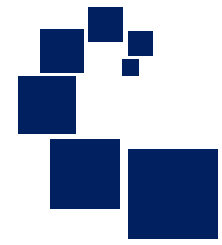
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				48.79	49.08	48.60	48.34	48.81			
2		45.78	48.62	48.82	47.62	46.84	46.64	48.03	48.79	46.77	
1		48.18	49.52	48.17	46.29	43.90	44.27	46.44	48.27	48.27	
0	44.89	47.29	49.12	47.54	45.26	42.00	43.95	45.80	47.65	48.37	46.02
-1		46.61	48.78	48.31	46.69	45.44	45.61	46.75	47.20	47.82	
-2		41.79	46.92	48.56	47.97	47.41	47.98	47.78	47.13	45.97	
-3			43.55	46.93	47.14	46.71	47.14	46.55	45.47		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.05	0.18	0.19	0.25	0.16			
2		0.19	0.26	0.14	0.22	0.27	0.14	0.22	0.17	0.27	
1		0.13	0.27	0.18	0.73	0.61	0.30	0.22	0.18	0.11	
0	0.16	0.21	0.18	0.18	0.36	0.61	0.24	0.25	0.15	0.13	0.20
-1		0.33	0.19	0.17	0.20	0.16	0.13	0.10	0.22	0.15	
-2		0.74	0.22	0.24	0.34	0.18	0.24	0.25	0.14	0.16	
-3			0.23	0.17	0.19	0.22	0.13	0.14	0.24		





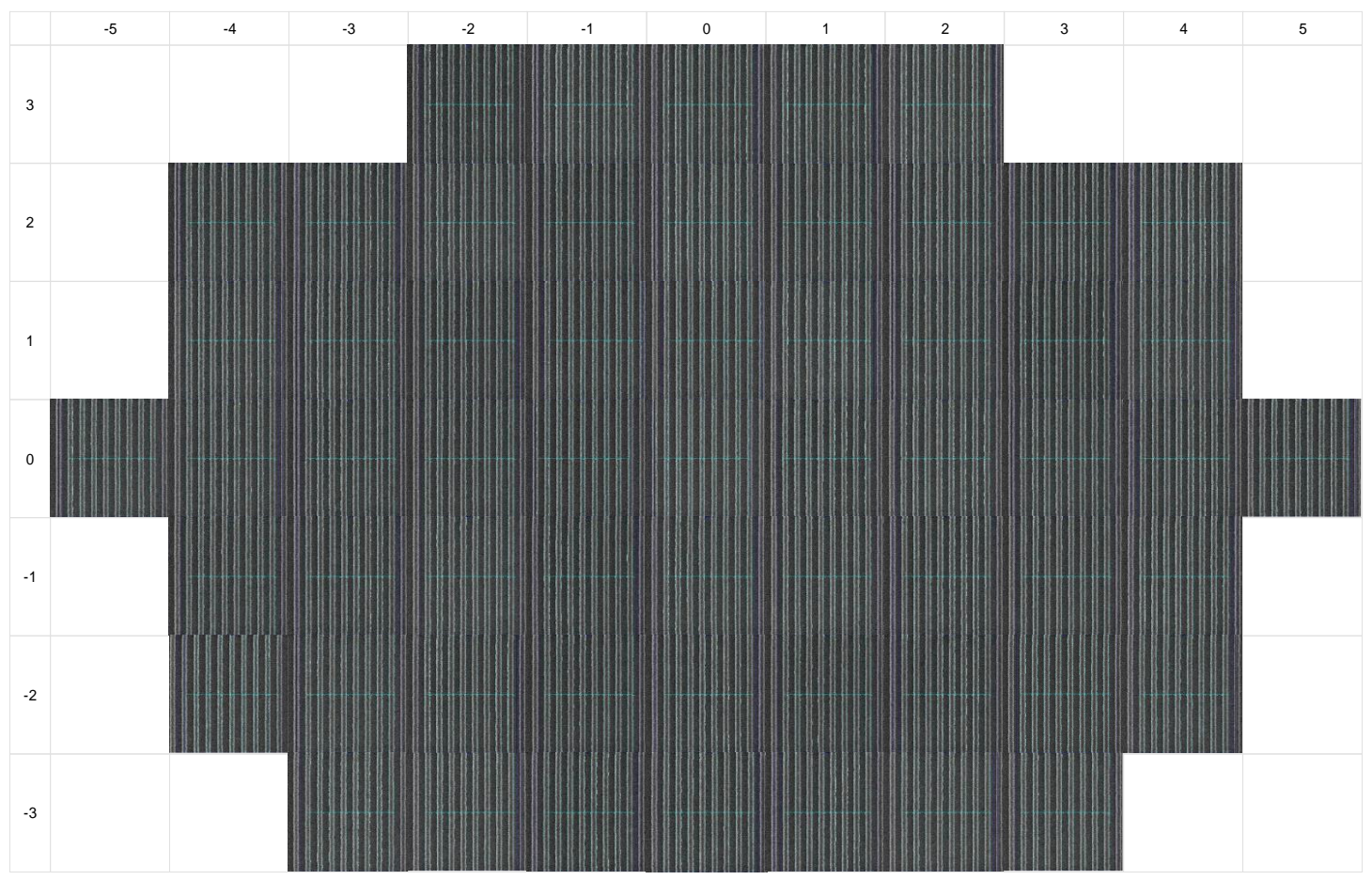
46JVS181SJH0 (2240EMEM002 slot 1) Reference Data

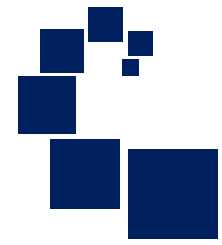
L50P100 Anchor Target

Oct 2022

L50P100 Anchor Target
CD-SEM image wafer map

Full Wafer Avg CD:	46.97	nm
Full wafer 1sigma CD:	1.70	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.27	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm





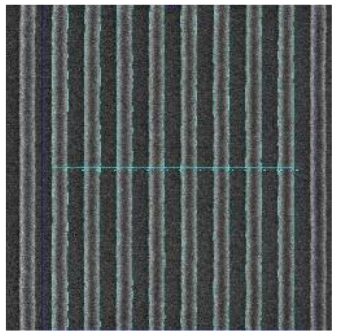
46JTP061SJG4 (2225DNDN001 slot 1) Reference Data

Secondary Targets

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Anchor Target

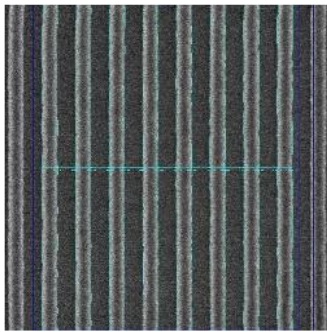
L50P100 (XLS*)



Full Wafer Avg CD:	46.97	nm
Full wafer 1sigma CD:	1.70	nm
Die-to-Die 1 sigma		
Avg:	0.23	nm
RMS:	0.27	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm

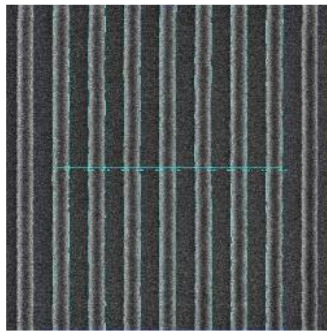
Secondary Targets

L52P104 (NHL*)



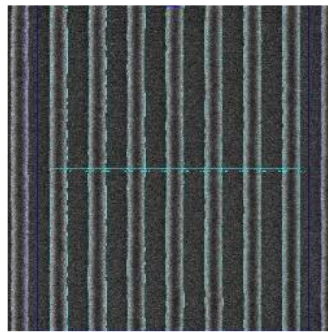
Full Wafer Avg CD:	50.0	nm
Full wafer 1sigma CD:	1.61	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR:	2.88	nm
FOV:	1000	nm

L55P110 (IHL*)



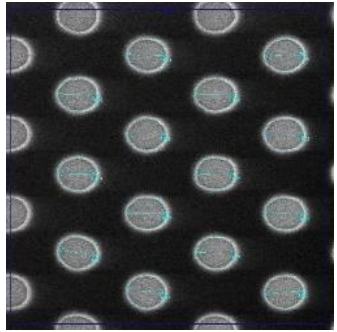
Full Wafer Avg CD:	53.5	nm
Full wafer 1sigma CD:	1.70	nm
Die-to-Die 1 sigma		
Avg:	0.24	nm
RMS:	0.26	nm
LWR:	2.85	nm
FOV:	1000	nm

L60P120 (NVL*)



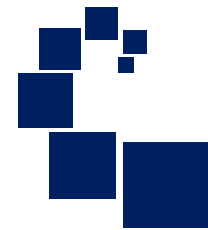
Full Wafer Avg CD:	56.8	nm
Full wafer 1sigma CD:	1.80	nm
Die-to-Die 1 sigma		
Avg:	0.20	nm
RMS:	0.22	nm
LWR:	3.18	nm
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	102.78	nm
Full wafer 1sigma CD:	2.17	nm
Die-to-Die 1 sigma		
Avg:	2.53	nm
RMS:	2.66	nm
Ellipticity	1.23	nm
FOV:	1000	nm

* Coding labels for CD data results files



46JVS180SJC6 (2240EMEM002 slot 2) Reference Data

L50P100 Anchor Target

Oct 2022

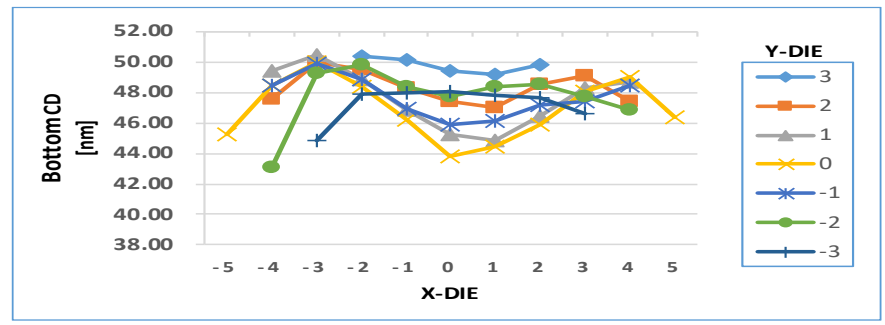
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.79	nm
Full wafer 1sigma CD:	1.69	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.24	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

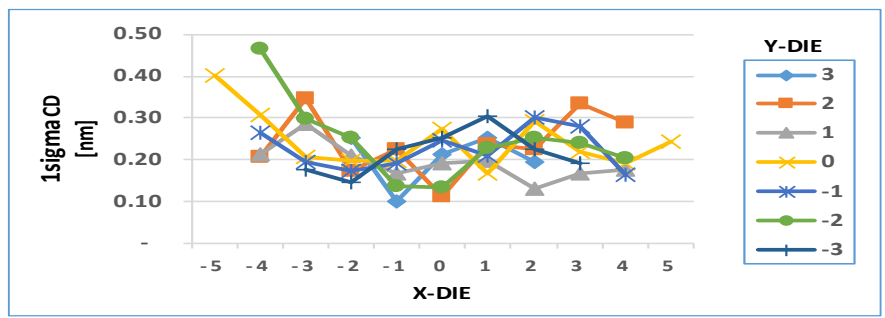
L50P100 Anchor Target Avg CD (line)

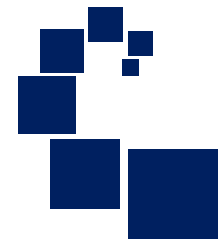
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				50.37	50.18	49.42	49.20	49.83			
2		47.63	49.98	49.53	48.29	47.43	46.99	48.51	49.11	47.43	
1		49.43	50.50	48.88	46.89	45.23	44.84	46.46	48.28	48.69	
0	45.28	48.50	50.02	48.38	46.26	43.77	44.42	45.94	48.08	49.03	46.41
-1		48.44	49.90	48.87	46.98	45.86	46.12	47.21	47.40	48.49	
-2		43.11	49.25	49.80	48.38	47.77	48.36	48.58	47.74	46.87	
-3			44.87	47.95	48.00	48.10	47.82	47.68	46.65		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.25	0.10	0.21	0.25	0.20			
2		0.21	0.35	0.17	0.23	0.11	0.24	0.22	0.33	0.29	
1		0.21	0.28	0.21	0.17	0.19	0.20	0.13	0.17	0.18	
0	0.40	0.31	0.21	0.20	0.20	0.27	0.17	0.29	0.22	0.19	0.24
-1		0.26	0.20	0.17	0.19	0.25	0.21	0.30	0.28	0.16	
-2		0.46	0.30	0.25	0.14	0.13	0.23	0.25	0.24	0.20	
-3			0.17	0.14	0.23	0.25	0.30	0.23	0.19		





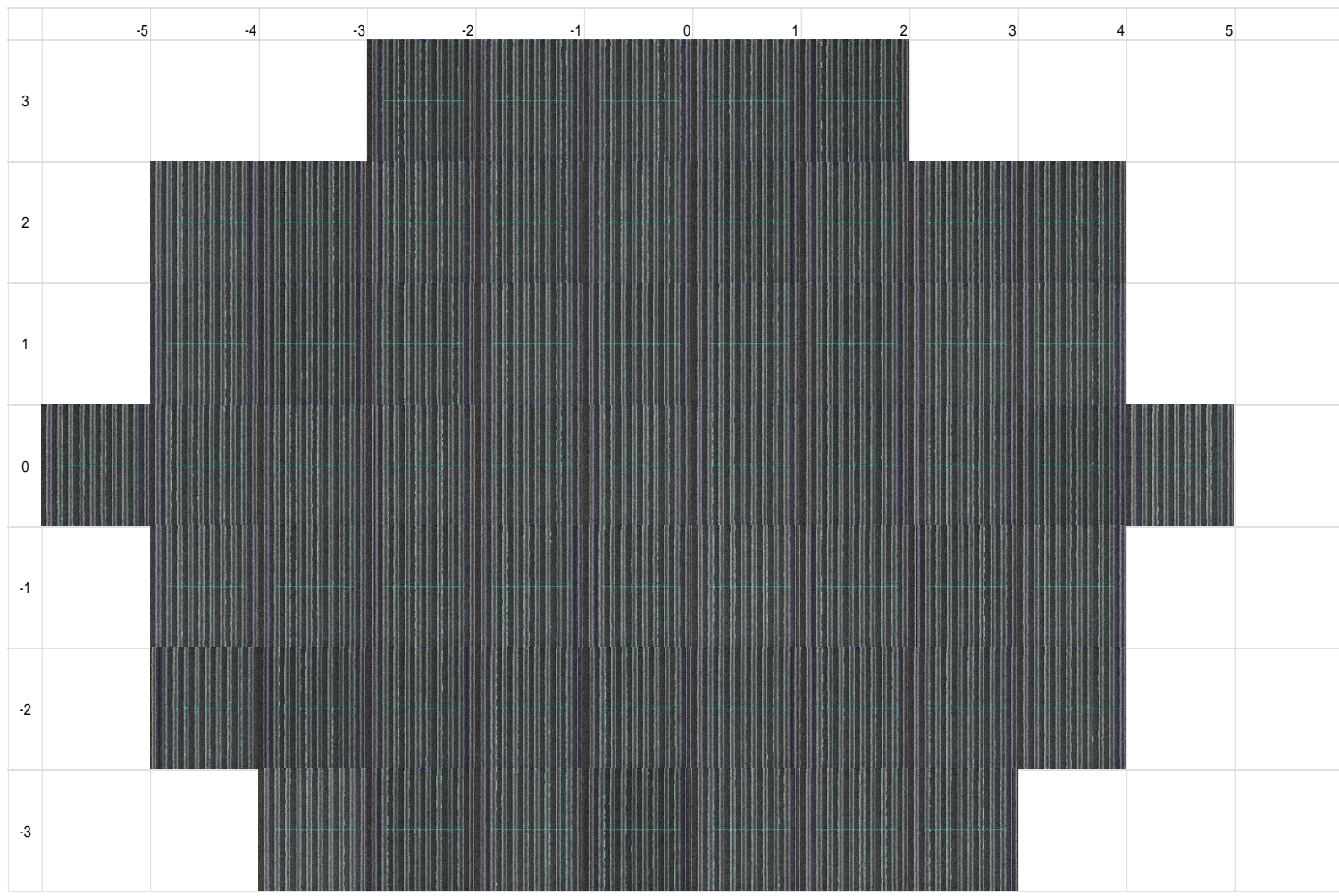
46JVS180SJC6 (2240EMEM002 slot 2) Reference Data

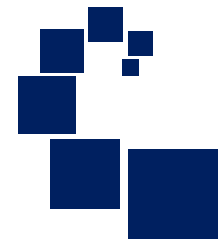
L50P100 Anchor Target

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L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.79	nm
Full wafer 1sigma CD:	1.69	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.24	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm





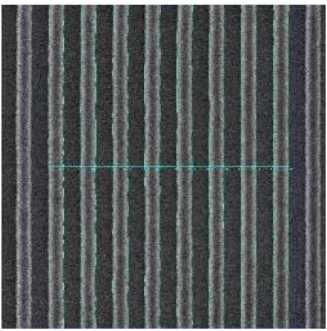
46JVS180SJC6 (2225DNDN001 slot 2) Reference Data

Secondary Targets

Oct 2022

Anchor Target

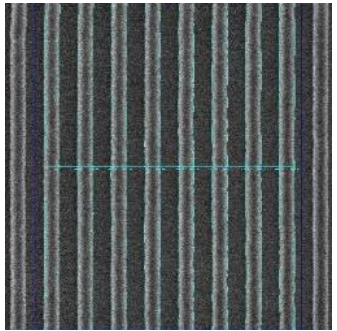
L50P100 (XLS*)



Full Wafer Avg CD:	47.79	nm
Full wafer 1sigma CD:	1.69	nm
Die-to-Die 1 sigma		
Avg:	0.23	nm
RMS:	0.24	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm

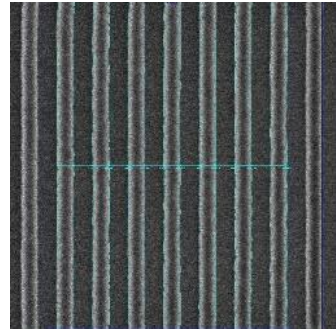
Secondary Targets

L52P104 (NHL*)



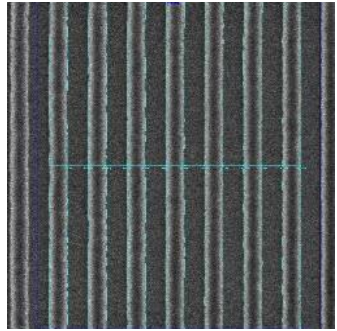
Full Wafer Avg CD:	50.8	nm
Full wafer 1sigma CD:	1.84	nm
Die-to-Die 1 sigma		
Avg:	0.22	nm
RMS:	0.24	nm
LWR:	2.90	
FOV:	1000	nm

L55P110 (IHL*)



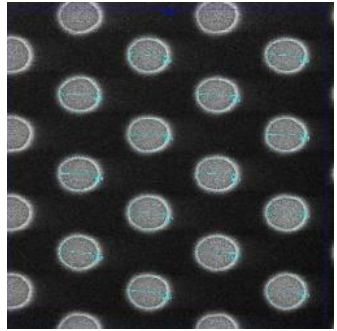
Full Wafer Avg CD:	54.1	nm
Full wafer 1sigma CD:	1.81	nm
Die-to-Die 1 sigma		
Avg:	0.27	nm
RMS:	0.30	nm
LWR:	2.98	
FOV:	1000	nm

L60P120 (NVL*)



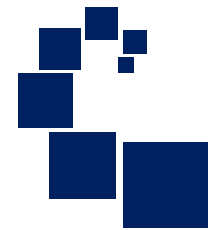
Full Wafer Avg CD:	57.5	nm
Full wafer 1sigma CD:	1.74	nm
Die-to-Die 1 sigma		
Avg:	0.18	nm
RMS:	0.21	nm
LWR:	3.21	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	101.2	nm
Full wafer 1sigma CD:	2.26	nm
Die-to-Die 1 sigma		
Avg:	2.52	nm
RMS:	2.54	nm
Ellipticity	1.26	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS179SJH0 (2240EMEM002 slot 3) Reference Data

L50P100 Anchor Target

Oct 2022

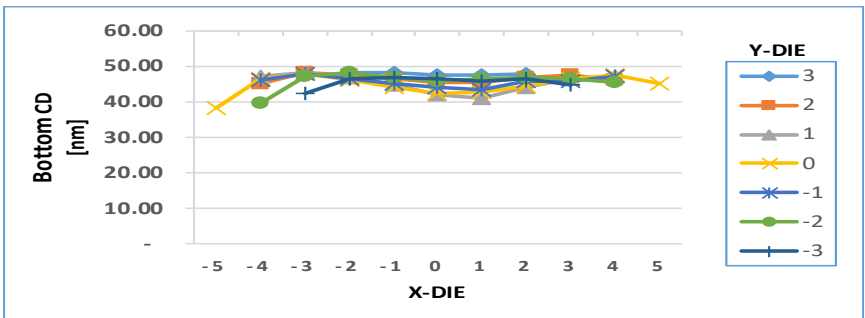
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	45.90	nm
Full wafer 1sigma CD:	2.12	nm
Die-to-Die 1sigma		
Avg:	0.28	nm
RMS:	0.34	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

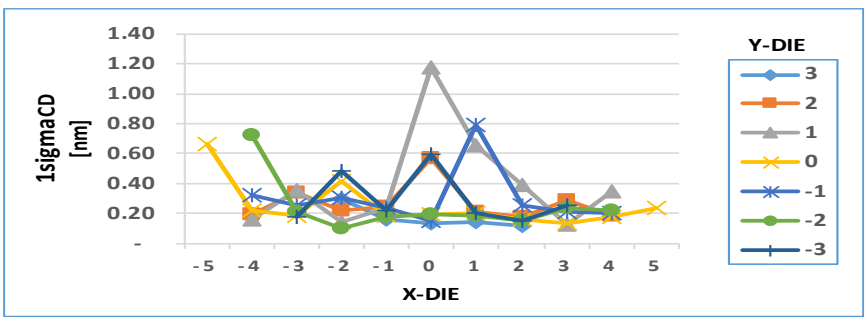
L50P100 Anchor Target Avg CD (line)

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				48.26	48.38	47.75	47.70	48.10			
2		45.38	48.34	47.69	46.62	45.52	45.67	46.89	47.50	46.38	
1		47.17	48.36	46.96	44.95	42.08	41.07	44.32	46.74	47.42	
0	38.34	46.64	47.85	46.24	44.27	42.42	42.79	44.67	46.45	47.76	45.13
-1		46.30	47.90	46.69	45.35	44.35	43.33	45.78	46.01	47.26	
-2		39.78	47.25	48.16	46.81	45.96	46.76	46.86	46.45	45.51	
-3			42.44	46.62	46.82	46.45	45.86	46.59	44.89		



L50P100 Anchor Target 1sigma CD

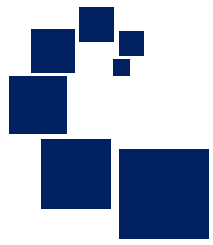
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.30	0.16	0.13	0.15	0.12			
2		0.19	0.33	0.22	0.24	0.57	0.21	0.17	0.29	0.18	
1		0.16	0.36	0.15	0.24	1.18	0.66	0.39	0.13	0.34	
0	0.67	0.22	0.19	0.42	0.19	0.20	0.20	0.16	0.13	0.17	0.24
-1		0.32	0.25	0.31	0.24	0.15	0.79	0.25	0.21	0.20	
-2		0.73	0.21	0.10	0.17	0.20	0.19	0.15	0.24	0.22	
-3			0.18	0.48	0.22	0.60	0.20	0.15	0.25		



46JVS179SJH0 (2240EMEM002 slot 3) Reference Data

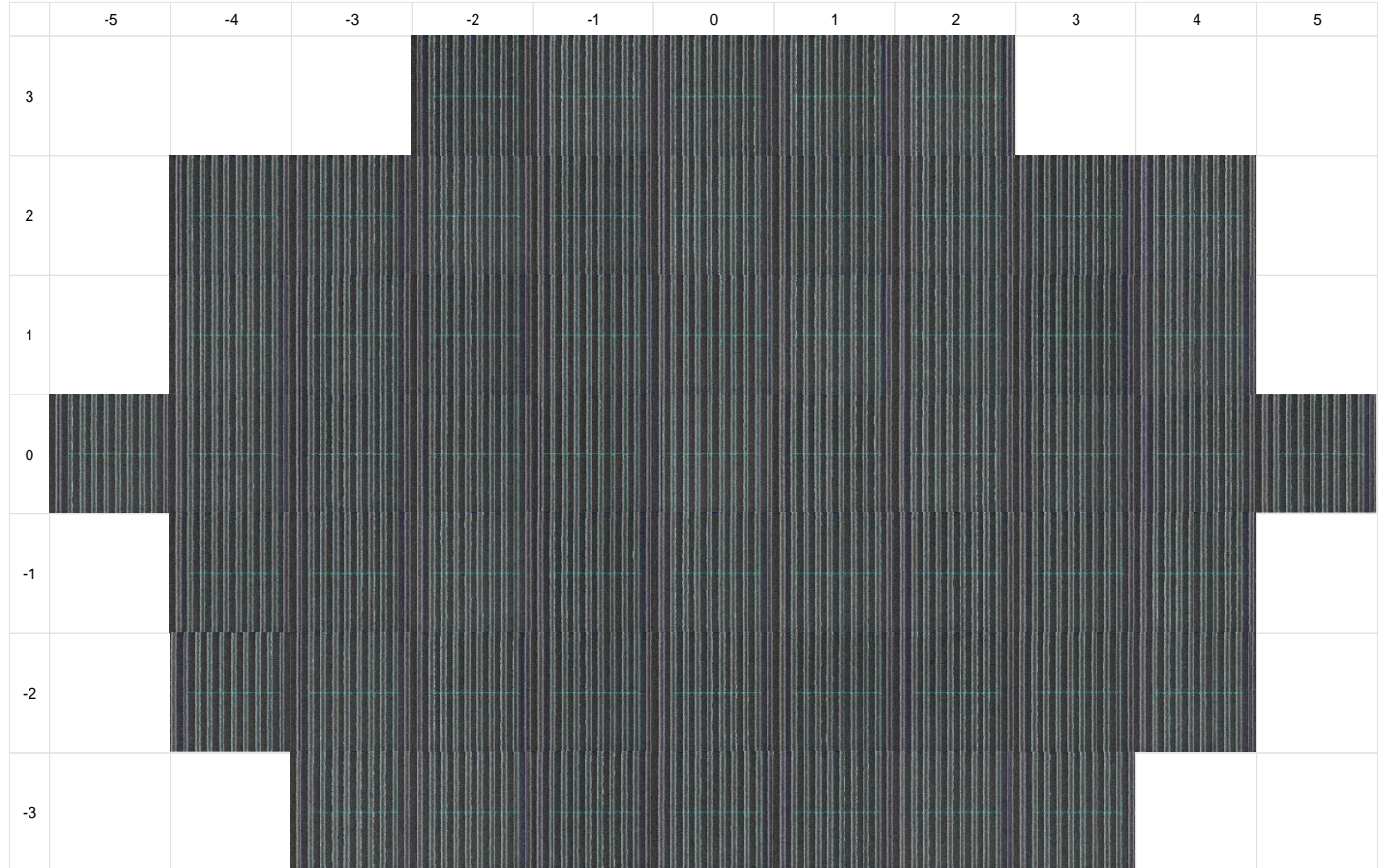
L50P100 Anchor Target

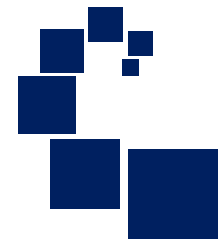
Oct 2022



L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	45.90	nm
Full wafer 1sigma CD:	2.12	nm
Die-to-Die 1sigma		
Avg:	0.28	nm
RMS:	0.34	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm





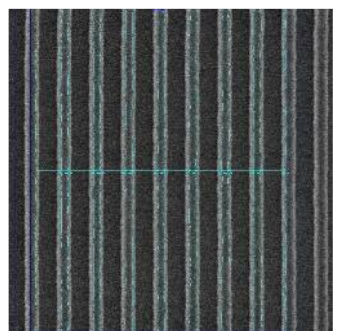
46JVS179SJH0 (2225DNDN001 slot 3) Reference Data

Secondary Targets

Oct 2022

Anchor Target

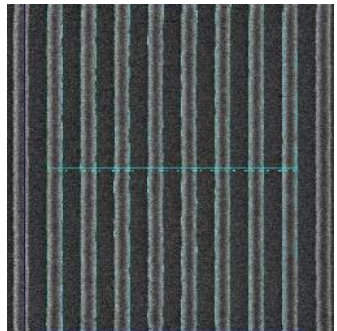
L50P100 (XLS*)



Full Wafer Avg CD:	45.90	nm
Full wafer 1sigma CD:	2.12	nm
Die-to-Die 1sigma		
Avg:	0.28	nm
RMS:	0.34	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm

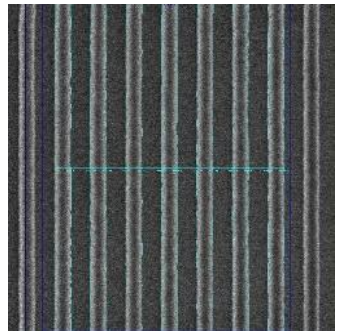
Secondary Targets

L52P104 (NHL*)



Full Wafer Avg CD:	49.1	nm
Full wafer 1sigma CD:	1.73	nm
Die-to-Die 1 sigma:		
Avg:	0.23	nm
RMS:	0.24	nm
LWR:	2.82	
FOV:	1000	nm

L55P110 (IHL*)



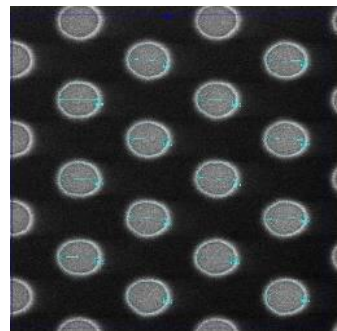
Full Wafer Avg CD:	52.3	nm
Full wafer 1sigma CD:	1.78	nm
Die-to-Die 1 sigma:		
Avg:	0.31	nm
RMS:	0.34	nm
LWR:	2.93	
FOV:	1000	nm

L60P120 (NVL*)



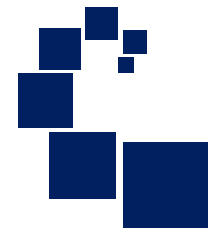
Full Wafer Avg CD:	55.6	nm
Full wafer 1sigma CD:	1.83	nm
Die-to-Die 1 sigma		
Avg:	0.23	nm
RMS:	0.26	nm
LWR:	3.28	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	104.38	nm
Full wafer 1sigma CD:	2.32	nm
Die-to-Die 1 sigma		
Avg:	2.13	nm
RMS:	2.25	nm
Ellipticity	1.22	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS177SJF7 (2240EMEM002 slot 4) Reference Data

L50P100 Anchor Target

Oct 2022

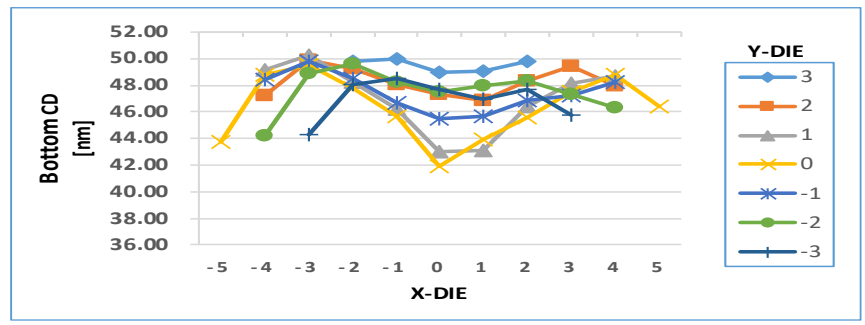
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.44	nm
Full wafer 1sigma CD:	1.93	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.26	nm
LWR Line (Avg):	2.90	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

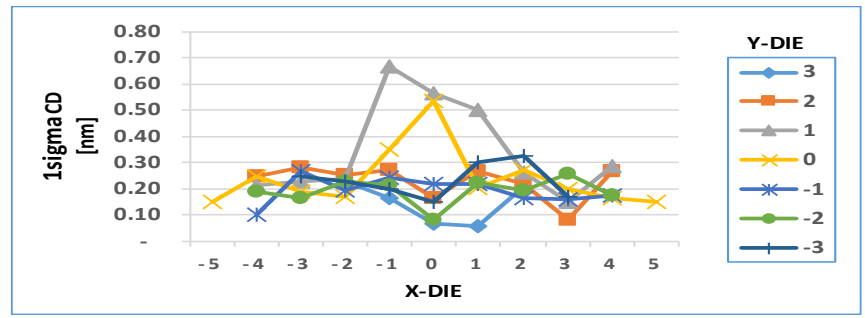
L50P100 Anchor Target Avg CD (line)

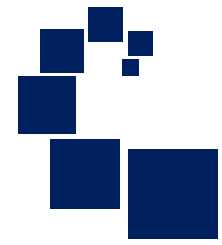
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				49.81	50.03	48.99	49.06	49.80			
2		47.21	49.90	49.22	48.06	47.30	46.88	48.37	49.41	47.99	
1		49.20	50.23	48.21	46.21	42.96	43.09	46.41	48.14	48.67	
0	43.77	48.84	49.50	47.82	45.69	41.92	43.93	45.60	47.51	48.80	46.40
-1		48.39	49.85	48.49	46.68	45.45	45.63	46.84	47.21	48.23	
-2		44.21	48.91	49.63	48.25	47.48	47.96	48.34	47.33	46.33	
-3			44.28	48.08	48.51	47.73	46.95	47.69	45.76		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.23	0.16	0.07	0.05	0.21			
2		0.25	0.28	0.25	0.27	0.16	0.27	0.22	0.08	0.27	
1		0.21	0.23	0.24	0.67	0.56	0.50	0.26	0.15	0.29	
0	0.15	0.25	0.19	0.17	0.35	0.53	0.20	0.27	0.20	0.17	0.15
-1		0.10	0.27	0.19	0.24	0.22	0.22	0.16	0.16	0.17	
-2		0.19	0.17	0.23	0.21	0.08	0.22	0.19	0.26	0.17	
-3			0.25	0.23	0.20	0.15	0.30	0.33	0.17		





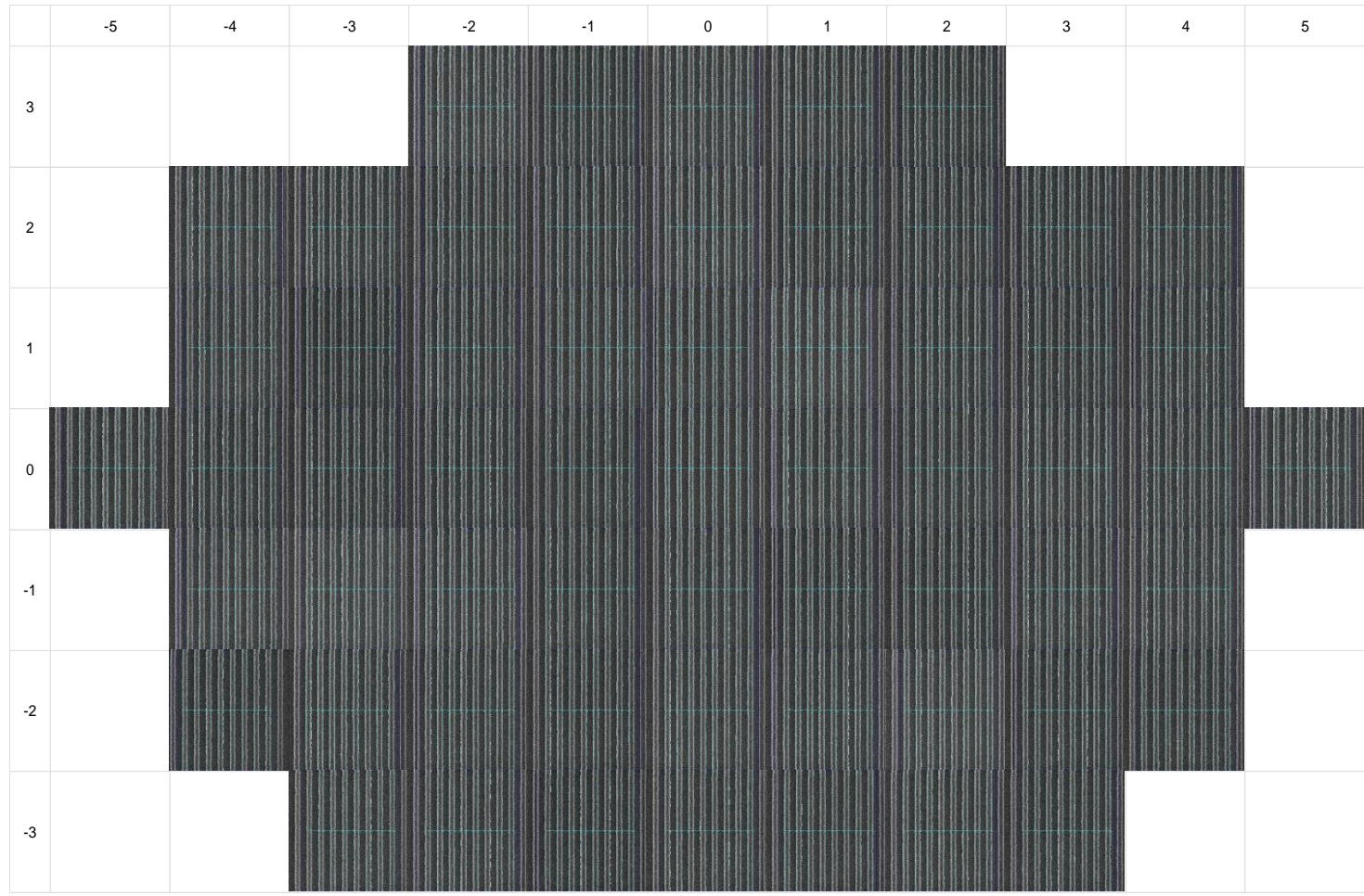
46JVS177SJF7 (2240EMEM002 slot 4) Reference Data

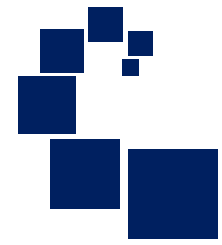
L50P100 Anchor Target

Oct 2022

L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.44	nm
Full wafer 1sigma CD:	1.93	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.26	nm
LWR Line (Avg):	2.90	nm
FOV:	1000	nm





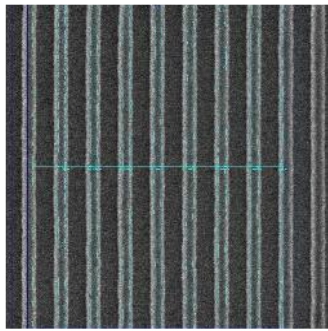
46JVS177SJF7 (2225DNDN001 slot 4) Reference Data

Secondary Targets

Oct 2022

Anchor Target

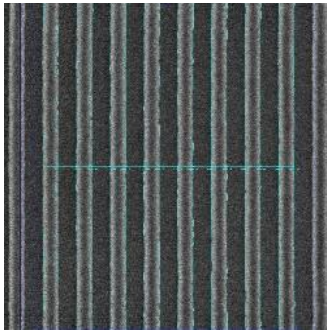
L50P100 (XLS*)



Full Wafer Avg CD:	47.44	nm
Full wafer 1sigma CD:	1.93	nm
Die-to-Die 1sigma		
Avg:	0.23	nm
RMS:	0.26	nm
LWR Line (Avg):	2.90	nm
FOV:	1000	nm

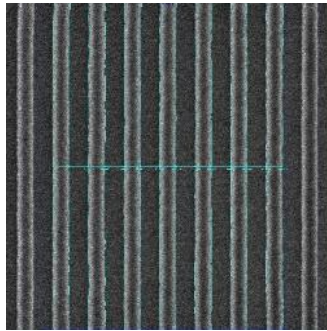
Secondary Targets

L52P104 (NHL*)



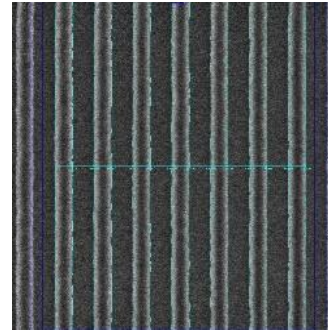
Full Wafer Avg CD:	50.5	nm
Full wafer 1sigma CD:	1.91	nm
Die-to-Die 1 sigma:		
Avg:	0.23	nm
RMS:	0.25	nm
LWR:	2.86	
FOV:	1000	nm

L55P110 (IHL*)



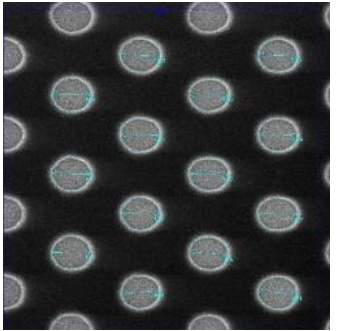
Full Wafer Avg CD:	53.9	nm
Full wafer 1sigma CD:	1.93	nm
Die-to-Die 1 sigma:		
Avg:	0.29	nm
RMS:	0.33	nm
LWR:	3.06	
FOV:	1000	nm

L60P120 (NVL*)



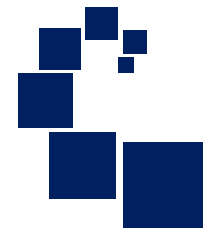
Full Wafer Avg CD:	57.2	nm
Full wafer 1sigma CD:	1.95	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR:	3.27	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	102.23	nm
Full wafer 1sigma CD:	2.45	nm
Die-to-Die 1 sigma		
Avg:	2.27	nm
RMS:	2.41	nm
Ellipticity	1.23	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS176SJB5 (2240EMEM002 slot 5) Reference Data

L50P100 Anchor Target

Oct 2022

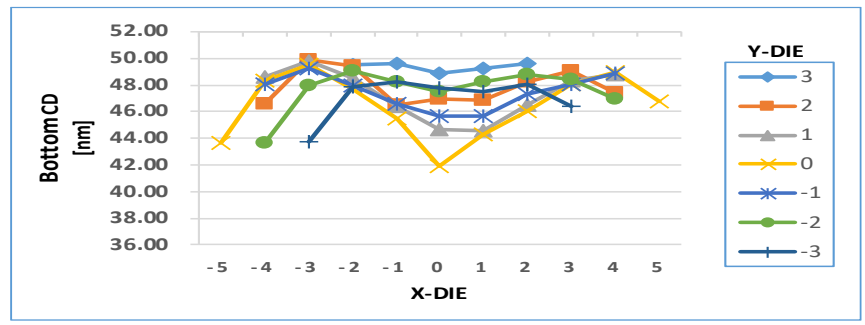
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.46	nm
Full wafer 1sigma CD:	1.78	nm
Die-to-Die 1sigma		
Avg:	0.24	nm
RMS:	0.27	nm
LWR Line (Avg):	3.00	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

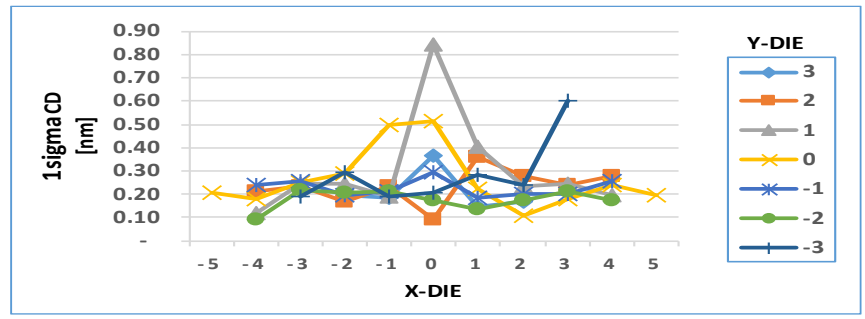
L50P100 Anchor Target Avg CD (line)

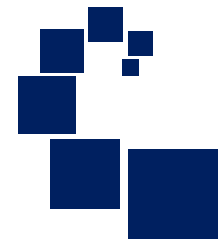
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				49.55	49.60	48.88	49.26	49.65			
2		46.62	49.85	49.40	46.45	46.92	46.87	48.28	49.06	47.39	
1		48.62	49.79	48.50	46.37	44.66	44.53	46.48	48.30	48.83	
0	43.64	48.36	49.49	47.67	45.45	41.93	44.29	46.00	48.10	49.01	46.75
-1		48.03	49.23	47.98	46.63	45.69	45.71	47.30	48.03	48.85	
-2		43.70	47.99	49.10	48.27	47.48	48.22	48.77	48.42	46.91	
-3			43.71	47.86	48.22	47.77	47.54	48.10	46.40		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.19	0.19	0.37	0.15	0.17			
2		0.21	0.24	0.17	0.23	0.09	0.36	0.28	0.24	0.28	
1		0.12	0.25	0.25	0.19	0.85	0.40	0.24	0.25	0.19	
0	0.21	0.18	0.25	0.29	0.50	0.51	0.22	0.11	0.18	0.24	0.20
-1		0.24	0.25	0.20	0.21	0.29	0.19	0.20	0.20	0.26	
-2		0.09	0.22	0.21	0.21	0.17	0.14	0.17	0.21	0.17	
-3			0.19	0.29	0.19	0.21	0.29	0.24	0.60		





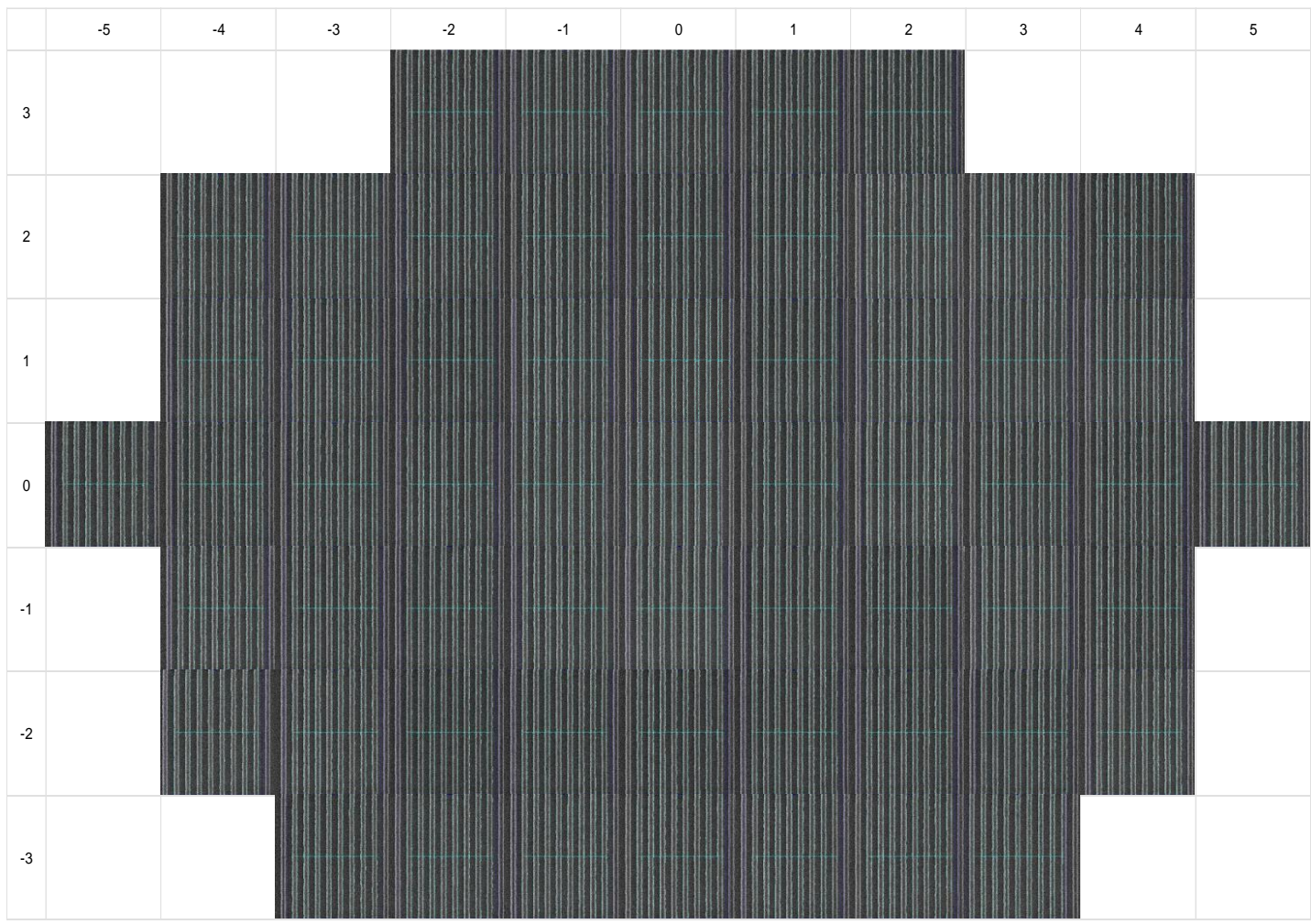
46JVS176SJB5 (2240EMEM002 slot 5) Reference Data

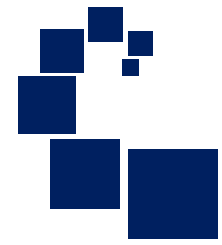
L50P100 Anchor Target

Oct 2022

L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.46	nm
Full wafer 1sigma CD:	1.78	nm
Die-to-Die 1sigma	Avg:	0.24 nm
	RMS:	0.27 nm
LWR Line (Avg):	3.00	nm
FOV:	1000	nm





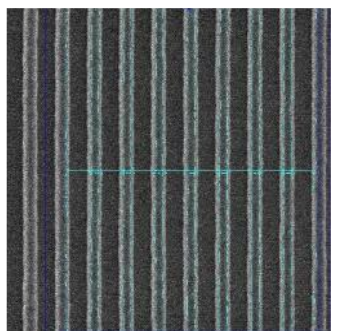
46JVS176SJB5 (2225DNDN001 slot 5) Reference Data

Secondary Targets

June 2022

Anchor Target

L50P100 (XLS*)



Full Wafer Avg CD:	47.46	nm
Full wafer 1sigma CD:	1.78	nm
Die-to-Die 1 sigma		
Avg:	0.24	nm
RMS:	0.27	nm
LWR Line (Avg):	3.00	nm
FOV:	1000	nm

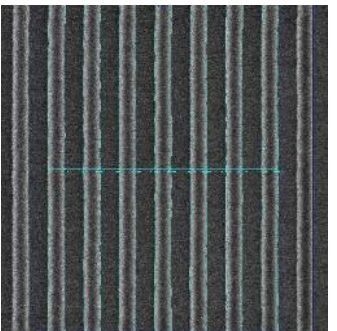
Secondary Targets

L52P104 (NHL*)



Full Wafer Avg CD:	50.7	nm
Full wafer 1sigma CD:	1.82	nm
Die-to-Die 1 sigma:		
Avg:	0.20	nm
RMS:	0.21	nm
LWR:	2.89	
FOV:	1000	nm

L55P110 (IHL*)



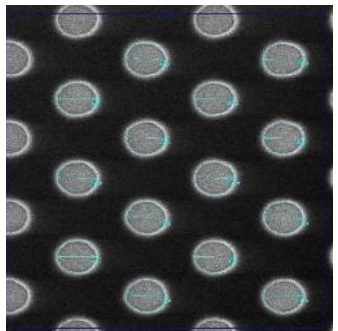
Full Wafer Avg CD:	54.0	nm
Full wafer 1sigma CD:	1.76	nm
Die-to-Die 1 sigma:		
Avg:	0.25	nm
RMS:	0.28	nm
LWR:	2.93	
FOV:	1000	nm

L60P120 (NVL*)



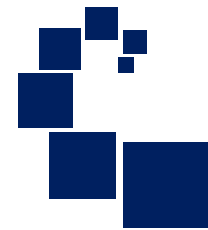
Full Wafer Avg CD:	57.3	nm
Full wafer 1sigma CD:	1.89	nm
Die-to-Die 1 sigma:		
Avg:	0.21	nm
RMS:	0.22	nm
LWR:	3.26	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	102.07	nm
Full wafer 1sigma CD:	2.43	nm
Die-to-Die 1 sigma:		
Avg:	2.52	nm
RMS:	2.66	nm
Ellipticity	1.23	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS125SJE3 (2240EMEM002 slot 6) Reference Data

L50P100 Anchor Target Oct 2022

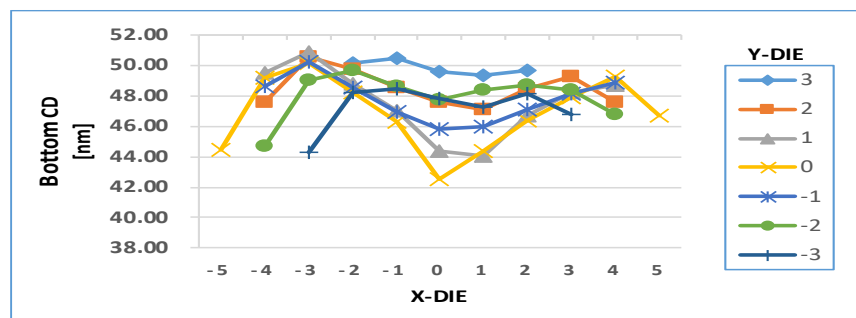
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.84	nm
Full wafer 1sigma CD:	1.83	nm
Die-to-Die 1sigma		
Avg:	0.24	nm
RMS:	0.28	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

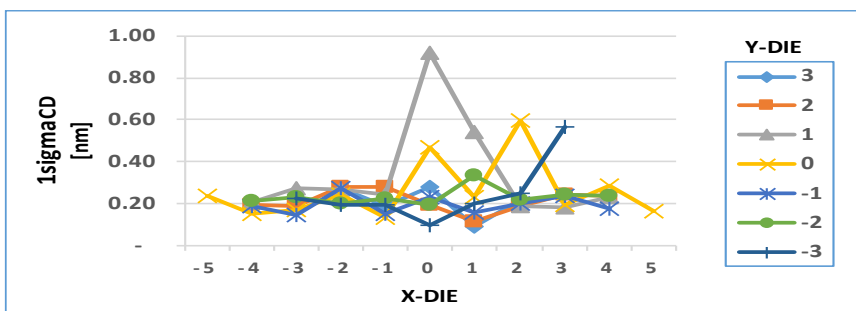
L50P100 Anchor Target Avg CD (line)

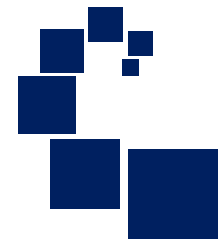
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				50.13	50.48	49.62	49.35	49.68			
2		47.57	50.52	49.77	48.54	47.57	47.09	48.48	49.24	47.55	
1		49.49	50.90	48.78	47.03	44.38	44.05	46.71	48.21	48.73	
0	44.43	49.16	50.14	48.22	46.31	42.54	44.38	46.42	47.93	49.29	46.73
-1		48.62	50.22	48.55	46.91	45.85	45.99	47.07	48.13	48.83	
-2		44.68	49.06	49.65	48.63	47.79	48.40	48.71	48.42	46.77	
-3			44.33	48.19	48.44	47.86	47.28	48.11	46.76		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.27	0.19	0.28	0.09	0.22			
2		0.19	0.19	0.28	0.28	0.19	0.11	0.19	0.24	0.24	
1		0.20	0.27	0.27	0.24	0.92	0.54	0.19	0.18	0.23	
0	0.24	0.15	0.17	0.24	0.13	0.47	0.23	0.60	0.19	0.29	0.16
-1		0.19	0.15	0.28	0.15	0.23	0.16	0.20	0.24	0.18	
-2		0.21	0.23	0.20	0.22	0.19	0.34	0.21	0.24	0.23	
-3			0.22	0.19	0.19	0.10	0.20	0.25	0.56		





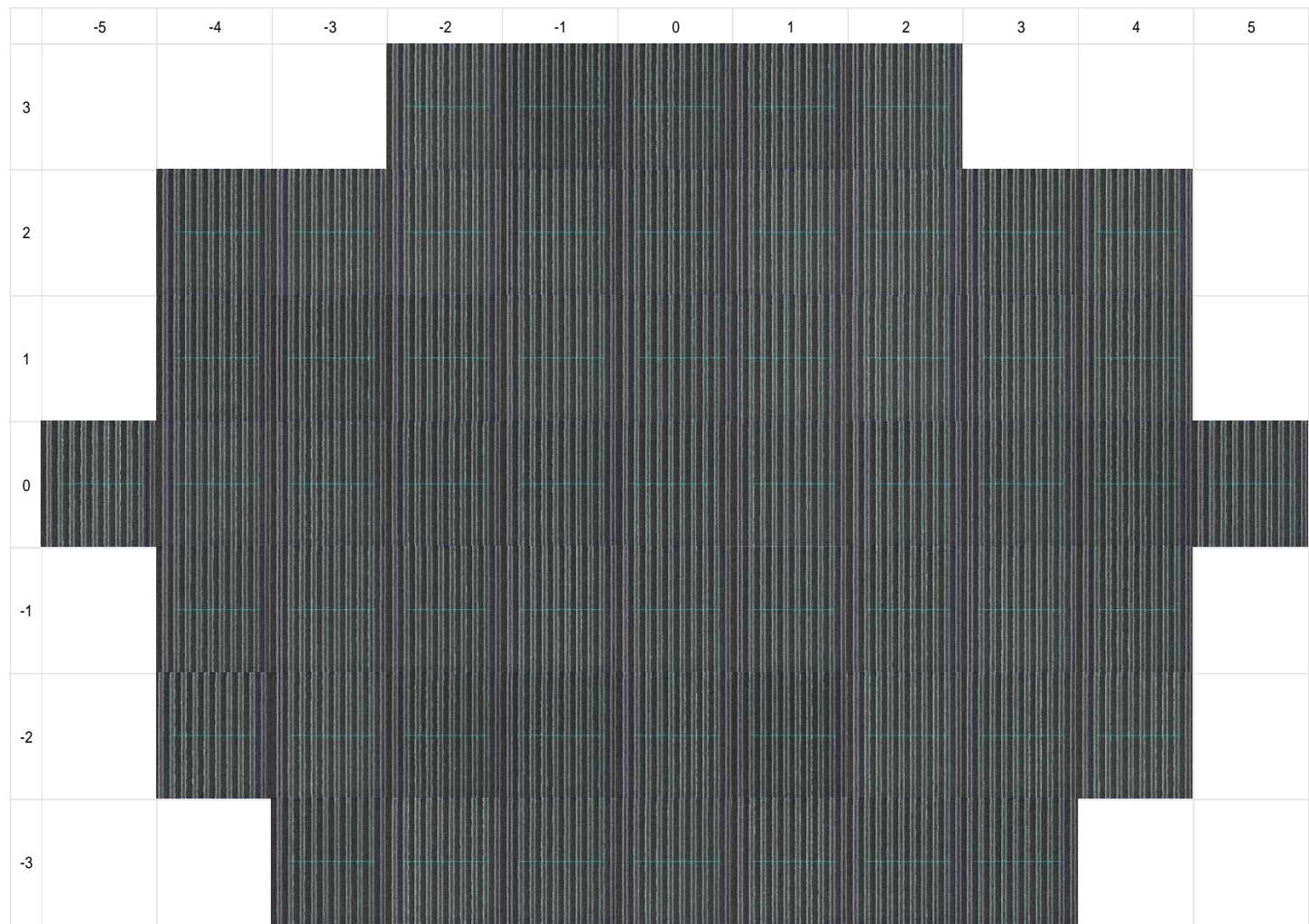
46JVS125SJE3 (2240EMEM002 slot 6) Reference Data

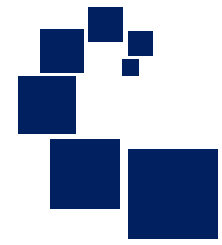
L50P100 Anchor Target

Oct 2022

L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.84	nm
Full wafer 1sigma CD:	1.83	nm
Die-to-Die 1sigma		
Avg:	0.24	nm
RMS:	0.28	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm





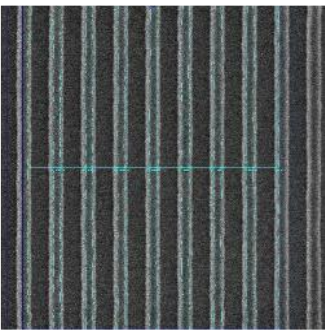
46JVS125SJE3 (2225DNDN001 slot 6) Reference Data

Secondary Targets

Oct 2022

Anchor Target

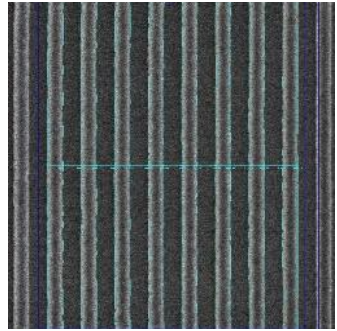
L50P100 (XLS*)



Full Wafer Avg CD:	47.84	nm
Full wafer 1sigma CD:	1.83	nm
Die-to-Die 1sigma		
Avg:	0.24	nm
RMS:	0.28	nm
LWR Line (Avg):	2.92	nm
FOV:	1000	nm

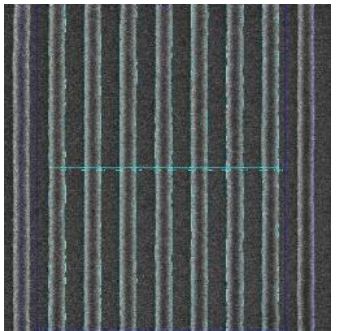
Secondary Targets

L52P104 (NHL*)



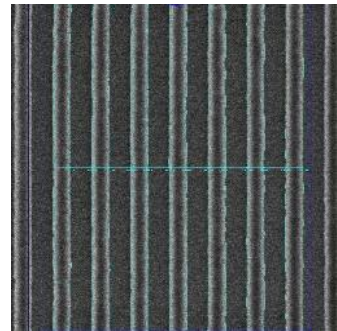
Full Wafer Avg CD:	50.9	nm
Full wafer 1sigma CD:	1.86	nm
Die-to-Die 1 sigma:		
Avg:	0.24	nm
RMS:	0.26	nm
LWR:	2.87	
FOV:	1000	nm

L55P110 (IHL*)



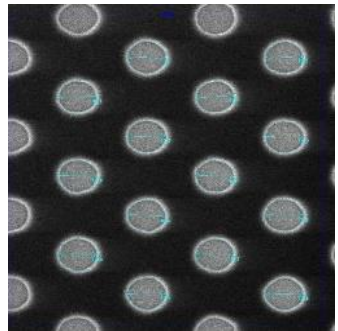
Full Wafer Avg CD:	54.3	nm
Full wafer 1sigma CD:	1.90	nm
Die-to-Die 1 sigma:		
Avg:	0.24	nm
RMS:	0.26	nm
LWR:	3.05	
FOV:	1000	nm

L60P120 (NVL*)



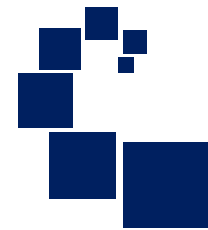
Full Wafer Avg CD:	57.5	nm
Full wafer 1sigma CD:	1.95	nm
Die-to-Die 1 sigma		
Avg:	0.20	nm
RMS:	0.23	nm
LWR:	3.39	
FOV:	1000	nm

C120246MEM (ECH*)



Full Wafer Avg CD:	101.35	nm
Full wafer 1sigma CD:	2.48	nm
Die-to-Die 1 sigma		
Avg:	2.36	nm
RMS:	2.49	nm
Ellipticity	1.22	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS151SJA7 (2240EMEM002 slot 7) Reference Data

L50P100 Anchor Target

Oct 2022

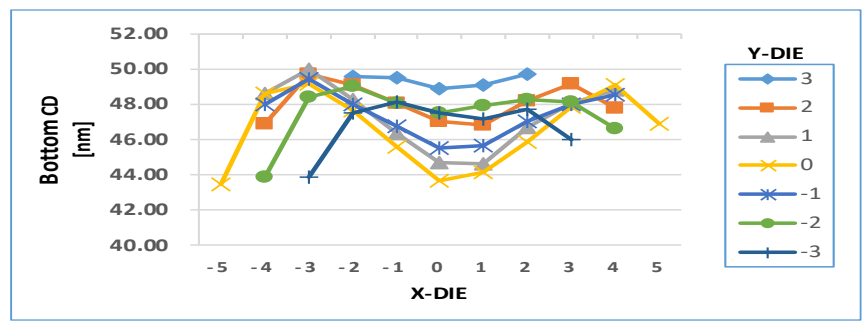
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.47	nm
Full wafer 1sigma CD:	1.67	nm
Die-to-Die 1sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

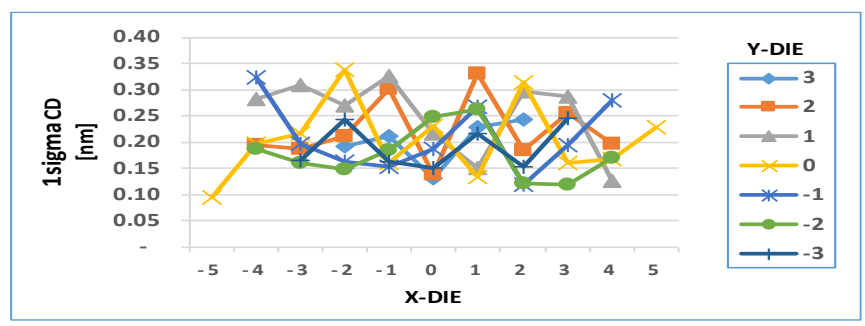
L50P100 Anchor Target Avg CD (line)

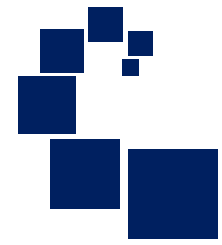
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				49.58	49.50	48.88	49.09	49.72			
2		46.88	49.70	49.14	48.05	47.07	46.84	48.23	49.16	47.82	
1		48.63	49.98	48.28	46.34	44.68	44.62	46.71	48.06	48.82	
0	43.44	48.60	49.16	47.64	45.60	43.67	44.14	45.89	47.84	49.11	46.89
-1		47.98	49.42	48.01	46.75	45.52	45.69	47.08	48.04	48.57	
-2		43.87	48.41	49.02	48.08	47.55	47.96	48.27	48.12	46.66	
-3			43.89	47.52	48.13	47.51	47.18	47.73	46.01		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.19	0.21	0.13	0.23	0.24			
2		0.19	0.19	0.21	0.30	0.14	0.33	0.18	0.26	0.20	
1		0.28	0.31	0.27	0.33	0.22	0.15	0.30	0.29	0.13	
0	0.09	0.20	0.22	0.34	0.16	0.23	0.13	0.32	0.16	0.17	0.23
-1		0.32	0.20	0.16	0.15	0.19	0.27	0.12	0.19	0.28	
-2		0.19	0.16	0.15	0.19	0.25	0.26	0.12	0.12	0.17	
-3			0.17	0.24	0.16	0.15	0.22	0.15	0.24		





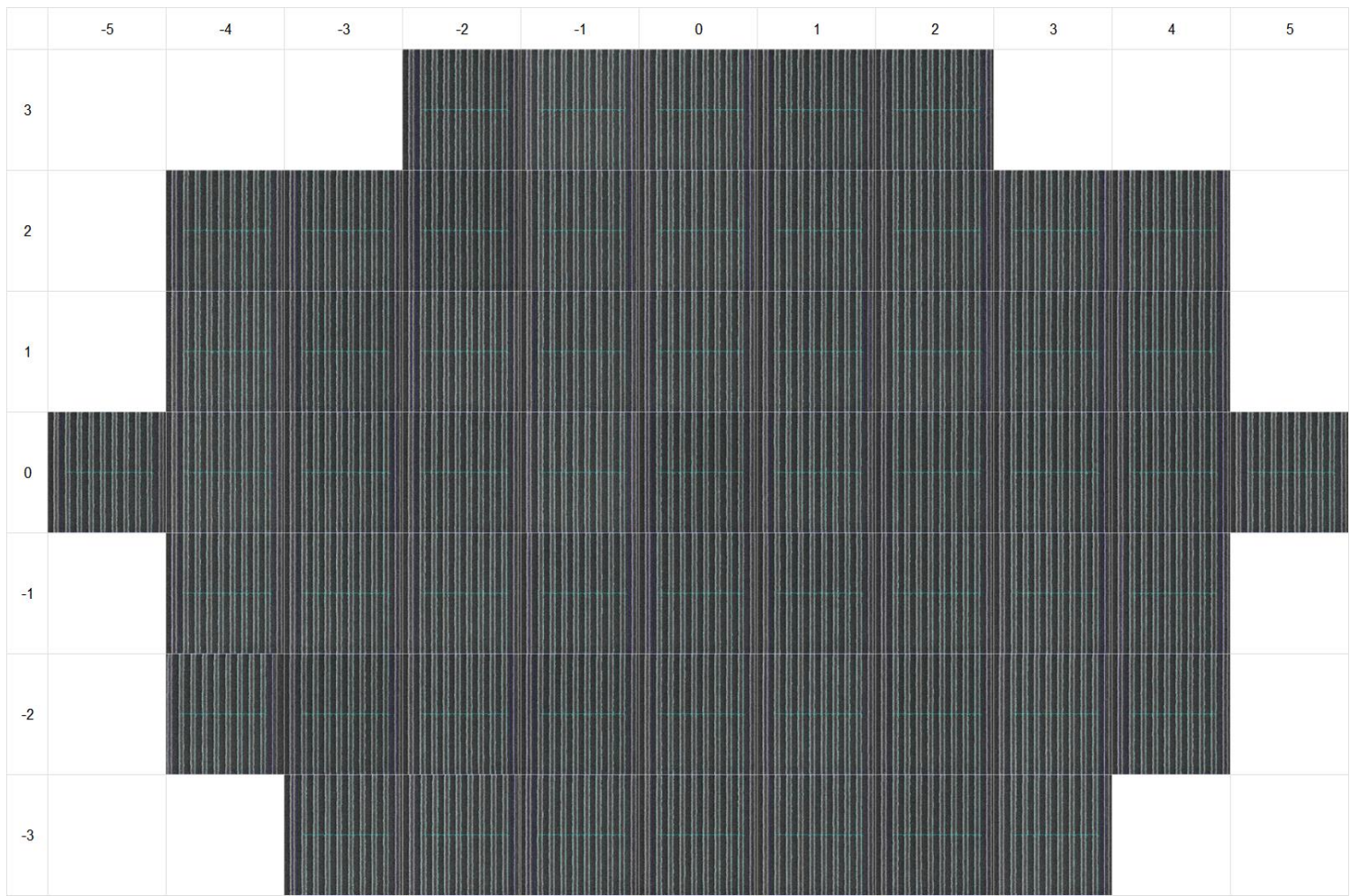
46JVS151SJA7 (2240EMEM002 slot 7) Reference Data

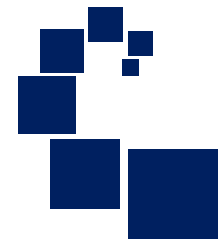
L50P100 Anchor Target

Oct 2022

L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.47	nm
Full wafer 1sigma CD:	1.67	nm
Die-to-Die 1sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm





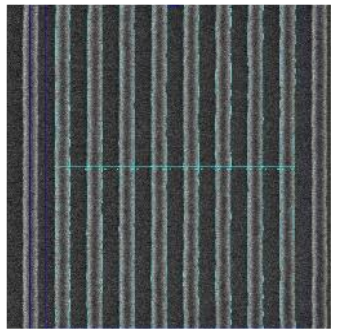
46JVS151SJA7 (2225DNDN001 slot 7) Reference Data

Secondary Targets

Oct 2022

Anchor Target

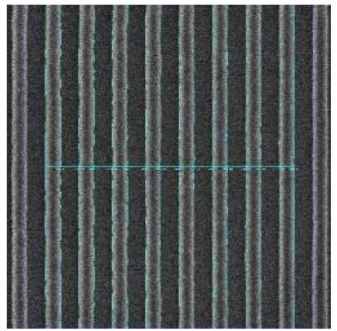
L50P100 (XLS*)



Full Wafer Avg CD:	47.47	nm
Full wafer 1sigma CD:	1.67	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.93	nm
FOV:	1000	nm

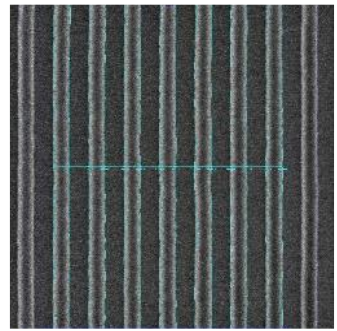
Secondary Targets

L52P104 (NHL*)



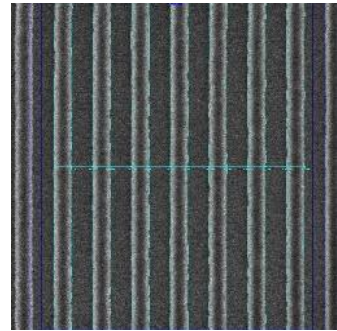
Full Wafer Avg CD:	50.5	nm
Full wafer 1sigma CD:	1.75	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR:	2.89	
FOV:	1000	nm

L55P110 (IHL*)



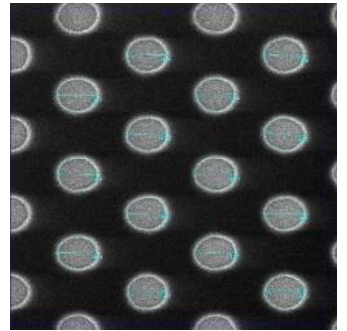
Full Wafer Avg CD:	53.8	nm
Full wafer 1sigma CD:	1.80	nm
Die-to-Die 1 sigma		
Avg:	0.32	nm
RMS:	0.35	nm
LWR:	2.98	
FOV:	1000	nm

L60P120 (NVL*)



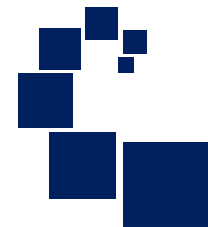
Full Wafer Avg CD:	57.1	nm
Full wafer 1sigma CD:	1.73	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.23	nm
LWR:	3.20	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	102.57	nm
Full wafer 1sigma CD:	2.31	nm
Die-to-Die 1 sigma		
Avg:	2.31	nm
RMS:	2.44	nm
Ellipticity	1.24	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS152SJF1 (2240EMEM002 slot 8) Reference Data

L50P100 Anchor Target

Oct 2022

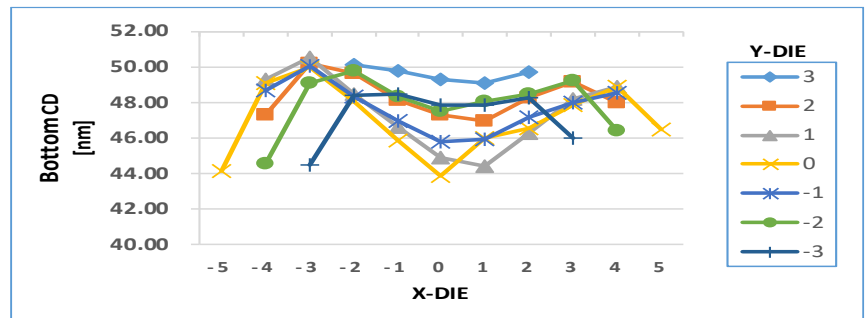
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.81	nm
Full wafer 1sigma CD:	1.68	nm
Die-to-Die 1sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

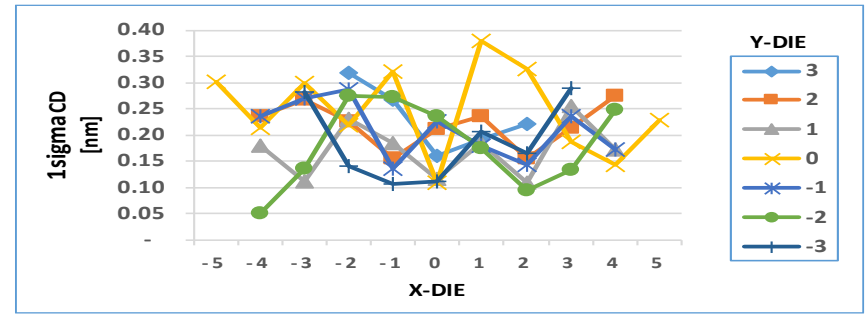
L50P100 Anchor Target Avg CD (line)

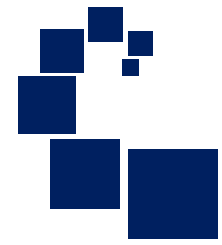
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				50.18	49.82	49.32	49.09	49.70			
2		47.33	50.25	49.68	48.14	47.36	46.99	48.29	49.21	47.99	
1		49.32	50.55	48.51	46.60	44.88	44.44	46.32	48.22	48.92	
0	44.18	49.10	50.02	48.09	45.86	43.86	46.02	46.59	47.90	48.91	46.52
-1		48.73	50.07	48.35	46.96	45.78	45.93	47.17	48.03	48.55	
-2		44.57	49.14	49.77	48.33	47.52	48.05	48.50	49.27	46.44	
-3			44.47	48.41	48.50	47.89	47.84	48.27	46.02		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.32	0.27	0.16	0.19	0.22			
2		0.24	0.27	0.23	0.16	0.21	0.24	0.16	0.21	0.28	
1		0.18	0.11	0.23	0.18	0.12	0.18	0.11	0.26	0.17	
0	0.30	0.21	0.30	0.22	0.32	0.11	0.38	0.33	0.19	0.14	0.23
-1		0.24	0.27	0.29	0.14	0.23	0.18	0.14	0.23	0.17	
-2		0.05	0.14	0.28	0.27	0.24	0.17	0.09	0.13	0.25	
-3			0.28	0.14	0.11	0.11	0.21	0.17	0.29		





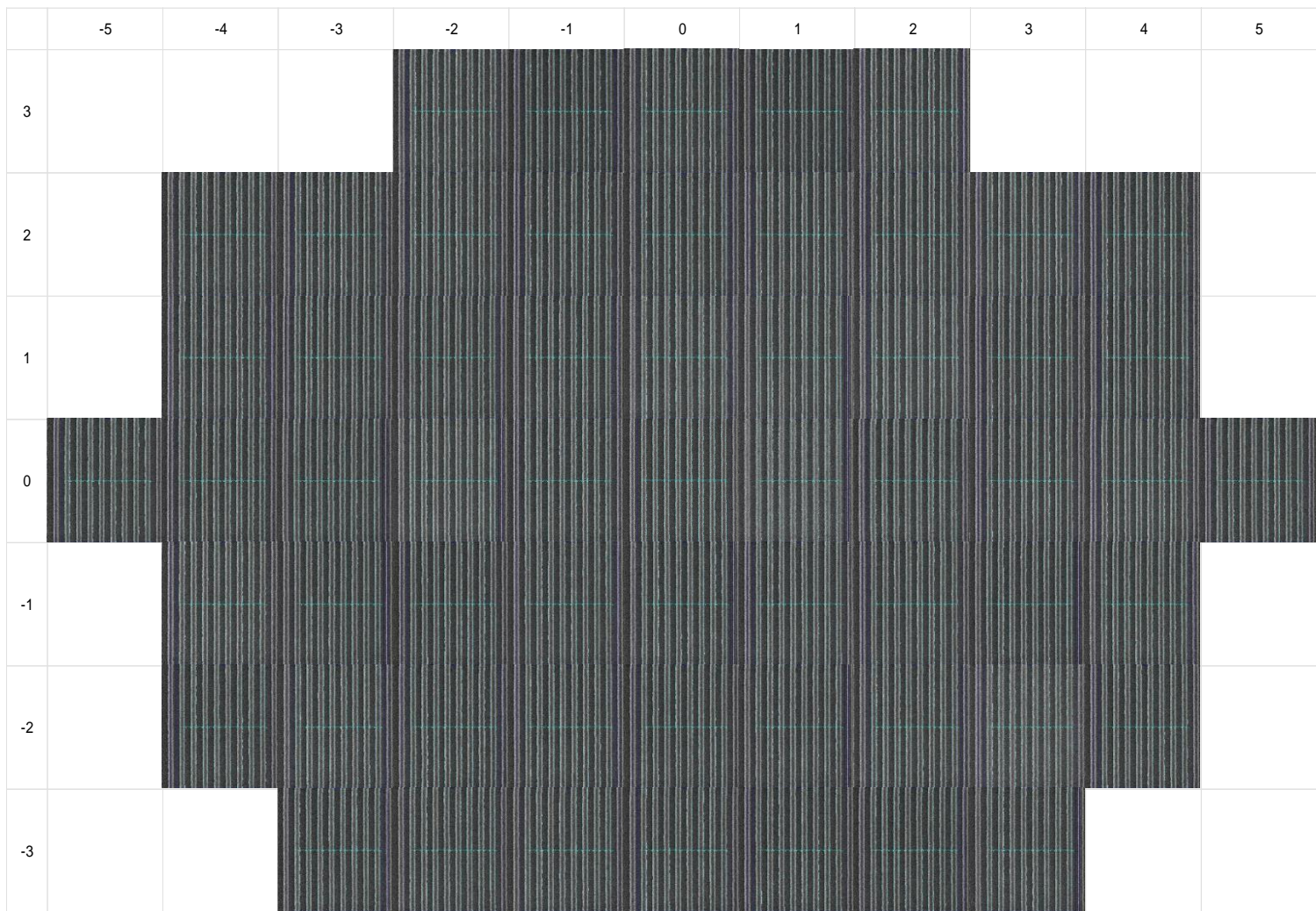
46JVS152SJF1 (2240EMEM002 slot 8) Reference Data

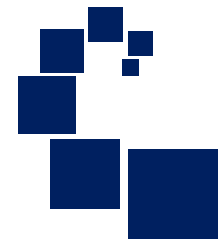
L50P100 Anchor Target

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L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.81	nm
Full wafer 1sigma CD:	1.68	nm
Die-to-Die 1sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm





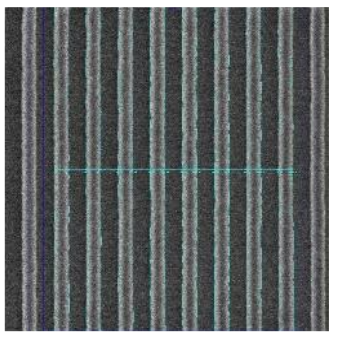
46JVS152SJF1 (2225DNDN001 slot 8) Reference Data

Secondary Targets

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Anchor Target

L50P100 (XLS*)



Full Wafer Avg CD:	47.81	nm
Full wafer 1sigma CD:	1.68	nm
Die-to-Die 1sigma		
Avg:	0.21	nm
RMS:	0.22	nm
LWR Line (Avg):	2.94	nm
FOV:	1000	nm

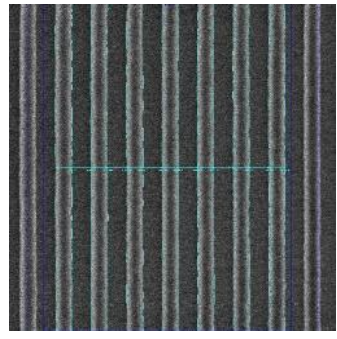
Secondary Targets

L52P104 (NHL*)



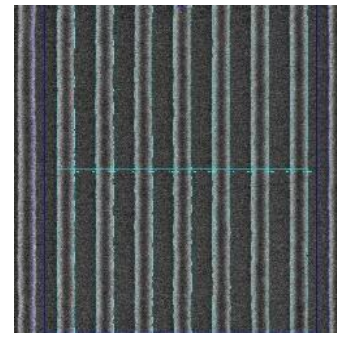
Full Wafer Avg CD:	50.8	nm
Full wafer 1sigma CD:	1.92	nm
Die-to-Die 1 sigma:		
Avg:	0.21	nm
RMS:	0.23	nm
LWR:	2.80	
FOV:	1000	nm

L55P110 (IHL*)



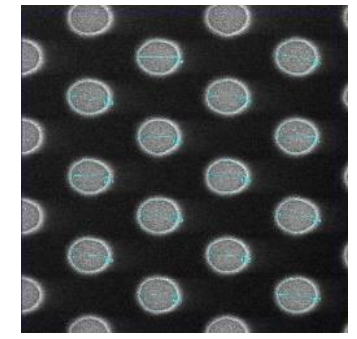
Full Wafer Avg CD:	54.2	nm
Full wafer 1sigma CD:	1.94	nm
Die-to-Die 1 sigma:		
Avg:	0.29	nm
RMS:	0.30	nm
LWR:	2.94	
FOV:	1000	nm

L60P120 (NVL*)



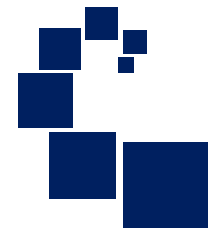
Full Wafer Avg CD:	57.4	nm
Full wafer 1sigma CD:	1.93	nm
Die-to-Die 1 sigma:		
Avg:	0.22	nm
RMS:	0.24	nm
LWR:	3.21	
FOV:	1000	nm

C120P246MEM (ECH*)



Full Wafer Avg CD:	101.70	nm
Full wafer 1sigma CD:	2.49	nm
Die-to-Die 1 sigma:		
Avg:	2.16	nm
RMS:	2.32	nm
Ellipticity	1.23	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS153SJC0 (2240EMEM002 slot 9) Reference Data

L50P100 Anchor Target

Oct 2022

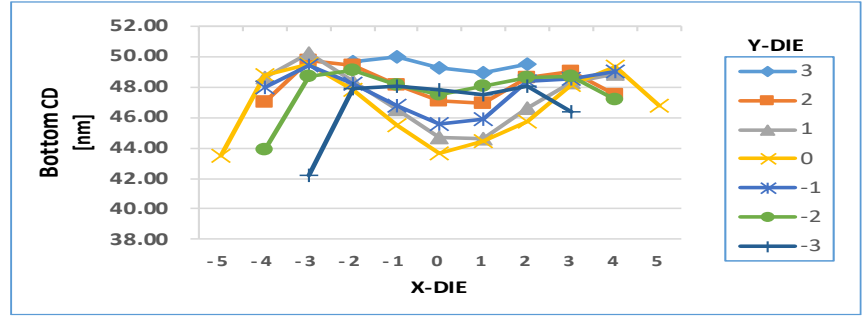
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.60	nm
Full wafer 1sigma CD:	1.79	nm
Die-to-Die 1sigma		
Avg:	0.22	nm
RMS:	0.23	nm
LWR Line (Avg):	2.91	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth).
 Size of image (field-of-view).

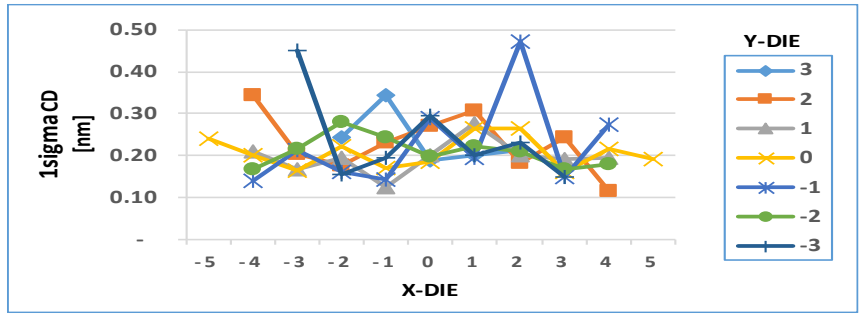
L50P100 Anchor Target Avg CD (line)

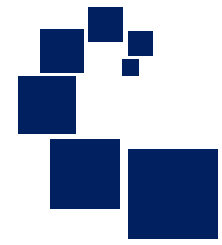
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				49.68	49.99	49.27	48.94	49.49			
2		46.99	49.73	49.44	48.17	47.13	46.93	48.62	49.02	47.54	
1		48.65	50.22	48.40	46.51	44.68	44.61	46.58	48.29	48.85	
0	43.52	48.77	49.53	47.80	45.49	43.66	44.47	45.76	48.15	49.32	46.77
-1		47.99	49.44	48.20	46.81	45.61	45.90	48.37	48.51	49.01	
-2		43.88	48.67	49.11	48.16	47.48	48.04	48.63	48.71	47.21	
-3			42.21	47.90	48.07	47.85	47.54	48.04	46.38		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.24	0.35	0.19	0.20	0.21			
2		0.34	0.20	0.18	0.23	0.27	0.31	0.18	0.24	0.12	
1		0.21	0.17	0.19	0.12	0.20	0.28	0.20	0.19	0.19	
0	0.24	0.20	0.16	0.22	0.17	0.19	0.26	0.26	0.16	0.21	0.19
-1		0.14	0.21	0.16	0.14	0.29	0.19	0.47	0.15	0.27	
-2		0.17	0.22	0.28	0.24	0.20	0.22	0.21	0.17	0.18	
-3			0.45	0.16	0.19	0.30	0.20	0.23	0.15		





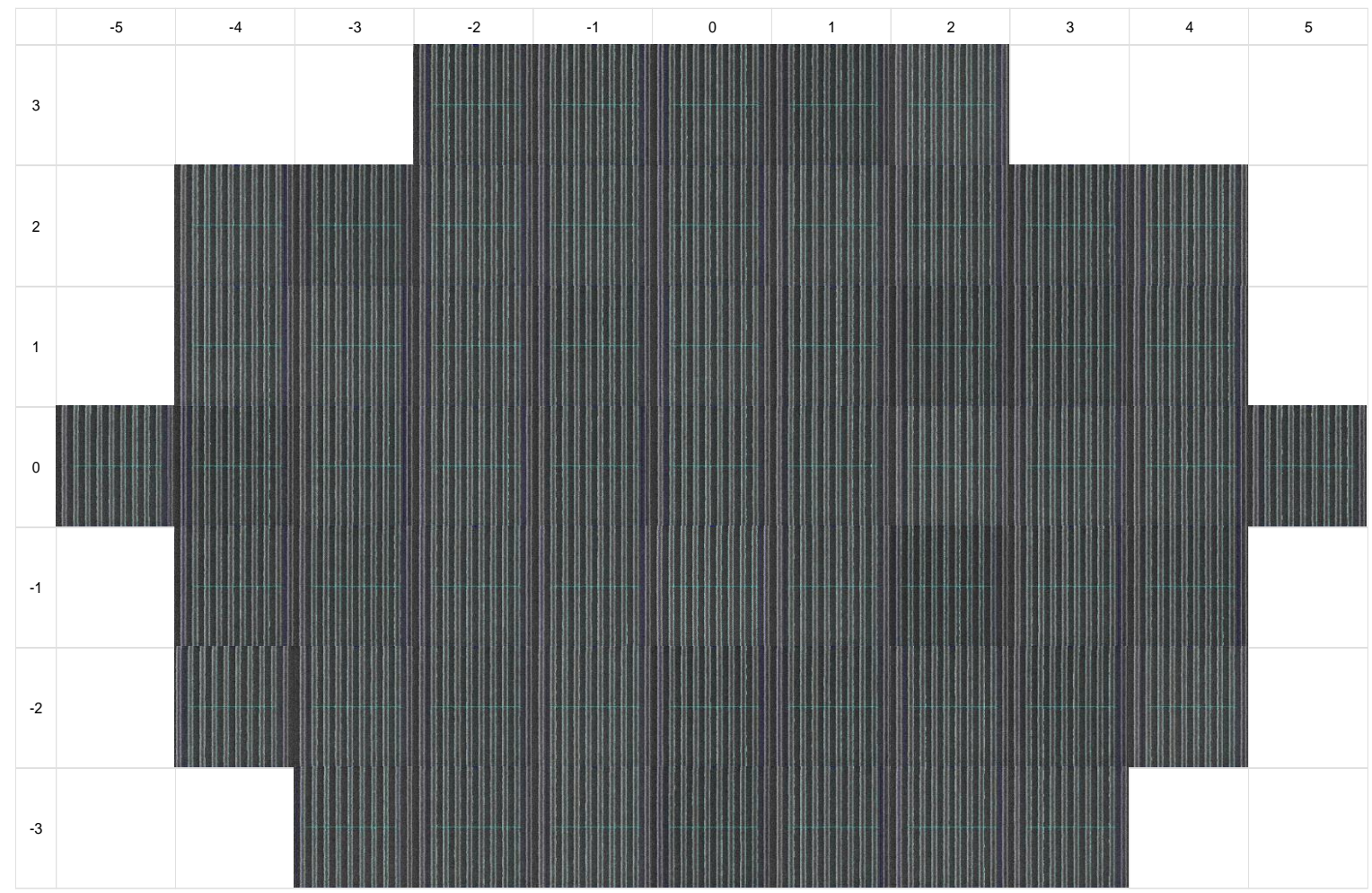
46JVS153SJC0 (2240EMEM002 slot 9) Reference Data

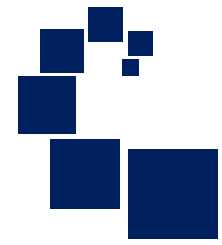
L50P100 Anchor Target

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L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.60	nm
Full wafer 1sigma CD:	1.79	nm
Die-to-Die 1sigma	Avg:	0.22 nm
	RMS:	0.23 nm
LWR Line (Avg):	2.91	nm
FOV:	1000	nm





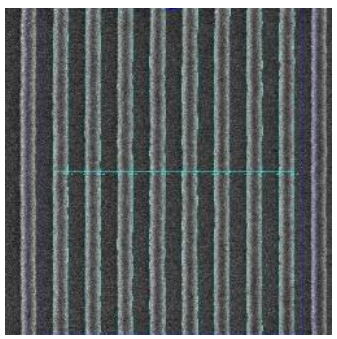
46JVS153SJC0 (2225DNDN001 slot 9) Reference Data

Secondary Targets

Oct 2022

Anchor Target

L50P100 (XLS*)



Full Wafer Avg CD:	47.60	nm
Full wafer 1sigma CD:	1.79	nm
Die-to-Die 1sigma		
Avg:	0.22	nm
RMS:	0.23	nm
LWR Line (Avg):	2.91	nm
FOV:	1000	nm

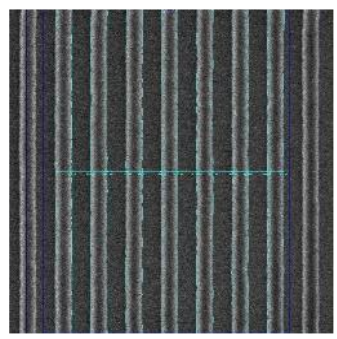
Secondary Targets

L52P104 (NHL*)



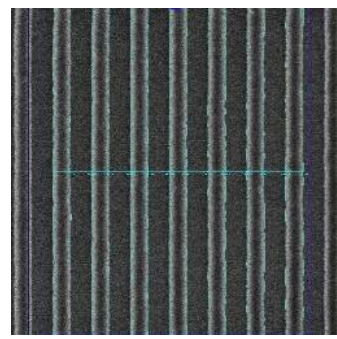
Full Wafer Avg CD:	50.7	nm
Full wafer 1sigma CD:	1.86	nm
Die-to-Die 1 sigma:		
Avg:	0.20	nm
RMS:	0.22	nm
LWR:	2.82	
FOV:	1000	nm

L55P110 (IHL*)



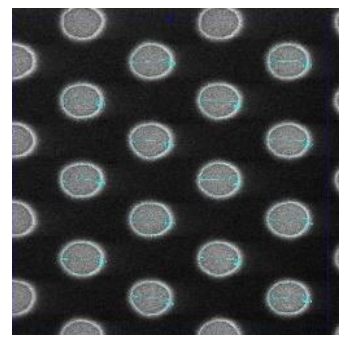
Full Wafer Avg CD:	54.0	nm
Full wafer 1sigma CD:	1.80	nm
Die-to-Die 1 sigma:		
Avg:	0.26	nm
RMS:	0.28	nm
LWR:	3.03	
FOV:	1000	nm

L60P120 (NVL*)



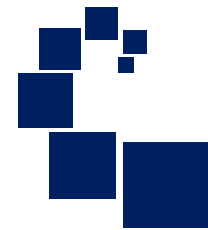
Full Wafer Avg CD:	57.2	nm
Full wafer 1sigma CD:	1.80	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.24	nm
LWR:	3.30	
FOV:	1000	nm

C120246MEM (ECH*)



Full Wafer Avg CD:	102.06	nm
Full wafer 1sigma CD:	2.18	nm
Die-to-Die 1 sigma		
Avg:	2.24	nm
RMS:	2.38	nm
Ellipticity	1.23	
FOV:	1000	nm

* Coding labels for CD data results files



46JVS154SJG2 (2240EMEM002 slot 10) Reference Data

L50P100 Anchor Target

Oct 2022

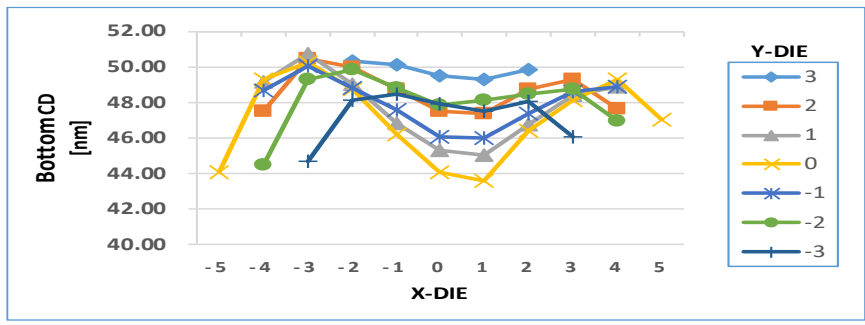
- All measurements in nm.
- Avg CD and 1sigma line-to-line variation for L50P100 anchor target for each die, reported for each die in wafer map format, and plotted to right.
- Average and 1sigma values are of 8 lines sampled at each site, from images on next page.
- CD values convey bottom CD of the lines.

Full Wafer Avg CD:	47.97	nm
Full wafer 1sigma CD:	1.75	nm
Die-to-Die 1sigma		
Avg:	0.22	nm
RMS:	0.23	nm
LWR Line (Avg):	2.89	nm
FOV:	1000	nm

Average of all individual die CD averages (8 targets/die).
 Stdev of all die CD average of (8 targets/die), represents across wafer variation.
 Feature-to-feature variation within grating.
 Arithmetic average value of feature-to-feature variation.
 RMS average value of feature-to-feature variation.
 Average of 3Sigma LWR (Linewidth)
 Size of image (field-of-view).

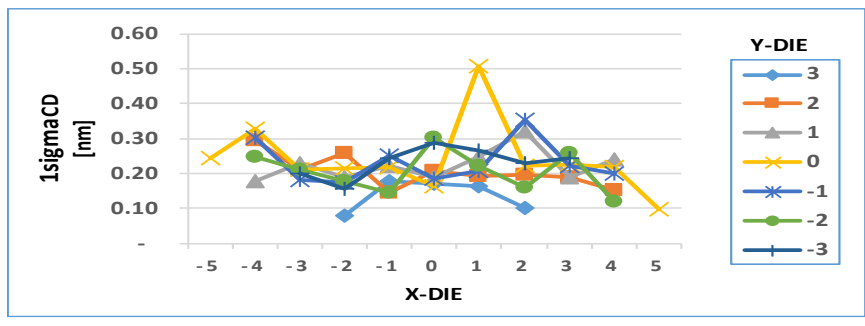
L50P100 Anchor Target Avg CD (line)

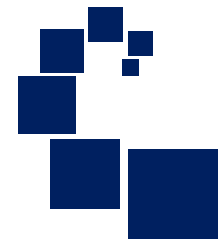
	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				50.37	50.12	49.54	49.34	49.88			
2		47.54	50.51	49.99	48.74	47.51	47.36	48.75	49.30	47.66	
1		49.20	50.79	49.03	46.87	45.33	45.04	46.74	48.44	48.90	
0	44.08	49.34	50.30	48.75	46.22	44.09	43.63	46.45	48.12	49.31	47.04
-1		48.68	50.07	48.83	47.61	46.10	46.05	47.41	48.64	48.91	
-2		44.48	49.35	49.84	48.85	47.86	48.12	48.51	48.78	46.99	
-3			44.71	48.14	48.51	47.91	47.55	48.07	46.05		



L50P100 Anchor Target 1sigma CD

	-5	-4	-3	-2	-1	0	1	2	3	4	5
3				0.08	0.18	0.17	0.16	0.10			
2		0.30	0.21	0.26	0.15	0.21	0.19	0.20	0.19	0.15	
1		0.18	0.23	0.19	0.22	0.19	0.25	0.32	0.19	0.24	
0	0.24	0.33	0.21	0.22	0.22	0.16	0.51	0.22	0.23	0.22	0.10
-1		0.30	0.18	0.18	0.25	0.18	0.21	0.35	0.22	0.20	
-2		0.25	0.21	0.18	0.14	0.30	0.22	0.16	0.26	0.12	
-3			0.20	0.16	0.24	0.29	0.27	0.23	0.24		





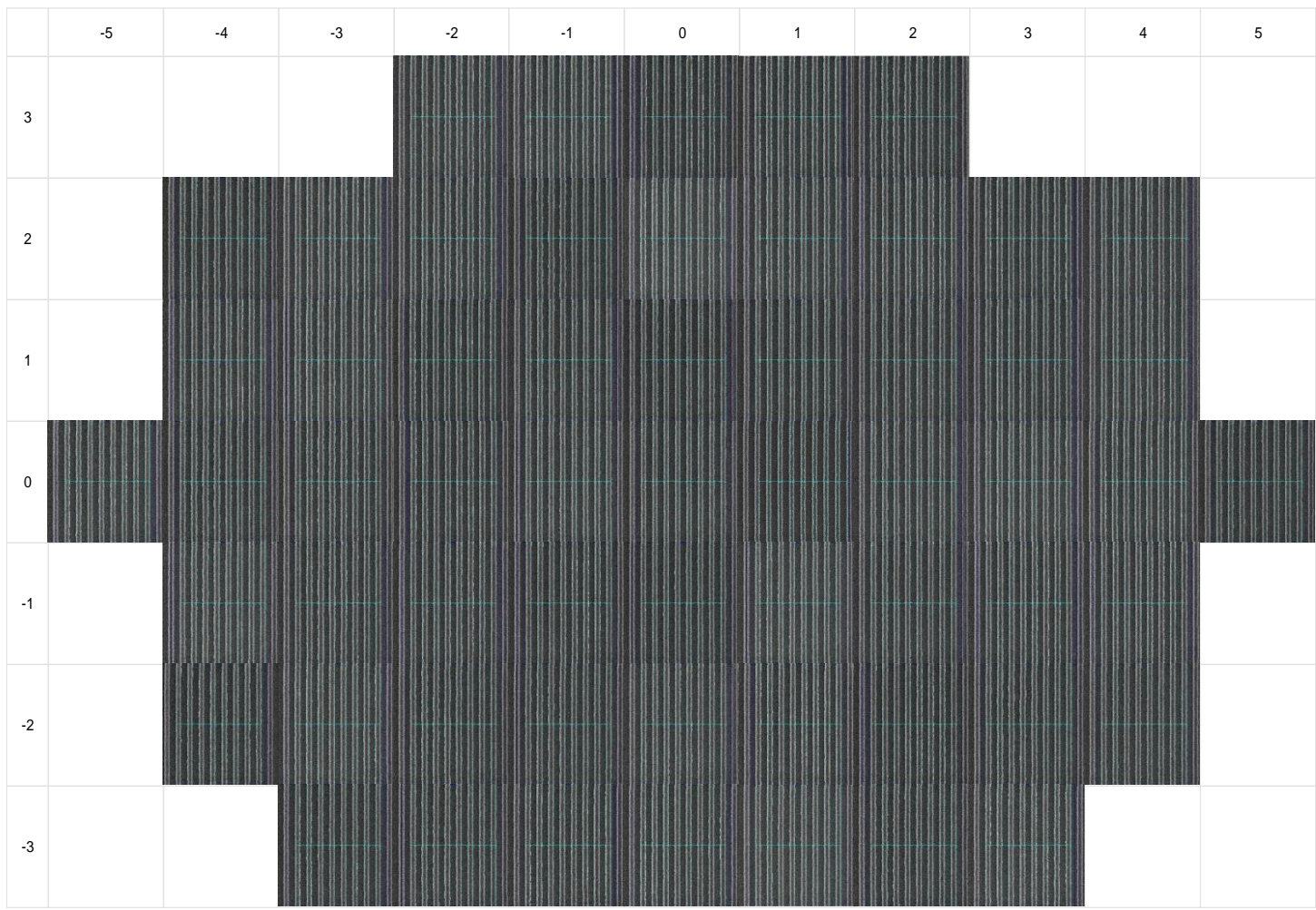
46JVS154SJG2 (2240EMEM002 slot 10) Reference Data

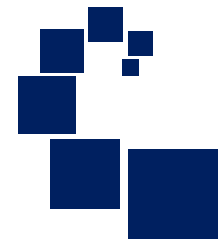
L50P100 Anchor Target

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L50P100 Anchor Target CD-SEM image wafer map

Full Wafer Avg CD:	47.97	nm
Full wafer 1sigma CD:	1.75	nm
Die-to-Die 1sigma	Avg:	0.22 nm
	RMS:	0.23 nm
LWR Line (Avg):	2.89	nm
FOV:	1000	nm





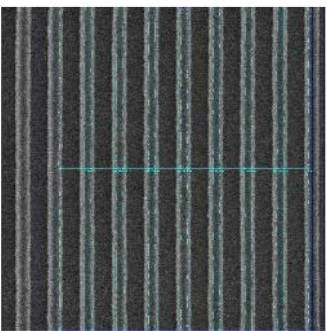
46JVS154SJG2 (2225DNDN001 slot 10) Reference Data

Secondary Targets

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Anchor Target

L50P100 (XLS*)



Full Wafer Avg CD:	47.97	nm
Full wafer 1sigma CD:	1.75	nm
Die-to-Die 1sigma		
Avg:	0.22	nm
RMS:	0.23	nm
LWR Line (Avg):	2.89	nm
FOV:	1000	nm

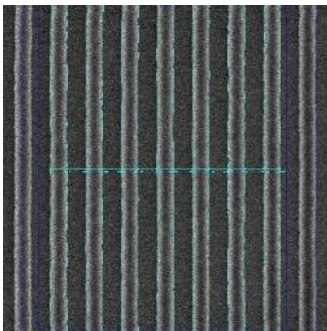
Secondary Targets

L52P104 (NHL*)



Full Wafer Avg CD:	51.1	nm
Full wafer 1sigma CD:	1.80	nm
Die-to-Die 1 sigma:		
Avg:	0.24	nm
RMS:	0.26	nm
LWR:	2.82	
FOV:	1000	nm

L55P110 (IHL*)



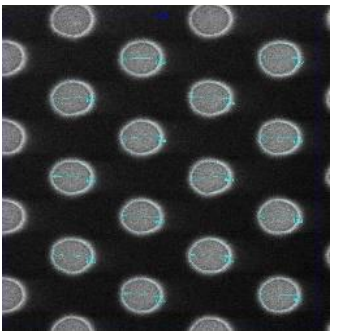
Full Wafer Avg CD:	54.4	nm
Full wafer 1sigma CD:	1.83	nm
Die-to-Die 1 sigma:		
Avg:	0.25	nm
RMS:	0.27	nm
LWR:	2.89	
FOV:	1000	nm

L60P120 (NVL*)



Full Wafer Avg CD:	57.6	nm
Full wafer 1sigma CD:	1.84	nm
Die-to-Die 1 sigma		
Avg:	0.21	nm
RMS:	0.23	nm
LWR:	3.27	
FOV:	1000	nm

C120P246MEM (ECH*)

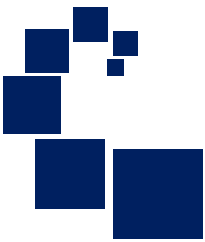


Full Wafer Avg CD:	101.12	nm
Full wafer 1sigma CD:	2.34	nm
Die-to-Die 1 sigma		
Avg:	2.26	nm
RMS:	2.38	nm
Ellipticity	1.23	
FOV:	1000	nm

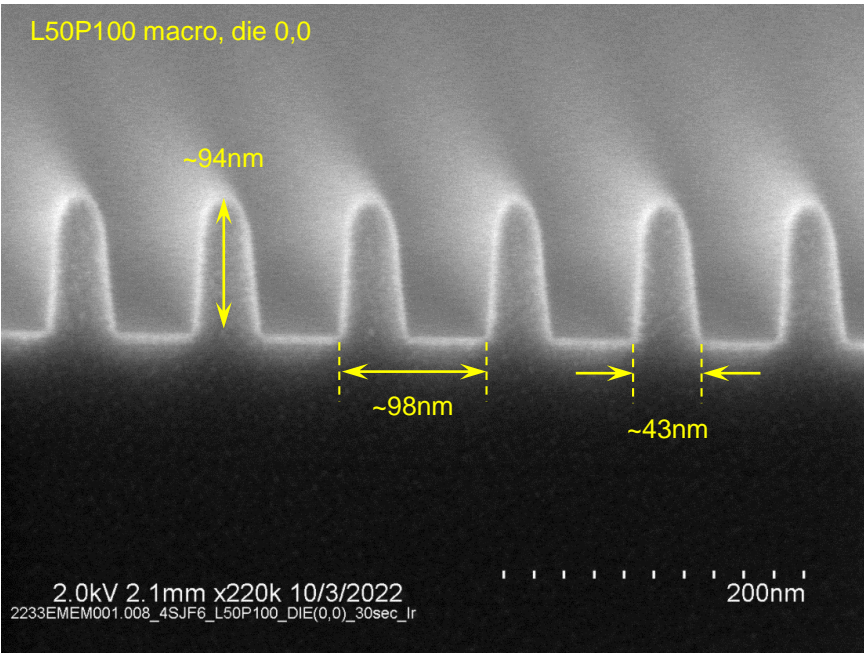
* Coding labels for CD data results files

L50P100 Target XSEM Reference Data

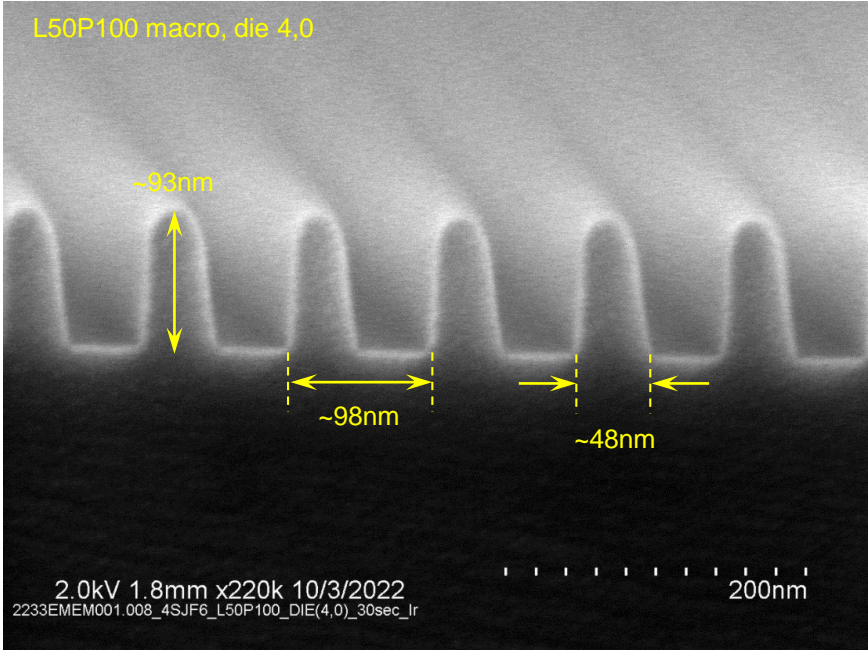
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Target XSEM images



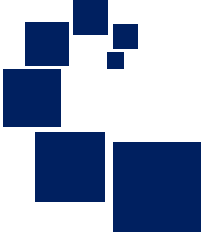
Center



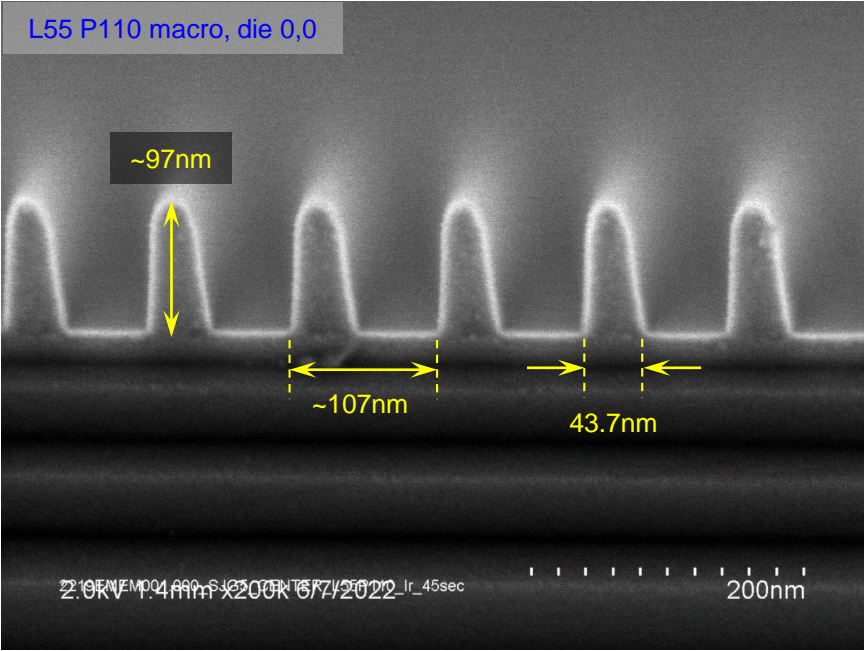
Edge

L55P110 Target XSEM Reference Data

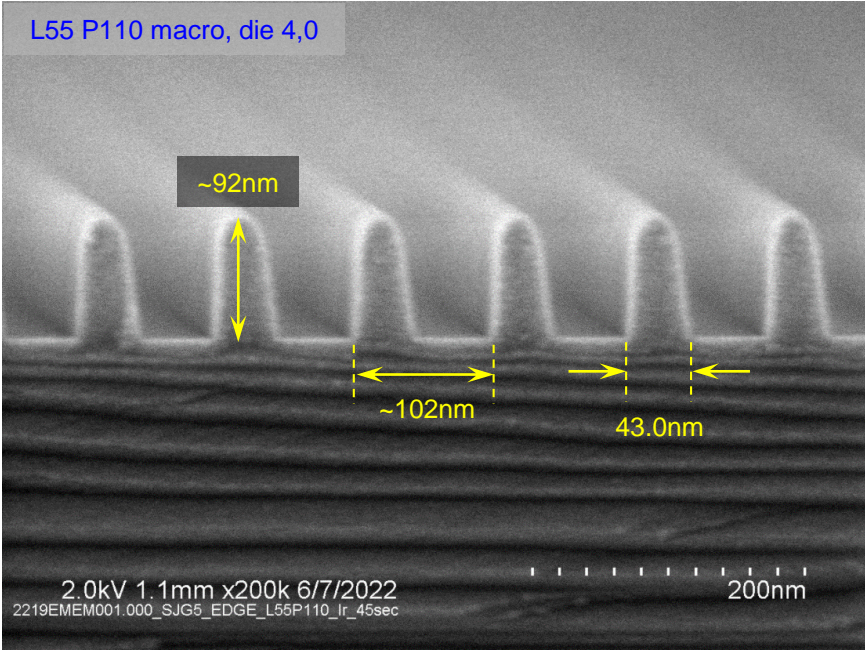
Oct 2022



Target XSEM images

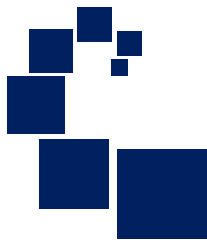


Center



Edge

Conclusions

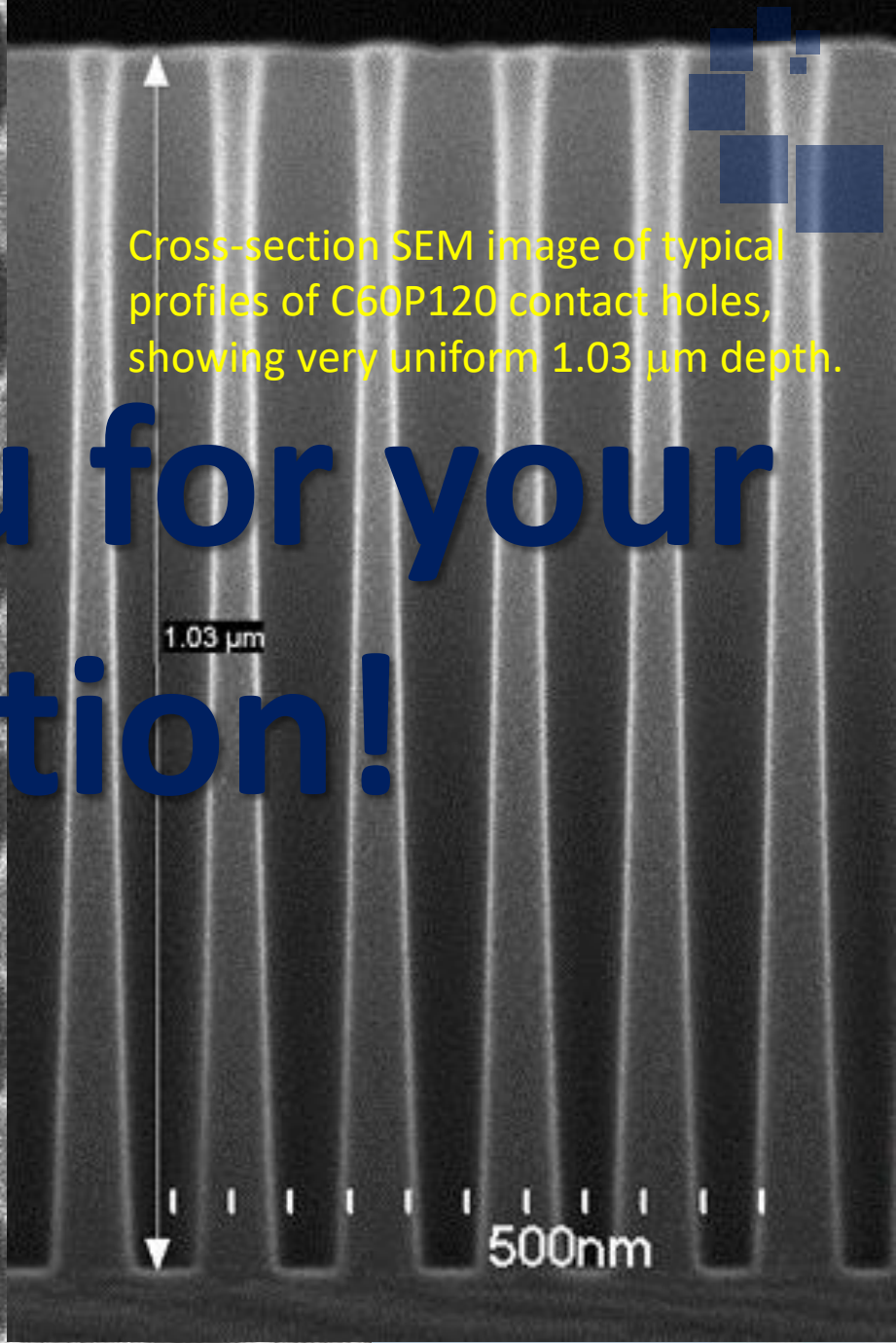


- Thank you for your purchase of AMAG HAR wafers!
- We hope this guide of reference CD-SEM metrology adds significant value to the use of these wafers.
- This report represents the standard metrology AMAG nanometro provides for such wafers, and future lots and wafer types will have similar companion data sets.





Top down CD-SEM image of typical C60P120 grating. FOV = 660 nm.
Note image cropped on right.



Cross-section SEM image of typical profiles of C60P120 contact holes, showing very uniform 1.03 μm depth.

Thank you for your Attention!