Supplementary information for
High quality 6-inch single-crystalline AlN template for E-mode HEMT power device

Zhiwen Liang[1], Shangfeng Liu[1,3,7], Ye Yuan[1,*], Tongxin Lu[1,7], Xiaopeng Li[1], Zirong Wang[6], Neng Zhang[6], Tai Li[1,7], Xiangdong Li [2,*], Qi Wang[5], Shengqiang Zhou[4], Kai Kang[6], Jincheng Zhang[2,8], Yue Hao[2,8] and Xinqiang Wang[1,5,7,*]

[1] Songshan Lake Materials Laboratory, Dongguan, Guangdong, 523808, People's Republic of China

[2] Guangzhou Wide Bandgap Semiconductor Innovation Center, Guangzhou Institute of Technology, Xidian University, Guangzhou 510555, China

[3] School of Physical Sciences, Great Bay University, Dongguan, 523808 China

[4] Helmholtz-Zentrum Dresden-Rossendorf, Institute of Ion Beam Physics and Materials Research, Bautzner Landstrasse 400, 01328, Dresden, Germany

[5] Dongguan Institute of Opto-Electronics Peking University, Dongguan, 523808, China

[6] Sinopatt. Technology Co., Ltd, Songshan Lake, Dongguan City, Guangdong Province, 523808, China

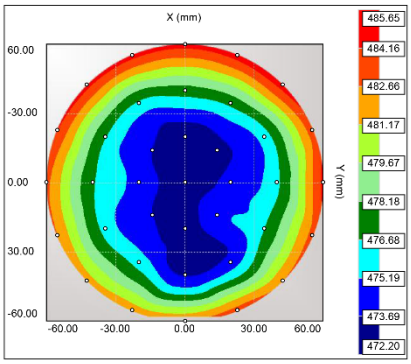
[7] State Key Laboratory of Artificial Microstructure and Mesoscopic Physics, School of Physics, Nano-Optoelectronics Frontier Center of Ministry of Education (NFC-MOE), Peking University, Beijing 100871, China

[8] State Key Laboratory of Wide Bandgap Semiconductor Devices and Integrated Technology, School of Microelectronics, Xidian University, Xi'an 710071, China

Elapsed Time 00:07:32, EachSite:12.22s

Operator	(SE)
Product	AlN_multi
JobName	6inch-test
CreateDate	2024/12/23

Thickness / T2(nm)			
Min	472.8145	AVG	478.8249
Max	485.0454	Unif	0.01614
Range	12.23086	Std	4.45546



	X(mm)	Y(mm)	Data
1	0	0	472.955
2	0	20.000	472.8145
3	-14.142	14.142	473.8868
4	-20.000	0	474.6518
5	-14.142	-14.142	473.7245
6	0	-20.000	473.1378
7	14.142	-14.142	474.7236
8	20.000	0	474.203
9	14.142	14.142	473.1864
10	0	40.000	477.4951
11	-20.000	34.641	476.4967
12	-34.641	20.000	476.8289
13	-40.000	0	476.8979
14	-34.641	-20.000	476.2019
15	-20.000	-34.641	476.0816
16	0	-40.000	473.6005
17	20.000	-34.641	474.4523

	X(mm)	Y(mm)	Data
18	34.641	-20.000	476.7481
19	40.000	0	476.4191
20	34.641	20.000	476.0275
21	20.000	34.641	477.1914
22	0	60.000	484.8021
23	-22.961	55.433	484.8598
24	-42.426	42.426	484.756
25	-55.433	22.961	484.2498
26	-60.000	0	483.1158
27	-55.433	-22.961	482.7206
28	-42.426	-42.426	481.9619
29	-22.961	-55.433	482.1817
30	0	-60.000	482.675
31	22.961	-55.433	483.4861
32	42.426	-42.426	482.632
33	55.433	-22.961	483.3385
34	60.000	0	484.5385

Elapsed Time 00:07:32, EachSite:12.22s

Operator	(SE)
Product	AlN_multi
JobName	6inch-test
CreateDate	2024/12/23

Thickness / T2(nm)			
Min	472.8145	AVG	478.8249
Max	485.0454	Unif	0.01614
Range	12.23086	Std	4.45546

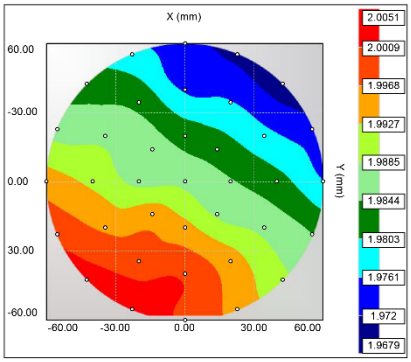
	X(mm)	Y(mm)	Data
35	55.433	22.961	483.6407
36	42.426	42.426	484.9947
37	22.961	55.433	485.0454

Figure S1 Thickness mapping (37 points) of 6 inch single-crystalline AlN template measured by ellipsometer

Elapsed Time 00:07:32, EachSite:12.22s

Operator	(SE)
Product	AlN_multi
JobName	6inch-test
CreateDate	2024/12/23

Refractive Index / N2			
Min	1.96955	AVG	1.98703
Max	2.00337	Unif	0.00851
Range	0.03382	Std	0.00926



	X(mm)	Y(mm)	Data
1	0	0	1.98751
2	0	20.000	1.98266
3	-14.142	14.142	1.98629
4	-20.000	0	1.98784
5	-14.142	-14.142	1.99476
6	0	-20.000	1.99394
7	14.142	-14.142	1.98802
8	20.000	0	1.98474
9	14.142	14.142	1.98255
10	0	40.000	1.97575
11	-20.000	34.641	1.98315
12	-34.641	20.000	1.98752
13	-40.000	0	1.99182
14	-34.641	-20.000	1.99622
15	-20.000	-34.641	1.99914
16	0	-40.000	2.00023
17	20.000	-34.641	1.99448

	X(mm)	Y(mm)	Data
18	34.641	-20.000	1.98739
19	40.000	0	1.98175
20	34.641	20.000	1.97731
21	20.000	34.641	1.97626
22	0	60.000	1.97351
23	-22.961	55.433	1.97795
24	-42.426	42.426	1.98221
25	-55.433	22.961	1.98699
26	-60.000	0	1.99474
27	-55.433	-22.961	1.99986
28	-42.426	-42.426	2.00294
29	-22.961	-55.433	2.00337
30	0	-60.000	2.00002
31	22.961	-55.433	1.99518
32	42.426	-42.426	1.98946
33	55.433	-22.961	1.98442
34	60.000	0	1.97622

Elapsed Time 00:07:32, EachSite:12.22s

Operator	(SE)
Product	AlN_multi
JobName	6inch-test
CreateDate	2024/12/23

Refractive Index / N2			
Min	1.96955	AVG	1.98703
Max	2.00337	Unif	0.00851
Range	0.03382	Std	0.00926

	X(mm)	Y(mm)	Data
35	55.433	22.961	1.97336
36	42.426	42.426	1.96955
37	22.961	55.433	1.97089

Figure S2 Refractive Index mapping (37 points) of 6 inch single-crystalline AlN template measured by ellipsometer