

Name of Tools - Brand/Model (Display)	Location	Lab Type	Process Type	Consumables Fees Apply	UOM	NUS (Member)	NUS (PPU)	Public (Member)	Public (PPU)	Engineering Service	Training Fees
Rapid Thermal Process - Annealsys	Level 1	Cleanroom	Annealing Process (Diffusion)		hr	100	150	165	250	NA	100
Rapid Thermal Process 1 - MILA3000	Level 2	Cleanroom	Annealing Process (Diffusion)		hr	55	80	90	135	Upon REQ	100
Rapid Thermal Process 2 - MILA3000	Level 2	Cleanroom	Annealing Process (Diffusion)		hr	55	80	90	135	Upon REQ	100
E-Beam Evaporator - AJA UHV	Level 1	Cleanroom	Deposition & Growth	Au, Pt, Ra and AG	hr	70	110	110	170	Upon REQ	150
E-Beam Evaporator - Edward (L2DL)	Level 2	Dry Lab	Deposition & Growth		hr	65	100	100	160	Upon REQ	150
Thermal Evaporator - Edward (L2DL)	Level 2	Dry Lab	Deposition & Growth		hr	65	100	100	160	Upon REQ	150
Sputtering System - AJA (No gold & copper)	Level 1	Cleanroom	Deposition & Growth		hr	65	100	110	170	Upon REQ	200
Sputtering System - AJA UHV	Level 1	Cleanroom	Deposition & Growth		hr	90	140	150	235	Upon REQ	200
Hotplate (L2CR)	Level 2	Cleanroom	Deposition & Growth		hr	10	15	20	25	NA	10
Photoresist Spinner (L2CR)	Level 2	Cleanroom	Deposition & Growth	Special photoresist	hr	10	15	20	25	NA	30
ALD Thermal (Dielectric) - Picosun	Level 5	Cleanroom	Deposition & Growth		hr	125	190	210	320	Upon REQ	250
ALD Plasma (Nitride) - Picosun	Level 5	Cleanroom	Deposition & Growth		hr	125	190	210	320	Upon REQ	250
PECVD - Oxford PlasmaPro 100	Level 5	Cleanroom	Deposition & Growth		hr	100	150	165	250	Upon REQ	150
MBE (II-VI / IV Materials Growth) - ULVAC	Level 6	Dry Lab	Deposition & Growth		hr	850	1000	1150	1350	Upon REQ	1250
XeF2 Vapor Etcher	Level 2	Wet Lab	Etching	Gas	hr	65	100	110	170	Upon REQ	100
Chemical Mechanical Planerization (CMP) - Logitech	Level 2	Cleanroom	Etching	Slurry and Pad	hr	65	100	110	170	NA	100
CMP SF1 Slurry	Level 1	Cleanroom	Etching		ea	65	65	70	80	NA	NA
CMP Pad	Level 1	Cleanroom	Etching		ea	NA	NA	NA	NA	NA	NA
CMP Template	Level 1	Cleanroom	Etching		ea	NA	NA	NA	NA	NA	NA
CMP Adhesive	Level 1	Cleanroom	Etching		ea	NA	NA	NA	NA	NA	NA
Plasma Asher - Samco	Level 5	Cleanroom	Etching		hr	65	100	110	170	400	100
ICP RIE and ALE (CH1 Metal Etch) - Oxford	Level 5	Cleanroom	Etching		hr	80	125	140	210	NA	200
ICP RIE and ALE (CH3 Compound) - Oxford	Level 5	Cleanroom	Etching		hr	80	125	140	210	NA	0
ICP RIE and ALE (CH2 Dielectric) - Oxford	Level 5	Cleanroom	Etching		hr	80	125	140	210	NA	0
Acid Wet Bench - Class 1000 (6" capability)	Level 5	Cleanroom	Etching	Special chemical	per day	18	25	25	30	NA	30
Solvent Wet Bench - Class 1000	Level 5	Cleanroom	Etching	Special chemical	per day	18	25	25	30	NA	30
4 Point Probe Station	Level 1	Cleanroom	Electrical Test		hr	30	35	45	55	Upon REQ	50
Probe Station with Semiconductor Analyser	Level 3	Dry Lab	Electrical Test		hr	25	30	35	40	NA	50
Electron Beam Lithography - Ellionix	Level 1	Cleanroom	Lithography		hr	160	200	210	250	Upon REQ	300
Electron Beam Lithography - Raith	Level 1	Cleanroom	Lithography		hr	200	250	250	300	Upon REQ	450
Mask Aligner - MA8 (Top-line, Bottom-line & IR Alignment)	Level 1	Cleanroom	Lithography	Special chemical	hr	100	150	165	250	Upon REQ	150
Mask Aligner - MA6	Level 2	Cleanroom	Lithography	Special chemical	hr	65	100	110	170	Upon REQ	150
Laser Writer - Hiedelberg DWL66+	Level 1	Cleanroom	Lithography		hr	80	125	140	210	Upon REQ	150
UV OZONE (L1CR)	Level 1	Cleanroom	Lithography		hr	12	20	20	25	NA	10
Hot Plate 1 (L1CR)	Level 1	Cleanroom	Lithography		hr	12	20	20	25	NA	10
Hot Plate 2 (L1CR)	Level 1	Cleanroom	Lithography		hr	12	20	20	25	NA	10
Spin Coater Laurell (L1CR)	Level 1	Cleanroom	Lithography	Special photoresist	hr	12	20	20	25	NA	30
Spin Coater SPS (L1CR)	Level 1	Cleanroom	Lithography	Special photoresist	hr	12	20	20	25	NA	30
Acid Wet Bench - Class 10	Level 1	Cleanroom	Wet Processing	Special chemical	per day	18	25	25	30	NA	30
Acid Wet Bench - Class 100	Level 1	Cleanroom	Wet Processing	Special chemical	per day	18	25	25	30	NA	30
Solvent Wet Bench - Class 10	Level 1	Cleanroom	Lithography	Special chemical	per day	18	25	25	30	NA	30
Solvent Wet bench - L2CR	Level 2	Cleanroom	Lithography	Special chemical	per day	18	25	25	30	NA	30
Acid Wet bench - L2WL	Level 2	Wet Lab	Lithography	Special chemical	per day	18	25	25	30	NA	30
Solvent Wet Bench - L2WL	Level 2	Wet Lab	Lithography	Special chemical	per day	18	25	25	30	NA	30
Magnetic Annealing System - TEL	Level 1	Cleanroom	Magnetic Process		hr	130	170	180	220	NA	250
Multichamber Sputterer - ULVAC	Level 1	Cleanroom	Magnetic Process	User to bring own wafer	hr	168	190	228	288	Upon REQ	300
Ion-Beam Etcher/Sputterer/SIMS - SCIA	Level 1	Cleanroom	Magnetic Process	User to bring own wafer. Free for SiO2, SiN and Ta2O5.	hr	130	170	180	220	Upon REQ	300
FTIR	Level 5	Cleanroom	Characterization & Metrology		hr	30	35	40	50	NA	50
Surface Profiler	Level 5	Cleanroom	Characterization & Metrology		hr	30	30	40	50	Upon REQ	50
Accretech Dicer	Level 3	Dry Lab	Characterization & Metrology		hr	60	90	100	150	Upon REQ	150
FESEM - JEOL JSM 6700F	Level 3	Dry Lab	Characterization & Metrology		hr	45	70	80	120	Upon REQ	100
SEM - NOVA	Level 3	Dry Lab	Characterization & Metrology		hr	60	90	100	150	Upon REQ	100
FIB SEM (FESEM mode only) - TESCAN	Level 3	Dry Lab	Characterization & Metrology		hr	75	110	120	185	Upon REQ	150
FIB SEM (FIB/TOF SIM mode only) - TESCAN	Level 3	Dry Lab	Characterization & Metrology		hr	200	250	250	300	Upon REQ	400

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Hitachi Regulas 8230 FE-SEM	Level 3	Dry Lab	Characterization & Metrology		hr	65	100	105	160	Upon REQ	300
Hitachi Regulas 8230 FE-SEM w EDX	Level 3	Dry Lab	Characterization & Metrology		hr	80	125	135	210	Upon REQ	300
Hitachi Regulas 8100 FE-SEM	Level 1	Cleanroom	Characterization & Metrology		hr	68	105	108	165	Upon REQ	320
Hitachi Regulas 8100 FE-SEM w EDX	Level 1	Cleanroom	Characterization & Metrology		hr	88	130	138	215	Upon REQ	320
AFM/SPM - Park NX20	Level 1	Cleanroom	Characterization & Metrology		hr	60	90	100	150	250 / hr	200 basic 200 adv
AFM/SPM - BRUKER Dimension Icon	Level 5	Dry Lab	Characterization & Metrology		hr	60	90	100	150	250 / hr	250
Scanning MOKE - EVICO Magnetics	Level 5	Dry Lab	Characterization & Metrology		hr	60	90	100	150	200 / hr	150
VSM - MicroSense EZ9	Level 5	Dry Lab	Characterization & Metrology		hr	45	70	80	120	200 / hr	100
SQUID - Quantum Design MPMS 3	Level 5	Dry Lab	Characterization & Metrology		hr	65	100	110	170	270 / hr	150
XRD - RIGAKU SmartLab	Level 5	Dry Lab	Characterization & Metrology		hr	75	110	100	185	RSM & In-plane - \$500 per sample Others - \$300 per sample	250 basic 300 adv
Ellipsometer	Level 5	Cleanroom	Characterization & Metrology		hr	40	60	65	100	Upon REQ	60
Raman and Micro PL System	Level 5	Dark Room	Characterization & Metrology		hr	50	70	80	120	NA	100
Die Bonder	Level 2	Cleanroom	Packaging		hr	90	140	140	235	Upon REQ	200
Wire Bonder - West Bond	Level 5	Dry Lab	Packaging	Precious metal	hr	30	35	45	55	Upon REQ	50
3D Printer - Optomec Aerosol	Level 1	Cleanroom	Others	User to bring own ink for printing	hr	240	270	270	320	Tool Hr + \$100/hr	300
2D Material Transfer Station with Glove Box	Level 1	Cleanroom	Others		hr	65	90	90	150	Upon REQ	200 per session
Membership					per qtr	1740	NA	1740	NA		

For Laser Micro-machining services, please refer to page 4 and 5.

Tool Rates Terms and Conditions

- 1 All rates are subject to changes without prior notice.
- 2 All users are to book the facility BEFORE usage in E6NanoFab tool booking system.
 - 2.1 *Users will be charged **2 times the usage fees** for tools used without prior booking for 1st offence.*
 - 2.2 *Users will be barred from using the system for 3 weeks in addition to being charged twice the normal rate.*
- 3 All users are to update the actual tool usage hours in E6NanoFab tool booking system and the log book of the tool.
 - 3.1 *For tools used beyond the last reserved session, users will be charged **2 times the usages fees** if the intended extension hours of tool is not booked within 15 minutes from the last reserved end time.*
 - 3.2 *E6NanoFab reserves the right to charge an admin fees for assisting users with updating the extended tool usage hour in the tool booking system.*
- 4 Users will be granted a maximum 15 minutes waiting time for the reserved tool. In event of no-show, users will be charged based on the following protocol:

In the case of a 3-hour reserved tool by user A in the tool booking system:

User A did not show up within 15 minutes will pay for the 1st hour of the booking.

User B who takes over the slot from User A will pay for the duration of the time he/she used it.

If nobody takes over User A's reserved slot, User A will have to pay for the entire 3-hour booking rate.

Guidelines on using E6NanoFab Tools

- 1 Only qualified users are allowed to book the system.
- 2 All users are to seek permission from his/her supervisor prior to using the system so as to avoid any disputes arising from the supervisor. E6NanoFab will not entertain the dispute, if any.
- 3 All users are liable for any damage or breakdown of the system due to mishandling or improper usage.
- 4 It is **mandatory** that users **sign in and sign out in the facility log book**. This shall be the actual time spent in using the system.
 - 4.1 *User is reminded to update the actual hour usage in the tool booking system immediately after use. Otherwise, administration fees will be charged for helping user with the update.*
- 5 Users are to **UNLOAD the sample(s)** and keep the system back to its normal condition BEFORE the next slot starts. Failing to do so, users will be liable to pay for the additional time taken to make the system back to its normal condition.

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Product Name (Common wafer size)	Product Number	Laser Machining service	Unit Price (SGD)
Si wafer 2-inch (51 mm) 275um thickness	# of dice	Description of cut	Unit price
Dicing 1mm - 5mm	1	Square or circular shape	45.00
Dicing 5mm - 10 mm	1	Square or circular shape	55.00
Dicing 10mm - 15mm	1	Square or circular shape	65.00
Dicing 15mm - 20mm	1	Square or circular shape	75.00
Dicing 20mm - 25mm	1	Square or circular shape	85.00
Dicing 25mm - 30mm	1	Square or circular shape	95.00
Dicing 30mm - 35mm	1	Square or circular shape	100.00
Dicing 35mm - 40mm	1	Square or circular shape	105.00
Dicing 40mm - 45mm	1	Square or circular shape	110.00
Dicing 45mm - 50mm	1	Square or circular shape	120.00
<i>*Customization</i>	<i>CALL</i>	<i>Custom non standard shape</i>	<i>CALL</i>
Si wafer 3-inch (76 mm) 375um thickness	# of dice	Description of cut	Unit price
Dicing 1mm - 5mm	1	Square or circular shape	85.00
Dicing 5mm - 10 mm	1	Square or circular shape	95.00
Dicing 10mm - 15mm	1	Square or circular shape	105.00
Dicing 15mm - 20mm	1	Square or circular shape	110.00
Dicing 20mm - 25mm	1	Square or circular shape	115.00
Dicing 25mm - 30mm	1	Square or circular shape	120.00
Dicing 30mm - 35mm	1	Square or circular shape	125.00
Dicing 35mm - 40mm	1	Square or circular shape	135.00
Dicing 40mm - 45mm	1	Square or circular shape	145.00
Dicing 45mm - 50mm	1	Square or circular shape	150.00
<i>*Customization</i>	<i>CALL</i>	<i>Custom non standard shape</i>	<i>CALL</i>
Si wafer 4-inch (100 mm) 525um thickness	# of dice	Description of cut	Unit price
Dicing 1mm - 5mm	1	Square or circular shape	110.00
Dicing 5mm - 10 mm	1	Square or circular shape	115.00
Dicing 10mm - 15mm	1	Square or circular shape	120.00
Dicing 15mm - 20mm	1	Square or circular shape	125.00
Dicing 20mm - 25mm	1	Square or circular shape	130.00
Dicing 25mm - 30mm	1	Square or circular shape	135.00
Dicing 30mm - 35mm	1	Square or circular shape	140.00
Dicing 35mm - 40mm	1	Square or circular shape	145.00
Dicing 40mm - 45mm	1	Square or circular shape	150.00
Dicing 45mm - 50mm	1	Square or circular shape	155.00

Product Name (Common wafer size)	Product Number	Laser Machining service	Unit Price (SGD)
<i>*Customization</i>	<i>CALL</i>	<i>Custom non standard shape</i>	<i>CALL</i>
Si wafer 5 - 8 inch (125 mm - 200 mm) 625um - 725um thickness	# of dice	Description of cut	Unit price
Dicing 1mm - 5mm	1	Square or circular shape	125.00
Dicing 5mm - 10 mm	1	Square or circular shape	130.00
Dicing 10mm - 15mm	1	Square or circular shape	135.00
Dicing 15mm - 20mm	1	Square or circular shape	140.00
Dicing 20mm - 25mm	1	Square or circular shape	145.00
Dicing 25mm - 30mm	1	Square or circular shape	150.00
Dicing 30mm - 35mm	1	Square or circular shape	155.00
Dicing 35mm - 40mm	1	Square or circular shape	160.00
Dicing 40mm - 45mm	1	Square or circular shape	165.00
Dicing 45mm - 50mm	1	Square or circular shape	170.00
<i>*Customization</i>	<i>CALL</i>	<i>Custom non standard shape</i>	<i>CALL</i>
Remarks:	<i>If design fall above 50mm for a 4.9 inch wafer etc:65mm cost will be \$205 + \$170.</i>		
Lead time	Typically 2-4days upon job confirmation, urgent job is available at \$50 additional with a lead time of 1 day.(etc: job submission on Tuesday and ready by next working day.)		
Job requirement	<i>Users are to provide accurate drawing in .DXF format.All silicon wafers to be cut will be provided by users.Silicon wafers are available at additional charges.</i>		
Pricing and payment	<i>Payment should be made prior job commemerce. Price listed is for non educational entites. For departments within NUS, 10% off waiver.</i>		
Terms and condition	<ol style="list-style-type: none"> <i>1. There will be no change of design upon job confirmation.</i> <i>2. Inform us about special job tolerances requirement. Additional charges my apply.</i> <i>3. We reserve the rights to reject any jobs that we deem unacceptable.</i> <i>4. These Terms and Conditions may, at the CQT sole discretion, be changed from time to time.</i> 		