

2021 Price List

| Name of Tools - Brand/Model (Display) | Location | Lab Type | Process Type | Consumables Fees Apply | NUS (Pay-Per-Use) | Public (Pay-Per-Use) | Engineering Service | Training Fees |
|---|----------|-----------|-------------------------------|---|-------------------|----------------------|---------------------|---------------|
| Rapid Thermal Process - Annealsys | Level 1 | Cleanroom | Annealing Process (Diffusion) | | 150 | 250 | NA | 100 |
| Rapid Thermal Process 1 - MILA3000 | Level 2 | Cleanroom | Annealing Process (Diffusion) | | 80 | 135 | Upon REQ | 100 |
| Rapid Thermal Process 2 - MILA3000 | Level 2 | Cleanroom | Annealing Process (Diffusion) | | 80 | 135 | Upon REQ | 100 |
| E-Beam Evaporator - AJA UHV | Level 1 | Cleanroom | Deposition & Growth | Au, Pt, Ra and AG | 110 | 170 | Upon REQ | 150 |
| E-Beam Evaporator - Edward (L2DL) | Level 2 | Dry Lab | Deposition & Growth | | 100 | 160 | Upon REQ | 150 |
| Thermal Evaporator - Edward (L2DL) | Level 2 | Dry Lab | Deposition & Growth | | 100 | 160 | Upon REQ | 150 |
| Sputtering System - AJA (No gold & copper) | Level 1 | Cleanroom | Deposition & Growth | | 100 | 170 | Upon REQ | 200 |
| Sputtering System - AJA UHV | Level 1 | Cleanroom | Deposition & Growth | | 140 | 235 | Upon REQ | 200 |
| Hotplate (L2CR) | Level 2 | Cleanroom | Deposition & Growth | | 15 | 25 | NA | 10 |
| Photoresist Spinner (L2CR) | Level 2 | Cleanroom | Deposition & Growth | Special photoresist | 15 | 25 | NA | 30 |
| ALD Thermal (Dielectric) - Picosun | Level 5 | Cleanroom | Deposition & Growth | | 190 | 320 | Upon REQ | 250 |
| ALD Plasma (Nitride) - Picosun | Level 5 | Cleanroom | Deposition & Growth | | 190 | 320 | Upon REQ | 0 |
| PECVD - Oxford PlasmaPro 100 | Level 5 | Cleanroom | Deposition & Growth | | 150 | 250 | Upon REQ | 150 |
| MBE (II-VI / IV Materials Growth) - ULVAC | Level 6 | Dry Lab | Deposition & Growth | | 1000 | 1350 | Upon REQ | 1250 |
| XeF2 Vapor Etcher | Level 2 | Wet Lab | Etching | Gas | 100 | 170 | Upon REQ | 100 |
| Chemical Mechanical Planerization (CMP) - Logitech | Level 1 | Cleanroom | Etching | Slurry and Pad | 100 | 170 | NA | 100 |
| CMP SF1 Slurry | Level 1 | Cleanroom | Etching | | 65 | 80 | NA | NA |
| CMP Pad | Level 1 | Cleanroom | Etching | | NA | NA | NA | NA |
| CMP Template | Level 1 | Cleanroom | Etching | | NA | NA | NA | NA |
| CMP Adhesive | Level 1 | Cleanroom | Etching | | NA | NA | NA | NA |
| Plasma Asher - Samco | Level 5 | Cleanroom | Etching | | 100 | 170 | 400 | 100 |
| ICP RIE and ALE (CH1 Metal Etch) - Oxford | Level 5 | Cleanroom | Etching | | 125 | 210 | NA | 200 |
| ICP RIE and ALE (CH3 Compound) - Oxford | Level 5 | Cleanroom | Etching | | 125 | 210 | NA | 0 |
| ICP RIE and ALE (CH2 Dielectric) - Oxford | Level 5 | Cleanroom | Etching | | 125 | 210 | NA | 0 |
| Acid Wet Bench - Class 1000 (6" capability) | Level 5 | Cleanroom | Etching | Special chemical | 25 | 30 | NA | 30 |
| Solvent Wet Bench - Class 1000 | Level 5 | Cleanroom | Etching | Special chemical | 25 | 30 | NA | 30 |
| 4-Point Probe Station | Level 1 | Cleanroom | Electrical Test | | 30 | 40 | NA | 50 |
| Probe Station with Semiconductor Analyser | Level 3 | Dry Lab | Electrical Test | | 30 | 40 | NA | 50 |
| Electron Beam Lithography - Ellionix | Level 1 | Cleanroom | Lithography | | 200 | 250 | Upon REQ | 300 |
| Electron Beam Lithography - Raith | Level 1 | Cleanroom | Lithography | | 250 | 300 | Upon REQ | 450 |
| Mask Aligner - MA8 (Top-line, Bottom-line & IR alignment) | Level 1 | Cleanroom | Lithography | Special chemical | 150 | 250 | Upon REQ | 150 |
| Mask Aligner - MA6 | Level 2 | Cleanroom | Lithography | Special chemical | 100 | 170 | Upon REQ | 150 |
| Laser Writer - Hiedelberg DWL66+ | Level 1 | Cleanroom | Lithography | | 125 | 210 | Upon REQ | 150 |
| UV OZONE (L1CR) | Level 1 | Cleanroom | Lithography | | 20 | 25 | NA | 10 |
| Hot Plate 1 (L1CR) | Level 1 | Cleanroom | Lithography | | 20 | 25 | NA | 10 |
| Hot Plate 2 (L1CR) | Level 1 | Cleanroom | Lithography | | 20 | 25 | NA | 10 |
| Spin Coater Laurell (L1CR) | Level 1 | Cleanroom | Lithography | Special photoresist | 20 | 25 | NA | 30 |
| Spin Coater SPS (L1CR) | Level 1 | Cleanroom | Lithography | Special photoresist | 20 | 25 | NA | 30 |
| Acid Wet Bench (Class 10) | Level 1 | Cleanroom | Wet Processing | Special chemical | 25 | 30 | NA | 30 |
| Acid Wet Bench (Class 100) | Level 1 | Cleanroom | Wet Processing | Special chemical | 25 | 30 | NA | 30 |
| Solvent Wet Bench (Class 10) | Level 1 | Cleanroom | Lithography | Special chemical | 25 | 30 | NA | 30 |
| Solvent Wet Bench (L2CR) | Level 2 | Cleanroom | Lithography | Special chemical | 25 | 30 | NA | 30 |
| Acid Wet Bench (L2WL) | Level 2 | Wet Lab | Lithography | Special chemical | 25 | 30 | NA | 30 |
| Solvent Wet Bench (L2WL) | Level 2 | Wet Lab | Lithography | Special chemical | 25 | 30 | NA | 30 |
| Magnetic Annealing System - TEL | Level 1 | Cleanroom | Magnetic Process | | 170 | 220 | NA | 250 |
| Multichamber Sputterer - ULVAC | Level 1 | Cleanroom | Magnetic Process | User to bring own wafer | 190 | 240 | Upon REQ | 250 |
| Ion-Beam Etcher/Sputterer/SIMS - SCIA | Level 1 | Cleanroom | Magnetic Process | User to bring own wafer. Free for SiO2, SiN and Ta2O5. | 170 | 220 | Upon REQ | 300 |
| FTIR | Level 5 | Cleanroom | Characterization & Metrology | | 35 | 50 | NA | 50 |
| Surface Profiler | Level 5 | Cleanroom | Characterization & Metrology | | 30 | 50 | Upon REQ | 50 |
| Accretech Dicer | Level 3 | Dry Lab | Characterization & Metrology | | 90 | 150 | Upon REQ | 150 |
| FESEM - JEOL JSM 6700F | Level 3 | Dry Lab | Characterization & Metrology | | 70 | 120 | Upon REQ | 100 |

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|--|----------|-----------|------------------------------|------------------------------------|-----------|--------------|--|----------------------|
| SEM - NOVA | Level 3 | Dry Lab | Characterization & Metrology | | 90 | 150 | Upon REQ | 100 |
| FIB SEM (FESEM mode only) - TESCAN | Level 3 | Dry Lab | Characterization & Metrology | | 110 | 185 | Upon REQ | 150 |
| FIB SEM (FIB/TOF SIM mode only) - TESCAN | Level 3 | Dry Lab | Characterization & Metrology | | 250 | 300 | Upon REQ | 400 |
| Hitachi Regulas 8230 FE-SEM | Level 3 | Dry Lab | Characterization & Metrology | | 100 | 160 | Upon REQ | 300 |
| Hitachi Regulas 8230 FE-SEM w EDX | Level 3 | Dry Lab | Characterization & Metrology | | 125 | 210 | Upon REQ | 300 |
| Hitachi Regulas 8230 FE-SEM | Level 1 | Cleanroom | Characterization & Metrology | | 105 | 165 | Upon REQ | 320 |
| Hitachi Regulas 8230 FE-SEM w EDX | Level 1 | Cleanroom | Characterization & Metrology | | 130 | 215 | Upon REQ | 320 |
| AFM/SPM - Park NX20 | Level 1 | Cleanroom | Characterization & Metrology | | 90 | 150 | 250 / hr | 200 basic 200 adv |
| AFM/SPM - BRUKER Dimension Icon | Level 5 | Dry Lab | Characterization & Metrology | | 90 | 150 | 250 / hr | 250 |
| Scanning MOKE - EVICO Magnetics | Level 5 | Dry Lab | Characterization & Metrology | | 90 | 150 | 200 / hr | 150 |
| VSM - MicroSense EZ9 | Level 5 | Dry Lab | Characterization & Metrology | | 70 | 120 | 200 / hr | 100 |
| SQUID - Quantum Design MPMS 3 | Level 5 | Dry Lab | Characterization & Metrology | | 100 | 170 | 270 / hr | 150 |
| XRD - RIGAKU SmartLab | Level 5 | Dry Lab | Characterization & Metrology | | 110 | 185 | RSM & In-plane - \$500 per sample Others - \$300 per sample | 250 basic 300 adv |
| Ellipsometer | Level 5 | Cleanroom | Characterization & Metrology | | 60 | 100 | Upon REQ | 60 |
| Raman and Micro PL System | Level 5 | Dark Room | Characterization & Metrology | | 70 | 120 | NA | 100 |
| Die Bonder | Level 2 | Cleanroom | Packaging | | 140 | 235 | Upon REQ | 200 |
| Wire Bonder - West Bond | Level 5 | Dry Lab | Packaging | Precious metal | 35 | 55 | Upon REQ | 50 |
| 3D Printer - Optomec Aerosol | Level 1 | Cleanroom | Others | User to bring own ink for printing | 270 | 320 | Upon REQ | 300 |

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.

| 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 for quote</i> | <i>Custom non-standard shape</i> | <i>Call for quote</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 for quote</i> | <i>Custom non-standard shape</i> | <i>Call for quote</i> |

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|---|-----------------------|----------------------------------|-----------------------|
| 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 |
| <i>*Customization</i> | <i>Call for quote</i> | <i>Custom non-standard shape</i> | <i>Call for quote</i> |

| Product Name (Common wafer size) | Product Number | Laser Machining service | Unit Price (SGD) |
|--|-----------------------|----------------------------------|-----------------------|
| 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 for quote</i> | <i>Custom non-standard shape</i> | <i>Call for quote</i> |

| | |
|----------------------------|---|
| Remarks: | <i>If design fall above 50mm for a 4.9 inch wafer etc: 65mm cost will be \$205 + \$170.</i> |
| Lead time | <ol style="list-style-type: none"> Typically 2-4days upon job confirmation. Urgent job is available at \$50 additional fees with 1 day lead time (eg. job submission on Tuesday and ready by next working day) |
| Job requirement | <ol style="list-style-type: none"> Users are to provide accurate drawing in DXF format. All silicon wafers to be cut will be provided by user. Silicon wafers are available at additional charges. |
| Pricing and payment | <i>Payment should be made prior job commencement. Price listed is for non-educational entities. For departments within NUS, 10% off waiver.</i> |
| Terms and condition | <ol style="list-style-type: none"> There will be no change of design upon job confirmation. Inform us about special job tolerances requirement. Additional charges may apply. We reserve the rights to reject any jobs that we deem unacceptable. The stipulated terms and conditions are subject to change without prior notice. . |