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| Objective |
| Batch name: Process template |
| This process flows is a guideline on how to use ESPACER on top of CSAR e-beam resist. |

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| Step Heading | Equipment | **ZEP spinning on Si, SiO2, SOI** | Comments |
| 1. Pretreatment
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| * 1. Surface treatment
 | BHF dip *or*HMDS | BHF dip for Si substrates (30 sec, H2O 5 min) HMDS treatment for SiO2 and III-V substrates | Generally, pre-treatment is not recommended. |
| 1. Spin coat of ZEP
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| * 1. Coat wafers
 | SSE Spinner, or Spin Coater LabSpin | **Resist:** CSAR**Spin:** 60 sec @ 4000 rpm (~140 nm)**Softbake:**  1-5 min @ 150 °C (hotplate) |  |
| 1. Coat with ESPACER (only for non-conductive substrates)
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| * 1. Coat with ESPACER
 | Manual Spinner 1 (E-5) | **Spin:** 60 sec @ 2000 rpm**No Softbake** | Spun on like resist, no bakingTake ESPACER out of the fridge in Cx1, wait 1 hour before opening the bottle. Use disposal pipette cleaned by N2 gun. |
| 1. E-beam exposure
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 | E-beam writer | Dose: 200 - 300 µC/cm2; a dose-test is required. See e-beam logbook for inspiration. | Dose depends strongly on substrate material, thickness of resist, critical dimension and load of pattern. |
| 1. Removal of ESPACER
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 | Petribowl, e-beam fumehood | Rinse in H2OBlow dry with N2. |  |
| 1. Development & Rinse
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| * 1. Develop-ment
 | Developer (E-beam) | Develop with X AR 600-54/6, 1 minRinse in IPA, 1 minBlow dry with N2. | Dose depends on how you develop; make sure you develop in same manner as after dose-test. |
| 1. De-scum
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| * 1. De-scum
 | BHF dip | BHF dip for Si substrates (30 sec, H2O 5 min). | De-scum generally not recommended. If residues appear, optimize dose, development and rinse process. |
| 1. Postbake (in case of wet etching)
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| * 1. Postbake
 | Hotplate | Postbake: 2 - 3 min @ 100 - 140 °C |  |
| 1. Lift-off and Strip
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| * 1. Lift-off
 | Petribowl,Fumehood | Remover 1165 in petribowl. |  |