



Request for Quote and Specifications of AlGaIn/GaN HEMT on Si Wafers

- The GEECI (Gallium Nitride Ecosystem Enabling Centre and Incubator) at SID-Indian Institute of Science is seeking bids from qualified industries for this tool as per the specifications below.
- Companies need to submit two bids, a technical bid and a commercial bid, in **two separate** sealed envelopes. The bids should be submitted no later than 30 days from the date of posting of this tender, as listed on the website date/time stamp, and by 5 pm on the 30th day or next weekday in case the 30th day falls on a weekend or a national holiday.
- Both technical and commercial bids should be addressed to “The Chief Executive, SID, IISc, Bangalore 560012, GST # 29AAATS5333E1ZJ.”
- All quotations should be CIF Bangalore.
- Cost of last mile transportation, including any insurance, from port of shipment to IISc has to be quoted as an option.
- In case of courier shipments maximum permissible weight would be 70kgs.
- The envelopes should be addressed to “Prof. Srinivasan Raghavan, CeNSE, IISc, Bangalore, 560012” and submitted to the office at CeNSE, IISc in Room No. GF 15 between 9 am and 5 pm.
- All questions regarding this tender should be addressed to Prof. Srinivasan Raghavan at the email address sraghavan@iisc.ac.in
- Post such submission all vendors should send an email to sraghavan@iisc.ac.in with the subject line: “GEECI_Bidder’s name_Tool Name” to intimate him of the submission within one day.
- Deviations from the technical specifications requested are allowed. Such deviations must be highlighted and justified. Their acceptance or rejection will be left to the discretion of the technical committee.
- The consumable sought will be used at the Centre for Nano Science and Engineering (CeNSE), Indian Institute of Science (IISc). IISc is India’s No. 1 institution on higher learning and the Center for Nano Science and Engineering is home to one of the best academic fabs in the world.
- The technical response, corresponding to the consumable being offered, should be in the form of a compliance table with at least 5 columns. Serial number in column 1. Each of the numbered technical items below should be addressed in a separate row of the table in column 2. Compliance to this requirement, in Yes/No, deviation from it and justification should be provided in the neighboring columns 3-5. Post the opening of a hard copy of the technical bid the committee will request for a soft copy of the files for further processing. Companies should **NOT** mail soft copies of the files unless specifically requested for.
- Detailed technical specifications of the consumable being offered should be included.
- Any additional capabilities or technical details, that you would like to bring to the attention of the purchase committee, can be listed at the end of the technical table.
- If multiple systems can fulfill the requirements, vendors can submit multiple bids.
- Vendors are encouraged to highlight the advantages of their consumables over comparable consumables from the competitors.
- The commercial bid should be broken up to the maximum extent possible into separate items with a cost against each to enable better comparison of price for various configurations across the bidders. As an option, please provide itemized cost for any *suggested* accessories/add-ons that may enhance the usability, capability, accuracy or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their consumable portfolio permits

GEECI, IISc Bangalore requires AlGaN HEMT on Si Wafers. Following are the major items required (see detailed specs below):

1. d-mode Wafers (6" diameter): 25 Nos.
2. e-mode Wafers (6" diameter): 100 Nos.
3. e-mode Wafers (8" diameter): 50 Nos.

Layer Specifications:

Layer name	Description	Thickness target	Comment
Substrate	150-mm Si substrate (111) 200-mm Si substrate (111)	1000µm or higher	Preferred is pre-doped Si
Buffer	Buffer	5µm or higher	Vertical breakdown data should be provided
GaN channel	GaN	175nm	Vendor should be able to customize based on our design requirement
Barrier	d-mode: AlGaN (25% Al) e-mode: AlGaN (18% Al)	d-mode: 20nm e-mode: 12nm	Vendor should be able to customize (In, Al) N barriers on request based on our design requirement
Cap layer	d-mode: SiN e-mode: p-GaN	d-mode: 20nm SiN e-mode: up to 100nm p-GaN (1-2e17 cm-3, electrically activated)	Vendor should be able to customize thicknesses based on design requirements

Material Specifications

Parameter	Measurement	Units	Target
Barrier thickness	X-Ray	nm	±10% or less
Barrier composition	Photoluminescence, ellipsometry	%	± 1% or better
Cap thickness	X-Ray	nm	± 10% or less
Wafer bow	Laser profilometer	µm	± 50 max.
Edge exclusion		mm	5

Electrical Specifications

Parameter	Measurement	Units	Target
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Electron mobility*	Hall	cm ² /V.s	d-mode: > 1800 (for 20nm AlGaIn, 25%Al) e-mode: Please specify your numbers
Sheet charge density*	Hall	/cm ²	d-mode: > 9e12 e-mode: > 4.5e12
Sheet resistivity*	Eddy current	Ohms/sq	d-mode: < 400 e-mode: < 800
Vertical breakdown voltage*	Qualified 650V (long term stress qualified)	V	> 1000
Lateral breakdown voltage* (L_{G-D} >20 μm)	Qualified 650V (long term stress qualified)	V	> 1200
Leakage current* (lateral, grounded substrate)	@650V, RT	nA/mm	< 100
Leakage current* (vertical)	@650V, RT	μA/mm ²	< 1

Terms and conditions:

- Shipping: On all the items the cost of shipping up to IISc. IISc will help FedEx to take care of the customs clearance at Bangalore Airport. Please include your payment option. IISc would prefer payment after receipt of Wafers (in 30 days).
- References: Bidders should provide details of other locations/users across the globe where similar material was delivered.
- The lead time for the delivery of the material should preferably be less than 4 weeks from the date of receipt of our purchase order. The smallest lead time will be appreciated.
- The validity period of the quotation should be 90 days at least.
- The vendor should be flexible with parts delivery. We may spread the entire requirement into 3 years and ask for delivery in lots of 25 wafers (Example: Year 1: 25 e-mode Wafers + 25 d-mode Wafers, Year 2: 50 e-mode Wafers and Year 3: 75 e-mode Wafers).