The Radio-Frequency (RF) GaN market is experiencing an impressive growth. Yole Développement expects that the overall GaN RF market will reach $2B by 2024, driven by two main applications: telecom infrastructure and defense.

Thanks to its higher power output at high frequencies and smaller footprint, GaN is increasingly adopted by the RF industry. Compared to existing silicon LDMOS and GaAs solutions, GaN devices are able to deliver the power efficiency level required for next-generation high frequency telecom networks in which power amplifiers play an important role.

System Plus Consulting unveils MACOM’s technical choices in its GaN Wideband Power Amplifier NPA1008, from die design to packaging.

The NPA1008 is a wideband integrated GaN power amplifier optimized for 20-2700 MHz operation. It is ideally suited for general purpose narrowband to broadband applications in test and measurement, defense communications, land mobile radio and wireless infrastructure.

In this report, System Plus Consulting presents a deep teardown analysis of the NPA1008.

Distributed by
Yole Développement

MACOM NPA1008 RF Power Amplifier with GaN-on-Si HEMT

Discover the MACOM wideband RF GaN Power Amplifier for general purpose, optimized for 20–2700 MHz operation.

Detailed optical and Scanning Electron Microscope pictures and cross-sections with Energy-Dispersive X-ray analysis are included to reveal MACOM’s technical choices at the microscopic level of the GaN-on-Si HEMT and the passive input match dies. These technical analyses are made together with corresponding patent analyses.

The report provides an estimation of the production costs of the HEMT, the passive die, and the package as well as the estimated selling price of the component.

COMPLETE TEARDOWN WITH

- Detailed optical and SEM photos
- Precise measurements
- Material EDX analysis
- Patent analysis
- Manufacturing process flow
- Supply chain evaluation
- Manufacturing cost analysis
- Estimated selling price
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TERMS AND CONDITIONS OF SALES

1. General provisions

1.1 The Contracting Parties undertake to observe the following general conditions whenever agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-ambiguous indication from the Buyer's side to make a purchase order. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effectiveness of these Terms and Conditions is exclusively applicable at the time of signature of the order.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer’s address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. Purchasing and payment

2.1 Products are sent by email to the Buyer:

- within [2] month from the order for Products already released; or
- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative-release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer

The Seller shall not by no means be responsible for any delay in respect of article 2.2 above, and including inaccuracies where a new event or access to new contradictory information would require for the analyst extra time to compute or compare data, as applicable to the type of event.

2.3 The mailing of the Product will occur only upon the payment, in accordance with the conditions contained in article 3. The mailings are operated through electronic means either by email via the sales department or automatically online via an email/password. If the Product's electronic delivery format is defective, the Seller undertakes to notify the Buyer and to provide a replacement of the defective format within 90 days from the date of the original download or receipt of the Product.

2.4 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be sent in writing to the Seller within 30 calendar days. The Seller agrees to provide evidence of such defects within 30 days.

2.5 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.3 shall remain at the Buyer's risk.

3. Price, invoicing and payment

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effectiveness of these Terms and Conditions is exclusively applicable at the time of signature of the order.

3.2 The Buyer may offer a pre-release discount for the companies willing to acquire in the future the specific report and agreeing on the fact that the report may be released later than the anticipated release date. In exchange to this understanding the Seller company will get a discount that can vary from 15% to 30%.

3.3 Payments due by the Buyer shall be sent by cheque payable to Yole Développement, credit card or by electronic transfer to the following account:

HSBC, 1 place de la Bourse 69002 Lyon France

Branch code: 00170
Account n°: 0170 200 1565 87
BIC or Swift: C00FRPPP
IBAN: FR 76 3003 6001 7001 7020 0156 587

4. Delivery, risks, ownership, and transfer

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretation of the marks of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss caused by the Products arising from a material breach of this agreement.

4.3 In no event shall the Seller be liable for:

- damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of business, interference with the use of programs or information) arising out of the use or inability to use the Seller’s website or the Products, or any information provided on the website, or in the Products;
- any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 The Seller shall not be liable for any delay in performance strictly or indirectly caused by or resulting from acts of nature or any other cause beyond the Seller's control which prevent or delay the performance of the Seller's services, including without limitation, strikes, labor disputes, floods, storms, accidents, acts of war, fire, governmental actions, laws, orders, or disasters beyond the Seller's control.

4.6 The Buyer agrees to pay in full the price of the Product, including all taxes, duties, levies, and other charges, whether or not specified.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are no guarantee as to the actual delivery dates. The replacement is guaranteed for a maximum of two months starting from the date of the Product's delivery but the Seller reserves the right to change from time to time the correct use of this guarantee.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of sale ability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. Force majeure

5.1 In the event of termination of the contract, or in default of contract, the Seller will have the right to invoice the stages in progress, and to take legal action for damages.

6. Responsibility of the Seller

6.1 All the IPR attached to the Products are and remain the property of the Seller and are protected under French and international laws. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effectiveness of these Terms and Conditions is exclusively applicable at the time of signature of the order.

6.2 The Buyer agrees not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of the Company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Products for purposes such as:

- Information storage and retrieval systems;
- Recording and re-transmissions over any network (including any local area network);
- Use in any timesharing service, bureau board or similar arrangement or public display;
- Posting any Product to any other online service (including bulletin boards or the Internet);
- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whatever this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyright and will guarantee that the Products are not disseminated out of the company.

6.5 In the context of annual subscriptions, the person of contact shall decide who within the Buyer, shall be entitled to access on line the reports on micro-wennes. In this respect, the Seller will give the Buyer a maximum of 10 accounts for the entire subscription period. The subscription organization shall be the responsibility of the Buyer. They shall be effective as from the date of purchase. The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

7. Miscellaneous

7.1 The buy may cancel the order in whole or in part post the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation of the order. The Buyer shall be entitled to any other direct or indirect costs or damages caused by the delay caused by the Seller.

7.2 In the event of breach by one Party under these conditions or the Seller breach the other Party shall be entitled to send by registered delivery a letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

7.3 All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

7.4 The Buyer and the Seller shall be the only organizations by which the Buyer acquires any rights. They shall be effective as from the date of purchase. The Seller may, from time to time, update these Terms and Conditions and the Buyer is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time. The Buyer shall have no other jurisdiction.

7.5 Any dispute arising out of or linked to these Terms and Conditions or to any contract (or orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Lyon, which shall have exclusive jurisdiction upon such issues.

7.6 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.

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