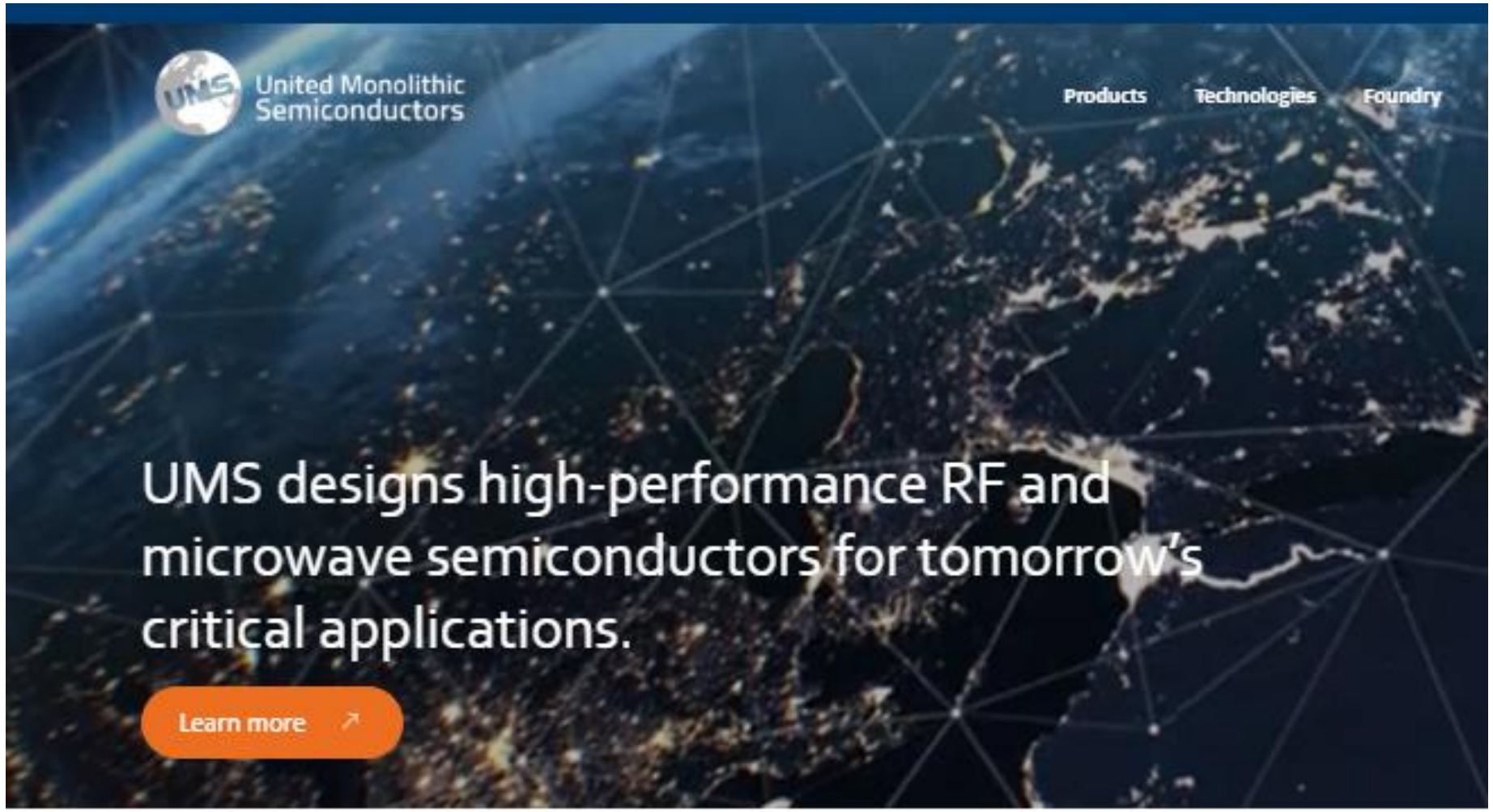
UMS presentation slides



RF & Millimeter-Wave Foundry Services

UMS foundry services offer open access to advanced III-V process technology with expert technical assistance enabling clients to create custom MMIC solutions.

For almost 30 years now, UMS has been a leading provider of III-V open foundry services used for the design of state-of-the-art RF and microwave MMICs in the Defense, Space, Telecom and ISM markets. Our UMS GaAs and GaN-on-SiC technologies are developed in-house and processed on industrial manufacturing lines located in Germany. From product development to full production, at UMS we support our foundry customers' growth all over the world.

UMS Foundry Services include open access to

- Leading edge GaN & GaAs technologies qualified for space: Reliability and high performance
- Widely scalable and highly accurate models: Design safety and fast time-to-market
- Extensive back-end capabilities: A la carte services on wafer or products
- Industrial low-cost packaging services: Competitive scalability

What you get when chosing UMS Foundry Services

- Dedicated support from design to tested and packaged products
- European manufacturing for small to large volume

UMS comprehensive support and set of solutions will enable you to design innovative systems, launch products on time to market and secure your supply chain for production.

UMS Preferred Design Centers

For customers lacking in-house design resources or with limited MMIC design expertise, but willing to benefit from UMS advanced processes and foundry services, UMS recommends the design services of MEC and Viper RF who are well-established design houses with a strong experience of using UMS foundry services.

Both design houses have highly skilled engineers with extensive experience in using UMS design tools and processes, as well as a proven track record of successfully delivering high-frequency, high-performance UMS-based MMICs. Outsourcing MMIC design to those UMS preferred design centers is a highly recommended option for companies seeking design expertise and cost-effectiveness, and willing to be on target immediately through the first MMIC prototyping run.

Since its inception in 2004, MEC has been dedicated to developing high-performance MMICs on UMS advanced IIIV processes. Over the years, more than 200 MMICs have been designed with UMS, mainly for space, military and telecom applications. Notably, MEC and UMS have successfully cooperated on many European strategic programs.

MEC's strengths are its ability to design very challenging high-power GaAs and GaN MMICs up to millimeter bands, its in-house thermal modeling expertise and its on-field applicative support.

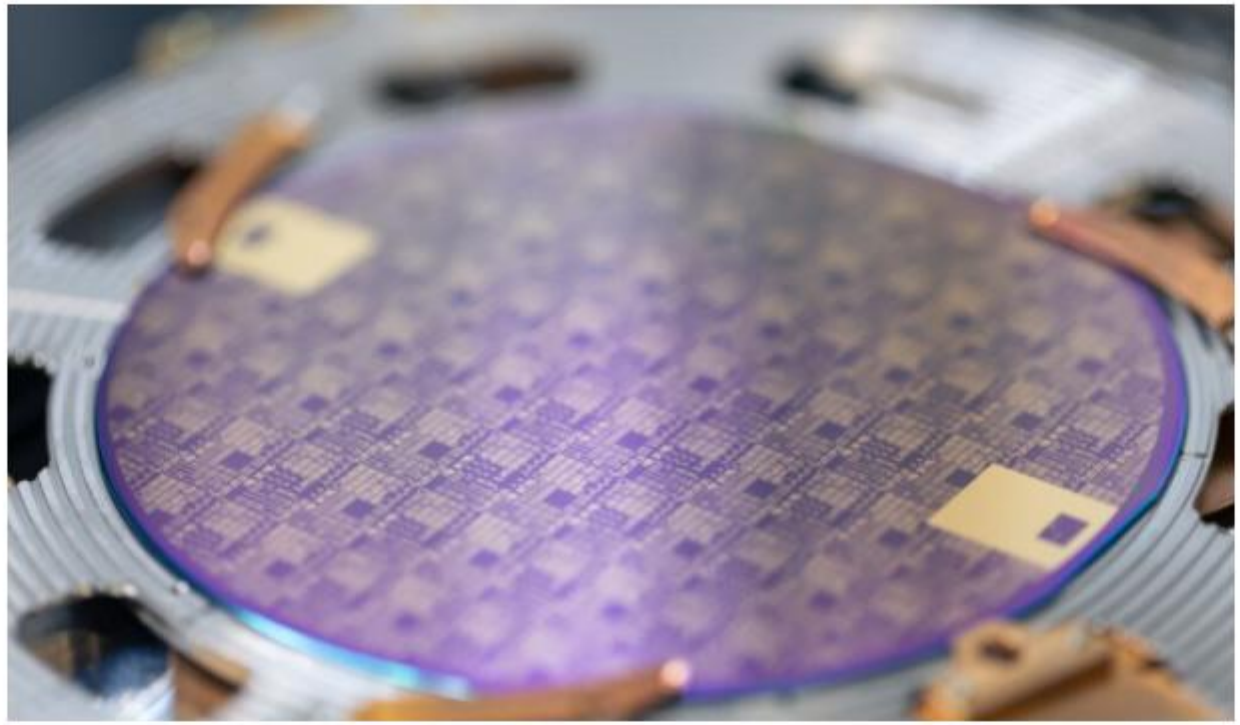
Visit MEC website for more information ↗

VIPER RF is a microwave and millimetre-wave product company with headquarters in the United Kingdom. The company was established in 2008 and is now a globally recognized MMIC supplier and design center.

VIPER RF custom designs GaAs & GaN MMICs for applications from 1-150GHz and has supplied MMICs into some of the most demanding commercial, defence and space markets.

Visit VIPER RF website for more information ↗

Test your Innovative Circuits with our Proven Technologies



https://www.ums-rf.com/shared-foundry-runs/

Shared foundry runs or Multi-Project Wafers (MPW) are a cost effective foundry approach well suited for Institutes, Labs, Research Centers and Universities. This service allows different customer projects on a single wafer.

You will be able to:

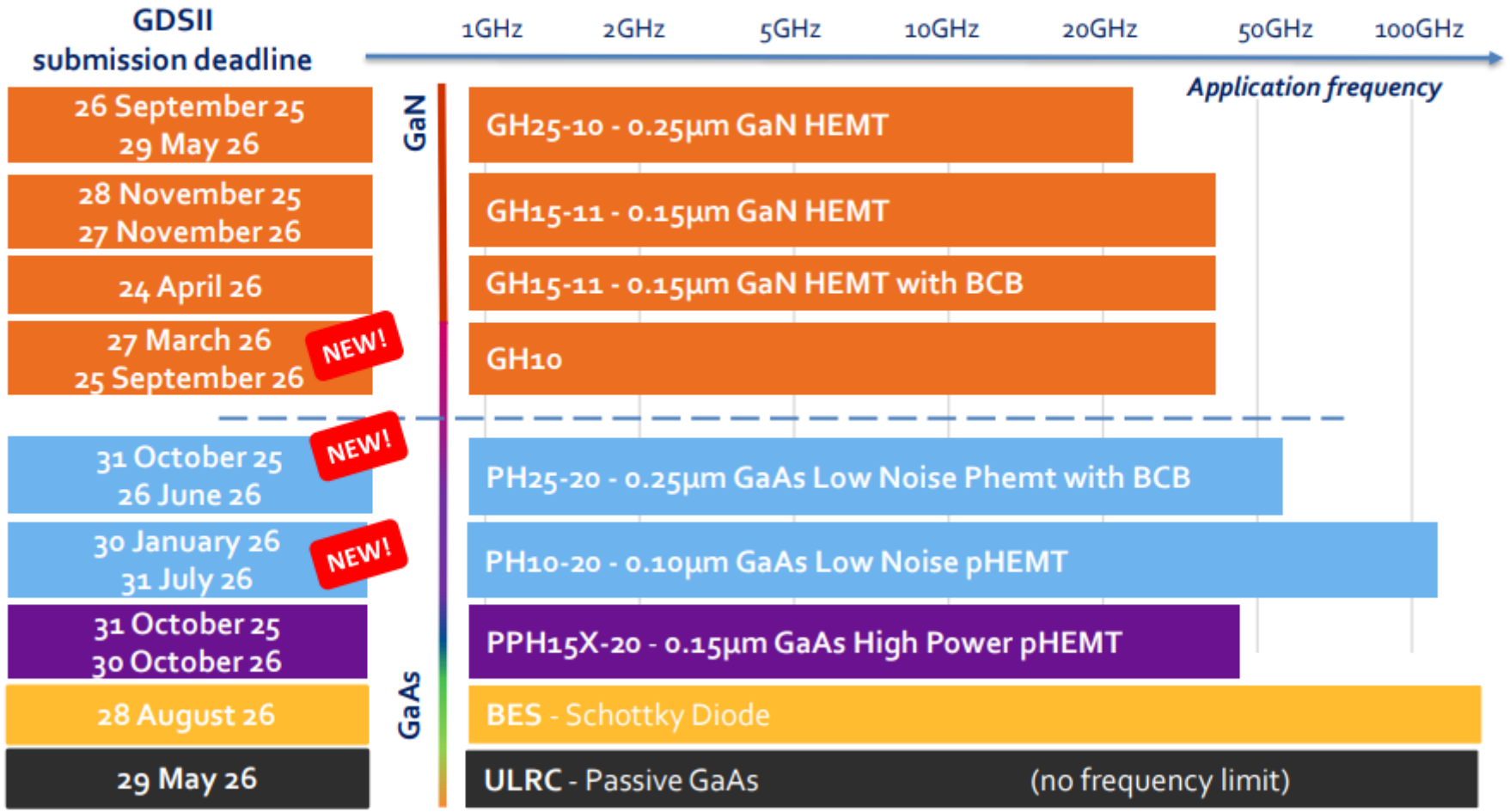
- Try new designs with high performance processes at limited cost
- Design MMICs not available on the market place with perfect system fit & cost savings
- Ensure business protection with secured IP & product exclusivity
- Participants have free access to Design Kits. 20 diced & untested MMICs in Gel-Pak® box will eventually be delivered.

Shared foundry runs 2025 / 2026

United Monolithic Semiconductors

EXPRESS YOUR TALENT WITH UMS

Create your winning RF products with UMS foundry service



- Order to be place at the lastest 2 weeks before the deadline

Industrial technologies qualified for Space

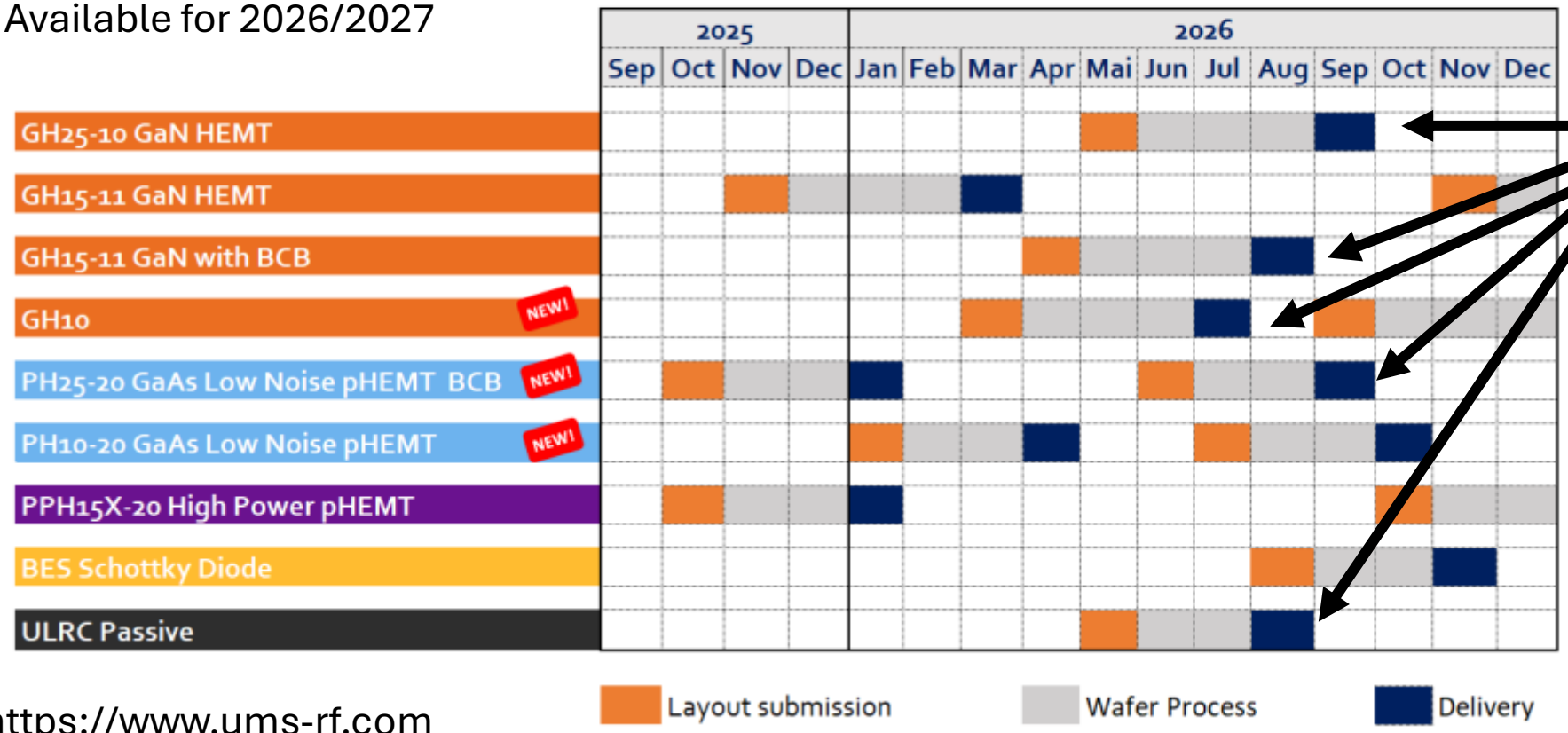
Assume that Similar Fab Schedule is Available for 2026/2027

Shared foundry runs 2025 / 2026

EXPRESS YOUR TALENT WITH UMS

Create your winning RF products with UMS foundry service

United Monolithic Semiconductors



Potential submission windows compatible with MS Thesis Program that would start in Fall Semester with a mid-Spring Semester design submission date. The completed Integrated Circuits would arrive for device characterization in the Fall Quarter. Choose Fabrication dates that Allow for summer fab Schedule!

https://www.ums-rf.com/wp-content/uploads/2025/11/MPW-Planning-2025-2026.pdf

Cal Poly M.S. student IC Design, layout and. design rule check period

IC Fabrication At UMS and Test Design at Cal Poly

IC Test And Thesis

Next MPW Runs

UMS shared foundry runs offer regular Multi Project Wafer runs with information 6 months notice before tape-out.

The possible die length and width, including dicing streets, are:

For high power process PPH15X	For Low noise and multi-purpose processes PH25, PH10, BES	For passive process ULRC	For GaN processes
1.4 mm 2 mm 2.4 mm 3.4 mm 4 mm 4.4 mm	1 mm 1.4 mm 2.4 mm 3.4 mm 4 mm	1.4 mm 2 mm 2.4 mm 3.4 mm 4 mm	1 mm 2 mm 3 mm 4 mm
With maximum aspect ratio 1:3	With maximum aspect ratio 1:3	With maximum aspect ratio 1:4	With maximum aspect ratio 1:4
Die size includes a 70 µm dicing street	Die size includes a 70 µm dicing street	Die size includes a 70 µm dicing street	Die size includes a 100 µm dicing street

Price is determined according to die area and process.

MPW Offer per technology

2025 Low-medium power process runs

- PH10-20 ↗
- PH25-20 with BCB ↗

2025 High Power Process run

- PPH15X-20 ↗

2025 Schottky diode process run

- BES ↗

2025 Passive process run

- ULRC-20 ↗

2025 GaN Hemt process runs

- GH25 10 ↗
- GH15-11 with BCB ↗
- GH15-11 without BCB ↗

Shared Foundry Runs

"*" indicates required fields

Company name *

Region *

APAC | EMEA | AMER

Country *

Name *

First name | Name

E-mail *

Choose your process *

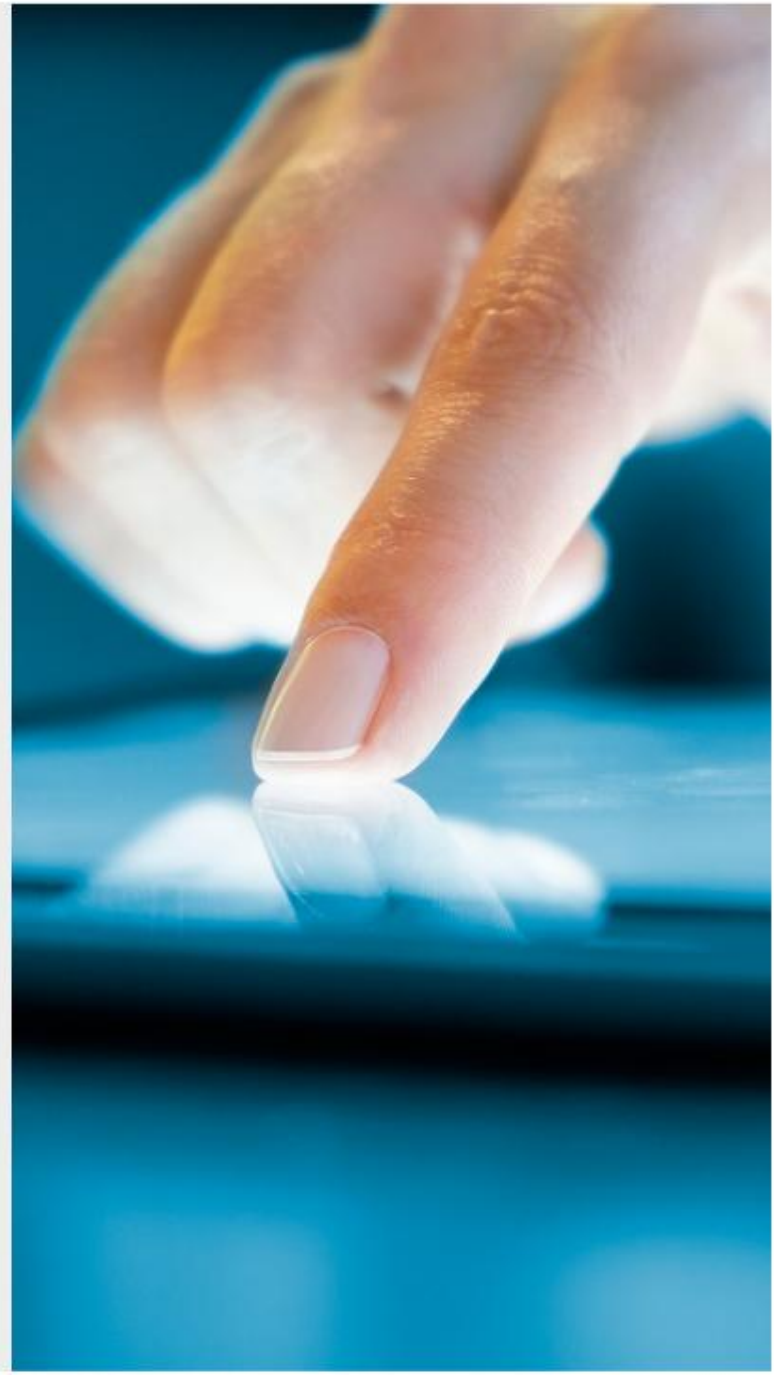
PH1O | PH25 | PPH15X 20 | GH10 | GH15 | GH25 | BES | ULRC | Other Process | Don't know

Please indicate "Other Process" considered or if process "not known", describe your performance objectives

Tape-out date *

mm/dd/yyyy

Submit



UMS Foundry organises regular training for immediate design start!

Participants will get a clear understanding of the technology processes, design flow and techniques to realise effective designs using our latest toolkits.

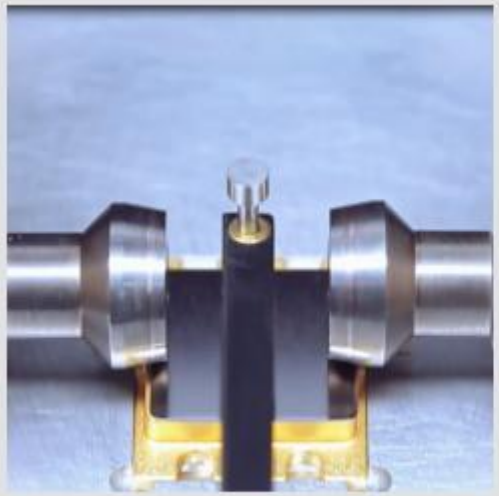
Equip attendees with the optimal methodologies for utilising UMS GaN and GaAs technologies for RF and mmWave MMIC applications - these are the objectives we have set for our Foundry Training.

This session will equip RF designers with the knowledge and skills to utilise the UMS PDKs effectively in circuit design.

During the training we will also address GaAs and GaN wafer fabrication in order to provide attendees with a deeper familiarity with III-V technologies. The important modelling topics are also addressed from both an electrical and thermal perspective. The content of our PDKs is also discussed, and demonstrations are provided with the support of Keysight and Cadence engineers.

Experienced UMS designers will deliver lectures on the following topics: LNA design, HPA design and mixer design. Examples are provided and discussed in detail.

The training also addresses foundry flow, layout rules and specifications related to GaN. Additionally, a lecture is provided on process qualification and the space level. All available back-end activities (on wafer test, dicing and picking) are discussed prior to a Back-end tour. The course furthermore includes discussions on different packaging solutions developed at UMS.



Course Content

The 3-day standard Foundry course is held at regular intervals in our Villebon-sur-Yvette facility.

Typically, the course covers the following topics

- GaAs and GaN Technologies
- Thermal and electrical modelling
- Layout skills and CAD demo with Keysight and Cadence
- Specific techniques for Mixer, High Power Amplifier and Low Noise Amplifier design
- On-wafer measurement and Back-End description
- Reliability and Space qualification
- How to get the best out of our foundry service
- Packaging: discussion of possibilities around a presentation of hardware solutions
- Open forum and specific questions

Contact us if you wish to attend or need further information on our foundry courses.

Contact us ↗

Foundry

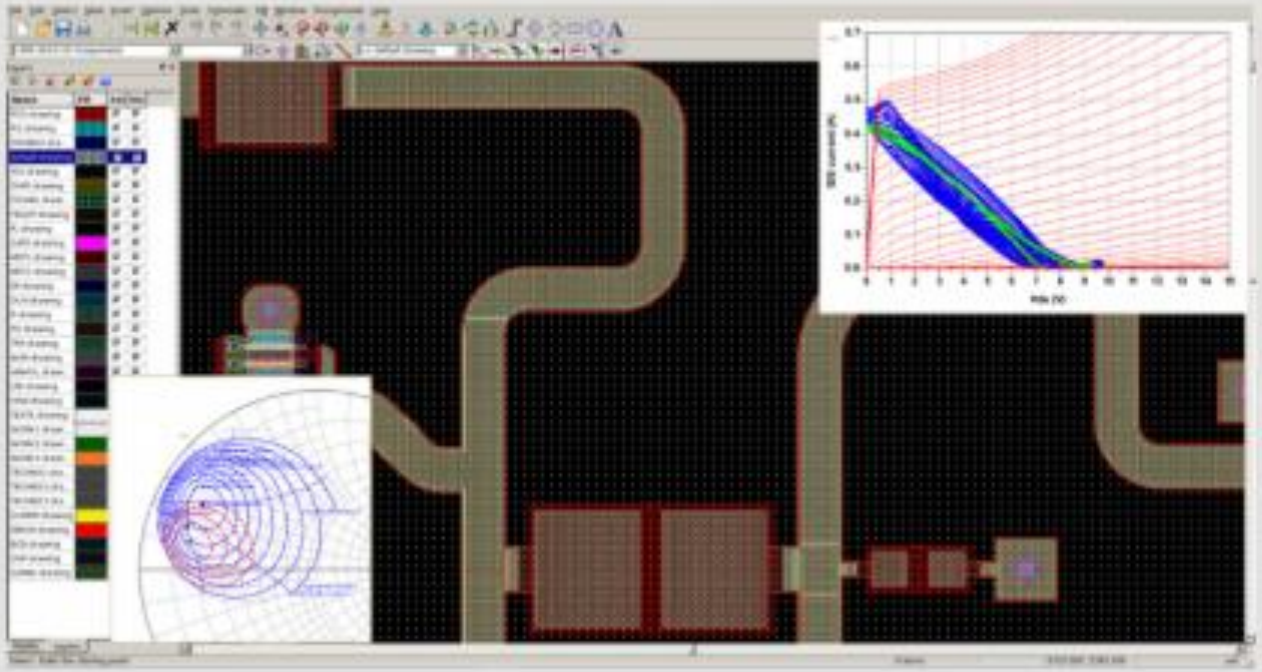
Design Kits

Our unique III-V Device Modelling Experience

UMS has developped an unique experience in III-V devices modelling. The accuracy of our electrical models is a well-known advantage and a key success factor for our foundry customers.

Our design kits have been refined by experienced CAD and modelling teams to shorten design cycle and ensure design optimisation. They include key features:

- Active small and large signal scalable models
- Electro-Thermal models for GaN technology
- Accurate passive models directly linked to auto-layout and library options
- Compatibility with industry standard tools and operating systems
- Proven techniques validated by the design of UMS products



Supported Tools

UMS works closely with main EDA vendors (Keysight, Cadence, ...) to develop and refine an effective suite of simulation packages to support designers. Design kits are fully compatible with

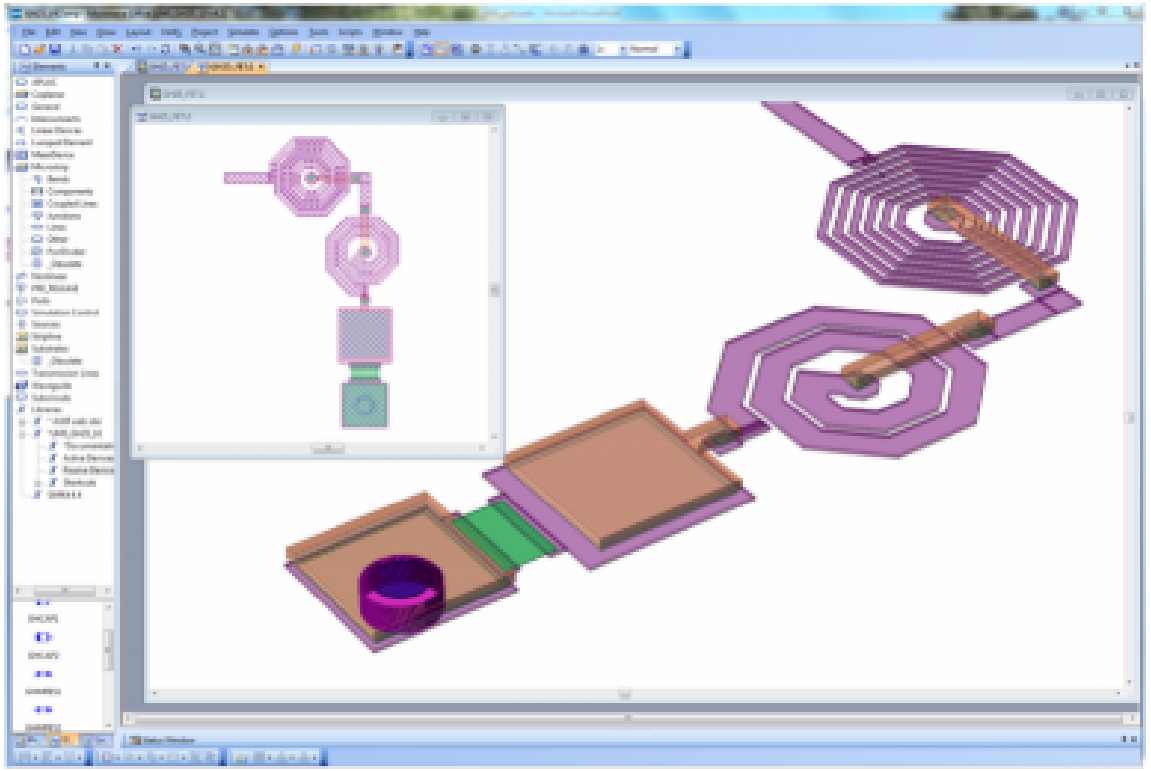
- Keysight Advanced Design System (ADS)
- Cadence :
  - AWR Design Environment Platform
  - Virtuoso (IC61x suite for layout verifications only)

Electrical Models and Libraries

High frequency design is supported by Electrical Model libraries, which have been validated by our 20 year experience design team. Successful solutions are developped for demanding markets and applications. Active and passive device models are available for all qualified processes, with spread data deduced from DC and RF process control monitoring.

For passive designs, UMS provides:

- passive scalable models (transmission lines, inductors, capacitors and resistors)
- substrates for electromagnetic simulations



Design Kit Request

To get your Design Kit, please follow the 2 step procedure:

1. UMS delivery of foundry design kit is subject to acceptance and signature of the DK/DM IP User Agreement.

Please click on the link below to upload the document.

PDK Agreement ↗

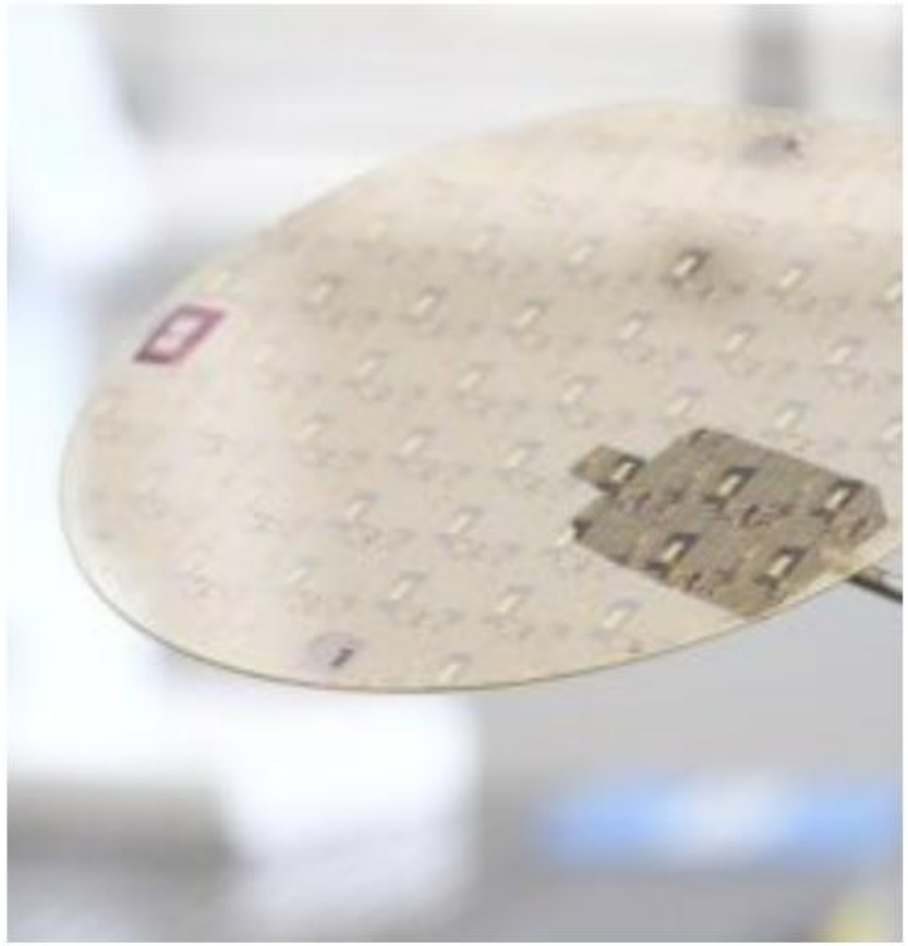
2. Request an account on our website.

We will acknowledge receipt of your request. Your design kit request will be processed as soon as we receive your signed DK/DM IP Use Agreement.

Request a PDK ↗

Foundry

Technologies



Technology for RF and mm-wave Applications

At UMS, we provide designers with dependable, high-performance GaAs and GaN process technologies. Our platforms have been validated through the successful deployment of numerous standard products across key sectors including Defence, Aerospace, Telecommunications, Automotive, and ISM applications.

Our advanced GaN HEMT, GaAs pHEMT, HBT, MESFET, Schottky diode, and passive component technologies—manufactured on a high-throughput 4-inch production line—are available in open foundry mode. This enables our customers to develop and fabricate their own low-noise or high-power MMIC solutions with full design autonomy.

Download our documentation for more information:

- Foundry brochure ↗
- GH10-10 technology ↗
- GaN GH25 technology ↗
- GaN GH15 technology ↗
- PPH15X-20 technology ↗
- PH10-20-Technology ↗
- PH25-20 technology ↗
- Foundry Innovation by UMS ↗

Contact us ↗

Technologies suitable for Space Flight Models

Most of our GaAs and GaN technologies, available in foundry mode, are space evaluated and listed within European Space Agency's (ESA) European Preferred Part List (EPPL).

Open Processes

Key parameters and characteristics for UMS open technologies are summarised below

Process	Active device	Power Density	Gate Length	Ids (gm max) Idss Ids sat/Ic	Operating Vds/Vce	V_{BDS} / V_{BCS}	Max. frequency of use	Vpinch	Gm max / β	Wafer Thickness	Noise / Gain
GH10 GaN	HEMT	3 W/mm	0.1 µm	- - 1.5 A/mm	15 V	>70 V	80 GHz	-2.5 V	550 mS/mm	50 µm	1.8 dB / 12 dB @30 GHz
GH15 GaN	HEMT	4.2 W/mm	0.15 µm	- 1.2 A/mm 1.45 A/mm	25 V	>70 V	45 GHz	-3.2 V	405 mS/mm	70/50 µm	1.5 dB / 11 dB @15 GHz
GH25 GaN	HEMT	5 W/mm	0.25 µm	- 0.88 A/mm 1 A/mm	37 V	>100 V	20 GHz	-3.4 V	290 mS/mm	100 µm	1.8 dB / 11 dB @15 GHz
PH25 Low Noise	pHEMT	250 mW/mm	0.25 µm	200 mA/mm - 500 mA/mm	3.5 V	> 6 V	60 GHz	- 0.8 V	560 mS/mm	100/70 µm	0.6 dB / 13 dB @10 GHz 2 dB / 8 dB @40 GHz
PH15 Low Noise	pHEMT	300 mW/mm	0.15 µm	220 mA/mm - 550 mA/mm	3.5 V	> 4.5 V	80 GHz	- 0.7 V	640 mS/mm	100 µm	0.5 dB / 14 dB @10 GHz 1.9 dB / 6 dB @60 GHz
PH10 Low Noise	pHEMT	250 mW/mm	0.1 µm	280 mA/mm - -	3 V	> 5 V	110 GHz	-0.45 V	750 mS/mm	70 µm	2.3 dB / 4.5 dB @70 GHz
PPH25 Power	pHEMT	700 mW/mm	0.25 µm	200 mA/mm - 500 mA/mm	6 V	> 12 V	30 GHz	- 0.9 V	450 mS/mm	100 µm	0.6 dB / 12 dB @10 GHz
PPH15X Power	pHEMT	800 mW/mm	0.15 µm	350 mA/mm - 575 mA/mm	6 V	> 12 V	45 GHz	- 0.95 V	480 mS/mm	70 µm	1.8 dB / 6 dB @40 GHz
HB20M VCO	HBT	2 W/mm	2 µm Emitter width	- - 0.3 mA/µm²	4 V	> 14 V	30 GHz	-	60	100 µm	-
HP07	MESFET	400 mW/mm	0.7 µm	300 mA/mm - 450 mA/mm	9 V	> 14 V	10 GHz	- 4.0 V	110 mS/mm	100 µm	-
BES	Schottky	-	1 µm	- - -	NA	< -5 V (Anode/Cathode)	>200 GHz	-	-	100 µm	-

(*) based on PCM data

Process datasheets

GaN HEMT

GH25-10 ↗

GH15-1x ↗

GaAs pHEMT Power

PPH15X-20 ↗

PPH25 ↗

GaAs pHEMT Low noise

PH10-10 ↗

PH10-20 ↗

PH15 ↗

PH25-10 ↗

PH25-20 ↗

Foundry innovation by UMS ↗

GaAs HBT

HB20M ↗

GaAs MESFET

HP07 ↗

GaAs Schottky

BES ↗

GaAs passive

ULRC-20 ↗

More Information on our Technologies

"*" indicates required fields

First name *

Last name *

Company *

Country *

E-mail *

Region *

APAC EMEA AMER

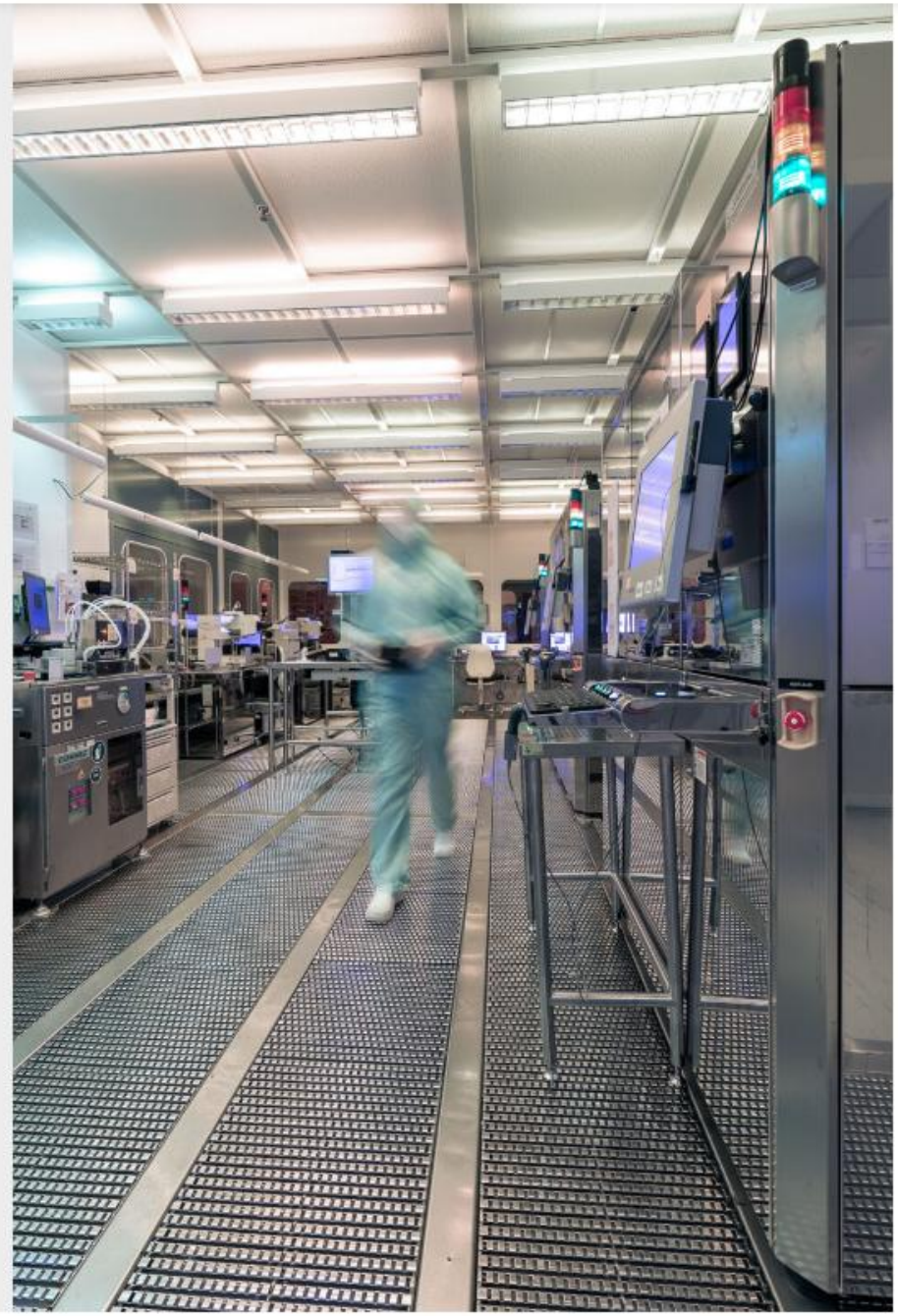
Select technologies you are Interested in *

- PH10
- PH15
- PH25
- PPH15X
- PPH25
- HB20M
- HP07
- BES
- ULRC
- GaN GH15
- GaN GH25

I agree *By clicking on the "I agree" button, you agree to comply with the following and without reservation :*

– not to communicate, assign or resell your acess codes to third parties and to reserve them for your sole and exlusive use – to comply with copyrights and intellectual property rights laws – To limit yourself to information & documents owned by you, public and authorized – In general, not to violate Franch Legislation and ultimately, Laws of your country In accordance with the Data Protection Act og 6 January 1978, you have at any time, a right of access Article 34 to 38, rectification (art. 36) and opposition (Article 26 of the Act).

Send



Design Success: First time & on time

UMS foundry provides an integrated suite of services to ensure your ASIC designs are successfully manufactured on the first run, on time.

We optimize the entire flow from design to fabrication and delivery, offering expert process selection, validated design kits, and continuous technical support.

This includes:

- Right process selection to meet design goals
- Design kits supporting scalable accurate and validated models, available on CAD platforms
- Technical support at all stages
- Manufacturing on reliable and repeatable III-V processes
- Known-good dies delivery
- On Demand:
  - Critical Foundry Design Reviews to early identify and resolve issues
  - MMIC validation through on-wafer tests
  - Prototyping
  - Fast-lane to optimise the project planning
  - Packaging
  - Space flow qualification

Our focus on accelerating your time to market through reliable manufacturing and efficient services makes us your ideal partner.

Contact us ↗

Our Goal: Your Project Success

Our foundry services are committed to providing products and services for a state of the art realization of your project.

Time to Market: the UMS fast track

Our approach is to focus on a range of core and optional services to shorten time to market at a consistent price for our customers.

1	2	3	4	5	6	7
Foundry Course → More information	**Design Kit Delivery** → More information	**DRC – FLR**	**Wafer Fabrication**	**On-Wafer Test Sorting** → More information	**Picking & Delivery**	**Packaging** → More information

Benefits for designers:

- Pre-design support for process selection
- Training courses (optional) to get the most out of your design
- Fast access to get what you need from our processes
- Value added with technical support
- Reduced lead times (fast-lane in option)
- Optional on-wafer testing, pick and sort, for an efficient one stop delivery
- Low cost packaging supported by dedicated PDK
- MPW shuttles (Shared foundry runs)

Do you need more information?

Contact us ↗

https://www.ums-rf.com/faq-foundry

- Frequently asked questions link

United Monolithic Semiconductors

PDK eDRC

DK/DM Request List

Welcome **DENNIS DERICKSON**

Logout

Design list

+ New Request

	Process	Statut	Download expiration
⊞	Process BES	Validated	2030-03-12
⊞	Process PPH15X-20	Validated	2030-03-12
⊞	Process HB20M	Validated	2030-03-12
⊞	Process ULRC-20	Validated	2030-03-12
⊞	Process PH25	Validated	2030-03-12

New Request

User guide

INFORMATION	**Lowest cost guaranteed** Simply provide your layout **before April 19, 2024**

DELIVERY	20 chips
CONDITIONING	Gel-Pak®

AVAILABLE DIE SIZE (mm)	1	1,4	2,4	3,4	4
MAX RATIO	1:3				

Die size include 70µm dicing street - Launching date flexibility is +/- 2 weeks

Dieframes for layout can be provided on request

Minimum order is 4mm² - Price is valid until April 19, 2024

Order to be placed before April 5, 2024

Important Notes:

- UMS may cancel the run in case of insufficient number of participants.
- For some countries a specific dedicated export license may be required before delivery.