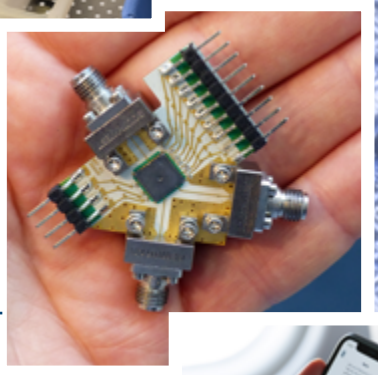
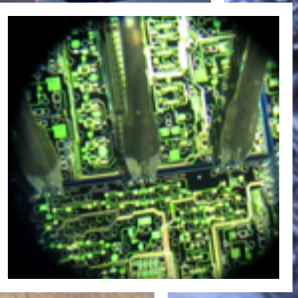
OMMIC
innovating with III-V'S

CATALOG

www.ommic.com

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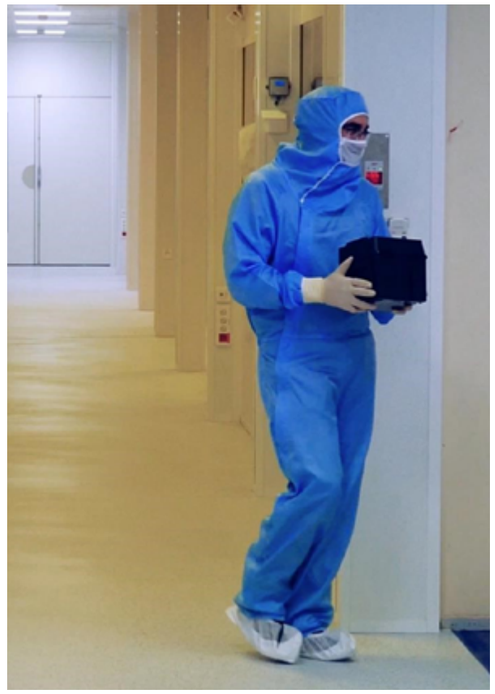


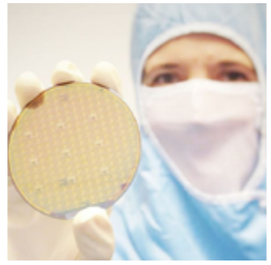
FOREWORD

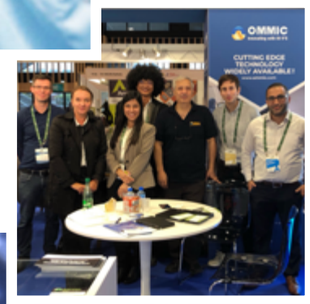
« OMMIC is a pioneer and leader in the III-V domain, in particular in GaN and GaAs semiconductor technologies. With the release of its new 6-inch production line, OMMIC has positioned itself as French industrial leader in the development of the European telecommunications. Its current technologies provides solutions for the 5G base station market at 28 and 40 GHz, as much for the 5G backhaul part of the network.

Indeed, OMMIC's GaN processes can be used at frequencies above 30 GHz with power output that has never been reached before in the industry. In addition, OMMIC is continuously investing in research and development to help its customers built new technologies.

With this unique line in Europe, OMMIC affirms its ambition to strenghten its leadership in the market with ever-increasing production volumes. »

OMMIC INTRODUCTION





OMMIC INTRODUCTION

WHO WE ARE

OMMIC is a supplier of epitaxial wafers, foundry services and MMICs based around the most advanced III-V processes, particularly in GaN and GaAs semiconductor technologies.

In recent years, our activity has been focussing on Gallium Nitride on Silicon (GaN/Si) technology, which is characterized by a higher power density than GaAs —an optimal candidate for emerging applications.
By supplying our advanced technology, we enable our customers to be leaders in a more and more demanding market place. We provide our customers with high-performance RF solutions mainly for:

- **space**: flight model, GPS system,etc.
- ✓ **telecommunication:** repeaters, radio communication, 5G base station,
- ✓ backhaul system, mobile phone switches, autonomous car,etc.
- **defense**: AESA radar, missile seeker, electronic warfare, passive and active
- ✓ imaging, etc.

A QUALITY POLICY

OMMIC advocates a strict quality, safety and environmental policy strictly ingrained in our corporate culture. For a sustainable commitment, we only work with suppliers who adhere to the same policy as us to ensure the protection of everyone. In short, we care about everything that enters and leaves of our company.

In addition, we also comply with ethic environmental standards such as **RoHS** and **REACH** which concerns the production and use of chemicals and their potential impacts on human health and our planet.
Responsive and competitive, as part of our continuous improvement process, we constantly strive to follow the demanding criteria of ISO standards. Indeed, we have been **ISO 9001 certified** since 1994 and **ISO 14001** since 2002. This sustainable commitment is fully supported by its quality management system.

AN INTERNATIONAL PRESENCE

Based in France, near Paris, we occupy a central position in Europe, but also in the world, to deliver the right product at the right time. Thanks to our reactive regional representative network (contact details on the back of the catalog), we are able to follow customers in their most challenging projects in the entire world.

HELP & SUPPORT

Meeting your requirements is our top priority, so we strive to provide you with the best experience. We have dedicated a **support team** at your service to bring you the best support with design or technical application assistance within 24 hours.
OMMIC provides practical solutions and support at no cost!

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PRODUCTS & SERVICES

We are supporting you in all your innovative projects by offering:

STANDARD MMICs

We offer **a comprehensive portfolio** of standard products using GaN/Si and GaAs processes. High performance technologies are available including high power amplifiers, ultra low Noise amplifiers, T/R chips, corechips, switches and more... from DC to 110 GHz.

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CUSTOM DESIGN

Can't find the product you need? OMMIC has a **team of designers** ready to follow you in your most challenging projects.

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FOUNDRY SERVICE

For companies with design capacity, foundry service is the best way to have **reliable sourcing**. Indeed, OMMIC's processes are designed to be produced for extended periode and compatible with space requirements.
We offer high performance HEMT & HBT processes using GaN, GaAs or InP technology. Our Processes Design Kit (PDK) are available under ADS or Microwave Office and come with thorough design manual.

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THE FACTORY

OMMIC's know-how is not limited to fabricating wafers but also includes epitaxy and back-end services. All of OMMIC's divisions are located on our historical site in Paris (an area of 27,000 m²) —this proximity is a key asset to develop innovative technology.

PRODUCTION

OMMIC consits of 5 main buildings with **1500 m²** of clean rooms of class 1000 and class 100 which are fully devoted to III-V integrated circuits development and fabrication.
Our wafers are delivered with **electrical properties guaranteed** by the measurement of specific test modules added during the fabrication called Process Control Monitor (PCM). Processes and equipments are also followed with Statistical Process Control (SPC).

TEST

Once the wafers are fabricated, all dies are measured with DC and RF metrics verified. This includes the bias levels, but also S-parameters, power measurements, noise measurements, etc. This ensure OMMIC delivers only working dies with stunning performances.

Our experience in microwave and millimetre waves tests and probe card's design, leads us to design complex tests procedures allowing testing the main performances and functionnalities of our MMIC products in order to guarantee the delivery of **know good dies**. We open to our customers our RF-test capabilities and knowledge to design and conduct tests on their own prototypes, in order to help them to validate and improve their products.

INSPECTION

The visual inspection process plays an essential role in our manufacturing steps to ensure anomaly detection. We can therefore implement prompt corrective or preventive responses and verify the finaly quality of each die before sending them to our customers.
In order to do so, we perform preliminary visual inspections at each critical step in the production line with sampling and a final visual inspection.
Two level of screening are available:

- ✓ **space grade** for the highest reliability
- ✓ **commercial grade** for product with less stringent requirements

STRATEGY & ROADMAP

OMMIC strategy is articulated aroung GaN/Si technology. With its wide bandgap and high electron mobility, GaN is a perfect candidate for emerging applications. Our strategy includes:

FULL UPDATE OF GaAs SOLUTIONS

OMMIC plans to fully update its GaAs pHEMT MMICs by our more efficient GaN/Si technology, offering the best III-V RF solutions, complementary to Silicon RF solutions.

HIGH-END DEFENSE INDUSTRY

We continue to serve high-end high value-added military market, by taking advantage of state-of-the-art processes.

SPACE QUALIFIED PROCESSES

We continue to serve high-end high value-added space industry, by taking advantage of avant-garde Hi-Reliability processes. This is why, we space qualify all our processes. Currently, the D007IH and D01GH are being evaluated by ESA.

LATEST NEWS

NEW PRODUCTS

This year, new standard products were released, we want to highlight 8 of them:

- 44-70 GHz LOW NOISE AMPLIFIER (CGY2272UH)
- 6-18 GHz 40 dBm GaN POWER AMPLIFIER (CGY2631UH)
- 14.5-18 GHz 43 dBm GaN POWER AMPLIFIER (CGY2632AUH)
- 14-18 GHz 46 dBm GaN POWER AMPLIFIER (CGY2632BUH)
- 25-29 GHz 41 dBm GaN POWER AMPLIFIER (CGY2653UH)
- 32-38 GHz 40 dBm GaN POWER AMPLIFIER (CGY2654UH)
- 2-20 GHz 40 dBm GaN POWER AMPLIFIER (DEV2641UH)
- 17-27 GHz 40 dBm GaN POWER AMPLIFIER (DEV2642UH)

For further details, please do not hesitate to contact our engineering team at information@ommic.com

FOLLOW US

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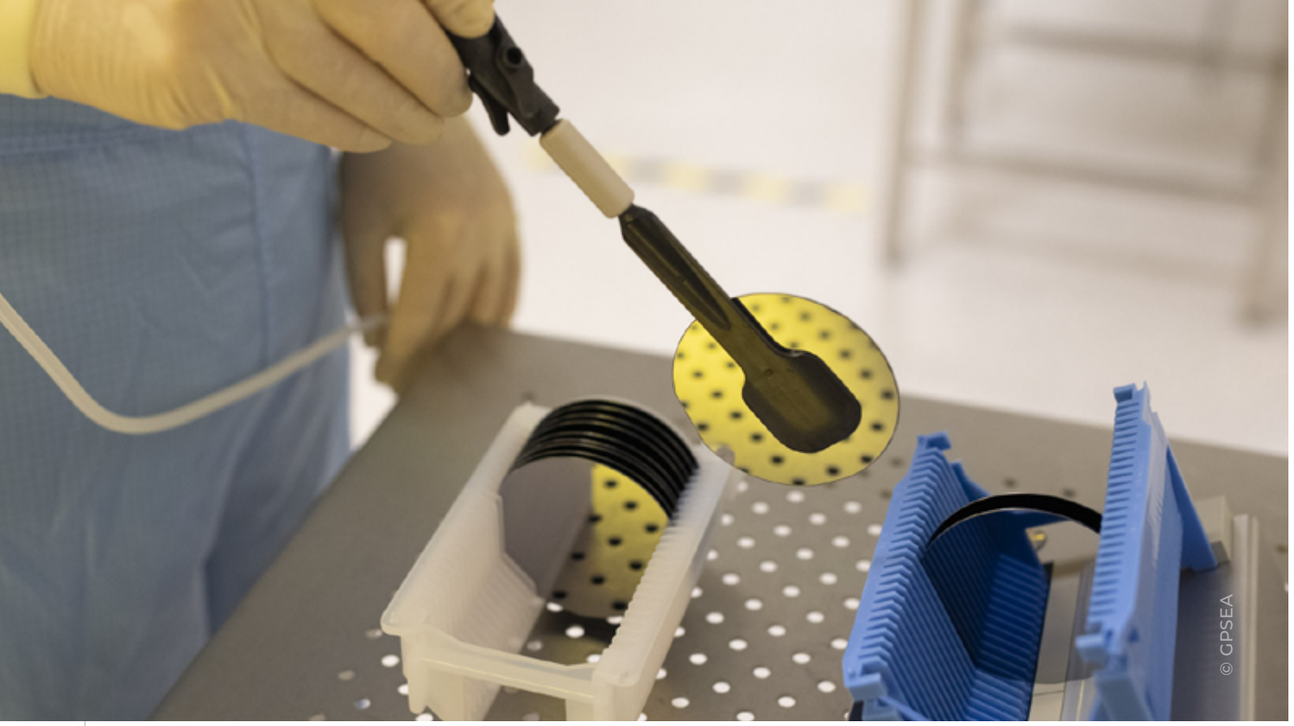
PRODUCT PORTFOLIO

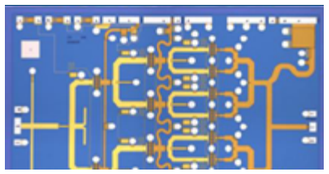


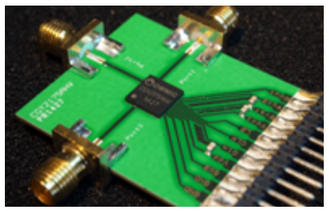
PRODUCT PORTFOLIO

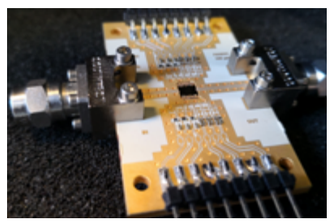
MMICs OFFERING

OMMIC offers a comprehensive portfolio of products using GaN/Si and GaAs processes. High performance technology is available from DC to 110 GHz including:

- **amplifiers,**
- **control functions,**
- **frequency converters**
- **diodes**
- **opticals**







Because meeting customer expectations is our top priority, we have chosen to space qualify all our processes in order to carry out your most demanding requirements. Thus, our GaN/Si and GaAs technologies are **space qualified** or currently being evaluated by the European Space Agency (cf page 28)

In order to get the highest level of reliability, all OMMIC's MMICs use gold bonding pads, backside metallization and are fully protected with Silicon Nitride passivation.
Please note that, as a company that cares about the environment and the protection of all, OMMIC's products are **RoHS** and **REACH compliant**.

AMPLIFIER

OMMIC portfolio offers a wide range of amplifiers including T/R chips, Low Noise Amplifiers (LNAs), Power Amplifiers (PAs), wideband and gain blocks amplifiers.
OMMIC's amplifiers can be used for applications such as **radar, telecom, satcom** and also **electronic warfare**. Our strategy is to fully replace our GaAs pHEMT products by our more efficient GaN/Si technology. Today, our portfolio cover L-, to W-band. This includes GaN products for power application, robust LNA and front end chips.

POWER AMPLIFIER

Need power and efficiency? We offer power amplifiers (drivers & HPA) from L- to Q-band. PAs using the trusted reliability of GaAs pHEMT technology have been space qualified and are well suited for flight models.
Take advantage of the high power density if our GaN amplifiers featuring outstanding performances with ouput power above 40 dBm, high linearity, low noise, no noticeable memory effect and efficiency up to 45%.

PERFORMANCE TABLE FOR POWER AMPLIFIERS

PRODUCT	FREQ. (GHz)	GAIN (dB)	PSAT (dBm)	PAE (%)	BIAS CURRENT (A)	DRAIN VOLTAGE (V)	PKG	STATUS
NEW DEV**2641**UH	2-20	20	40	40	-	-	Die	Sample
NEW CGY**2631**UH	6-18	20	40	38	2	12	Die	Sample
NEW CGY**2632B**UH	14-18	28	46	35	-	12	Die	Ask us
NEW CGY**2632A**UH	14.5-18	29	43	35	-	12	Die	Ask us
NEW DEV**2642**UH	17-21	25	40	42	2.5	9	Die	Prod
CGY**2135**UH/C1	18-23	25	33	20.2	1.2	4	Die	Prod
NEW CGY**2653**UH	25-29	21	41	30	-	-	Die	Dev
CGY**2650**UH/C1	29.5-33.5	20	40	31	1.2	12	Die	Prod
NEW CGY**2654**UH	32-38	22	40	30	-	-	Die	Sample
CGY**2651**UH/C1	37-43	22	40	35	2.7	12	Die	Prod

board available
**MMIC labeled in blue are using GaN/Si technology*
space evaluated product

LOW NOISE AMPLIFIER

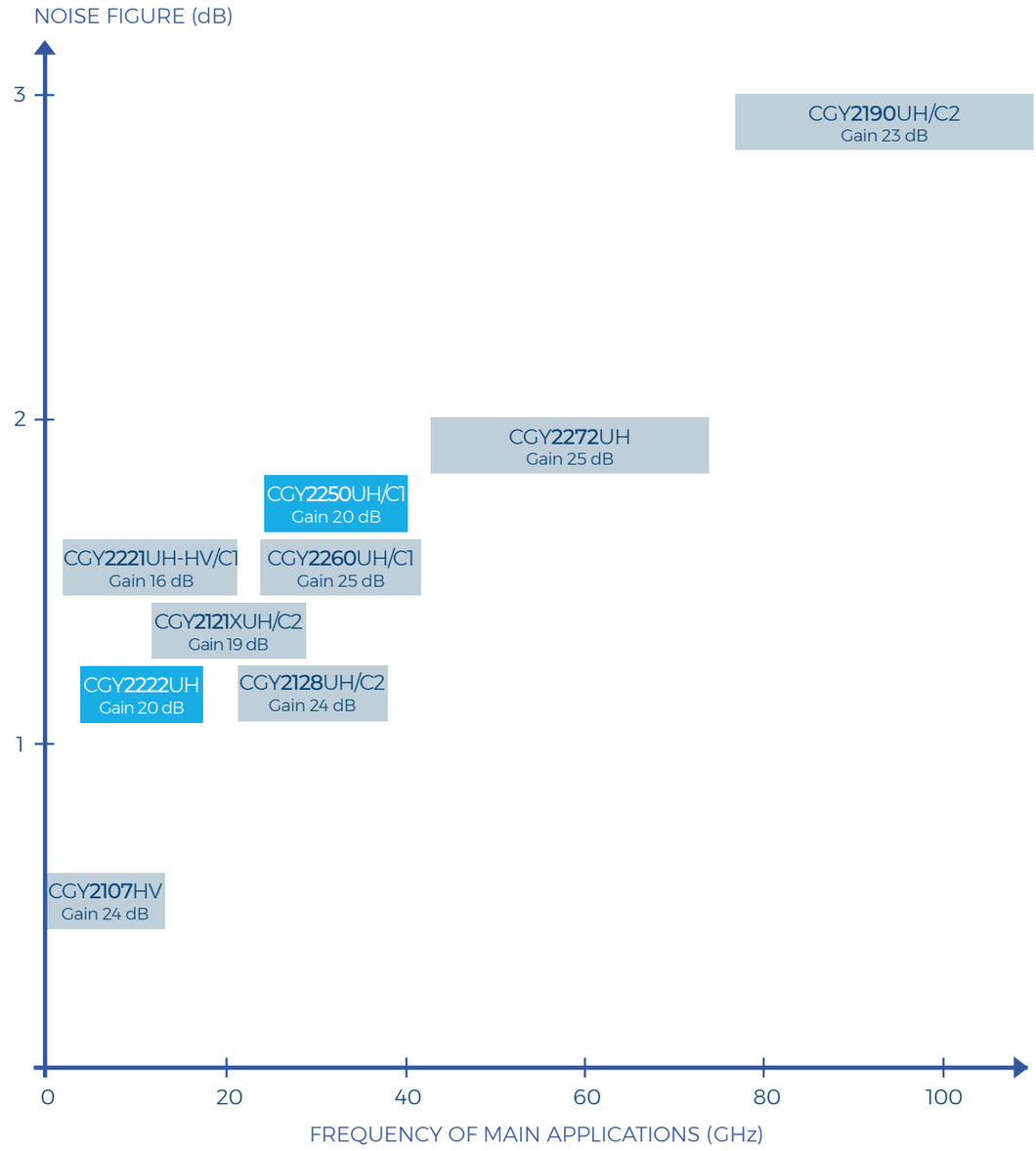
We offer LNAs from 100 MHz to 110 GHz. All of OMMIC processes are designed to minimize the noise figure of the transistors. Metamorphic technology (e.g. D007IH & D004IH) is especially good for providing low noise at high frequencies.

Looking for a robust LNA (Pin > 40 dBm)? The large breakdown voltage combined with the low noise of our GaN/Si technology makes it perfect for such feature. They have been designed so that maximum input power is higher than 33 dBm in CW. This is handy because, in most settings, no limitor is needed in front of the LNA. Moreover, GaN LNAs feature high power saturation, which allows high dynamic range radars.

PERFORMANCE TABLE FOR LOW NOISE AMPLIFIERS

PRODUCT	FREQ. (GHz)	GAIN (dB)	NF (dB)	OP1dB (dBm)	CURRENT (mA)	VOLTAGE (V)	PKG	STATUS
CGY**2106**XHV	0.1 - 3	19	0.45	35	100	5	QFN	Prod
CGY**2105**XHV	0.5 - 4	19	0.42	35	100	5	QFN	Prod
CGY**2107**HV	0.5 - 6	24	0.5	36	100	5	QFN	Prod
CGY**2108**GS	0.5 - 6	21	0.6	36	100	5	Herm. Glass	Prod
CGY**2108**HV	0.5 - 6	22	0.5	36	100	5	QFN	Prod
CGY**2220**UH/C1	1 - 12	35	1.3	12	52	1.5	Die	Prod
CGY**2230**UH/C1	1 - 18	35	1.5	12	50	1.5	Die	Prod
CGY**2178**UH/C1	5 - 6	30	1	15	40	3	Die	Prod
CGY**2120**XUH/C1	5 - 7	13	0.5	12	1	50	Die	Prod
CGY**2290**SUH/C1	6 - 18	9	3.3	13	33	5	Die	Prod
CGY**2221**HV/C1	7.5 - 13	16	1.6	17	82	5	QFN	Prod
CGY**2124**UH/C1	8 - 12	33	1.1	11	55	5	Die	Prod
CGY**2221**UH/C1	8 - 12	16	1.6	17	82	5	Die	Prod
CGY**2222**UH	8 - 12	20	1.5	20	160	8	Die	Sample
CGY**2232**UH/C1	12 - 15	27	1.3	0	50	3	Die	Prod
CGY**2125**AUH/C1	13 - 15	25	1	8	20	3.3	Die	Prod
CGY**2121**XUH/C2	18 - 26	19	1.5	5	60	0.8	Die	Prod
CGY**2128**UH/C2	24 - 34	24	1.3	11	47	3.5	Die	Prod
CGY**2122**XUH/C2	25 - 43	32	1.5	1	30	1.1	Die	Prod
CGY**2260**UH/C1	25 - 43	25	1.5	8	50	1.5	Die	Prod
CGY**2250**UH	26 - 34	20	1.6	17	90	8	Die	Prod
NEW CGY**2272**UH	44 - 70	25	2	5	40	1.1	Die	Prod
CGY**2271**UH	71 - 86	25	3	10	40	1.1	Die	Sample
CGY**2190**UH/C2	75 - 110	23	3	1	33	1	Die	Prod

board available
**MMIC labeled in blue are using GaN/Si technology*
space evaluated product



T/R CHIP

Are you designing a RF front-end? We offer T/R chips operating from 26 to 40 GHz which are composed of a PA, a LNA and switches to route the signal.
OMMIC's T/R chips are design with GaN/Si technology which features high output power, outstanding efficiency as well as great robustness.

PERFORMANCE TABLE FOR T/R CHIPS

PRODUCT	FREQ. (GHz)	GAIN Rx / Tx (dB)	Tx POUT (dBm)	Rx NF (dB)	SUPPLY CURRENT (A)	SUPPLY VOLTAGE (V)	PKG	STATUS
CGY**2750**UH	26 - 34	20 / 20	36	2.7	0.45	12	Die	Sample
CGY**2760**UH	37 - 40	16 / 27	35	3.5	1.3	12	Die	Demo

WIDEBAND AMPLIFIER

Our portfolio of MMICs, includes wideband amplifiers from DC to 54 GHz dedicated to application such as instrumentation, electronic warfare and 43 Gb/s OC-768 EAM driver. OMMIC's wideband amplifiers are space qualified because they are manufactured using GaAs pHEMT technology.

PERFORMANCE TABLE FOR WIDEBAND AMPLIFIERS

PRODUCT	FREQ. (GHz)	GAIN (dB)	NF (dB)	P1dB OUT (dBm)	SUPPLY CURRENT (A)	SUPPLY VOLTAGE (V)	PKG	STATUS
CGY**2141**UH/C1	0.01 - 46	16	2	21	195	5	Die	Prod
CGY**2144**UH/C2	0.01 - 54	13	2.5	15	100	5	Die	Prod
CGY**2145**UH/C1	0.5 - 45	13	2.6	18	85	5	Die	Prod
CGY**2160**UH/C1	1.5 - 47	15	2.5	19	103	5	Die	Prod

GAIN BLOCK AMPLIFIER

We offer gain block for industrial applications, wireless infrastructure, aerospace and defense.

PERFORMANCE TABLE FOR GAIN BLOCK AMPLIFIERS

PRODUCT	FREQ. (GHz)	GAIN (dB)	NOISE FIGURE (dB)	PSAT (dBm)	PKG	STATUS
CGY**2731**UH/C1	12 - 15	19	4	10	Die	Prod

board available
**MMIC labeled in blue are using GaN/Si technology*
space evaluated product

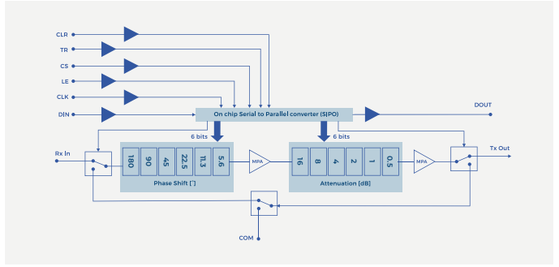
CONTROL FUNCTION

OMMIC's portfolio offers a large choice of control functions including corechips, phase shifters, attenuators, true time delays and switches operating from DC to 96 GHz. These devices are ideal for use in civil applications such as radars, telecommunication, instrumentation, GPS systems but also for passive and active imaging.

CORECHIP

Corechips are based on the integration in a single die of digital phase shifters, digital attenuators, LNAs, MPAs and switches for phased array antenna applications. Phase shifters, attenuators, LNAs and MPAs integrated into a single chip controlled through Serial CMOS TTL compatible access.
With our ED02AH process, it is possible to have enhanced (E) and depletion (D) transistors on the same die. Having E- and D- type transistors allows one to design control functions with a serial interface that simplifies the interaction with the device.

Example: CGY2170YHV/C1 a 6 bit packaged Corechip
Each phase and attenuation states are loaded in the shift register (at a clock (CLK) rate up to 250 MHz), then phase and attenuation configuration are changed after latch enable (LE) signal.



PERFORMANCE TABLE FOR CORECHIPS (PS + ATT)

PRODUCT	ACCESS	FREQ. (GHz)	INTERFACE	BITS	RMS	ATTENUATION / PHASE RANGE	PKG	STATUS
CGY**2175**AHV/C1	3 ports	4.5-6.5	CMOS, Serial	6	0.5 dB / 2°	31.5 dB / 360°	QFN	Prod
CGY**2175**AUH/C1	3 ports	4.5-6.5	CMOS, Serial	6	0.2 dB / 1.3°	31.5 dB / 360°	Die	Prod
CGY**2170**YHV/C1	3 ports	8-12	CMOS, Serial	6	0.5 dB / 4°	31.5 dB / 360°	QFN	Prod
CGY**2170**YUH/C1	3 ports	8-12	CMOS, Serial	6	0.4 dB / 3°	31.5 dB / 360°	Die	Prod
CGY**2330**UH/C1	2 ports	12-15	Serial	6	0.5 dB / 11.25°	15 dB / 348.8°	Die	Prod
CGY**2351**UH/C1	2 ports	26.5-30.5	Serial	6	0.5 dB / 4°	22 dB / 360°	Die	Prod
CGY**2350**UH/C1	2 ports	34-36	Serial	5	0.5 dB / 5°	15 dB / 348.8°	Die	Prod

Phase shifter + LNA integrated in one die for internet over satellites Rx phased array antenna application.

PERFORMANCE TABLE FOR Rx CORECHIPS

PRODUCT	ACCESS	FREQ. (GHz)	GAIN / NF (dB)	OP1dB (dBm)	BITS	PHASE ERROR RMS (°)	INTERFACE (V)	PKG	STATUS
CGY**2179**HV/C1	2 ports	10.7 - 12.75	12 / 2	3	4	7	0 / +5	QFN	Prod
CGY**2179**UH/C1	2 ports	10.7 - 12.75	12 / 2	3	4	7	0 / +5	Die	Prod

board available
space evaluated product

PHASE-SHIFTER

Need to change the phase of a signal? OMMIC offers digital phase shifters from 4.8 to 18 GHz with its space qualified ED02AH GaAs pHEMT process. Use 360° phase shifting chips down to 1.09° RMS Phase Error with insertion loss from 5 dB.
Phase shifters are dedicated for defense, communication and aerospace.

PERFORMANCE TABLE FOR DIGITAL PHASE-SHIFTER FUNCTIONS

PRODUCT	FREQ. (GHz)	PHASE CONTROL (°)	INSERTION LOSS (dB)	IP1dB (dBm)	BITS	PHASE ERROR RMS (°)	INTERFACE (V)	PKG	STATUS
CGY**2177**AUH/C1	4.8 - 6.8	360	5	20	6	2	0 / +5	Die	Prod
CGY**2173**UH/C2	6 - 18	360	13	27	6	4	0 / -3	Die	Prod
CGY**2392**SHV/C1	6 - 18	360	10.8	20	6	1.09	0 / +5	QFN	Prod
CGY**2392**SUH/C1	6 - 18	360	10.8	20	6	1.7	0 / +5	Die	Prod
CGY**2172**XAUH/C1	8 - 12	360	8	18	6	2	0 / -3	Die	Prod
CGY**2172**XBUH/C1	8 - 12	360	8	18	6	3	0 / +5	Die	Prod
CGY**2174**UH/C1	14 - 16	360	8	20	6	6	0 / -3	Die	Prod

ATTENUATOR

Need to reduce amplitude level of incoming signal, protect your systems from high power? We offer attenuators from 1 to 18 GHz with its space qualified ED02AH GaAs pHEMT process. Up to 35 dB attenuation range in 0.5 dB steps.

PERFORMANCE TABLE FOR DIGITAL ATTENUATOR FUNCTIONS

PRODUCT	FREQ. (GHz)	AMPLITUDE CONTROL (dB)	INSERTION LOSS (dB)	IP1dB (dBm)	BITS	RMS ATTEN. (dB)	INTERFACE (V)	PKG	STATUS
CGY**2176**AUH/C1	1 - 8	31.5	5.6	-	6	0.20	0 / +5	Die	Prod
CGY**2171**XBUH/C1	1 - 15	31.5	5	20	6	0.25	0 / +3	Die	Prod
CGY**2390**SUH/C1	6 - 18	35	2.2	-	3	0.20	0 / +5	Die	Prod
CGY**2169**UH/C1	10 - 18	23.5	4	20	6	0.40	0 / -3	Die	Prod

TRUE TIME DELAY FUNCTION

We offer true time delay functions of 1-bit and 5-bit operating from 6 to 18 GHz introducing a delay from 10 to 330 ps.

PERFORMANCE TABLE FOR TRUE TIME DELAY FUNCTIONS

PRODUCT	FREQ. (GHz)	BITS	MIN DELAY (ps)	FULL DELAY (ps)	INSERTION LOSS (dB)	INTERFACE (V)	PKG	STATUS
CGY**2394**SUH/C1	6-18	1	330	330	6	0 / +4	Die	Prod
CGY**2393**SUH/C1	6-18	5	10	310	6	0 / +4	Die	Prod

board available
space evaluated product

SWITCH

Our switches portfolio includes discrete components from single-pole-single-throw (SPST) to single-pole-dual-throw (SPDT). These switch products showcase a great isolation, low losses and large power handling.

PERFORMANCE TABLE FOR SWITCHES

PRODUCT	FREQ. (GHz)	ISOLATION (dB)	INSERTION LOSS (dB)	SWITCHING SPEED (ns)	PKG	STATUS
CGY**2890**SUH/C1	6 - 18	> 50	1.5	-	Die	Prod
CGY**2370**UH/C1	92 - 96	35	2.2	10	Die	Prod

FREQUENCY CONVERTER

WIDEBAND MIXER

Looking for high frequencies converters? We have the solution with our range of various up and down converters. Designed to feature high isolation, our wideband mixers can be used for applications such as radars, telecommunication, instrumentation, GPS systems and much more.

PERFORMANCE TABLE FOR WIDEBAND MIXERS

PRODUCT	CONVERTER	FREQ. (GHz)	LO FREQ. (GHz)	IF FREQ. (GHz)	LO INPUT POWER (dBm)	CONV. GAIN (dB)	P1dB OUT (dBm)	PKG	STATUS
CGY**2183**UH/C1	Active Down	0.1 - 6	0.1 - 6	DC - 3	-5	11	-5	Die	Prod
CGY**2184**UH/C1	Active Down	0.1 - 6	0.1 - 6	DC - 3	0	18	3	Die	Prod
CGY**2180**UH/C1	Up & Down	0.7 - 3.7	0.7 - 4	DC - 2	12	-7	5	Die	Prod
CGY**2181**UH/C1	Up & Down	1 - 4.5	1 - 5	DC - 2	15	-7	6	Die	Prod
CGY**2182**UH/C1	Up & Down	3 - 10	3 - 10	DC - 3	15	-7	5	Die	Prod
CGY**2460**UH/C1	Down	40.5 - 43.5	8.8 - 10	5 - 6	9	33	0	Die	Prod
CGY**2470**UH/C1	Up	92 - 96	86 - 90	5.1 - 6	7	-3	2	Die	Prod
CGY**2471**UH/C1	Down	92 - 96	86 - 90	5.2 - 6	10	-10	5	Die	Prod

MULTIPLIER

Our portfolio of MMICs includes a x8 multiplier as part of our 94 GHz chipset.

PERFORMANCE TABLE FOR MULTIPLIERS

PRODUCT	FREQ. (GHz)	MULTIPLICATION	ISOLATION (dB)	OUTPUT POWER (dBm)	PKG	STATUS
CGY**2770**UH/C2	11 - 11.5	x8	20	5	Die	Prod

board available
space evaluated product

DIODE

Need a detector diode for your projects? Our portfolio includes a zero bias diode that is a great match with CGY2190UH/C2 for imaging solutions.

PERFORMANCE TABLE FOR ZERO BIAS DETECTION DIODES

PRODUCT	FREQ. (GHz)	SENSITIVITY (mV/uW)	BREAKDROWN VOLTAGE (V)	IRL (dB)	PKG	STATUS
CGY**2870**AUH/C1	80 - 110	5	-15	> 2	Die	Sample

OPTICAL

OMMIC's portfolio includes TransImpedance Amplifiers (TIA) up to 43 Gb/s for optical fibers application.

PERFORMANCE TABLE FOR TRANSIMPEDANCE AMPLIFIERS

PRODUCT	DATA RATE (Gb/s)	DIFF GAIN (dB)	INPUT OVER LOAD (mApp)	ON CHIP AGC	CURRENT (mA)	POWER SUPPLY (V)	PKG	STATUS
CGY**2102**UH/C2	2.5	76	2.5	Yes	45	+3.3	Die	Prod
CGY**2110**UH/C1/S2	10	72	2.0	Yes	70	+5.0	Die	Prod
CGY**2116**UH/C1	10.7	74	2.5	Yes	83	+5.0	Die	Prod
CGY**2144**UH/C2	43	49	3.5	No	100	+5.0	Die	Prod

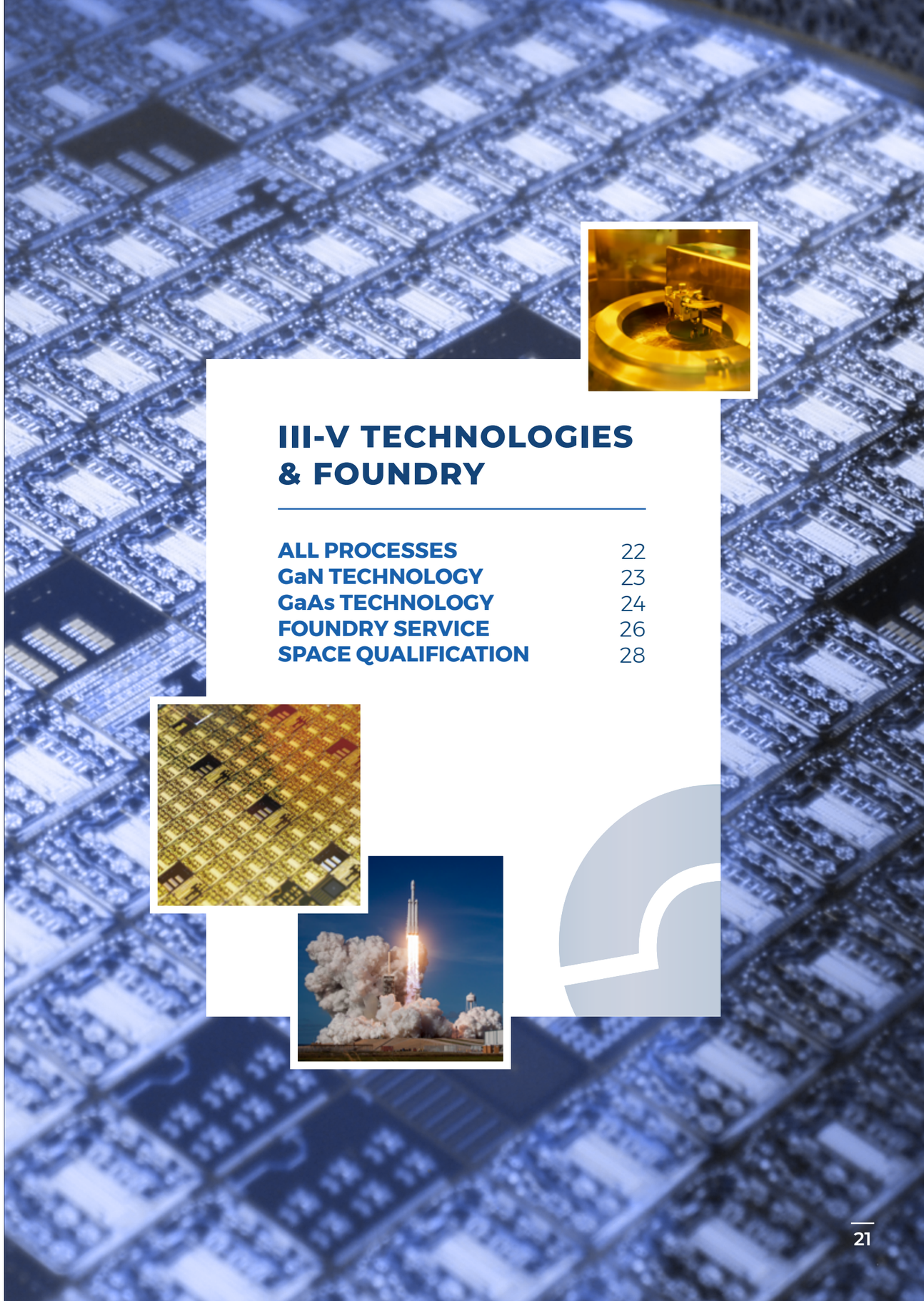
space evaluated product

Additional technical and commercial information can be provided by our sales team available at information@ommic.com

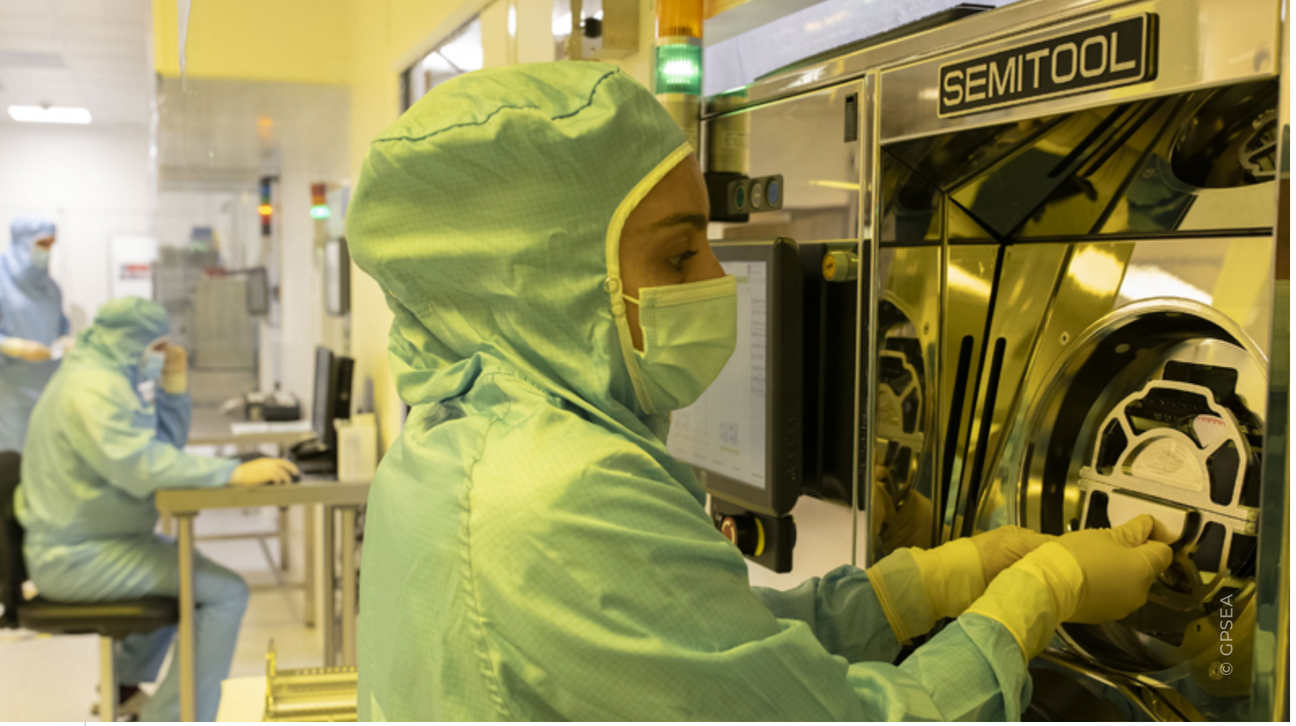
CAN'T FIND THE PRODUCT YOU NEED?

Having trouble finding a product with exotic specification on the market? Do not worry, OMMIC has other options.

SEE PAGE 30



III-V TECHNOLOGIES & FOUNDRY



III-V TECHNOLOGIES & FOUNDRY

ALL PROCESSES

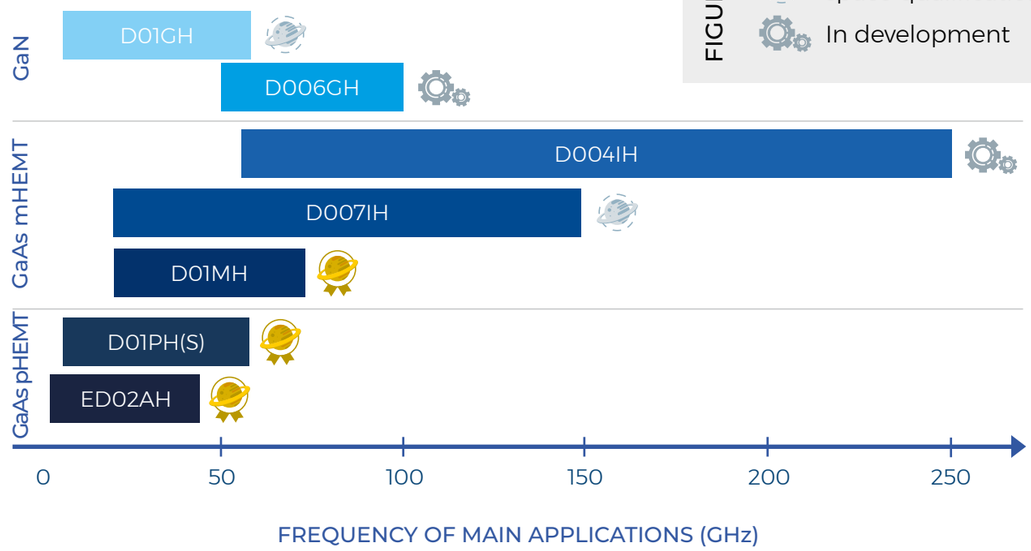
OMMIC has a fully **open foundry policy** providing the most innovative processes to the world. With foundry service, sourcing is not an issue, our processes are designed to last for more than 30 years, and remain available as long as needed.
Use it to design the devices that are best suited for you! (cf page 28)

They are designing using OMMIC's technologies:

Plextek · VIPER DESIGN · NASA Jet Propulsion Laboratory California Institute of Technology · MC2 technologies · Together ahead. RUAG · IMST · cnes · XFAB MIXED-SIGNAL FOUNDRY EXPERTS · ThalesAlenia Space · AIRBUS · इसरो ISRO

Having more than 40 years of experience in process development, OMMIC's engineers conceived a wide portfolio of processes using **III-V materials** - focused on millimetre wave and terahertz - including **GaAs mHEMT and pHEMT**, InP HBT and **GaN HEMT**.
These processes enable cut-off frequencies as high as 400 GHz enabling new application at always higher frequencies.

FIGURE
Space qualified
Ongoing space qualification
In development



GaN TECHNOLOGY

STATE-OF-THE-ART PERFORMANCE

D01GH PROCESS

TECHNOLOGY GaN on Si
STATUS Production
GATE LENGTH 100 nm
WAFER SIZE 3 inch / 6 inch
THICKNESS 100 µm
GATE WRITE E-beam
Ft - Fmax 110 - 180 GHz
Vbgd 36 V
Vds.q 12 V
Idss - Idss max 1200 - 1700 mA/mm
TRANSCONDUCTION 800 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 1,5 dB (40 GHz)
POWER DENSITY 4 W/mm CW 5,9 Pulse

REPRESENTATIVE DEVICE

CGY**2651**UH/C1
MMIC Power Amplifier
FREQ 37 - 43 GHz
GAIN 22 dB
PSAT 41 dBm
PAE 35%
POWER CONSUMPTION
- **Vd** 12 V
- **Id** 2.7 A

STATE-OF-THE-ART PERFORMANCE

D006GH PROCESS

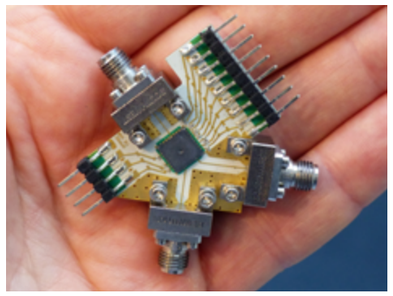
TECHNOLOGY GaN on Si
STATUS Production
GATE LENGTH 60 nm
WAFER SIZE 3 inch / 6 inch
THICKNESS 100 µm
GATE WRITE E-beam
Ft - Fmax 150 - 190 GHz
Vbgd 36 V
Vds.q 12 V
Idss 1200 mA/mm
Idss max 1700 mA/mm
TRANSCONDUCTION 900 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 1 dB (40 GHz)
POWER DENSITY 2.9 W/mm CW 4 Pulse

WHY GaN TECHNOLOGY?

At OMMIC, we believe GaN is the third revolution of III – V compounds. With its **wide bandgap, high breakdown voltage and high electron mobility**, it is a good candidate for power application, but also noise at high frequencies.
Furthermore, D01GH and D006GH have been engineered to **reduce traps** as much as possible. This is why, unlike most GaN processes on the market OMMIC's GaN provides **few-to-no memory effect**. It also features good linearity in terms of ACLR or EVM, which can be further improved using digital predistortion techniques.
Today, we focus on providing **integrated T/R chips** with robust LNAs, high PAs and fast switch on a single die. This optimise the overall power and noise figure of the chips, while keeping compact sizes.

➡ DISCOVER GaN MMICs
To offer the best RF III-V solutions, we plan to fully update GaAs pHEMT solutions using GaN/Si technology. OMMIC's GaN process portfolio includes D01GH for modern millimetre wave application, and D006GH for the sub-Terahertz.

SEE PAGE 15 - 17



GaAs TECHNOLOGY

D007IH PROCESS

STATE-OF-THE-ART PERFORMANCE

TECHNOLOGY GaAs mHEMT
STATUS Production
GATE LENGTH 70 nm
WAFER SIZE 3 inch
THICKNESS 70 - 100 µm
GATE WRITE E-beam
Ft - Fmax 300 - 450 GHz
Vbgd 4 V
Vds.q 3 V
Idss - Idss max 200 - 400 mA/mm
TRANSCONDUCTION 1600 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 0.5 dB (30 GHz)

REPRESENTATIVE DEVICE

CGY**2190**UH/C2
MMIC Low Noise Amplifier
FREQ 75 - 110 GHz
GAIN 23 dB
NOISE FIGURE 3 dBm
OP1dB 1 dBm
POWER CONSUMPTION
- **Vd** 1 V
- **Id** 33 mA

D004IH PROCESS

STATE-OF-THE-ART PERFORMANCE

TECHNOLOGY GaAs mHEMT
STATUS Development
GATE LENGTH 40 nm
WAFER SIZE 3 inch
THICKNESS 70 - 100 µm
GATE WRITE E-beam
Ft - Fmax 400 - 600 GHz
Vbgd 1.5 V
Vds.q 1 V
Idss - Idss max 200 - 400 mA/mm
TRANSCONDUCTION 2000 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 0.4 dB (30 GHz)

D01MH PROCESS

TECHNOLOGY GaAs mHEMT
STATUS Production
GATE LENGTH 125 nm
WAFER SIZE 3 inch
THICKNESS 70 - 100 µm
GATE WRITE E-beam
Ft - Fmax 150 - 250 GHz
Vbgd 8 V
Vds.q 6 V
Idss - Idss max 300 - 500 mA/mm
TRANSCONDUCTION 700 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 0.8 dB (30 GHz)
POWER DENSITY 30 mW/mm

REPRESENTATIVE DEVICE

CGY**2128**UH/C2
MMIC Low Noise Amplifier
FREQ 24 - 34 GHz
GAIN 24 dB
NOISE FIGURE 1.3 dB
PSAT 11 dBm
POWER CONSUMPTION
- **Vd** 3.5 V
- **Id** 47 mA

D01PH(S) PROCESS

TECHNOLOGY GaAs pHEMT
STATUS Production
GATE LENGTH 135 nm
WAFER SIZE 3 inch
THICKNESS 70 - 100 µm
GATE WRITE E-beam
Ft - Fmax 100 - 180 GHz
Vbgd 12 V
Vds.q 10 V
Idss - Idss max 500 - 700 mA/mm
TRANSCONDUCTION 650 mS/mm
MIM CAPACITORS 400 pF/mm²
NOISE FIGURE 1.1 dB (30 GHz)
POWER DENSITY 640 mW/mm

REPRESENTATIVE DEVICE

CGY**2135**UH/C1
MMIC Power Amplifier
FREQ 18 - 23 GHz
GAIN 25 dB
PSAT 33 dBm
POWER CONSUMPTION
- **Vd** 4 V
- **Id** 1.2 A

ED02AH PROCESS

TECHNOLOGY GaAs pHEMT
STATUS Production
GATE LENGTH 180 nm
WAFER SIZE 3 inch / 6 inch
THICKNESS 100 µm
GATE WRITE E-beam
Ft - Fmax 60 - 110 GHz
Vbgd 8 V
Vds.q 7 V
Idss 250(on) / 160(off) mA/mm
Idss max 400 (on) / 180(off) mA/mm
TRANSCONDUCTION 450 mS/mm
MIM CAPACITORS 49 & 400 pF/mm²
NOISE FIGURE 0.8 dB (18 GHz)
POWER DENSITY 330 mW/mm

REPRESENTATIVE DEVICE

CGY**2170**YHV/C1
MMIC Corechip *(Phase Shifter + Amplifier + Attenuator)*
FREQ 8 - 12 GHz
GAIN 6 dB
PHASE CONTROL 360°
ATTEN CONTROL 31.5 dB
RMS PHASE 3°
RMS ATTEN 2.25 dB

FOUNDRY SERVICE

For companies with design capacity, foundry service is the best way to have reliable sourcing. Indeed, with foundry service, there is no unexpected end of life; our processes are designed to last for more than 30 years.

PROCESS DESIGN KIT

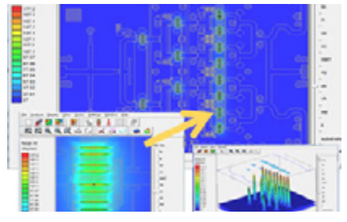
We offer high performance HEMT & HBT processes using GaN, GaAs or InP technology. Our Process Design Kit (PDK) includes OMMIC design manuals and design tools that are extremely comprehensive. With our PDK most functions can be designed, this includes mixed signal, low noise, high power, etc from DC to sub-Terahertz. OMMIC PDK is available under ADS or Microwave Office.

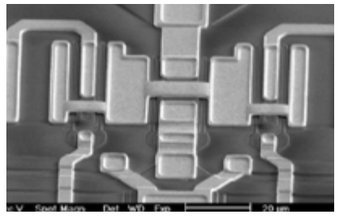
	ADS	AWR	PSpice
D01GH GaN/Si	✓	✓	✓
D006GH GaN/Si	✓	✓	✓
D004IH GaAs mHEMT	✓	✓	✓
D007IH GaAs mHEMT	✓	✓	
D01MH GaAs mHEMT	✓	✓	✓
D01PH(S) GaAs pHEMT	✓	✓	✓
ED02AH GaAs pHEMT	✓	✓	✓

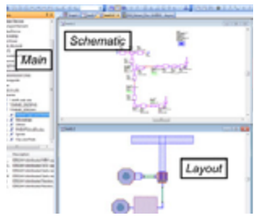
OMMIC design kits includes:

- Fully scalable models for all devices
- Linear, non linear and noise models for transistors (and diodes)
- Process statistical variations of all active and passive devices, allowing representative yield analysis
- Temperature effects for all passive and active devices
- Complete auto layout for all devices, including all types of interconnections
- E.M. information allowing advanced analysis
- Electro-thermal simulator
- Design Rules Checking

Design kits are **regularly updated** on our website in close collaboration with software suppliers. If you need help with PDK, do not hesitate to contact us. We provide hot line support, dedicated training and powerful verification tools.







OPTION 1
FULL WAFER

All of OMMIC's processes are available for full wafer foundry services. This service includes optional on-wafer test (following customer specification) and visual inspection (MIL-STD-883).

Before manufacturing, all projects are checked by OMMIC using design rules checking.

OPTION 2
MULTI PROJECT WAFER

A Multi Project Wafer (MPW) is a **cost effective** way to experience a new design topology or a new technology through a limited number of samples. MPW is available on our most advanced processes.

This service comes with several conditions of use, see below.

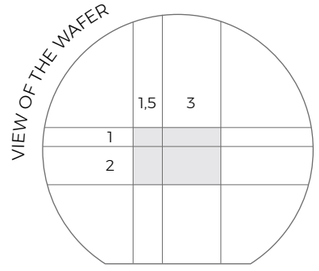
MULTI PROJECT WAFER SERVICE

➡ MPW CONDITIONS OF USE

size of the circuit must correspond to one of the fixed patterns for a multi project
layout must be suplied according to a predefined time table available on our website, by default 4 dates per year
multi project order should be placed at least 4 weeks before the annonced MPW start date
orders needs to comply with minimum order value when it is applicable

	1,5 mm	3 mm
1 mm	A* = 1,5 mm² N* = 25 dies	A* = 3 mm² N* = 20 dies
2 mm	A* = 3 mm² N* = 20 dies	A* = 6 mm² N* = 15 dies

A* = Area of the reticule / N* = Number of dies delivered



➡ MPW SCHEDULE

MPW runs are available once per quarter.
Schedule dates are regularly updated on our website.
Please scan the QR Code or click aside to get the latest schedule.
For further details, contact us at information@ommic.com

➡ UNIVERSITY PARTNERSHIP

We are commited to give access to OMMIC's technologies for educational purposes to universities and educational establishments. Please contact us for more details.

SPACE QUALIFICATION

Our processes are built for high **reliability and long life-time**. This is why, we have been working in close collaboration with the European Space Agency (ESA) for more than 20 years, with the goal to be space qualified.

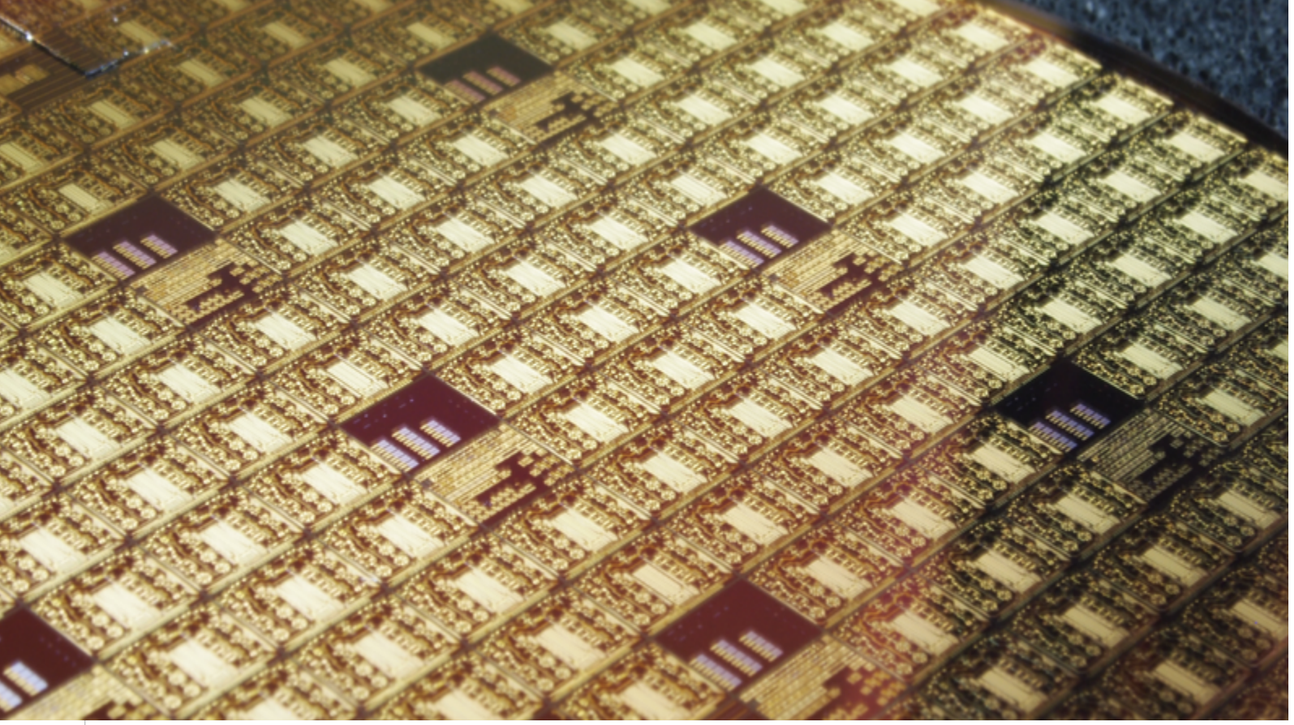
Currently, ESA has already evaluated three of our processes: ED02AH, D01PH and D01MH. This three processes are now included in the ESA EPPL (European Preferred Part List) for space applications, with long term proven mission history in a very large number of satellites.

In the coming months, after a successful space pre-evaluations, D007IH process is considered to be inserted in the EPPL after ESA monitored evaluation procedures. Regarding our latest GaN/Si technology, D01GH process is currently undergoing space evaluations.

Follow us on social networks to keep up to date with what's happening next.

For further details, additional technical and commercial information can be provided by our engineering team available at information@ommic.com

FAB+ SERVICES



FAB+ SERVICES

GETTING FURTHER

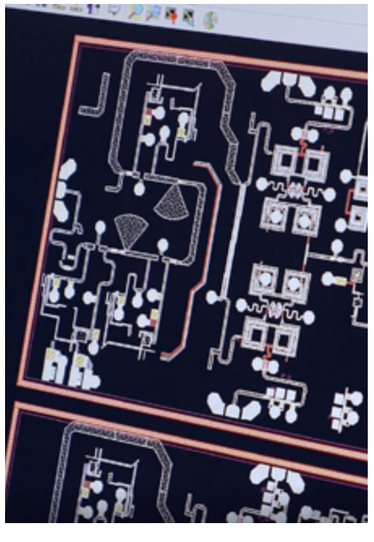
For more than 20 years, we are supporting you in all your most innovative projects in the field of space, telecom or defense by offering you a wide choice of cutting-edge technologies.

CUSTOM DESIGN

OMMIC has a team of MMIC designers ready to follow your most challenging projects based on **your specifications** and statement of work.

The design flow includes several reviews where close discussions with customers ensure that the final MMIC will really enhances the final system. Based on space standards such as ECSS-Q60-12A, this design flow have been approved for flight model designs.

The fabrication line, test center, reliability center and modeling team are on the same site. This proximity allows our design center to obtain the **best performances** from all the OMMIC processes, while maintaining yield and reliability.



RELIABILITY CENTER

We have a dedicated reliability team to carry out numerous tests, to guarantee space qualification but also for the reliability of all our components.

We have been supplying many standard parts designed during the European Component Iniative (ECI) programs but also more than **50 000 MMICs for flight models**. To date, our components have more than **1 000 000 years of flight life** accumulated around the earth in several space missions and satellite equipment from Europe, United States, China, Japan, Russia and other countries.

OMMIC design team has thorough experience in designing space qualified components. Do not hesitate contacting us at information@ommic.com for your most ambitious projects.

QUALIFIED BY ESA

All our millimetre wave processes are **built for high reliability** and long life-time as requested by space customers. This is why, our processes are developed following European Space Agency (ESA) guidelines, with the goal to be space qualified. Today, all our processes are either qualified or being screened.

THEY TRUST US

BACK-END SERVICES

ON-WAFER TEST

OMMIC runs automatic on-wafer test benches to provide only know good dies. The testing is performed in a controlled clean room and follows the customer's requirements. All usual tests are available (i.e. S-parameters, spectrum analysis, scalar measurements, noise figure, DC pulsed power measurements, etc). This adds up to our DC & RF front end process monitoring. OMMIC opens its RF-test capabilities and knowledge to design and conduct tests on customers prototype to help them improve their products.

AUTOMATIC PICKING

Once produced, the wafers can be shipped in boxes, on film, or picked. If the wafer has been tested, we will discriminate the best performing dies from the others.
Mass production volumes can be very important, especially on 6-inch. This is why, we have been investing in automated tool such as our automatic picking machine to fully support 5G volumes. The picked dies can be packed in Gel-Pack® or waffle pack.

VISUAL INSPECTION

We perform visual inspection at each critical steps during the manufacturing process to ensure anomaly detections. In addition to those tests, we can also perform visual inspection at die level at the end of the process to unsure further anomaly detections.
Two level of screening are available: space grade for the highest reliability (MIL-STD-883) and commercial grade for product with less stringent requirements.

MMIC PACKAGING

We are moving towards a world where integration and ease of use are central to the definition of complex electronic subsystems. We invest every day to simplify the use of our products for customers by developing packaged solutions while ensuring optimal performances. Today, OMMIC's olutions cover L- to Ka-band. This includes GaN products for power application, robust LNA and T/R chip front ends.

HELP & SUPPORT

Committed to meeting your needs, OMMIC provides practical **solutions** and support **at no cost**! Facing an issue? Our engineers are available at information@ommic.com offering design or technical application assistance within 24 hours.

CUSTOMER SUPPORT
Interested in OMMIC? Submit your general questions about product and process availability, status, services, pricing...

DESIGN SUPPORT
For those who conceive their MMICs via our PDK, we provide everything you need to make the experience as optimal as possible.

TECHNICAL SUPPORT
Our dedicated technical application team is here to help you with the biggest challenges as well as the simplest technical questions.

AFTER SALES SUPPORT
We do our utmost to satisfy you. If you have any questions or if something does not work as you expect, please contact us.

OMMIC
innovating with III-V'S

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