

# Hi-Rel Space Qualification Flow



# CONQUER SPACE WITH UMS

UMS offers catalogue products, ASIC and Foundry service for space use. The S Class space products are qualified for Flight Model and processed on ESA evaluated technologies.

**Discrete Die Lot Qualification based on ESA/ESCC 9010 and MIL-PRF-38534, Table C-II**

## WAFER ACCEPTANCE TEST

TEST	TEST CONDITIONS	TESTED SAMPLES
100% DC & RF testing	As per data sheet or detail specification	100%
Visual inspection	MIL-STD-883 Method 2010, Cond.A	100%
Wire bond evaluation	MIL-STD-883 Method 2011	20 (1 failure allowed)
Die shear test	MIL-STD-883 Method 2019	5 (0 failure allowed)
SEM	MIL-STD-883 Method 2018	4

## LOT ACCEPTANCE TEST

TEST	TEST CONDITIONS	TESTED SAMPLES
Device mounting	Sampling for element evaluation	12
Internal visual inspection	MIL-STD-883 Method 2010, Cond.A	12
Initial electrical test	As per data sheet or detail specification	10 + 2 reference part
Burn in	240H @Tj=175°C for GaAs (or Ta max= 125°C), DC biased 240H @Tj=200°C for GaN (or Ta max= 125°C), DC biased	10
Post burn in electrical test	As per data sheet or detail specification	10 + 2 reference part
Steady-state life	1000H @Tj=175°C for GaAs (or Ta max= 125°C), DC biased 1000H @Tj=200°C for GaN (or Ta max= 125°C), DC biased	10
Final electrical test	As per data sheet or detail specification	10 (0 failure allowed)

**UMS also introduced recently a Commercial Space flow specifically for LEO needs about products in QFN package.**

- A re-inforced Control Plan is applied for QFN packaging.
- A full dedicated screening is proposed and a LAT may be added optionnally:

STEP	TEST CONDITIONS	TESTED SAMPLES
Traceability	Assembly date code vs wafer lot	Assembly date code vs wafer lot
Assembly control Plan	Re-inforced Control Plan	100%
Thermal Cycling	10 cycles	100%
C-SAM	JEDEC JESD22 A113E & J STD020C	100%
DC/RF measurement	As per datasheet	100%
External visual Inspection	MIL-STD-883 Method 2009	100%
LAT (in option)	Endurance Test 1000h @Tjmax	10 sample +2 ref



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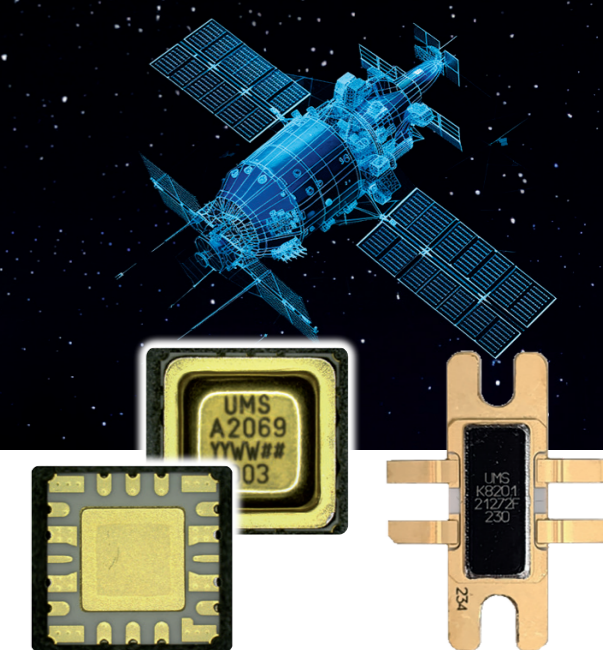
Worldwide distributor:  
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## UMS Space solutions for New Space, LEO, GEO, deep space missions, Earth observation and communications

A long heritage with more than 100 000 flying MMICs.

- GaAs and GaN state of the art proprietary technologies,
- Catalog products in bare die or package,
- Foundry services,
- ASIC design service.



## Industrial technologies qualified for space

GaN and GaAs processes from DC to 100GHz

- GaN HEMT
- GaAs low noise and power pHEMT, MESFET, Schottky diode, and HBT
- Some parts of manufacturing process are Space Qualified (QML\*)

## Hermetic solutions

Our hermetic metal ceramic SMD packaged products exhibit high reliability and electrical performance.

- Operation up to Ka-Band
- Hermetic sealing
- Space qualified process
- Traceability
- Compatibility with many parts of our catalog

## A complete offer:

- Large range of standard COTS products for New Space, in bare die form or packaged in QFN.
- Class S / Hi-Rel products
  - Catalog GaAs and GaN bare die & MMICs with WAT/LAT qualification.\*\*
  - Specific range of off-the-shelf products in hermetic packages.
- Development of MMICs according to specifications
- Open Foundry services on processes qualified for Space to design your own products
- New commercial Space flow for LEO needs

For New Space projects, benefit from UMS' space experience and dedicated support with full or optimised specific qualification flows.

\* <https://escies.org/webdocument/showArticle?id=727&groupid=6>

\*\* Based on standards ESA/ESCC 9010 specifications and MIL-PRF-38534 (see last page).

UMS 2026/2027 - Printed on PEFC paper - Smith Corporate : 01 69 59 11 30 - www.smithcorporate.fr

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# UMS catalog space offer

Already flying in GEO and beyond fully qualified according to ESA/ESCC

AMPLIFIER LNA	Freq (GHz)	Gain (dB)	NF (dB)	OP1dB (dBm)
CHA3801-FAB	1-2	28	1.5	16
CHA3801-99S	1-2	28	1.5	15
CHA3024-FDB	2-22	15	3	18
CHA3656-FAB	5.8-16	20	1.75	14.5
CHA3666-FAB	6-16	21	1.8	17
CHA3666-99S	6-17	21	1.8	17
CHA2110-99S	7-12	19	1.2	11
CHA2063a99S	7-13	19	2	8
CHA2066-99S	10-16	16	2	10
CHA3689-99S	12.5-30	26	2	15
CHA2069-FAB	16-32	22	2.5	10
CHA2362-99F	26-30	22	2	8
CHA2394-99S	36-40	21	2.5	8

AMPLIFIER - MPA	Freq (GHz)	Gain (dB)	OP1dB (dBm)	IP3 (dBm)
CHA3023-99S	1-18	14	17	-
CHA5115-99S	8-12	25	28	-
CHA6710-99S	8-12.75	22.5	-	39
CHA6710-FAB	8-12.75	22.5	-	39
CHA5266-FAB	10-16	23.5	26	35.5
CHA5266-99S	10-16	23	26.5	36
CHA4253-FAB	17-21	26	23.5	33
CHA5350-99S	17-24	26	26.5	35.5
CHA2098b99S	20-40	19	16	-

AMPLIFIER - HPA	Freq (GHz)	Gain (dB)	IP3 (dBm)	Psat (dBm)
CHA8054-99S	7.7-8.6	27	-	43.6
CHA7115-99S	8.5-11.5	27.5	-	39
CHA8710-99S	8.5-10.5	28.5	-	42
CHA8352-99S	10.7-12.75	25	-	43
CHA6551-99S	17-24	22	39	32
CHA6652-98S	21-27.5	22.5	39	33
CHA5659-98F	36-43.5	20	29.5	38.5
CHA8252-99F	10W	31	-	41

ATTENUATOR - ANALOG	Freq (GHz)	Ins. Loss (dB)	Att. Range (dB)	IP-1dB (dBm)
CHT3091-FAB	DC-14	2.5	20.5	15
CHT3091a99S	DC-40	3	17	15
CHT4660-FAB	0.5-16	2	35	27
CHT4690-FAB	0.5-16	3.5	33.5	27
CHT4690-99S	5-30	4	28	25
CHT4694-99S	25-45	4	24	22

ATTENUATOR - DIGITAL	Freq (GHz)	Ins. Loss (dB)	Att. Error (dB)	IP-1dB (dBm)
CHT4012a99S	DC-6	2.5	+/-0.5	20
CHT4016-99S	4-16	6.5	-1.5/1	18

DOWN CONVERTER	Freq (GHz)	NF (dB)	Conv Gain (dB)	IP-1dB (dBm)
CHR3693-FAB	21-26.5	2.5	13	0
CHR2295-99S	24-30	3.5	11	-10

GaN POWER TRANSISTORS	Freq (GHz)	Glin (dB) @ Freq (GHz)	Power (W)	PAE (%) @ Freq (GHz)
CHK8201-SYA*	Up to 4	22 @ 1.3	45	55 @ 1.3
CHKA012bSYA*	Up to 6	19 @ 1.3	130	58 @ 1.3
CHK8101-SYC*	Up to 6	24 @ 1.3	15	64 @ 1.3

POWER DETECTOR	Freq (GHz)	Dynamic Range (dB)	Type
CHE1270a99S	5-44	30	Wide-Band

MULTIPLIER	Xn	IF Freq (GHz)	Input Power (dBm)	Output Power (dBm)
CHX2193-99S	X2	6.25-8.25	12	14
CHX2193-FAB	X2	6.25-8.25	10	14
CHX2089-99S	X2	8-11.5	12	15
CHX2090-99S	X2	11-13	12	15

PHASE SHIFTER	Freq (GHz)	Bits Nb	Phase range (°)	Ins. Loss (dB)
CHP6013-SRF	1.2-1.4	6	360	8.5
CHP4010-99S	7-9	6	360	9
CHP3015-99S	8.5-11.5	6	360	7.5

SWITCH	Freq (GHz)	Loss (dB)	IP-1dB IN (dBm)	Isol. (dB)
CHS5104-99S	DC-4	0.5	30	35
CHS5104-FAB	DC-6	0.6	30	30
CHS5100-99S	DC-20	2.1	20	30

TRANSISTOR	Freq (GHz)	Gain (dB)	NF (dB)
EC2612-99S	DC-40	9.5 @ 40GHz	1.5 @ 40GHz

## Already flying in Low Earth Orbit (LEO)

AMPLIFIER LNA	Freq (GHz)	Gain (dB)	NF (dB)	OP1dB (dBm)
CHA3666-QAG	5.8-17	21	1.8	16
CHA3666-99F	6-17	21	1.8	17
CHA2110-QDG	7-12	19	1.2	10
CHA2090-99F	17-24	23	2	10

POWER DETECTOR	Freq (GHz)	Dynamic Range (dB)	Type
CHE1270a99F	5-44	30	Wide-Band
CHE1270-QAG	5-44	30	Wide-Band

ATTENUATOR - ANALOG	Freq (GHz)	Ins. Loss (dB)	Att. Range (dB)	IP-1dB (dBm)
CHT3091a99F	DC-40	3	17	15

AMPLIFIER - MPA	Freq (GHz)	Gain (dB)	OP1dB (dBm)	IP3 (dBm)
CHA5266-99F	10-16	23	26.5	36
CHA5350-99F	17-24	26	26.5	35.5

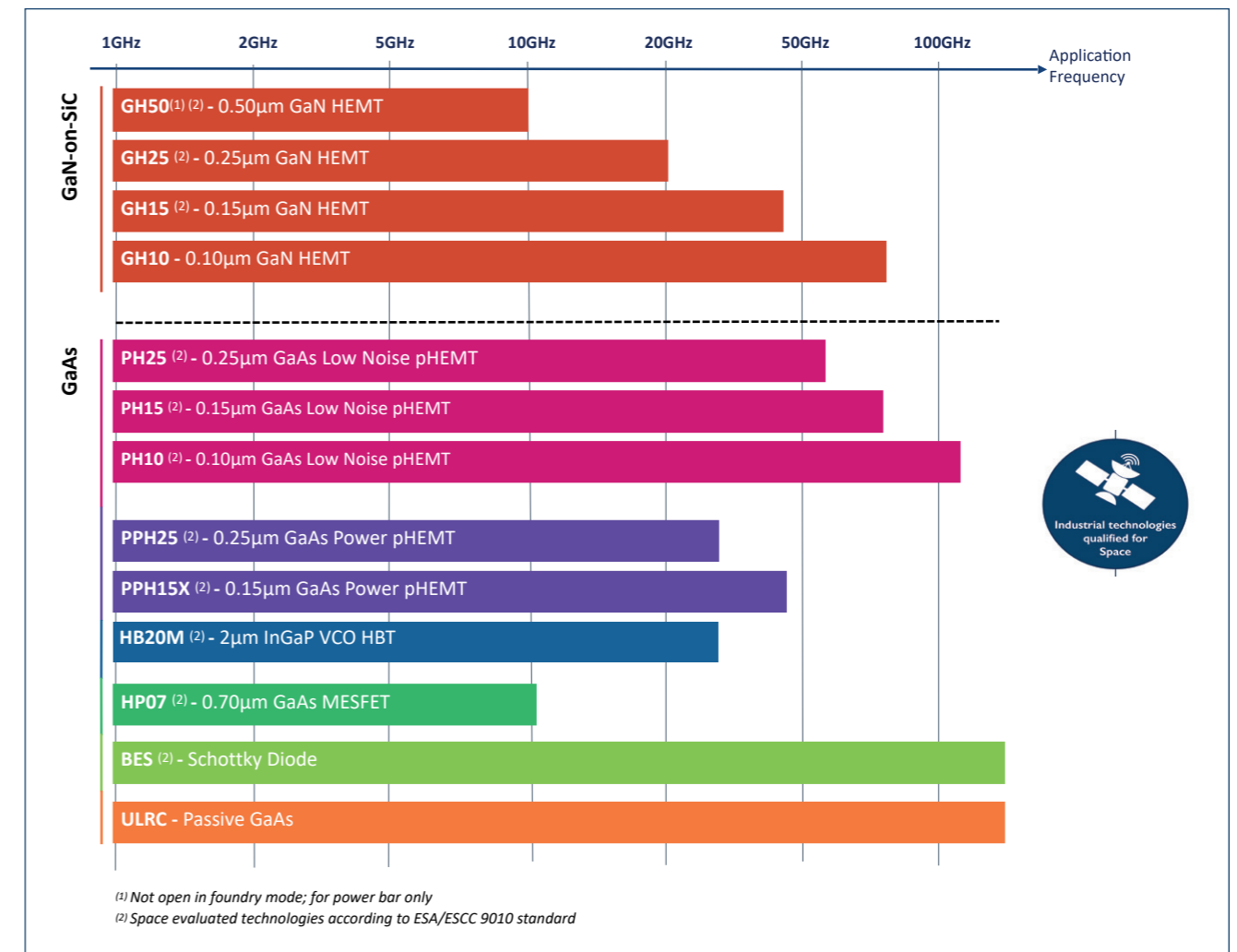
AMPLIFIER - HPA	Freq (GHz)	Gain (dB)	IP3 (dBm)	Psat (dBm)
CHA8710a99F	8.5-10.5	28.5	-	44
CHA6550-98F	17-23.6	22	39	34

GaN POWER TRANSISTORS	Freq (GHz)	Glin (dB) @ Freq (GHz)	Power (W)	PAE (%) @ Freq (GHz)
CHK9014-99F	Up to 13	13 @ 12	60	50 @ 12

\* Products Space Qualified ESA/ESCC (QPL) <https://escies.org/webdocument/showArticle?id=166&groupid=6>

# UMS technologies qualified for space from DC to 100GHz

Our products are manufactured on UMS proprietary technologies qualified for space. These technologies are available to design your own MMIC via our foundry service.



- Process Design Kit (PDK) on request for MMIC designers together with Full Foundry Service offer from wafer fabrication up to fully qualified parts delivery

## UMS hermetic packages:

UMS propose hermetic metal ceramic packaging solutions for space:

- SMD Unleaded hermetic metal ceramic 6x6mm<sup>2</sup> (FAB)
- SMD Unleaded hermetic metal ceramic 7x7mm<sup>2</sup> (FDB)
- Ceramic flange mount package (SYA)
- Ceramic flange mount package (SYC)
- ESA ESCC Space qualified product (QPL)
- ESA ESCC Space qualified product (QPL)