W-band Overview

W-band Product Datasheet Overview

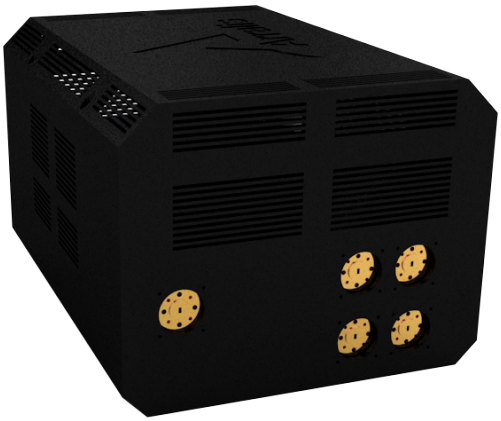
The worlds leading product portfolio at 94 GHz

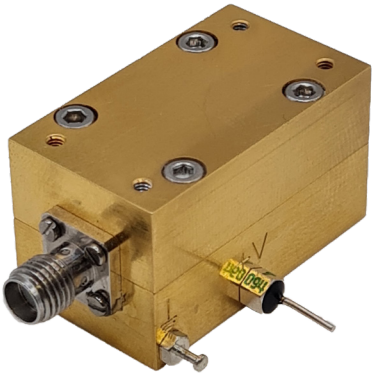
Our world leading portfolio includes the most extensive range of 94 GHz products including; MMIC's, RF Front End Modules, Sub-Systems and complete RF Systems.

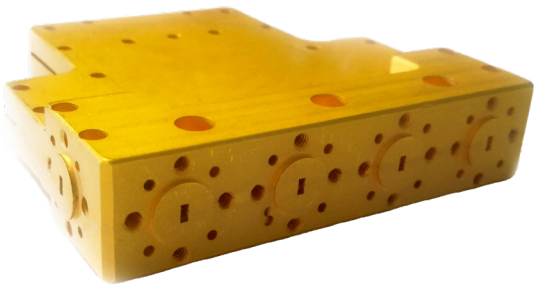
Overview

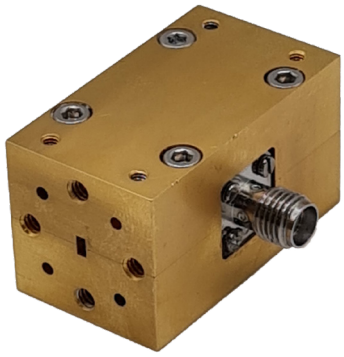
Arralis RF and mm-wave systems and sub-systems can offer you game-changing benefits with minimum modifications to your existing operations. We are democratising 94 GHz so you can get on with building leading-edge products at frequencies that you can handle.

Key current applications include; earth observation, satellite communications, helicopter landing in degraded visual environments, drone navigation and combined scan and track radar solutions.









Power & Low Noise Amplifiers

Evaluation boards for Power & Low Noise Amplifiers are available on request.

GaAs PHEMT MMIC Low Noise Amplifier 92-96 GHz
W-LNA-9296

A 4-stage MMIC low noise amplifier that provides up to 23 dB of stable gain, with a typical noise figure of 5 dB from a +2 V supply voltage and at less than 70 mA.

Features
- 20-23 dB gain
- 5 dB noise figure

GaAs PHEMT Medium Power Amplifier 92-96 GHz
W-MPA-9296

A 4-stage MMIC medium power amplifier which provides up to 13 dB of stable gain, and a P3 power output of 10 dBm from a +4 V supply voltage.

Features
- 13 dB gain
- 10 dBm P3 output
- Unconditionally stable

GaAs PHEMT Medium power amplifier 95-105 GHz
W-MPA-95105

This 4 stage MMIC medium power amplifier provides over 20 dB of stable gain, and a P3 power output of 16dBm from a +4 V supply voltage.

Features
- >20 dB gain
- >16 dBm P3 output
- Unconditionally stable

GaAs PHEMT MMIC Medium Power Amplifier 86 - 91 GHz
W-MPA-8691

A 4-stage MMIC power amplifier that provides greater than 20 dB of stable gain, and a power output of more than 16 dBm from a 4 V supply voltage and <85 mA current.

Features
- 20 dB gain
- 16 dBm Psat
- Unconditionally stable

GaAs PHEMT MMIC Power Amplifier 86 - 90 GHz
W-MPA-8690

A 4-stage power amplifier which provides greater than 23 dB of stable gain, and a power output of more than 14 dBm from a 2.5 V supply voltage and 90 mA current at the high output powers.

Features
- >23 dB gain
- >14 dBm Psat
- Unconditionally stable

GaAs PHEMT MMIC Power Amplifier 92-96 GHz
W-PA-9296

A 4-stage MMIC power amplifier which provides up to 20 dB of flat, stable gain and a power output of more than 18 dBm from a 4 V supply voltage and <210 mA current.

Features
- 20 dB gain
- 18 dBm Psat
- Unconditionally stable

GaAs PHEMT MMIC Power Amplifier 92-96 GHz
W-PA-9296-M

A mirrored version of MMIC W-PA-9296.

Features
- 20 dB gain
- 18 dBm Psat
- Unconditionally stable

GaAs PHEMT MMIC Power Amplifier 89-93 GHz
W-PA-8993

A 3-stage MMIC power amplifier that provides up to 13 dB of stable gain and a power output of more than 18 dBm from a 4 V supply voltage.

Features
- 13 dB gain
- >18 dBm Psat
- Unconditionally stable

Mixers

Evaluation boards available on request.

Single-Balanced GaAs Diode MMIC Mixer 92-96 GHz
W-SBM-9296

A single balanced diode mixer with integrated filter to increase image rejection. This MMIC is designed for output frequencies ranging from 92-96 GHz using LO signals within the 86-90 GHz band.

Features
- <17 dB conversion loss
- 10 dB return loss
- >25 dB LO-RF isolation

Image Cancellation MMIC Mixer 92-96 GHz
W-ICM-9296

An I/Q MMIC diode mixer with integrated quadrature coupler for single sideband (LO+IF /RF-LO) operation in both upconverter and downconverter modes. This MMIC is fabricated using GaAs Shottky diode technology.

Features
- 15 dB conversion loss
- 13 dBm LO drive
- >20 dB RF/ LO isolation

Image Cancellation MMIC Mixer 92-96 GHz on Carrier
W-ICM-C-9295

This MMIC carrier contains the Arralis W-ICM-9296 Image Cancellation Mixer MMIC which is fabricated using GaAs Shottky diode technology.

Features
- 15 dB conversion loss
- 13 dBm LO drive
- >20 dB RF/ LO isolation

W-band Product Datasheet Overview

Multipliers

Evaluation boards available on request.

GaAs PHEMT MMIC x4 Multiplier 88-95 GHz
W-x4M-8895

A x4 frequency multiplier with integrated amplifier and filter designed to drive our W-band mixers so that frequencies in the 92-96 GHz range can be easily realized using a 5.4 GHz baseband signal. This MMIC is a x4 multiplier with inputs of 22-23.75 GHz, supplied on a 50 um GaAs PHEMT substrate.

Features
- 88-95 GHz output
- 22-23.75 GHz input
- 3 dB conversion loss
- >8 dB return loss
- 7 dBm output power

GaAs Diode MMIC x4 Multiplier, 85-90 GHz
W-x4M-8590

A x4 frequency multiplier designed to convert frequencies in the 21.25-22.5 GHz band into the 85-90 GHz band. W-x4M-8590 is fabricated using GaAs diode technology and offers a typical conversion loss of less than 30 dB across the band with an input drive level of 15 dBm.

Features
- 85-90 GHz output
- 21.25-22.5 GHz
- 30 dB conversion loss
- 15 dBm drive level
- No DC bias required

GaAs PHEMT MMIC x4 or x8 Multiplier 86-92 GHz
W-x4x8M-8692

A frequency multiplier with integrated amplifier and filter, designed to drive our W-band mixers so that frequencies in the 92-96 GHz range can be easily realized using a 5.4 GHz baseband signal. This MMIC has a wideband input impedance match so that it can operate in both x4 or x8 modes with input frequencies of 21.5-23 GHz and 10.825 GHz to 11.325 GHz respectively.

Features
- Either x4 or x8 operation
- 86-92 GHz output (x4 mode)
- 86.6-90.6 GHz output (x8 mode)
- >8 dB return loss

Up/Downconverters

Evaluation boards available on request.

GaAs PHEMT MMIC Downconverter 92-96 GHz
W-DC-9296

This MMIC is designed for frequencies in the range from 92-96 GHz using LO signals within the 86-90 GHz range. The circuit supplies low conversion loss for IF frequencies up to 6 GHz and uses a notch filter to remove any RF or LO signals at the IF port.

Features
- 92-96 GHz IP frequency
- <4 dB conversion loss
- 10 dB return loss
- 40 dB Harmonic rejection

GaAs PHEMT Downconverter core chip 93-96 GHz
W-DC-9396

An integrated mixer and low noise amplifier MMIC that downconverts frequencies from 93-96 GHz into the 3-6 GHz frequency band. This MMIC provides conversion gain with a maximum output power of -5 dBm and noise figure <5 dB while running from a +4 V supply voltage at less than 80 mA.

Features
- 93-96 GHz input
- 3-6 GHz output
- 5 dB conversion gain
- -5 dBm output power
- 5dB noise figure

GaAs PHEMT Upconverter Core Chip 92-96 GHz
W-UC-9296

An integrated mixer and medium power amplifier MMIC that upconverts frequencies from 2-6 GHz into the 92-96 GHz frequency band. This MMIC provides very low conversion loss with a maximum output power of 10 dBm running from a +4 V supply voltage and at less than 80 mA.

Features
- 92-96 GHz output
- 2-6 GHz input
- <4 dB conversion loss
- >10 dBm P3 output power

Rotman Lens Antenna

6 Beam Rotman Lens Antenna 92-96 GHz
W-RL-6B-9296 (Preliminary)

This 6 beam Rotman Lens antenna is optimised for use in the 92–96 GHz band. The assembly is milled out of high quality low loss materials to realise a waveguide module. Combined with either multiple RF front ends or an SP6T, Electronic scanning is achieved.

Features
- 92-96 GHz band
- Complete waveguide assembly
- 14 dB typical gain
- Low sidelobes

12 Beam Rotman Lens Antenna 92-96 GHz
W-RL-12B-9296 (Preliminary)

This 12 beam Rotman Lens antenna is optimised for use in the 92–96 GHz band. The assembly is milled out of high quality low loss materials to realise a waveguide module. Combined with either multiple RF front ends or an SP6T, Electronic scanning is achieved.

Features
- 92-96 GHz band
- Complete waveguide assembly
- 13 dB typical gain
- Low sidelobes

Switches

GaAs PHEMT MMIC SPDT Switch, 90-100 GHz

W-SPDT-90100

An SPDT diode based switch that covers from 90-100 GHz with very low loss when closed and high isolation when open. A packaged version of the device is also available with WR10 waveguide input and outputs on request.

Features
- 90-100 GHz
- <4 dB insertion loss
- >10 dB return loss

GaAs Diode SP3T MMIC Switch, 90-110 GHz

W-SP3T-90110

An SP3T diode based switch that covers frequencies from 90-110 GHz. A packaged version of the device is also available with WR10 waveguide input and output.

Features
- 90-110 GHz
- 6 dB insertion loss
- 10 dB return loss
- 15 dB isolation

GaAs PHEMT MMIC Attenuator / SPST Switch 90-100 GHz

W-SPST-90100

A GaAs PHEMT diode based SPST switch and variable attenuator with a single input and output. The attenuation value may be adjusted to any value within the specified attenuation range. Manufactured on a 50um substrate with 100nm gate length.

Features
- 90-100 GHz
- 2-25 dB attenuation range
- Low operating current
- >15 dBm power handling

Sub-Systems

Our 94 GHz Sub-Systems are fully integrated standalone assemblies designed for radar sensors and security systems. The modules are complete and serve the function of a full FMCW radar front end or separately as a downconverter or upconverter.

Radar and communications Transmit Module 94 GHz

W-x4TX-9296

The modules inputs are either a variable IF signal between 2-6 GHz with a fixed LO or a fixed IF with a variable LO between 21.65-22.65 GHz. The saturated power is 15 dBm and has typically 20 dB of image rejection. **Available in a right angle RF output version' W-x4TX-RA-9296'.**

Features
- 92-96 GHz range
- Integrated self contained module
- High output power
- 21.65-22.65 GHz LO

Radar and communications Transmit Module 94 GHz

W-x8TX-9296

The modules inputs are either a variable IF signal between 2-6 GHz with a fixed LO or a fixed IF with a variable LO between 10.80-11.40 GHz. The power saturation is 15 dBm and has typically 20 dB of Image rejection. **Available in a right angle RF output version' W-x8TX-RA-9296'.**

Features
- 92-96 GHz range
- Integrated self contained module
- High output power
- 10.80-11.40 GHz LO

Radar and communications Receive Module 94 GHz

W-x4RX-9296

The output is a variable wideband IF signal between 2-6 GHz with a fixed LO of 22.50 GHz. The standard noise figure is 3.2 dB and has typically 20 dB of image rejection. The receiver has typically 15 dB of gain down to an RF input of -130 dBm. **Available in a reduced size option 'W-x4RX-SM-9296'.**

Features
- 92-96 GHz range
- Integrated self contained module
- High output power
- 22.5 GHz LO

Radar and communications Receive Module 94 GHz

W-x8RX-9296

The output is a variable wideband IF signal between 2-6 GHz with a fixed LO of 11.25 GHz. The standard noise figure is 3.2 dB and has typically 20 dB of image rejection. The receiver has typically 15 dB of gain down to an RF input of -130 dBm. **Available in a reduced size option 'W-x8RX-SM-9296' and right angle RF input version' W-x8RX-RA-9296'.**

Features
- 92-96 GHz range
- Integrated self contained module
- High output power
- 11.25 GHz LO

Radar

FMCW Radar 94 GHz

W-FMCWR-9296 (Preliminary)

A fully integrated stand-alone FMCW radar designed for radar sensors and security systems. A digital input is provided for control of the FMCW sweep characteristics/baseband receive gain. The only output is a baseband beat frequency signal, the frequency of which is proportional to the range. The standard RF transmit power is 40 mW with an option for 10 mW.

Features
- 92-96 GHz range
- High output power
- Excellent performance in poor visibility conditions
- Built in FMCW sweep generation