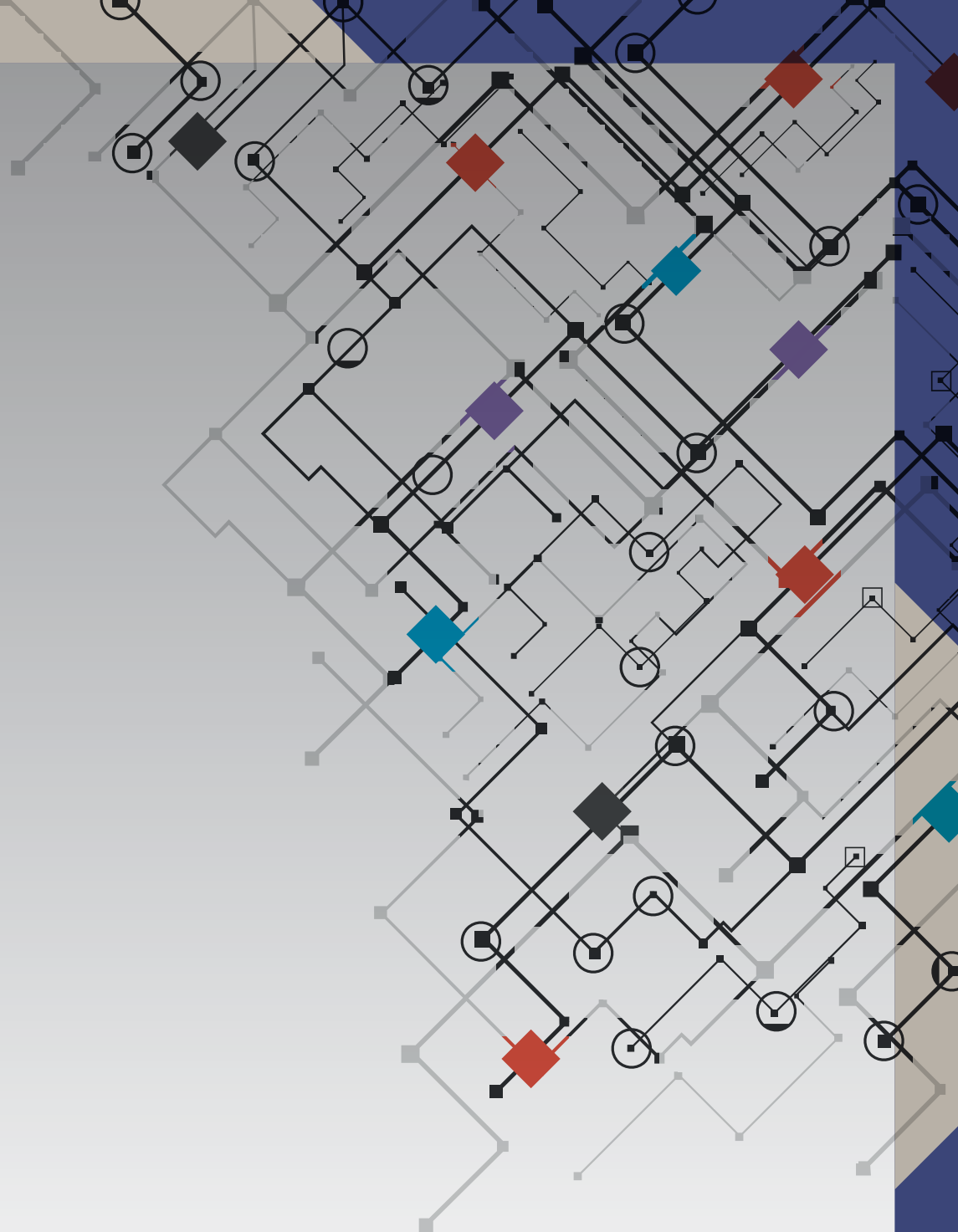




2018
Product overview

Company overview

Vectrawave is an independent private innovative European company, created in 2006 in France specializing in the market of RF/microwave microelectronics and components for fiber optic systems intended for high-speed data transmission. Vectrawave produces both basic components for complex microwave systems and complete customized sub-modules / systems providing customer the optimal technological solution based on his requirements. Proposed solutions are cost-optimized by determining the correct depth of development and selection of the appropriate technologies.

Vectrawave focuses on the development of a broad spectrum of semiconductor components in different levels of integration: from discrete semiconductor devices to highly-integrated solutions: specialized microwave integrated circuits (MMIC), solutions using SiP (system in a package) and multichip modules (MCM), combining several semiconductor dies utilizing various technologies. Produced components covering wide range of operating frequencies from 0 to tens of GHz.

In addition to the development and production of microwave circuits, company also specializing in advanced packaging, integration and testing (including space qualification testing). Technologies used: GaAs, SiGe, GaN, InP, CMOS.

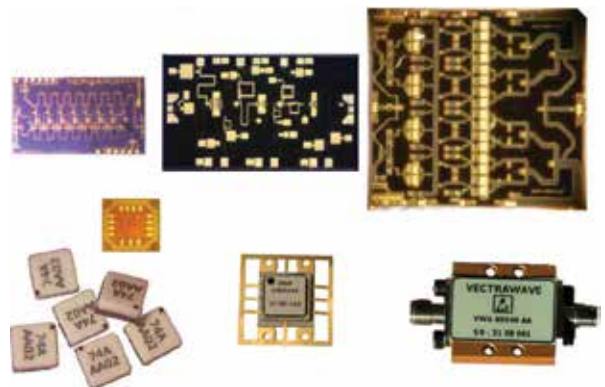
Vectrawave has a team of experienced professionals who starting design process from clear understanding of the customer requirements in order to develop the system as a whole, not like the set of individual independent components, thus achieving shortest possible design time and implementing reliable, competitive solutions.

In addition to customized solutions, Vectrawave offers a wide range of standard products for various applications, such as: optical systems for high-speed data transmission, broadband communication systems, satellite communication, radar applications, instrumentation.



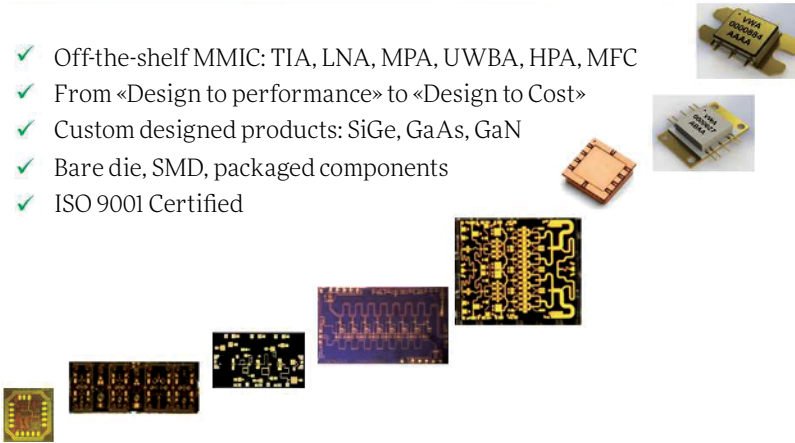
Vectrawave Products:

- MMIC's Solutions
- X-Band Subsystems
- Ka-Band Subsystems
- Optical communication products & subsystems
- RF optical products & subsystems



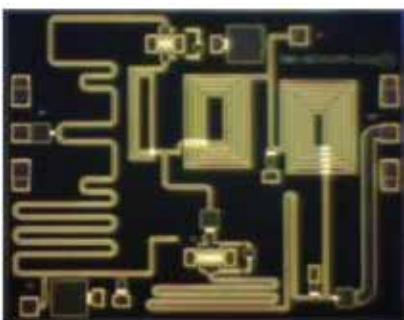
MMIC's Solutions

- ✓ Off-the-shelf MMIC: TIA, LNA, MPA, UWBA, HPA, MFC
- ✓ From «Design to performance» to «Design to Cost»
- ✓ Custom designed products: SiGe, GaAs, GaN
- ✓ Bare die, SMD, packaged components
- ✓ ISO 9001 Certified

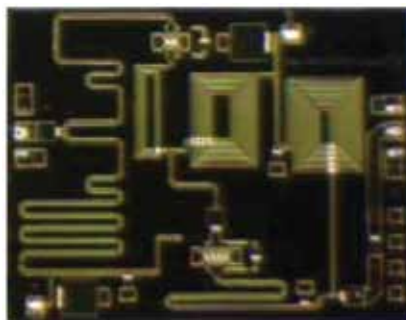


MMIC Design for system Solution up to 110GHz

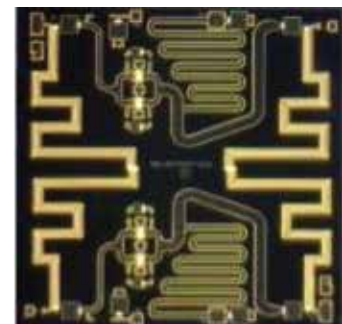
VWA P/N	Function	Specification
VWA 5000063 AA	Dual Transimpedance amplifier	2,9-3,4_3,7-4,3 GHz- ZT=350 _16dB Gain- Pout +10 dBm
VWA 5000068 AA	Low Noise Amplifier	2,5-3,5 GHz- 16dB Gain- Pout +17 dBm
VWA 5000069 AA	Low Noise Amplifier	2,9-4,3 GHz- 14dB Gain- Pout +15 dBm
VWA 5000060 AA	MPA Amplifier	2,5-6 GHz-10dB Gain- Pout+24 dBm



VWA 5000068 AA



VWA 5000069 AA



VWA 5000060 AA

TX/RX MMIC chipset solution

GaAs HPA = 5W, 9W,
10W, 12W, 15W

GaN/SiC HPA = 35W

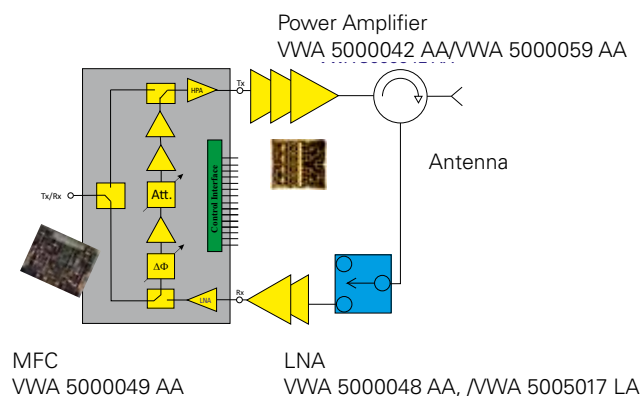


VWA 5000057 AA = DPS 6 Bits /7-13 GHz

VWA 5000055 AA = DAT 5 Bits /DC – 18GHz

VWA 5000049 AA = MFC /8-12 GHz

VWA 5005017 LA = LNA /8-12 GHz



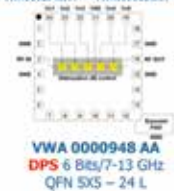
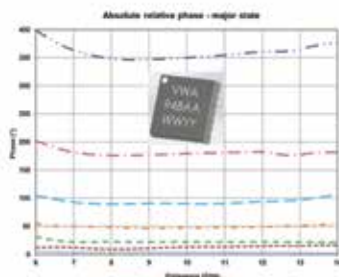
Chip Set 1: LNA, **MFC**, HPA (MPA)

Chip Set 2: LNA, **DPS**, **DAT**, MPA, HPA

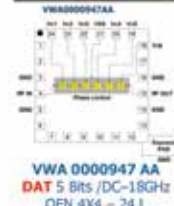
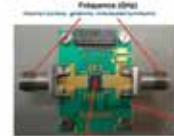
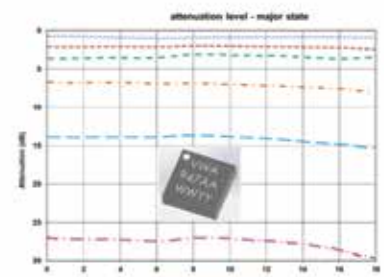
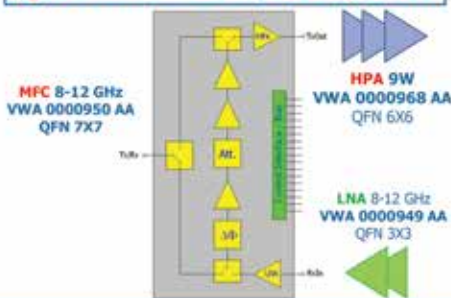
X Band Design Kit for T/R				Die	Status
P/N	Function	Frequency	Gain/A/PHI	Size (mm)	P,E
VWA 5000061 AA	Gain Block Amplifier	7 to 13 GHz	13dB	2,3X3,0X0,1	P
VWA 50035 AA	Medium Power Amplifier	8 to 13 GHz	22dB	3,5X2,9X0,2	P
VWA 50035 AC	Medium Power Amplifier	8 to 12 GHz	22dB	2,3X1,8X0,1	P
VWA 5000058 AA	High Power Amplifier (2 Stages)	8 to 11GHz	21dB	1,4X4,4X0,1	P
VWA 5000059 AA	High Power Amplifier (2 Stages)	9 to 11GHz	21dB	2,5X4,4X0,1	P
VWA 50036 AC	High Power Amplifier (3 Stages)	7 to 13 GHz	21dB	4,1X4,4X0,1	P
VWA 5000070 AA	High Power Amplifier (2 Stages)	8.5 to 10.5GHz	17dB	4,4X3,6X0,1	P
VWA 5000042 AA	High Power Amplifier (3 Stages)	8 to 12 GHz	25dB	3,9X4,5X0,1	P
VWA 5005017 LA	Low Noise Amplifier (NF=1,6dB)	9 to 12 GHz	19dB	1,6X1,1X0,1	P
VWA 5000048 AA	Low Noise Amplifier (NF=1,1dB)	8 to 12 GHz	32dB	2,4X1,56X0,1	P
VWA 5000055 AA	5 Bits Digital Attenuator	DC-18GHz	31dB/5 Bits	2,4X1,55X0,1	P
VWA 5000057 AA	6 Bits Digital Phase Shifter	7-13 GHz	360°/6 Bits	3X2,1X0,1	P
VWA 5000049 AA	Multi Function Chip (DPS/DAT)	8 to 12 GHz	20dB	4X5X0,1	P

QFN SET SOLUTION for T/R Module

X Band QFN KIT		Evaluation board		Characteristics				
Part Number	Size (mm)	Part Number	Function	Supply	Frequencies	Pout (SAT)	Gain	NF
VWA0000702XX	4x4-24 L	VW A0000703AA	X-band MPA	8V /115mA	7.5-13GHz	23dBm	22dB	
VWA0000946AA	4x4-24 L	VWA0000952AA	X-Band MPA	8V/190mA	8-12GHZ	26 dBm	21 dB	
VWA0000947AA	4x4-24 L	VW A0000955AA	5 bits/ 31db attenuator	-7.5V/ 9mA	DC-18GHZ	24dBm	IL=6dB	
VWA0000948AA	5x5-24L	VW A0000956AA	360°/6 bits phase shifter	-7.5V/10mA	7-13GHZ	21 dBm	IL=6dB	
VWA0000949AA	3x3-16 L	VWA0000951AA	X-band LNA	5V / 70mA	7-13GHZ	14.5dBm	18 dB	1.6dB
VWA0000950XX	7x7-48 L	VW A0000963AA	X-band MFC	4V/300mA; -5V/25mA	8.5-11 GHz	20dBm	20dB	5dB
VWA0000968XX	6x6-28 L	Contact Factory	X-band HPA	8V / 3A	7.5-11.5GHz	39dBm	20dB	

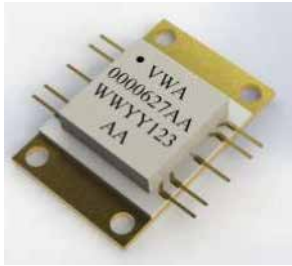


QFN Set 1: LNA, MFC, HPA



QFN Set 2: LNA, DPS, DAT, MPA, HPA





Description

The VWA 0000627 AA is a 3 stages Solid State Amplifier operating in the frequency range 8.5 to 11 GHz. The device is capable of +40dBm output power at Psat. This amplifier uses a leaded package with a thermally conductive copper composite base. A plastic lid, fixed with epoxy glue, closes the package. The module has been optimized to provide high efficiency (PAE > 30%) with Vd=+8.0V.

VWA-0000627 AA

**8.5 to 11 GHz – 25dB – 40dBm
Flange Package
Solid State Amplifier**

Features

- 3 stages High Power pHEMT GaAs MMIC
- Wide band : 8.5 to 11 GHz
- High Output Psat : +40dBm
- High linear gain : 25dB typ.
- 50Ω, AC coupled RF input and output,
- Supply (saturation) : 4.5A @ +8.0V; Vg= -0.7V
- Copper composite base to reduce thermal resistance
- Dimensions : 11.43 x 17.32 mm²

HERMETICAL PACKAGE SOLUTION



Description

The VWA-0000699-AA is a 3 Stages analog High Power Surface Mount Package amplifier operating in the frequency range 8 to 12 GHz.

The SMD package includes a cascaded 3 stages amplifier designed in 0.25μm pHEMT process, and its decoupling circuit interfaces.

The device is capable of +41dBm output power at Psat, and provides 25 dB of large signal gain from 8 to 12 GHz with less than 1 dB of Gain variation. The package has been optimized to provide high efficiency, supply current is 4.5A with Vd=+8.5V, when delivering +41dBm output power, in pulse mode.

GDSII file is available for mechanical design.

Evaluation board available on request

VWA-0000699-AA

**8 to 12 GHz – 25 dB – 12W
SMD High Power Amplifier**

Features

- 3 stages High Power pHEMT GaAs Amplifier
- Small Surface Mount Package Device
- Wide band : 8 to 12 GHz
- High Output Psat : +41 dBm
- Large signal gain : 25 dB
- 50Ω, AC coupled RF input and output,
- Power supply: 4.5A @ +8.5 V; Vg= -0.7V
- 8 x 8 x 2 mm

Applications

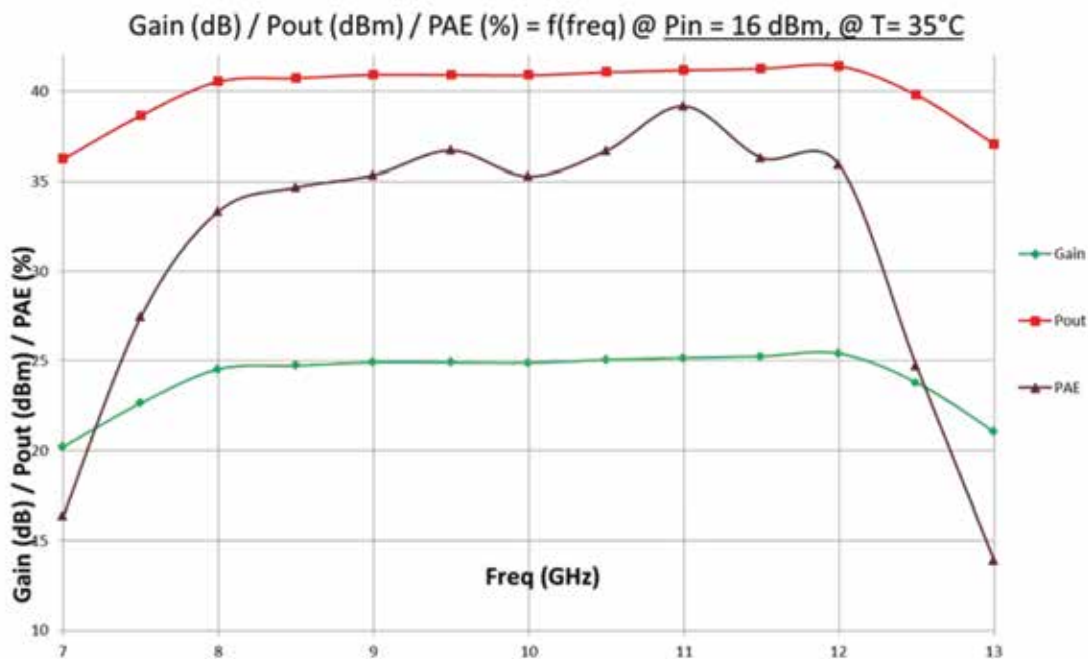
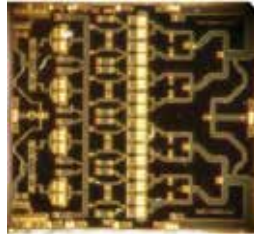
- X band High Power amplifier
- Broadband communication
- Radar
- Test and measurement

HIGH POWER AMPLIFIER SSPA SOLUTIONS

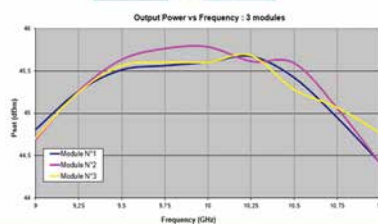
VWA 500042 AA

12W X-Band High Power MMIC

25dB Large Signal Gain
Die size: 3900 x 4500 x 100 μm

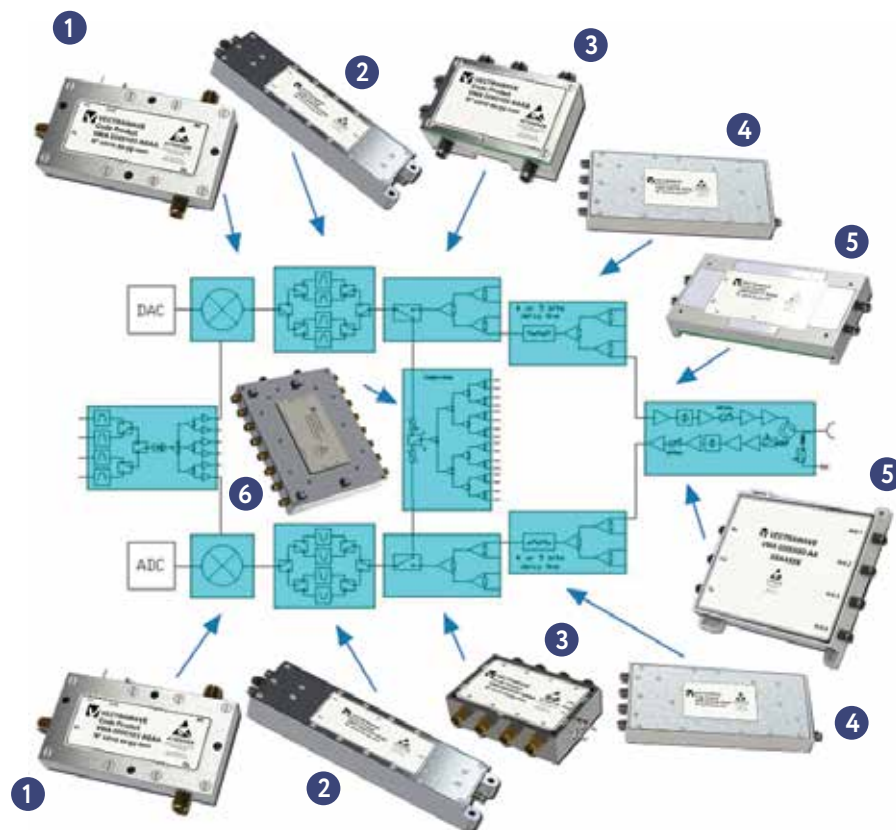


30W GaN Flange package HPA



X-Band Subsystems

RF Front End – RF Module Set
X-Band Radar



1. UP/DOWN- Converter
2. Filters Bank
3. Dispatcher
4. Delay line and Power divider/
combiner
5. T/R module: Single (top) and
Quad (bottom)
6. Calibration

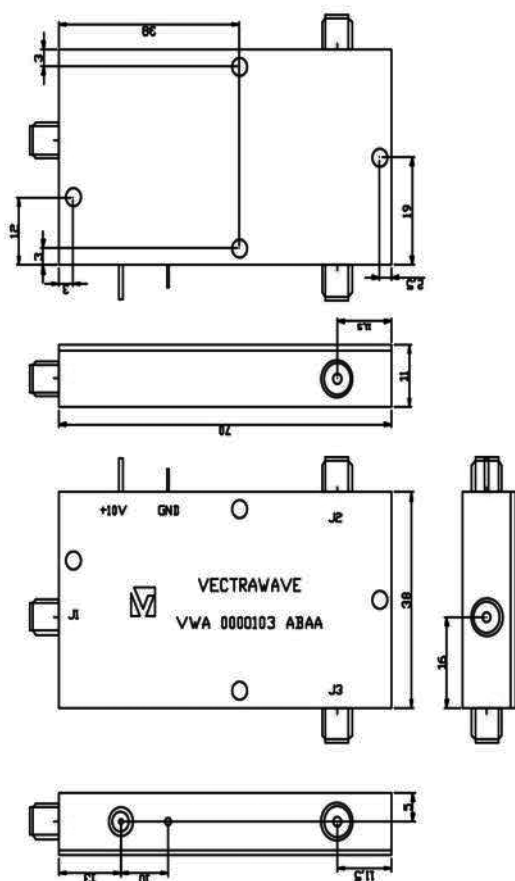


Description

Into a standard SMA packaging, this module exists in 3 versions (see functional block diagrams):

- Up converter
- Up-converter with IF doubler
- Down-converter.

Mechanical dimensions



VWA 0000103 AA
VWA 0000103 AB
VWA0000108 AA

X to Ka-Band Up and Down Converters

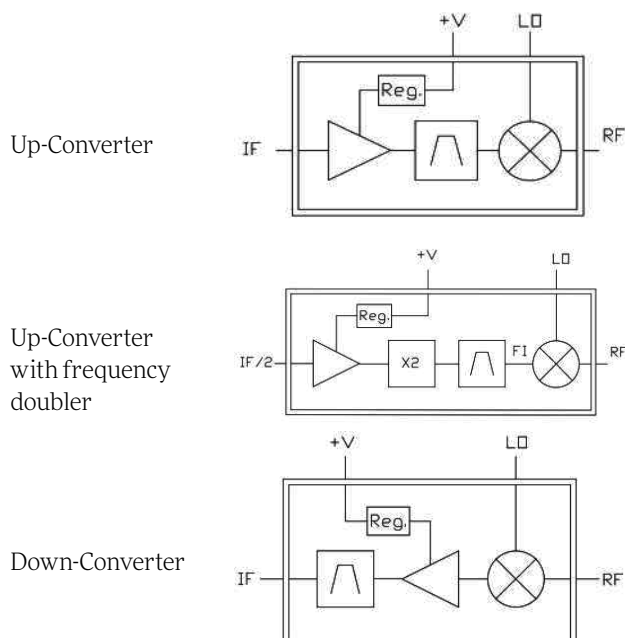
Main Features

- SMA connectors
- Applications over X and Ka-Band
- RF & LO : 6 to 18 GHz
- IF : DC to 3 GHz (dependent on filter)
- Thermal compensation inside
- Bias regulation inside

Ordering information

Product code	
VWA 0000103 AA	Up-Converter
VWA 0000103 AB	Up-Converter with x2
VWA 0000108 AA	Down-Converter

Functional Block Diagrams





VWA-0000104-AB

X to Ka band filters bank MCM

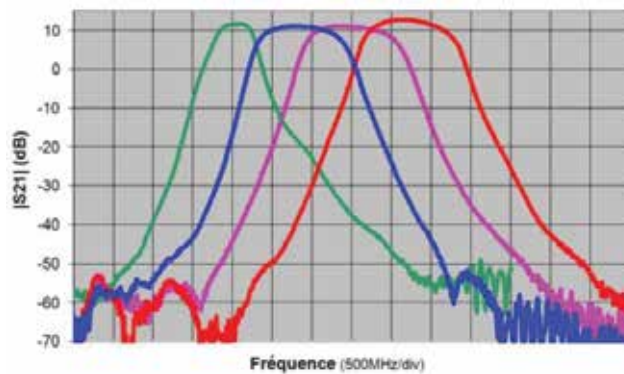
Description

The VWA 0000104 AB is a switched filter banks. This module allows to choose one filter among four. The gain (thermal compensated) is adjustable filter by filter. This module integrates all the RF passives and biasing devices in the same package.

Features

- K connectors
- Applications over X and Ka frequency range
- Independent gain adjustment for each filter
- Thermal compensation inside
- Bias regulation inside
- TTL compatible control

X-band Application Example



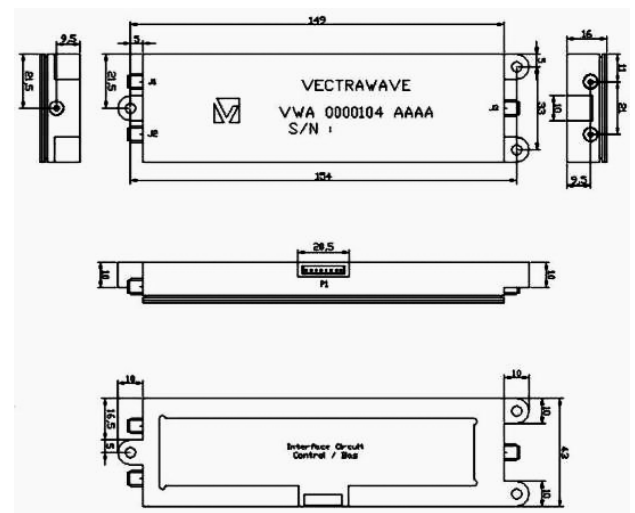
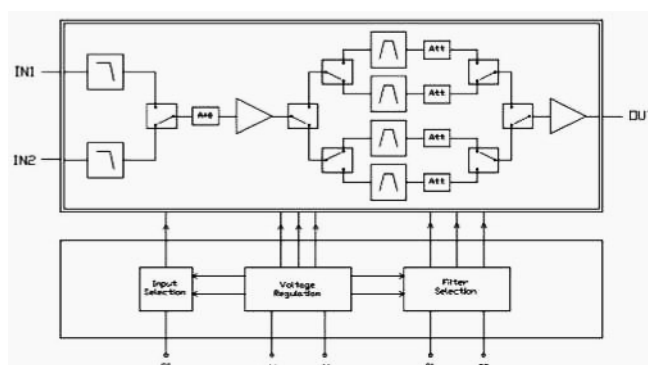
Applications

- Commercial and military radar
- Electronic Warfare

Ordering information

Product code
VWA 0000104 AB

Functional Block Diagram





VWA 0000106 AA
VWA 0000107 AA
VWA 0000507 AA
VWA0000506 AA

DELAY LINES

Description

The 4 and 5 delay lines units (LSB=45ps) exist in two versions : with a 4 ways combiner or with a 4 ways divider. Units with combiner integrate also a 5 bits attenuator (LSB=1dB).

Power divider and power combiner are balanced in amplitude (<0.5dB) and phase (<5°).

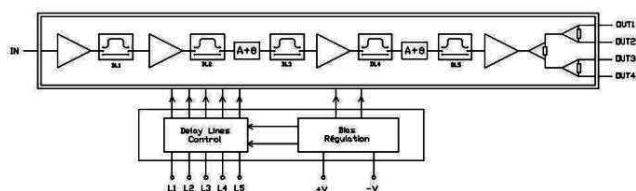
Amplifiers inside offset the losses.

Main Features

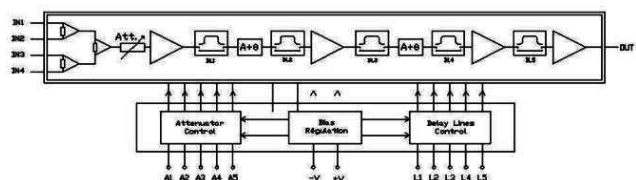
- K connectors
- Applications over X-band
- Thermal compensation inside
- Bias regulation inside
- TTL compatible control
- Combiner or divider inside
- 5 bits attenuator inside (unit with combiner)

Functional Block Diagrams

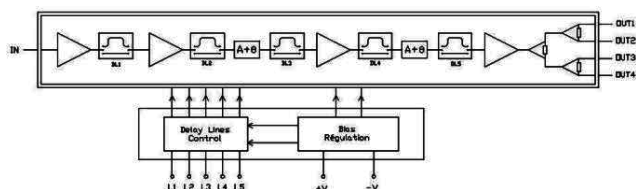
VWA 0000507 AA



VWA 0000506 AA



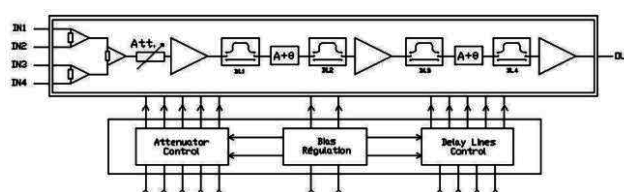
VWA 0000106 AA



Ordering information

Product code	
VWA 0000106 AAAA	4 bits delay line & divider
VWA 0000107 AAAA	Combiner & 4 bits delay line
VWA 0000506 AAAA	Combiner & 5 bits delay line
VWA 0000507 AAAA	5 bits delay line & divider

VWA 0000107 AA



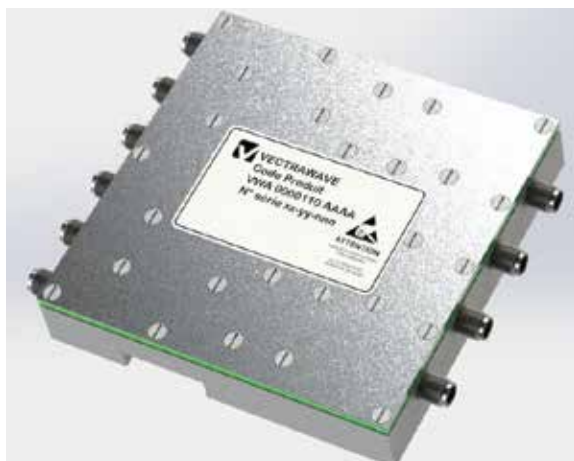


VWA 0000105 AA

RF Dispatcher

Main Features

- K connectors
- Applications over X and Ka frequency range
- Thermal compensation inside
- Bias regulation inside
- TTL compatible control



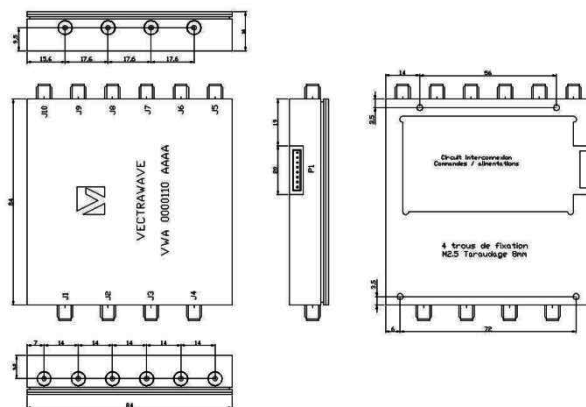
VWA 0000110 AA

LO Distributor

Main Features

- K connectors
- Applications over X and Ka frequency range
- Thermal compensation inside
- Bias regulation inside
- TTL compatible control

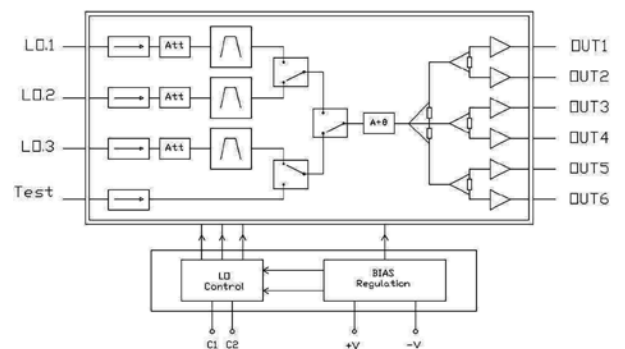
Mechanical dimensions

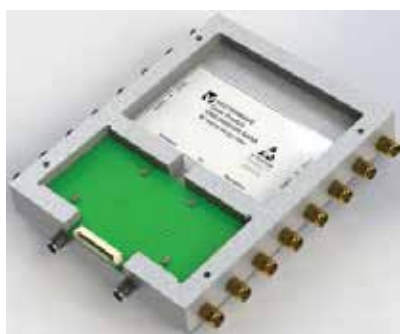


Ordering information

Product code
VWA 0000110 AA

Functional Block Diagrams





VWA-0000109-AA

2 to 16 X-band
RF Divider / Combiner - MCM

Description

This module is a 2 to 16 divider/combiner.

A switch allows to choose between the 2 accesses.

A 5 bits attenuator is present on each of the 2 accesses.

The 16 ways are balanced in amplitude and phase.

Please contact us for more information. We will be happy to adapt this product to your need.

Features

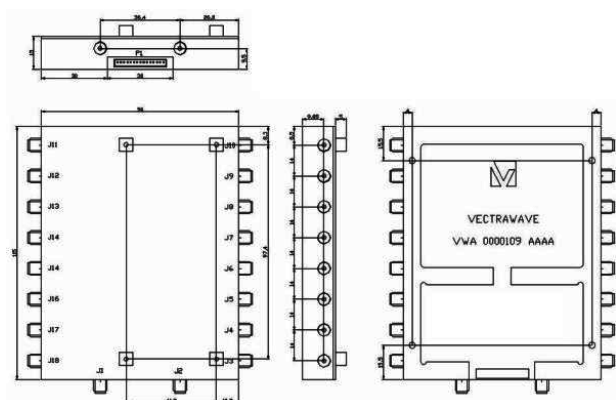
- K connectors
- Applications over X and Ka frequency range
- Bias regulation inside
- TTL compatible control

Ordering information

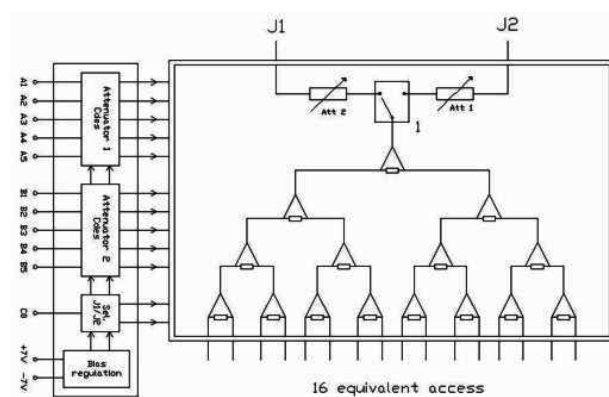
Product code

VWA 0000109 AA

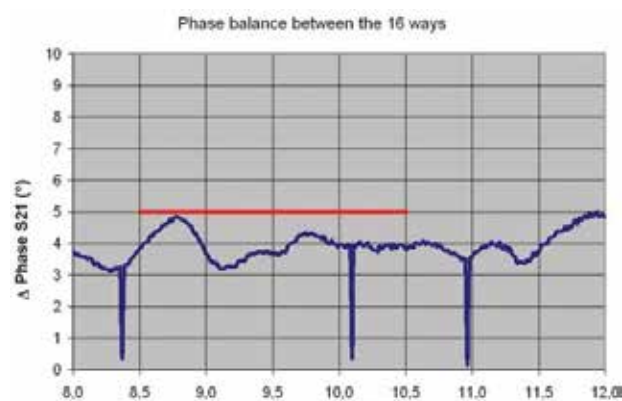
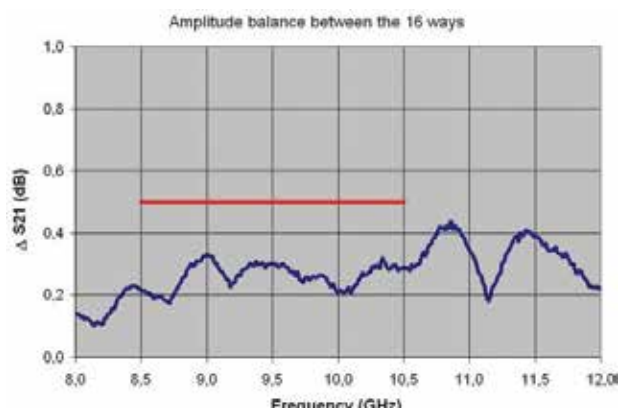
Mechanical dimensions



Functional Block Diagrams



Typical performances





VWA 0000121 AA

T/R Module

Main Features

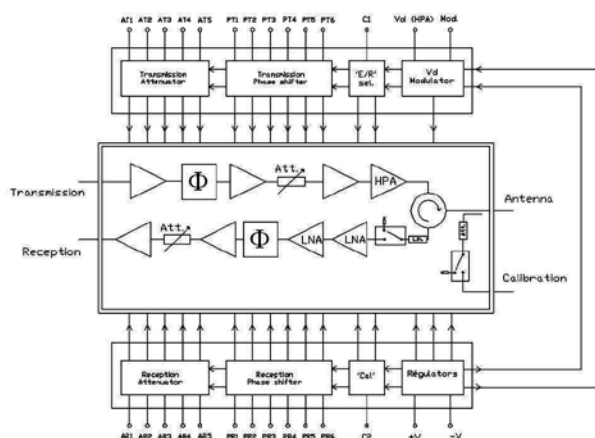
- K connectors
- Applications over X band frequency range
- Bias regulation inside
- TTL compatible modulator for HPA drain supply inside
- TTL compatible control : attenuators and phase shifters
- LNA protection against high power in reception
- Antenna output VSWR better than -14dB.
- Transmission and reception calibration access available

Ordering information

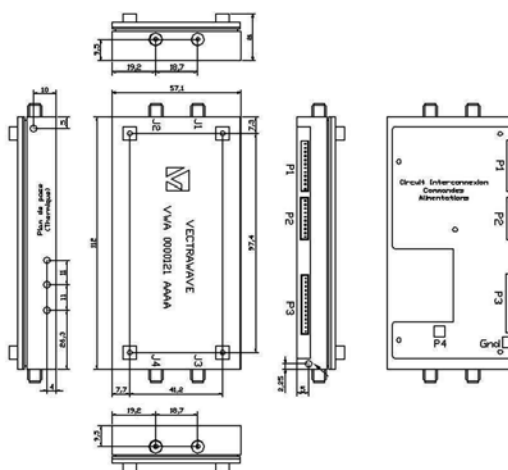
Product code

VWA 0000121 AAAA

Functional Block Diagrams



Mechanical dimensions

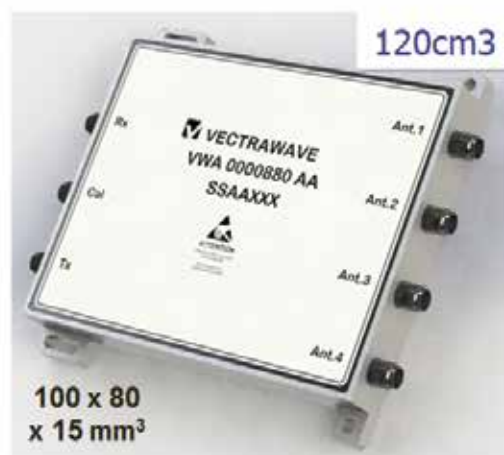
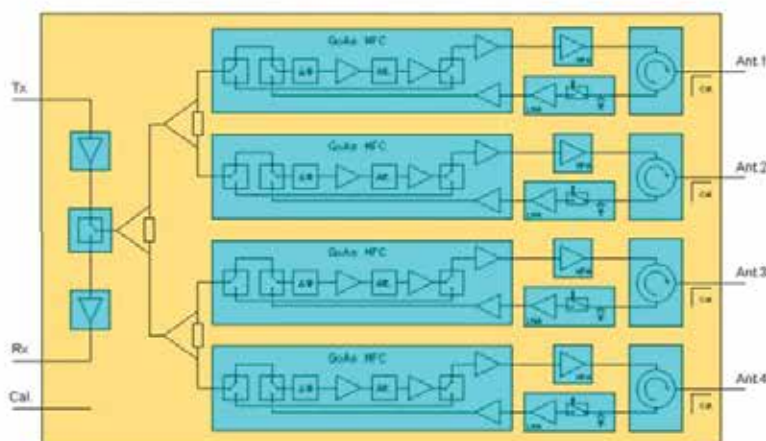


Small form factor packaging solution for tr module can be provided on request

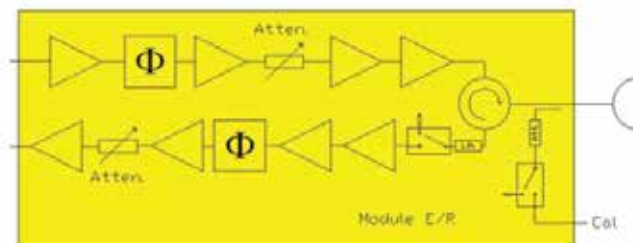
VWA0000506AA Module RX Power Divider Switchable Delay Line



Quadri-module (MFC based)



Single Module (DAT & DPS)



Ka-Band Subsystems

Your Solution Provider for RF and Microwave Sub-Systems

- * Off-the-shelf MMIC : LNA, MPA, HPA
- * Bare die or SMD packaged components
- * Custom designed products : SiGe, GaAs, GaN
- * From "Design to Performance" to "Design to Cost"
- * ISO 9001 Certified

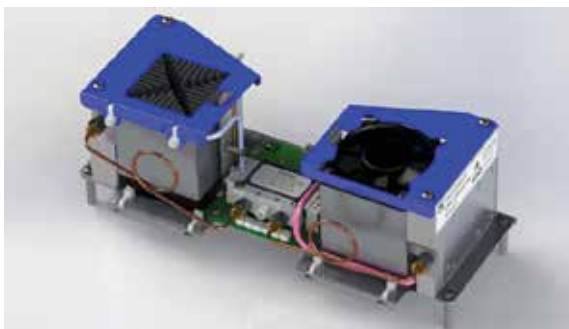
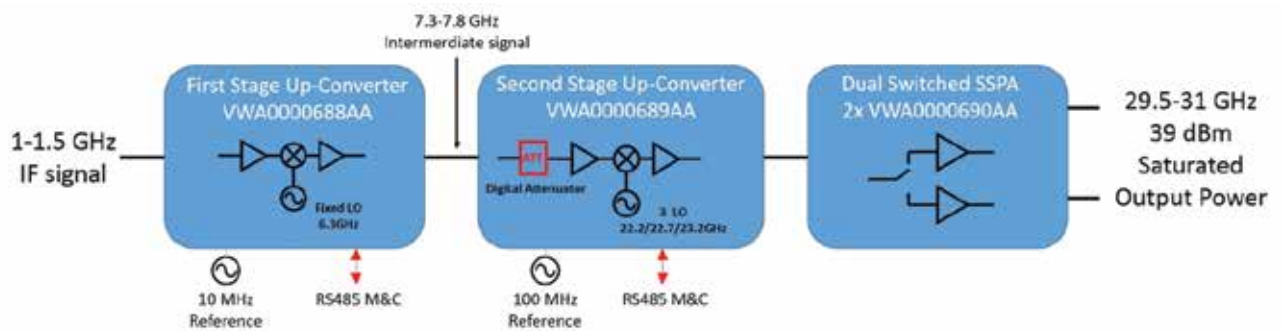


VWA 0000690 AA
Ka Band 10W, 40dB Gain - Linear SSPA

- * 2 Stages High Power GaN Amplifier
- * Wide band : 29 to 31 GHz
- * High P1dB>+40dBm
- * High adjustable signal gain : 40dB min
- * K Input connector : waveguide Output WR28
- * Power supply : 3A @ +24V
- * SFF size : 60x70 13.7mm (out of waveguide)

VWA0000687AA – 10W Ka Band Bloc Up Converter

- Double Stage Up Converter and dual switched SSPA,
- Transpose an IF signal (1-1.5GHz) to a Ka-band RF signal (29.5-31GHz, 3 x Sub bandwidth of 500MHz),
- 55dB gain max for a Saturated Output Power to 39dBm,
- RS485 Monitoring and Control
- Mobile and Satellite Communications Applications



VWA0000687AA – 10W Ka Band Bloc Up Converter



VWA0000688AA-First stage Up-Converter



VWA0000689AA-Second stage Up-Converter

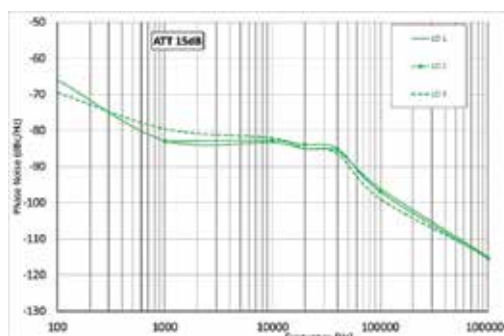
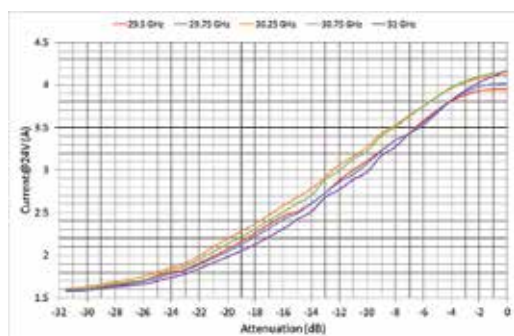
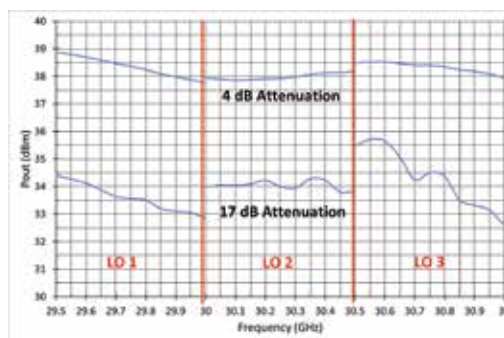
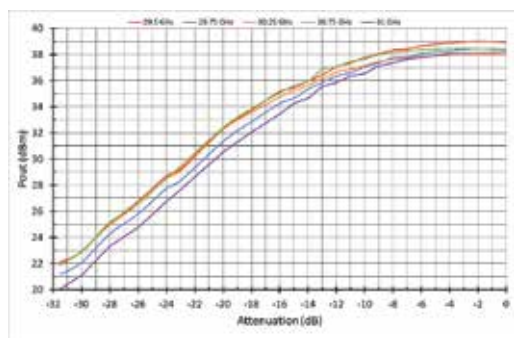


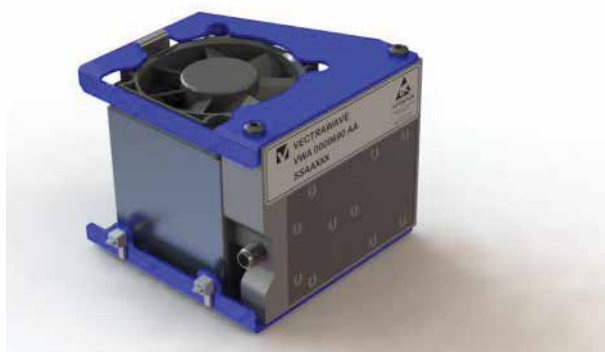
VWA0000690AA – Solid State Power Amplifier

VWA0000687AA – 10W Ka Band B.U.C. specification

Parameters		Min	Typ	Max	Units	Comments
Frequency Range	Input	1		1.5	GHz	
	Output	29.5		31	GHz	
Electrical Specifications	Input Power		-15	-10	dBm	
	Saturated Output power		39		dBm	
	IM3 @Pout=34dBm		-25		dBc	two-tone 5MHz
	Attenuator Range	0		31.5	dB	0.5dB step
	External Reference 10MHz	Frequency Input Power	10 0±5dB5d8		MHz dBm	
	External Reference 100MHz	Frequency Input Power	100 2		MHz dBm	
	Output Phase Noise	100Hz 1kHz 10kHz 100kHz 1MHz	-66 -80 -81 -94 -115		dBc/Hz	
	Gain Flatness Full Band			±3	dB	
DC Supply		voltage current	22 1.6	24 4.5	V A	
Parameters		Comments				
Interfaces Specifications	Input	K2.92 (f) – Anritsu K102F				
	Output	WR28 Flat- UG599-U				
	Reference 10MHz	SMA (f)- Multicomp 19-49-5-TGC				
	Reference 100MHz	SMA (f)- Multicomp 19-49-5-TGC				
	Supply	Mini-Fit Jr- Molex 39-30-1042				
	M&C connector	DataMate L-Tek HARWIN M80- 8420342				
Mechanical	weight	2300 g				
Monitoring and Control communication	RS485	Attenuator, sub- band Local oscillator of second Up- converter, switched SSPA output, temperature monitoring				

VWA0000687AA – 10W Ka Band B.U.C. Measurement





VWA-0000690-AA

**Ka Band 10W, 40dB Gain
Linear SSPA**

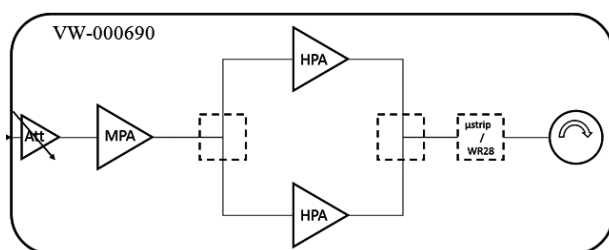
Description

The VWA-0000690-AA is a 10 W Solid State Linear High Power amplifier operating in the frequency range 29 to 31 GHz.

The device is a linear cascaded 2 stages amplifier, using High Power GaN MMIC technology. The mechanical housing includes a variable attenuator and an isolator at the power stage output, ideal for connecting to an antenna or combining several SSPA together.

The devices is providing more than +40 dBm output power at P1dB, 40dB large signal gain from 29 to 31 GHz with minimum flatness. The Design has been optimized to provide high efficiency, supply current is as low as 3 A within 24V, when delivering +40 dBm output power. S2P file can be provided for system design simulation. GDSII file is also available for mechanical design.

Functional Block Diagrams



Features

- 2 stages High Power GaN Amplifier
- Wide band : 29 to 31 GHz
- High P1dB > +40dBm
- High adjustable signal gain: 40dB min
- K Input connector; Waveguide Output WR28
- Power supply: 3 A @ +24 V
- SFF size : 60 X 70 X 13,7 mm (out of Wave guide)

Applications

- SatCom Transmitter
- Broadband communication
- Test and measurement
- Higher output SSPA

Ordering information

Product code
VWA 0000690 AA

Typical Characteristics

Parameters	Symbol	Min	Typ	Max	Unit
Frequency range	F	29		31	GHz
Gain from 29 to 31 GHz	G		40		dB
Output power @ 1dB	P1dB		40,5		dBm
Input/Output Return Loss	IS11I IS22I		12		dB
Supply voltage	VD		24		V
Supply current	ID		3		A



VWA-0000689-AA

Ka Band Up-Converter, 20dB Adjustable Gain Integrated LO

Description

The VWA-0000689-AA is a Ka-Band integrated Up-Converter with 20 dB adjustable of conversion gain. The device has an internal adjustable local oscillator that require a 100 MHz reference. Its input IF 7.3 to 7.8 GHz is up-converted to Ka-band at a linear output power of 15 dBm. The device is composed of an up-conversion scheme to ensure a low phase noise and high rejection and include a 6-bits attenuator to adjust conversion gain. An interface board allows a thermal monitoring, gain compensation, frequency local oscillator control with small frequency step and 6-bits gain control trough RS485 bus.

GDS file is also available for mechanical design.

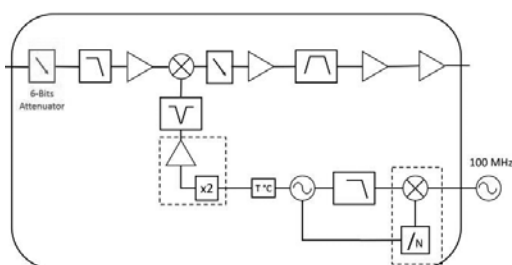
Features

- IF Bandwidth : 7.3 to 7.8 GHz
- RF Bandwidth : 29.5 to 31 GHz
- P1dB : 15 dBm
- Digital Gain control : 20 dB max
- 100 MHz reference
- Thermal Monitoring and gain compensation
- 2.9 connectors
- RS485 bus connector
- Power supply: 0.36 A @ +24 V
- SFF size : 180 X 120 X 25 mm

Applications

- SatCom Transmitter
- Broadband communication
- Test and measurement

Functional Block Diagrams



Ordering information

Product code
VWA 0000689 AA

Typical Characteristics

Parameters	Symbol	Min	Typ	Max	Unit
IF Bandwidth	FIF	7.3		7.8	GHz
RF Bandwidth	FRF	29.5		31	GHz
Adjustable Gain	G			20	dB
Output power @ 1dB	P1dB		15		dBm
Input/Output Return Loss	IS11I IS22I		12		dB
LO Phase Noise	@100Hz @1kHz @10kHz @100kHz @1MHz		-66 -74 -80 -94 -118		dBc/Hz
Supply voltage	VD		24		V
Supply current	ID		0.36		A



VWA-0000688-AA

7.3 to 7.8 GHz Up-Converter , 15dB Conversion Gain Integrated LO

Description

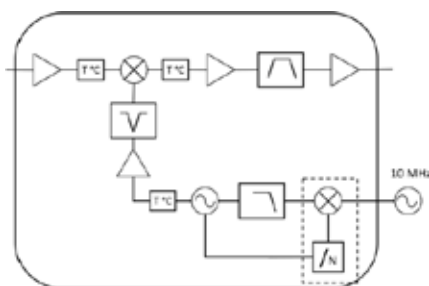
The VWA-0000688-AA is a C-Band integrated Up-Converter with 15 dB of conversion gain.

The device has an internal local oscillator that require a 10 MHz reference. Its input IF 1.0 to 1.5 GHz is up-converted to 7.3 to 7.8 GHz frequency band at a linear output power of 10 dBm. The device is composed of an up-conversion scheme to ensure a low phase noise and high rejection. GDSII file is also available for mechanical design.

Features

- IF Bandwidth : 1.0 to 1.5 GHz
- RF Bandwidth : 7.3 to 7.8 GHz
- P1dB : 15 dBm
- Gain : 15 dB max
- 10 MHz reference
- Thermal gain compensation
- 2.9 connectors
- RS485 bus connector
- Power supply: 0.18 A @ +24 V
- SFF size : 180 X 120 X 25 mm

Functional Block Diagrams



Applications

- SatCom Transmitter
- Broadband communication
- Test and measurement

Ordering information

Product code
VWA 0000688 AA

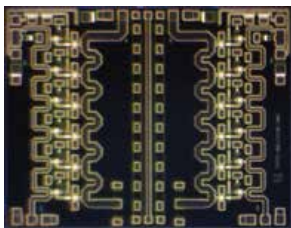
Typical Characteristics

Parameters	Symbol	Min	Typ	Max	Unit
IF Bandwidth	FIF	1.0		7.8	GHz
RF Bandwidth	FRF	7.3		31	GHz
Gain	G		15	20	dB
Output power @ 1dB	P1dB		10		dBm
Input/Output Return Loss	IS11I IS22I		12		dB
LO Phase Noise	@100Hz @1kHz @10kHz @100kHz @1MHz		-80 -90 -93 -100 -130		dBc/Hz
Supply voltage	VD		24		V
Supply current	ID		0.18		A

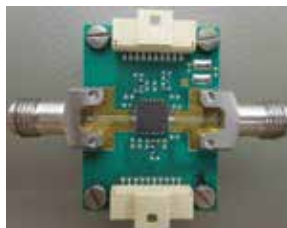
Optical communication products & subsystems

«Providing integrated solution for PAM4 & 400 G Optical links»

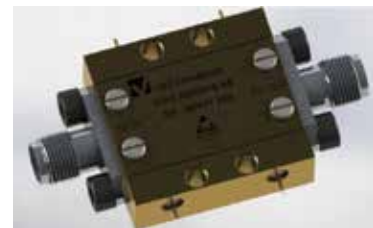
**Distributed MMIC
Amplifier up to 50GHz**



**QFN Drivers
up to 40GHz**



**30KHz to 40 GHz
Driver Amplifier**



**Optical
Receiver**

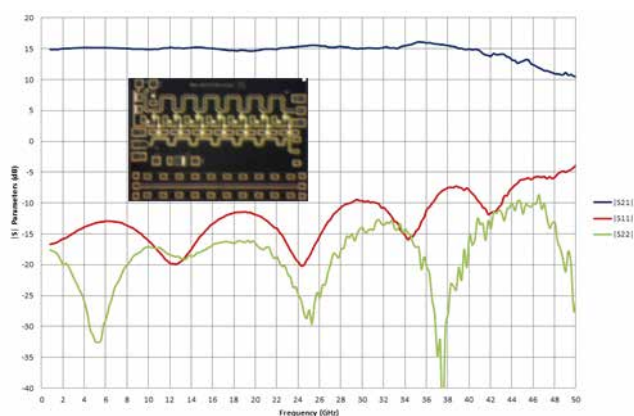


**Dual/Quad Driver for
optical transmitter**



**Optical
Switch/Amplifier**



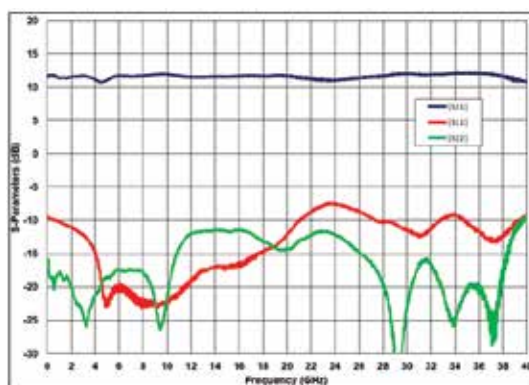
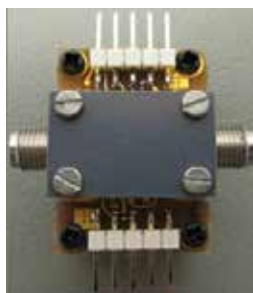


**Distributed MMIC Amplifier
up to 50 GHz**

**VWA 0000918 AA EVB
for VWA 0000052 AA**

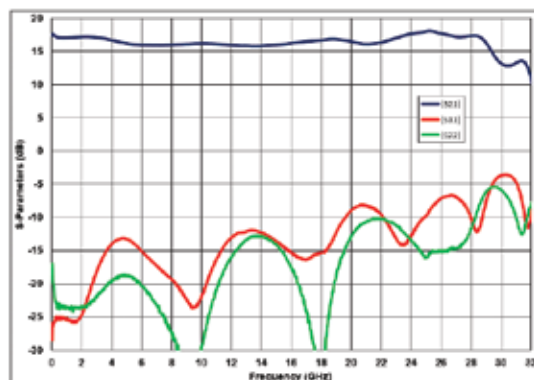
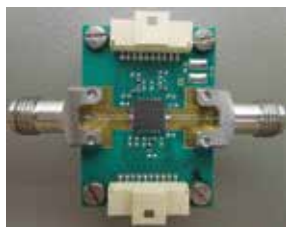
**Evaluation board (EVB)
for Chip & QFN up to 40GHz**

**VWA 0000918 AA
include Bias Tee & DC Block**

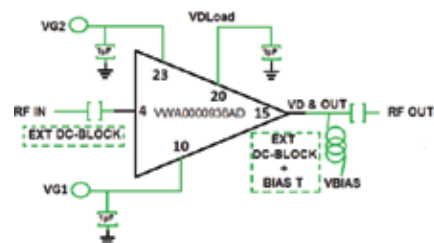


MMIC P/N	EVB Chip	QFN P/N	Size	EVB QFN
VWA 50014 AA	VWA 0000921 AA	VWA 0000936 AD	5X5 24L	VWA 0000957 AA
VWA 50015 AA	VWA 0000924 AA	Consult Factory		Consult Factory
VWA 50015 AB	VWA 0000925 AA	Consult Factory		Consult Factory
VWA 50015 AC	VWA 0000924 AA	Consult Factory		Consult Factory
VWA 50025 AA	VWA 0000922 AA	Consult Factory		Consult Factory
VWA 5000050 AA	VWA 0000927 AA	Consult Factory		Consult Factory
VWA 5000051 AA	VWA 0000928 AA	Consult Factory		Consult Factory
VWA 5000052 AA	VWA 0000918 AA	VWA 0000940 AA	4X4 24L	VWA0000958 AA
VWA 5000053 AA	VWA 0000926 AA	Consult Factory		Consult Factory
VWA 5000054 AA	VWA 0000919 AB	Consult Factory		Consult Factory
VWA 5000056 AA	VWA 0000923 AB	VWA 0000942 AA	5X5 24L	VWA 0000960 AA
VWA 5000062 AA	VWA 0000920 AB	Consult Factory		Consult Factory

VWA 0000957 AA
EVb for QFN
VWA 0000936 AD



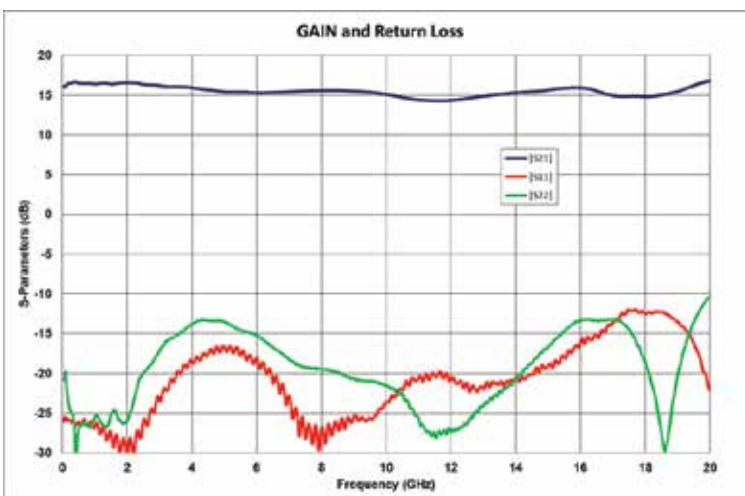
VWA 0000957 AA
External Bias Tee & DC Block



VWA 0000964 AA
Size : 20,7 X 19 X 9,1mm



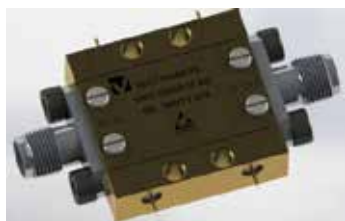
Driver Amplifier
up to 40 GHz



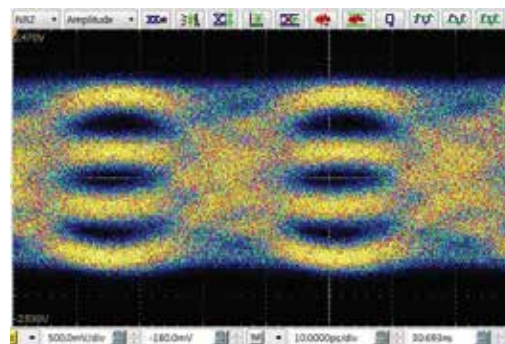
Part Number	Description	RF In/Out
VWA 0000964 AA	40KHz-20GHz ,15dB Gain, NF= 2,5 to 4,5dB, 23 dBm Psat- 8V/100mA- RF, Pulse & Datacom	SMA (F)
VWA 0000916 AA	40KHz-40GHz, 20dB Gain, NF 5dB, Vout =4Vpp,-6V/280mA- RF, Pulse & Datacom	K(F)

VWA 0000916 AA

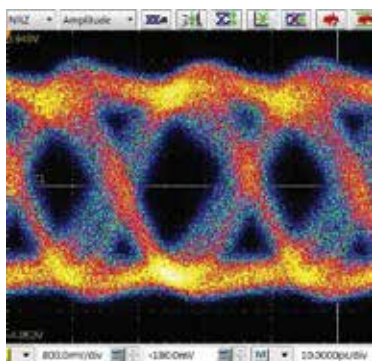
Size : 20,7 X 19 X 9,1mm



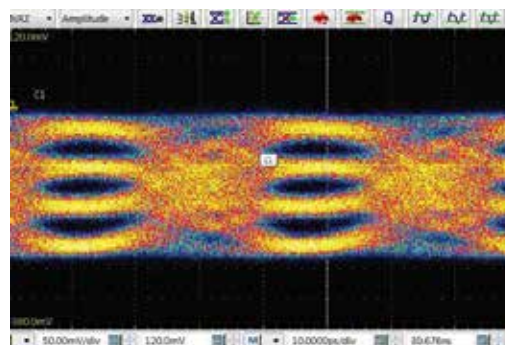
PAM 4 - 28 Gbps Output signal - 0,5V /Div



56 Gbps NRZ Output – 0,8V/Div



28 Gbps Input signal - 0,05V /Div



RF Signal Processing

Code	Function	Package
VWA 00020 AB	8-12 GHz,600° Phase shift,7Vpp output PSD	SMD
VWA 00060 AB	9.9-11.5 GHz->19.8-23 Ghz, 800° Phase shift,4Vpp output PSD	SMD
VWA 00066 AA	9.9-11.5 GHz->19.8-23 Ghz, 600° Phase shift,8Vpp output PSD	SMD
VWA 00039 AB	8-12 GHz,600° Phase shift,7Vpp output PSD	EVB
VWA 00061 AB	9.9-11.5 GHz->19.8-23 Ghz, 800° Phase shift,4Vpp output PSD	EVB
VWA 00064 AB	9.9-11.5 GHz->19.8-23 Ghz, 600° Phase shift,8Vpp output PSD	EVB
VWA 00045 AD	10.7 GHz-> 21.4Ghz(X3), Phase control 6 bit (5.6°), 2Vpp output PSD	Module
VWA 00054 AD	10.7 GHz-> 21.4GHz(X2)-42.8GHz, Phase control 6 bit (5.6°), 2Vpp output PSD	Module
VWA 00047 AA	21-22 GHz->42-44 GHz, 2.8Vpp, K connectors, Active Frequency Double FDF	Module
VWA 00053 AA	10-11 GHz->20-22 GHz, 2.8Vpp, K connectors, Active Frequency Double FDF	Module



10G/20G/30G/40G Data Coders

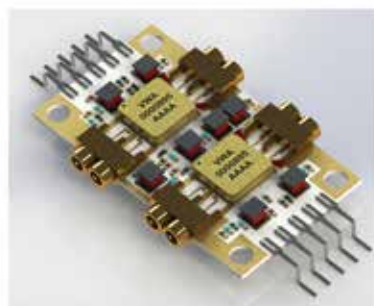
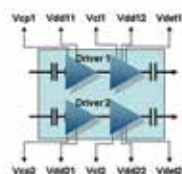
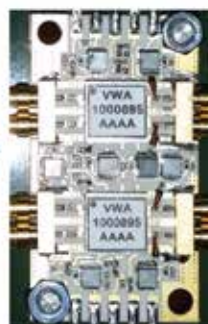
High Speed Logic & Data Coders

Code	Function	Package
VWA 50001 AA	40 Gbps, 800 mVpp, NRZ to RZ-DPSK coder	Die
VWA 50002 AA	40 Gbps, 800 mVpp, D- FF Gate	Die
VWA 50023 AA	40 Gbps, 800 mVpp, Differential Coder	Die
VWA 50024 AA	40 Gbps, 800 mVpp, NRZ to RZ Coder	Die
VWA 50029 AA	40 Gbps, 800 mVpp Duobinary Coder	Die
VWA 50030 AA	40 Gbps, 800 mVpp Differential Limiter Amplifier	Die
VWA 00055 AA	30 Gbps, 800 mVpp, NRZ to RZ-DPSK coder	QFN
VWA 00056 AA	30 Gbps, 800 mVpp, D- FF Gate	QFN
VWA 00057 AA	30 Gbps, 800 mVpp, Differential Limiter Amplifier	QFN
VWA 00058 AA	30 Gbps, 800 mVpp Duobinary Coder	QFN
VWA 00059 AA	30 Gbps, 800 mVpp, NRZ to RZ Coder	QFN
VWA 00074 AB	30 Gbps, 800 mVpp, Differential Coder	QFN
VWA 00077 AB	30 Gbps, 800 mVpp, GPPO connectors, NRZ to RZ-DPSK coder	EVB
VWA 00088 AB	30 Gbps, 800 mVpp, GPPO Connectors, D- FF Gate	EVB
VWA 00094 AB	30 Gbps, 800 mVpp, GPPO Connectors, Duobinary Coder	EVB
VWA 00095 AB	30 Gbps, 800 mVpp, GPPO Connectors, NRZ to RZ Coder	EVB
VWA 00078 AB	30 Gbps, 800 mVpp, GPPO Connectors, Differential Coder	EVB
VWA 00075 AB	30 Gbps, GPPO connectors, NRZ to RZ-DPSK Coder with Double Driver 7Vpp	EVB
VWA 00068 AB	40 Gbps, 800 mVpp, K connectors, NRZ to RZ-DPSK coder	Module
VWA 00069 AB	40 Gbps, 800 mVpp, K Connectors, D- FF Gate	Module
VWA 00070 AB	40 Gbps, 800 mVpp, K Connectors, Differential Coder	Module
VWA 00071 AB	40 Gbps, 800 mVpp, K Connectors, NRZ to RZ Coder	Module
VWA 00072 AB	40 Gbps, 800 mVpp, K Connectors, Duobinary Coder	Module
VWA 00087 AB	40 Gbps, 800 mVpp, K Connectors, Differential Limiter Amplifier	Module

DUAL & QUAD DRIVER for 100G to 400G



VWA_5000051_AAAA: Double Amplifier MMIC 1
VWA_5000053_AAAA: Double Amplifier MMIC 2
VWA_0000895_AAAA: Double Driver_QFN 8X8
VWA_1000045_AAAA: GPPO Quad Driver Module



QUAD SOA DRIVER VWA 0000905 AA for Optical Packet Switching



QUAD SOA DRIVER VWA 0000905 AA for Optical Packet Switching



VWA-0000905-AA

Quadruple SOA/BOA Driver

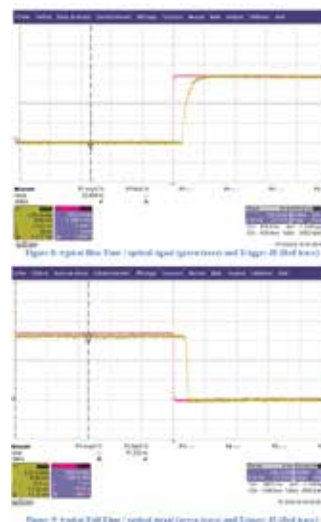
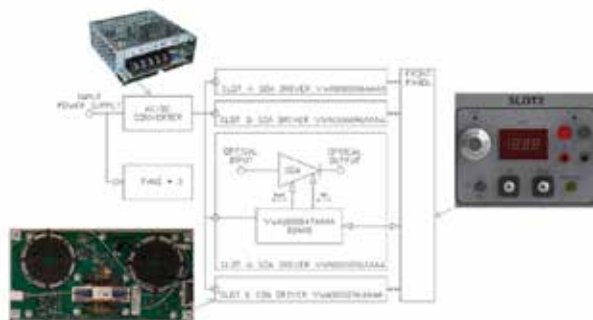
Main Features

- 2U 19" Rackable
- Power Supply typ. 220V/50Hz
- LVTTTL inputs to control pulse (SMB connector)
- Optical I/O FC/APC
- ZIF connectors to connect SOA/BOA (Easy maintenance)

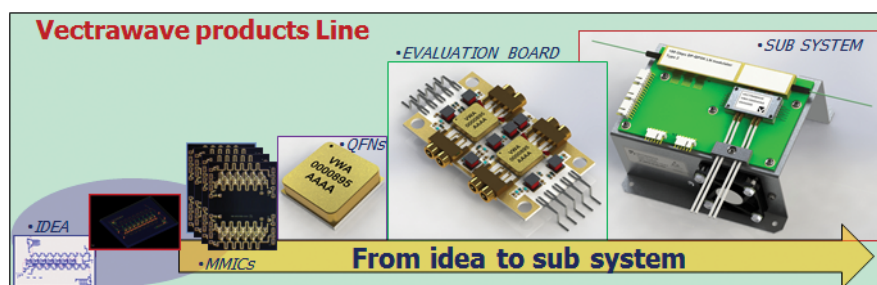
Applications

- Optical burst switching
- Optical Time Domain Multiplexing
- SOA/BOA evaluation test

Functional Block Diagrams

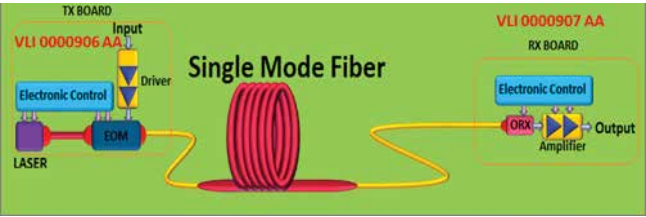


Packaging of «100G to 400G Subsystems» in BGA Package, on specific Requirement



RF OPTICAL PRODUCTS & SUBSYSTEMS

O.5 /2GHz to 18GHz RF Optical Link



The OTX is composed by an optical laser source with a constant emitting power level at 1550nm. Then an Electro Optical Modulator (EOM) is used to convert the electrical analog signal into an optical analog signal. A driver is used to ensure the electrical dynamic required for linear operation.

OTX Subsystem : P/N VLI 0000906 AA (0,5 to 18 GHz) Integrating Laser diode, RF Analog EOM Modulator, RF amplifier with fix gain VWA 0000906 AA & VWA 0000954 AA (2 Stages) or switchable gain P/N VWA 0000073 AC.

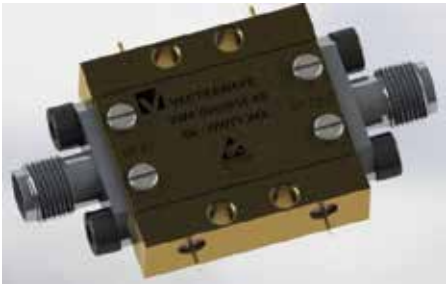
The ORX includes an optical photo receiver (ORX) allows to convert the optical signal into electrical signal. Then linear Low Noise amplifier is used to ensure a reasonable output signal amplitude level.

ORX subsystem : P/N VLI 0000907 AA (0,5 to 18 GHz) integrating Optical Photo receiver P/N VLI 0000893 or VLI 0000894, or ..., and LNA amplifier type VWA 0000913 AA (3 Stages) or VWA 0000916 AA (2 Stages)

VWA 0000954 AA

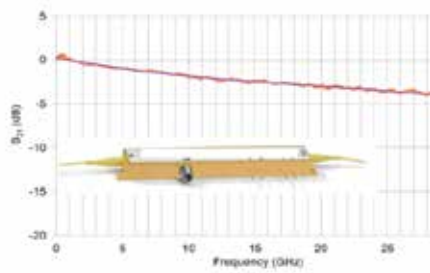


VWA 0000916 AA



Part Number	Description	RF In/Out
VWA 00052	0,5-4 GHz ,31 dB Gain, 18 dBm Psat- 9V/200mA- RF Amplifier	SMA(F)
VWA 00073 AC	0,5-20 GHz, Switchable 0- 20- 40 dB Gain, 20 dBm- +12V/-12V- RF Amplifier	SMA(F)
VWA 0000906 AA	0,5-20 GHz,15dB Gain, NF 2,5 to 4,5dB / 23 dBm Psat- 9V/200mA- RF Amplifier	SMA(F)
VWA 0000954 AA	0,5-20 GHz, 24dB Gain, NF 2,5 to 5dB / 22 dBm Psat- 8V/290mA-RF Amplifier	SMA(F)

DFB + OEM or Direct Laser diode modulation



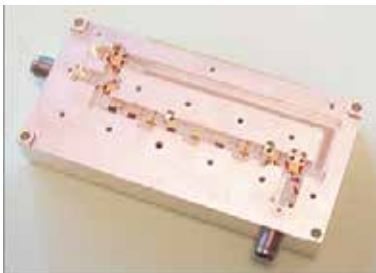
Optical Photo Receiver



0,5 to 40 GHz RF Optical Link with Switch Gain Amplifier (0/20/40dB) For OTX System integration with EOM & DFB Laser



0,5 to 40GHz switch Gain Amplifier with K connector



Micro strip Pin Optical Receiver



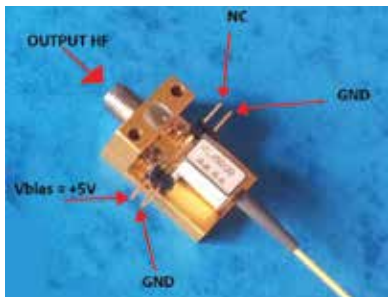
Optical Receiver with K connector



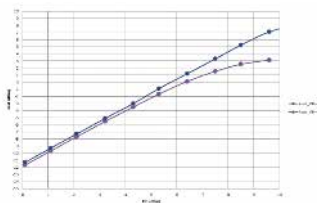
Optical Receiver with coplanar PIN



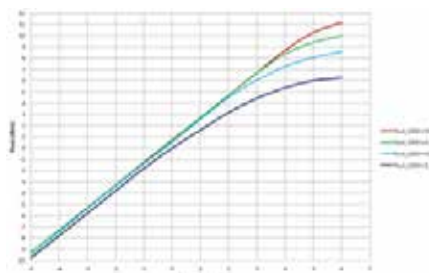
Optical Receivers: Narrow band versus Wide band (50Ohms)



X Band RF Optical receiver without TIA
Pout Vs Pin @ 9,2GHz, $m=1$, $S_r = 0,75$ A/W
Vbias=+5V & Vbias =+10V



VLI 0000898 AA : S Band RF Optical receiver with TIA
Pout Vs Pin @ 4,3GHz, $m=1$



Optical Receivers: L, S, C, X, Ku, Ka narrow band versus Wide band solution

2-3GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	6	0,003	0,75	-2,5	79,05	3,98	Narrow Band Solution
	dBm	A	A/W	dBm	OHMS	dB	300MHz
13GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	6	0,003	0,75	-2,5	79,05	3,98	Narrow Band Solution
	dBm	A	A/W	dBm	OHMS	dB	700MHz
20GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	6	0,002	0,5	-6	79,24	4	Narrow Band Solution
	dBm	A	A/W	dBm	OHMS	dB	1000MHz
30GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	6	0,0015	0,38	-10	66,67	2,5	Narrow Band Solution
	dBm	A	A/W	dBm	OHMS	dB	1500MHz
40GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	8	0,0025	0,4	-14	25,24	-5,94	Wide Band Solution
	dBm	A	A/W	dBm	OHMS	dB	DC-40GHz
15GHz	Pin	Iph	S (A/W)	Pout	Zt (ohms)	GAIN (dB)	
	13	0,015	0,75	1,5	25,06	-6	Wide Band Solution
	dBm	A	A/W	dBm	OHMS	dB	DC-14GHz



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Asia Office : 4F 123 AnMei St. NeiHu - Taipei - 11484 -
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