



**32 Gbps 7 Vpp Output  
Double Driver  
in SMD package**

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**30kHz – 25GHz**

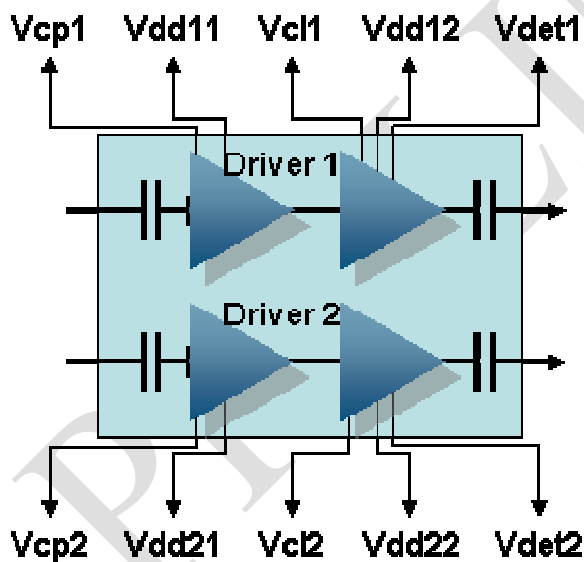
**Description**

The **VWA 00090 AA** is a double amplifier for driving Lithium Niobat MZ double modulator up to 32Gbps.

The module integrates two Double stage amplifiers with output level and cross point control commands. Output voltage can be adjusted from 2Vpp (eye amplitude opening) to 7Vpp or less without cross point change.

The module integrates all the RF passives and biasing devices in the same package, only low frequency coils are required on user board.

**Functional Block Diagram**



**Ordering information**

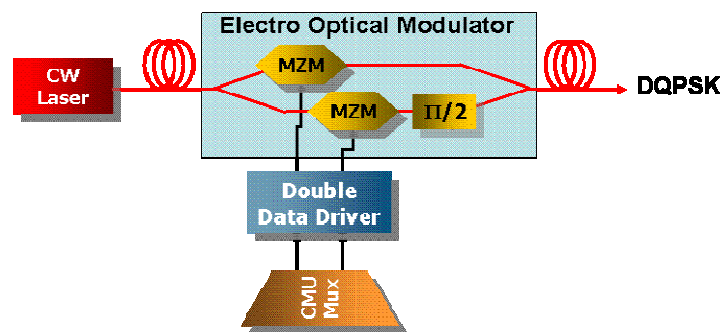
**Code:** VWA 00090 AA

**Main Features**

- SMD
- Small size 7x12,5x2,8 mm
- Data rate up to 32Gb/s
- Output voltage adjustable from 2Vpp to 7Vpp
- Input amplitude:  $\geq 350\text{mV pp}$
- Cross point adjustment range 30% to 70%
- Independent Output level and cross point adjustment
- Integrated output level peak detector
- Power supply (typ): Vdd: +5V and +8V;  $-2\text{V} < \text{Vg} < +2\text{V}$ .
- Low power consumption <4W (Vout=7Vpp)

**Applications**

- DPSK
- DQPSK
- DP-QPSK
- 40 and 100Gbps



**光貿易株式会社**  
〒113-0034  
 東京都文京区湯島 3-13-8 湯島不二ビル 301号  
 TEL : 03-3832-3117 FAX : 03-3832-3118  
 e-mail : contact@hikari-trading.com  
 http://www.hikari-trading.com/

Head Office : rue de la Croix Blanche - Immeuble LOGI – 78350 France

<http://www.vectrawave.com>

+33 (0)619 870 560

+33 (0)139 564 012

mail : [info@vectrawave.com](mailto:info@vectrawave.com)

**Typical Characteristics**

Dynamic characteristics are given for:

- driver 1:  $V_{dd11}=5V$ ,  $V_{dd12}=8V$ ,  $-4V \leq V_{cl1} \leq 1V$ ,  $-0.5V \leq V_{cp1} \leq 0V$
- driver 2:  $V_{dd21}=5V$ ,  $V_{dd22}=8V$ ,  $-4V \leq V_{cl2} \leq 1V$ ,  $-0.5V \leq V_{cp2} \leq 0V$
- Input voltage = 500mVpp
- Bit rate 21.5Gbps

Electrical Parameters	Symbols	Min	Typ	Max	Units	Notes
High Frequency Response (-3 dB)	$BW_{high}$	25			GHz	
Low Frequency Response (-3 dB)	$BW_{low}$			30	kHz	
Averaged max small signal gain	G	25	30		dB	
Input and output return loss	$S_{ii}$			-10	dB	
Output Voltage max	$V_{pp-max}$	7	8	9	Vpp	
Output voltage control dynamic	$\Delta V_{out}$	3	5		dB	1
Rise time (20/80%)	$t_r$		12	13	ps	2
Fall time (20/80%)	$t_f$		11	13	ps	2
Added RMS Jitter	RMS Jitter			0.5	ps	
Differential phase (Amp1/Amp2)	$\Delta \Phi_{12}$			2	ps	3
Differential gain (Amp1/Amp2)	$\Delta G_{12}$			1	dB	3
Crosstalk (Amp1 ↔ Amp2)	Xtlk	30			dB	2
Output voltage control	$V_{cli}$	-4		1	V	5
Cross point voltage control	$V_{cpi}$	-0.3	-0.15	0	V	
Cross point variation with $V_{cli}$	$\Delta C_p$		4	5	%	1
Output voltage detector	$V_{det\_i}$		37		mV/Vpp	4

Notes:

1.  $V_{cl\_i} Min \leq V_{cl\_i} \leq V_{cl\_i} Max$
2. for  $V_{out} = 7V_{pp}$
3. measured at 21.5 Gbps
4. measured at 21.5Gbps
5. apply through 1KOhm serial resistor

Power supply	Symbols	Min	Typ	Max	Units	Notes
First stage supply voltage	$V_{dd\_i1}$	5	8	9	V	
First stage supply current	$I_{dd\_i1}$		110	120	mA	
Second stage supply voltage	$V_{dd\_i2}$	8	8	9	V	
Second stage supply current	$I_{dd\_i2}$		180	210	mA	
Total power consumption driver1 & driver2	P	3.8	4		W	6

Notes:

6. Output voltage = 7Vpp

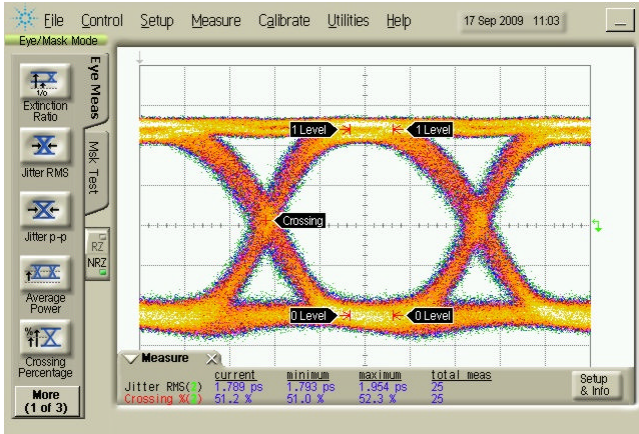
Environment Parameters	Symbols	Min	Typ	Max	Units
Operating temperature (case)	$T_{op}$	-5		+75	°C

**Absolute Maximum ratings**

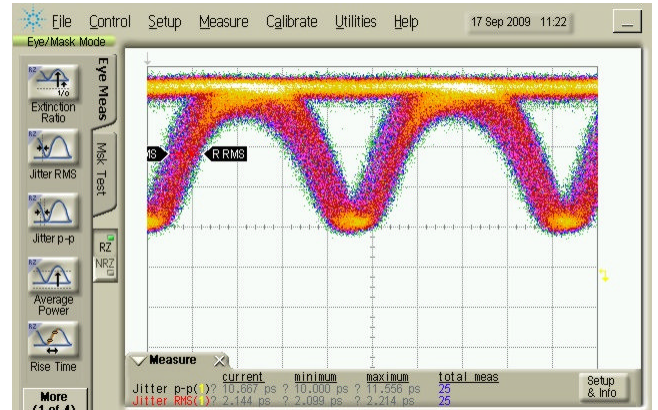
Environment Parameters	Symbols	Min	Typ	Max	Units
Storage temperature	T <sub>stg</sub>	-40		+125	°C

Power supply	Symbols	Min	Typ	Max	Units
First stage supply voltage	Vdd_i1 Max	0		10	V
Second stage supply voltage	Vdd_i2 Max	0		10	V
Output voltage control	Vcli Max	-5		4	V
Cross point voltage control	Vcpi Max	-2.5		0	V

Typical measurements

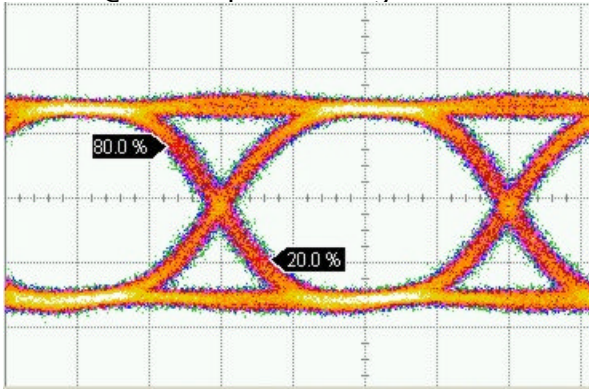


21.5Gbps electrical 7Vpp eye amp diagram

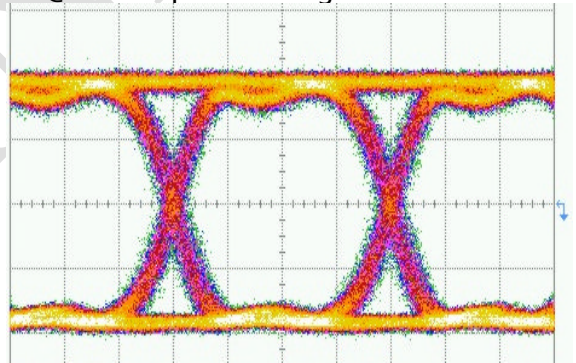


21.5Gbps DPSK optical eye diagram

NRZ Data @ 12.5Gbps for a length of 2<sup>31</sup>-1 Bits.



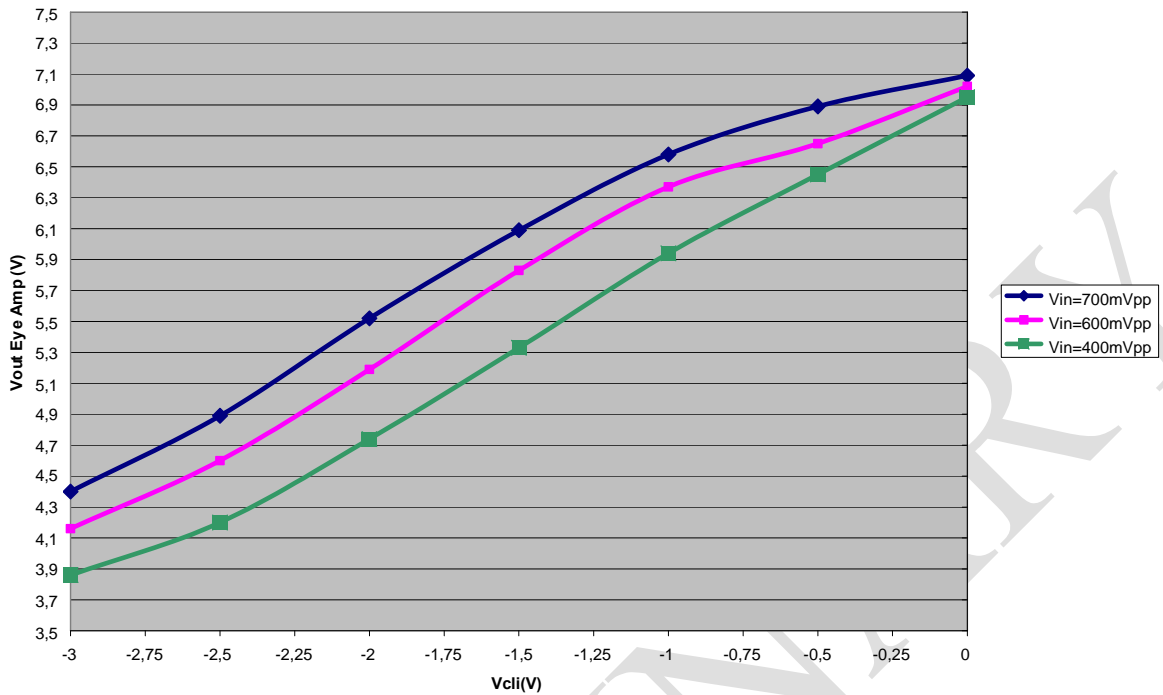
NRZ Data @ 12.5Gbps for a length of 2<sup>31</sup>-1 Bits.



Input signal			
Cp (%)	tr (ps)	tf (ps)	Eye Amp (Vpp)
49	25.3	22.6	0.593

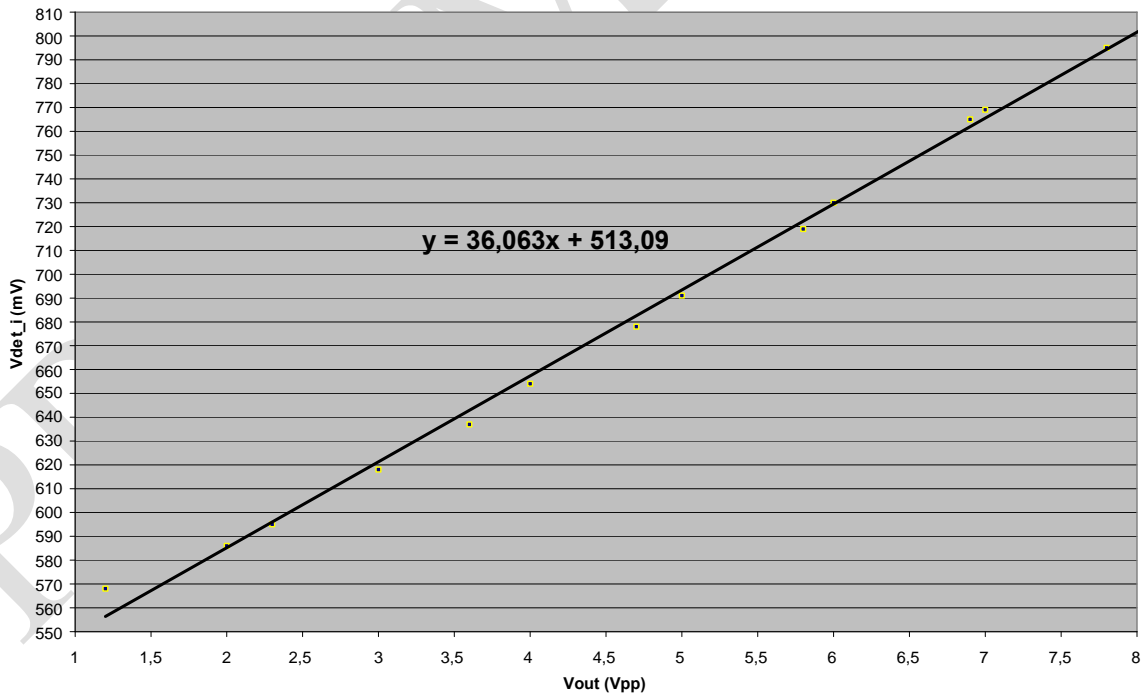
Output signal			
Cp (%)	tr (ps)	tf (ps)	Eye Amp (Vpp)
50.6	16	16.4	7.1

**Output Eye Amplitude (V) Versus Vcli (V)**

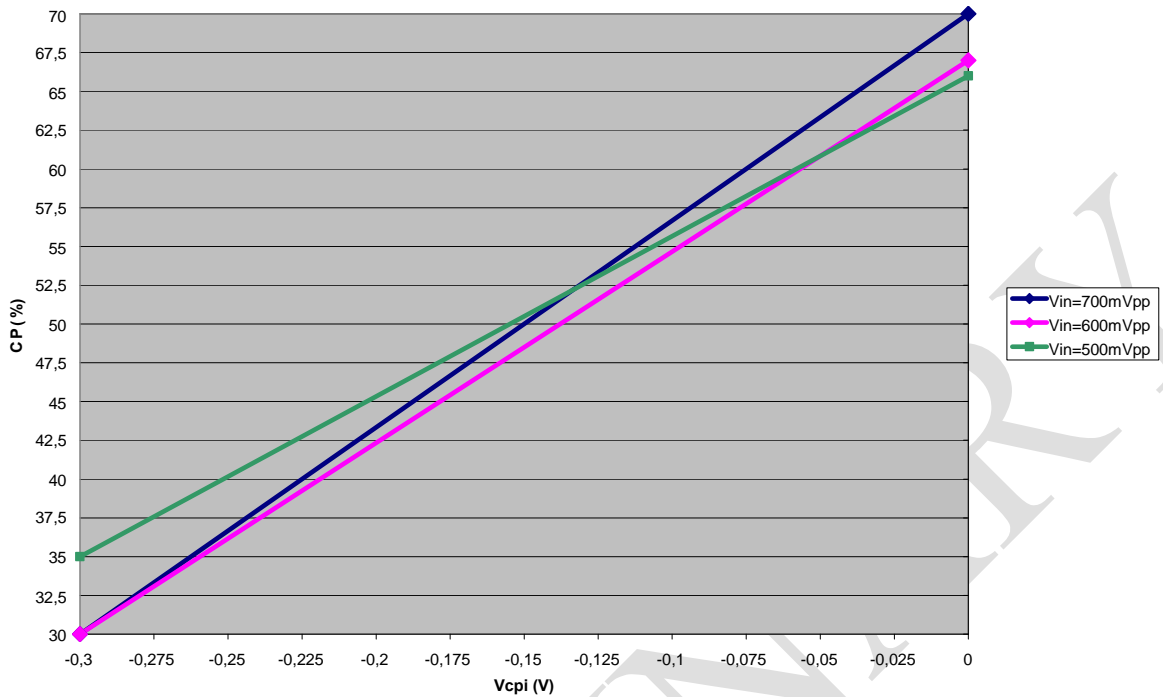


Output voltage eye amplitude variation with output voltage control (for different input levels)

**Vdet\_i Versus Output amplitude (Vpp)**

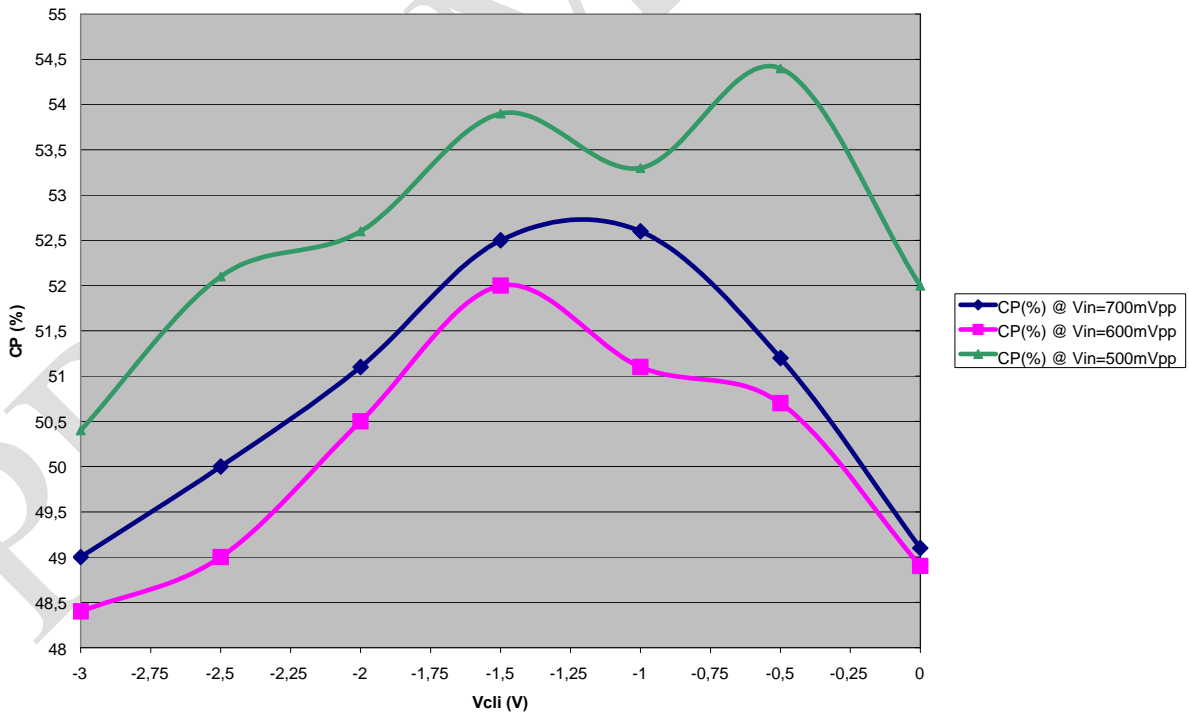


**Cross Point (%) Versus Vcpi (V)**



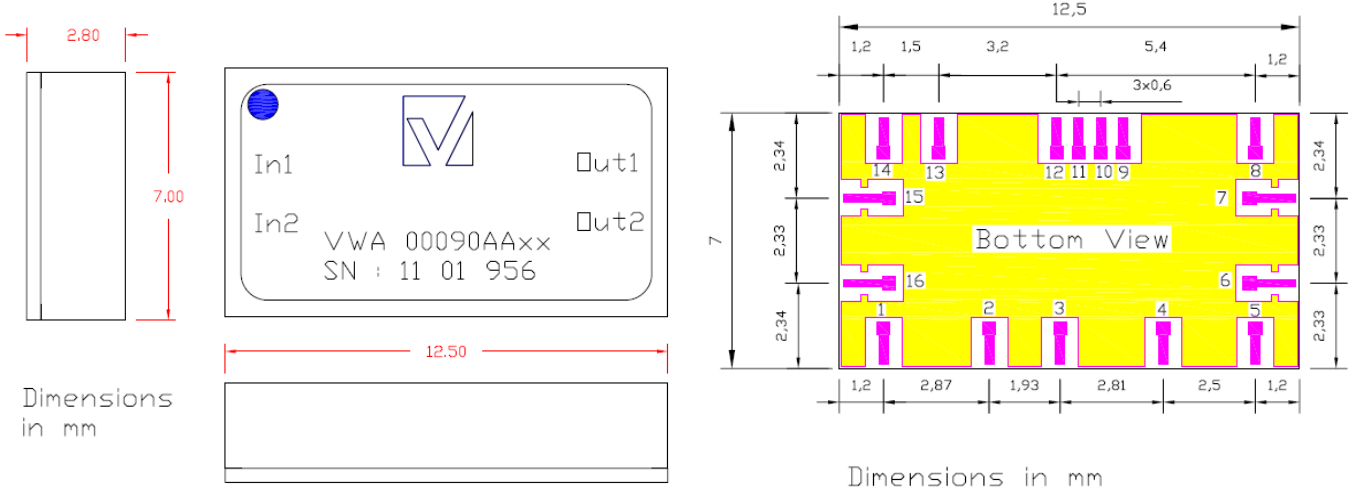
Cross point variation with cross point control (@ Vout=7Vpp)

**Cross Point (%) Versus Vcli (V)**



Cross point variation with output voltage control (when cross point is set at 50% @ Vout=7Vpp)

**Mechanical dimensions and pin out**



VWA 00090 AAxx P□			
1	GND	9	Vdd22
2	Vdd11	10	Vcl2
3	Vcl1	11	Vcp1
4	Vdd12	12	Vcp2
5	Vdet1	13	Vdd21
6	Out1	14	GND
7	Out2	15	In2
8	Vdet2	16	In1

**Handling**

These products are sensitive to electrostatic discharge and should not be handled except at a static free workstation. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling the device.

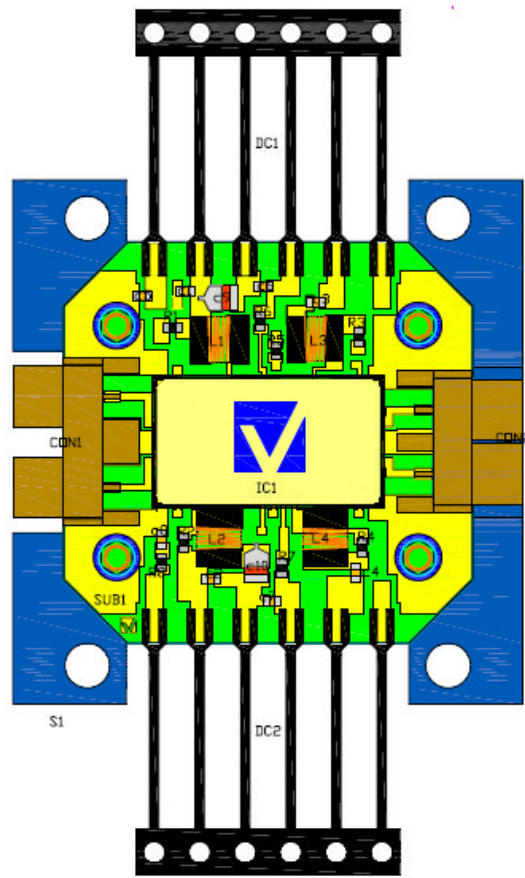
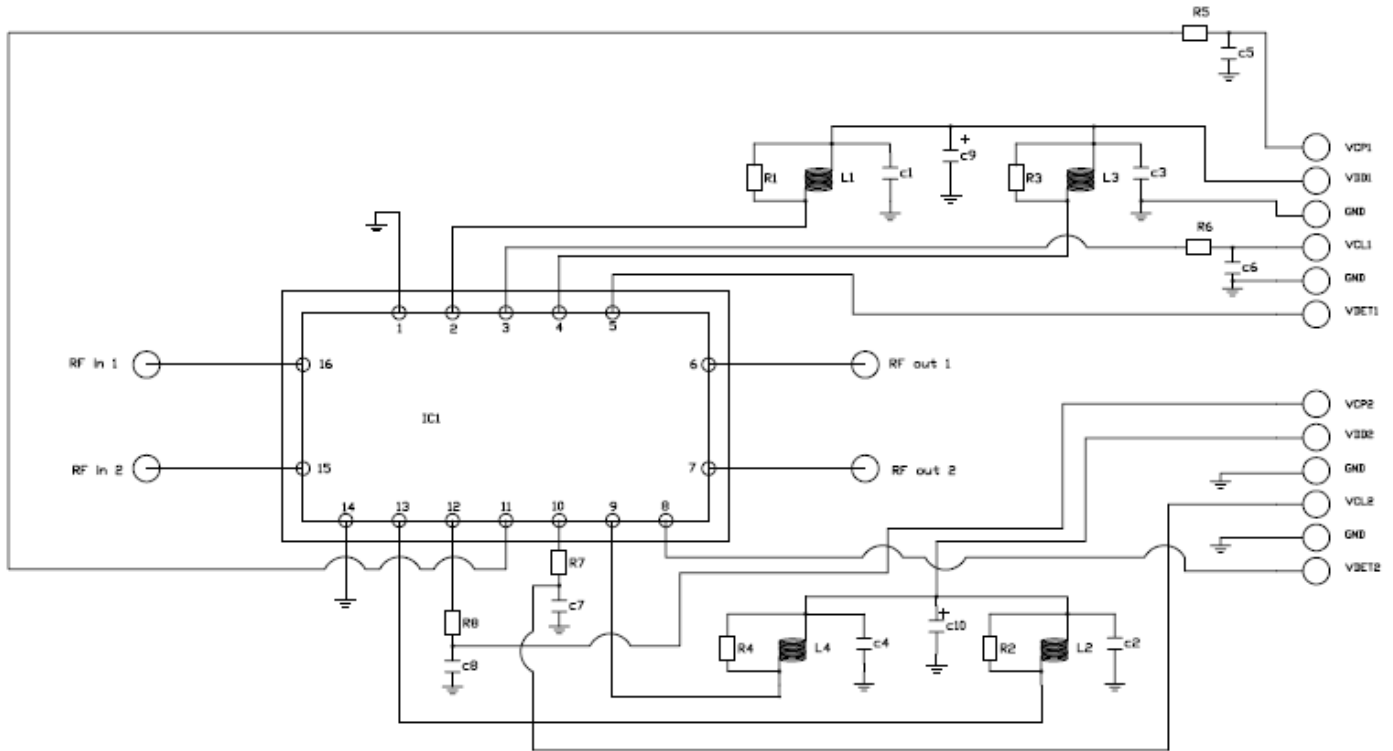


electrostatic discharge and should not be handled except at a static free workstation. Take precautions to prevent ESD; use wrist straps, grounded work surfaces and recognized anti-static techniques when handling the device.

**Demonstration board**

Demonstration board equipped with low frequencies coils and GPP0 connectors is available; ordering code: VWA 00067 AAxx

Electrical schematic and layout are given bellow.





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**Section 1.01 Sales Contacts**

**France**

*Vectrawave*-Les Loges en Josas,  
Mobile : + 33 (0)619 870 560  
Tel : +33 (0)174 875 332  
Fax : +33 (0)139 564 012  
[info@vectrawave.com](mailto:info@vectrawave.com)

**Germany**

*Municom GmbH*-Traunstein,  
Phone : +49 (0)861 166 77-0  
[Hpaule@minicom.de](mailto:Hpaule@minicom.de)

**Italy**

*Alfa Microonde*-Roma  
Phone : + 39 066 635 273  
[maurizio.cirillo@alfamicroonde.com](mailto:maurizio.cirillo@alfamicroonde.com)

**Netherland**

*Air Parts* -Alphenaar den Rijn,  
Phone : +31 (0)172 422 455  
[Luytgaarden.bert@air-parts.com](mailto:Luytgaarden.bert@air-parts.com)

**JAPAN**

*M-RF Co., Ltd* - Tokyo  
Phone +81 (0)3-5821-3623  
[tajima@mrf.co.jp](mailto:tajima@mrf.co.jp)

*Hikari Inc* - Tokyo  
Phone +81 (0)3-3832-3117  
[watanabe@hikari-trading.com](mailto:watanabe@hikari-trading.com)

**ISRAEL**

*Impact Electronics Ltd.*  
Yossi Cohen  
[israel@vectrawave.com](mailto:israel@vectrawave.com)

**CHINA**

*Photonteck Company Limited*  
Shenzhen  
Phone +86 (0)755-86170157  
[asia.li@photonteck.com](mailto:asia.li@photonteck.com)

**DOCUMENT REVISION**

<b>Date</b>	<b>Edition</b>	<b>Author</b>	<b>Comments</b>
01/02/2010	0.1	GCH	
03/02/2010	0.2	BHA	Measurements sheets+ performances data
08/02/2010	0.31	BHA-GCH	Update