Laser Diodes

iC-HVxxxV 200 MHz LASER SWITCH WITH INTEGRATED POWER VCSEL ARRAY

preliminary

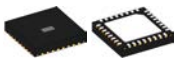
FEATURES

- VCSEL output from CW up to 200 MHz
- Integrated power VCSEL array
- Three independent channels for bias and pulse control
- TTL and LVDS inputs
- VCSEL array supply voltage up to 5.5 V
- Simple power control at pins CIx
- Control voltage < 3 V for full CW output power
- Wide supply voltage range from 3 to 5.5 V
- Temperature measurement
- Open drain error output
- Thermal shutdown

APPLICATIONS

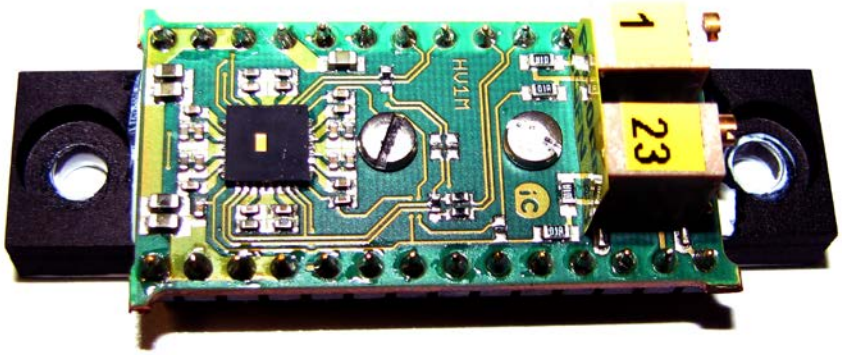
- TOF cameras
- Gesture recognition
- Laser illumination

PACKAGES



oQFN32-5x5

EVALUATION BOARD HV1M WITH iC-HVxxxV



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DESCRIPTION

Table 1 gives the VCSEL arrays (wave lengths and output power) currently available to be assembled onto the iC-HV.

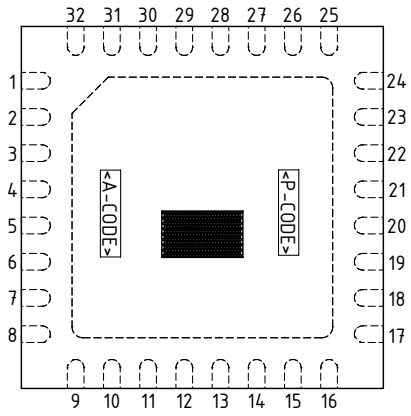
The chip-on-chip assembly of the power VCSEL array onto the iC-HV die yields the shortest possible connectivity and thus the lowest inductance in the VCSEL current path for the fastest switching speed. Since all critical connections are carried out inside the oQFN package, all signals at the pins are fairly uncritical. Thus significantly reducing the challenge of an highly optimised PCB.

xxx	Wave length [nm]	Optical power typ. [W]	
		CW	pulsed
102	808	1.6	6
103	980	1.4	5

Table 1: Available wavelengths

PACKAGING INFORMATION

PIN CONFIGURATION oQFN32-5x5



PIN FUNCTIONS

No.	Name	Function
1	EN1	Negative LVDS input channel 1
2	EP1	Positive LVDS input channel 1 TTL switching input channel 1
3	GND	Ground
4	VLDA	VCSEL array supply voltage
5	VLDA	VCSEL array supply voltage
6	GND	Ground
7	NER	Error monitor output
8	VTEMP	Temperature Voltage
9	ELVDS	TTL/LVDS input selector
10	VDD	Supply voltage
11	GND	Ground
12	VLDA	VCSEL array supply voltage
13	VLDA	VCSEL array supply voltage
14	GND	Ground
15	VDD	Supply voltage
16	CI2	Power control voltage channel 2
17	EN2	Negative LVDS input channel 2
18	EP2	Positive LVDS input channel 2 TTL switching input channel 2
19	GND	Ground
20	VLDA	VCSEL array supply voltage
21	VLDA	VCSEL array supply voltage
22	GND	Ground
23	EP3	Positive LVDS input channel 3 TTL switching input channel 3
24	EN3	Negative LVDS input channel 3
25	CI3	Power control voltage channel 3
26	VDD	Supply voltage
27	GND	Ground
28	VLDA	VCSEL array supply voltage
29	VLDA	VCSEL array supply voltage
30	GND	Ground
31	VDD	Supply voltage
32	CI1	Power control voltage channel 1

The *Thermal Pad* is to be connected to a *Ground Plane* (GND) on the PCB.

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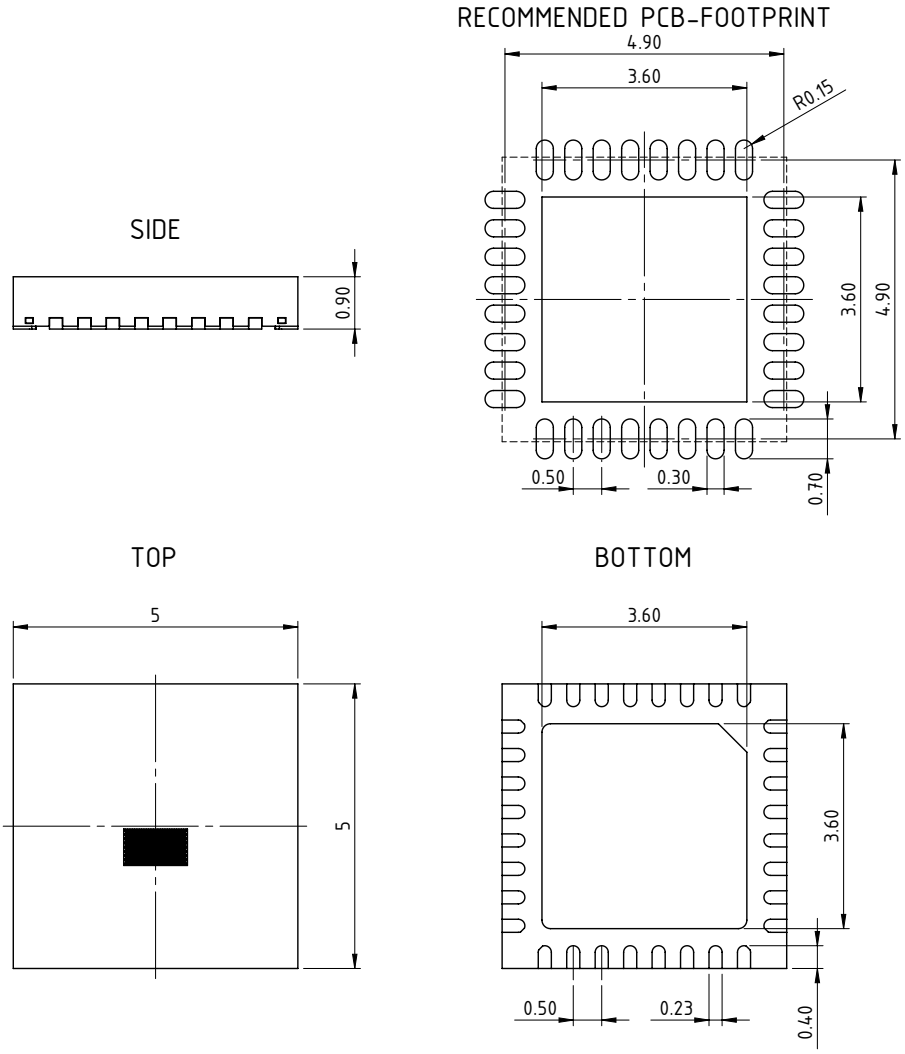
PACKAGE DIMENSIONS oQFN32-5x5



All dimensions given in mm.
Tolerances of form and position according to JEDEC MO-220.

dra_oqfn32-2_hv3202_pack_1, 10:1

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HV102V 808 nm

CW output

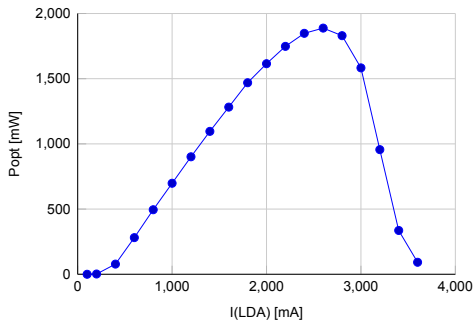


Figure 1: Optical output (VDD = 5 V, VLDA = 4 V)

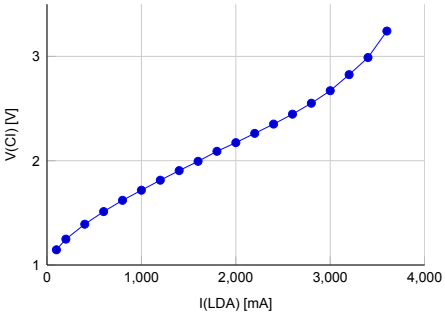


Figure 3: Voltage V(CI) (2 channels)

Conclusion
1900 mW optical output power at 2600 mA. Low threshold current of about 200 mA. VLDA-voltage too low for a load current > 3400 mA (overproportional rise of V(CI)).

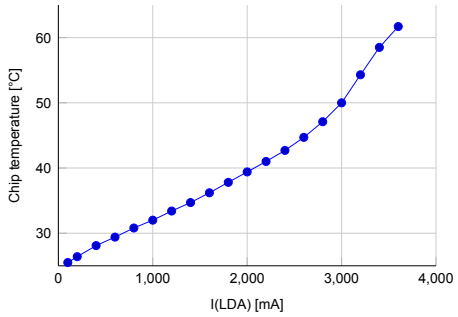


Figure 2: Chip temperature

Pulsed output at 2% duty cycle

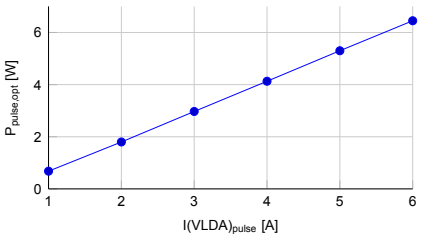
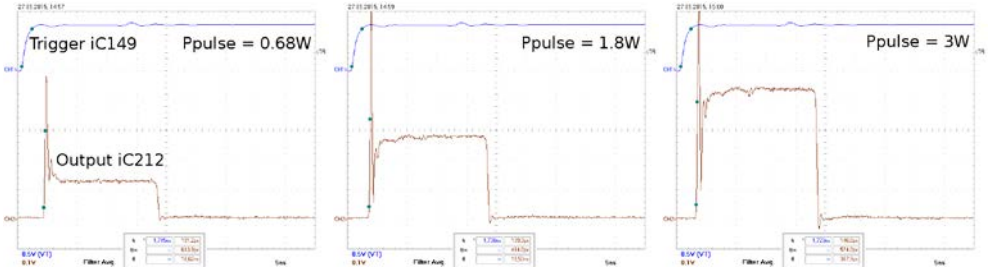


Figure 4: Optical output power at VLDA = 5.5 V, 2 channels, VDD = 5 V, f = 1 MHz, tp = 20 ns



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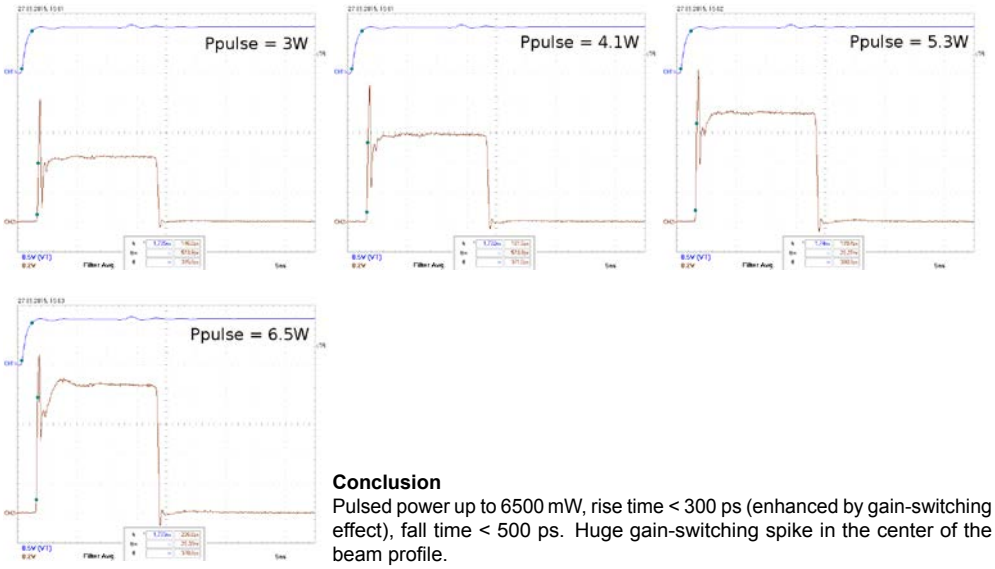

Conclusion
Pulsed power up to 6500 mW, rise time < 300 ps (enhanced by gain-switching effect), fall time < 500 ps. Huge gain-switching spike in the center of the beam profile.

Beam Profile, $I_{pulse} \approx 2.5$ A

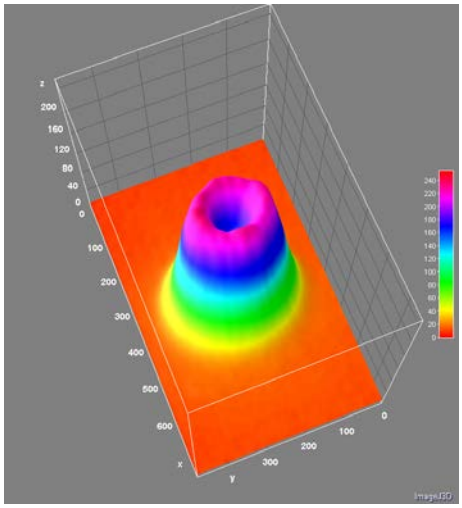

Figure 5: Beam profile shows 50% notch in center

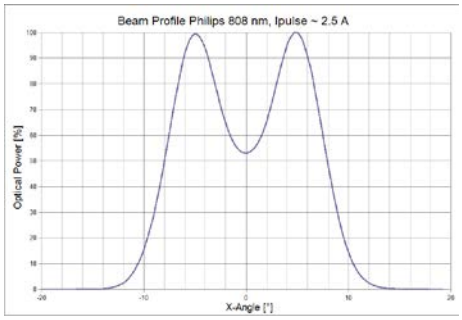

Figure 6: Beam Profile using LEDGON 100 Goniophotometer, Beam Divergence 16° (FWHM)

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HV103V 980 nm

CW output

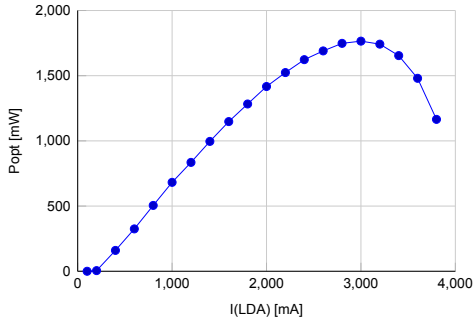


Figure 7: Optical output (VDD = 5 V, VLDA = 4 V)

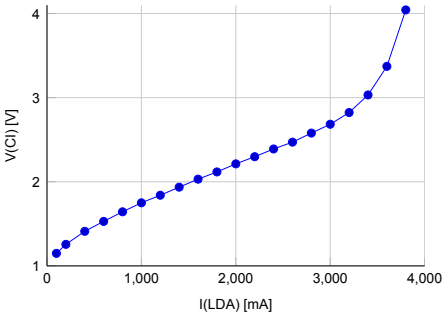


Figure 9: Voltage V(CI) (2 channels)

Conclusion
1700 mW optical output power at 3000 mA. Low threshold current of about 200 mA. VLDA-voltage too low for a load current > 3500 mA (overproportional rise of V(CI)).

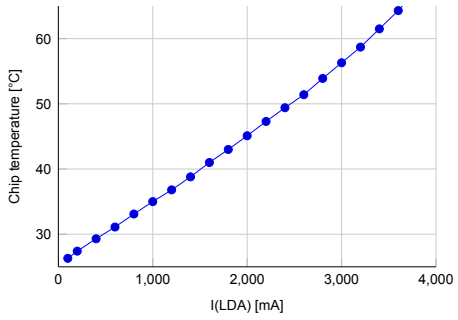


Figure 8: Chip temperature

Pulsed output at 2% duty cycle

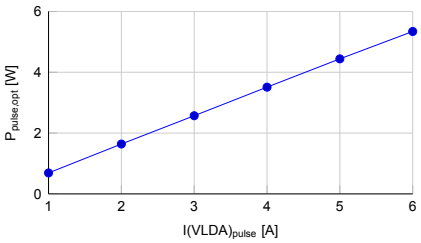
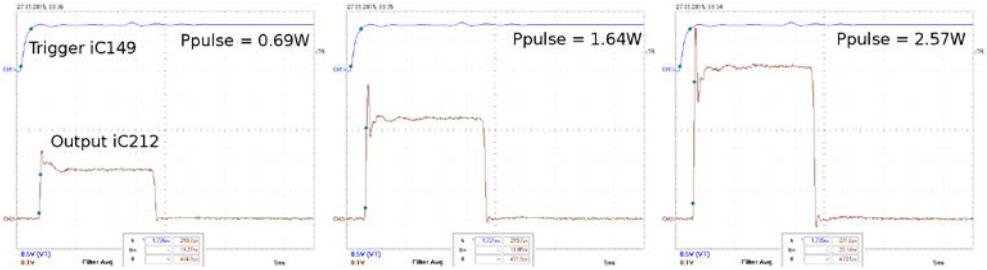


Figure 10: Optical output power at VLDA = 5.5 V, 2 channels. VDD = 5 V, f = 1 MHz, tp = 20 ns



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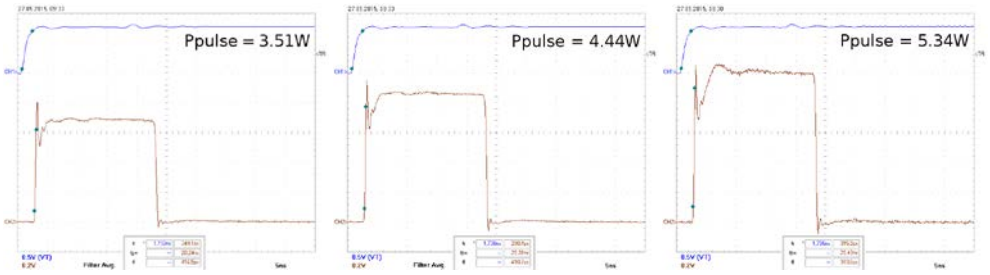
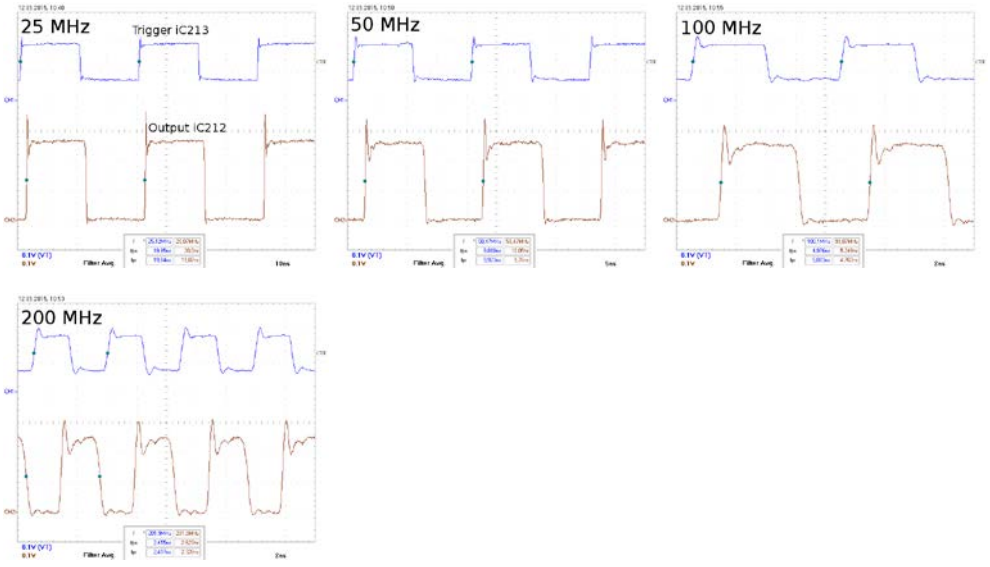
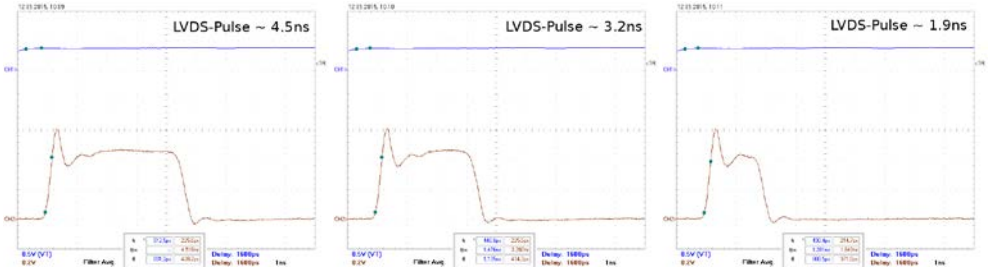


Conclusion
Pulsed power up to 5300 mW, risetime < 300 ps (caused by gain-switching effect), falltime < 500 ps.

50% duty cycle, $P_{pulse} \approx 1.4$ W



Short pulses



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Beam Profile, $I_{pulse} \approx 2.5$ A

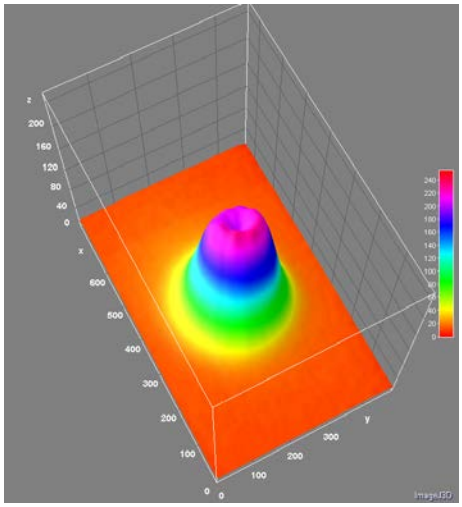

Figure 11: Profile with small notch

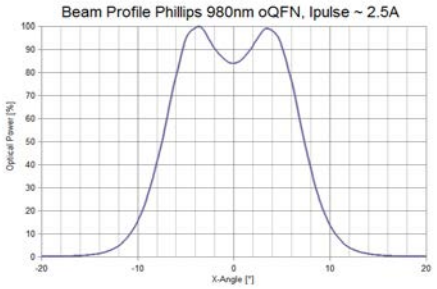

Figure 12: Beam Profile using LEDGON 100 Goniophotometer, Beam Divergence 15° (FWHM)

SAFETY INSTRUCTIONS

Laser light can damage the human eye and the eyes of animals! Do not look at any laser light directly or through any optical lens. When handling a VCSEL array, do not look directly at the light generated by it. Wear appropriate safety glasses to prevent light from entering the eye even by reflection.

REVISION HISTORY

Rel.	Rel. Date*	Chapter	Modification	Page
A1	2017-08-15		Initial Release	

* Release Date format: *YYYY-MM-DD*

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ORDERING INFORMATION

Type	Package	Order Designation
iC-HV102V	oQFN32-5x5	iC-HV102V oQFN32-5x5
iC-HV103V	oQFN32-5x5	iC-HV103V oQFN32-5x5

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For technical support, information about prices and terms of delivery please contact us.

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