



HLJ Technology Co., Ltd.

Specification

Project Code : 3S503-V01

Product : 1135nm 9mil-3E

Confidential

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Specification

The specification applies to GaAs infrared chip for [1135nm](#) wavelength range.

The [3S503-V01](#) is a [1135nm](#) [9](#) mil Vertical Cavity Surface Emitting Laser (VCSEL) chip. The product characterized by the IR light wavelength and unique oxide-confined process of VCSELs.

Part Number : VSB36C09000-R001

Features

- Wavelength: 1135nm
- Chip size: 235 x 235 ± 15 μm
- Chip thickness : 150 ± 15 μm
- Drive current : 40mA
- Output power : 20mW @20μs, Duty 50%
- Electrode side : Gold alloy on both anode P(emission side) and cathode N(backside)
- Other configurations available on request

Applications

- Moving sensor/ Gesture
- Optical encoders
- 3D sensing
- Health or medical product
- Mobile and consumer

Electrical Optical Characteristics (Pulse Width:20μs, Duty: 50%)

T_A = 25°C unless otherwise noted

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Threshold Current	I _{th}	4	8	12	mA	
Output Power	P _o	18	20	-	mW	I _f =40mA
Forward Voltage	V _f	1.7	1.9	2.1	V	I _f =40mA
Slope Efficiency (S.E.)	η _s	0.45	0.60	0.75	W/A	I _f =40mA
Center Wavelength	λ _c	1125	1135	1145	nm	I _f =40mA
Power Conversion Efficiency	PCE	24		-	%	I _f =40mA
Wavelength Shift	Δλ/ΔT	-	0.07	-	nm/°C	I _f =40mA
Beam Divergence	θ	18	22	26	deg.	Full Width 1/e ²

Note 1: Forward Voltage (V_f) measurement allowance is ±0.1V.

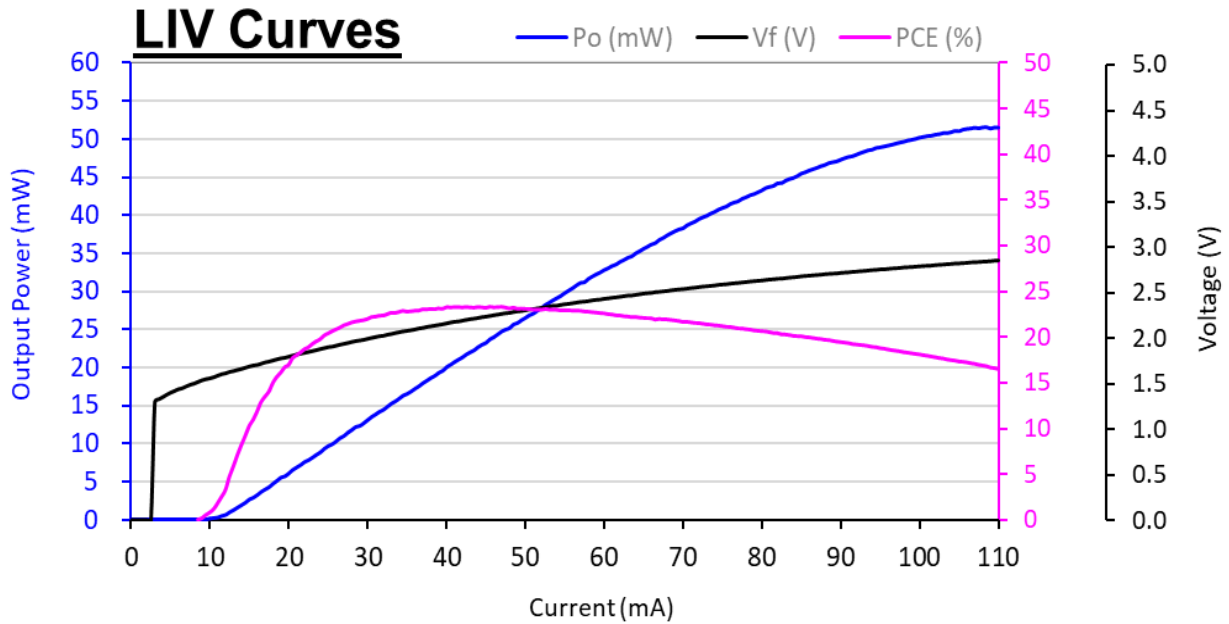
Note 2: Center Wavelength (λ_c) measurement allowance is ±2.0nm.

Note 3: Others measurement allowance is ±10%.

Note 4: Wafer on probe system test and chip mounted on Cu star board, and measured with operating bias current (I_f) @ 40mA @ Pulse Width (PW):20μs, Duty Cycle (DC): 50%.

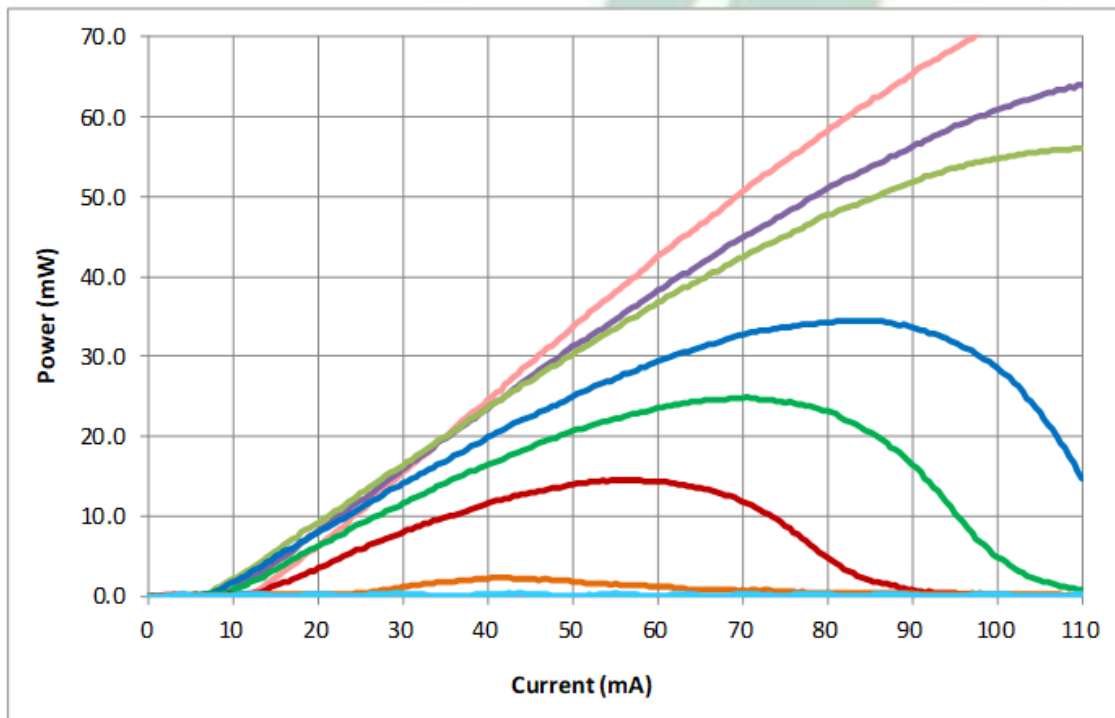
Typical Performance Curves (Pulse Width: 20μs, Duty: 50%)

- Typical Electrical-Optical Characteristics ($T_a = 25^\circ\text{C}$)

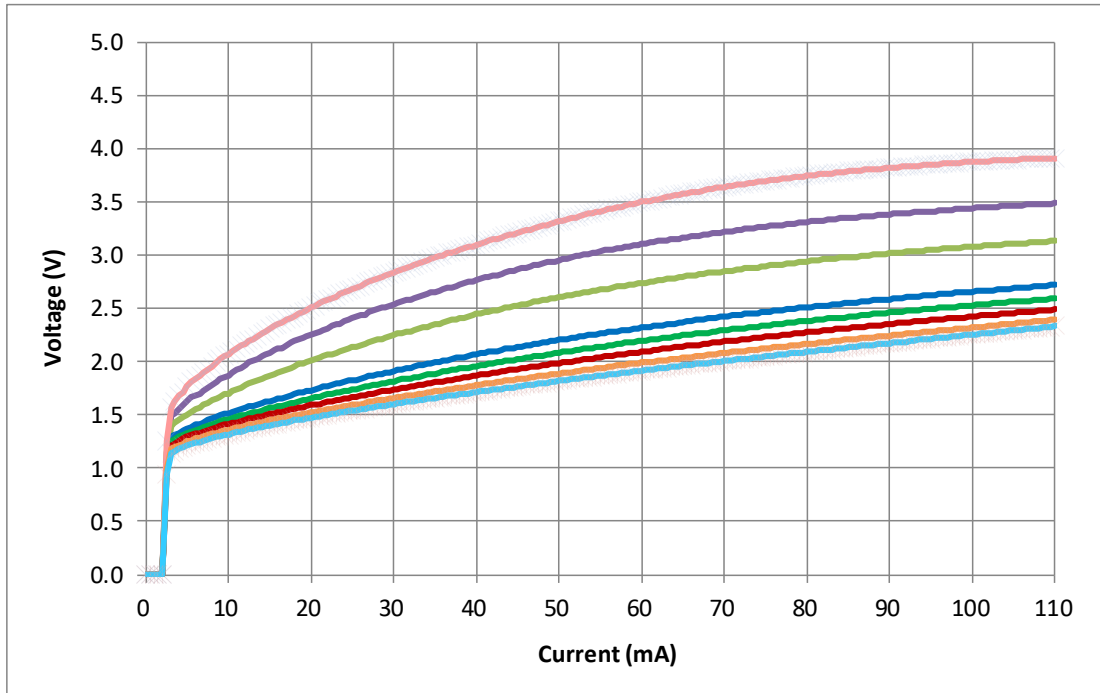


- Typical Electrical-Optical Characteristics ($T_a = -40\sim 105^\circ\text{C}$)

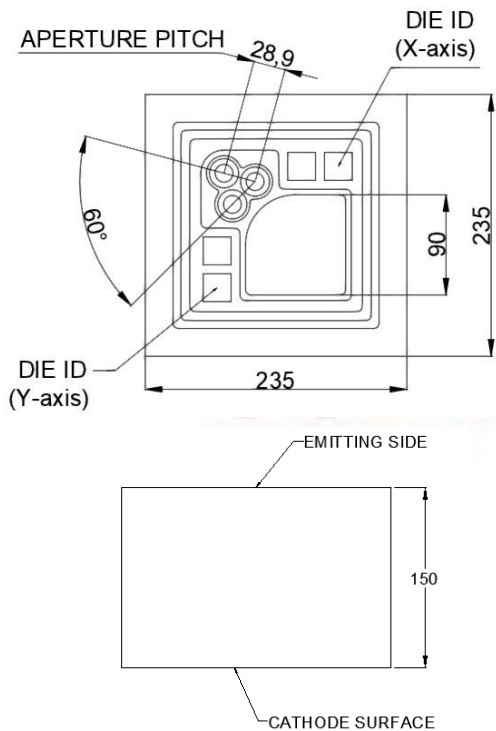
3E Pulse Mode at -40°C , -20°C , 0°C , 35°C , 50°C , 65°C , 85°C , 105°C



3E Pulse Mode at -40°C, -20°C, 0°C, 35°C, 50°C, 65°C, 85°C, 105°C



Dimensions



Specification	Min.	Typ.	Max.
Chip width	220	235	250
Chip length	220	235	250
Chip thickness	135	150	165
Bond pad width	-	90	-

Unit: μm

Other Information

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■ **RoHs Compliance:**

HLJ committed to environment protection and sustainable development, this part complies with EU 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) and the relevant of held as part of our controlled documentation.

■ **Packaging Q'ty:**

500 ea/ die sheet, 8 die sheet/pack, 6 pack/ box, 6 box/ cargo box

■ **ESD Protection:**

VCSEL is very sensitive to Electrostatic discharge (ESD) and Electrical over stress (EOS), excessive ESD have damage the chip and result in performance degradation. Make sure during the whole usage and installation process that no ESD exist and electrical circuits are equipped with surge protection.

■ **Important Notice:**

The data provided in this data sheet shall be typical. In accordance with the HLJ policy of continuous improvement, specifications may change without notice.

Revision History

Revision	Description	Author	Release Date
1.0	Establish a Datasheet	Jerry	2023/09/08
1.1	Establish a Datasheet	Jerry	2023/10/15
1.2	Establish a Datasheet	Jerry	2024/03/12
1.3	Spec. Table adjunction (Ith. SE. PCE)	Jerry	2024/03/20

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