HLJ Technology Co., Ltd.

Specification

Project Code : 2S102-V02

Product :4” 680nm VCSEL Chip 9mil

Specification

The specification applies to GaAs visible light chip for 680nm wavelength range.

The 2S102-V02 is a 680nm 09mil Vertical Cavity Surface Emitting Laser (VCSEL) chip. The product characterized by the visible light wavelength and unique oxide-confined process of VCSELs.

Part Number :

Features

- Visible light chip, 680nm center optical wavelength
- Pulse condition operation
- 4mW VCSEL (@9mA)
- Multi-mode beam profile
- Other configurations available on request

Applications

- Sensor light source (position sensing, motion control, medical devices, printing and bar code scanners, etc.)
- Consumer electronics

Electrical Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Operating Current	I_{op}	-	9	10	mA	CW
Threshold Current	I_{th}	-	3	4	mA	
Forward Voltage	V_f	2.2	2.4	2.6	V	I_f = 9mA, CW
Output Power	P_o	3	4	5	mW	I_f = 9mA, CW, T_a = 25℃
Center Wavelength	λ_c	670	680	690	nm	I_f = 9mA, CW
Beam Divergence	θ	19	22	25	degree	I_f = 9mA, Full Width 1/e^2
Slope Efficiency	ηs	0.5	0.6	-	W/A	

Note1:

- Any quality management (final quality control, outgoing quality control, etc.) used If = 9mA, T_a = 25℃, CW as the testing conditions, unless specified otherwise.
- Forward Voltage (V_f) measurement allowance is ±0.1V.
- Center Wavelength (λ_c) measurement allowance is ±1.5nm.
- Other measurement allowances are ±10%.

Note2:

- Pulse condition of ≤ 1μs pulse width, 1% duty cycle.

Absolute Maximum Rating

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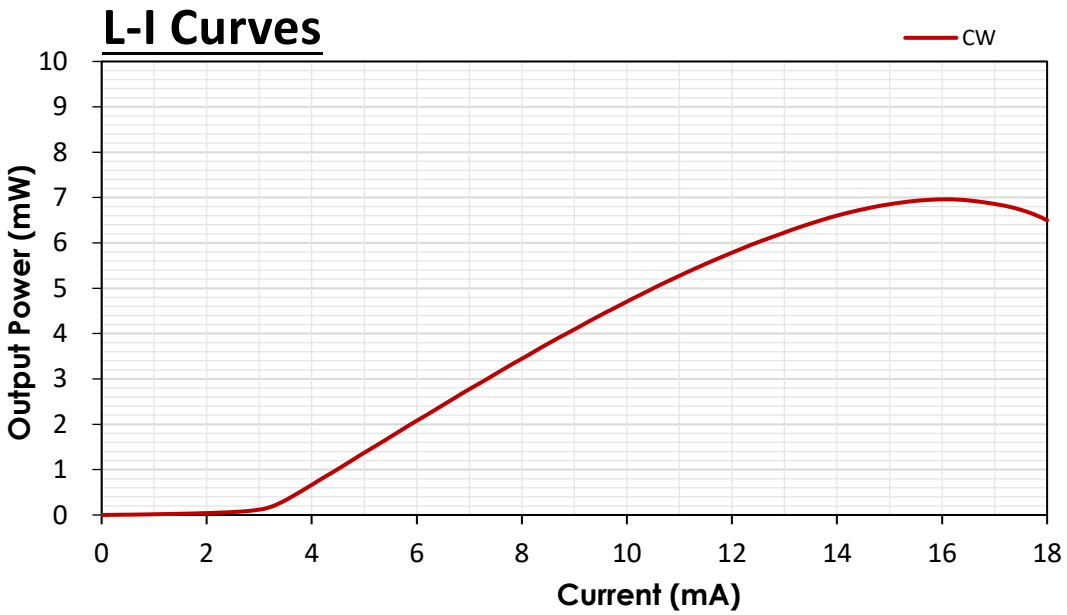
Parameter	Symbol	Unit	Notes
Storage Temperature	T_{stg}	-40℃ to 150℃	
Operating Temperature (VCSEL)	T_{op}	-20℃ to 65℃	≤ 1μs pulse width, 1% duty cycle
Maximum Pulse Current	-	12mA	≤ 1μs pulse width, 1% duty cycle, T=25℃
Laser Reverse Voltage	-	5V	
Human-Body Model	-	200V	JESD22-A114
Machine Model	-	30V	JESD22-A115
Max. Package SMT Solder Reflow Temp.	-	260℃	Time ≤ 10sec

Note:

- Different package type will affect the Absolute Maximum Ratings data, and for HLJ the lasers are mounted on TO-46 headers for burn-in and characteristic test.
- The maximum pulse laser current in the Absolute Maximum Ratings shall valid along with the operating temperature noted at the table above. GaInP/AlGaInP based VCSEL is sensitive to temperature; if stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device.
- These are stress ratings only, functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" shall not be applied.
- Absolute Maximum Ratings are limiting values that shall not be exceeded, even instantaneously. Exposure to absolute-maximum-rating conditions for extended periods may affect reliability of the device, and electrical parameters are guaranteed only within the recommended operating temperature range.
- Electrostatic discharge (ESD) damage is major source affecting the lifetime of oxide VCSEL, excessive ESD could damage the VCSEL chip and result in performance degradation and reliability failure, make sure during the whole usage and installation process that no ESD exists.

Typical Performance Curves

■ Typical Electrical-Optical Characteristics (T_a = 25℃)



Dimensions

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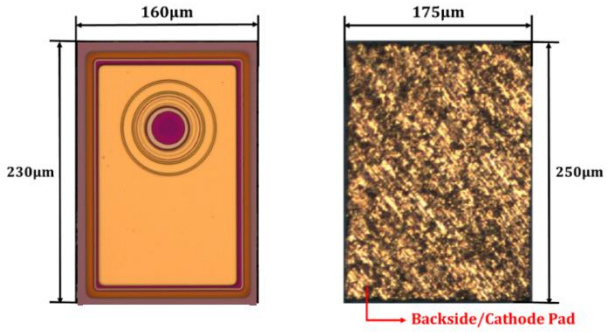

Specification	Unit	Min.	Typ.	Max.	Condition
Number of Emitters	ea		1		-
Length(X)	µm	145	160	175	Front Side
Width(Y)	µm	215	230	245	Front Side
Thickness	µm	85	100	115	-
Cathode of Length	µm	160	175	190	Backside
Cathode of Width	µm	235	250	265	Backside

Note:
- Dimension unit is in micrometer, tolerance is ± 3µm unless specified otherwise.

Other Information

- **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: (by product to modify)**
  8K ea/Die sheet, 8 Die sheet/Antistatic bag, 6 Antistatic bag/Box, 6 Box/Carton 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.

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Revision History

Revision	Description	Author	Release Date
1	Establish a Datasheet	Bo-Ting,Lin	2021/06/01
2	Absolute Maximum Ratings Note Correction、Cover revision	Bo-Ting,Lin	2022/09/07
3	Correct appearance and output power	Tank Chou	2023/04/11

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