HLJ Technology Co., Ltd.

850nm 10mil VCSEL Chip-M (5G)

5Gbps Datasheet

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Datasheet

The specification applies to GaAs infrared chip for 850nm wavelength range.

The **850nm 10mil VCSEL Chip-M (5G)** is 850nm multimode Vertical Cavity Surface Emitting Laser (VCSEL) chips are designed for high-speed optical data communication applications, have characterized by unique oxide-confined aperture design and provides stable electro-optical characteristic and high reliability.

Features

- GaAs infrared chip
- 850nm center optical wavelength
- About 2.5mW VCSEL (@6mA)
- 3dB Bandwidth 3GHz
- Data rates up to 5Gbps
- Multi-mode beam profile
- Other configurations available on request

Ordering information

Part Number: 8ACHCED05

Description: 850nm VCSEL Chip-M (5G)

HLJ Technology Co., Ltd.—No.2, Guangfu S. Rd., Hukou Township, Hsinchu Industrial Park, Hsinchu County 30351, Taiwan

Phone: +886-3-5973077 FAX: +886-3-5973080 www.hlj.com.tw

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Electrical Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Operating Current	Iop	-	6	-	mA	
Threshold Current	I_{th}	0.8	1.4	2	mA	
Output Power	P_o	1.2	2.5	-	mW	I_f=6mA
Slope Efficiency(S.E.)	η_s	0.35	0.6	-	W/A	
Forward Voltage	V_f	-	2.0	-	V	I_f=6mA
Resistance	R_s	35	50	65	Ω	
Center Wavelength	λ_c	840	850	860	nm	I_f=6mA
Spectral Bandwidth	$\Delta\lambda$	-	-	0.85	nm	I_f=6mA
Beam Divergence	θ	-	30	40	deg.	I_f =6mA, Full Width 1/ e^2
Rise Time (20~80%)	T_r	-	50	70	ps	I_f =6mA
Fall Time (20~80%)	T_f	-	50	70	ps	I_f =6mA
Wavelength Tuning Over Temp.	***	-	0.07	-	nm/K	
3dB Bandwidth	f_{3db}	3	-	-	GHz	I_f =6mA
Relative Intensity Noise	RIN	***	-	-130	dB/Hz	10GHz BW, I_f =6mA

Note:

- The any quality management (include final quality control, outgoing quality control, etc.) will I_f = 6mA, T_a = 25℃, CW as the criterion, unless specified otherwise.
- Forward Voltage (V_f) measurement allowance is ±0.1V.
- Center Wavelength (λ_c) measurement allowance is ±1.5nm.
- Others measurement allowance is ±5%.

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Absolute Maximum Rating

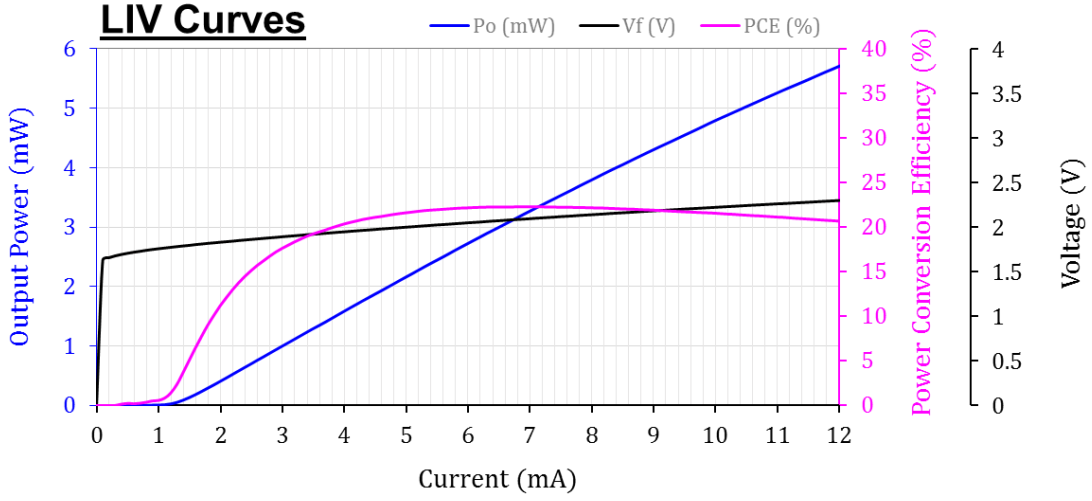
Parameter	Symbol	Range	Notes
Storage Temperature	T_{stg}	-40℃ to 150℃	
Operating Temperature (VCSEL)	T_{op}	-40℃ to 85℃	
Maximum CW Current	-	12mA	
Human-Body Model	-	300V	JESD22-A114
Machine Model	-	50V	JESD22-A115
Maximum Package SMT Solder Reflow Temperature	-	260℃, < 10 seconds	

Note:

- The VCSEL chip any test and quality management all mounted on TO-can package (TO-46).
- The maximum CW laser current in the Absolute Maximum Ratings is valid for the operating temperature noted at the table above. VCSELs is very 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” is not implied. Exposure to absolute-maximum-rating conditions for extended periods may affect device reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.
- VCSEL is very sensitive to ESD and excessive ESD could damage the VCSEL chip and result in performance degradation and reliability failure, please make sure during the whole usage and installation process that no ESD exist to affect the VCSEL.

Typical Performance Curves

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



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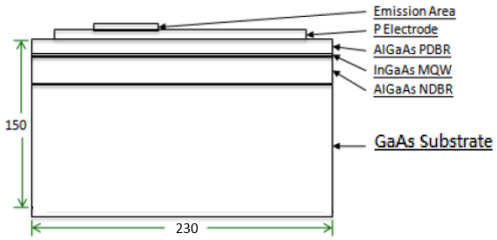
Dimensions



Specification	Unit	Min.	Typ.	Max.	Condition
Number of emitters	ea		1		-
Length(X), Width(Y)	μm	215	230	245	-
Thickness	μm	135	150	165	-
Emitter surface area diameter	μm		16		-
Anode pad size (Bond pad)	μm	97	100	103	Emitter side
Cathode pad size	μm	215	230	245	Backside

Note:
- Dimensions in micrometer.
- Dimension tolerance ± 3μm unless specified otherwise.

Other Information

- **RoHs Compliance:**
  HLJ committed to environment protection and sustainable development, this part is compliant 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:**
  4K 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 or EOS have damage the chip and result in performance degradation. Please make sure during the whole usage and installation process does not exist to affect the VCSEL (take normal ESD precautions when handling this product) and VCSEL can also be damaged by electrical surge, please make sure any driving electrical circuits are equipped with surge protection.
- **Important Notice:**
  The datasheet provided in this data sheet are typical. In accordance with the HLJ policy of continuous improvement specifications may change without notice.

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