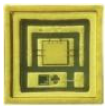
VCPD35A-850H4Wx

850nm 4000mW VCSEL with Photodiode and Diffuser

Data Sheet



Description

The Lasermate VCPD35A-850H4Wx is a high-performance Vertical Cavity Surface Emitting Laser (VCSEL) diode operating at 850nm with 4000mW output power. Integrated with a photodiode and diffuser, and housed in a compact 3535 surface-mount (SMD) package, it is designed for high-precision sensing applications. The device features low threshold current, oxide isolation for stability, and excellent reliability for demanding environments.

Features

- 850nm wavelength, 4W optical output
- Integrated photodiode and diffuser
- Compact 3535 surface-mount package
- Low wavelength drift and threshold current
- Oxide isolation technology for stability
- High reliability and easy collimation
- Operates at 4.5A drive current

Applications

- 3D sensing systems
- IR illumination for imaging or surveillance
- Medical diagnostic and therapeutic devices
- Lidar systems
- Proximity and presence detection sensors

Ordering Information

Part Number	Description
VCPD35A-850H4WA	850nm 4000mW VCSEL with Photodiode and 60ºx45º Diffuser
VCPD35A-850H4WB	850nm 4000mW VCSEL with Photodiode and 72ºx58º Diffuser
VCPD35A-850H4WC	850nm 4000mW VCSEL with Photodiode and 90ºx70º Diffuser
VCPD35A-850H4WD	850nm 4000mW VCSEL with Photodiode and 110ºx85º Diffuser
VCPD35A-850H4WE	850nm 4000mW VCSEL with Photodiode and 120ºx90º Diffuser

Specifications

Absolute Maximum Ratings				
Parameters	Symbol	Rating	Unit	Conditions
Case Operating Temperature	Top	-40 to 85	°C	
Storage Temperature	Tstg	-40 to 105	°C	
Reflow Soldering Temperature	Tsol	260	°C	10 seconds
Reverse Voltage	Vr	5	V	
Maximum Continuous Current	Imax	5	A	
ESD Exposure (Human Body) Model	ESD	2K	V	

Notes:

- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or other conditions above those indicated in the operations section for expanded periods of time may affect reliability.
- In its maximum rating diode laser operation could damage its performance or cause potential safety hazard such as equipment failure.
- Electrostatic discharge is the main reason for laser fault of the diode. Take effective precautions against ESD. When dealing with laser diodes, use wrist strap, grounding work surface and strict antistatic technology.

Electro-Optical Characteristics (T_{op}=25°C)						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power	P_o	-	4	-	W	I_F=4.5A
Threshold Current	I_{th}	-	0.6	-	A	
Forward Pulse Current	I_F	-	4.5	-	A	
Power Conversion Efficiency	PCE	36	38	41	%	I_F=4.5A
Slope Efficiency	η	-	1.03	-	W/A	P_o=4W
Peak Wavelength	λ_P	840	850	860	nm	I_F=4.5A
Forward Voltage	V_f	2.1	2.3	2.4	V	I_F=4.5A
Differential Resistance	R	0.50	0.52	0.54	Ohm	I_F=4.5A
Beam Angle	Θ	-	25	-	Deg	I_F=4.5A
Wavelength Temperature Drift	$\Delta\lambda_P/\Delta T$	-	0.07	-	nm/°C	I_F=4.5A
Emission Area		-	1070 x 1034	-	um	
Rise/Fall Time		-	1	-	ns	
Soldering Temperature	Tsol	-	-	260	°C	10 seconds
Substrate	AlN					

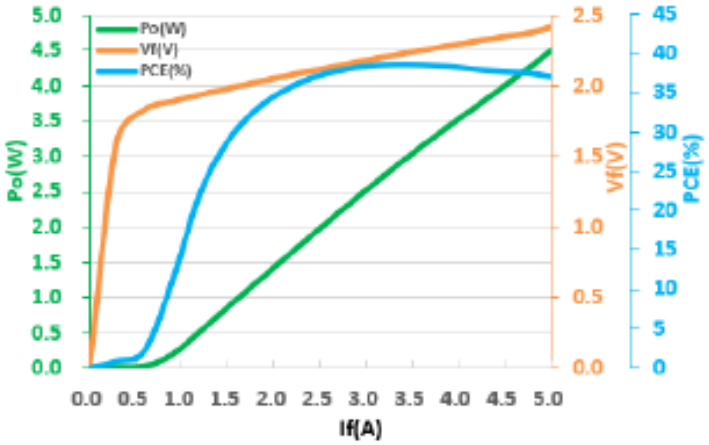
Note: Electro-optical characteristic with a package or diffuser would require further evaluation. Values are based on limited sample size and estimated values.

Environmental Specifications						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Case Operating Temperature	Top	-40	25	85	°C	
Storage Temperature	Tstg	-40	25	105	°C	

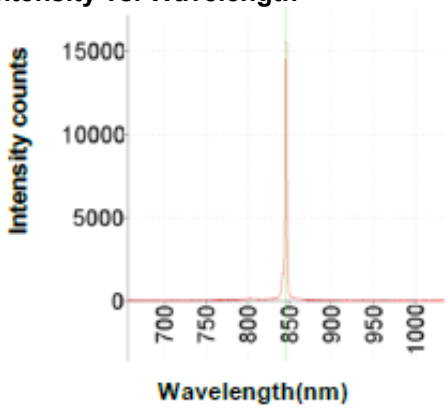
Photodiode Specifications			
Range	**Filter**	**Substrate**	**Responsivity**
400-1100nm	No	Si	0.97 @ 850nm

Typical Characteristics

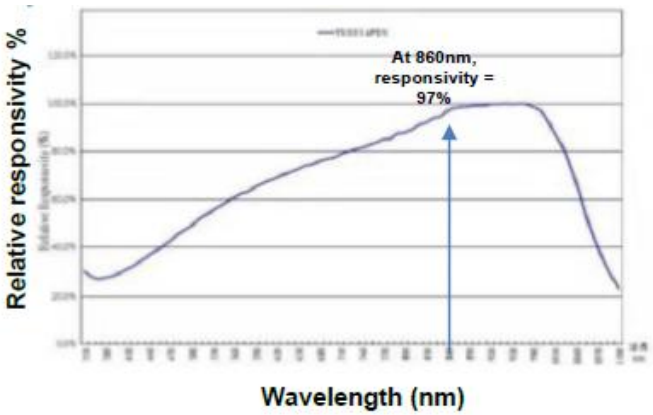
LIV Graph



Intensity vs. Wavelength

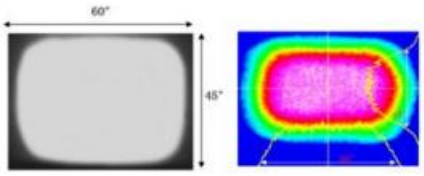


Photodiode Responsivity Chart

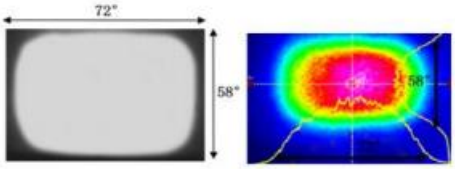


Typical Laser Spot and Beam Profile

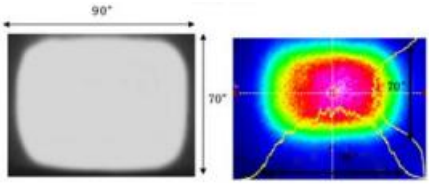
Beam angle: 60°x45°



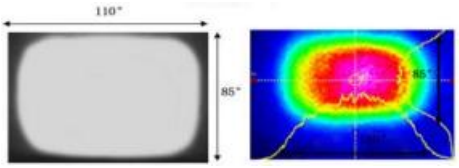
Beam angle: 72°x58°



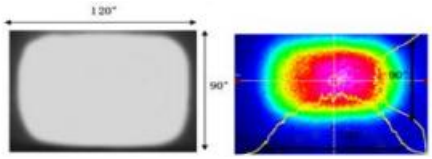
Beam angle: 90°x70°



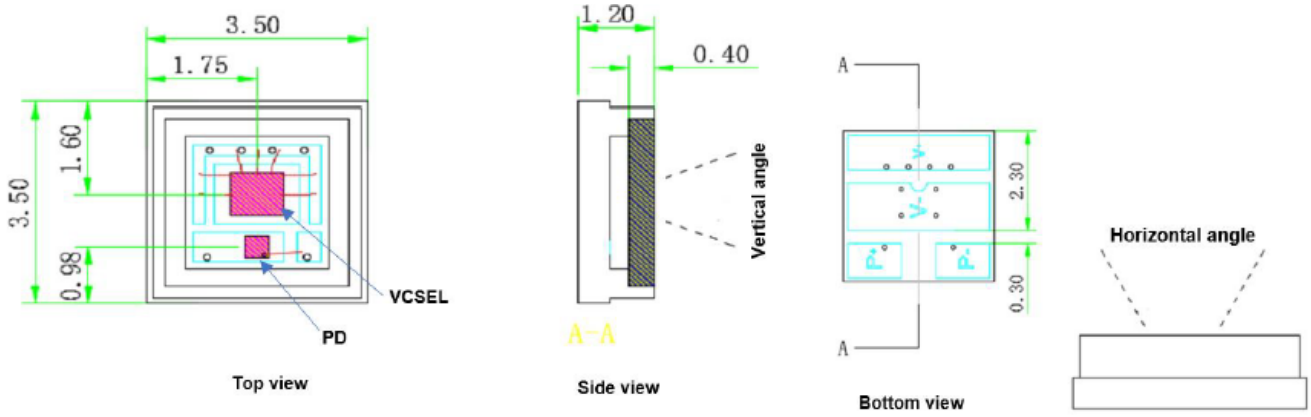
Beam angle: 110°x85°



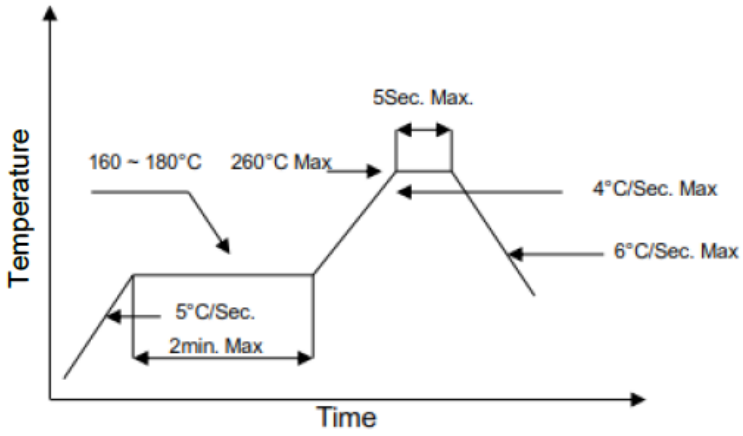
Beam angle: 120°x90°



Outline Dimensions (unit: mm)



SMT Reflow Soldering Curve



Note: Reflow soldering can be operated only one time. During the temperature ramp-up, no forces may be exerted on the LD which would deform or damage them. After soldering is completed, please do not process until the product temperature ramps down to room temperature.

Additional Notes

1. Please use solder paste to cure the laser diode.
2. Please make sure that the heat of VCSEL diode has been completely conducted to metal shell to avoid affecting the optical power output.
3. This VCSEL diode can be only used in constant voltage and current.
4. Please do not aim the laser at people or animals.
5. You may observe the laser spot through an image monitoring equipment.
6. Please do not touch VCSEL diode surface by naked hands or squeeze the sealant on VCSEL diode surface. It may cause wrong optical angle and distorted laser spot, and even damage the VCSEL diode.
7. Please use ceramic suction nozzle to absorb the VCSEL diode, so as to avoid VCSEL diode sticking to the nozzle.
8. Please add a 0.02s blowing action after locating the laser diode to aluminum substrate.
9. Specifications are subject to change without notice.