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Data Sheet
Rev 01.0421

940nm 100W CW VCSEL Diode

VCx-940C100WA

Description

The Lasermate VCx-940C100WA is an 940nm wavelength, 100W output power, CW operating mode, Vertical Cavity Surface Emitting Laser (VCSEL) diode. Available in different package types, the VCSEL is characterized by its single longitudinal mode, circular spot, and high reliability. VCx-940C100WA is designed for use in Scanning LiDAR, pump source of solid-state laser, laser machining, 3D sensors.

Features

- 940nm VCSEL Diode
- Output power: 100W
- Single longitudinal mode
- Low wavelength drift
- Circular spot
- High reliability
- Easy to collimate

Applications

- 3D sensor
- Scanning LiDAR
- Pump source of solid-state laser
- Laser machining

Product Overview

The following table lists the available part numbers, as well as the package type of each of the part numbers.

Part Number	Package
VC25A-940C100WA	2511 Package, Substrate AlN
VCTMC-940C100WA	T-mount Package, Substrate Cu
VC25A-940C100WA-C	2511 Package, Substrate AlN + Water Cooling Case

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	180	°C	10 seconds
Reverse Voltage	Vr	25	V	
Maximum Continuous Current	Imax	25	A	
ESD Exposure (Human Body) Model	ESD	2K	V	

Notes:

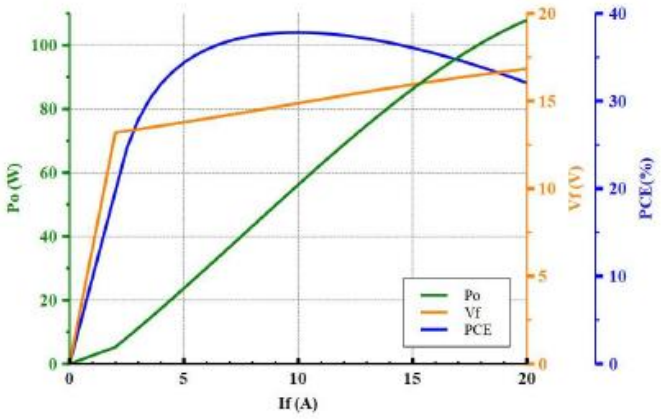
- Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or other conditions above those indicated in the operations section for expanded periods of time may affect reliability.
- 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, CW mode)						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power	P_o	-	100	110	W	I_F=18A
Threshold Current	I_{th}	-	2	-	A	
Forward Current	I_F	-	18	-	A	
Slope Efficiency	η	-	6.3	-	W/A	P_o=100W
Power Conversion Efficiency	PCE	-	34	-	%	I_F=18A
Peak Wavelength	λ_P	930	940	950	nm	I_F=18A
Laser Forward Voltage	V_F	-	16	17	V	I_F=18A
Series Resistance	R_S	-	0.2	-	Ω	I_F=18A
Beam Divergence	(1/e^2)	-	25	-	deg	I_F=18A
Wavelength Temperature Drift	$\Delta\lambda_P/\Delta T$	-	0.07	-	nm/°C	I_F=18A
Emission Area			17.22x6.45			

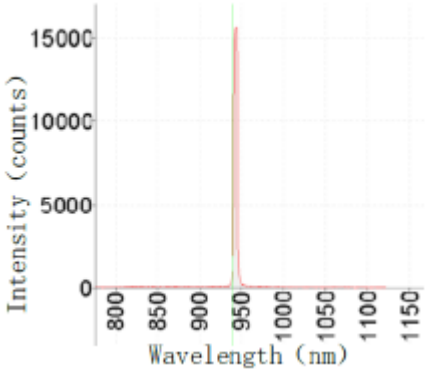
Note: Electro-optical characteristic with a package or diffuser would require further evaluation. Values are based on limited sample size and estimated values.

Typical Characteristics

LIV Graph

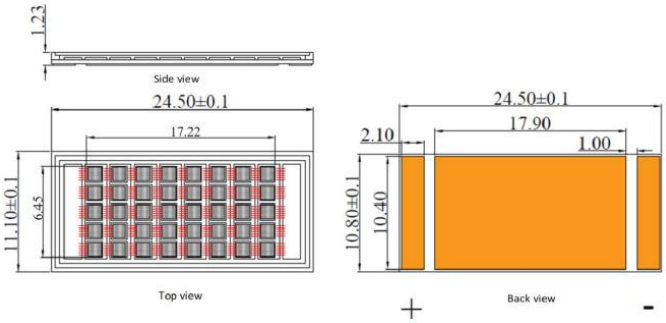


Intensity vs. Wavelength



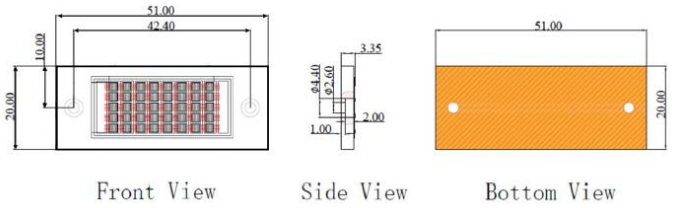
Outline Dimensions (unit: mm)

VC25A-940C100WA (2511 SMD Package, Substrate AlN)

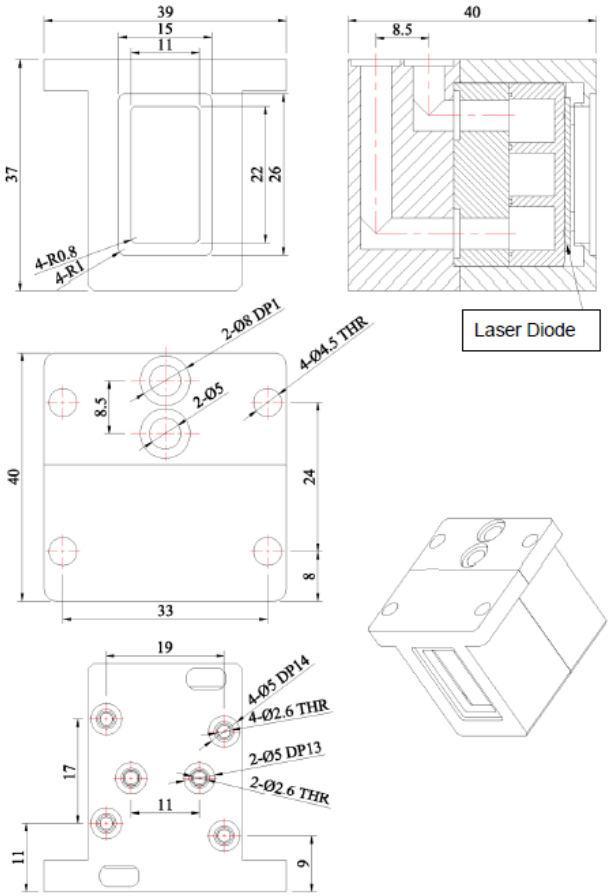


Note: Soldering procedure – The base plate is at right angles, and there is no bevel or chamfer. The copper clad and the substrate copper cannot be layered for 30 minutes at 300 degrees.

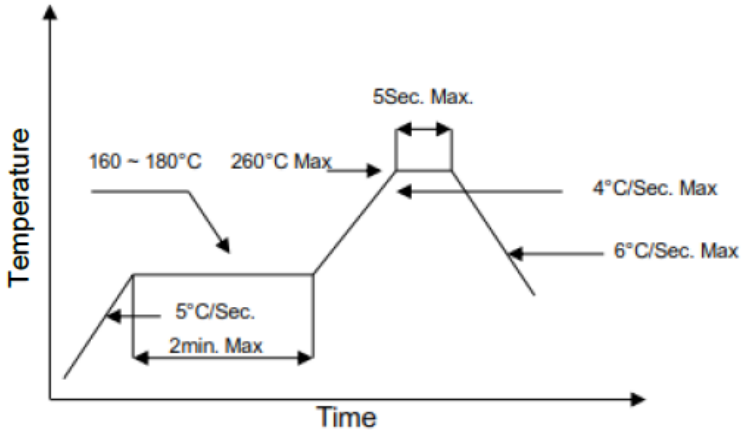
VCTMC-940C100WA (T-mount SMD Package, Substrate Cu)



VC25A-940C100WA-C (2511 SMD Package, Substrate AlN + Water Cooled Case)



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.

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