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Data Sheet
Rev 03.1220

940nm 50W Pulsed VCSEL Diode

VCx-940P50WA

Description

The Lasermate VCx-940P50WA is an 940nm wavelength, 50W output power, pulsed operating mode, Vertical Cavity Surface Emitting Laser (VCSEL) diode. Available in different package types, the VCSEL is characterized by its single wavelength, short rise time, and high reliability. VCx-940P50WA is designed for use in 3D sensor, gesture recognition, IR illumination, medical application, broadband access network.

Features

- 940nm VCSEL Diode
- Output power: 50W (ns pulse)
- Single wavelength
- Low wavelength drift
- Oxide isolation technology
- Short rise time
- High reliability
- Easy to collimate

Applications

- 3D sensor
- Scanning lidar
- Laser curtain
- Range finder sensor
- 3D detection
- Proximity sensor

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
VC20A-940P50WA	2016 Package, Substrate AlN
VC20C-940P50WA	2016 Package, Substrate CuAg
VCT-940P50WA	TO-46 Package, Substrate CuAg

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	°C	10 seconds
Reverse Voltage	Vr	5	V	
Maximum Continuous Current	Imax	200	A	Duty cycle 0.1% max
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.

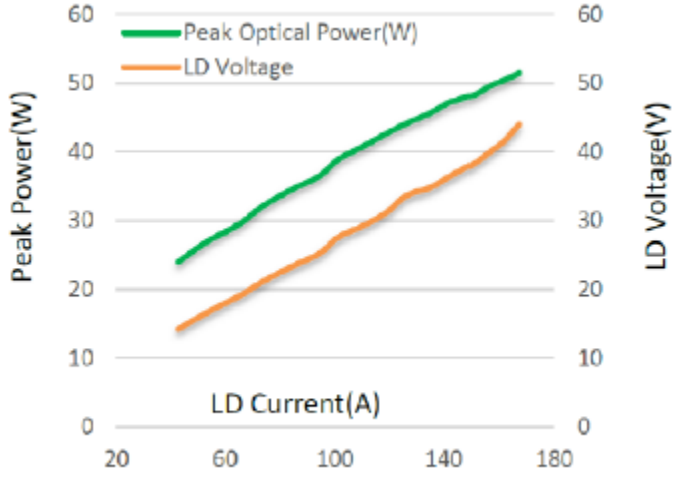
Electro-Optical Characteristics of Single Die (T_{op}=25°C, Pulse width 6.4ns at 11.68 kHz)						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power	P_o	40	50	52	W	I_F=160A
Threshold Current	I_{th}	-	0.1	-	A	
Forward Pulse Current		-	160	-	A	
Emission Area		-	370x371	-	um	
Peak Wavelength	λ_P	930	940	950	nm	P_o=50W
Pulse Forward Voltage	V_F	38	40	42	V	I_F=160A
Series Resistance	R_S	0.24	0.25	0.26	Ohm	I_F=160A
Beam Angle	Θ	-	20	-	Deg	I_F=160A
Wavelength Temperature Drift	$\Delta\lambda_P/\Delta T$	-	0.07	-	nm/°C	I_F=160A
Rise Time	Tr	-	2.4	-	ns	
Soldering Temperature	Tsol			260	°C	10 seconds
Duty Cycle		-	-	0.1	%	

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

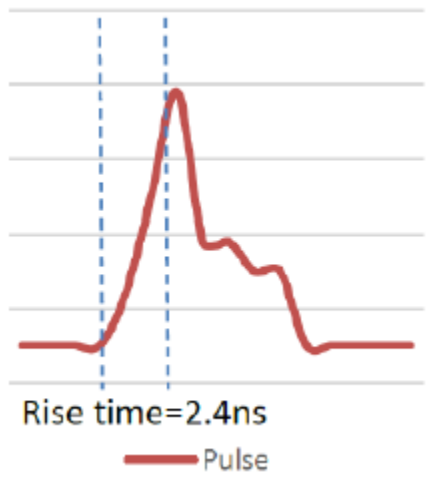
Environmental Specifications						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Ref.
Case Operating Temperature	T_{op}	-40	25	85	°C	
Storage Temperature	T_{stg}	-40	25	105	°C	

Typical Characteristics

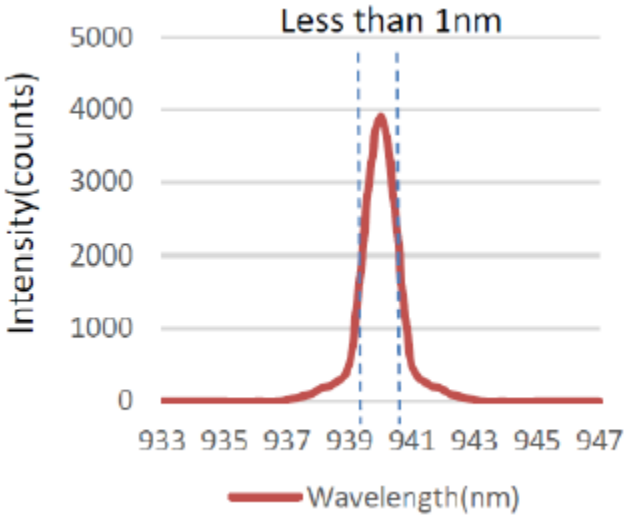
LIV Graph



Pulse width=6.4ns

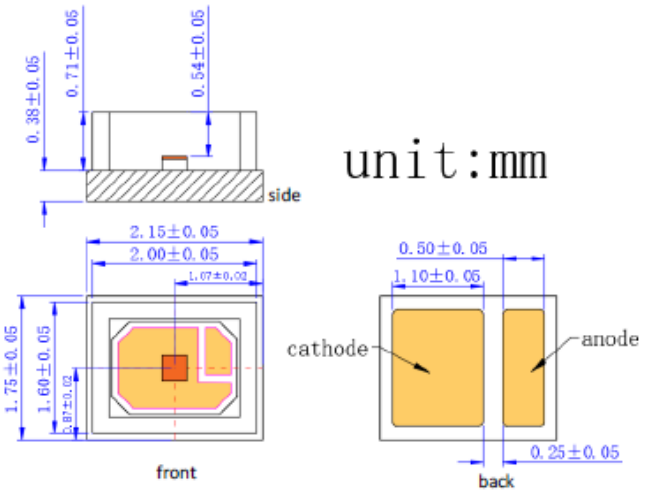


Intensity vs. Wavelength

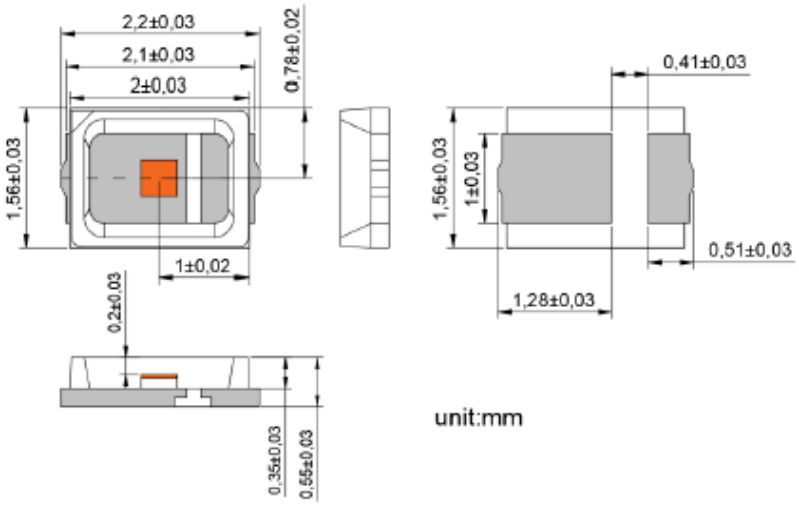


Outline Dimensions (unit: mm)

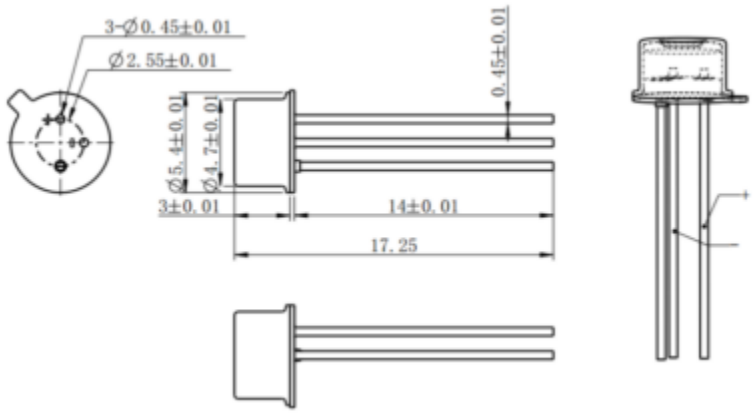
VC20A-940P50WA (2016 SMD Package, Substrate AlN)



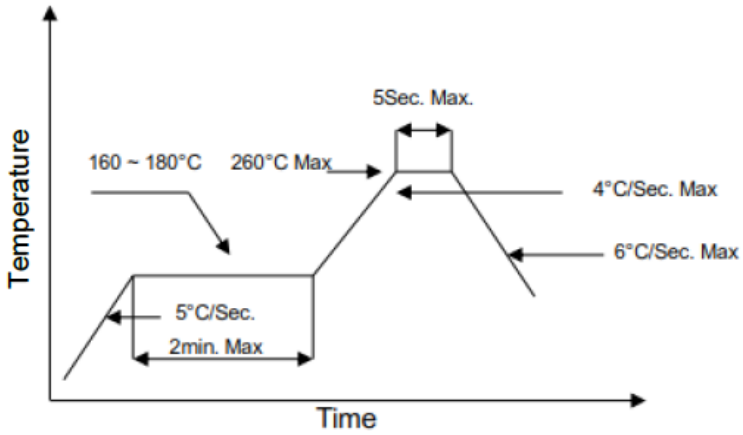
VC20C-940P50WA (2016 SMD Package, Substrate CuAg)



VCT-940P50WA (TO-46 Package, Substrate CuAg)



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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