



VCx-850P50WA

850nm 50W Pulsed VCSEL Diode

Data Sheet

Features

- 850nm VCSEL diode
- 50W peak pulsed output power (ns pulse width)
- Single wavelength emission
- Good thermal conduction
- Short rise time for fast pulse response
- Available in SMD or TO-can package options

Applications

- 3D sensing and facial recognition
- LiDAR and laser scanning systems
- Proximity detection and gesture recognition
- Laser curtain and safety barriers
- Range finding and time-of-flight (ToF) sensors

Ordering Information

Part Number	Description
VC20A-850P50WA	850nm 50W Pulsed VCSEL Diode, SMD 2016 Package
VCT5-850P50WA	850nm 50W Pulsed VCSEL Diode, TO-56 Package

Absolute Maximum Ratings

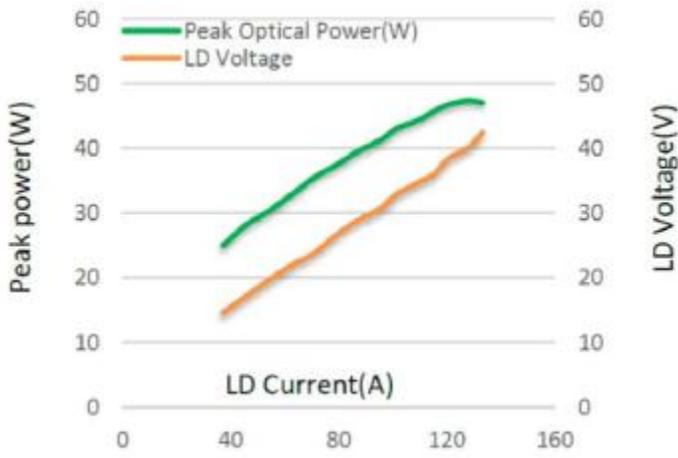
Parameters	Symbol	Rating	Unit	Conditions
Case Operating Temperature	Top	-40 to 85	°C	
Storage Temperature	Tstg	-40 to 105	°C	
Reflow Soldering Temperature	Tsol	260	°C	10 seconds
Reverse Voltage	Vr	5	V	
Maximum Continuous Current	I _{max}	180	A	Duty cycle 0.1% max
ESD Exposure (Human Body) Model	ESD	2K	V	

Electro-Optical Characteristics (T_{op}=25°C, Pulse width 6.2ns at 11.68 kHz)

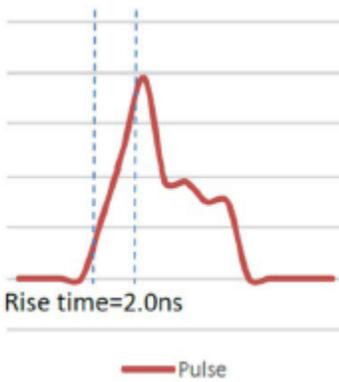
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power	P _o	40	50	52	W	I _F =120A
Threshold Current	I _{th}	-	0.1	-	A	
Forward Pulse Current		-	120	-	A	
Emission Area		-	370x371	-	um	
Peak Wavelength	λ _P	840	850	860	nm	P _o =50W
Pulse Forward Voltage	V _F	36	38	40	V	I _F =120A
Series Resistance	R _s	0.30	0.32	0.33	Ω	I _F =120A
Beam Angle	θ	-	20	-	Deg	I _F =120A
Wavelength Temperature Drift	Δλ _P / ΔT	-	0.07	-	nm/°C	I _F =120A
Rise Time	T _r	-	2	-	ns	
Soldering Temperature	Tsol			260	°C	5 seconds
Duty Cycle		-	-	0.1	%	

Typical Characteristics

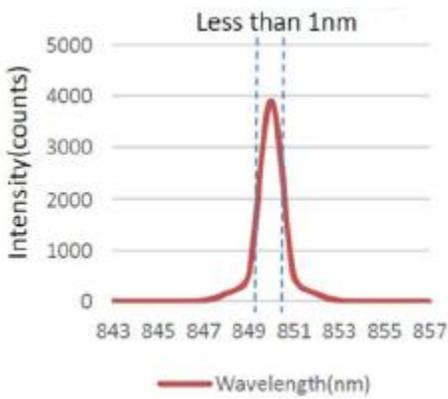
LIV Graph



Pulse width=6.2ns

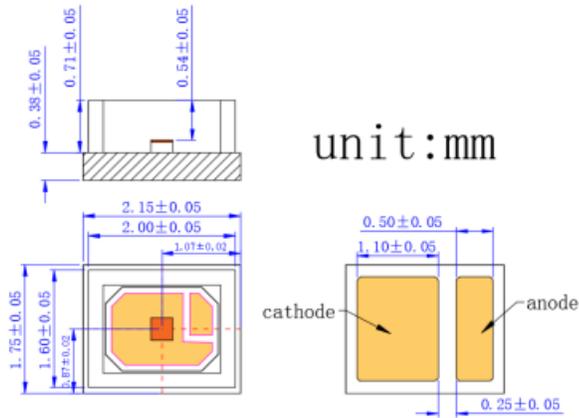


Intensity vs. Wavelength

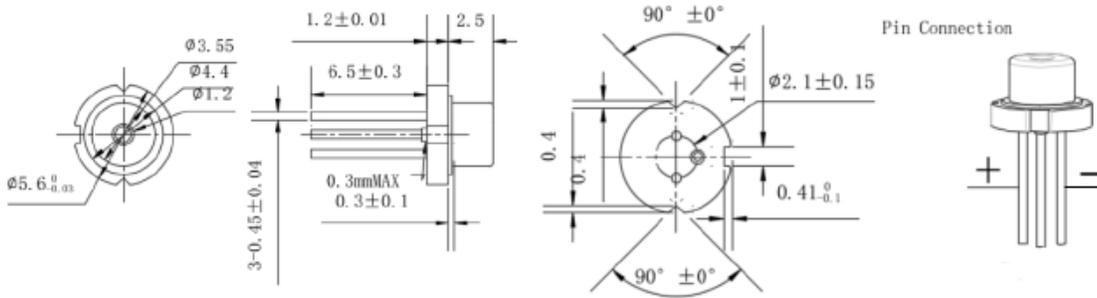


Outline Dimensions (unit: mm)

SMD 2016 Package



TO-56 Package



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. Stresses exceeding those listed in Absolute Maximum Ratings may cause permanent damage to the device. These ratings are stress limits only and do not imply functional operation under such conditions. Exposure to conditions beyond recommended operating limits may affect device reliability.
2. Operation at or near maximum ratings may degrade performance and may create potential safety risks, including device failure.
3. The device is sensitive to electrostatic discharge (ESD). Proper ESD precautions, including grounded wrist straps, antistatic work surfaces, and ESD-safe handling procedures, must be followed during handling and assembly.
4. Adequate thermal management must be provided. The VCSEL device should be properly mounted to ensure efficient heat transfer to the package or system thermal path to maintain stable optical performance.
5. Avoid direct exposure of laser radiation to human eyes or skin. Follow applicable laser safety regulations and system-level safety design practices.
6. The emitting surface of the VCSEL should not be touched or contaminated. Mechanical contact or contamination may degrade optical performance or damage the device.
7. Use appropriate pick-and-place handling tools, such as ceramic or ESD-safe vacuum nozzles, to prevent mechanical or electrostatic damage during assembly.
8. Specifications are subject to change without notice.