



VCx-850P4WA

850nm 4000mW Pulsed VCSEL Diode

Data Sheet

Features

- 850nm VCSEL diode
- Output power: 4000mW (pulsed)
- Good thermal conduction
- Oxide isolation technology
- Available in SMD 5050 or T-Mount package options

Applications

- 3D sensor systems
- LiDAR (Light Detection and Ranging)
- Infrared (IR) illumination
- Proximity sensing
- Medical and health monitoring systems

Ordering Information

Part Number	Description
VC50A-850P4WA	850nm 4000mW Pulsed VCSEL Diode, SMD 5050 Package
VCTMC-850P4WA	850nm 4000mW Pulsed VCSEL Diode, T-Mount Package

* Additional package configurations may be available upon request.

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}	6	A	
ESD Exposure (Human Body) Model	ESD	2K-4K (Class 2)	V	
ESD Exposure (Machine) Model	ESD	200-400 (Class B)	V	

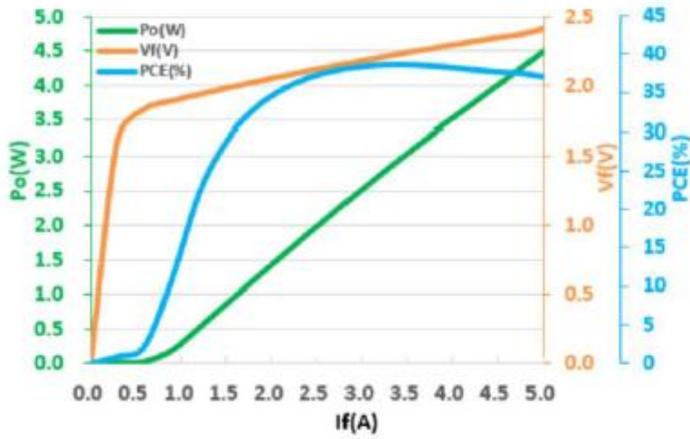
Electrical-Optical Characteristics (T_{op}=25°C, Pulse width 0.1ms, Duty cycle 1%)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power	P _o	-	4000	-	mW	I _F =4.5A
Threshold Current	I _{th}	-	600	-	mA	
Forward Current	I _F	-	4.5	-	A	
Slope Efficiency	η	-	1.03	-	W/A	P _o =4000mW
Power Conversion Efficiency	PCE	-	39	-	%	I _F =4.5A
Peak Wavelength	λ _P	840	850	860	nm	I _F =4.5A
Laser Forward Voltage	V _F	-	2.3	-	V	I _F =4.5A
Series Resistance	R _S	-	0.51	-	Ω	I _F =4.5A
Beam Divergence	FWHM _B	-	20	-	deg	
Wavelength Temperature Drift	Δλ _P /ΔT	-	-	0.07	nm/°C	I _F =4.5A
Emission Area		-	970x1080	-	um ²	
No. of Emission Aperture		-	600	-		

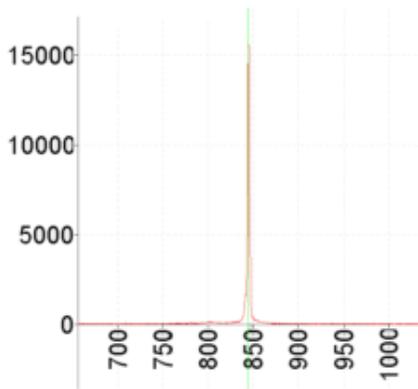
Note: Electro-optical characteristic with a package or diffuser would require further evaluation. Values are based on limited sample size and estimated values.

Typical Characteristics

LIV Graph

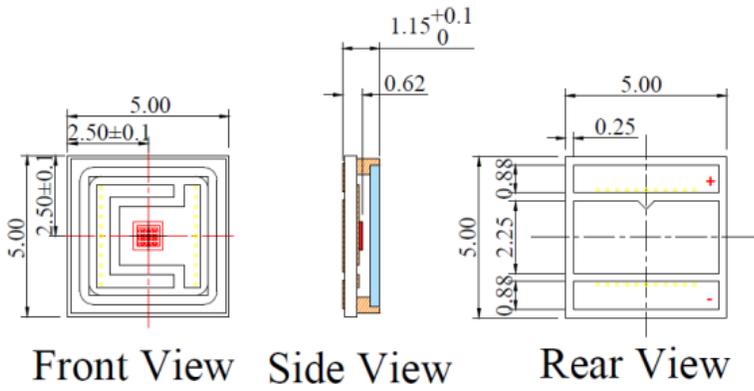


Intensity vs. Wavelength

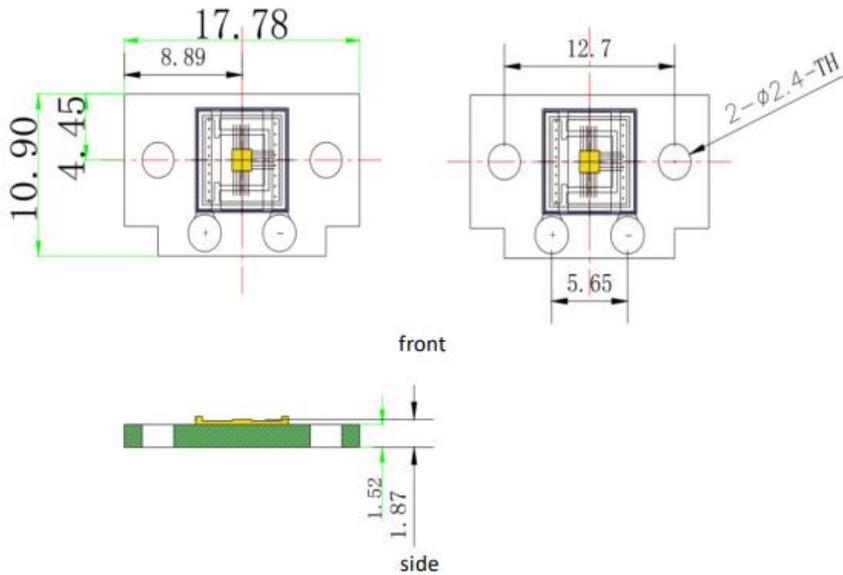


Outline Dimensions (unit: mm)

SMD 5050 Package



T-Mount 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.