# VCD35A-940P4Wx
## 940nm 4000mW VCSEL with Diffuser

## Features

- 940nm VCSEL Diode
- Output Power: 4000mW (pulsed)
- 3535 surface-mount SMD package
- Integrated optical diffuser

## Applications

- 3D sensors
- Gesture recognition
- Lidar systems
- IR illumination
- Medical diagnostics
- Proximity sensors

## Ordering Information

| Part Number | Description |
|---|---|
| VCD35A-940P4WA | 940nm 4000mW VCSEL with 60°x45° Diffuser |
| VCD35A-940P4WB | 940nm 4000mW VCSEL with 72°x58° Diffuser |
| VCD35A-940P4WC | 940nm 4000mW VCSEL with 90°x70° Diffuser |
| VCD35A-940P4WD | 940nm 4000mW VCSEL with 110°x85° Diffuser |
| VCD35A-940P4WE | 940nm 4000mW VCSEL with 120°x90° Diffuser |

\* Other diffuser options 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 | Imax | 6 | A | |
| ESD Exposure (Human Body) Model | ESD | 2K | V | |

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

| Parameters | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Optical Output Power | $P_o$ | - | 4.0 | - | W | $I_F$=5.0A |
| Threshold Current | $I_{th}$ | - | 0.4 | - | A | |
| Forward Current | | - | 5.0 | - | A | |
| Peak Wavelength | $\lambda_P$ | 930 | 940 | 950 | nm | $I_F$=5.0A |
| Forward Voltage | $V_F$ | - | 2.16 | - | V | $I_F$=5.0A |
| Power Conversion Efficiency | PCE | - | 38 | - | % | $I_F$=5.0A |
| Slope Efficiency | η | - | 0.86 | - | W/A | $P_o$=4.0W |
| Series Resistance | $R_S$ | - | 0.15 | - | Ω | $I_F$=5.0A |
| Wavelength Temperature Drift | $\Delta\lambda_P / \Delta T$ | - | - | 0.07 | nm/°C | $I_F$=5.0A |
| Beam Divergence | $FWHM_B$ | | 20 | | deg | |
| Emission Area | | | 846x811 | | $um^2$ | |
| Number of Emission Aperture | | | 598 | | | |

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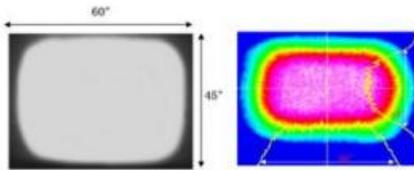
## Typical Characteristics

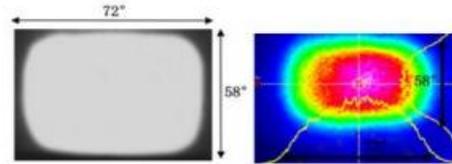### LIV Graph
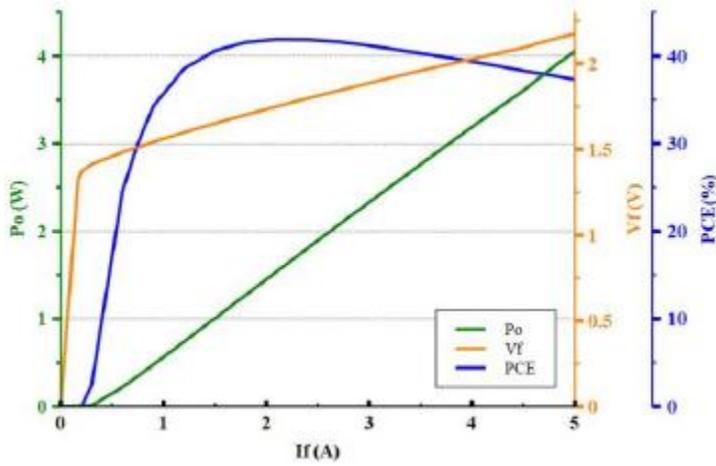


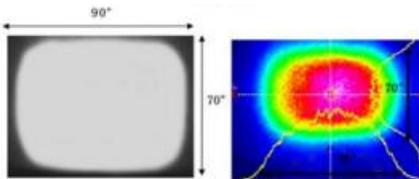### Intensity vs. Wavelength
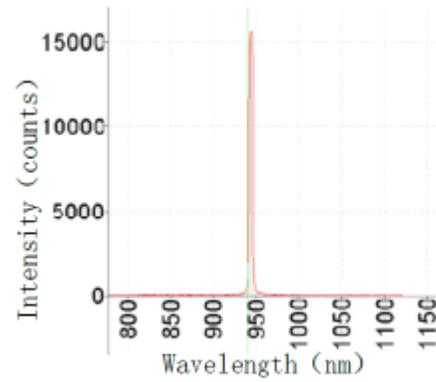


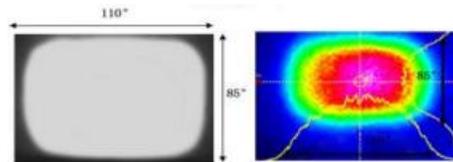### Typical Beam Profile with Diffuser

Beam angle: 60°x45°



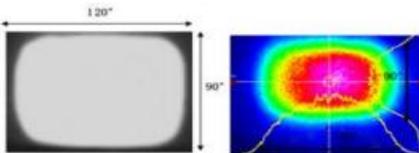Beam angle: 72°x58°



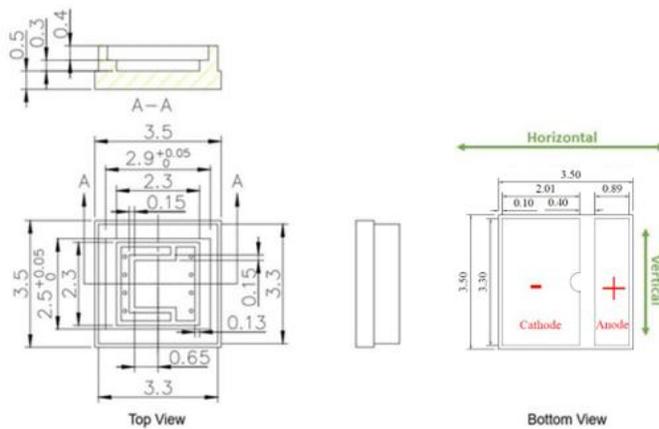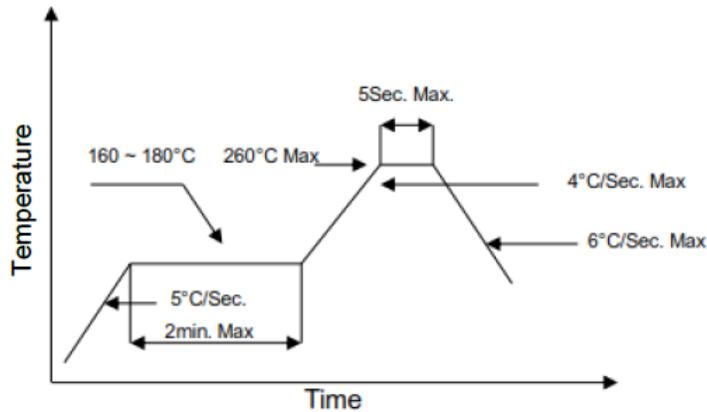Beam angle: 90°x70°



Beam angle: 110°x85°



Beam angle: 120°x90°

## Outline Dimensions (unit: mm)



Top View

Bottom View

## 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.