VCx-660A1SP
660nm 1mW Linearly Polarized Single Mode VCSEL

Data Sheet

Features

- 660nm 1mW red VCSEL diode
- Single transverse and longitudinal mode
- Stable linear polarization output
- Wavelength tunable via temperature and current scanning
- Small emission area for easy collimation
- High side-mode suppression ratio (SMSR)
- High polarization extinction ratio (PER)
- Excellent beam quality
- High reliability

Applications

- Optical sensing systems
- Laser Doppler measurement
- FTIR spectroscopy
- Machine vision and imaging
- Optical coherence tomography (OCT)
- Medical and biomedical instrumentation
- Oxygen concentration measurement

Ordering Information

Part Number	Description
VC35A-660A1SP	660nm 1mW Linearly Polarized Single Mode VCSEL in 3535 SMD Package
VCT-660A1SP	660nm 1mW Linearly Polarized Single Mode VCSEL in TO46 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 Pulse Current	Imax	3	mA	
ESD Exposure (Human Body) Model	ESD	2K-4K	V	Class 2
ESD Exposure (Machine) Model	ESD	200-400	V	Class B
Moisture Sensitive Level	MSL	1-3		

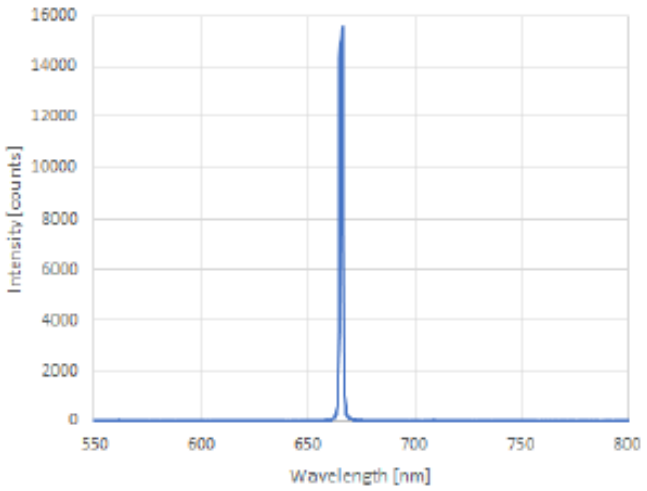
Electrical-Optical Characteristics (T_{op}=25°C, 0.1ms pulse width, 1% duty cycle)

Parameters		Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Output Power (Pulse)		P_o	-	1	1.2	mW	I_F=2.5mA
Optical Output Power (CW)		P_o	-	0.8	1	mW	I_F=2.5mA
Threshold Current		I_{th}	-	0.5	-	mA	
Forward Current		I_F	-	2.5	-	mA	
Power Conversion Efficiency		PCE	-	12	15	%	I_F=2.5mA
Slope Efficiency		η	-	0.5	-	W/A	P_o=1mW
Series Resistance		R	-	330	-	Ω	I_F=2.5mA
Peak Wavelength		λ_P	655	660	665	nm	I_F=2.5mA
Forward Voltage		V_f	3.0	3.2	3.4	V	I_F=2.5mA
Single-Mode Suppression Ratio		SMSR	25	-	-	dB	
Polarization Extinction Ratio		PER	15	-	-	dB	
Spectral Width		SW	-	-	100	MHz	I_F=2.5mA
Rise Time		Tr	-	80	-	ps	
Fall Time		Tf	-	80	-	ps	
Emission Diameter			-	φ22		um	
Beam Divergence	(1/e^2)	Θ	15	17	19	Deg	
	FWHM	Θ	10	12	14	deg	
Wavelength Temperature Drift		$\Delta\lambda_P/\Delta T$	-	0.045	-	nm/°C	I_F=2.5mA
Beta Value		B	-	3930	-	K	B=[ln(R1)-ln(R2)]/{1/T1-1/T2}
TEC Voltage		Vpe	-	-	0.51	V	
TEC Current		Ipe	-	-	0.96	A	
TEC Efficiency		Ppe	-	-	0.29	W	
Soldering Temperature		Tsol			260	°C	10 seconds
Number of Emission Aperture			-	1	-		

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

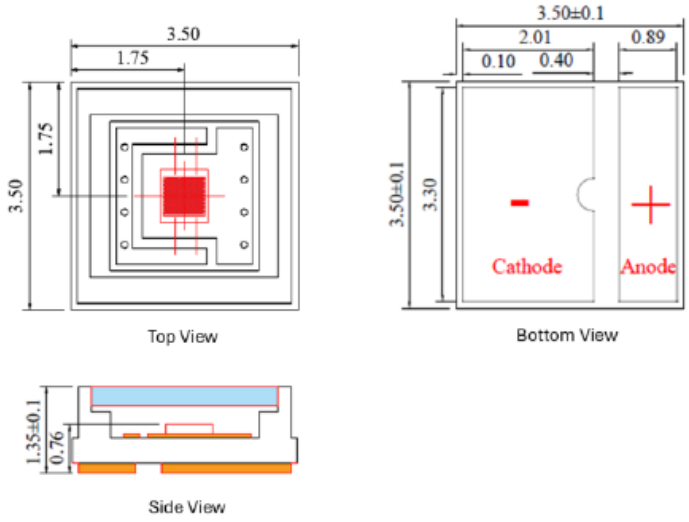
Typical Characteristics

Spectral Wavelength

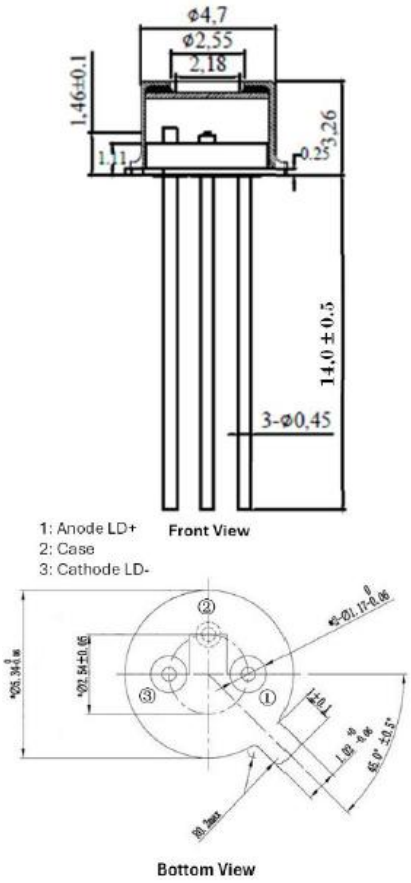


Outline Dimensions (unit: mm)

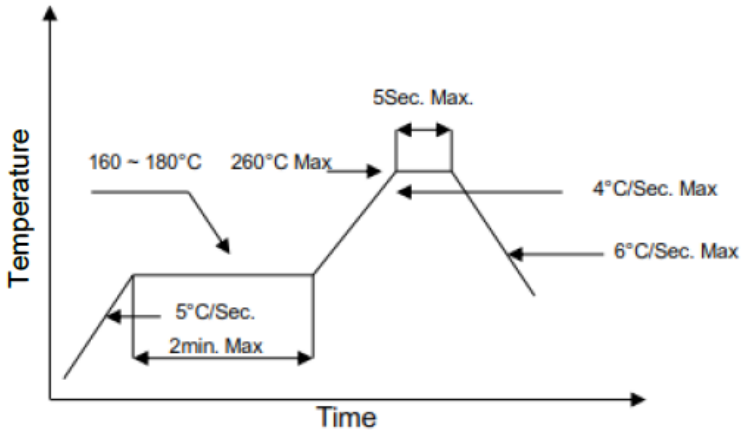
SMD 3535 Package



TO-46 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.