



VCx-680H5A

680nm 5mW VCSEL Diode

Features

- 680nm 5mW red VCSEL diode
- Low wavelength drift, 0.045nm/°C
- High slope efficiency, high PCE
- Available in SMD or TO-can package options

Applications

- Sensing applications
- Indication applications
- Short distance datacom
- Machine vision
- Cosmetic applications
- Medical applications

Ordering Information

Part Number	Description
VC20A-680H5A	680nm 5mW VCSEL Diode, SMD 2016 Package
VCT5-680H5A	680nm 5mW VCSEL Diode, TO-56 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	17	mA	
ESD Exposure (Human Body) Model	ESD	2K-4K (Class 2)	V	
ESD Exposure (Machine) Model	ESD	200-400 (Class B)	V	

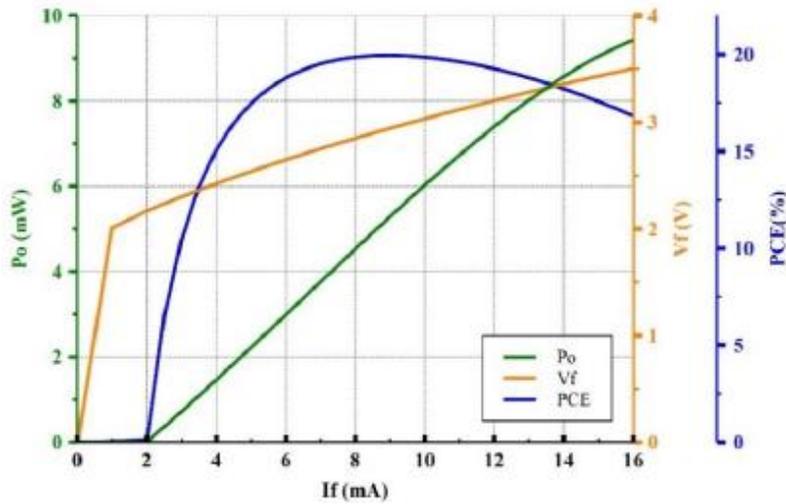
Electro-Optical Characteristics (T_{op}=25°C)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Optical Power (0.1ms pulse width, 1% duty cycle)	P _o	-	5	-	mW	I _F =8.6mA
Optical Power (CW mode)	P _o	-	5	-	mW	I _F =10mA
Threshold Current	I _{th}	-	1.9	-	mA	
Forward Current	I _F	-	8.6	-	mA	
Power Conversion Efficiency	PCE	-	20	-	%	I _F =8.6mA
Differential Resistance	R	-	94	-	Ω	I _F =8.6mA
Slope Efficiency	η	-	0.75	-	mW/mA	I _F =8.6mA
Peak Wavelength	λ _P	670	680	690	nm	P _o =5mW
Forward Voltage	V _f	-	2.9	-	V	I _F =8.6mA
Emission Diameter		-	Φ12	-	um	
Number of Emission Aperture		-	1	-	-	
Beam	(1/e ²)	Θ	18	-	deg	
Divergence	FWHM	Θ	15	-	deg	
Wavelength Temperature Drift	Δλ _P / ΔT	-	0.045	-	nm/°C	I _F =8.6mA
Soldering Temperature	Tsol			260	°C	10 seconds

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

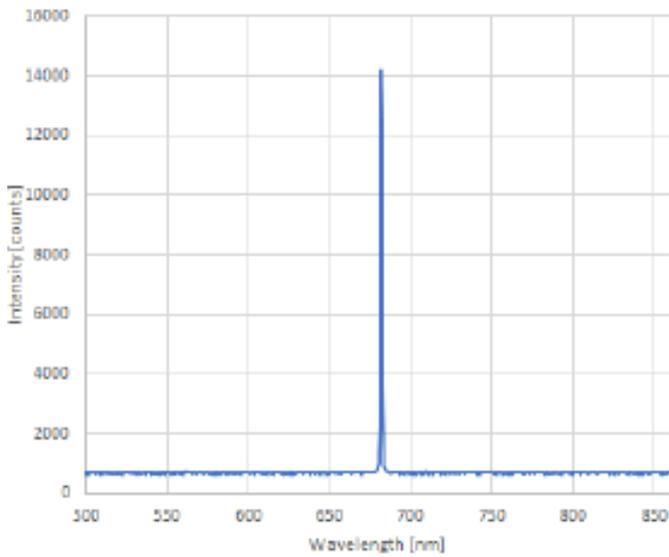
LIV Graph



Notes:

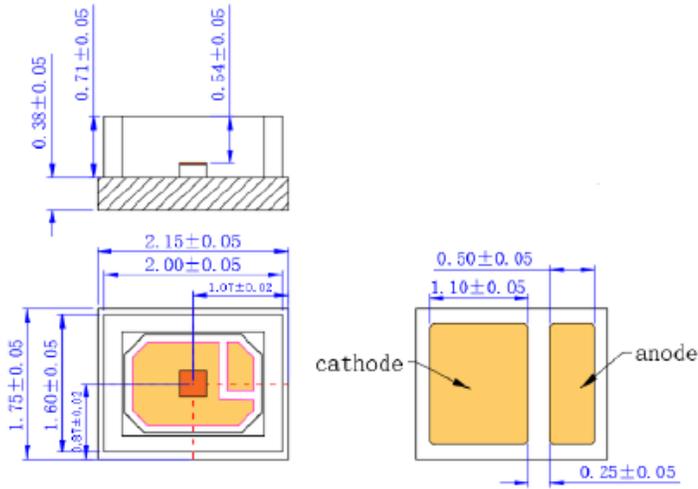
1. LIV graph was measured at 25°C (left); power output, voltage and power conversion efficiency variation trend with changed operating temperature (right, normalized).
2. Forward Voltage (V_F) measurement allowance is +/-0.1V.
3. Peak Wavelength (λ_p) measurement allowance is +/-1.5nm.
4. Others measurement allowance is +/-10%.

Spectral Wavelength

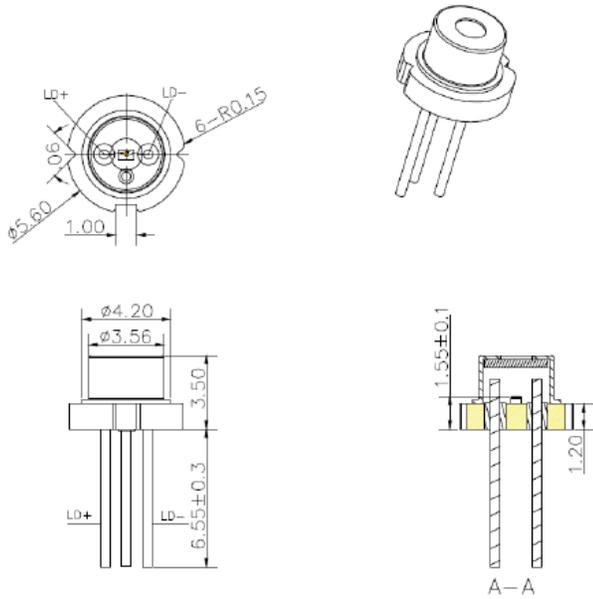


Outline Dimensions (unit: mm)

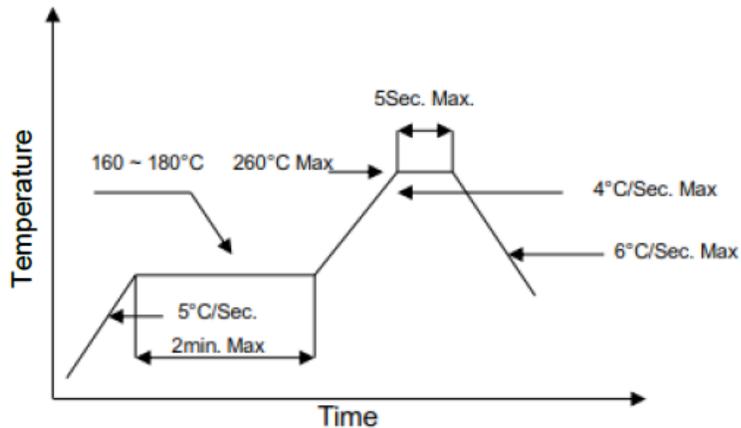
SMD 2016 Package



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.