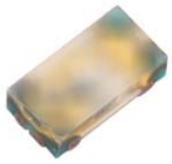
DATASHEET

Technical Datasheet
0402 VCSEL LD
Vertical Cavity Surface Emitting Laser (VCSEL)
VS-IR16-116C/L893/TR8



Features

- Peak wavelength : 940nm (typ.)
- Fast switching time
- Human Body Model (HBM) : Min. 8KV
- Pb free
- Halogen free (Br<900ppm, Cl<900ppm, Br+Cl<1500ppm)
- EU REACH and RoHS compliant
- Compatible with infrared and vapor phase reflow solder process.
- Meet IEC-60825-1：2014 Class 1 Laser Eye Safety Standard.

Description

EVERLIGHT's infrared VCSEL Device (VS-IR16-116C/L893/TR8) is a higher intensity laser diode more than LED Device. Due to the VCSEL has higher directivity characteristic, the device has smaller angle and higher energy. The device is spectrally matched with avalanche photodiode(APD) and photodiode(PD).

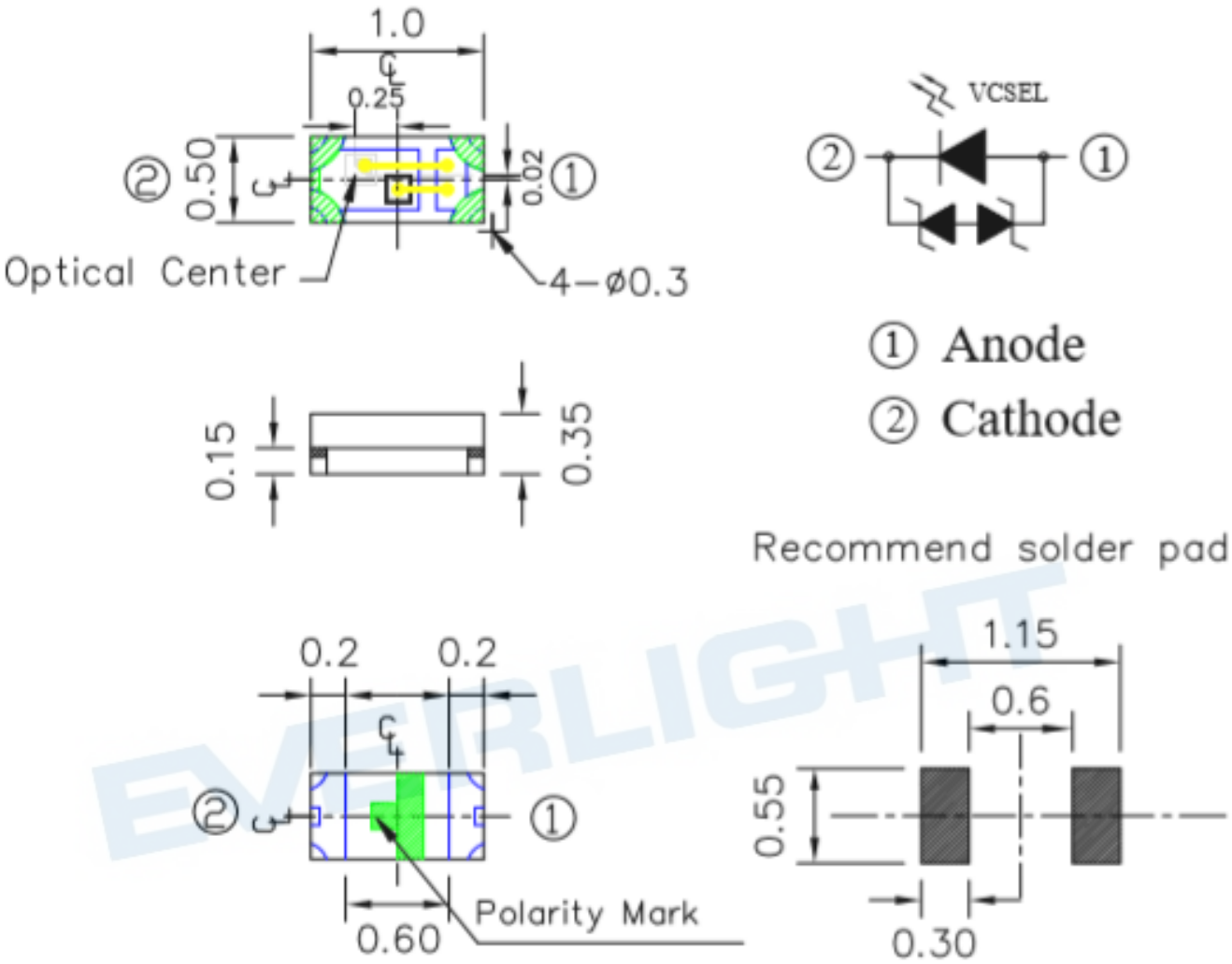
Applications

- Proximity Sensor emitter
- Infrared applied system

Part number table

Model No.	Chip material	Lens
VS-IR16-116C/L893/TR8	GaAs	Water Clear

Package Dimensions



Notes: **1. All dimensions in mm**
2. Tolerance unless mentioned ±0.1mm

Absolute Maximum Ratings (note1)

Parameter	Symbol	Rating	Unit
Storage Temperature	T_{stg}	-40 ~ +100	°C
Operating Temperature	T_{opr}	-40 ~ +85	°C
Pulse forward current(note3,5)	I_{FP}	25	mA
Reverse voltage(note2,5)	V_R	5	V
Soldering Temperature (note4)	T_{sol}	260	°C

Note 1 : Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.
Note 2 : for 10 seconds or less
Note 3 : t_p = 0.5ms, duty cycle = 1%
Note 4 : soldering time <5sec
Note 5 : At room temperature

Electro-Optical Characteristics (T_a=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Threshold current	I_{TH}	-	3.5	-	mA	t_p = 0.5ms, duty cycle = 1%
Optical power output	P_O	8	14	18	mW	I_{FP} = 20mA t_p = 0.5ms, duty cycle = 1%
Power conversion efficiency	PCE	-	30	-	%	
Slope efficiency	η	-	0.8	-	mW/mA	
Peak wavelength	λp	920	940	960	nm	
Spectral bandwidth	Δλ	-	1	-	nm	
Forward voltage	V_F	1.8	2.3	2.8	V	
Differential resistance	R_{diff}	-	43	-	Ohm	
VCSEL Reverse Current	I_r	-	-	1	uA	V_R=5V
Beam Divergence	$2\theta_{1/2}$	-	28	-	°	I_{FP} = 20mA t_p = 0.5ms, duty cycle = 1%
	$2\theta_{1/e^2}$	-	32	-		

Typical Electro-Optical Characteristics Curves

Fig.1 L-I-V Curve (T_a =25℃ t_p = 0.5ms, duty cycle = 1%)

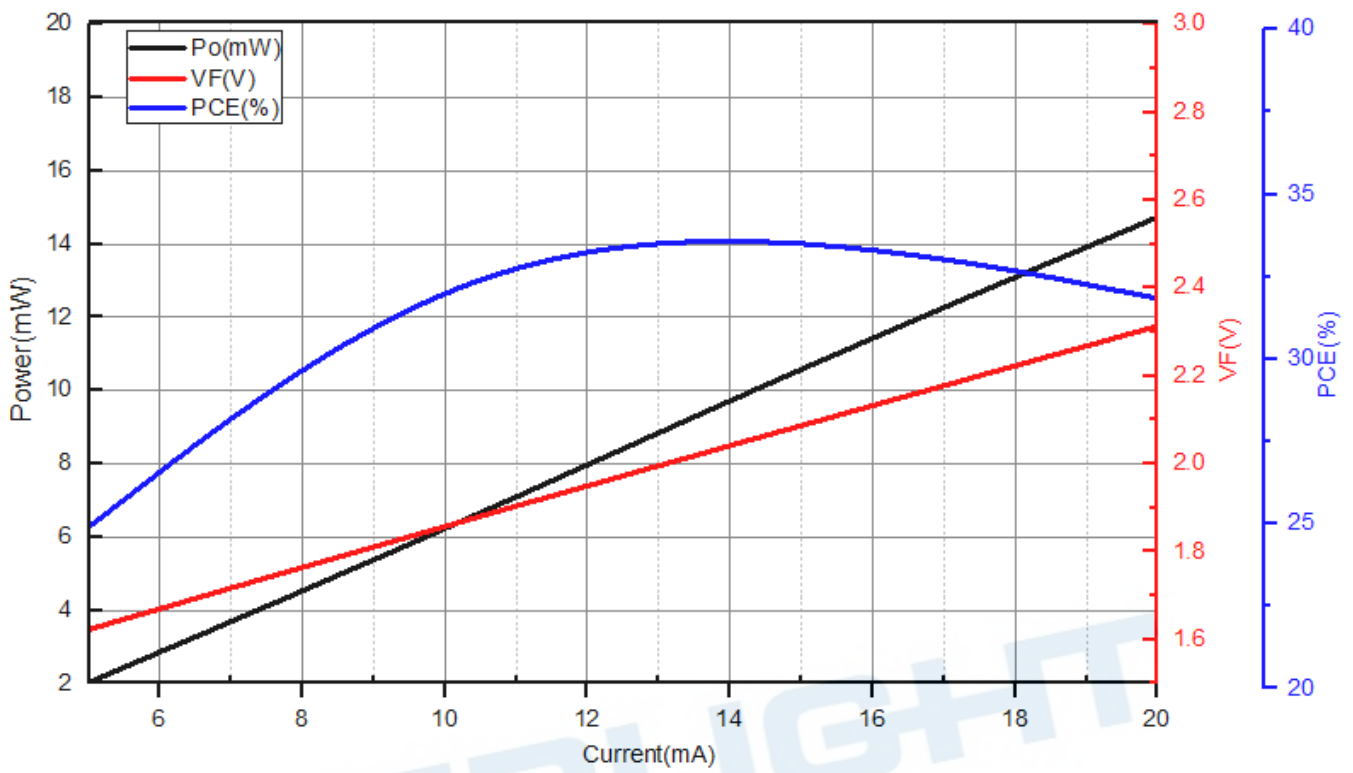
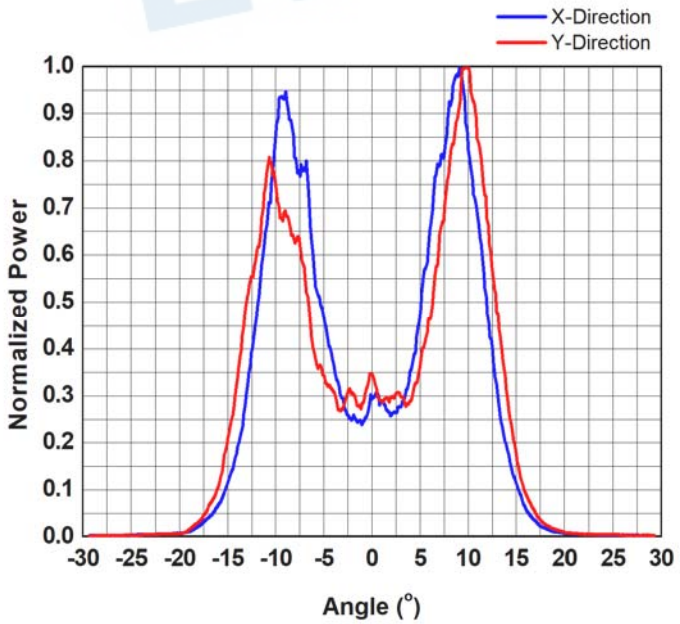


Fig.2 Beam Divergence (@20mA Pulse 0.5ms, duty 1%)



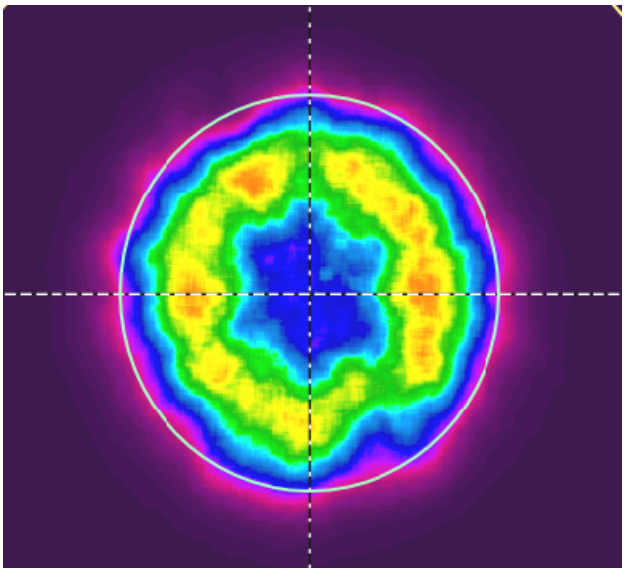
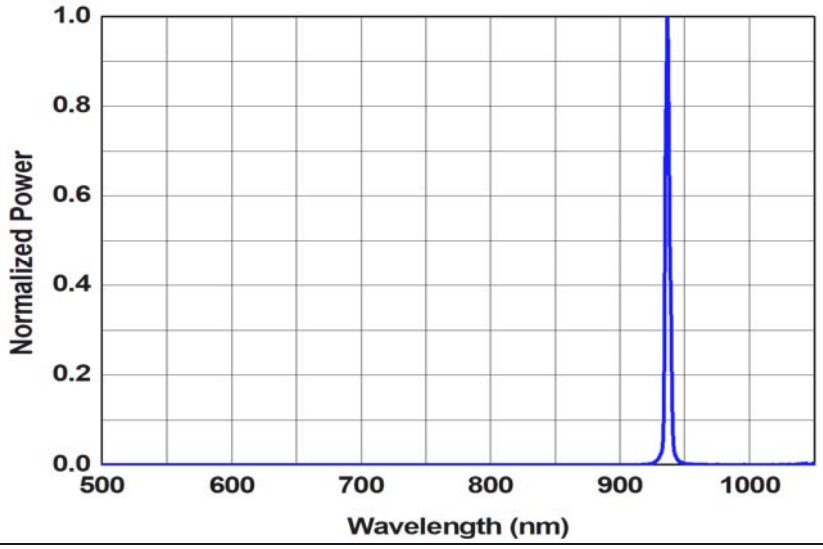
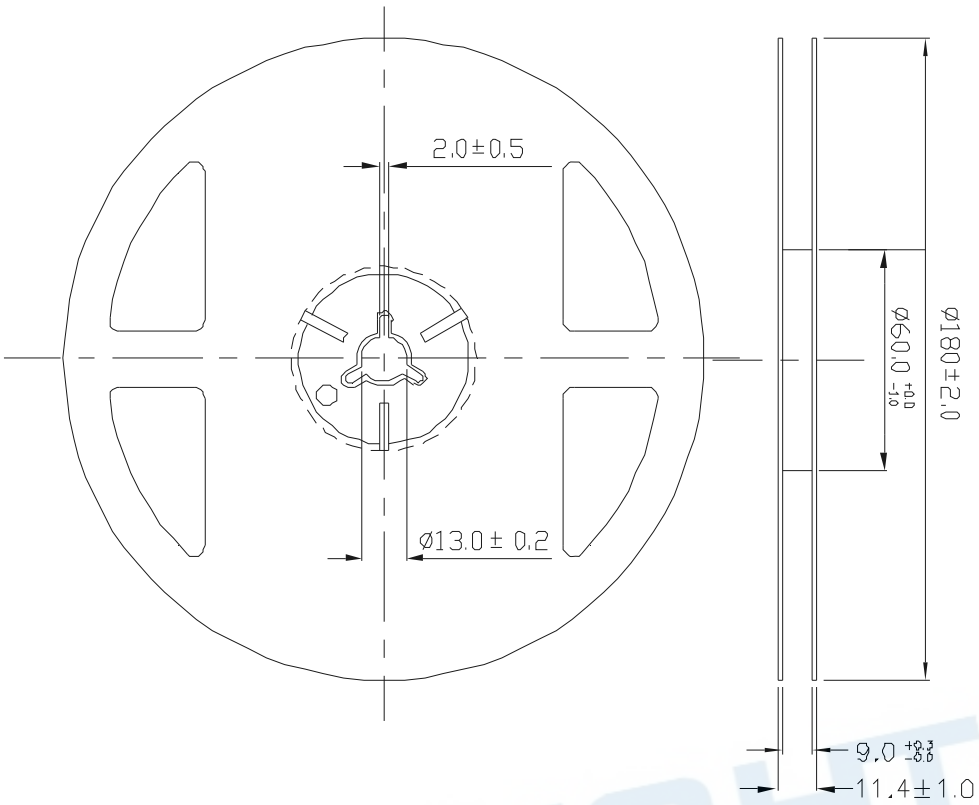


Fig.3 Spectrum (nm)
(@20mA Pulse 0.5ms, duty 1%)

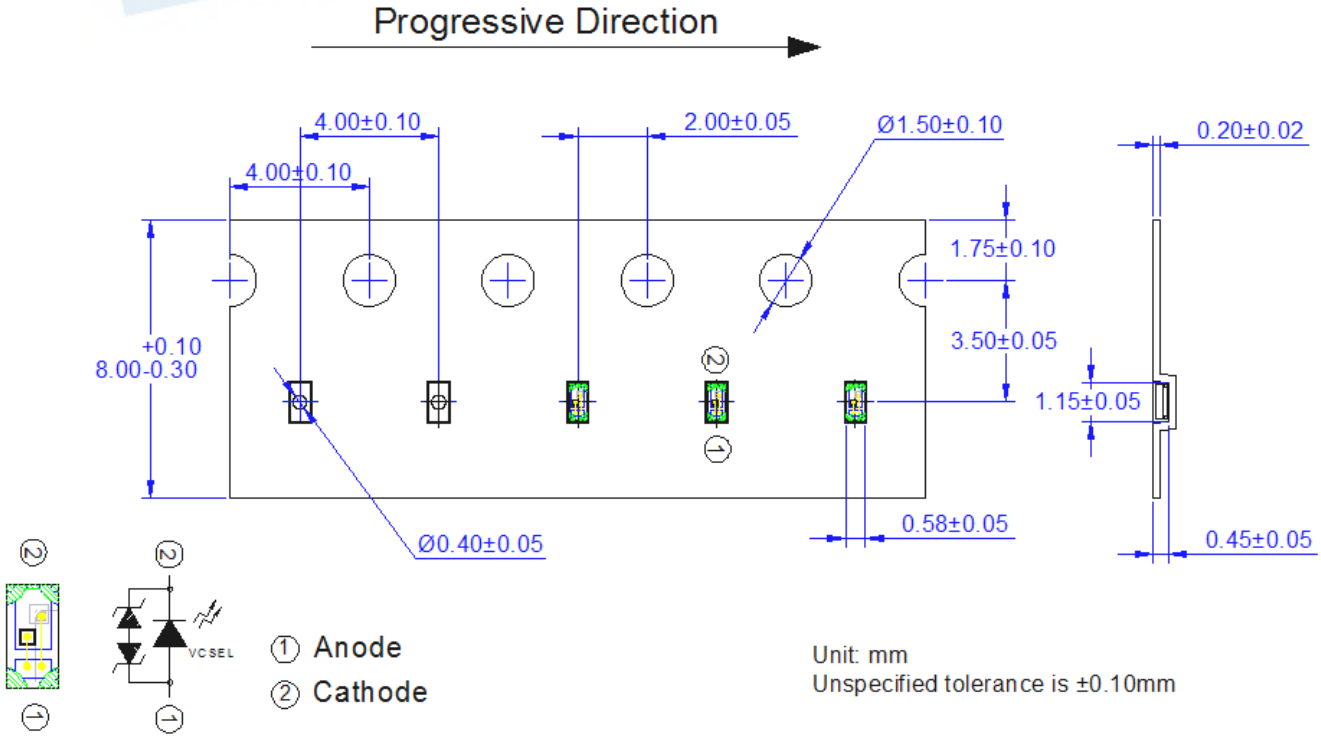


Reel Dimensions

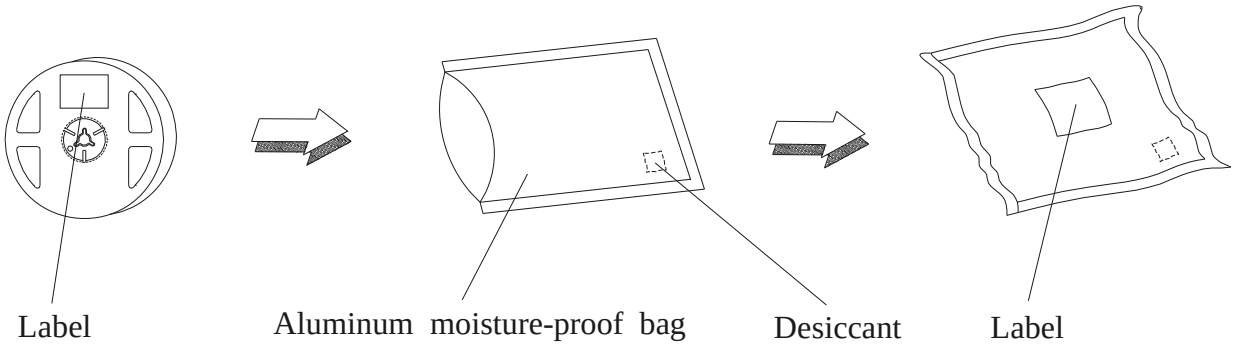


Note: The tolerances unless mentioned is ±0.1mm ,Unit = mm

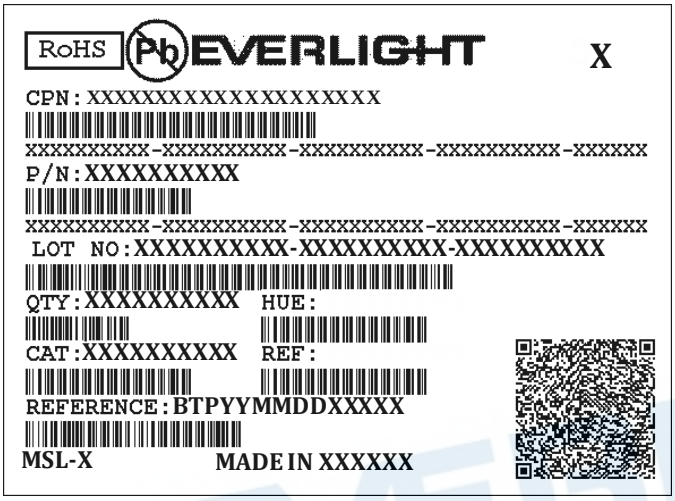
Carrier Tape Dimensions: Loaded quantity 5000 PCS per reel



Moisture Resistant Packaging



Label Form Specification



CPN: Customer's Production Number
P/N : Production Number
QTY: Packing Quantity
CAT: Ranks(mW Bin)
HUE: Peak Wavelength
REF: Reference(VF Bin)
LOT No: Lot Number
MADE IN TAIWAN: Production Place

DISCLAIMER

1. EVERLIGHT reserves the right(s) on the adjustment of product material mix for the specification.
2. The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
3. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
4. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from the use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
5. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without obtaining EVERLIGHT's prior consent.
6. This product is not intended to be used for military, aircraft, automotive, medical, life sustaining or life saving applications or any other application which can result in human injury or death. Please contact authorized Everlight sales agent for special application request.

Usage Precautions

CAUTION!

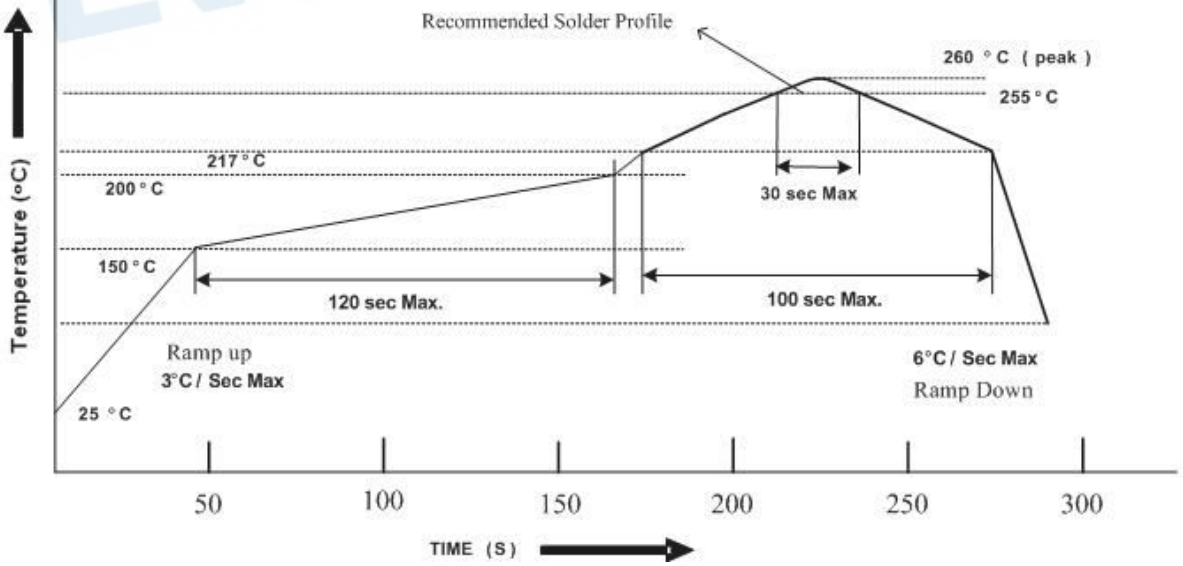
This part has high invisible radiation intensity. Depending on the operating conditions, this radiation might be harmful to human eyes. Safety precautions and a classification of the products incorporating this part according to laser safety regulations (IEC60825-1) must be undertaken.

Storage

- Do not open moisture proof bag before the products are ready to use.
- Before opening the package, the VCSEL should be kept at 30℃ or less and 80%RH or less.
- The VCSEL should be used within a year.
- After opening the package, the VCSEL should be kept at 30℃ or less and 60%RH or less.
- The VCSEL should be used within 168 hours (7 days) after opening the package (MSL3)
- If the moisture absorbent material (silica gel) has faded away or the VCSEL have exceeded the storage time, baking treatment must be performed with the following conditions.
- Baking treatment: 60±5℃ for Min. 24 hours.

Soldering conditions

- Reflow soldering should not be done more than two times
- Mechanical stress to the component must be avoided during soldering process
- Do not warp the circuit board after soldering
- Hand soldering or manual reworking are not recommended
- Pb free solder profile as shown below



Repairing

Repair should not be done after the VCSEL have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the VCSEL will or will not be damaged by repairing.