# SHARP GH05C01A9G *Multi-mode Green Laser Diode*

*ϕ9.0mm TO-CAN Package*

March 2022

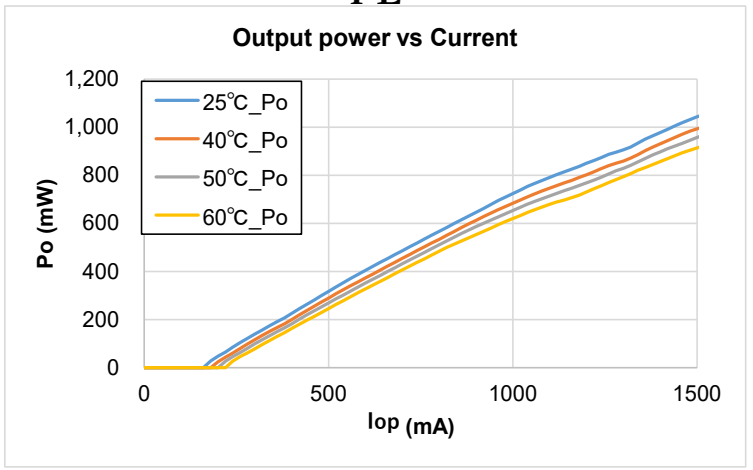
## Characteristics

(Tc=25℃, CW)

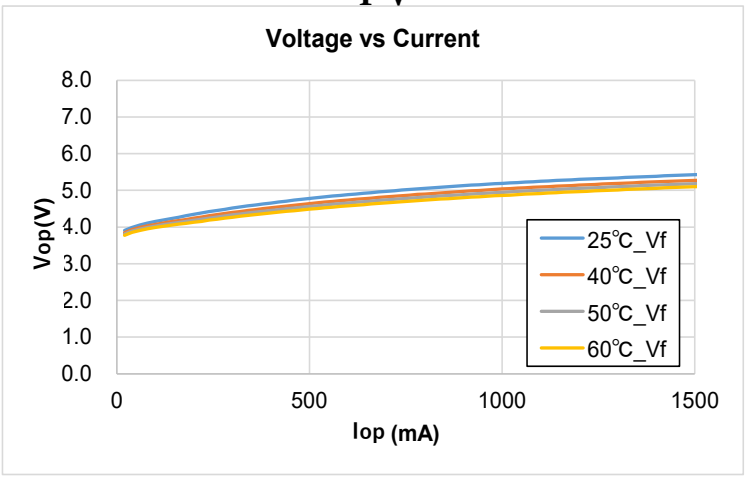
| Item | Conditions | Characteristic value (TYP.) |
|---|---|---|
| Wavelength (Peak) | Po=600mW | 520nm |
| Output(mW) | – | 600mW |
| Threshold current | – | 180mA |
| Operating current | Po=600mW | 1,050mA |
| Operating voltage | Po=600mW | 5.2V |
| Far Field ( $1/e^2$ (°)) | Po=600mW | θ// 9 , θ⊥ 44 |
| Terminal connections | No.9 | ϕ9.0 |

## CW I-L,I-V Temperature

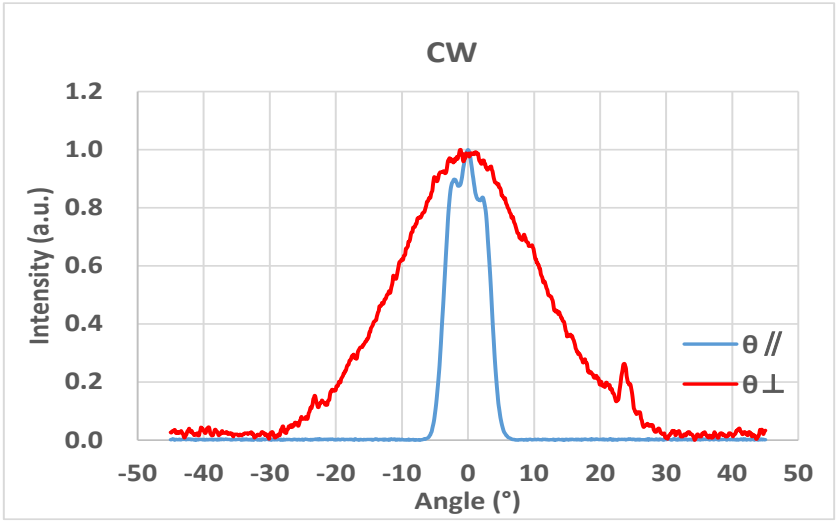
### I-L



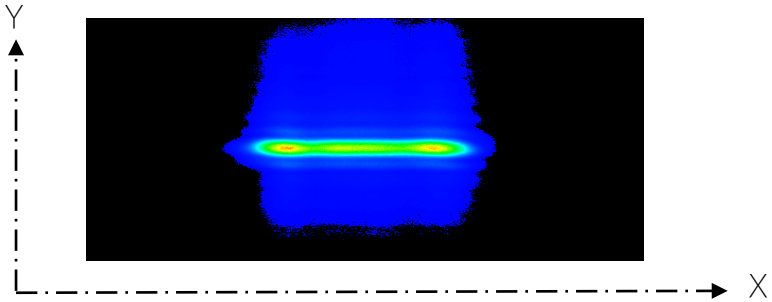

### I-V




## Far Field Pattern

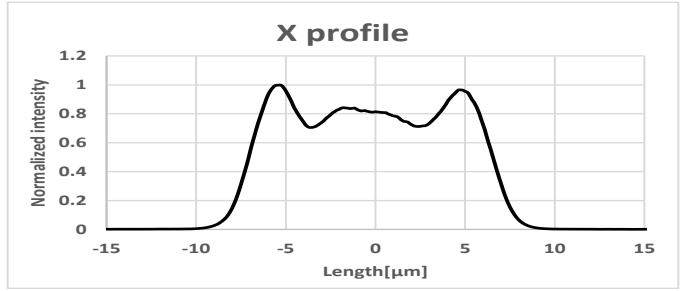


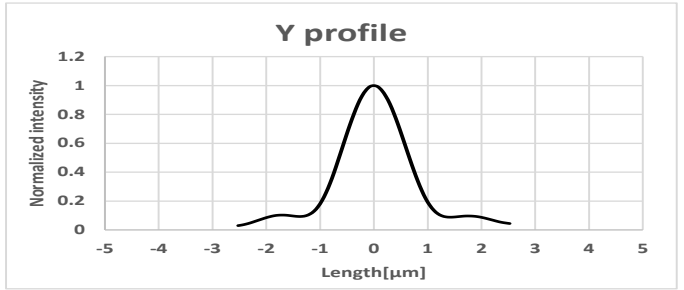

## Near Field Pattern



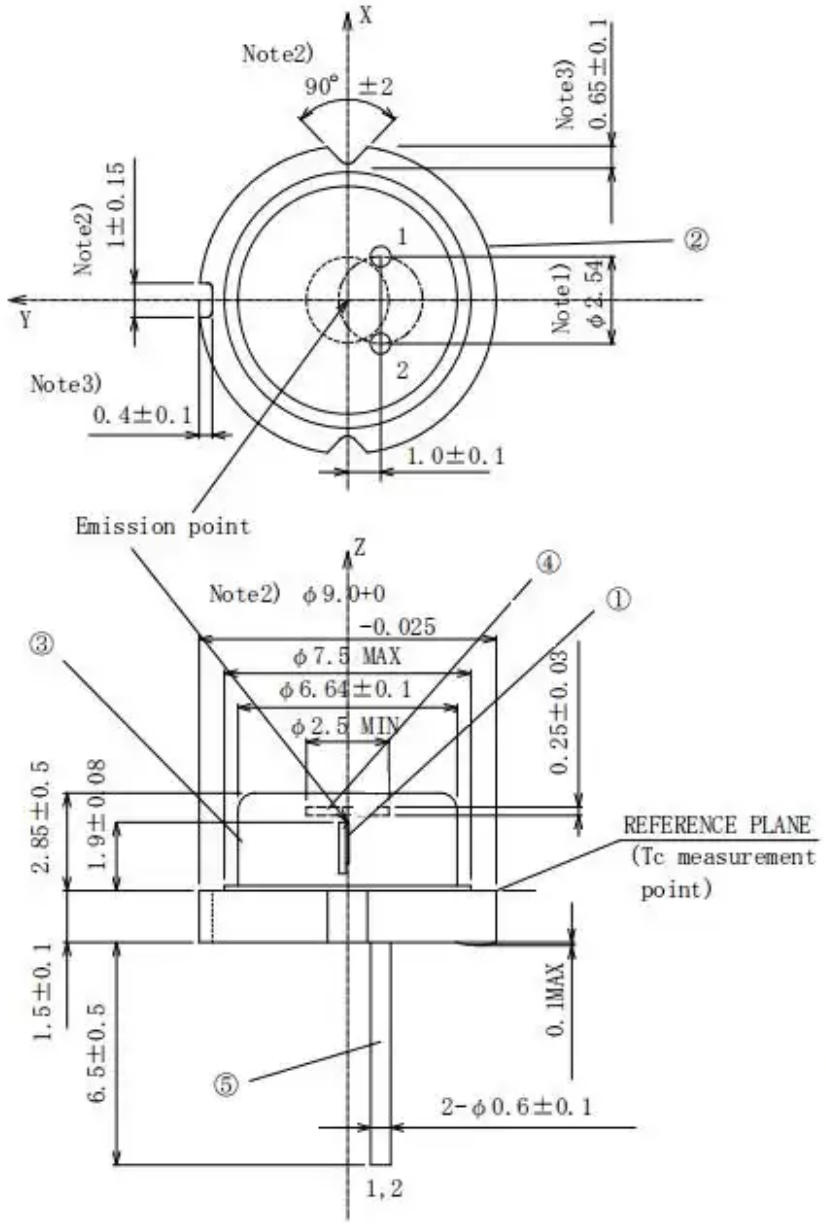

Emitter size

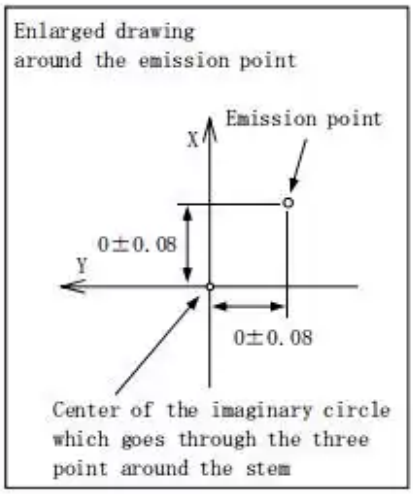
| | FWHM(μm) | 1/e (μm) | $1/e^2$ (μm) |
|---|---|---|---|
| X | 13.6 | 14.2 | 15.6 |
| Y | 1.31 | 1.56 | 2.22 |

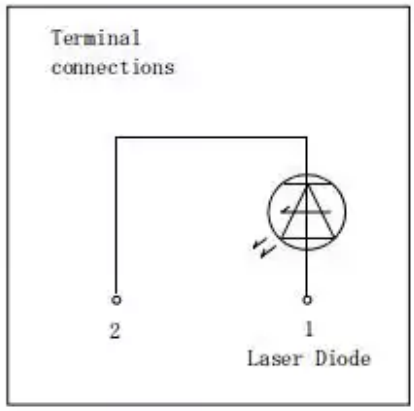


2. Outline dimensions and Terminal connections




Mass of the product :
1.13g (reference value)

Note 1) Dimension of the bottom of leads.

Note 2) These dimensions are valid only in the range of 0 ～ 0.75mm below from the reference plane.

Note 3) These dimensions are defined from the imaginary circle which goes through the three points around the stem to the bottom of cut off parts.

GENERAL TOLERANCES ±0. 2

UNIT:mm

| No. | Component | Material | Finish |
|---|---|---|---|
| ① | Laser Diode Chip | InAlGaN | - |
| ② | Stem | Fe, Cu | Gold-plated |
| ③ | Cap | 45 alloy | Nickel+Pd plated |
| ④ | Window glass | Borosilicated glass | - |
| ⑤ | Lead pins | Kovar | Gold-plated |

## 3. Ratings and Characteristics

### 3-1 Absolute Maximum Ratings

(Tc=25℃ (Note 1))

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Operating current (CW) | Iop | 1.4 | A |
| Reverse voltage | Vrl | 2 | V |
| Operating temperature (Case temperature) | Top(c) | 0 ～ +60 | ℃ |
| Storage temperature | Tstg | -40 ～ +85 | ℃ |
| Soldering temperature (Note 2) | Tsld | 350 | ℃ |

(Note 1) Tc : Case temperature ( Tc measurement point is refer to P.2 drowing.)

(Note 2) Soldering temperature means soldering iron tip temperature while soldering.
Soldering position is 1.6mm apart from bottom edge of the case. (Immersion time: ≦3s)

### 3-2 Electro-optical Characteristics (Note 1)

(Tc=25℃)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Threshold current | Ith | - | - | 0.22 | 0.30 | A |
| Operating current (CW) | Iop | Po=0.6W | - | 1.1 | 1.39 | A |
| Operating voltage | Vop | | - | 5.2 | 6.2 | V |
| Wavelength (Note 4) | λp | | 510 | 520 | 530 | nm |
| Beam divergence angle(Parallel)(Note 2,3) | θ // | | 5 | 13 | 20 | ° |
| Beam divergence angle(Perpendicular)(Note 2,3) | θ ⊥ | | 35 | 45 | 55 | ° |
| Misalignment angle (Parallel) (Note 3) | Δ θ // | | -5 | - | 5 | ° |
| Misalignment angle (Perpendicular) (Note 3) | Δ θ ⊥ | | -5 | - | 5 | ° |
| Differential efficiency | ηd | | 0.45 | 0.65 | - | W/A |

(Note 1) Initial value, Continuous Wave Operation

(Note 2) Full width angle at $1/e^2$ of peak intensity

(Note 3) Parallel to the junction plane(X-Z plane)
Perpendicular to the junction plane(Y-Z plane)

(Note 4) It is based on method for measurement of light spectrum analyzer Q8344A made by Advantest Corp. of Sharp Corp. property.

4. Reliability

These tests are sampling examples from a specific lot for reference purpose only, and do not constitute any warranty or assurance in connection with the devices.

4-1 Test items and confidence level

Tested samples should have a laser diode chip with the same structure of this model.

These tests are confirmed by performing the operating test under the following conditions in time of development or change process related to the reliability of this product.

Reference Standards : JIS　　Confidence level : 90%

| No. | Test | Test Conditions | Samples:n | Defective:C | LTPD(%) | Failure criteria No. [4-2] |
|---|---|---|---|---|---|---|
| 1 | Solderability | Soldering temperature: 240±5℃(Flux used)<br>Immersion time:5±0.5s | 11 | 0 | 20 | 1 |
| 2 | Resistance to soldering | Soldering iron tip temperature:350+0℃/-5℃<br>Immersion time:3+0s/-1s(Note 1) | 11 | 0 | 20 | 3,4,5 |
| 3 | Terminal strength (Tensile test) | Load:5N Duration:5±1s<br>Once for each terminal | 11 | 0 | 20 | 2 |
| 4 | Terminal strength (Bending test) | Load:2.5N 0°～90°～ 0°～ -90°～0°<br>Once for each terminal | 11 | 0 | 20 | 2 |
| 5 | Mechanical shock | Acceleration:1,000m/s$^2$ Pulse width:6ms<br>Direction:±X, ±Y and ±Z<br>Three times for each direction | 11 | 0 | 20 | 3,4,5 |
| 6 | Variable frequency vibration | Acceleration:100m/s$^2$ or Amplitude:1.5mm<br>Frequency:<br>10～500～10Hz 15min<br>reciprocation Direction:<br>X,Y and Z 2 h for each direction | 11 | 0 | 20 | 3,4,5 |
| 7 | Temperature cycling | Lower temperature:-40℃<br>Higher temperature:+85℃<br>Duration:30min each, 30 times | 11 | 0 | 20 | 3,4,5 |
| 8 | High temperature storage | Storage temperature:85℃<br>t=500 h | 11 | 0 | 20 | 3,4,5 |
| 9 | Low temperature storage | Storage temperature:-40℃<br>t=500 h | 11 | 0 | 20 | 3,4,5 |
| 10 | High temperature Humid atmosphere storage | Storage temperature:60℃ (Note 2)<br>humidity:90%RH<br>t=100h | 11 | 0 | 20 | 3,4,5 |

(Note 1) Soldering position is 1.6mm apart from bottom edge of the case.

(Note 2) To be measured after 72 hours exposure to the room atmosphere.

4-2 Parameters to be measured and Failure criteria

| No. | Parameters | Failure judgment criteria |
|---|---|---|
| 1 | Solderability | 95% or more is covered with solder. |
| 2 | Terminal strength | It is defective if there are breaking and loosening. |
| 3 | Threshold current | Ith > initial value ×1.3, Ith < initial value ×0.7 |
| 4 | Operating current | Iop > initial value ×1.3, Iop < initial value ×0.7 |
| 5 | Operating voltage | Vop > initial value ×1.2, Vop < initial value ×0.8 |

4-3 Lifetime Test

The target mean time to failure (MTTF) of this product is more than 2,000 h. MTTF is confirmed by performing the operating test under the following conditions in time of development or change process related to the reliability of this product.

Samples tested should have a laser diode chip with the same structure of this model.

| Conditions | Failure judgment criteria |
|---|---|
| Tc=50℃, CW<br>Iop=1.1A<br>ACC drive(Note 2)<br>500 houres | Failure is defined as the time under the output power under the conditions in the left changes -50% of the initial (12 h) value(Note 1). As for the samples which do not fail within 500 hours, their life time is calculated by extrapolating operating power data of between 400 and 500 hours.<br>MTTF is estimated by plotting each life time in Weibull function worksheet.(Note 1) |

(Note 1) Defective samples caused by surge current is rejected.

(Note 2) Automatic current control