



## LED23 series

- Mid-IR LED Series
- 2.30 – 2.39  $\mu\text{m}$
- 0.6 – 1.0 mW QCW



### Description

**LED23 series** contain one LED chip die with a typical peak wavelength of **2.35  $\mu\text{m}$** , an optical power of typ. **0.7 mW QCW**. There are different options of packaging available, as you can choose between TO-can, with parabolic reflector (R), window (W), and containing thermoelectric cooler and thermoresistor (T).

### Maximum Ratings

| Parameter                              | Symbol           | Values |      | Unit               |
|--|------------------|--------|------|--------------------|
|  |                  | Min.   | Max. |                    |
| Operating Current, QCW mode            | $I_{QCW\ max}$   |        | 250  | mA                 |
| Operating Current, pulsed mode         | $I_{PULSE\ max}$ |        | 2    | A                  |
| Storage Temperature *                  | $I_{STR}$        | -60    | +90  | $^{\circ}\text{C}$ |
| Operating Temperature *                | $T_{CASE}$       | -60    | +90  | $^{\circ}\text{C}$ |
| Lead Solder Temperature * <sup>2</sup> | $T_{SLD}$        |        | +180 | $^{\circ}\text{C}$ |

\* Temperature range may vary for different packaging types

\*<sup>2</sup> must be completed within 5 seconds

### LED Characteristics

( $T_{CASE}=25^{\circ}\text{C}$ )

| Parameter                                   | Symbol          | Conditions                | Values |      |      | Unit          |
|---|-----------------|---------------------------|--------|------|------|---------------|
|   |                 |                           | Min.   | Typ. | Max. |               |
| Peak Wavelength                             | $\lambda_P$     | $I_F=150\text{mA}$ QCW    | 2.30   |      | 2.39 | $\mu\text{m}$ |
| Half Width (FWHM)                           | $\Delta\lambda$ | $I_F=150\text{mA}$ QCW    | 170    |      | 270  | nm            |
| Optical Output Power, QCW *                 | $P_O$           | QCW mode *                | 0.6    | 0.7  |      | mW            |
| Optical Output Power, pulsed * <sup>2</sup> | $P_O$           | Pulse mode * <sup>2</sup> | 6.0    | 7.0  |      | mW            |
| Operating Voltage                           | $V_{OP}$        | $I_F=200\text{mA}$ QCW    | 0.5    |      | 2.5  | V             |
| Switching Time                              | $t_s$           |                           |        |      |      | ns            |

\* Repetition rate: 0.5 kHz, pulse duration: 1 ms, duty cycle: 50%, current: 200 mA

\*<sup>2</sup> Repetition rate: 0.5 kHz, pulse duration: 20  $\mu\text{s}$ , duty cycle: 1%, current: 1 A

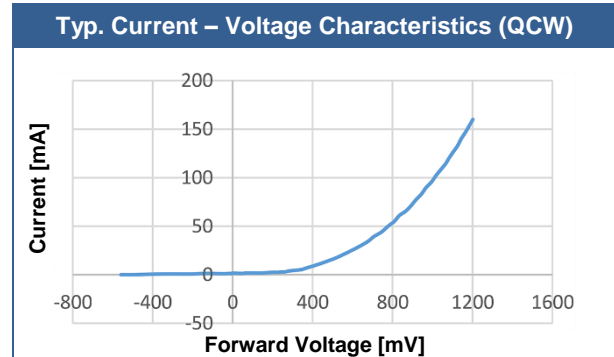
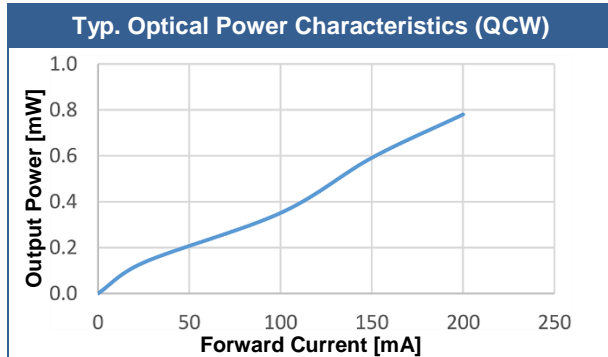
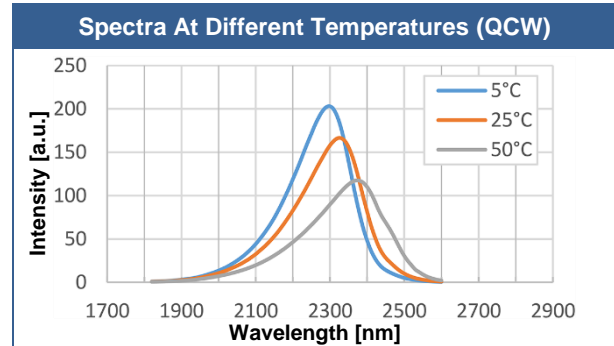
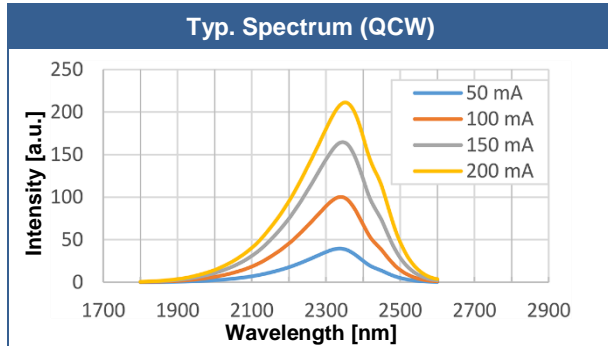
### Packages

| Part Number | Package  |
|-------------|--|
| LED23       | TO-18 with cap without glass window  |
| LED23-R     | TO-18 with parabolic reflector without glass window  |
| LED23-RW    | TO-18 with parabolic reflector with glass window   |
| LED23-TW    | TO-5 with built-in thermocooler and thermoresistor, covered by cap with glass window                 |
| LED23-TRW   | TO-5 with built-in thermocooler and thermoresistor, covered by parabolic reflector with glass window |

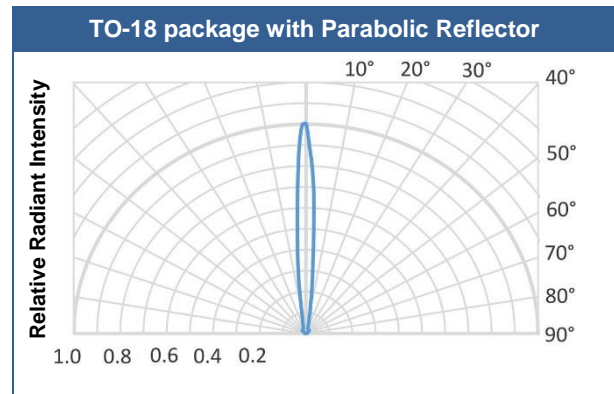
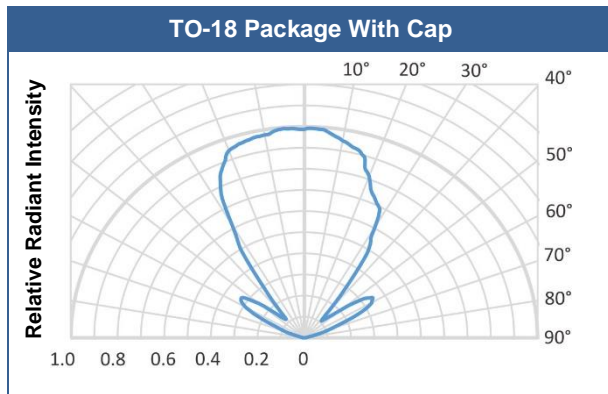
All parameters refer to LEDs in TO18 package with a cavity and operation at ambient temperature 25 $^{\circ}\text{C}$  unless otherwise stated.



## Performance Characteristics



## Radiant Characteristics (Far-Field Pattern)

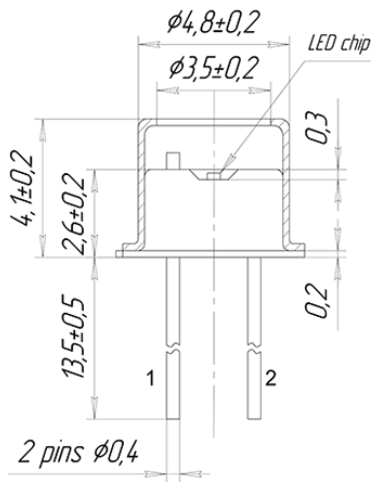




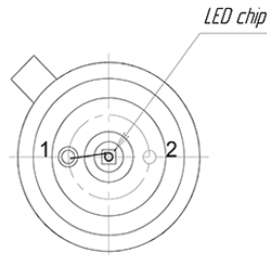
## Outline Dimensions

LED23

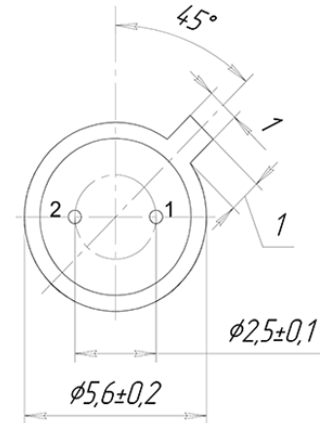
TO-18, with cap, without window



TOP VIEW



BOTTOM VIEW

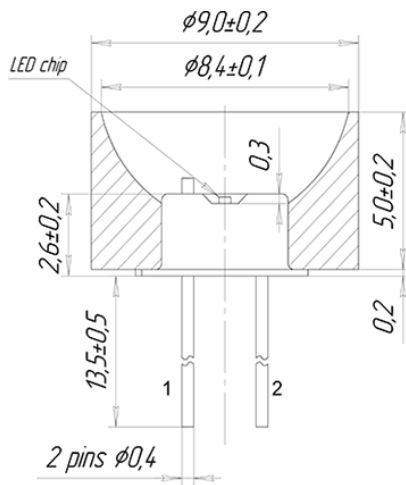


| Lead  | Description         |
|-------|---------------------|
| PIN 1 | LED Cathode         |
| PIN 2 | LED Anode (red dot) |

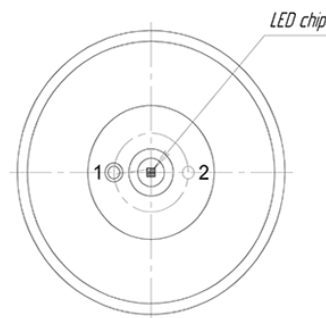
All Dimensions in mm

LED23-R

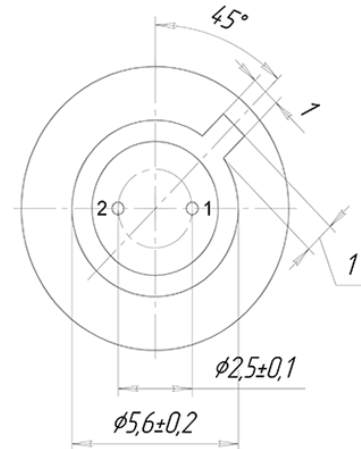
TO-18, with parabolic reflector, without window



TOP VIEW



BOTTOM VIEW



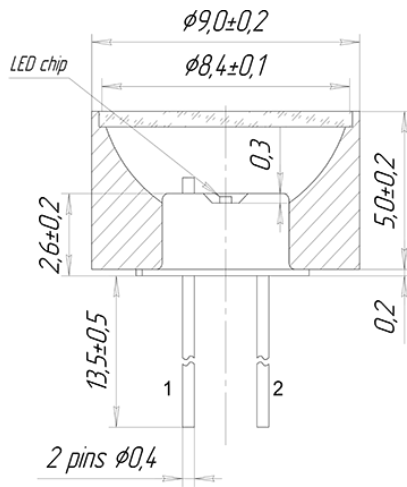
| Lead  | Description         |
|-------|---------------------|
| PIN 1 | LED Cathode         |
| PIN 2 | LED Anode (red dot) |

All Dimensions in mm

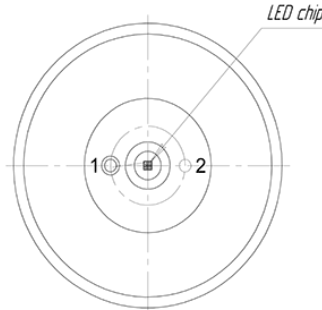


## LED23-RW

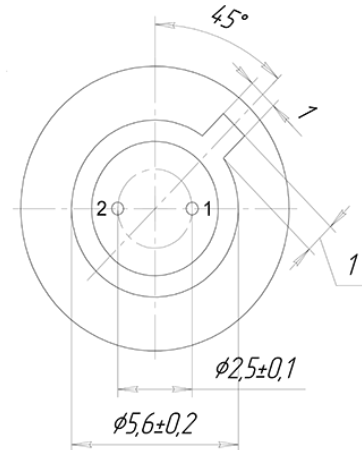
## TO-18, with parabolic reflector and window



TOP VIEW



BOTTOM VIEW

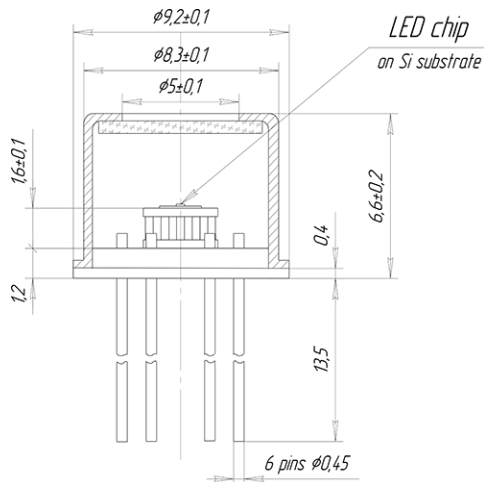


| Lead  | Description         |
|-------|---------------------|
| PIN 1 | LED Cathode         |
| PIN 2 | LED Anode (red dot) |

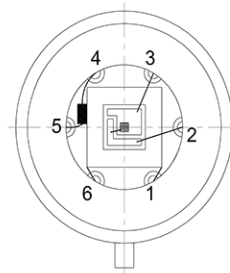
All Dimensions in mm

## LED23-TW

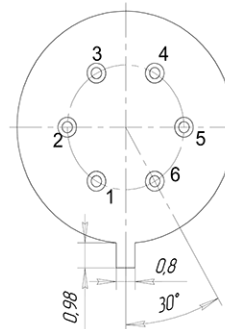
## TO-5, thermocooler and thermoresistor, cap and window



TOP VIEW



BOTTOM VIEW

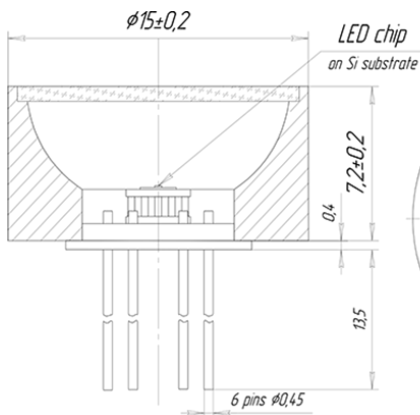


| Lead  | Description         |
|-------|---------------------|
| PIN 1 | TEC +               |
| PIN 2 | LED Anode (red dot) |
| PIN 3 | LED Cathode         |
| PIN 4 | Thermistor          |
| PIN 5 | Thermistor          |
| PIN 6 | TEC -               |

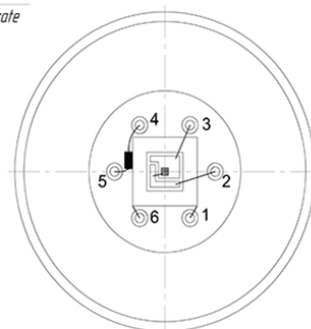
All Dimensions in mm

## LED23-TRW

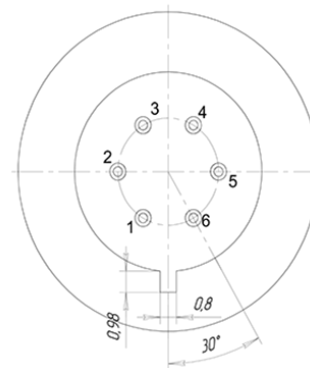
## TO-5, thermocooler and thermoresistor, cap and window



TOP VIEW



BOTTOM VIEW



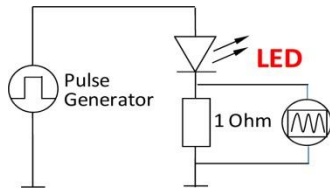
| Lead  | Description         |
|-------|---------------------|
| PIN 1 | TEC +               |
| PIN 2 | LED Anode (red dot) |
| PIN 3 | LED Cathode         |
| PIN 4 | Thermistor          |
| PIN 5 | Thermistor          |
| PIN 6 | TEC -               |

All Dimensions in mm

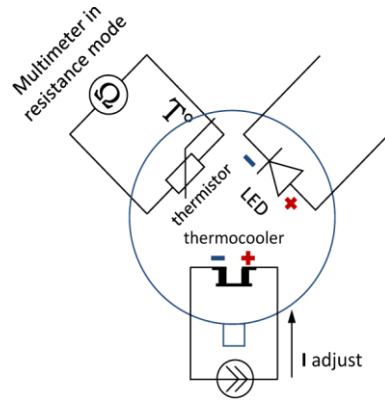


## Operating Regime

### LED Basic Circuit Connection



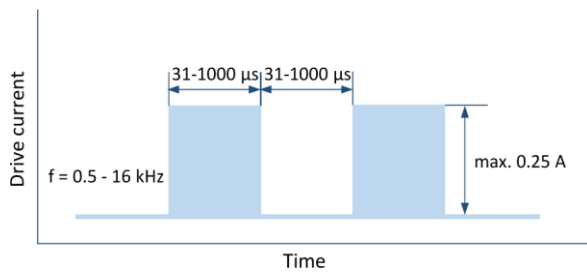
### LED With Thermoelectric Module



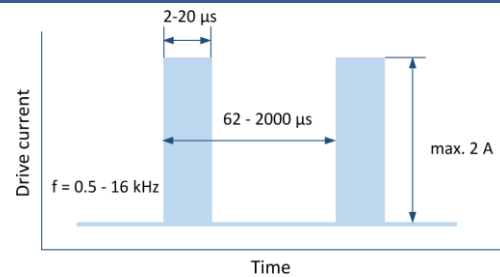
Constant current source

We recommend to use **Quasi Continuous Wave (QCW) mode** with duty cycle 50% or 25% to obtain maximum average optical power and **Pulse mode** to obtain maximum peak power. Hard CW (continuous wave) mode is **NOT** recommended.

### Quasi Continuous Wave (QCW) mode



### Pulse Mode





## Precautions

---

### Cautions:

- Check your connection circuits before turning on the LED.
- Mind the LED polarity: LED anode is marked with a RED dot.  
Reverse voltage applying is FORBIDDEN!
- DO NOT connect the LED to the multimeter.
- Control the current applied to the LED in order not to exceed the maximum allowable values.

### Soldering:

- Do avoid overheating of the LED
- Do avoid electrostatic discharge (ESD)
- Do avoid mechanical stress, shock, and vibration
- Do only use non-corrosive flux
- Do not apply current to the LED until it has cooled down to room temperature after soldering

### Static Electricity:

LEDs are **sensitive to electrostatic discharge (ESD)**. Precautions against ESD must be taken when handling or operating these LEDs. Surge voltage or electrostatic discharge can result in complete failure of the device.



### Operation:

Do only operate LEDs with a current source.

Running these LEDs from a voltage source will result in complete failure of the device.

Current of a LED is an exponential function of the voltage across it. Usage of current regulated drive circuits is mandatory.



## Revisions History

---

| Rev. | Rel. Date  | Chapter | Modification    | Page |
|------|------------|---------|-----------------|------|
| A1   | 2020-07-08 | -       | Initial release | -    |

---

© All Rights Reserved

The above specifications are for reference purpose only and subjected to change without prior notice