Near-Infrared Light-Emitting Diode

Lms14LED series

1.45 µm

Preliminary data

Near infrared LED based on InGaAs.

Features	Applications
• Low power consumption; • High response time; • Long lifetime; • Available in various packages; • RoHS compliant	Optical sensors and analysers (for example, for water/ moisture content measurement)

Standard models

Model	Package[1]
Lms14LED	TO-18 with a cap with a glass window
Lms14LED-R	TO-18 with a reflector without a glass window
Lms14LED-RW	TO-18 with a reflector with a glass window
Lms14LED-TEM	TO-5 with a built-in thermocooler and thermistor, with a cap with a glass window
Lms14LED-TEM-R	TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window
Lms14LED-CS3020	SMD 3x2 mm (without encapsulation/ glass window)

[1] Package hermeticity is not tested and is not guaranteed.

Absolute maximum ratings (at ambient temperature Ta = +25°C, unless otherwise stated)

Model	Maximum operating current			Operating/ storage temperature[4], T_{op}/T_{stg}	Soldering temperature (t = 3 s, ≥3 mm from the case), T_{sol}
	qCW mode[2], I_{qCW}	pulse mode[3], I_{pul}	direct current, I_{DC}		
Lms14LED	0.14 A	0.7 A	0.07 A	+5..+85 °C	+260 °C
Lms14LED-R				-20..+85 °C	
Lms14LED-RW				+5..+85 °C	
Lms14LED-TEM					
Lms14LED-TEM-R					
Lms14LED-CS3020				-20..+85 °C	-

[2] qCW mode: repetition rate: 0.5 KHz, pulse duration: 1 ms, duty cycle: 50%.

[3] Pulse mode: repetition rate: 0.5 KHz, pulse duration: 20 µs, duty cycle: 1%.

[4] No dew condensation.

Optical and electrical parameters (at ambient temperature Ta = +25°C, unless otherwise stated)

Model	Peak emission wavelength, λ_p, µm	FWHM of the emission band, nm	Optical power	Forward voltage (0.14 A), V, V
			average (0.1 A, qCW[2]), P_{qCW}, mW	
	min - max	typical	min	min - max
Lms14LED	1.40-1.49	70-100	≥ 7	0.6-1.8
Lms14LED-R				
Lms14LED-RW				
Lms14LED-TEM			≥ 5	
Lms14LED-TEM-R				
Lms14LED-CS3020				

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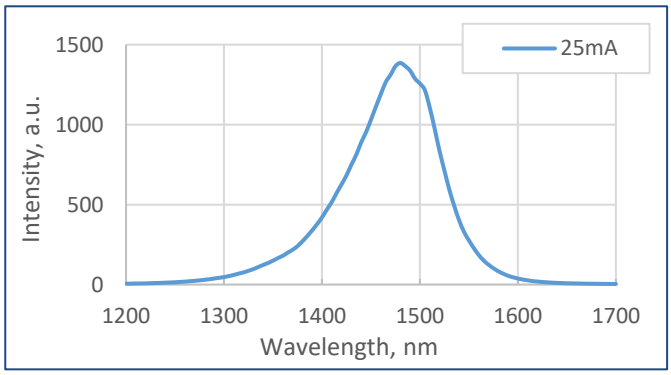
Typical thermocooler and thermistor parameters (for "TEM", "TEM-R" models)[5]

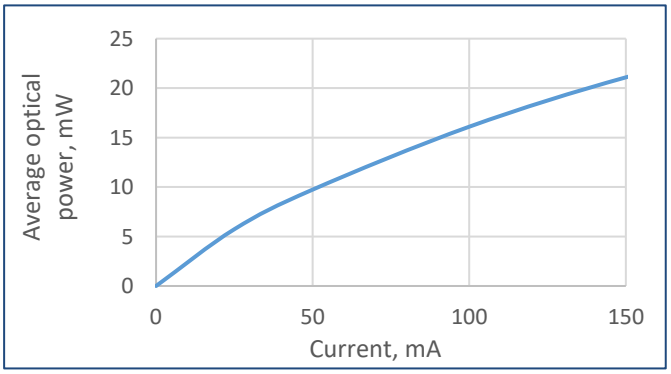
Parameter	Value	Comments
Thermocooler (Peltier element)		
Maximum current, I_{max}, A	1.5 ± 0.08	at ΔT_{max}
Maximum voltage drop, U_{max}, V	0.85 ± 0.05	
Maximum temperature difference a I=I_{max}, ΔT_{max}, K	70 ± 2	at Q_{max}=0, at other Q: $T=\Delta T_{max}(1-Q/Q_{max})$
Maximum heat pumping capacity at I=I_{max}, Q_{max}, W	0.72 ± 0.04	at ΔT=0, at other ΔT: $Q=Q_{max}(1-\Delta T/\Delta T_{max})$
Thermistor		
NTC thermistor type	TC103	
Resistance nominal, R, kOhm	10.0 ± 0.5	at T=25°C
β-constant, K^{-1}	3380± 35 (or 3435 ± 85, or 4250 ± 85)	

[5] For actual parameters please refer to the technical data provided with the exact ordered LEDs.

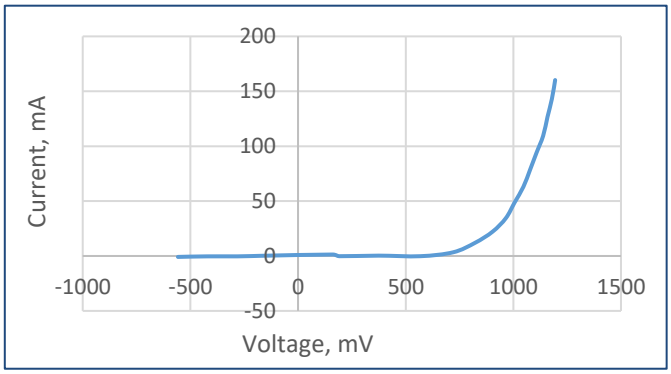
Typical LED spectra (qCW[2])



Typical optical power - current characteristic (qCW[2])



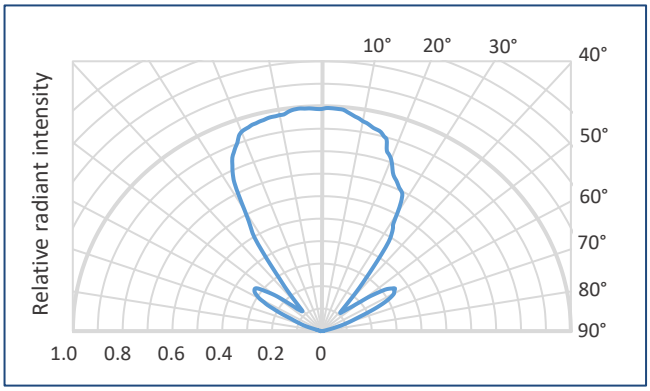
Typical current-voltage characteristic (qCW[2])



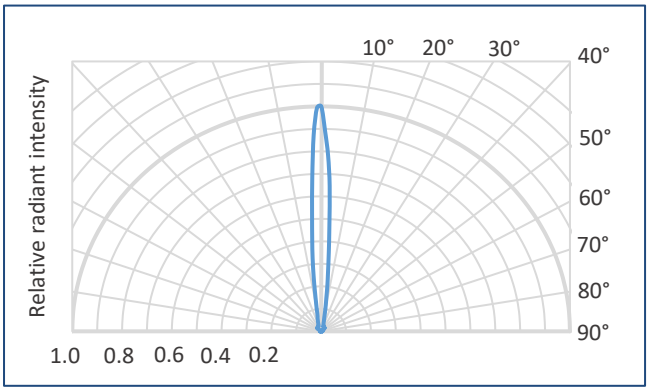
[2] qCW mode: repetition rate: 0.5 KHz, pulse duration: 1 ms, duty cycle: 50%.

Typical radiation patterns of different LED models

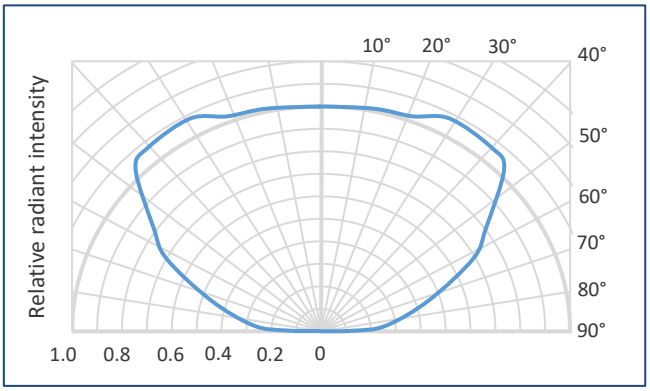
Lms14LED
TO-18 with a cap with a glass window



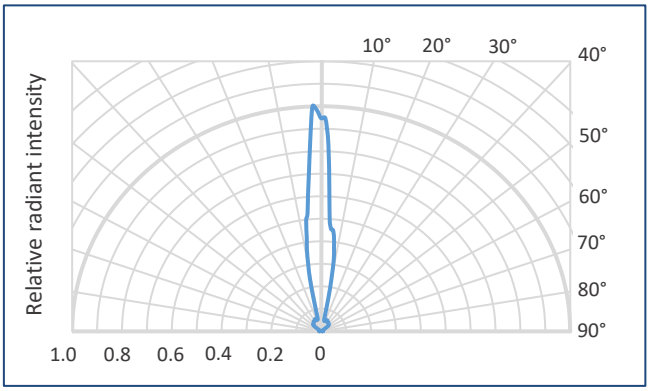
Lms14LED-R/ Lms14LED-RW
TO-18 with a reflector without/ with a glass window



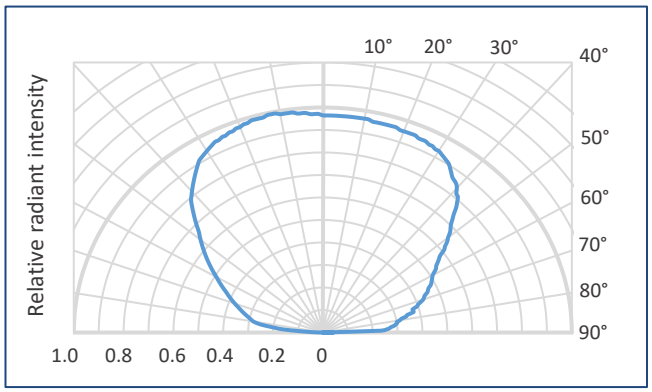
Lms14LED-TEM
TO-5 with a built-in thermocooler and thermistor, with a cap with a glass window



Lms14LED-TEM-R
TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window

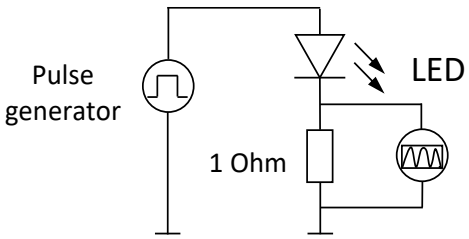


Lms14LED-CS3020
SMD 3x2 mm (without encapsulation/ glass window)

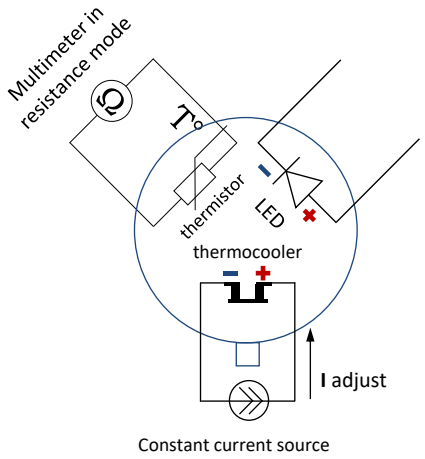


LED connecting and driving

LED basic circuit connection

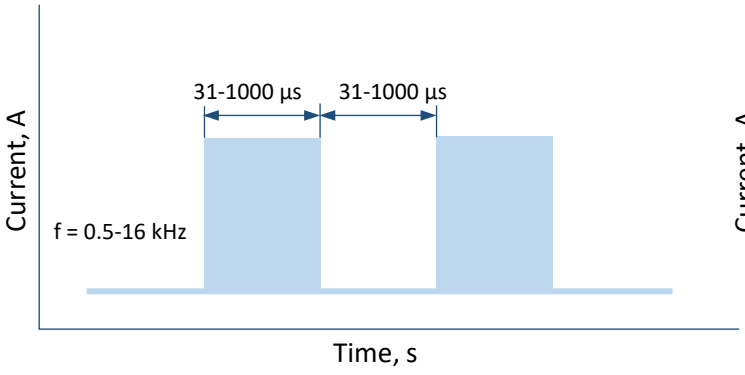


LED with thermoelectric module basic circuit connection

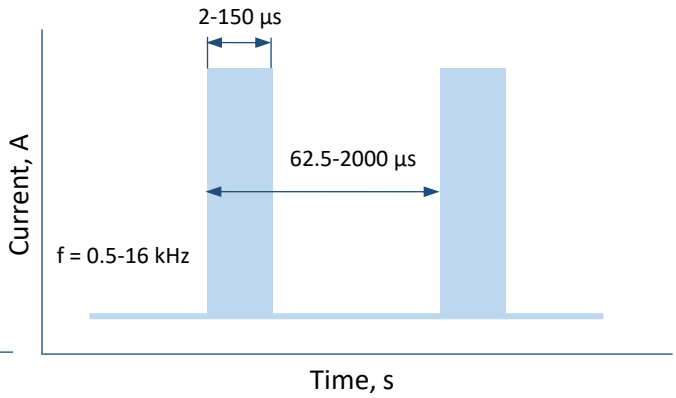


We recommend using **Quasi Continuous Wave (qCW) mode** with a duty cycle 50% or 25% to obtain maximum average optical power and short **Pulse modes** to obtain maximum peak power.

Quasi Continuous Wave (qCW) mode



Pulse mode



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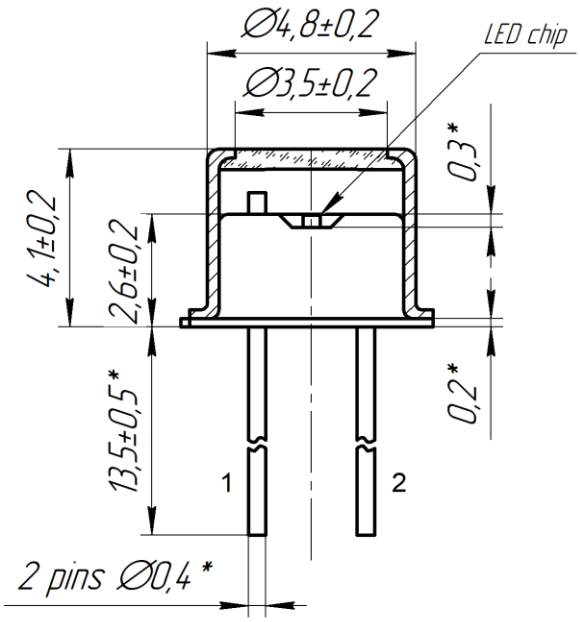
Technical Drawings

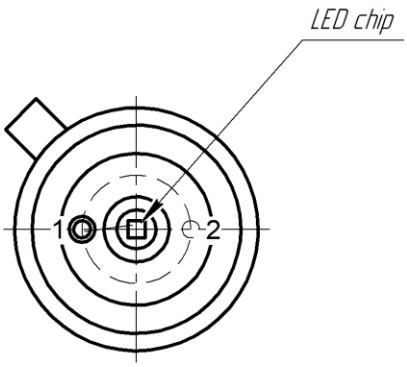
Lms14LED



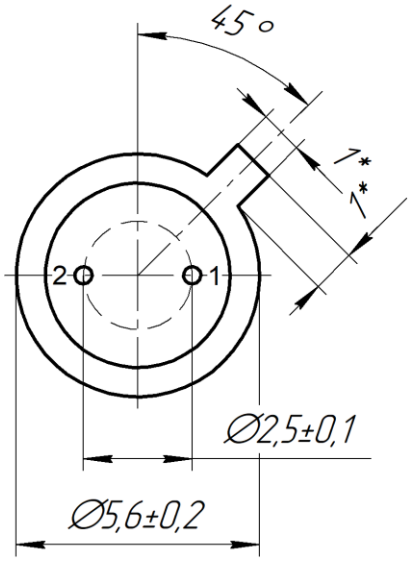
LED pinout:
1 – electrically isolated from the case – anode [1]

2 – electrically connected to the case – cathode [1]

Top view



Bottom view



[1] For LED polarity (anode and cathode) please refer to the technical data provided with the exact ordered LEDs. LED anode is marked with a RED dot.

*Reference dimensions.
All dimensions are pointed in mm.

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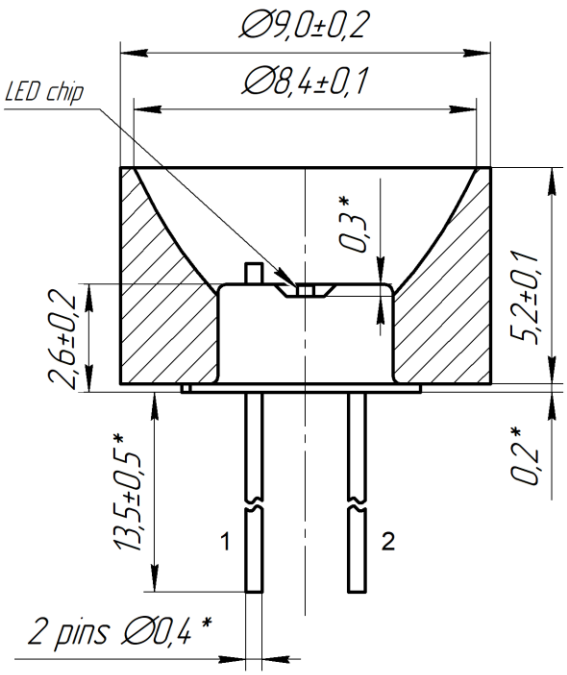
Technical Drawings

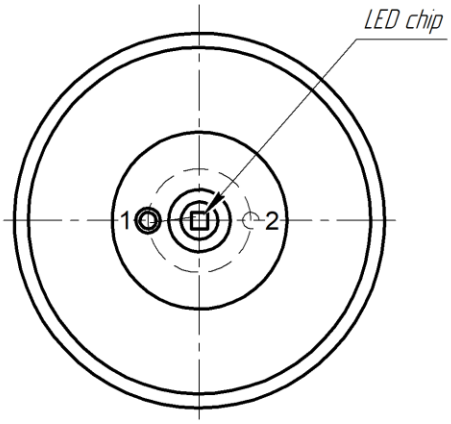
Lms14LED-R



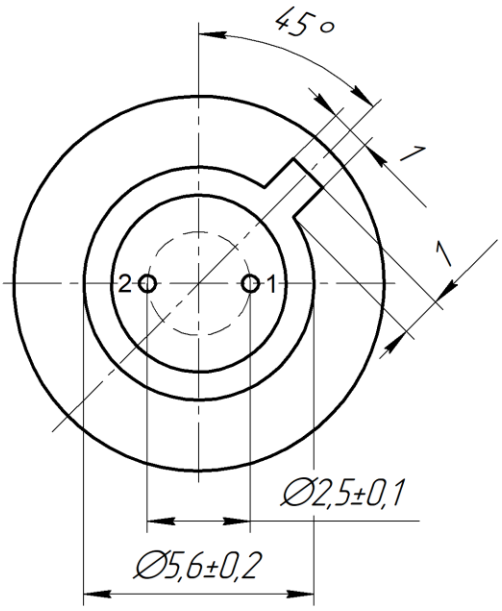
LED pinout:
1 – electrically isolated from the case – anode [1]

2 – electrically connected to the case – cathode [1]

Top view



Bottom view



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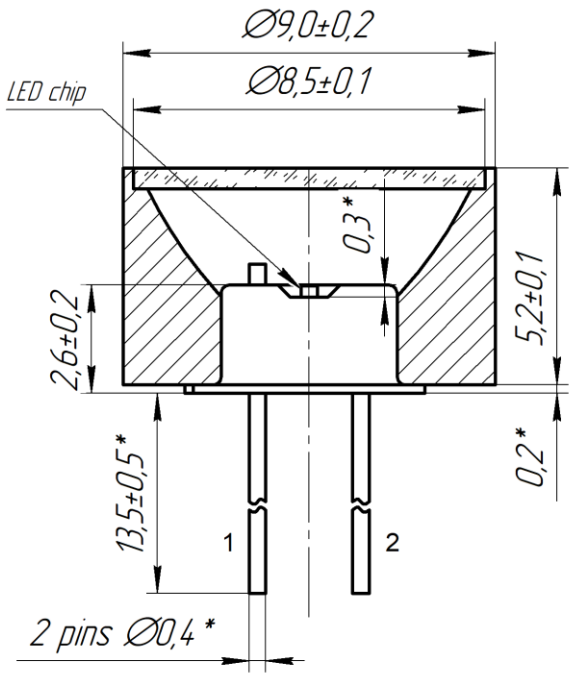
Technical Drawings

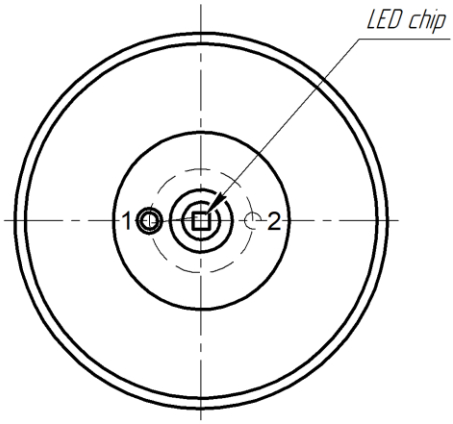
Lms14LED-RW



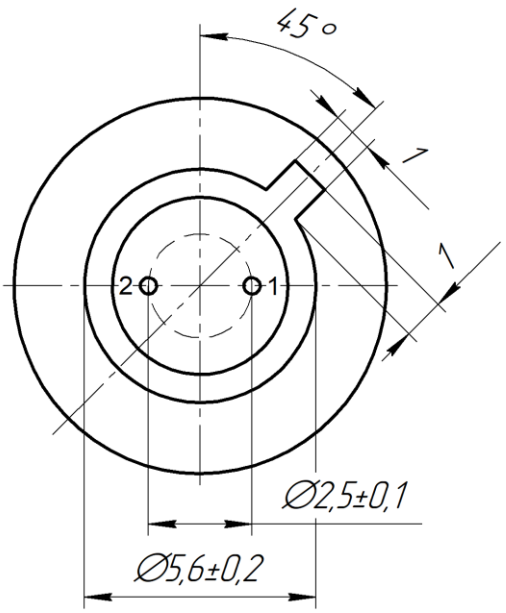
LED pinout:
1 – electrically isolated from the case – anode [1]

2 – electrically connected to the case – cathode [1]

Top view



Bottom view

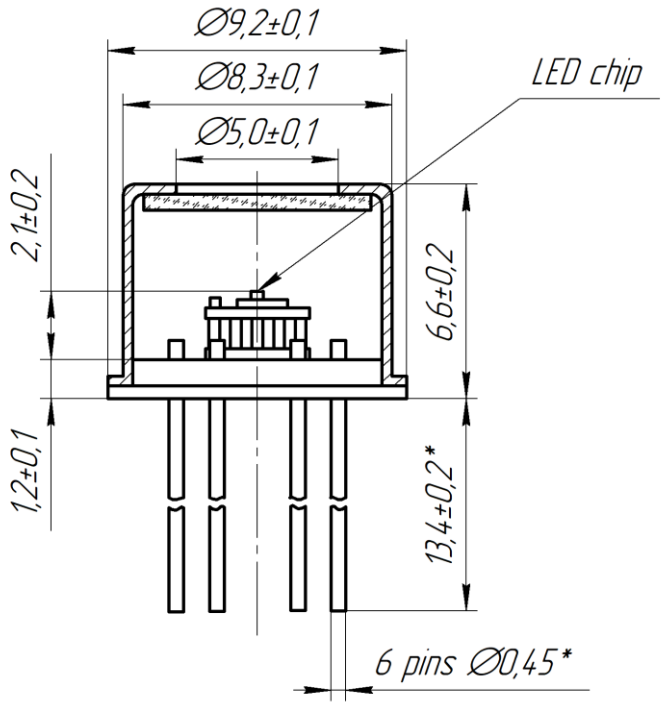


[1] *For LED polarity (anode and cathode) please refer to the technical data provided with the exact ordered LEDs. LED anode is marked with a RED dot.*

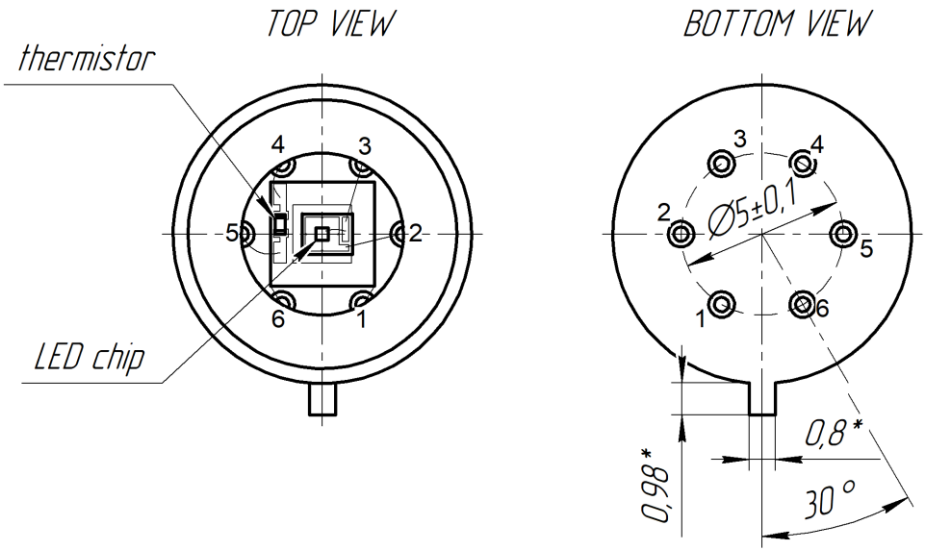
**Reference dimensions.*
All dimensions are pointed in mm.

Technical Drawings

Lms14LED-TEM



LED pinout:
1 – thermocooler +
2 – LED anode
3 – LED cathode
4 – thermistor
5 – thermistor
6 – thermocooler –
(all pins are electrically isolated from the case)



LED anode is marked with a RED dot, cathode – with a BLUE dot.

*Reference dimensions.
All dimensions are pointed in mm.

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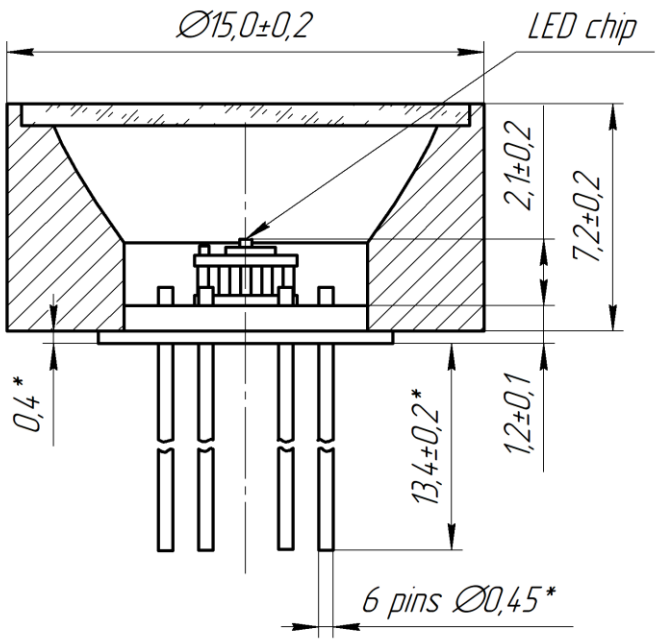
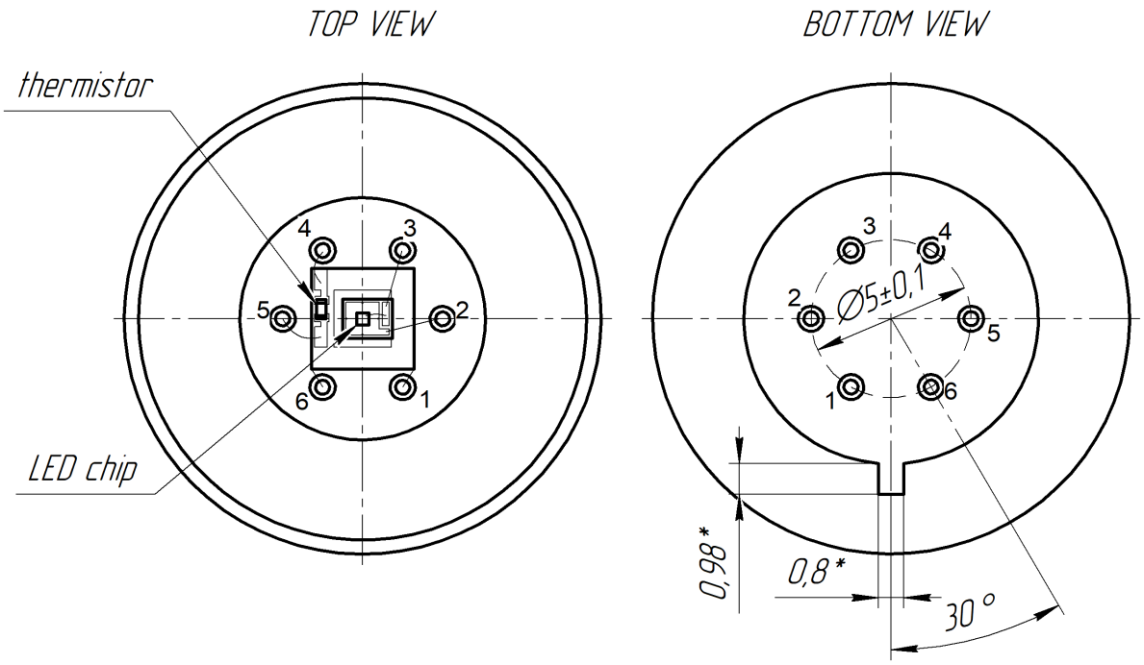
Technical Drawings

Lms14LED-TEM-R



LED pinout:
1 – thermocooler +
2 – LED anode
3 – LED cathode
4 – thermistor
5 – thermistor
6 – thermocooler –
(all pins are electrically isolated from the case)



LED anode is marked with a RED dot, cathode – with a BLUE dot.

*Reference dimensions.
All dimensions are pointed in mm.

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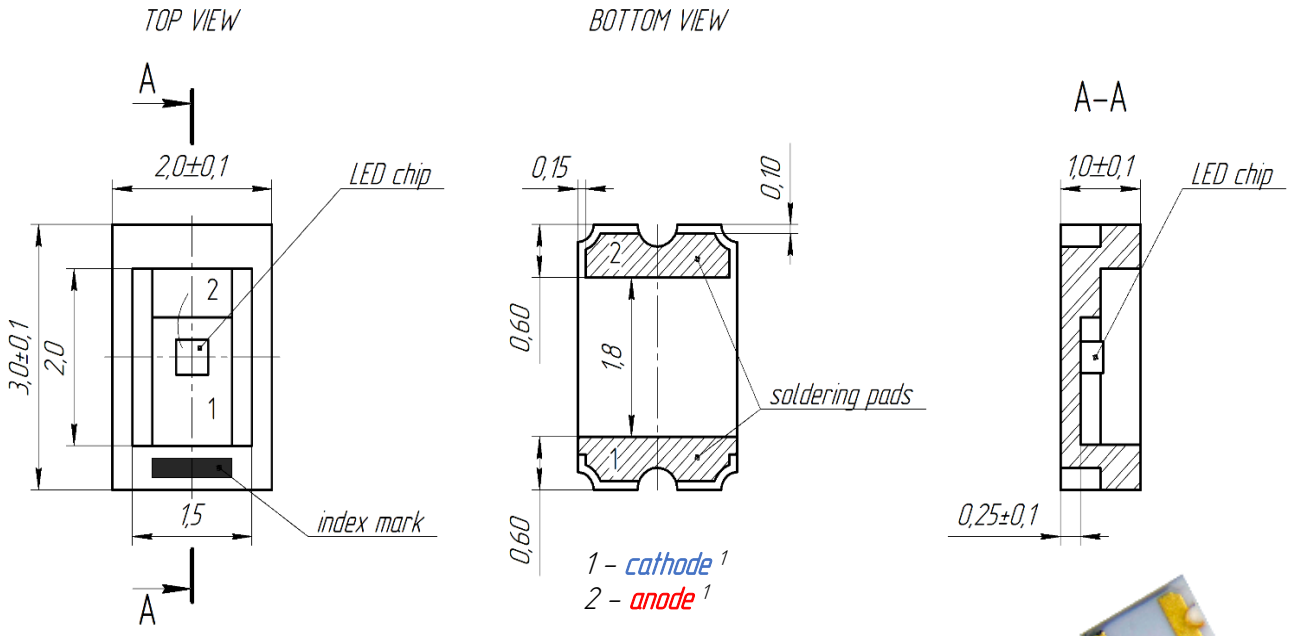
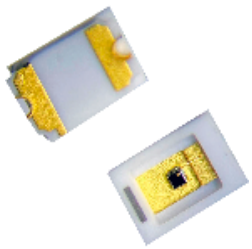
Technical Drawings

Lms14LED-CS3020



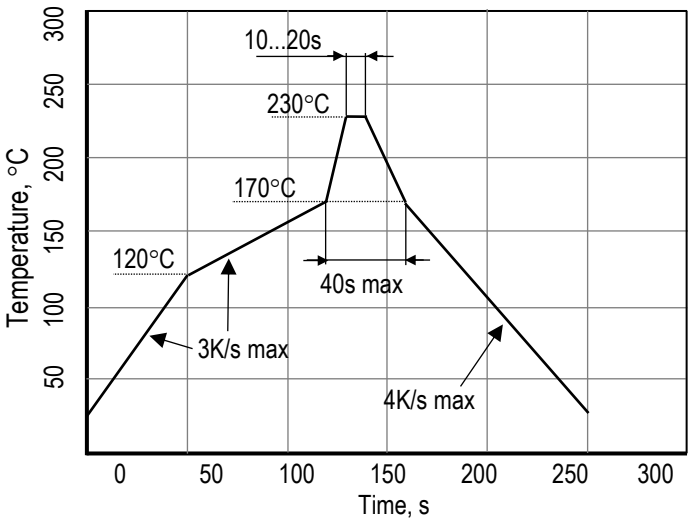


[1] For LED polarity (anode and cathode) please refer to the technical data provided with the exact ordered LEDs.

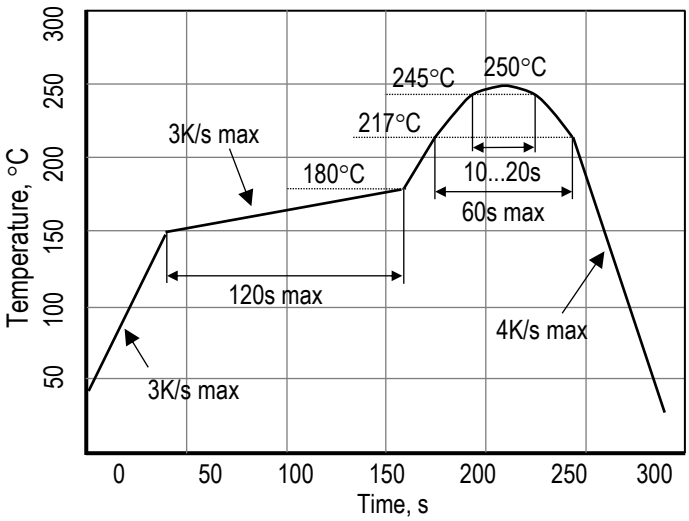
Package – Al_2O_3 ceramics, WITHOUT encapsulation; soldering pads – gold plated.
All dimensions are pointed in mm.

Recommended IR reflow soldering profiles for Lms14LED-CS3020

for lead containing soldering



for lead free soldering



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IMPORTANT CAUTIONS & NOTES

- Please mind the LED polarity (pointed in the technical data provided with the ordered LEDs). For TO-packaged LEDs anode is marked with a red dot.
- Please check your connection circuit before turning on the LED.
- Please control the CURRENT applied to the LED in order NOT to EXCEED the maximum allowable values pointed in the technical data provided with the LED.

Please do NOT connect the LED to the multimeter.

- REVERSE voltage applying is FORBIDDEN.
- For "TEM"/ "TEM-R" LED models please control the current and voltage applied to the thermocooler in order NOT to EXCEED the maximum allowable values pointed in the technical data provided with the LED.
- For "TEM"/ "TEM-R" LED models with thermocooler please provide effective heat dissipation from the package. LEDs are mounted on the cold side of thermocooler (Peltier element), hot side is mounted on TO-5 header, it is important to provide good conditions for dissipating heat from the hot side to avoid overheating of thermocooler and the LED, otherwise, they may be damaged.
- Violating LED package integrity is forbidden.
- Handle LED with care, avoid mechanical damaging that may occur due to physical impact (for example, because of the falling down). For LED models without glass window/ glass covering be carefull in order not to damage the wire contact and crystal.

- The typical data and estimations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and estimations.
- LED parameters may vary depending on the usage case, operation conditions, etc. Validation of the parameters, long-term stability of the product must be performed by the user for the exact application.

WARRANTY CONDITIONS

Warranty period: ONE year after delivery. The Warranty is limited to LED repair or replacement for defects found and reported within one year period.

Non-warranty cases: we shall assume no warranty for damages caused by unsuitable or improper use, non-observance of the cautions or by defective or negligent handling. LEDs that reveal any hints of mishandling cannot be replaced, even if this was not the initial reason for returning.

Related products:

- **Photodiodes** - detectors of infrared radiation spectrally matched with the LEDs.
- **Electronics** for LED power supply in pulse modes.

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