Middle-Infrared Light-Emitting Diode

Lms44LED series

4.15-4.40 µm

Preliminary data

Heterostructure LED matched to InAs substrate.

Features	Applications
• Low power consumption; • High response time; • Long lifetime; • Available in various packages; • RoHS compliant	Optical sensors and analysers

Standard models

Model	Package[1]
Lms44LED-R	TO-18 with a reflector WITHOUT a glass window
Lms44LED-RW	TO-18 with a reflector with a glass window
Lms44LED-CG	TO-18 with chalcogenide glass covering
Lms44LED-TEM-R	TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window
Lms44LED-CG-TEM-R	TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window, LED chip with chalcogenide glass covering

[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}		
Lms44LED-R	0.25 A	2 A	-60..+90 °C	+260 °C
Lms44LED-RW			+5..+90 °C	
Lms44LED-CG	0.2 A	1 A	0..+50 °C	
Lms44LED-TEM-R	0.25 A	2 A	+5..+90 °C	
Lms44LED-CG-TEM-R	0.2 A	1 A	+5..+50 °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	Average optical power (0.2 A, qCW[2]), P_{qCW}, µW	Forward voltage (0.2 A), V, V
	min - max	min - max	min	min - max
Lms44LED-R	4.15-4.40	800-1200	≥ 12	0.2-0.8
Lms44LED-RW				
Lms44LED-CG			≥ 75	
Lms44LED-TEM-R			≥ 8	
Lms44LED-CG-TEM-R			≥ 25	

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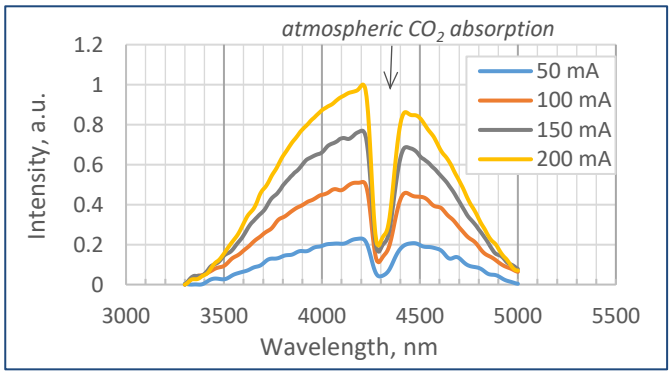
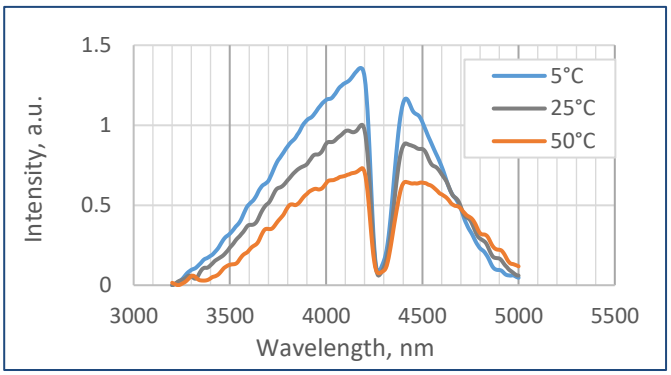
Typical thermocooler and thermistor parameters (for "TEM", "TEM-R" models)[5]

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)	

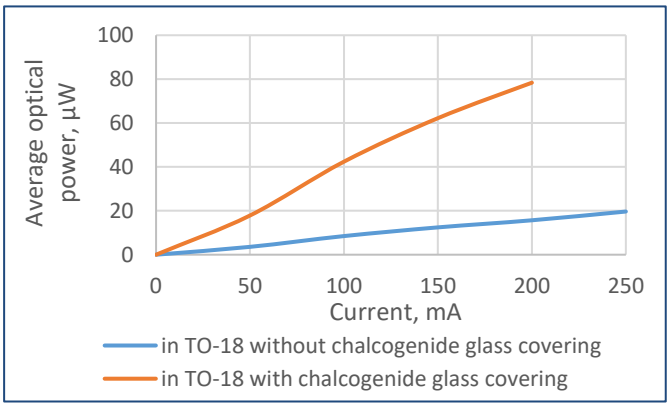
[5] For actual parameters please refer to the technical data provided with the exact ordered LEDs.

Typical LED spectra (qCW[2])

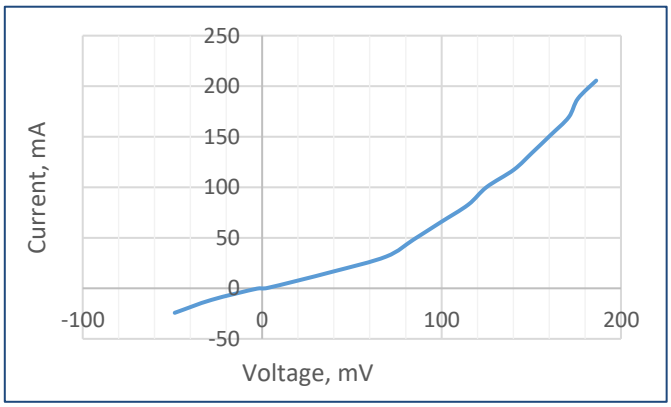




Typical optical power - current characteristic (qCW[2])



Typical current-voltage characteristic (qCW[2])



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

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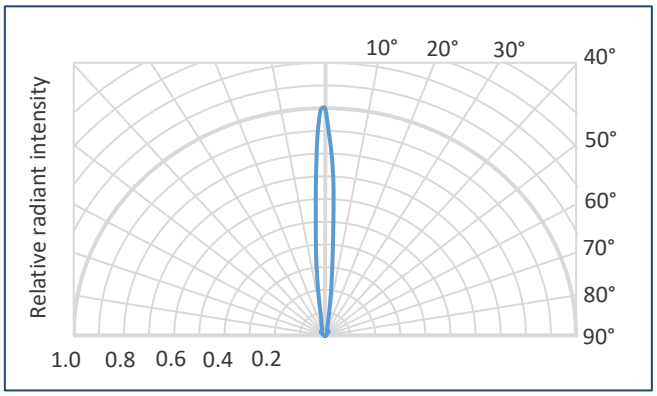
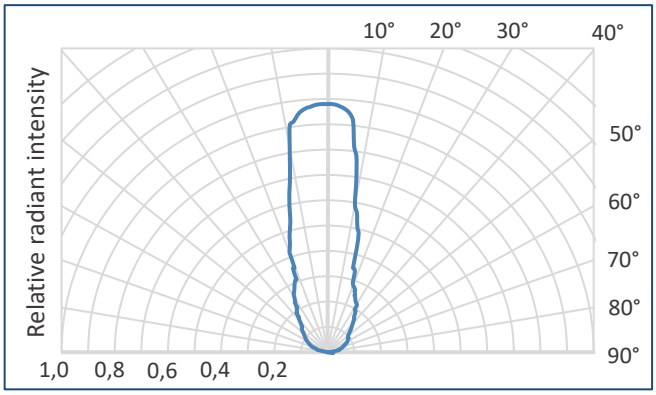
Typical radiation patterns of different LED models

Lms44LED-R/ Lms44LED-RW
TO-18 with a reflector without/ with a glass window

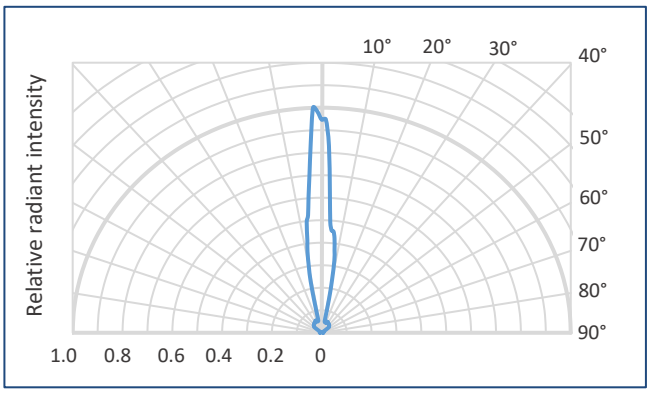


Lms44LED-CG
TO-18 with chalcogenide glass covering



Lms44LED-TEM-R/ Lms44LED-CG-TEM-R

TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window (LED chip without/ with chalcogenide glass covering



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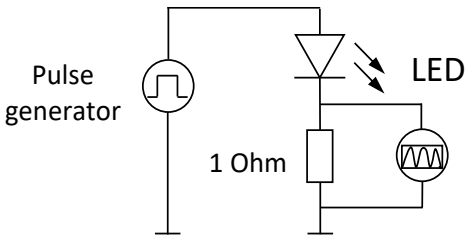
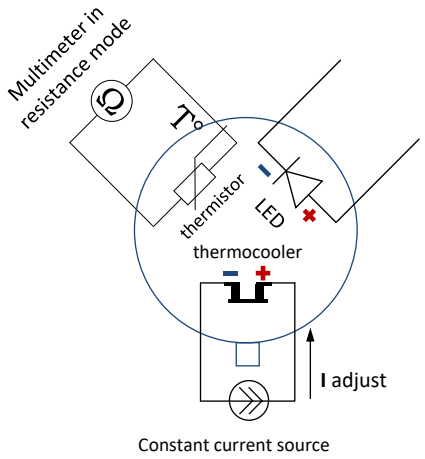
LED connecting and driving

LED basic circuit connection

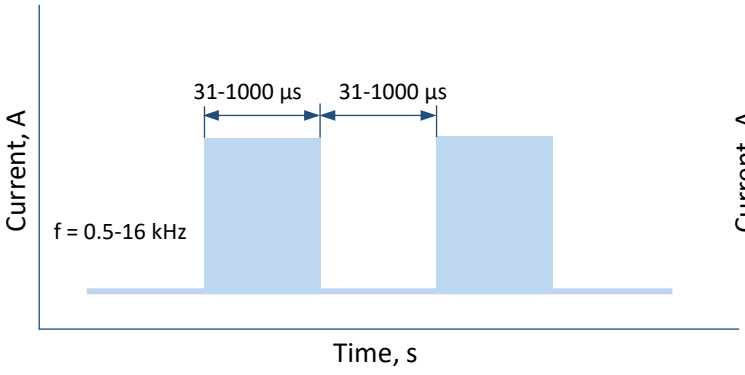


LED with thermoelectric module basic circuit connection

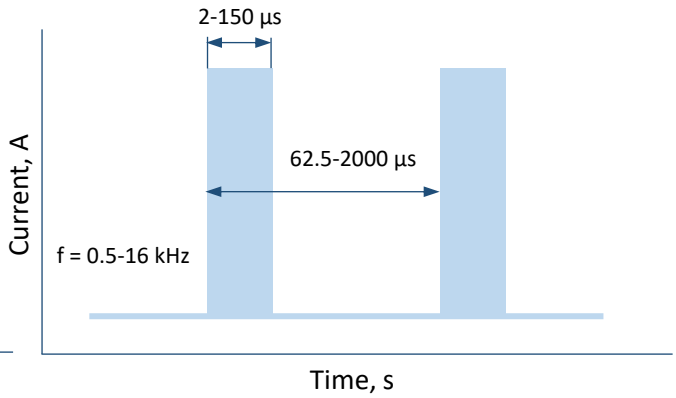


We recommend using **Quasi Continuous Wave (qCW) mode** with a duty cycle 50% or 25% to obtain maximum average optical power and short **Pulse modes** to obtain maximum peak power. Hard CW (continius wave) mode is NOT recommended.

Quasi Continuous Wave (qCW) mode



Pulse mode



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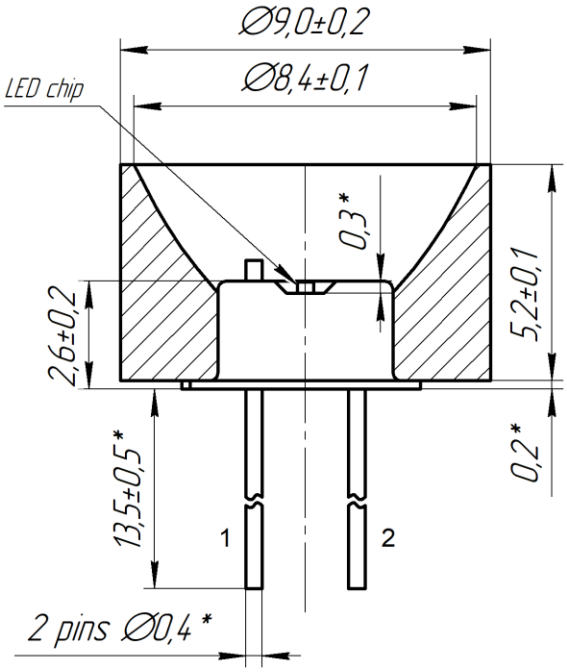
Technical Drawings

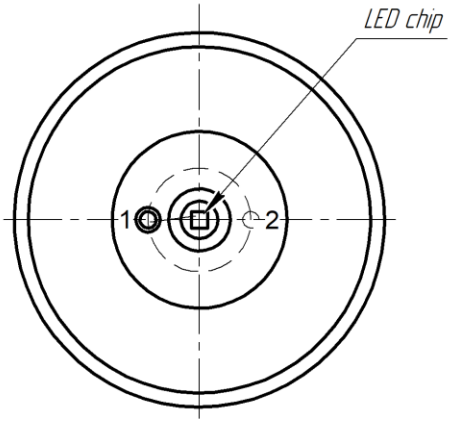
Lms44LED-R



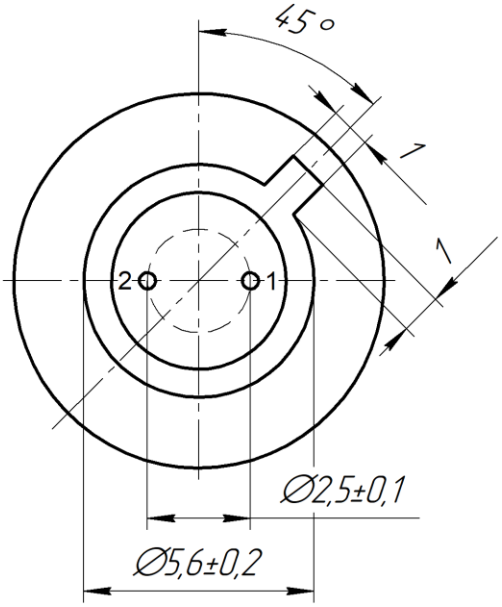
LED pinout:
1 – electrically isolated from the case – cathode [1]

2 – electrically connected to the case – anode [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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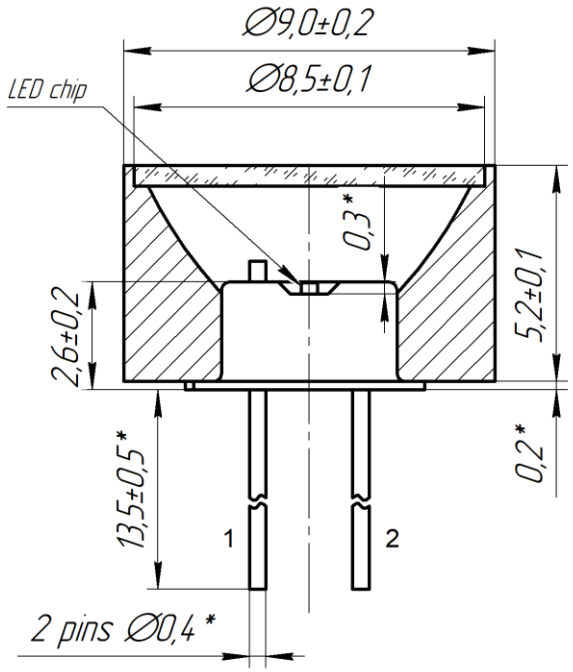
Technical Drawings

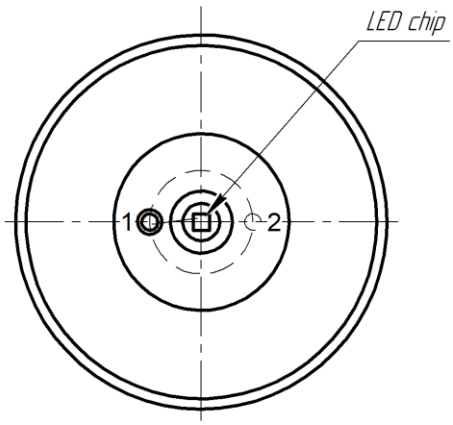
Lms44LED-RW



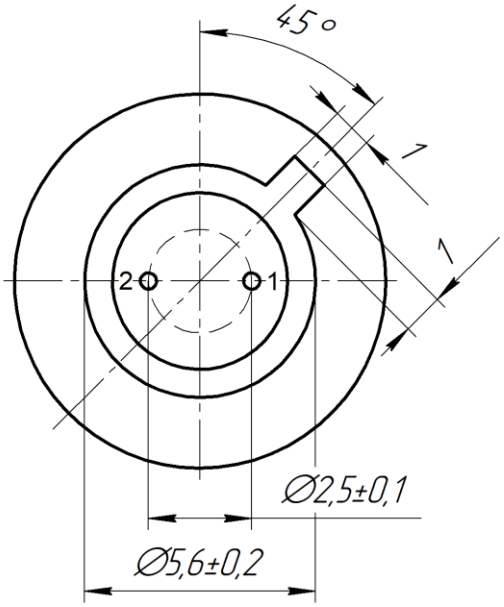
LED pinout:
1 – electrically isolated from the case – cathode [1]

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

Top view



Bottom view



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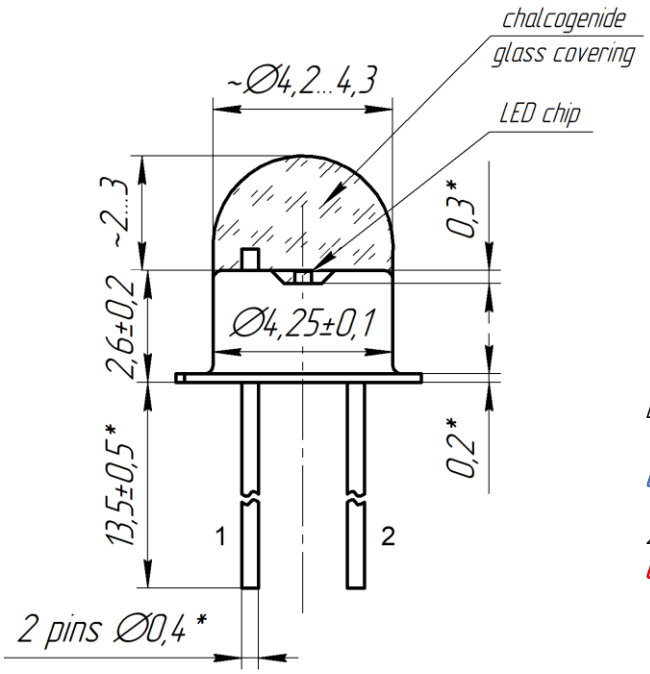
Technical Drawings

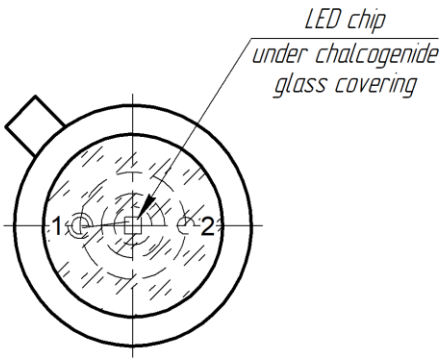
Lms44LED-CG



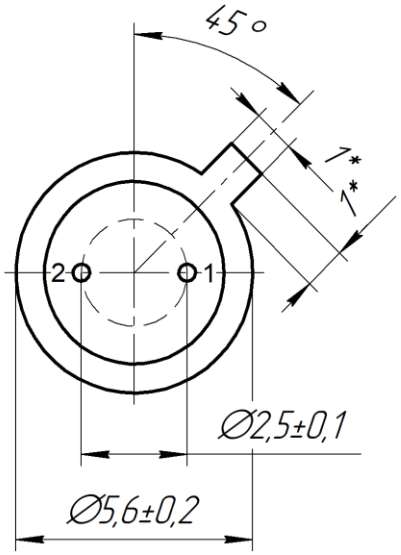
LED pinout:
1 – electrically isolated from the case – cathode [1]

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

Top view



Bottom view



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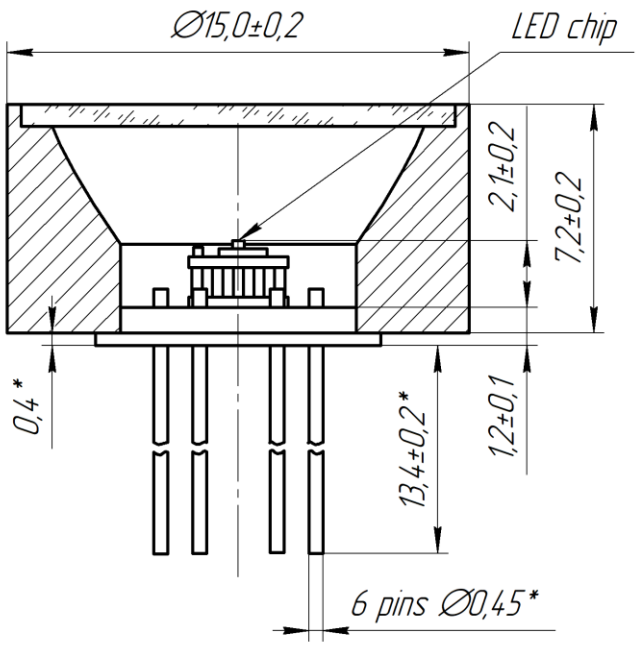
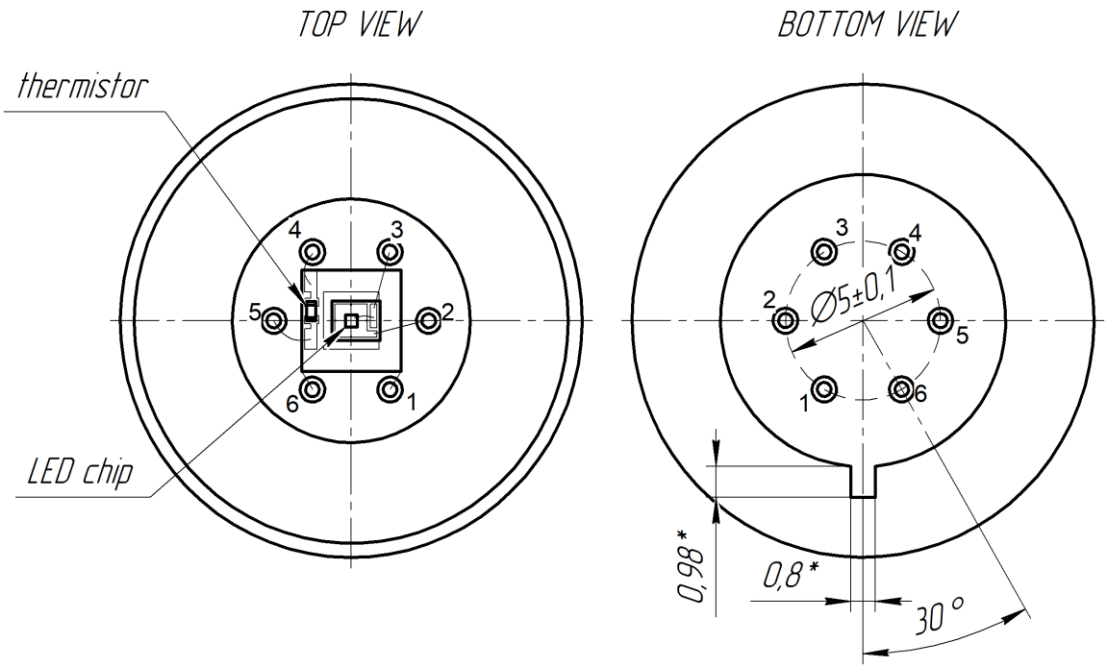
Technical Drawings

Lms44LED-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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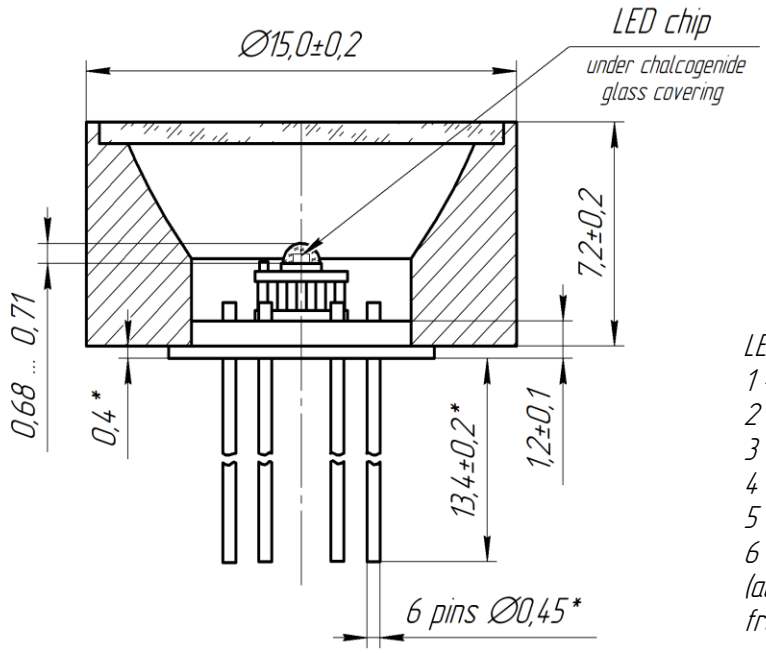
Technical Drawings

Lms44LED-CG-TEM-R



LED pinout:
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2 – LED anode
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5 – thermistor
6 – thermocooler –
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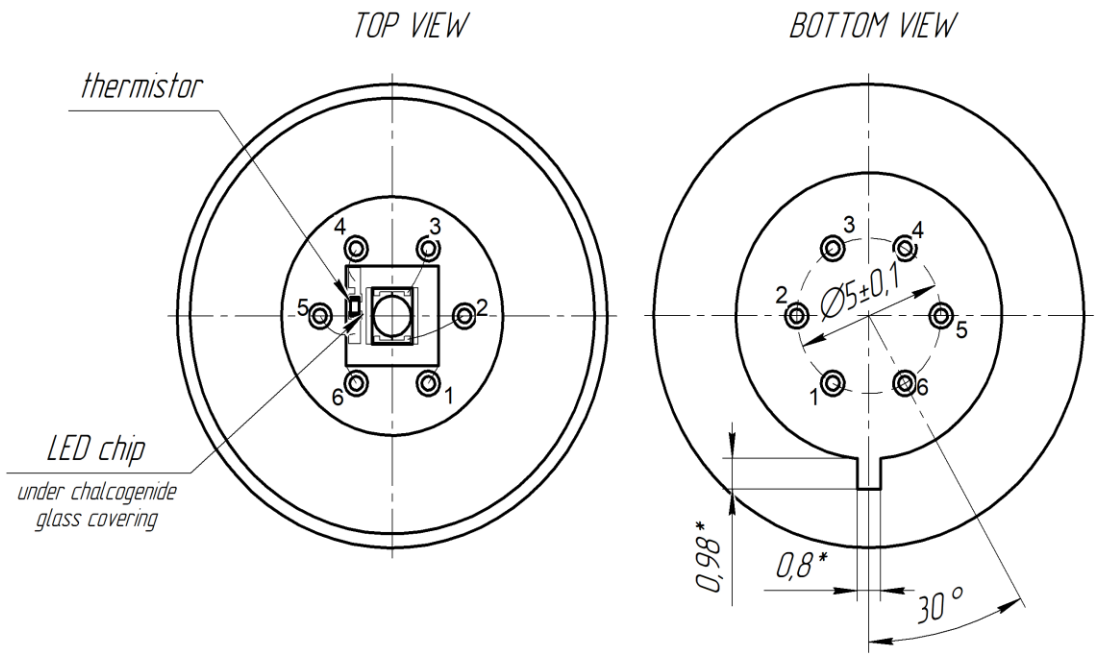

LED anode is marked with a RED dot, cathode – with a BLUE dot.

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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 "CG" models with chalcogenide glass covering please do not touch the glass and do not apply any force to it.
- 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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