

Heterostructure LED matched to InAs substrate.

Features	Applications
<ul style="list-style-type: none"> • Low power consumption; • High response time; • Long lifetime; • Available in various packages; • RoHS compliant 	Optical sensors and analysers



Standard models

Model	Package ¹
Lms28LED	TO-18 with a cap WITHOUT a glass window
Lms28LED-R	TO-18 with a reflector WITHOUT a glass window
Lms28LED-RW	TO-18 with a reflector with a glass window
Lms28LED-CG	TO-18 with chalcogenide glass covering
Lms28LED-TEM	TO-5 with a built-in thermocooler and thermistor, with a cap with a glass window
Lms28LED-TEM-R	TO-5 with a built-in thermocooler and thermistor, with a reflector with a glass window
Lms28LED-CS3020	SMD 3x2 mm (without encapsulation/ glass window)

¹ Package hermeticity is not tested and is not guaranteed.

Absolute maximum ratings (at ambient temperature $T_a = +25^\circ\text{C}$, unless otherwise stated)

Model	Maximum operating current		Operating/ storage temperature ⁴ , T_{op}/T_{stg}	Soldering temperature ($t = 3\text{ s}, \geq 3\text{ mm}$ from the case), T_{sol}
	qCW mode ² , I_{qCW}	pulse mode ³ , I_{pul}		
Lms28LED	0.25 A	2 A	-60..+90 $^\circ\text{C}$	+260 $^\circ\text{C}$
Lms28LED-R			+5..+90 $^\circ\text{C}$	
Lms28LED-RW			0..+50 $^\circ\text{C}$	
Lms28LED-CG	0.2 A	1 A	+5..+90 $^\circ\text{C}$	
Lms28LED-TEM	0.25 A	2 A	-60..+90 $^\circ\text{C}$	-
Lms28LED-TEM-R				
Lms28LED-CS3020				

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 $T_a = +25^\circ\text{C}$, unless otherwise stated)

Model	Peak emission wavelength, λ_p , μm	FWHM of the emission band, nm	Optical power		Forward voltage (0.2 A), V, V	
			average (0.2 A, qCW ²), P_{qCW} , μW	peak (1 A, имп.^3), P_{pul} , μW		
	min - max	min - max	min	min	min - max	
Lms28LED	2.83-2.90	300-500	≥ 20	≥ 150	0.2-1.0	
Lms28LED-R						
Lms28LED-RW						
Lms28LED-CG			≥ 100	≥ 700		
Lms28LED-TEM			≥ 14	≥ 105		
Lms28LED-TEM-R						
Lms28LED-CS3020						

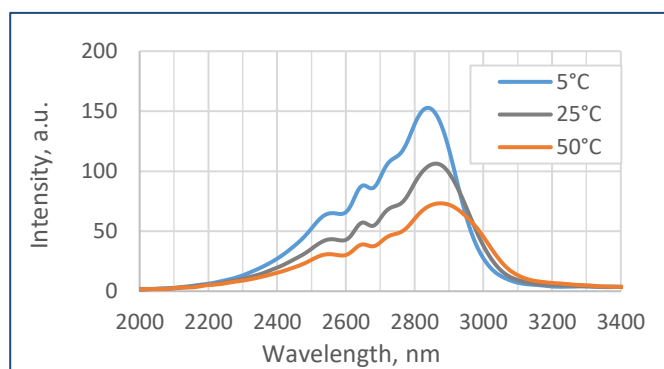
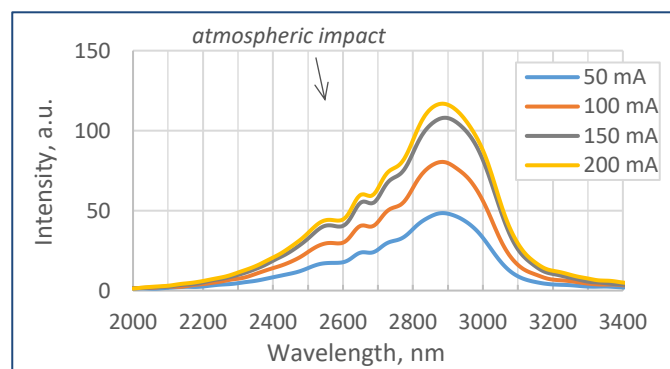
Lms28LED series

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

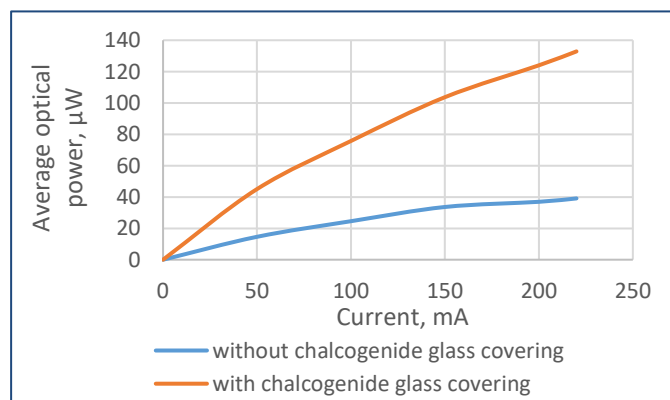
Parameter	Value	Comments
Thermocooler (Peltier element)		
Maximum current, I_{max} , A	1.5 ± 0.08	at ΔT_{max}
Maximum voltage drop, U_{max} , V	0.85 ± 0.05	
Maximum temperature difference at $I=I_{\text{max}}$, ΔT_{max} , K	70 ± 2	at $Q_{\text{max}}=0$, at other Q: $T=\Delta T_{\text{max}}(1-Q/Q_{\text{max}})$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

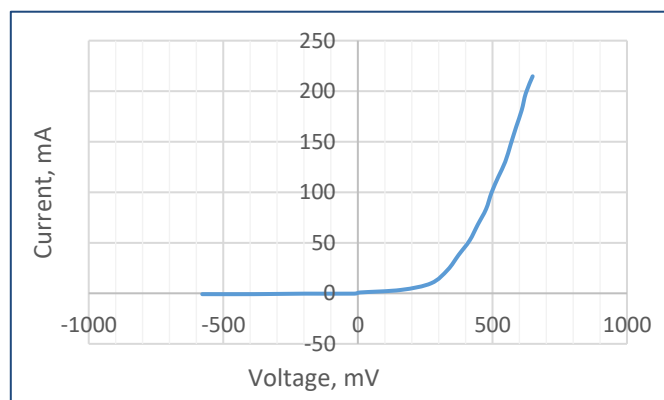
Typical LED spectra (qCW^2)



Typical optical power - current characteristic (qCW^2)



Typical current-voltage characteristic (qCW^2)



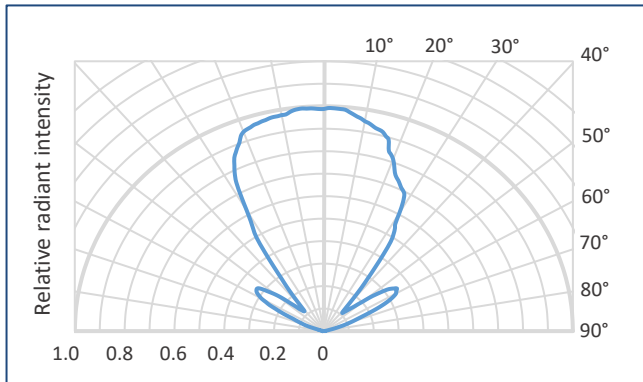
² qCW mode: repetition rate: 0.5 KHz, pulse duration: 1 ms, duty cycle: 50%.

Lms28LED series

Typical radiation patterns of different LED models

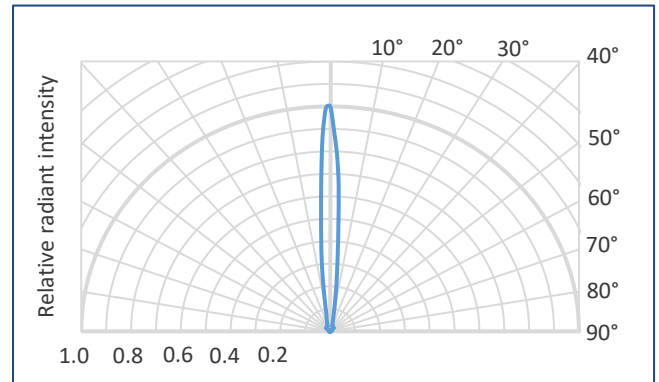
Lms28LED

TO-18 with a cap WITHOUT a glass window



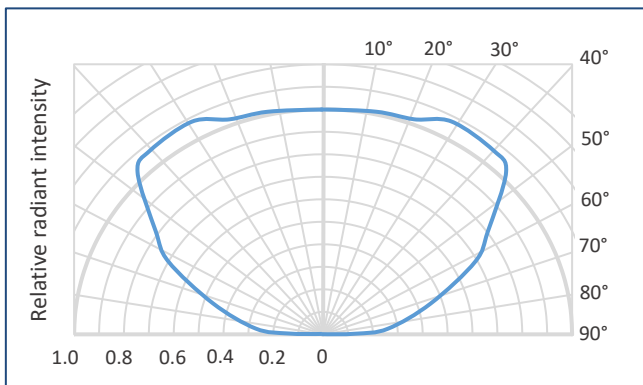
Lms28LED-R/ Lms28LED-RW

TO-18 with a reflector without/ with a glass window



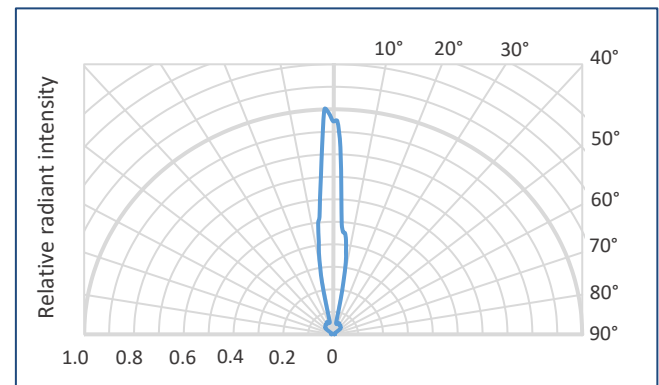
Lms28LED-TEM

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



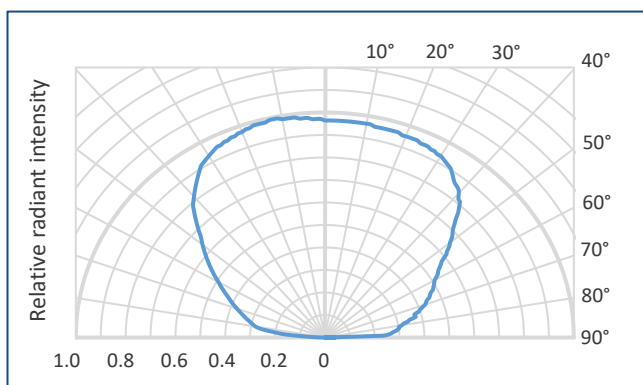
Lms28LED-TEM-R

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



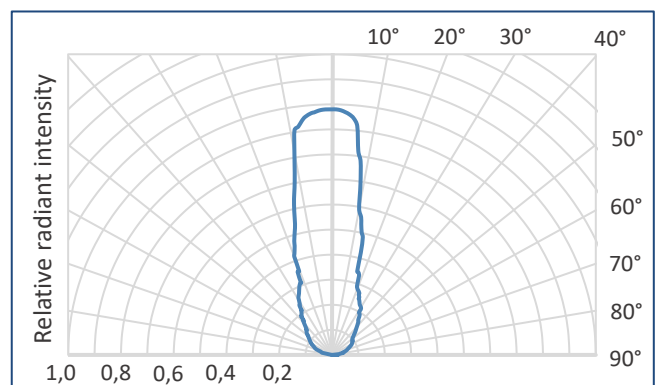
Lms28LED-CS3020

SMD 3x2 mm (without encapsulation/ glass window)

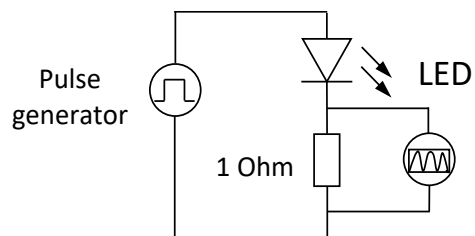


Lms28LED-CG

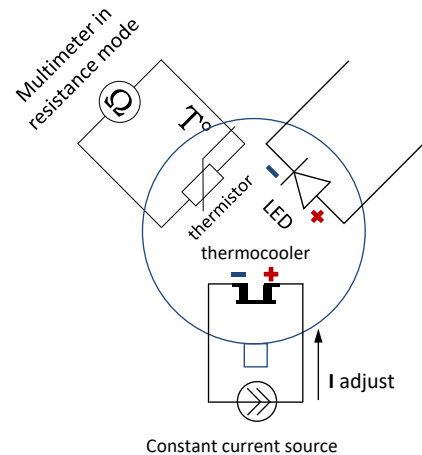
TO-18 with a reflector WITHOUT a glass window



LED basic circuit connection

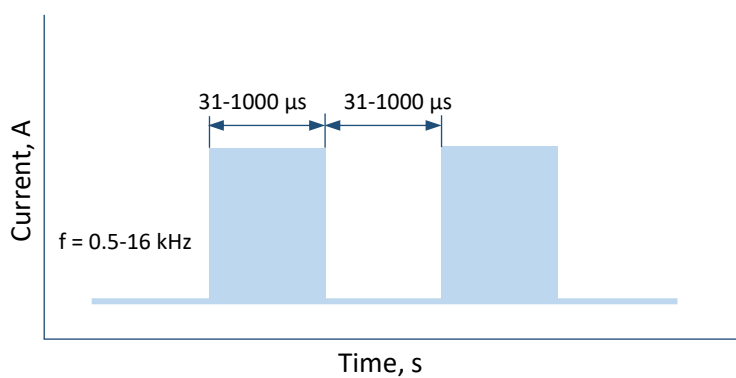


LED with thermoelectric module basic circuit connection

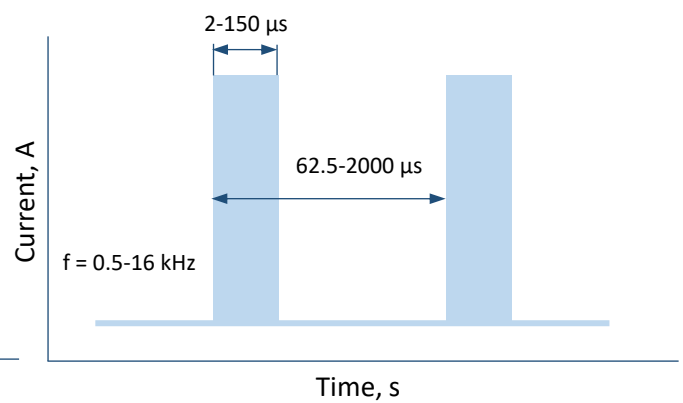


We recommend using **Quasi Continuous Wave (qCW) mode** with a duty cycle 50% or 25% to obtain maximum average optical power and short **Pulse modes** to obtain maximum peak power. Hard CW (continuous wave) mode is NOT recommended.

Quasi Continuous Wave (qCW) mode

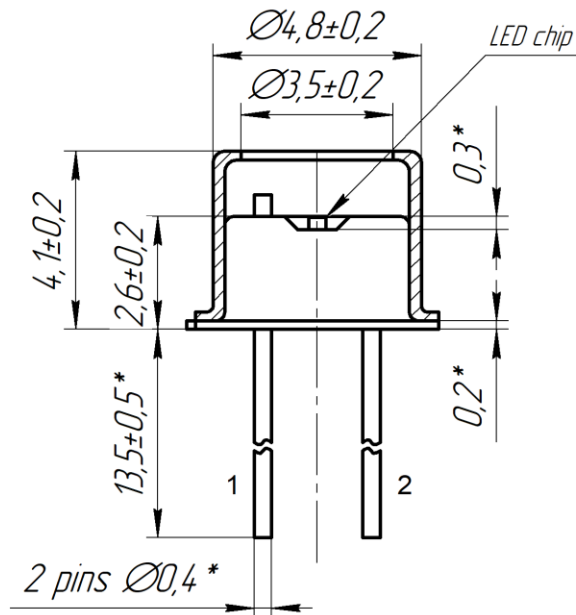


Pulse mode



Technical Drawings

Lms28LED



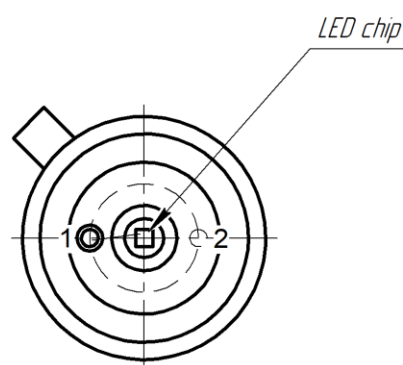
Top view



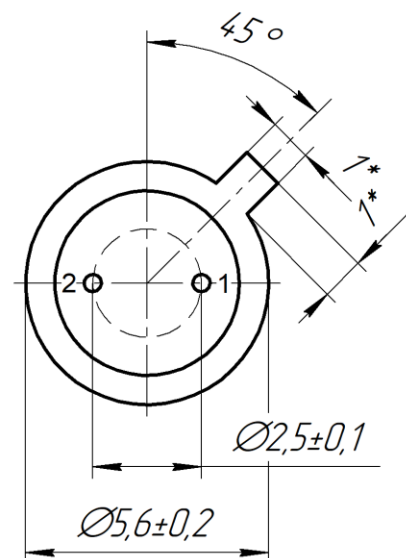
LED pinout:

1 - electrically isolated from the case -
*cathode*¹

2 - electrically connected to the case -
*anode*¹



Bottom view

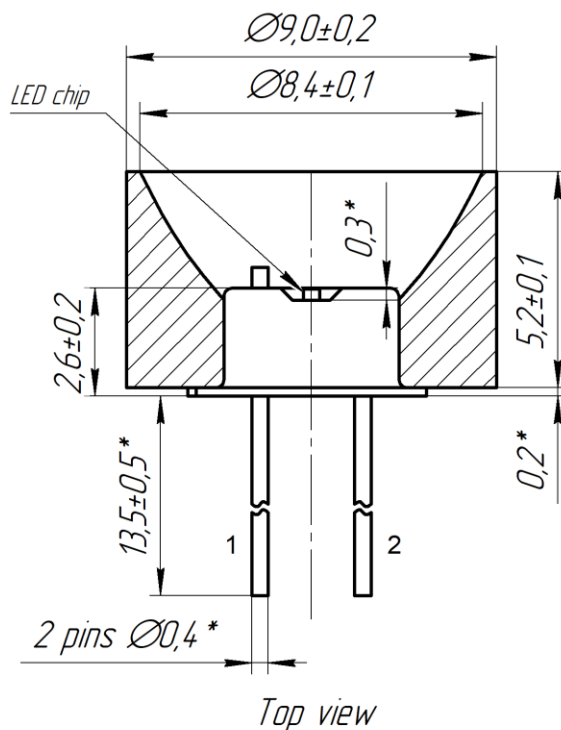


¹ For LED polarity (*anode* and *cathode*) please refer to the technical data provided with the exact ordered LEDs.
LED *anode* is marked with a *RED* dot.

*Reference dimensions.
All dimensions are pointed in mm.

Technical Drawings

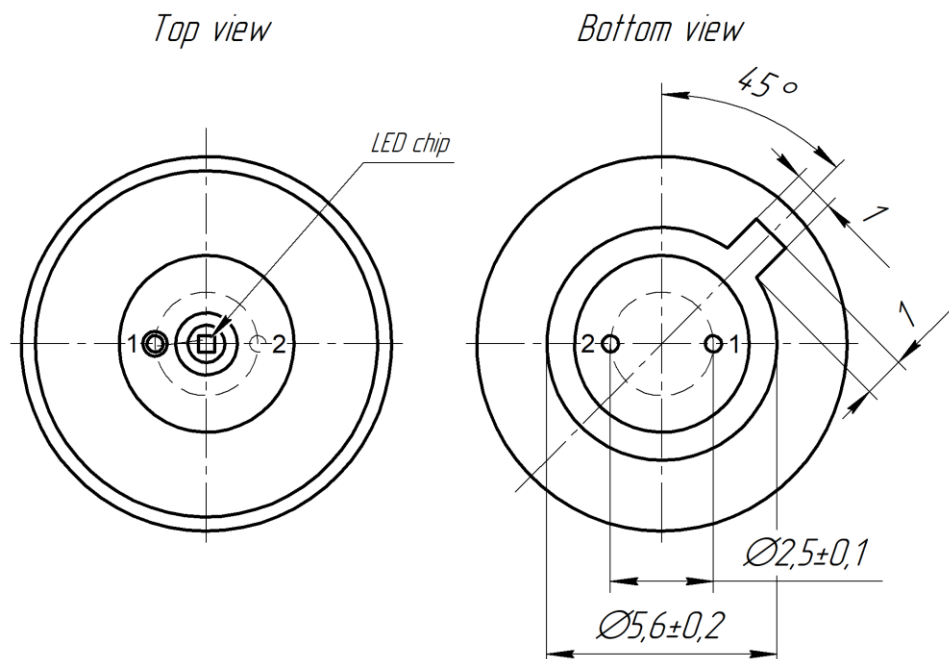
Lms28LED-R



LED pinout:

1 - electrically isolated from the case -
*cathode*¹

2 - electrically connected to the case -
*anode*¹

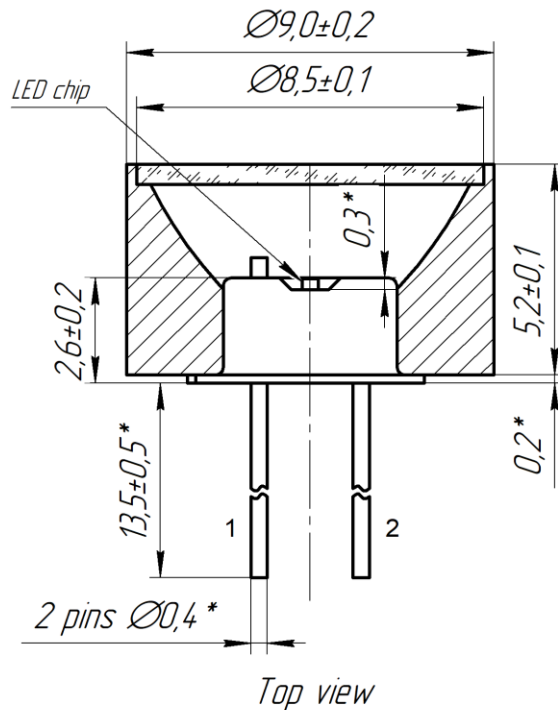


¹ For LED polarity (*anode* and *cathode*) please refer to the technical data provided with the exact ordered LEDs.
LED *anode* is marked with a *RED* dot.

*Reference dimensions.
All dimensions are pointed in mm.

Technical Drawings

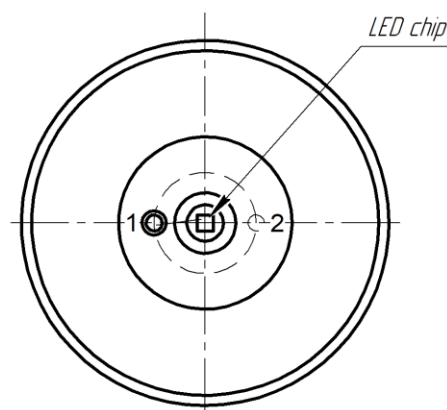
Lms28LED-RW



LED pinout:

1 - electrically isolated from the case -
*cathode*¹

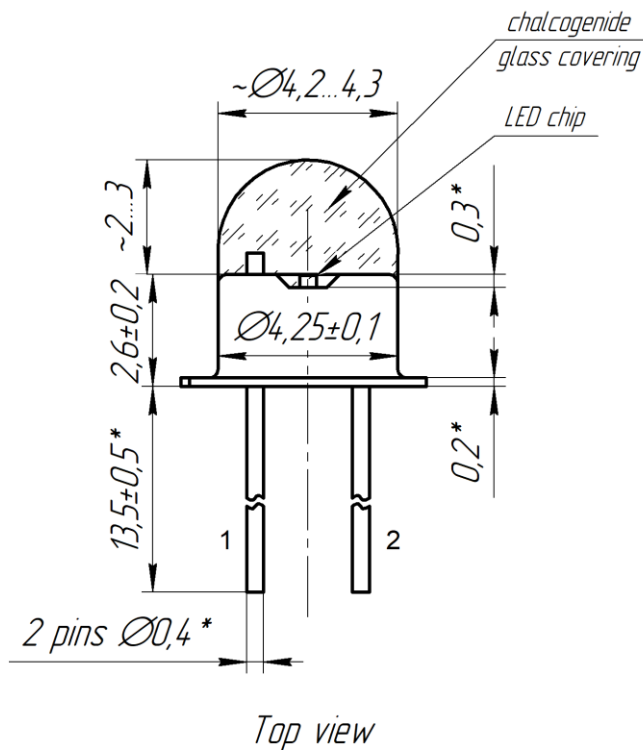
2 - electrically connected to the case -
*anode*¹



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.

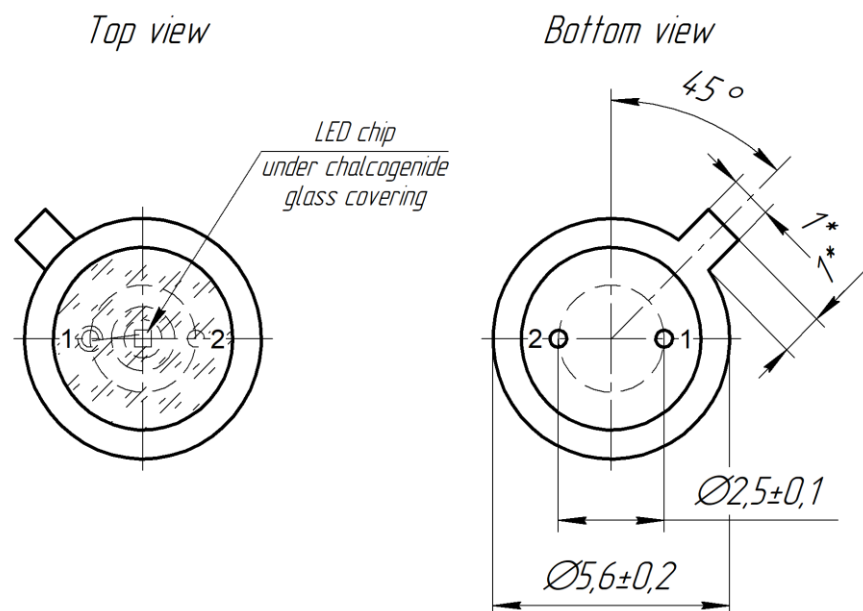
Lms28LED-CG



LED pinout:

1 - electrically isolated from the case -
*cathode*¹

2 - electrically connected to the case -
*anode*¹



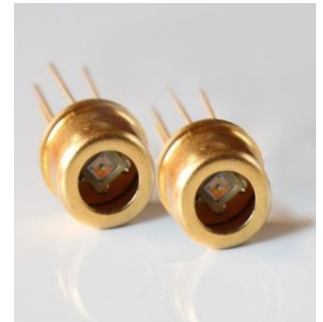
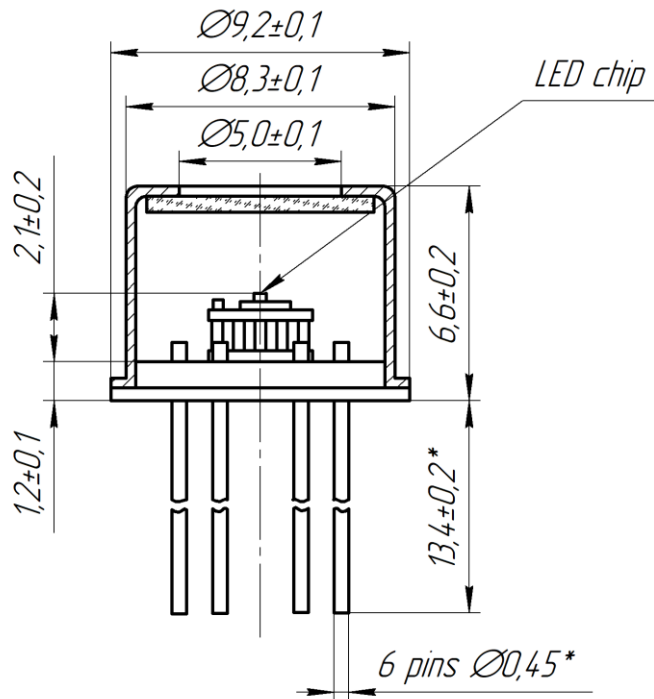
¹ For LED polarity (*anode* and *cathode*) please refer to the technical data provided with the exact ordered LEDs.
LED *anode* is marked with a *RED* dot.

*Reference dimensions.

All dimensions are pointed in mm.

Technical Drawings

Lms28LED-TEM



LED pinout:

1 – thermocooler +

2 – LED *anode*

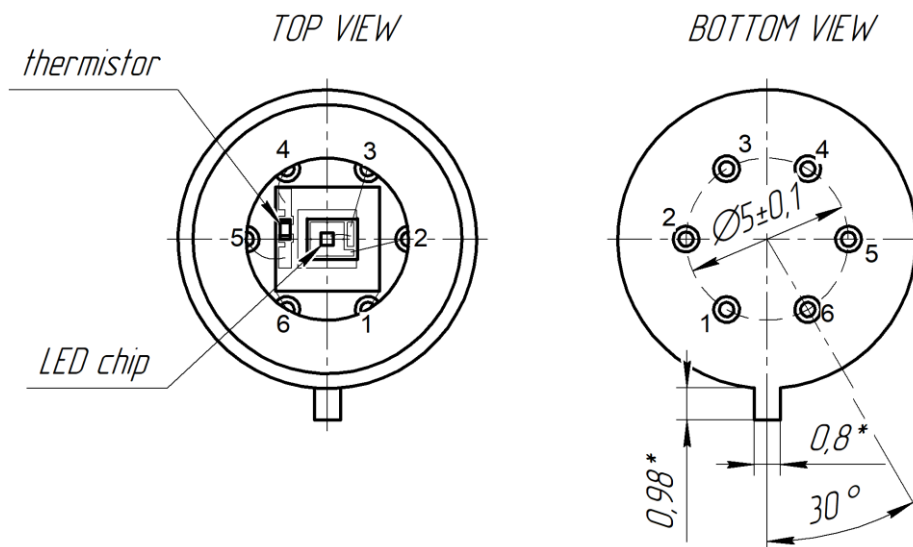
3 – LED *cathode*

4 – thermistor

5 – thermistor

6 – thermocooler –

(all pins are electrically isolated from the case)



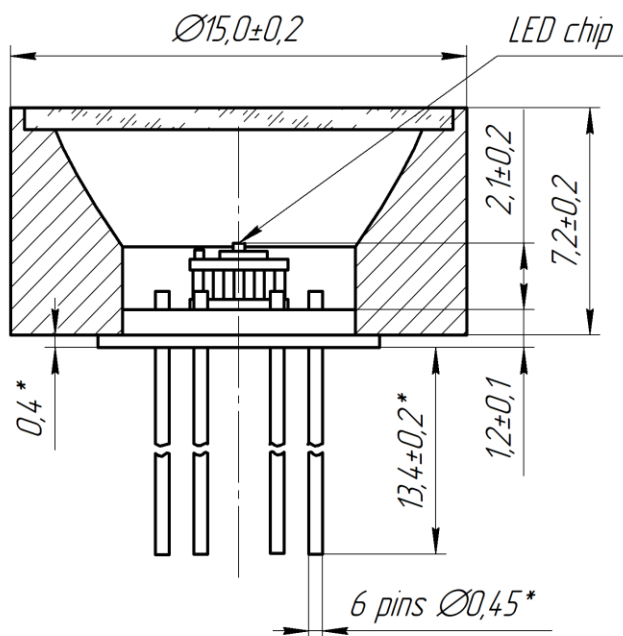
LED *anode* is marked with a *RED* dot, *cathode* – with a *BLUE* dot.

*Reference dimensions.

All dimensions are pointed in mm.

Technical Drawings

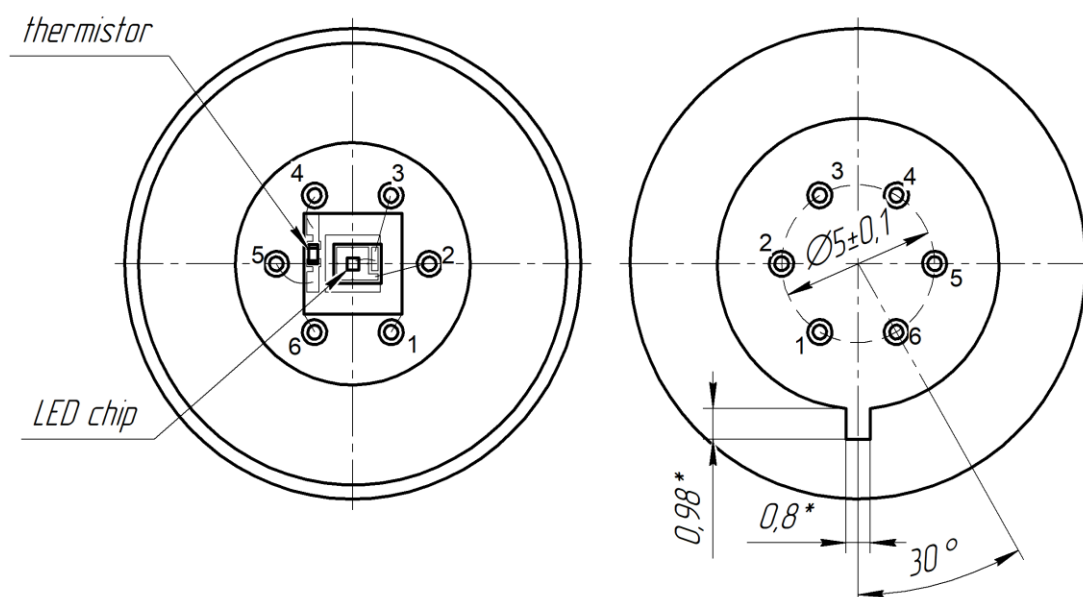
Lms28LED-TEM-R



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

TOP VIEW

BOTTOM VIEW



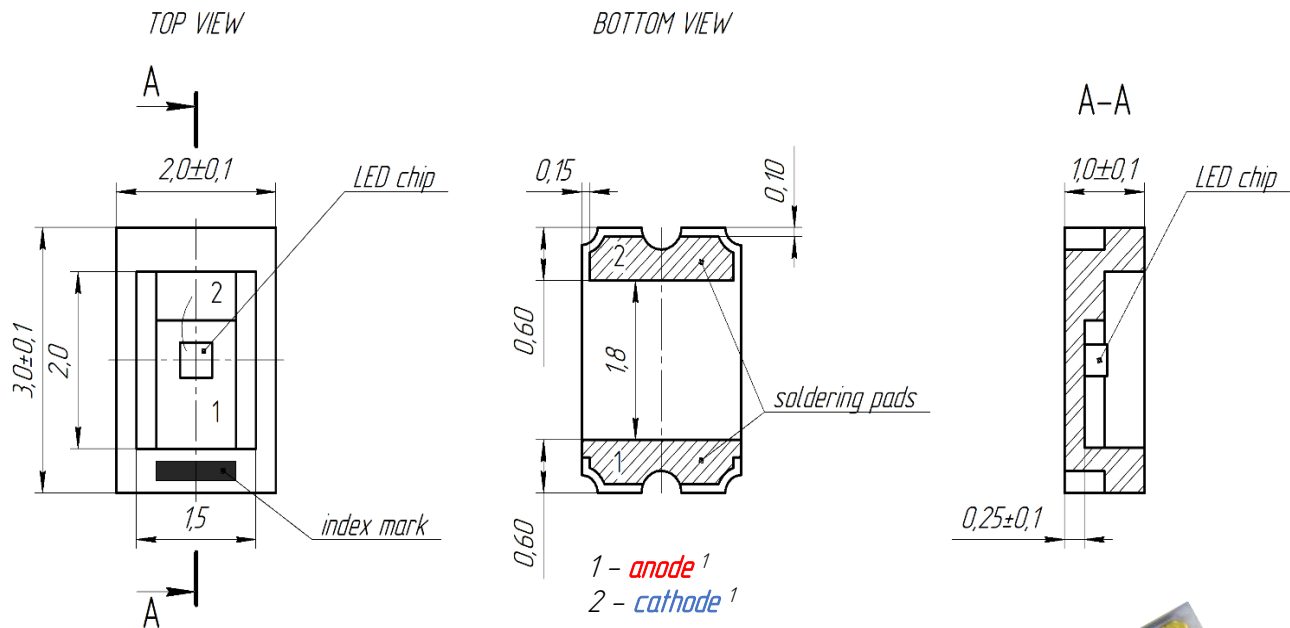
LED **anode** is marked with a **RED** dot, **cathode** - with a **BLUE** dot.

*Reference dimensions.

All dimensions are pointed in mm.

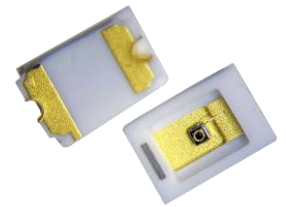
Technical Drawings

Lms28LED-CS3020



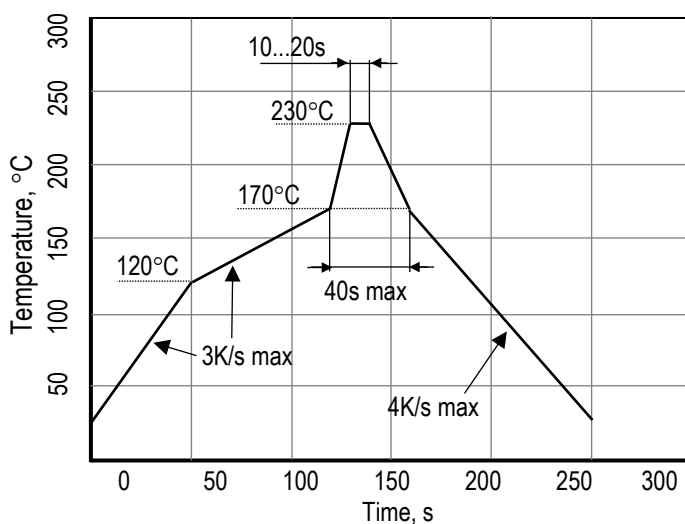
¹ For LED polarity (anode and cathode) please refer to the technical data provided with the exact ordered LEDs.

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

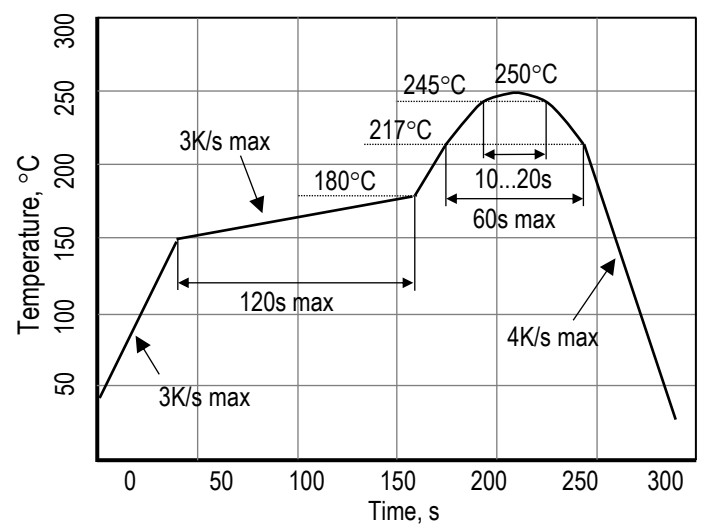


Recommended IR reflow soldering profiles for Lms28LED-CS3020

for lead containing soldering



for lead free soldering



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 careful in order not to damage the wire contact and crystal.
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- 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.