Near-Infrared (NIR) Light-Emitting Diode

Lms20LED series

### Device parameters

<table>
<thead>
<tr>
<th>Operating/ storage temperature</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$T_{stg}$</td>
<td>-60...+90°</td>
<td>°C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Soldering temperature (can be applied for not more than 5 secs)</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$T_{sul}$</td>
<td>+180</td>
<td>°C</td>
</tr>
</tbody>
</table>

*Temperature range may vary for different packaging types.

All parameters refer to LEDs in TO18 package with a cavity and operation at ambient temperature 25°C unless otherwise stated.

### LED parameters

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Symbol</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak emission wavelength$^1$</td>
<td>qCW mode$^3$ $I = 150$ mA</td>
<td>$\lambda_p$</td>
<td>2.00 - 2.09</td>
</tr>
<tr>
<td>FWHM of the emission band$^1$</td>
<td>qCW mode$^3$ $I = 150$ mA</td>
<td>FWHM</td>
<td>150 - 250</td>
</tr>
<tr>
<td>Average optical power (minimal / typical)$^1$</td>
<td>qCW mode$^3$ $I = 200$ mA</td>
<td>$P_{qCW}$</td>
<td>min 0.8 / typ 0.9</td>
</tr>
<tr>
<td>Peak optical power (minimal / typical)$^2$</td>
<td>Pulse mode$^4$ $I = 1$ A</td>
<td>$P_{pul}$</td>
<td>min 7.5 / typ 8.5</td>
</tr>
<tr>
<td>Maximum operating current</td>
<td>qCW mode$^3$</td>
<td>$I_{qCW}$</td>
<td>250</td>
</tr>
<tr>
<td>Forward voltage$^3$</td>
<td>qCW mode$^3$ $I = 200$ mA</td>
<td>$V$</td>
<td>0.5 - 2.5</td>
</tr>
</tbody>
</table>

### Typical spectra (qCW$^3$)

![Typical spectra graph](image)

### Spectra at different temperatures (qCW$^3$, 150 mA)

![Spectra at different temperatures graph](image)

### Typical optical power characteristic (qCW$^3$)

![Typical optical power characteristic graph](image)

### Typical current-voltage characteristic (qCW$^3$)

![Typical current-voltage characteristic graph](image)

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1 Parameter tested for each device.

2 Parameter tested for representative sampling.

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

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

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<table>
<thead>
<tr>
<th>Packages</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO-18 with a cap with a glass window</td>
<td>Lms20LED</td>
</tr>
<tr>
<td>TO-18 with a parabolic reflector without a glass window</td>
<td>Lms20LED-R</td>
</tr>
<tr>
<td>TO-18 with a parabolic reflector with a glass window</td>
<td>Lms20LED-RW</td>
</tr>
<tr>
<td>TO-5 with a built-in thermocooler and thermoresistor, covered by a cap with a glass window</td>
<td>Lms20LED-TEM</td>
</tr>
<tr>
<td>TO-5 with a built-in thermocooler and thermoresistor, covered by a parabolic reflector with a glass window</td>
<td>Lms20LED-TEM-R</td>
</tr>
</tbody>
</table>

### Radiant characteristics (far-field pattern)

- **TO-18 package with a cap**
- **TO-18 package with a parabolic reflector**

### Related products:

- **Photodiodes Lms24PD, Lms25PD series** - detectors of mid-infrared radiation;
- **LED drivers (D-41i, D-51i, minidrivers mD-1c, mD-1p)** - provide LED power supply in pulse modes.
Near-Infrared (NIR) Light-Emitting Diode

To drive the LED we recommend the following basic circuit connections:

**LED basic circuit connection**

![LED basic circuit connection diagram]

**LED with thermoelectric module basic circuit connection**

![LED with thermoelectric module basic circuit connection diagram]

**IMPORTANT CAUTIONS:**

- please check your connection circuit before turning on the LED;
- please mind the LED polarity: anode is marked with a RED dot; REVERSE voltage applying is FORBIDDEN;
- please do not connect the LED to the multimeter;
- please control the CURRENT applied to the LED in order NOT to EXCEED the maximum allowable values.

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**

<table>
<thead>
<tr>
<th>Drive current</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>f = 0.5 - 16 kHz</td>
<td>31-1000 μs 31-1000 μs</td>
</tr>
<tr>
<td>max. 0.25 A</td>
<td></td>
</tr>
</tbody>
</table>

**Pulse mode**

<table>
<thead>
<tr>
<th>Drive current</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>f = 0.5 - 16 kHz</td>
<td>2-20 μs</td>
</tr>
<tr>
<td>62 - 2000 μs</td>
<td>max. 2 A</td>
</tr>
</tbody>
</table>

**IMPORTANT CAUTIONS:**

- please check your connection circuit before turning on the LED;
- please mind the LED polarity: anode is marked with a RED dot; REVERSE voltage applying is FORBIDDEN;
- please do not connect the LED to the multimeter;
- please control the CURRENT applied to the LED in order NOT to EXCEED the maximum allowable values.

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HEAD OFFICE LED Microsensor NT, LLC and RnD CENTRE Microsensor Technology, LLC
10, A, Kurchatova str., 1N, St-Petersburg, 194223, Russia; info@lmsnt.com; www.lmsnt.com
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Technical Drawings

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Near-Infrared (NIR) Light-Emitting Diode

2.00 - 2.09 μm

Technical Drawings

Lms20LED-R

1 - LED cathode
2 - LED anode

TOP VIEW

BOTTOM VIEW

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10, A, Kurchatova str., 1N, St-Petersburg, 194223, Russia; info@lmsnt.com; www.lmsnt.com
Near-Infrared (NIR) Light-Emitting Diode

1.80 - 1.89 μm

Technical Drawings

Lms20LED-RW

1 - LED cathode
2 - LED anode

TOP VIEW

BOTTOM VIEW
Near-Infrared (NIR) Light-Emitting Diode

2.00 - 2.09 μm

Technical Drawings

Lms20LED-TEM

1 - TEC +
2 - LED anode
3 - LED cathode
4 - thermistor
5 - thermistor
6 - TEC -

TOP VIEW

BOTTOM VIEW