

# Datasheet

## LuxaLight LED Engine Red 640nm Protected (24 Volt, 108 LEDs, 2835, IP64)

**LE-24-640-108X2835PZQ**

**Version: 2025-08-29.2**

## Product description

The **Zirqle LED Engine Red 640 nm (Protected, 24 V)** is a semi-finished aluminum PCB module, developed for engineers and OEMs who need a strong, targeted deep-red light source for integration into custom fixtures, photobiological systems, or R&D setups. Delivered as a light-emitting core, it offers full flexibility in enclosure, optics, and thermal management.

Equipped with 108 × 2835 SMD LEDs, an industrial silicone coating providing IP64 protection, and an integrated NTC sensor, the module ensures reliable and durable operation. Combined with the MaNima Pollux Industrial System, it becomes a complete, high-efficiency red-light solution, with performance optimized via pulsing and advanced thermal control.

## Key Specifications

| Property           | Value / Description                       |
|--------------------|-------------------------------------------|
| Type               | LED Engine – semi-finished PCB module     |
| LEDs               | 108 × 2835 SMD LEDs                       |
| PCB base           | Aluminum                                  |
| PCB protection     | Industrial silicone coating (IP64 rating) |
| Dimensions         | 200 × 20 × 2 mm (modular design)          |
| Supply             | 24 V DC / ~30 W                           |
| Wavelength         | 640 nm red (peak ~640 nm)                 |
| Irradiance (5 cm)  | ~461 W/m <sup>2</sup>                     |
| PPFD (5 cm)        | ~2,485 µmol/m <sup>2</sup> ·s             |
| Illuminance (5 cm) | ~26,980 lx                                |
| Beam angle         | 120°                                      |
| Thermal monitoring | Integrated NTC sensor (5 kΩ, β = 3950)    |

## Applications

- Horticultural lighting** – 640 nm red light is strongly absorbed by chlorophyll b and contributes to photosynthesis and biomass production; complements 660 nm for balanced plant growth.
- Plant research** – used in controlled environments to study spectral effects on flowering, morphology, and crop yield; double-red peaks (640 nm + 660 nm) boost biomass accumulation.
- Photobiomodulation & therapy** – supports wound healing, collagen synthesis, and inflammation reduction through mitochondrial stimulation.
- Industrial inspection & machine vision** – enhances contrast of pigments, inks, and printed codes in vision systems.
- Barcode scanning & automation** – provides a visible, high-contrast light source for barcode scanning and positioning applications.
- R&D & spectroscopy** – stable deep-red reference source for sensor calibration, spectral imaging, and experimental setups.

## Benefits for Engineers

- Semi-finished module** – ideal for OEM and R&D integration
- Perfect Pollux companion** – becomes a complete red-light system with MaNima Pollux
- Improved efficiency with Pollux** – pulsing and thermal management maximize performance
- Design freedom** – full flexibility for custom housings, optics, and thermal setups
- High optical output** – ~461 W/m<sup>2</sup>, ~2,485 µmol/m<sup>2</sup>·s, ~26,980 lx at 5 cm
- Modular scalability** – multiple engines can be combined as required
- Thermal safety** – integrated NTC ensures stable operation and extended lifetime
- Industrial robustness** – IP64 protection via silicone coating

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## Integration with MaNima Pollux Industrial System

- Real-time NTC temperature monitoring
- Pulse/strobe modes for higher peak intensities and efficiency
- Prevents overheating while maximizing radiant output
- Compatible with PLC/SCADA automation systems
- Open UDP-based API for advanced integration and customization

## Technical specifications

| General                                                      |                                    |                 |
|--------------------------------------------------------------|------------------------------------|-----------------|
| Brand                                                        | Zirqle                             |                 |
| Application                                                  | Barcode Scanning<br>Machine Vision |                 |
| LED type                                                     | 2835                               |                 |
| PCB color                                                    | White                              |                 |
| Material                                                     | Aluminum                           |                 |
| Dimensions                                                   | 200 × 20 × 2 mm                    |                 |
| Mounting                                                     | 3M tape VHB4905                    |                 |
| Warranty                                                     | 5 years                            |                 |
| LEDs per piece                                               | 108.00                             |                 |
| Lifetime                                                     | 70000 hours                        |                 |
| Lighting                                                     |                                    |                 |
| Luminous Flux                                                | 755,1 lm                           |                 |
| Wave length                                                  | 640 nm                             |                 |
| BIN                                                          | 3 SDCM                             |                 |
| Beam angle                                                   | 120 °                              |                 |
| LB waarde                                                    | L80B50                             |                 |
| Measurement results                                          |                                    |                 |
| Illuminance (Lux)<br>(Object size: 1 piece)                  |                                    | 24V             |
|                                                              | 5cm                                | 53660 lx        |
|                                                              | 10cm                               | 20080 lx        |
|                                                              | 15cm                               | 10060 lx        |
|                                                              | 20cm                               | 6221 lx         |
|                                                              | 25cm                               | 4088 lx         |
|                                                              | 30cm                               | 3125 lx         |
|                                                              |                                    |                 |
| Total PPFD umol/m2 (PAR 400-700nm)<br>(Object size: 1 piece) |                                    | 24V             |
|                                                              | 5cm                                | 2170.99 umol/m2 |
|                                                              | 10cm                               | 826.33 umol/m2  |
|                                                              | 15cm                               | 427.78 umol/m2  |
|                                                              | 20cm                               | 267.63 umol/m2  |
|                                                              | 25cm                               | 179.52 umol/m2  |
|                                                              | 30cm                               | 137.95 umol/m2  |
|                                                              |                                    |                 |
| Peak wavelength<br>(Object size: 1 piece)                    | 643 nm                             |                 |

|                                           |             |             |
|-------------------------------------------|-------------|-------------|
| Peak irradiance<br>(Object size: 1 piece) |             | <b>24V</b>  |
|                                           | <b>5cm</b>  | 18.53 W/sqm |
|                                           | <b>10cm</b> | 6.89 W/sqm  |
|                                           | <b>15cm</b> | 3.5 W/sqm   |
|                                           | <b>20cm</b> | 2.16 W/sqm  |
|                                           | <b>25cm</b> | 1.45 W/sqm  |
|                                           | <b>30cm</b> | 1.09 W/sqm  |

|                                            |             |             |
|--------------------------------------------|-------------|-------------|
| Total irradiance<br>(Object size: 1 piece) |             | <b>24V</b>  |
|                                            | <b>5cm</b>  | 412.9 W/sqm |
|                                            | <b>10cm</b> | 164.6 W/sqm |
|                                            | <b>15cm</b> | 85.76 W/sqm |
|                                            | <b>20cm</b> | 53.12 W/sqm |
|                                            | <b>25cm</b> | 34.96 W/sqm |
|                                            | <b>30cm</b> | 27.46 W/sqm |

- By combining Pulse Mode with Real-Time Monitoring, the efficiency of LED systems can be increased, resulting in higher output.
- We have the expertise and equipment to perform measurements tailored to the specific requirements of the application.

## Electronics

| Working voltage             | 24V                                                                                                                                                                                                                        |        |          |    |    |     |        |     |            |         |            |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|----------|----|----|-----|--------|-----|------------|---------|------------|
| Current per piece           | 1.25 A / piece                                                                                                                                                                                                             |        |          |    |    |     |        |     |            |         |            |
| Power consumption per piece | 30.00 W / piece                                                                                                                                                                                                            |        |          |    |    |     |        |     |            |         |            |
| PCB material                | Aluminium                                                                                                                                                                                                                  |        |          |    |    |     |        |     |            |         |            |
| Pinout                      | <table> <tr> <th>Symbol</th><th>Function</th></tr> <tr> <td>V+</td><td>V+</td></tr> <tr> <td>GND</td><td>Ground</td></tr> <tr> <td>NTC</td><td>NTC sensor</td></tr> <tr> <td>NTC_GND</td><td>NTC ground</td></tr> </table> | Symbol | Function | V+ | V+ | GND | Ground | NTC | NTC sensor | NTC_GND | NTC ground |
| Symbol                      | Function                                                                                                                                                                                                                   |        |          |    |    |     |        |     |            |         |            |
| V+                          | V+                                                                                                                                                                                                                         |        |          |    |    |     |        |     |            |         |            |
| GND                         | Ground                                                                                                                                                                                                                     |        |          |    |    |     |        |     |            |         |            |
| NTC                         | NTC sensor                                                                                                                                                                                                                 |        |          |    |    |     |        |     |            |         |            |
| NTC_GND                     | NTC ground                                                                                                                                                                                                                 |        |          |    |    |     |        |     |            |         |            |

|                |                                          |
|----------------|------------------------------------------|
| NTC parameters | Resistance: 5000 Ohm<br>Beta value: 3950 |
|----------------|------------------------------------------|

## Environmental

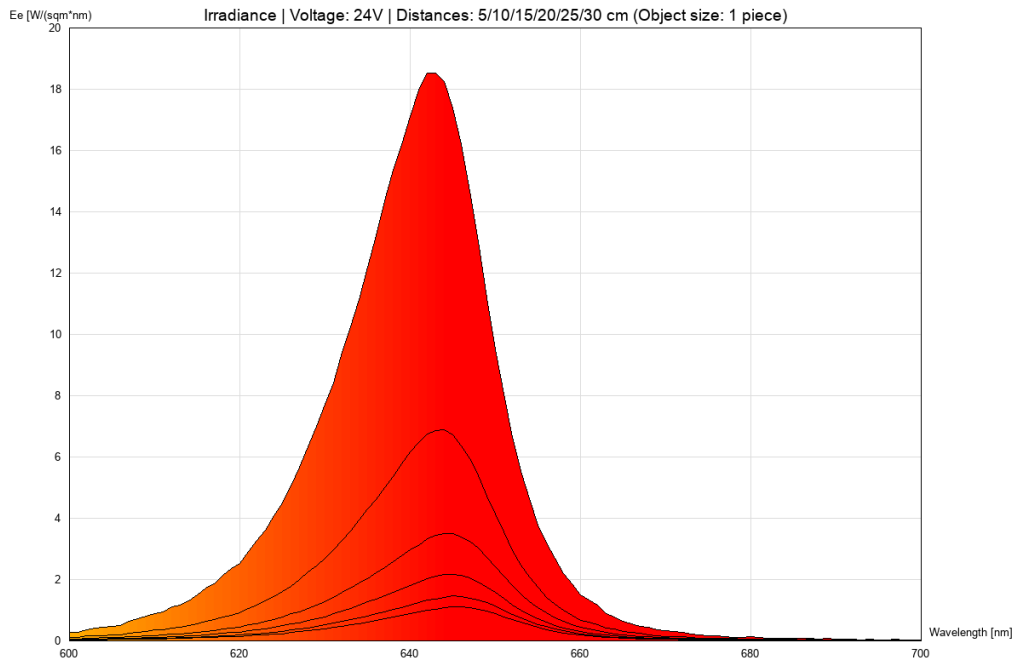
|                       |              |
|-----------------------|--------------|
| Operating temperature | -20 ~ +60 °C |
| Storage temperature   | -40 ~ +80 °C |
| IP class              | IP 64        |

## Directives - standards - certificates

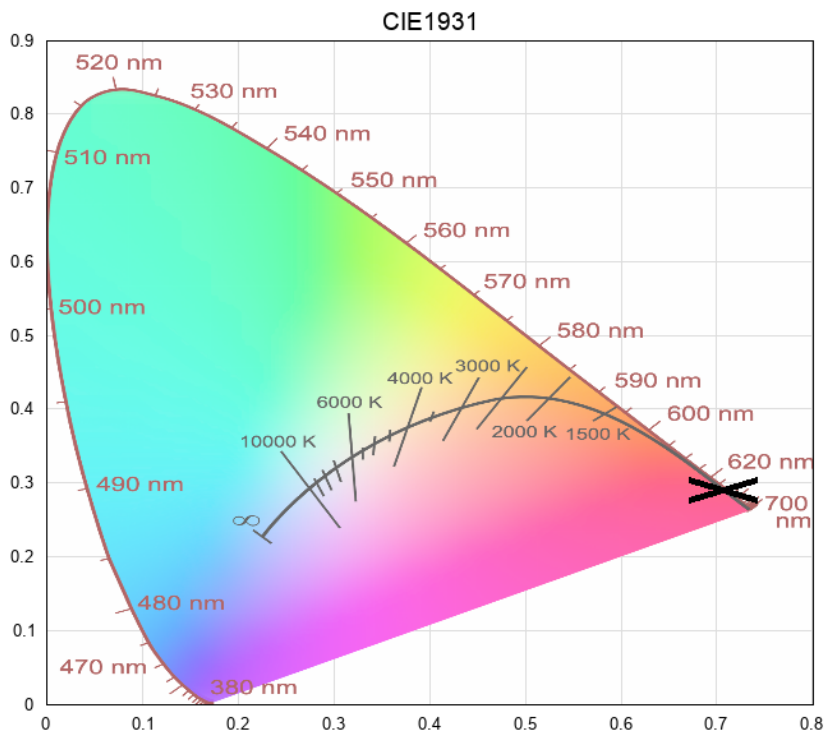
|                  |                                  |
|------------------|----------------------------------|
| Directives       | RoHS<br>CE                       |
| Safety standards | EN60598-1<br>EN62031<br>IEC62471 |

## Measurement results

### irradiance - 600-700-red (24V)



**cie1931**



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