

# C4L-SL080HRB

Sensor LED hyperred (650 nm point source)



The black Sensor LED is designed for applications, where an extremely small emission point is needed and stray light needs to be avoided. The LED is produced by using a 650 nm LED point source chip mounted in a small black PLCC4 package to minimize reflections. The Sensor LED is easy to handle and IR-reflow solderable. The chip placement accuracy relative to the package is very high. Additionally the LED is categorized by radiant power and peak wavelength.



## Features

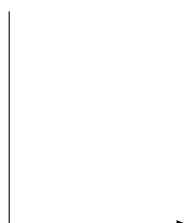
- Black package
- High optical precision
- Very low reflections inside package
- Small emission point (80 micrometer)
- Lambertian emission pattern

## Applications

- Industrial applications
- Sensor applications
- Light grids
- Data communication

## Ordering information

| TYPE              | PEAK WAVELENGTH | RADIANT POWER |
|-------------------|-----------------|---------------|
| C4L-SL080HRB-04oz | 635 ... 660 nm  | 0,5 ... 2 mW  |



C 4 L Chips 4 Light  
S Sensor LED 80  
L Low current  
0 8 0 80 $\mu$ m emission point diameter  
H R Hyper red  
B AllnGaP high efficiency chip  
0 Peak wavelength min.: 635 nm  
4 Peak wavelength max.: 660 nm  
o Radiant power min.: 0,5 mW  
z Radiant power max.: 2 mW

Customers' special wishes are also welcome.

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## Electro-optical characteristics ( $T_A = 25^\circ\text{C}$ )<sup>1</sup>

| PARAMETER                  | SYMBOL           | CONDITION            | MIN. | TYP. <sup>2</sup> | MAX. | UNIT |
|----------------------------|------------------|----------------------|------|-------------------|------|------|
| Forward voltage            | $V_F$            | $I_F = 20\text{ mA}$ | 1,7  |                   | 2,4  | V    |
| Peak wavelength            | $\lambda_{peak}$ | $I_F = 20\text{ mA}$ | 635  |                   | 660  | nm   |
| Radiant power <sup>3</sup> | $\Phi_e$         | $I_F = 20\text{ mA}$ | 0,5  |                   | 2    | mW   |
| Spectral bandwidth         | $\Delta\lambda$  | $I_F = 20\text{ mA}$ |      | 25                |      | nm   |
| Viewing angle              | $2\Theta_{1/2}$  |                      |      | 120               |      | °    |

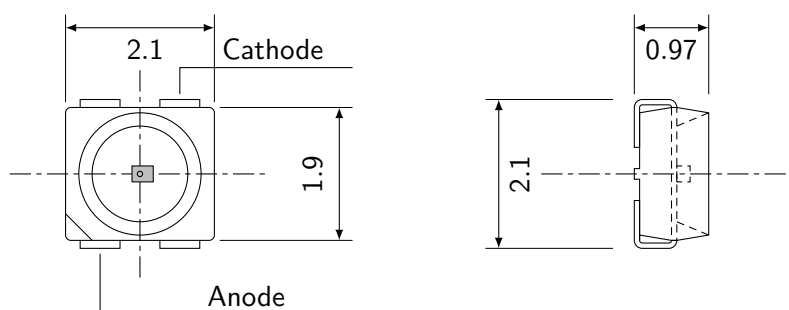
## Maximum ratings ( $T_A = 25^\circ\text{C}$ )<sup>4</sup>

| PARAMETER                              | SYMBOL     | MINIMUM | MAXIMUM | UNIT |
|--|------------|---------|---------|------|
| Operating temperature range            | $T_{op}$   | -20     | 85      | °C   |
| Storage temperature range              | $T_{stg}$  | -20     | 85      | °C   |
| Peak current ( $t_p = 10\mu\text{s}$ ) | $I_{peak}$ |         | 30      | mA   |
| Forward current                        | $I_F$      |         | 30      | mA   |
| LED junction temperature               | $T_j$      |         | 125     | °C   |
| Reverse voltage                        | $V_R$      |         | 5       | V    |
| Power dissipation                      | $P_D$      |         |         | mW   |

## Thermal characteristics

| PARAMETER          | SYMBOL            | VALUE | UNIT |
|--------------------|-------------------|-------|------|
| Thermal resistance | $R\Theta_{J-Pin}$ |       | K/W  |

## Outline drawing



all dimensions in mm. Tolerance  $\pm 0.1$  except given ones

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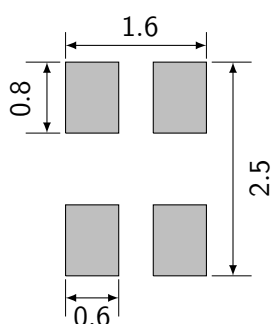
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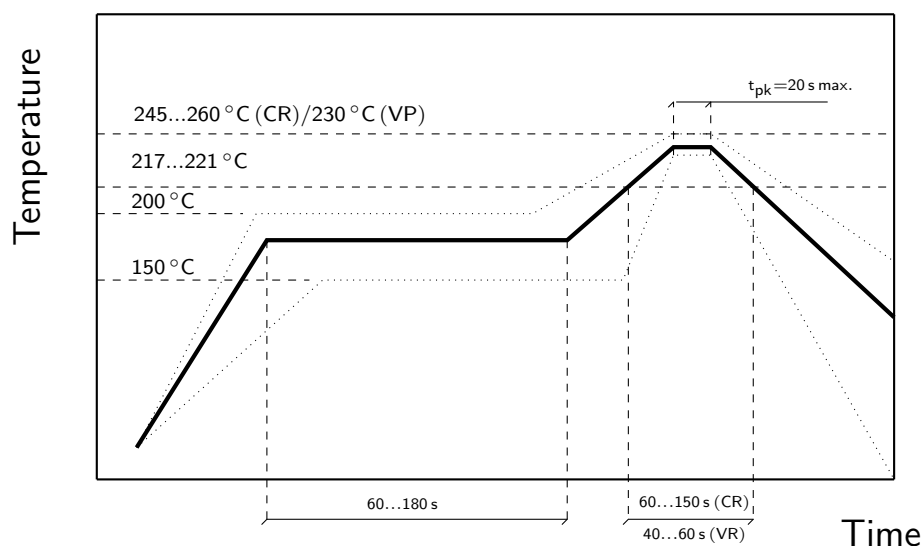
## Packaging and Labelling

LEDs are packaged automatically into paperboard containers. Labels for identification with the lot data are placed on the box. The label shows company name and address, LED type, quantity, lot number, production date, machine number and the appropriate barcode. The box is hermetically sealed in a plastic bag for shipment.

## Recommended Solderpad



## Recommended Soldering Profile



Recommended reflow soldering conditions following IPS/JEDEC J-STD-020.

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|   | MAXIMUM       |
|---|---------------|
| Temperature maintained between 150 and 200 °C                     | 180 s         |
| Temperature maintained above 217 °C, Convection Reflow (CR) 150 s |               |
| Temperature maintained above 217 °C, Vapor Phase (VP)             | 60 s          |
| Ramp-Up Rate  | +3 °C/s       |
| Peak Temperature ( $t_{pk}$ ), Convection Reflow (CR)             | 245 to 260 °C |
| Peak Temperature ( $t_{pk}$ ), Vapor Phase (VP)                   | 230 °C        |
| Time to Peak Temperature  | 8 min         |
| Time within 5°C of actual Peak Temperature                        | 20 s          |
| Ramp-Down Rate  | -6°C/s        |

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Actual solder profile may vary from the example given, and is very much depending on machine type and configuration, geometrical configuration, board shape etc. It is strongly recommended to optimize and evaluate the actual soldering conditions carefully for each individual project before releasing the soldering process.

## General Precautions with moisture-sensitive devices

Plastic and COB-assembled LEDs are sensitive to temperature shocks and especially to reflow soldering (the popcorn effect).

The cause of the popcorn effect is the enclosed moisture which can lead to cracks in the package with a sudden rise in temperature. All shapes and sizes of package for surface-mounted components are sensitive to this effect. The sensitivity increases with the thermal stress from the respective soldering process.

Components delivered without any form of protection against moisture should therefore either be baked or stored permanently in a dry environment, in both cases until immediately prior to soldering. The user is responsible for the qualification of the preparation and further processing of the LEDs.

## Notes:

- The usage of LEDs in life-support devices or systems has to be expressly and written authorized by the supplier!
- Lead free product - RoHS compliant.
- Care must be taken when handling products, particularly if an over-voltage exceeds the maximum rating. The overflow in energy may cause damage to the products. In addition these products are sensitive to static electricity. Customers must take care when handling the products to ensure that the handling process is fully protected against static generation. Ensure that products are grounded and that the facility has conductive mats, antistatic uniforms and shoes. Antistatic containers are considered to be a good insurance against static electricity. The soldering iron point should be properly grounded. An atmospheric ionizer is recommended for use in the facility where static could be

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- generated.
- Storage ambient conditions for all LEDs in sealed packages must be within  $T_A = 10...40^{\circ}\text{C}$  and relative humidity  $<60\%$ . LEDs in opened packages must be used within 2 weeks after opening. Storage time under the conditions above in sealed packages must not exceed 24 months.
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<sup>1</sup>After 1 minute of operation.

<sup>2</sup>Typical (Typ) data are defined as long-term production mean values. These values are not specified and only given for information.

<sup>3</sup>Measurements are done with an accuracy of  $\pm 15\%$ . Correlation to customer's equipment and products is required.

<sup>4</sup>Not to be exceeded at any time.