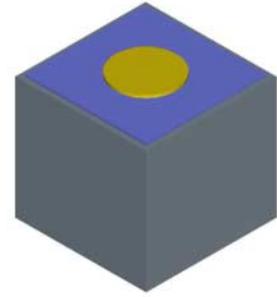


# High Efficiency 9 mil ThinGaN LED (470 nm) Lead (Pb) Free Product - RoHS Compliant

## OD B09RG



### Features

- High efficiency due to new ThinGaN concept
- Lambertian Emission pattern
- Ideal for LCD backlighting and coupling in light guides
- Polarity: n-side up
- Wavelength (typ.): 470 nm
- Technology: ThinGaN
- Grouping parameters: luminous intensity, wavelength

### Applications

- Outdoor displays
- Optical indicators
- Backlighting (LCD, switches, keys, displays, illuminated advertising, general lighting)
- Interior automotive lighting (e.g. dashboard backlighting, etc.)
- Marker lights (e.g. steps, exit ways, etc.)
- Signal and symbol luminaire

Here you can find important REACH information of OSRAM Opto Semiconductors' products:

[http://www.osram-os.com/osram\\_os/EN/Products/REACH](http://www.osram-os.com/osram_os/EN/Products/REACH)

Please also note the special information in the section „Handling and storage conditions“ on page 6.

Type	Ordering Code	Description
ODB09RG	t.b.d.	9 mil high efficiency ThinGaN chip, 455 - 475 nm, > 50 mcd

**Electrical values**<sup>1)</sup> ( $T_A = 25\text{ °C}$ , correlated to 5mm radial package)

Parameter	Symbol	Value <sup>2)</sup>			Unit
		min.	typ.	max.	
Dominant wavelength $I_F = 10\text{ mA}$ , $t_p = 30\text{ms}$	$\lambda_{\text{dom}}$	455		475	nm
Reverse voltage $I_R = 10\mu\text{A}$	$V_R$	5			V
Forward voltage $I_F = 10\text{ mA}$ , $t_p = 30\text{ ms}$	$V_F$	2.7		3.5	V
Luminous Intensity $I_F = 10\text{ mA}$ , $t_p = 30\text{ ms}$	$I_V$	50			mcd

<sup>1)</sup> *Measurement limits describe actual settings and do not include measurement uncertainties. Each wafer and fragment of a wafer is subject to final testing. The wafer or its pieces are individually attached on foils (rings). All el. values are referenced to the vendor's measurement system (correlation to customer product(s) is required). Measurement uncertainty +/-15% for brightness, +/- 1nm for wavelength and +/- 0.1V for voltage.*

<sup>2)</sup> *Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations 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 calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.*

**Binning**

Luminous intensity (mcd)	455 - 460 nm	460 - 465 nm	465 - 470 nm	470 - 475 nm
50 - 64	E24	F24	G24	H24
64 - 80	E25	F25	G25	H25
80 - 100	E26	F26	G26	H26
100 - 128	E27	F27	G27	H27
128 - 160	E28	F28	G28	H28
> 160	E29	F29	G29	H29

**Maximum Ratings<sup>1)</sup>**

Parameter	Symbol	Value	Unit
Maximum Operating temperature range	$T_{op}$	-40...+100	°C
Maximum forward current ( $T_A = 25^\circ\text{C}$ )	$I_F$	25	mA
Minimum forward current ( $T_A = 25^\circ\text{C}$ )	$I_F$	3	mA
Maximum surge Current ( $T_A = 25^\circ\text{C}$ ) $t_p = 10 \mu\text{s}$ , $D = 0.05$	$I_{peak}$	0.1	A
Maximum junction temperature	$T_j$	125	°C

<sup>1)</sup> Maximum ratings are strongly package dependent and may differ between different packages. The values given represent the chip in an OSRAM Opto Semiconductor's TOPLED package.

**Mechanical values<sup>1)</sup>**

Parameter	Symbol	Value <sup>2)</sup>			Unit
		min.	typ.	max.	
Length of chip edge (x-direction)	$L_x$	0.205	0.23	0.255	mm
Length of chip edge (y-direction)	$L_y$	0.205	0.23	0.255	mm
Diameter of the sorted wafer	$D$			100	mm
Die height	$H$	170	190	210	$\mu\text{m}$
Diameter of bondpad	d	80	90	105	$\mu\text{m}$

**Additional information**

Metallization frontside	Gold
Metallization backside	AuGe alloy
Die bonding	Epoxy bonding

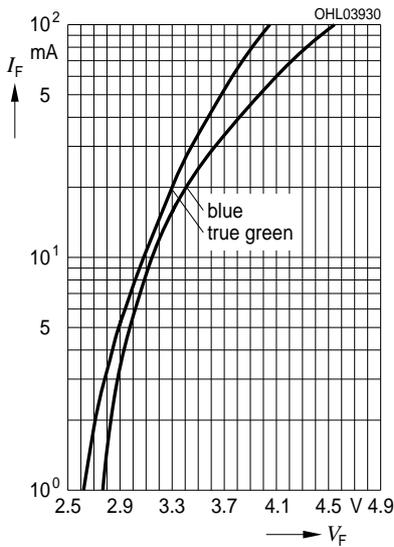
<sup>1)</sup> All chips are checked according to the following procedure and the OSRAM OS specification of the visual inspection A63501-Q0013-N001-\*-76G3:

Unless otherwise described below, the quality level of the final visual inspection shall comply to an AQL 0,4 (according MIL-STD-105E, level II), if the customer performs an incoming visual inspection of a shipment. The quality inspection (final visual inspection) is performed by production. An additional visual inspection step as special release procedure by QM after the final visual inspection is not installed.

<sup>2)</sup> Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations 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 calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice

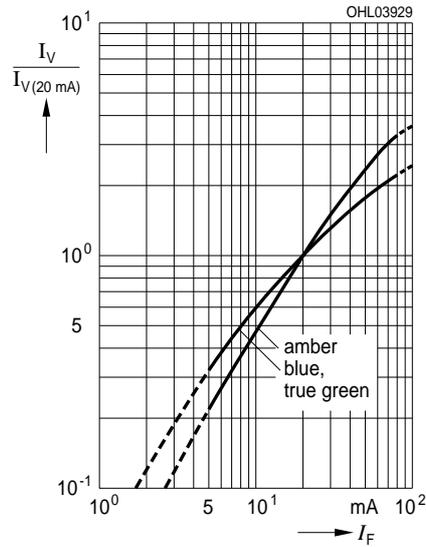
**Forward current<sup>1)</sup>**

$I_F = f(V_F), T_A = 25\text{ °C}$ , curve „blue“



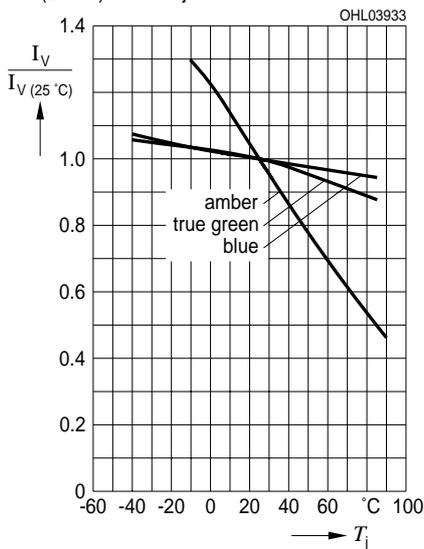
**Relative luminous intensity<sup>1) 2)</sup>**

$I_V/I_{V(20\text{ mA})} = f(I_F), T_A = 25\text{ °C}$ , curve „blue“



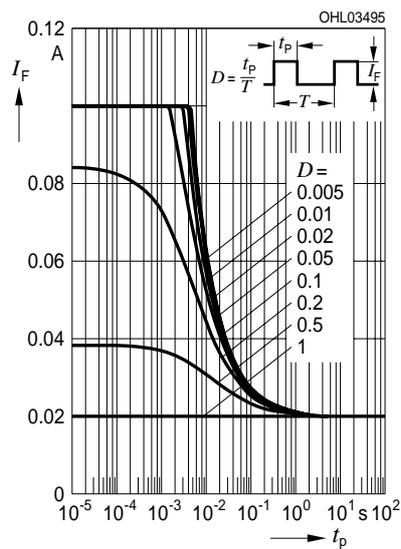
**Relative luminous intensity<sup>1)</sup>**

$I_V/I_{V(25\text{ °C})} = f(T_j); I_F = 20\text{ mA}$ , curve „blue“



**Permissible pulse handling capability<sup>1)</sup>**

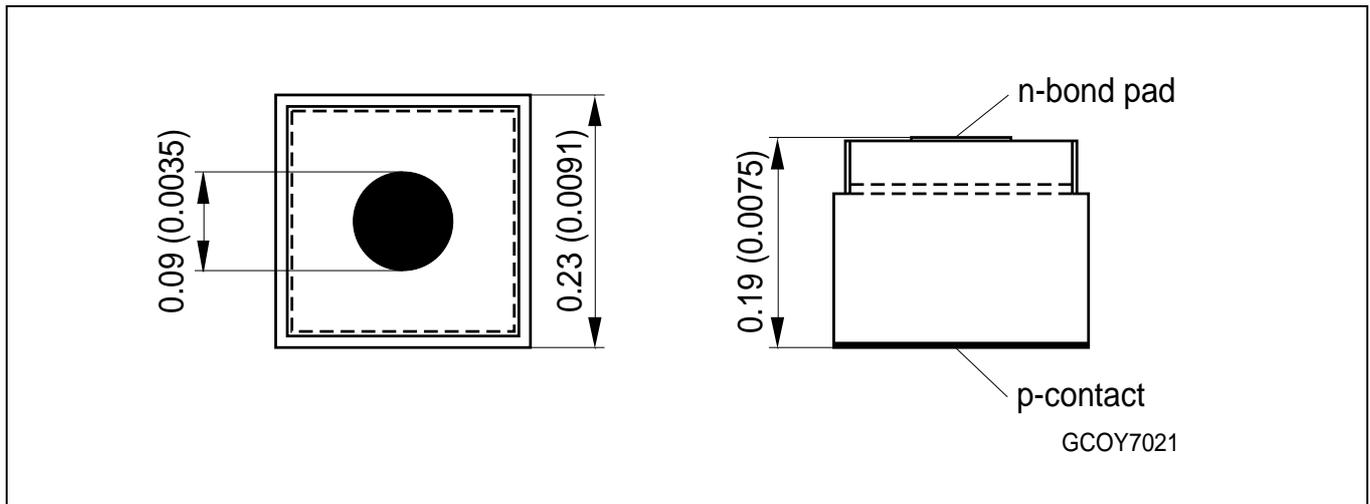
Duty cycle  $D =$  parameter,  $T_A = 25\text{ °C}$



<sup>1)</sup> Due to the special conditions of the manufacturing processes of LED, the typical data or calculated correlations 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 calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice. Given values are package dependent.. The values represent the chip in an OSRAM Opto Semiconductor's TOPLED package.

<sup>2)</sup> In the range where the line of the graph is broken, you must expect higher brightness differences between single LEDs within one packing unit.

## Chip Outlines



Dimensions are specified as typical<sup>1)</sup> values as follows: mm (inch).

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### Attention please!

The information generally describes the type of component and shall not be considered as assured characteristics or detailed specification.

Terms of delivery and rights to change design reserved. Due to technical requirements components may contain dangerous substances. For information on the types in question please contact our sales organization.

### Handling and Storage Conditions:

Storage time for wafers in sealed condition shall not exceed 6 months (storage ambient conditions:  $T_a=15...30^{\circ}\text{C}$ ; relative humidity: < 60%). The hermetically sealed shipment lot shall be opened under temperature and moisture controlled cleanroom environment only. Customer has to follow the according rules for disposition of material that can be hazardous for humans and environment.

Chips are placed on a blue foil, which may contain the following substance in a concentration of circ.18% wt:

Bis (2-ethyl(hexyl)phthalate) (DEHP) [CAS #: 117-81-7; EC # 204-211-0].

Dice have to be handled ESD sensitive.

### Packing

Chips are placed on a blue foil with minimum size of 18 x 18 cm<sup>2</sup> or alternatively on a blue foil inside a 6" ring.

For shipment the wafers of a shipment lot are arranged to stacks. The stack is put in a plastic ESD bag with a maximum of 14 wafers in one bag. A maximum of 4 bags is put in a packaging box. A maximum of 5 packaging boxes is put in a shipping carton which is sealed for storage and shipment.

Please use the recycling operators known to you. We can also help you – get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You will have to bear the costs of transport. For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

### Label and shipping documents

Each wafer is identified with a sticker, which is attached to each wafer. The label shows chip type, wafer number, quantity, binning and the minimum, average and maximum values of voltage, luminous intensity and wavelength. Each wafer shipment includes an additional document, which summarizes the content.

### Design objectives

a) workability

The chip design was developed and released based on the vendor's standard assembly procedures and packaging.

Bond strength properties are in accordance to MIL\_STD-750D, method 2037. Whether the chip fits to the customer's product(c) with its according die and wire bond procedures and packaging must be evaluated by the customer himself. If workability problems arise after this release a mutually conducted problem solving procedure has to be set up, if the chips are suspected of contributing to the problems

#### b) chip characteristics

The chips are produced by the vendor with best effort, but on chip level a subset of the chip characteristics can be determined only. Performance of the chip in the customer's product(s) can only be determined by the customer himself.

#### Returns/Complaints

To return material because of technical or logistical reasons a RMA-number is necessary. Samples for analysis purposes can be send to OSRAM OS without credit.

#### Shipping Conditions:

If not otherwise arranged, the "General Conditions for the supply of products and services of the electrical and electronics industry" apply for any shipment. If these documents are not familiar to you, please request them at our nearest sales office.

#### Components used in life-support devices or systems must be expressly authorized by us for such purpose!

Critical components<sup>2)</sup>, may only be used in life-support devices or systems<sup>3)</sup> with the express written approval of OSRAM OS.

#### Revision History:2009-08-01

Previous Version: 2009-03-01

Page	Subjects (major change since last revision)	Date of change
3	Binning changed	2009-08-01

<sup>1)</sup> Typical (referred to as typ.) data are defined as long-term production mean values and are only given for information. This is not a specified value.

<sup>2)</sup> A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

<sup>3)</sup> Life support devices or systems are intended (a) to be implanted in the human body, or (b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered.

EU RoHS and China RoHS compliant product



此产品符合欧盟 RoHS 指令的要求；

按照中国的相关法规和标准，不含有毒有害物质或元素。