# OSRAM LE CG P1AR

# Datasheet

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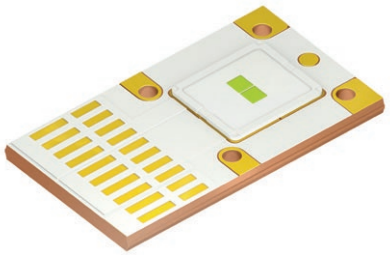
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OSRAM

## OSRAM OSTAR® Projection Power

# LE CG P1AR

OSRAM OSTAR Projection Power is a high luminance LED for projection applications.



## Applications

- Projection & Display
- Visualization

## Features

- Package: OSTAR High Power Projection
- Chip technology: UX:3
- Typ. Radiation: 120° (Lambertian emitter)
- Color: Cx = 0.32, Cy = 0.64 acc. to CIE 1931 (• converted green)
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)

## Ordering Information

| Type | Luminous Flux [1] $I_F$ = 8000 mA $\Phi_V$ | Ordering Code |
|---|---|---|
| LE CG P1AR-USVQ-A | 5630 ... 8200 lm | Q65113A2107 |



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## Maximum Ratings

| Parameter | Symbol | | Values |
|---|---|---|---|
| Storage Temperature | $T_{stg}$ | min.<br>max. | -40 °C<br>85 °C |
| Junction Temperature | $T_j$ | max. | 150 °C |
| Forward Current<br>$T_j = T_{j,max}$ | $I_F$ | min.<br>max. | 200 mA<br>13500 mA |
| Forward Current pulsed<br>D = 0.7; f = 240 Hz; $T_j = T_{j,max}$ | $I_{F\ pulse}$ | | 16000 mA |
| Surge Current<br>$t_P \leq 50$ µs; D = 0.1 ; $T_j = T_{j,max}$ | $I_{FS}$ | max. | 19000 mA |
| ESD withstand voltage<br>acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2) | $V_{ESD}$ | | 2 kV |
| Reverse current [2)] | $I_R$ | max. | 200 mA |
| Max. voltage difference anode-board, cathode-board | $\lvert\Delta V_{a\text{-}b}\rvert$, $\lvert\Delta V_{c\text{-}b}\rvert$ | max. | 40 V |



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## Characteristics

$T_{Board}$ = 25 °C; $I_F$ = 8000 mA; f = 1000 Hz; D = 0.50

| Parameter | Symbol | | Values |
|---|---|---|---|
| Chromaticity Coordinate [3]<br>within λ = 500 ... 600 nm | Cx<br>Cy | typ.<br>typ. | 0.32<br>0.64 |
| Peak Wavelength | $\lambda_{peak}$ | typ. | 520 nm |
| Spectral bandwidth at 50% $I_{rel,max}$ | Δλ | typ. | 96 nm |
| Viewing angle at 50% $I_V$ | 2φ | typ. | 120 ° |
| Radiating surface | $A_{color}$ | typ. | 3.35 x 1.55 mm² |
| Partial Flux acc. CIE 127:2007 [4]<br>$I_F$ = 8000 mA | $\Phi_{E/V,\ 120°}$ | typ. | 0.77 |
| Forward Voltage [5]<br>$I_F$ = 8000 mA | $V_F$ | min.<br>typ.<br>max. | 6.4 V<br>6.8 V<br>7.6 V |
| Reverse voltage (ESD device) | $V_{R\ ESD}$ | min. | 45 V |
| Reverse voltage [2]<br>$I_R$ = 20 mA | $V_R$ | max. | 1.2 V |
| Real thermal resistance junction/board | $R_{thJB\ real}$ | typ. | 0.90 K / W |
| Electrical thermal resistance junction/board<br>with efficiency $\eta_e$ = 26 % | $R_{thJB\ elec.}$ | typ. | 0.67 K / W |



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## Brightness Groups

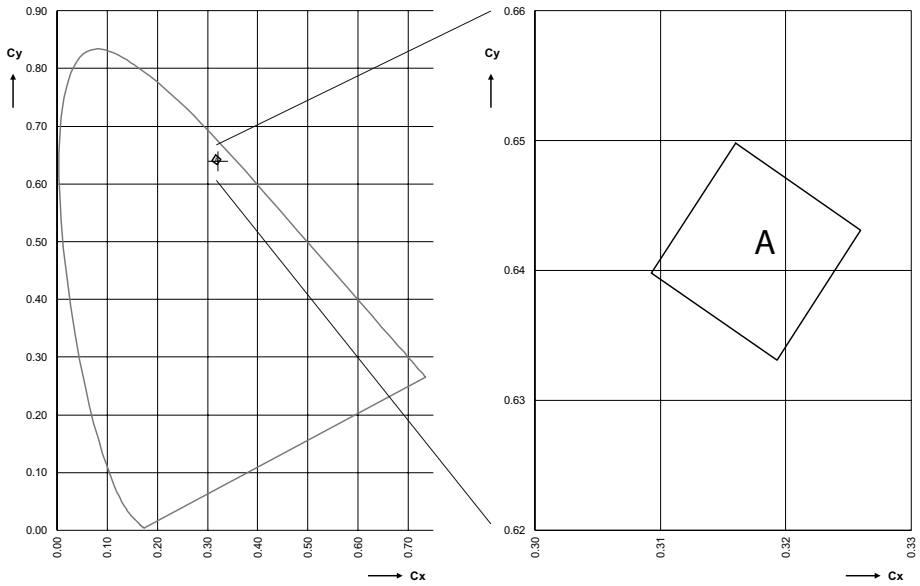
| Group | Luminous Flux [1] $I_F$ = 8000 mA min. $\Phi_V$ | Luminous Flux [1] $I_F$ = 8000 mA max. $\Phi_V$ |
|---|---|---|
| US | 5630 lm | 6100 lm |
| UT | 6100 lm | 6580 lm |
| UU | 6580 lm | 7100 lm |
| VP | 7100 lm | 7630 lm |
| VQ | 7630 lm | 8200 lm |



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## Chromaticity Coordinate Groups

within λ = 500 ... 600 nm




## Chromaticity Coordinate Groups [3)]

| Group | Cx | Cy |
|---|---|---|
| A | 0.3193 | 0.6331 |
| | 0.3093 | 0.6398 |
| | 0.3160 | 0.6498 |
| | 0.3260 | 0.6431 |

## Group Name on Label

**Example: US-A**

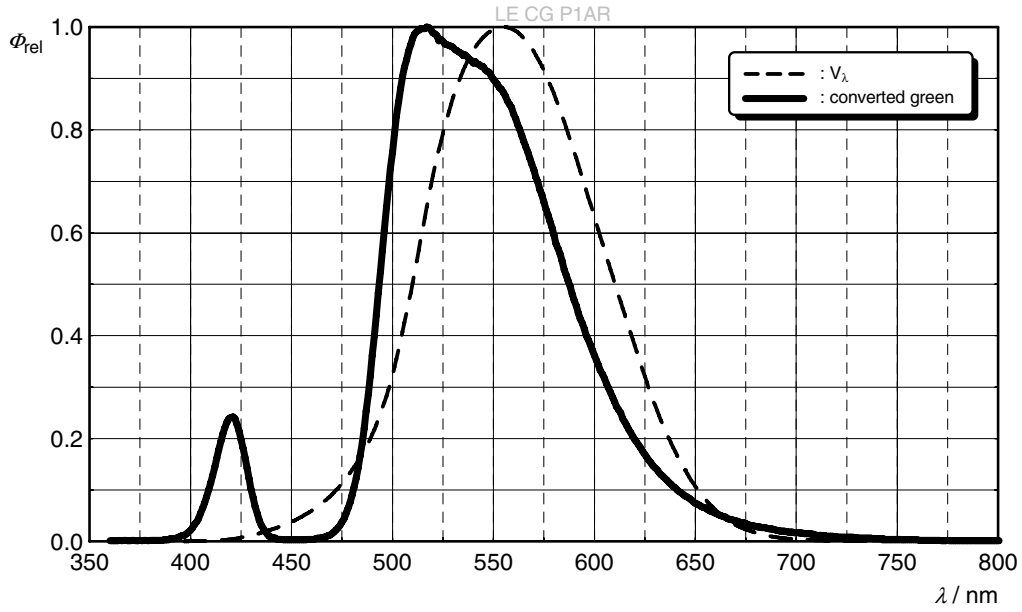
| Brightness | Color Chromaticity |
|---|---|
| US | A |



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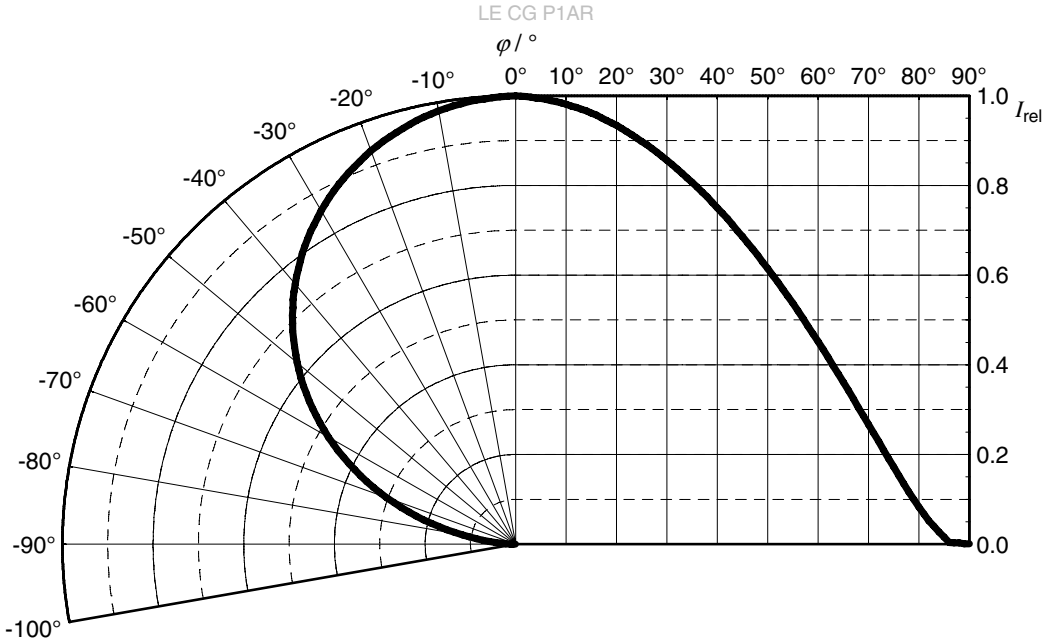
## Relative Spectral Emission [4)]

$\Phi_{rel} = f(\lambda)$; $I_F$ = 8000 mA; $T_J$ = 25 °C




## Radiation Characteristics [4)]

$I_{rel} = f(\phi)$; $T_J$ = 25 °C

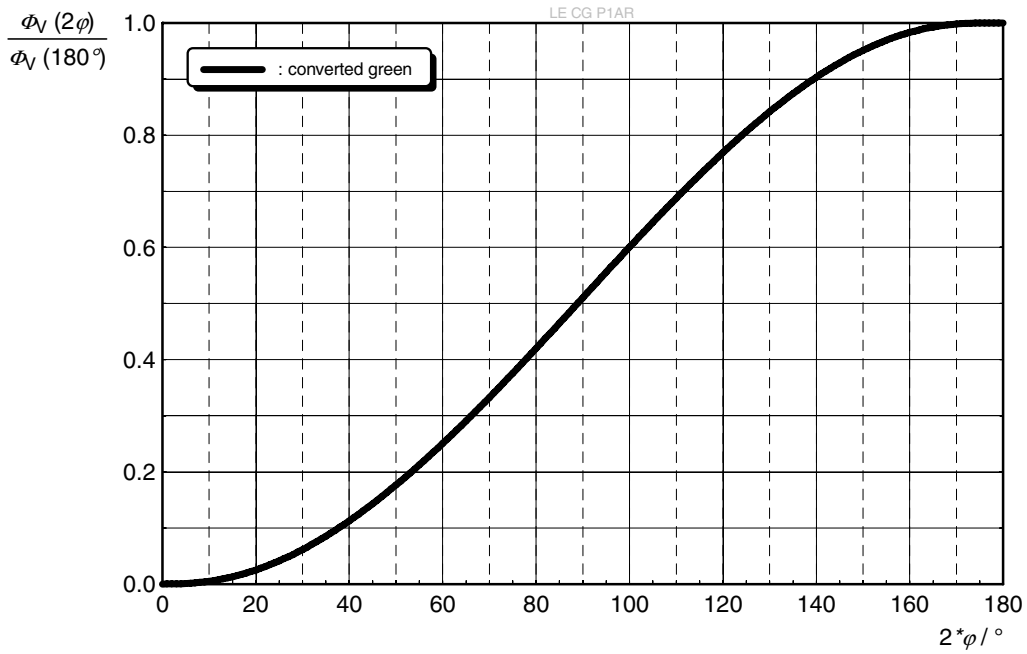





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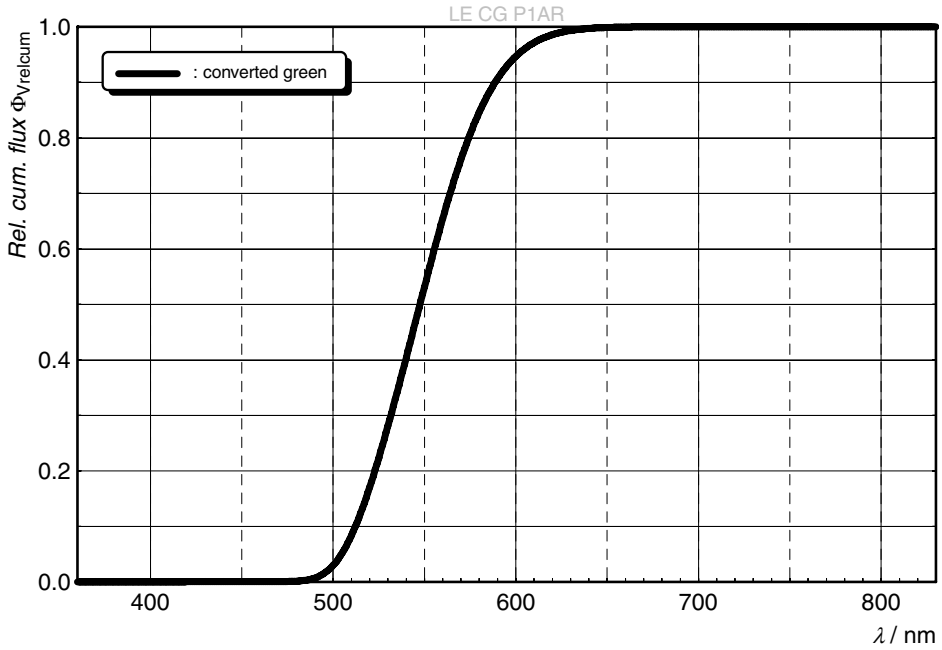
## Relative Partial Flux [4)]

$\Phi_v(2\varphi)/\Phi_v(180°) = f(\varphi)$; $T_J$ = 25 °C




## Relative cumulated Luminous Flux [4)]

$\Phi_{Vrel - cum} = f(\lambda)$; $I_F$ = 8000 mA; $T_J$ = 25 °C

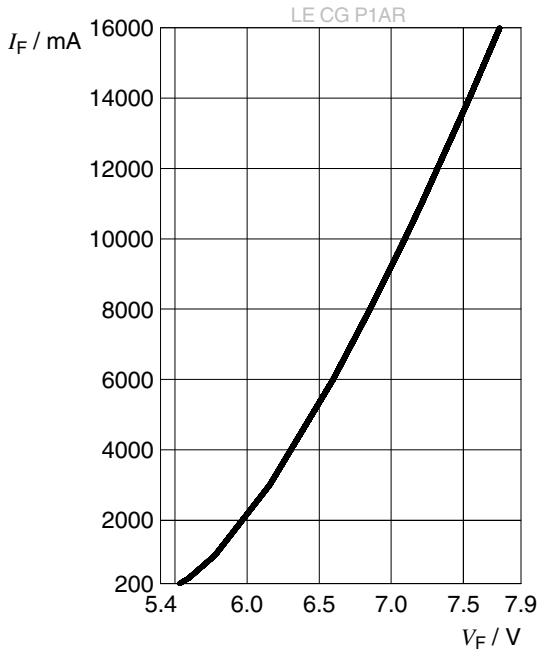





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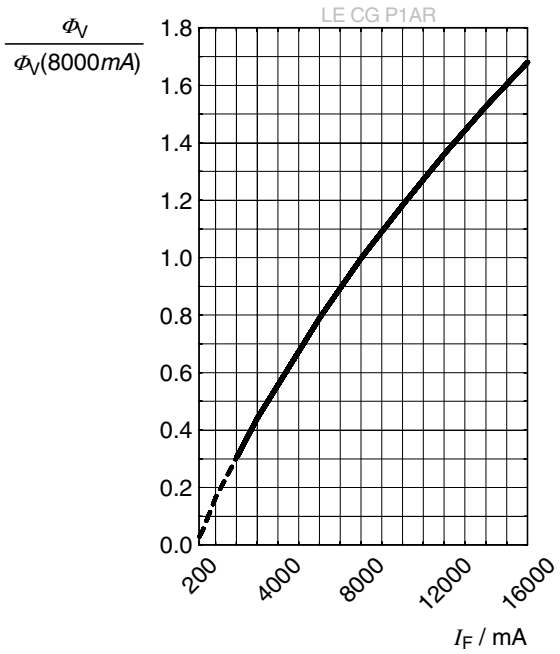
## Forward current [4]

$I_F = f(V_F)$; $T_J$ = 25 °C



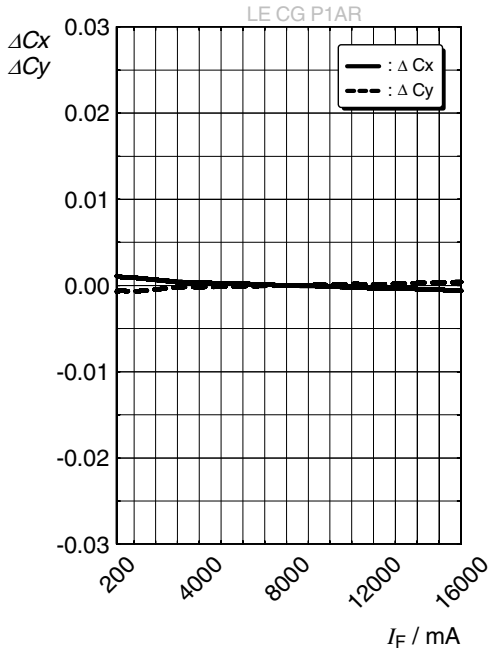

## Relative Luminous Flux [4], [6]

$\Phi_v/\Phi_v(8000\ mA) = f(I_F)$; $T_J$ = 25 °C



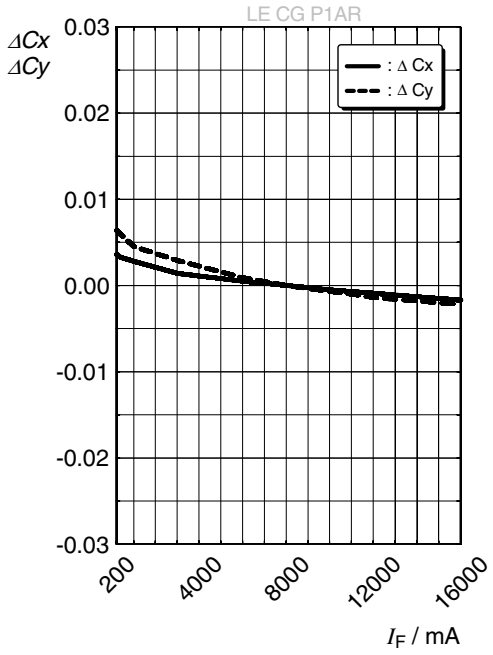

## Chromaticity Coordinate Shift [4]

ΔCx, ΔCy = f(IF); Tj = 25 °C;
within λ = 500 ... 600 nm




## Chromaticity Coordinate Shift [4]

ΔCx, ΔCy = f(IF); TJ = 25 °C;
full spectral range

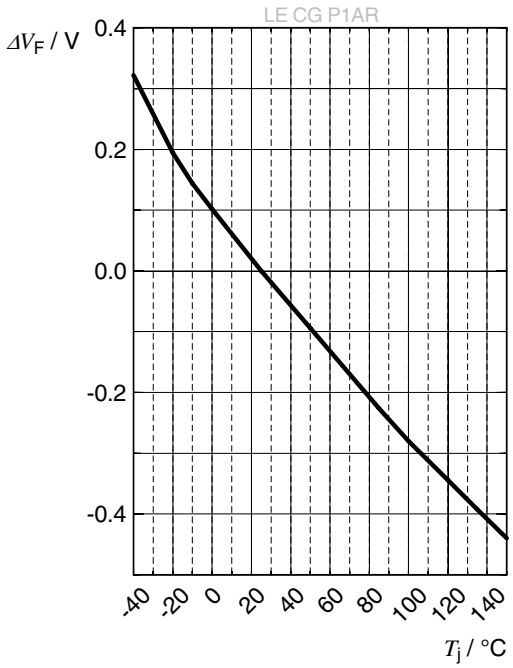





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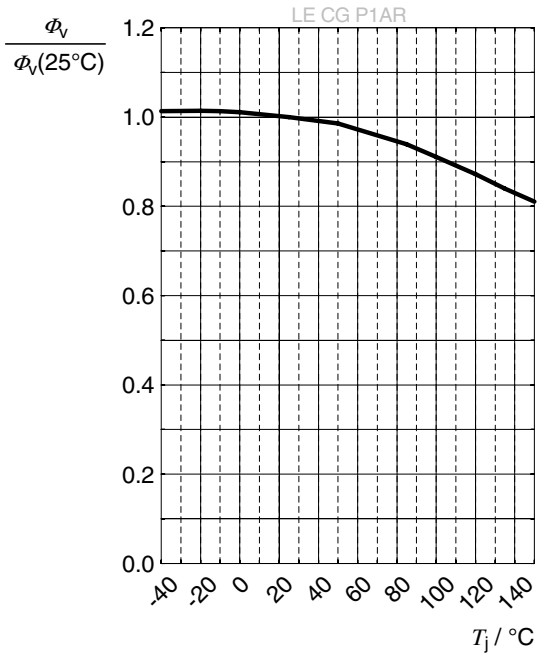
## Forward Voltage [4)]

$\Delta V_F = V_F - V_F(25\ °C) = f(T_j);\ I_F = 8000\ mA$



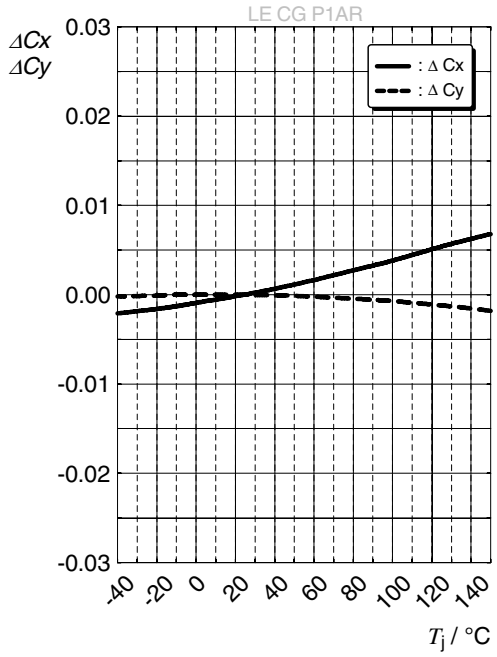

## Relative Luminous Flux [4)]

$\Phi_v/\Phi_v(25\ °C) = f(T_j);\ I_F = 8000\ mA$



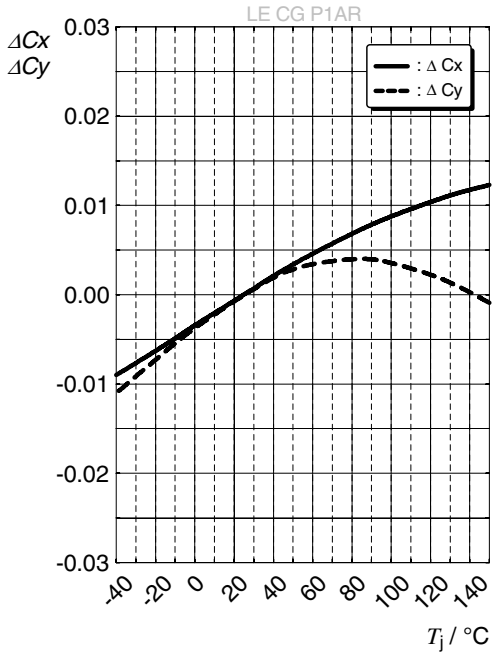

## Chromaticity Coordinate Shift [4)]

ΔCx, ΔCy = f(Tj); IF = 8000 mA;
within λ = 500 ... 600 nm




## Chromaticity Coordinate Shift [4)]

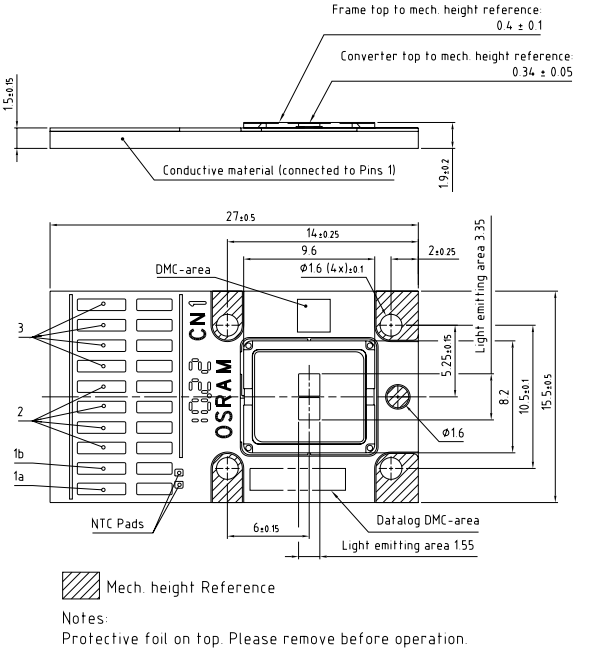
ΔCx, ΔCy = f(Tj); IF = 8000 mA;
full spectral range






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## Dimensional Drawing [7)]




## Further Information:

**Approximate Weight:** 5,000.0 mg

**ESD advice:** The device is protected by ESD device which is connected in parallel to the Chip.

**Notes:** For superior solder joint connectivity results we recommend soldering under standard nitrogen atmosphere.
Package not suitable for any kind of wet cleaning or ultrasonic cleaning.

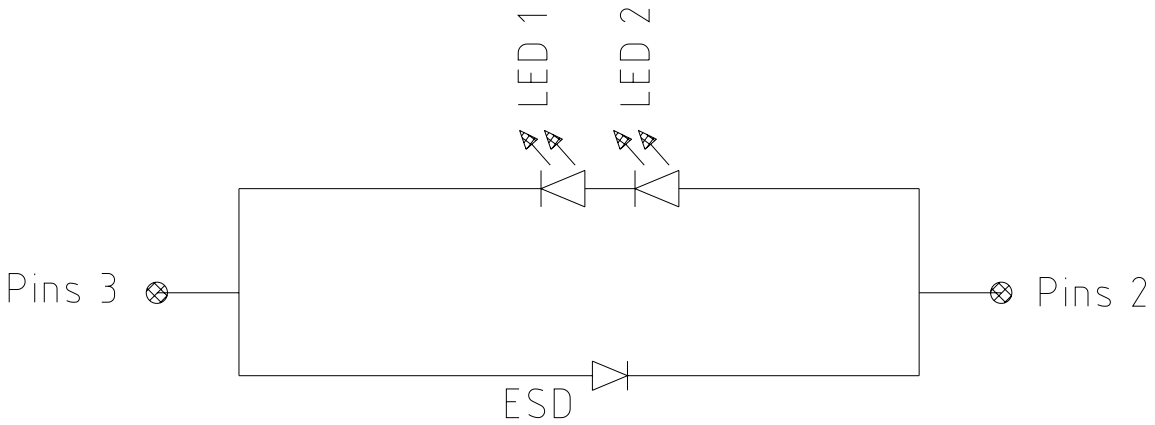
**Connector:** TYU, TU1502 Series, 1.50mm Pitch, Wire to Board Wafer,
Part Number TU1502WNR-10S-*-*

**Recommended mating connector:** TYU, TU1502 Series, 1.50mm Pitch, Wire to Board Housing,
Part Number TU1502HNO-10
TYU, TU1502 Series, 1.50mm Pitch, Terminal,
Part Number TU1502TPO-*



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## Electrical Internal Circuit



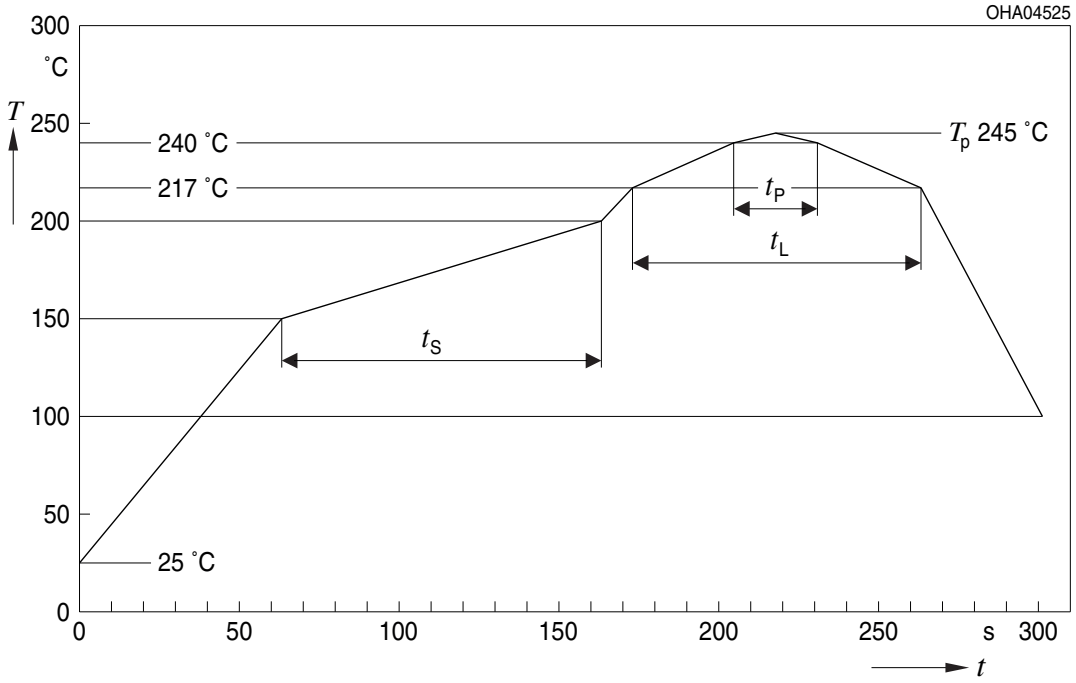

Pins 1a: NTC/Substrate potential, isolated from Cathode and Anode
Pins 1b: NTC
Pins 2: Anode
Pins 3: Cathode



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## Reflow Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E




| Profile Feature | Symbol | Pb-Free (SnAgCu) Assembly | | | Unit |
|---|---|---|---|---|---|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up rate to preheat*)<br>25 °C to 150 °C | | | 2 | 3 | K/s |
| Time $t_S$<br>$T_{Smin}$ to $T_{Smax}$ | $t_S$ | 60 | 100 | 120 | s |
| Ramp-up rate to peak*)<br>$T_{Smax}$ to $T_P$ | | | 2 | 3 | K/s |
| Liquidus temperature | $T_L$ | | 217 | | °C |
| Time above liquidus temperature | $t_L$ | | 80 | 100 | s |
| Peak temperature | $T_P$ | | 245 | 260 | °C |
| Time within 5 °C of the specified peak temperature $T_P$ - 5 K | $t_P$ | 10 | 20 | 30 | s |
| Ramp-down rate*<br>$T_P$ to 100 °C | | | 3 | 6 | K/s |
| Time<br>25 °C to $T_P$ | | | | 480 | s |

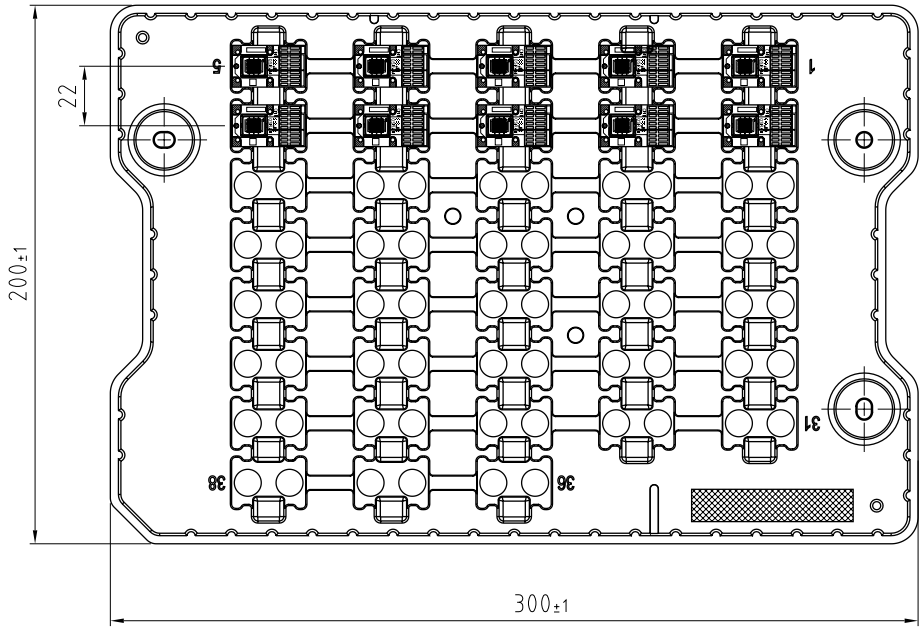
All temperatures refer to the center of the package, measured on the top of the component
* slope calculation DT/Dt: Dt max. 5 s; fulfillment for the whole T-range



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## Tray [7)]

38 pieces per tray

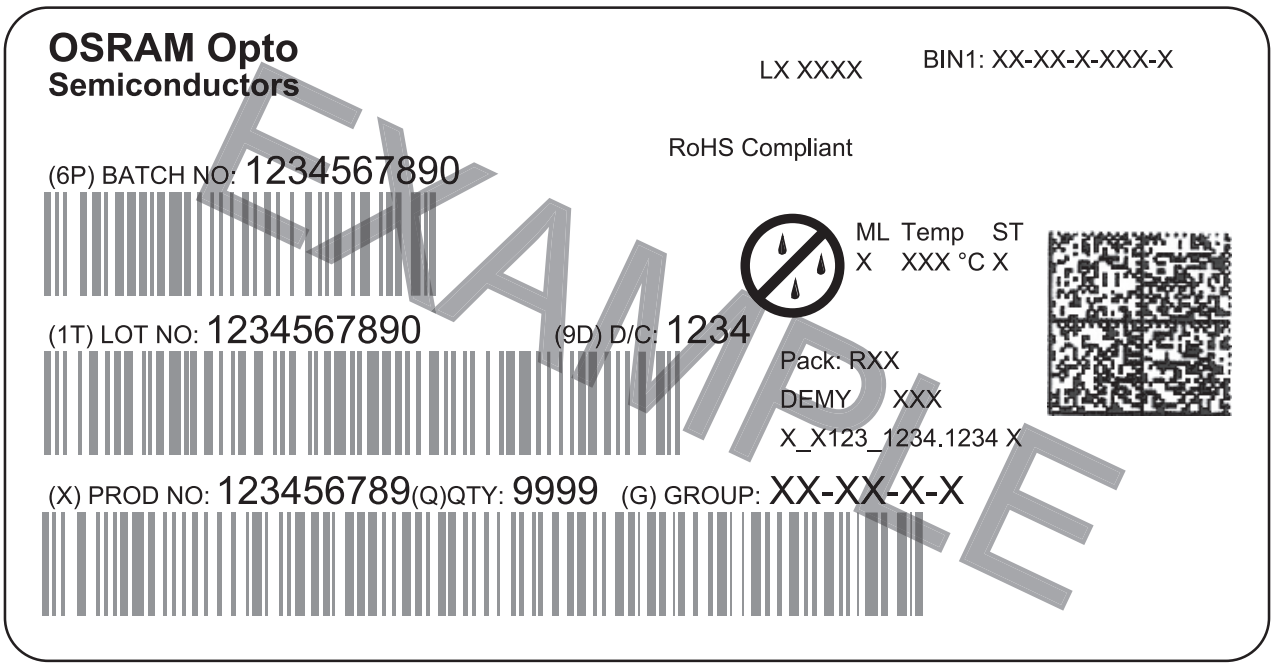



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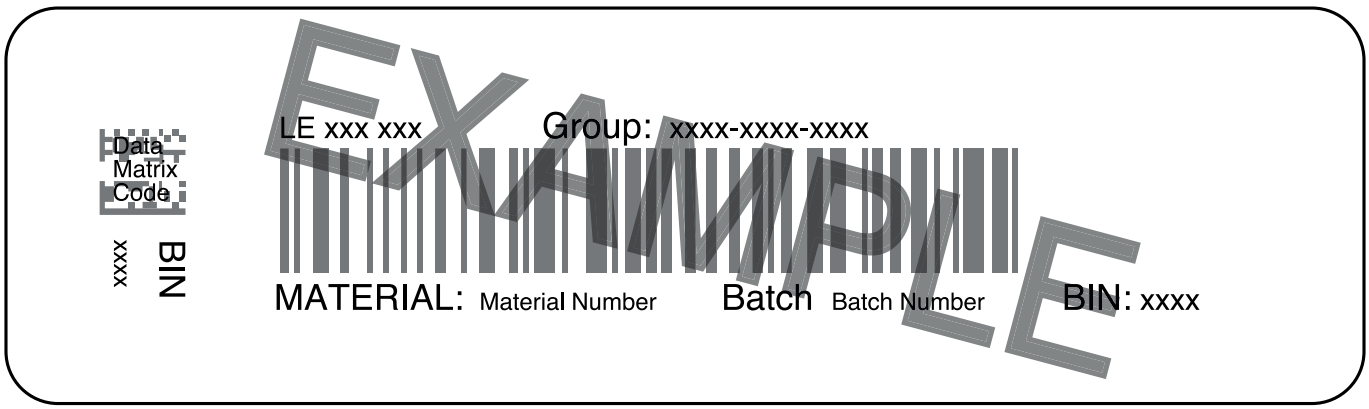
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## Barcode-Product-Label (BPL)




OHA04563

## Barcode-Tray-Label (BTL)

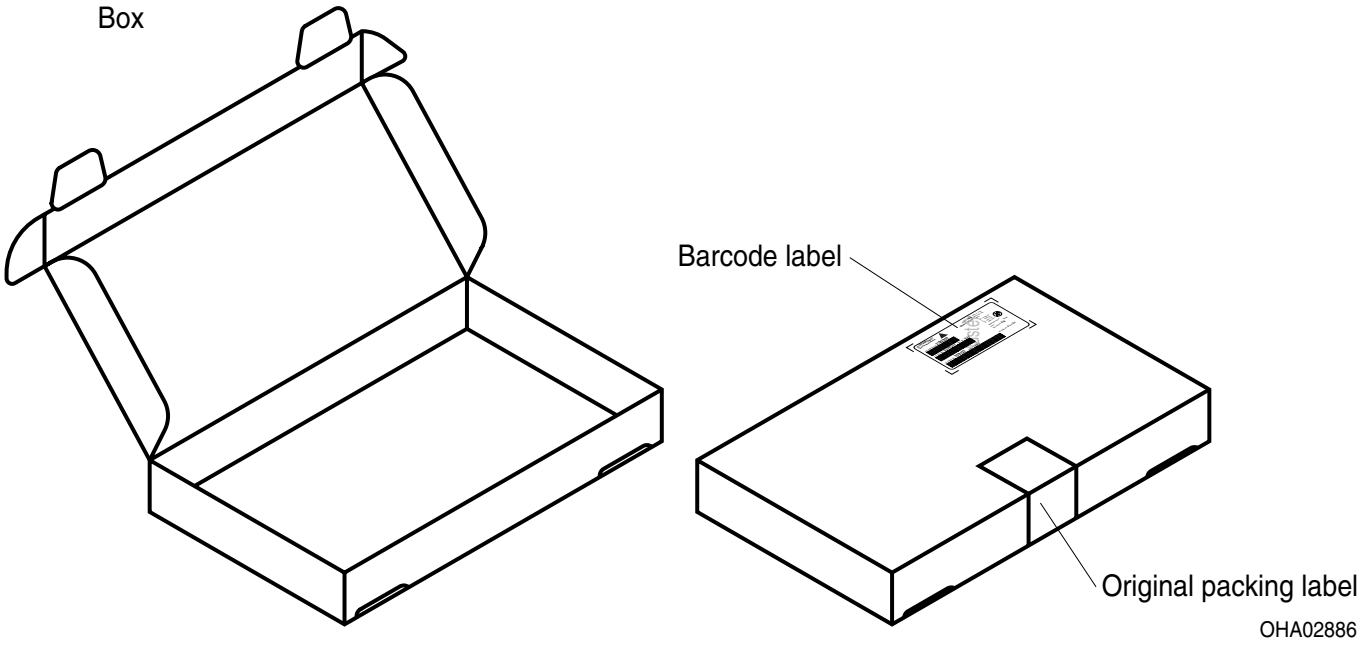



OHA02684_1



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## Schematic Transportation Box [7)]




## Dimensions of Transportation Box

| Width | Length | Height |
|---|---|---|
| 333 ± 5 mm | 218 ±5 mm | 28 ± 5 mm |
| 337 ± 5 mm | 218 ±5 mm | 63 ± 5 mm |



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## Data Matrix Code Description

The Data Matrix Code bin information is Laser marked during testing

Content: aaaa@bbbb@ccc@ddddd@eeeee

Data Matrix Code Type: ECC200

| | |
|---|---|
| a = Luminous Flux (Phiv) [lm] or Radiant Flux (Phie) [W] | (example: 3306) |
| b = Forward Voltage (Vf) [V] | (example: 3.46) |
| c = Wavelength (Ldom) [nm] | (example: 618) |
| d = Color Coordinate Cx | (example: 0.321) |
| e = Color Coordinate Cy | (example: 0.641) |

@: Seperator = Blank



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## Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the device specified in this data sheet fall into the class **moderate risk (exposure time 0.25 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit www.osram-os.com/appnotes



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# Disclaimer

### Attention please!

The information describes the type of component and shall not be considered as assured characteristics.
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.
If printed or downloaded, please find the latest version on our website.

### Packing

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 must 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.

### Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.
Our products are not qualified at module and system level for such application.

In case buyer – or customer supplied by buyer – considers using our components in product safety devices/ applications or medical devices/applications, buyer and/or customer has to inform our local sales partner immediately and we and buyer and /or customer will analyze and coordinate the customer-specific request between us and buyer and/or customer.



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## Glossary

1) **Brightness:** Brightness values are measured during a pulse train of 100 ms with a pulse width of 500 µs and a frequencey of 1 kHz, with an internal reproducibility of +/- 8 % and an expanded uncertainty of +/- 11 % (acc. to GUM with a coverage factor of k = 3). The peak brightness is calculated according to the pulse duration and frequency.

2) **Reverse Operation:** This product is intended to be operated applying a forward current within the specified range. Applying any continuous reverse bias or forward bias below the voltage range of light emission shall be avoided because it may cause migration which can change the electro-optical characteristics or damage the LED.

3) **Chromaticity coordinate groups:** Chromaticity coordinates are measured during a pulse train of 100 ms with a pulse width of 500 µs and a frequencey of 1 kHz , with an internal reproducibility of +/- 0,005 and an expanded uncertainty of +/- 0,01 (acc. to GUM with a coverage factor of k = 3).

4) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, 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.

5) **Forward Voltage:** The forward voltage is measured during a pulse of typical 500 µs, with an internal reproducibility of +/- 0,05 V and an expanded uncertainty of +/- 0,1 V (acc. to GUM with a coverage factor of k=3).

6) **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.

7) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ±0.1 and dimensions are specified in mm.



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## Revision History

| Version | Date | Change |
|---|---|---|
| 1.0 | 2021-05-31 | Initial Version |
| 1.1 | 2021-07-19 | Characteristics |
| 1.2 | 2022-08-17 | Dimensional Drawing |



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