

**Golden DRAGON with Lens**  
**Enhanced Optical Power LED (ThinGaN)**  
**Lead (Pb) Free Product - RoHS Compliant**

**LCW W51M**

**Vorläufige Daten für OS-PCN-2009-033-A/  
Preliminary Data for OS-PCN-2009-033-A**

**Abkündigung nach OS-PD-2010-003  
Obsolete acc. to OS-PD-2010-003**



**Besondere Merkmale**

- **Gehäusetypp:** weißes SMD Gehäuse, klarer Silikon - Verguss mit Optik, Chip level conversion
- **Besonderheit des Bauteils:** Lichtquelle mit hoher Lichtausbeute bei geringem Platzbedarf.
- **Farbort:**  $x = 0,42$ ,  $y = 0,40$  nach CIE 1931 (weiß)
- **Farbtemperatur:** 2500 K bis 4800 K
- **Farbwiedergabeindex:** 80
- **Abstrahlwinkel:** 20°, enger Abstrahlwinkel
- **Technologie:** ThinGaN
- **optischer Wirkungsgrad:** 50 lm/W bei 3500 K
- **Gruppierungsparameter:** Lichtstrom, Farbort
- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** Selektivlöten
- **Vorbehandlung:** nach JEDEC Level 4
- **Gurtung:** 24-mm Gurt mit 100/Rolle,  $\varnothing 180$  mm
- **ESD-Festigkeit:** ESD-sicher bis 8 kV nach JESD22-A114-D
- **Erweiterte Korrosionsfestigkeit:** Details siehe Seite 15

**Anwendungen**

- Tragbare Beleuchtung z.B. am Fahrrad
- Dekorative Beleuchtung
- Signal- und Symbolleuchten zur Orientierung
- Markierungsbeleuchtung (Stufen, Fluchtwege, u.ä.)
- Fassadenbeleuchtung im Innen- und Außenbereich
- Spotbeleuchtung / kontrastreiche Beleuchtung
- Vitrinenbeleuchtung
- Taschenlampen
- Effektleuchtung: Sternenhimmel

**Features**

- **package:** white SMD package, colorless clear silicone resin with optic, chip level conversion
- **feature of the device:** lightsource with high luminous efficiency and small dimensions
- **color coordinates:**  $x = 0.42$ ,  $y = 0.40$  acc. to CIE 1931 (white)
- **color temperature:** 2500 K to 4800 K
- **color reproduction index:** 80
- **viewing angle:** 20°, narrow viewing angle
- **technology:** ThinGaN
- **optical efficiency:** 50 lm/W at 3500 K
- **grouping parameter:** luminous flux, color coordinates
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** selective soldering
- **preconditioning:** acc. to JEDEC Level 4
- **taping:** 24 mm tape with 100/reel,  $\varnothing 180$  mm
- **ESD-withstand voltage:** up to 8 kV acc. to JESD22-A114-D
- **Superior Corrosion Robustness:** details see page 15

**Applications**

- portable light source (e.g. bicycle)
- decorative and entertainment lighting
- signal and symbol luminaire for orientation
- marker lights (e.g. steps, exit ways, etc.)
- indoor and outdoor commercial and residential architectural lighting
- spot lighting / high contrast lighting
- glass cabinet lighting
- flashlight
- effect illumination: starry sky

**Bestellinformation**  
**Ordering Information**

| Typ                 | Farbtemperatur    | Lichtstrom <sup>1)</sup> Seite 21               | Lichtstärke<br>2) Seite 21                    | Bestellnummer |
|---------------------|-------------------|-------------------------------------------------|-----------------------------------------------|---------------|
| Type                | color temperature | Luminous Flux <sup>1)</sup> page 21             | Luminous Intensity<br>2) page 21              | Ordering Code |
|                     |                   | $I_F = 350 \text{ mA}$<br>$\Phi_V \text{ (lm)}$ | $I_F = 350 \text{ mA}$<br>$I_V \text{ (mcd)}$ |               |
| ■LCW W51M-HZJZ-4U9X | 2700 K            | 39.000 ... 71.000                               | 126.500 (typ.)                                | Q65110A7893   |
| ■LCW W51M-HZJZ-4R9T | 3000 K            | 39.000 ... 71.000                               | 126.500 (typ.)                                | Q65110A7892   |
| ■LCW W51M-JXKX-4O9Q | 3500 K            | 45.000 ... 82.000                               | 146.000 (typ.)                                | Q65110A7894   |
| ■LCW W51M-JYKY-4L8N | 4000 K            | 52.000 ... 97.000                               | 171.400 (typ.)                                | Q65110A7896   |
| ■LCW W51M-JYKY-4J8K | 4500 K            | 52.000 ... 97.000                               | 171.400 (typ.)                                | Q65110A7895   |

■Abgekündigt nach OS-PD-2010-003 - wird ersetzt werden durch LCW CP7P  
 Obsolete acc. to OS-PD-2010-003 - will be replaced by LCW CP7P  
 Letzte Bestellung / Last Order: 2010-08-20  
 Letzte Lieferung / Last Delivery: 2011-02-20

Anm.: Die oben genannten Typbezeichnungen umfassen die bestellbaren Selektionen. Diese bestehen aus wenigen Helligkeitsgruppen (siehe **Seite 10** für nähere Informationen). Es wird nur eine einzige Helligkeitsgruppe pro Gurt geliefert. Z.B.: LCW W51M-HZJZ-4R9T bedeutet, dass auf dem Gurt nur eine der Helligkeitsgruppen HZ, JX, JY oder JZ enthalten ist.  
 Um die Liefersicherheit zu gewährleisten, können einzelne Helligkeitsgruppen nicht bestellt werden.

Gleiches gilt für die Farben, bei denen Farbortgruppen gemessen und gruppiert werden. Pro Gurt wird nur eine Farbortgruppe geliefert. Z.B.: LCW W51M-HZJZ-4R9T bedeutet, dass auf dem Gurt nur eine der Farbortgruppen -4R bis -9T enthalten ist (siehe **Seite 5** für nähere Information).  
 Um die Liefersicherheit zu gewährleisten, können einzelne Farbortgruppen nicht bestellt werden.

Note: The above Type Numbers represent the order groups which include only a few brightness groups (see **page 10** for explanation). Only one group will be shipped on each reel (there will be no mixing of two groups on each reel). E.g. LCW W51M-HZJZ-4R9T means that only one group HZ, JX, JY or JZ will be shippable for any one reel.  
 In order to ensure availability, single brightness groups will not be orderable.

In a similar manner for colors where chromaticity coordinate groups are measured and binned, single chromaticity coordinate groups will be shipped on any one reel. E.g. LCW W51M-HZJZ-4R9T means that only 1 chromaticity coordinate group -4R to -9T will be shippable on each reel (see **page 5** for explanation).  
 In order to ensure availability, single chromaticity coordinate groups will not be orderable.

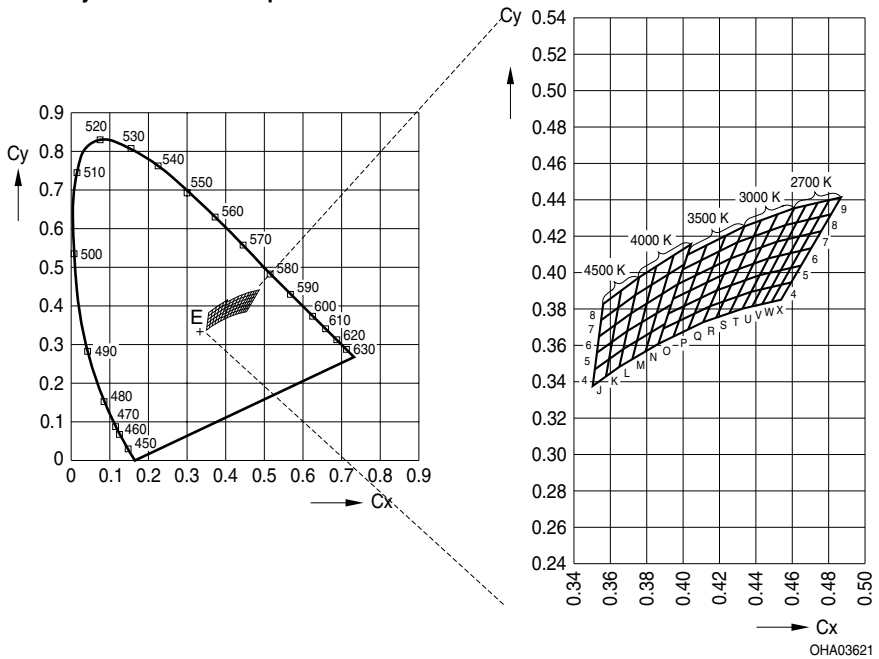
**Grenzwerte**  
**Maximum Ratings**

| Bezeichnung<br>Parameter                                                                     | Symbol<br>Symbol             | Wert<br>Value                         | Einheit<br>Unit |
|----------------------------------------------------------------------------------------------|------------------------------|---------------------------------------|-----------------|
| Betriebstemperatur<br>Operating temperature range                                            | $T_{op}$                     | – 40 ... + 85                         | °C              |
| Lagertemperatur<br>Storage temperature range                                                 | $T_{stg}$                    | – 40 ... + 100                        | °C              |
| Sperrschichttemperatur<br>Junction temperature                                               | $T_j$                        | 125                                   | °C              |
| Durchlassstrom<br>Forward current<br>( $T_S=25^\circ\text{C}$ )                              | (min.) $I_F$<br>(max.) $I_F$ | 100<br>400                            | mA<br>mA        |
| Stoßstrom<br>Surge current<br>$t \leq 10 \mu\text{s}$ , $D = 0.005$ , $T_S=25^\circ\text{C}$ | $I_{FM}$                     | 2000                                  | mA              |
| Sperrspannung<br>Reverse voltage<br>( $T_S=25^\circ\text{C}$ )                               | $V_R$                        | not designed for<br>reverse operation | V               |

**Kennwerte**  
**Characteristics**  
 $(T_S = 25\text{ }^{\circ}\text{C})$

| Bezeichnung<br>Parameter                                                                                                                                  | Symbol<br>Symbol                         | Wert<br>Value                         | Einheit<br>Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|---------------------------------------|-----------------|
| Farbkoordinate x nach CIE 1931 <sup>3)</sup> Seite 21 (typ.)<br>Chromaticity coordinate x acc. to CIE 1931 <sup>3)</sup> page 21<br>$I_F = 350\text{ mA}$ | x                                        | 0.42                                  | —               |
| Farbkoordinate y nach CIE 1931 <sup>3)</sup> Seite 21 (typ.)<br>Chromaticity coordinate y acc. to CIE 1931 <sup>3)</sup> page 21<br>$I_F = 350\text{ mA}$ | y                                        | 0.40                                  | —               |
| Farbtemperatur <sup>2)</sup> Seite 21 (min.)<br>Color temperature <sup>2)</sup> page 21<br>$I_F = 350\text{ mA}$ (max.)                                   | $T$<br>$T$<br>$T$                        | 2500<br><br>4800                      | K<br>K<br>K     |
| Abstrahlwinkel bei 50 % $I_V$ (Vollwinkel) (typ.)<br>Viewing angle at 50 % $I_V$                                                                          | $2\varphi$                               | 20                                    | Grad<br>deg.    |
| Durchlassspannung <sup>4)</sup> Seite 21 (min.)<br>Forward voltage <sup>4)</sup> page 21 (typ.)<br>$I_F = 350\text{ mA}$ (max.)                           | $V_F$<br>$V_F$<br>$V_F$                  | 2.7<br>3.2<br>3.7                     | V<br>V<br>V     |
| Sperrstrom<br>Reverse current (max.)                                                                                                                      | $I_R$                                    | not designed for<br>reverse operation | $\mu\text{A}$   |
| Wärmewiderstand<br>Thermal resistance<br>Sperrschicht/Lötpad (typ.)<br>Junction/soldering point (max.)                                                    | $R_{th\text{ JS}}$<br>$R_{th\text{ JS}}$ | 6.5<br>11**                           | K/W<br>K/W      |

Farbortgruppen<sup>3)</sup> Seite 21  
Chromaticity Coordinate Groups<sup>3)</sup> page 21



Farbtemperatur 2700 K  
Color temperature 2700K

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4U              | 0.433 | 0.380 |
|                 | 0.437 | 0.389 |
|                 | 0.443 | 0.391 |
|                 | 0.438 | 0.381 |
| 5U              | 0.437 | 0.389 |
|                 | 0.442 | 0.398 |
|                 | 0.448 | 0.400 |
|                 | 0.443 | 0.391 |
| 6U              | 0.442 | 0.398 |
|                 | 0.447 | 0.408 |
|                 | 0.453 | 0.409 |
|                 | 0.448 | 0.400 |
| 7U              | 0.447 | 0.408 |
|                 | 0.451 | 0.417 |
|                 | 0.458 | 0.418 |
|                 | 0.453 | 0.409 |
| 8U              | 0.451 | 0.417 |
|                 | 0.456 | 0.426 |
|                 | 0.462 | 0.427 |
|                 | 0.458 | 0.418 |
| 9U              | 0.456 | 0.426 |
|                 | 0.461 | 0.435 |
|                 | 0.467 | 0.437 |
|                 | 0.462 | 0.427 |
| 4V              | 0.438 | 0.381 |
|                 | 0.443 | 0.391 |
|                 | 0.448 | 0.392 |
|                 | 0.443 | 0.383 |
| 5V              | 0.443 | 0.391 |
|                 | 0.448 | 0.400 |
|                 | 0.453 | 0.401 |
|                 | 0.448 | 0.392 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 6V              | 0.448 | 0.400 |
|                 | 0.453 | 0.409 |
|                 | 0.459 | 0.410 |
|                 | 0.453 | 0.401 |
| 7V              | 0.453 | 0.409 |
|                 | 0.458 | 0.418 |
|                 | 0.464 | 0.420 |
|                 | 0.459 | 0.410 |
| 8V              | 0.458 | 0.418 |
|                 | 0.462 | 0.427 |
|                 | 0.469 | 0.429 |
|                 | 0.464 | 0.420 |
| 9V              | 0.462 | 0.427 |
|                 | 0.467 | 0.437 |
|                 | 0.474 | 0.438 |
|                 | 0.469 | 0.429 |
| 4W              | 0.443 | 0.383 |
|                 | 0.448 | 0.392 |
|                 | 0.454 | 0.393 |
|                 | 0.448 | 0.384 |
| 5W              | 0.448 | 0.392 |
|                 | 0.453 | 0.401 |
|                 | 0.459 | 0.402 |
|                 | 0.454 | 0.393 |
| 6W              | 0.453 | 0.401 |
|                 | 0.459 | 0.410 |
|                 | 0.464 | 0.412 |
|                 | 0.459 | 0.402 |
| 7W              | 0.459 | 0.410 |
|                 | 0.464 | 0.420 |
|                 | 0.470 | 0.421 |
|                 | 0.464 | 0.412 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 8W              | 0.464 | 0.420 |
|                 | 0.469 | 0.429 |
|                 | 0.475 | 0.430 |
|                 | 0.470 | 0.421 |
| 9W              | 0.469 | 0.429 |
|                 | 0.474 | 0.438 |
|                 | 0.480 | 0.440 |
|                 | 0.475 | 0.430 |
| 4X              | 0.448 | 0.384 |
|                 | 0.454 | 0.393 |
|                 | 0.459 | 0.394 |
|                 | 0.454 | 0.385 |
| 5X              | 0.454 | 0.393 |
|                 | 0.459 | 0.402 |
|                 | 0.465 | 0.404 |
|                 | 0.459 | 0.394 |
| 6X              | 0.459 | 0.402 |
|                 | 0.464 | 0.412 |
|                 | 0.470 | 0.413 |
|                 | 0.465 | 0.404 |
| 7X              | 0.464 | 0.412 |
|                 | 0.470 | 0.421 |
|                 | 0.476 | 0.423 |
|                 | 0.470 | 0.413 |
| 8X              | 0.470 | 0.421 |
|                 | 0.475 | 0.430 |
|                 | 0.481 | 0.432 |
|                 | 0.476 | 0.423 |
| 9X              | 0.475 | 0.430 |
|                 | 0.480 | 0.440 |
|                 | 0.487 | 0.441 |
|                 | 0.481 | 0.432 |

Farbtemperatur 3000 K  
Color temperature 3000 K

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4R              | 0.411 | 0.373 |
|                 | 0.415 | 0.381 |
|                 | 0.422 | 0.384 |
|                 | 0.418 | 0.375 |
| 5R              | 0.415 | 0.381 |
|                 | 0.419 | 0.390 |
|                 | 0.426 | 0.393 |
|                 | 0.422 | 0.384 |
| 6R              | 0.419 | 0.390 |
|                 | 0.422 | 0.399 |
|                 | 0.430 | 0.402 |
|                 | 0.426 | 0.293 |
| 7R              | 0.422 | 0.399 |
|                 | 0.426 | 0.408 |
|                 | 0.435 | 0.411 |
|                 | 0.430 | 0.402 |
| 8R              | 0.426 | 0.408 |
|                 | 0.430 | 0.417 |
|                 | 0.439 | 0.420 |
|                 | 0.435 | 0.411 |
| 9R              | 0.430 | 0.417 |
|                 | 0.434 | 0.425 |
|                 | 0.443 | 0.429 |
|                 | 0.439 | 0.420 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4S              | 0.418 | 0.375 |
|                 | 0.422 | 0.384 |
|                 | 0.430 | 0.387 |
|                 | 0.425 | 0.378 |
| 5S              | 0.422 | 0.384 |
|                 | 0.426 | 0.393 |
|                 | 0.434 | 0.396 |
|                 | 0.430 | 0.387 |
| 6S              | 0.426 | 0.393 |
|                 | 0.430 | 0.402 |
|                 | 0.439 | 0.405 |
|                 | 0.434 | 0.396 |
| 7S              | 0.430 | 0.402 |
|                 | 0.435 | 0.411 |
|                 | 0.443 | 0.414 |
|                 | 0.439 | 0.405 |
| 8S              | 0.435 | 0.411 |
|                 | 0.439 | 0.420 |
|                 | 0.447 | 0.423 |
|                 | 0.443 | 0.414 |
| 9S              | 0.439 | 0.420 |
|                 | 0.443 | 0.429 |
|                 | 0.452 | 0.432 |
|                 | 0.447 | 0.423 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4T              | 0.425 | 0.378 |
|                 | 0.430 | 0.387 |
|                 | 0.437 | 0.389 |
|                 | 0.433 | 0.380 |
| 5T              | 0.430 | 0.387 |
|                 | 0.434 | 0.396 |
|                 | 0.442 | 0.398 |
|                 | 0.437 | 0.389 |
| 6T              | 0.434 | 0.396 |
|                 | 0.439 | 0.405 |
|                 | 0.447 | 0.408 |
|                 | 0.442 | 0.398 |
| 7T              | 0.439 | 0.405 |
|                 | 0.443 | 0.414 |
|                 | 0.451 | 0.417 |
|                 | 0.447 | 0.408 |
| 8T              | 0.443 | 0.414 |
|                 | 0.447 | 0.423 |
|                 | 0.456 | 0.426 |
|                 | 0.451 | 0.417 |
| 9T              | 0.447 | 0.423 |
|                 | 0.452 | 0.432 |
|                 | 0.461 | 0.435 |
|                 | 0.456 | 0.426 |

Farbtemperatur 3500 K  
Color temperature 3500 K

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4O              | 0.386 | 0.361 |
|                 | 0.389 | 0.369 |
|                 | 0.398 | 0.373 |
|                 | 0.394 | 0.365 |
| 5O              | 0.389 | 0.369 |
|                 | 0.392 | 0.377 |
|                 | 0.401 | 0.381 |
|                 | 0.398 | 0.373 |
| 6O              | 0.392 | 0.377 |
|                 | 0.394 | 0.385 |
|                 | 0.404 | 0.390 |
|                 | 0.401 | 0.381 |
| 7O              | 0.394 | 0.385 |
|                 | 0.397 | 0.393 |
|                 | 0.407 | 0.398 |
|                 | 0.404 | 0.390 |
| 8O              | 0.397 | 0.393 |
|                 | 0.400 | 0.401 |
|                 | 0.410 | 0.408 |
|                 | 0.407 | 0.398 |
| 9O              | 0.400 | 0.401 |
|                 | 0.402 | 0.410 |
|                 | 0.413 | 0.415 |
|                 | 0.410 | 0.406 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4P              | 0.394 | 0.365 |
|                 | 0.398 | 0.373 |
|                 | 0.406 | 0.377 |
|                 | 0.403 | 0.369 |
| 5P              | 0.398 | 0.373 |
|                 | 0.401 | 0.381 |
|                 | 0.410 | 0.386 |
|                 | 0.406 | 0.377 |
| 6P              | 0.401 | 0.381 |
|                 | 0.404 | 0.390 |
|                 | 0.413 | 0.394 |
|                 | 0.410 | 0.386 |
| 7P              | 0.404 | 0.390 |
|                 | 0.407 | 0.398 |
|                 | 0.416 | 0.403 |
|                 | 0.413 | 0.394 |
| 8P              | 0.407 | 0.398 |
|                 | 0.410 | 0.406 |
|                 | 0.420 | 0.412 |
|                 | 0.416 | 0.403 |
| 9P              | 0.410 | 0.406 |
|                 | 0.413 | 0.415 |
|                 | 0.423 | 0.420 |
|                 | 0.420 | 0.412 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4Q              | 0.403 | 0.369 |
|                 | 0.406 | 0.377 |
|                 | 0.415 | 0.381 |
|                 | 0.411 | 0.373 |
| 5Q              | 0.406 | 0.377 |
|                 | 0.410 | 0.386 |
|                 | 0.419 | 0.390 |
|                 | 0.415 | 0.381 |
| 6Q              | 0.410 | 0.386 |
|                 | 0.413 | 0.394 |
|                 | 0.422 | 0.399 |
|                 | 0.419 | 0.390 |
| 7Q              | 0.413 | 0.394 |
|                 | 0.416 | 0.403 |
|                 | 0.426 | 0.408 |
|                 | 0.422 | 0.399 |
| 8Q              | 0.416 | 0.403 |
|                 | 0.420 | 0.412 |
|                 | 0.430 | 0.417 |
|                 | 0.426 | 0.408 |
| 9Q              | 0.420 | 0.412 |
|                 | 0.423 | 0.420 |
|                 | 0.434 | 0.425 |
|                 | 0.430 | 0.417 |

**Farbtemperatur 4000 K**  
**Color temperature 4000 K**

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4L              | 0.365 | 0.348 |
|                 | 0.367 | 0.358 |
|                 | 0.375 | 0.362 |
|                 | 0.372 | 0.352 |
| 5L              | 0.367 | 0.358 |
|                 | 0.369 | 0.368 |
|                 | 0.377 | 0.373 |
|                 | 0.375 | 0.362 |
| 6L              | 0.369 | 0.368 |
|                 | 0.371 | 0.378 |
|                 | 0.380 | 0.383 |
|                 | 0.377 | 0.373 |
| 7L              | 0.371 | 0.378 |
|                 | 0.374 | 0.387 |
|                 | 0.383 | 0.393 |
|                 | 0.380 | 0.383 |
| 8L              | 0.374 | 0.387 |
|                 | 0.376 | 0.397 |
|                 | 0.385 | 0.403 |
|                 | 0.383 | 0.393 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4M              | 0.372 | 0.352 |
|                 | 0.375 | 0.362 |
|                 | 0.382 | 0.367 |
|                 | 0.379 | 0.356 |
| 5M              | 0.375 | 0.362 |
|                 | 0.377 | 0.373 |
|                 | 0.385 | 0.378 |
|                 | 0.382 | 0.367 |
| 6M              | 0.377 | 0.373 |
|                 | 0.380 | 0.383 |
|                 | 0.388 | 0.388 |
|                 | 0.385 | 0.376 |
| 7M              | 0.380 | 0.383 |
|                 | 0.383 | 0.393 |
|                 | 0.392 | 0.399 |
|                 | 0.388 | 0.388 |
| 8M              | 0.383 | 0.393 |
|                 | 0.385 | 0.403 |
|                 | 0.395 | 0.409 |
|                 | 0.392 | 0.399 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4N              | 0.379 | 0.356 |
|                 | 0.382 | 0.367 |
|                 | 0.390 | 0.372 |
|                 | 0.386 | 0.361 |
| 5N              | 0.382 | 0.367 |
|                 | 0.385 | 0.376 |
|                 | 0.393 | 0.383 |
|                 | 0.390 | 0.372 |
| 6N              | 0.385 | 0.378 |
|                 | 0.388 | 0.388 |
|                 | 0.397 | 0.393 |
|                 | 0.393 | 0.383 |
| 7N              | 0.388 | 0.388 |
|                 | 0.392 | 0.399 |
|                 | 0.401 | 0.404 |
|                 | 0.397 | 0.393 |
| 8N              | 0.392 | 0.399 |
|                 | 0.395 | 0.409 |
|                 | 0.404 | 0.415 |
|                 | 0.401 | 0.404 |

**Farbtemperatur 4500 K**  
**Color temperature 4500 K**

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 4J              | 0.350 | 0.337 |
|                 | 0.351 | 0.347 |
|                 | 0.359 | 0.352 |
|                 | 0.357 | 0.343 |
| 5J              | 0.351 | 0.347 |
|                 | 0.352 | 0.356 |
|                 | 0.361 | 0.362 |
|                 | 0.359 | 0.352 |
| 6J              | 0.352 | 0.356 |
|                 | 0.354 | 0.365 |
|                 | 0.363 | 0.371 |
|                 | 0.361 | 0.362 |
| 7J              | 0.354 | 0.365 |
|                 | 0.355 | 0.374 |
|                 | 0.364 | 0.381 |
|                 | 0.363 | 0.371 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 8J              | 0.355 | 0.374 |
|                 | 0.356 | 0.383 |
|                 | 0.366 | 0.390 |
|                 | 0.364 | 0.381 |
| 4K              | 0.357 | 0.343 |
|                 | 0.359 | 0.352 |
|                 | 0.367 | 0.358 |
|                 | 0.365 | 0.348 |
| 5K              | 0.359 | 0.352 |
|                 | 0.361 | 0.362 |
|                 | 0.369 | 0.368 |
|                 | 0.367 | 0.358 |

| Gruppe<br>Group | Cx    | Cy    |
|-----------------|-------|-------|
| 6K              | 0.361 | 0.362 |
|                 | 0.363 | 0.371 |
|                 | 0.371 | 0.378 |
|                 | 0.369 | 0.368 |
| 7K              | 0.363 | 0.371 |
|                 | 0.364 | 0.381 |
|                 | 0.374 | 0.387 |
|                 | 0.371 | 0.378 |
| 8K              | 0.364 | 0.381 |
|                 | 0.366 | 0.390 |
|                 | 0.376 | 0.397 |
|                 | 0.374 | 0.387 |

### Helligkeits-Gruppierungsschema Brightness Groups

| Helligkeitsgruppe<br>Brightness Group | Lichtstrom <sup>1)</sup> Seite 21<br>Luminous Flux <sup>1)</sup> page 21 | Lichtstärke <sup>2)</sup> Seite 21<br>Luminous Intensity <sup>2)</sup> page 21 |
|---------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------|
|                                       | $\Phi_V$ (lm)                                                            | $I_V$ (mcd)                                                                    |
| HZ                                    | 39.000 ... 45.000                                                        | 96.600 (typ.)                                                                  |
| JX                                    | 45.000 ... 52.000                                                        | 111.550 (typ.)                                                                 |
| JY                                    | 52.000 ... 61.000                                                        | 129.950 (typ.)                                                                 |
| JZ                                    | 61.000 ... 71.000                                                        | 151.800 (typ.)                                                                 |
| KX                                    | 71.000 ... 82.000                                                        | 176.000 (typ.)                                                                 |
| KY                                    | 82.000 ... 97.000                                                        | 205.900 (typ.)                                                                 |

Anm.: Die Standardlieferform von Serientypen beinhaltet eine Familiengruppe. Diese besteht aus wenigen Helligkeitsgruppen. Einzelne Helligkeitsgruppen sind nicht bestellbar.

Note: The standard shipping format for serial types includes a family group of only a few individual brightness groups. Individual brightness groups cannot be ordered.

### Gruppenbezeichnung auf Etikett Group Name on Label

Beispiel: HZ-4R

Example: HZ-4R

| Helligkeitsgruppe<br>Brightness Group | Farbortgruppe<br>Chromaticity Coordinate Group |
|---------------------------------------|------------------------------------------------|
| HZ                                    | 4R                                             |

Anm.: In einer Verpackungseinheit / Gurt ist immer nur eine Helligkeitsgruppe enthalten.

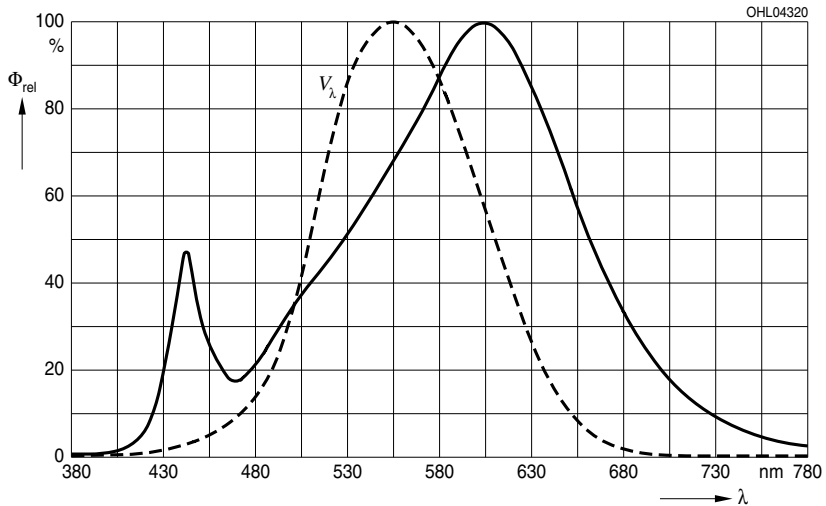
Note: No packing unit / tape ever contains more than one brightness group.

**Relative spektrale Emission**<sup>2)</sup> Seite 21

**Relative Spectral Emission**<sup>2)</sup> page 21

$V(\lambda)$  = spektrale Augenempfindlichkeit / Standard eye response curve

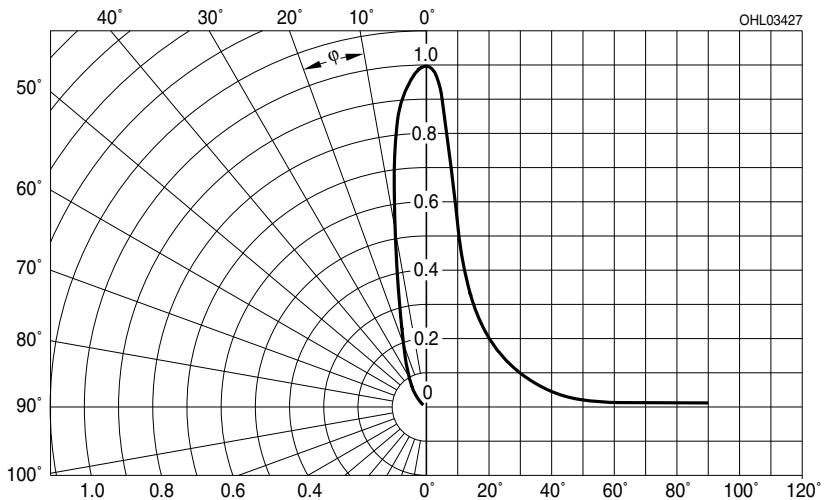
$\Phi_{\text{rel}} = f(\lambda)$ ;  $T_S = 25^\circ\text{C}$ ;  $I_F = 350\text{ mA}$



**Abstrahlcharakteristik**<sup>2)</sup> Seite 21

**Radiation Characteristic**<sup>2)</sup> page 21

$I_{\text{rel}} = f(\varphi)$ ;  $T_S = 25^\circ\text{C}$

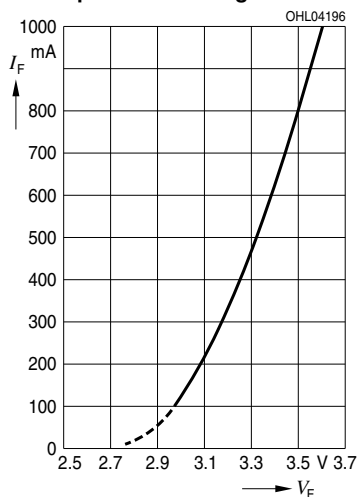


Durchlassstrom<sup>2)4)</sup> Seite 21

Forward Current<sup>2)4)</sup> page 21

$$I_F = f(V_F); T_S = 25^\circ\text{C}$$

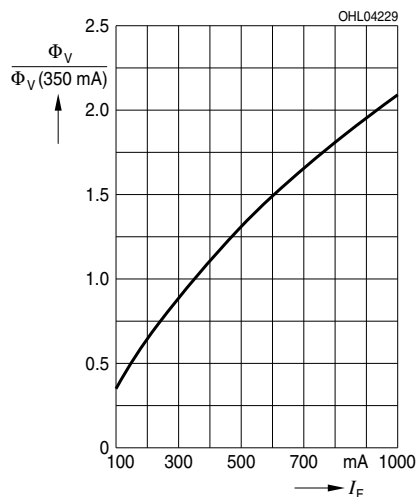
solid line: specified DC-range



Relative Lichtstrom<sup>2)</sup> Seite 21

Relative Luminous Flux<sup>2)</sup> page 21

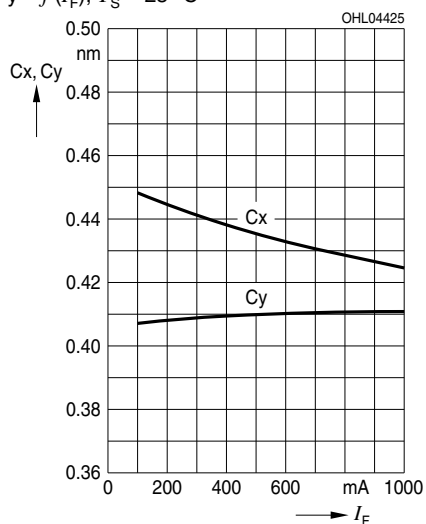
$$\Phi_V / \Phi_V(350 \text{ mA}) = f(I_F); T_S = 25^\circ\text{C}$$



Farbortverschiebung<sup>2)</sup> Seite 21

Chromaticity Coordinate Shift<sup>2)</sup> page 21

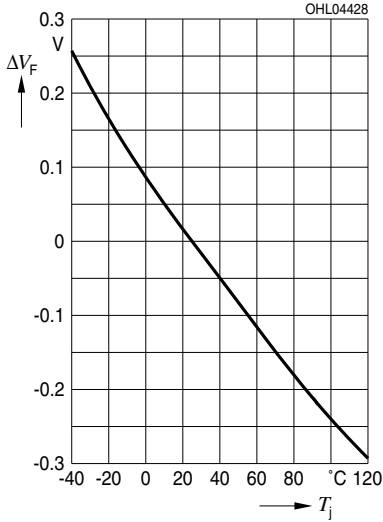
$$x, y = f(I_F); T_S = 25^\circ\text{C}$$



**Relative Vorwärtsspannung**<sup>2)4)</sup> Seite 21

**Relative Forward Voltage**<sup>2)4)</sup> page 21

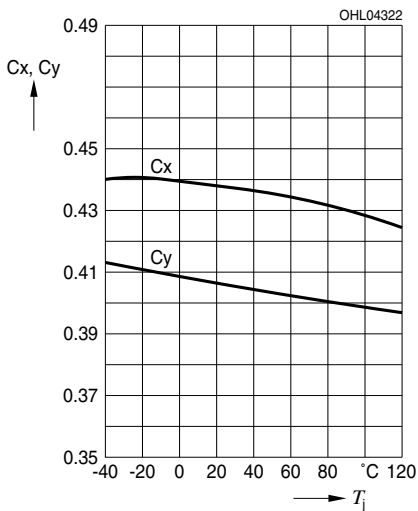
$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 350\text{ mA}$



**Farbortverschiebung**<sup>2)</sup> Seite 21

**Chromaticity Coordinate Shift**<sup>2)</sup> page 21

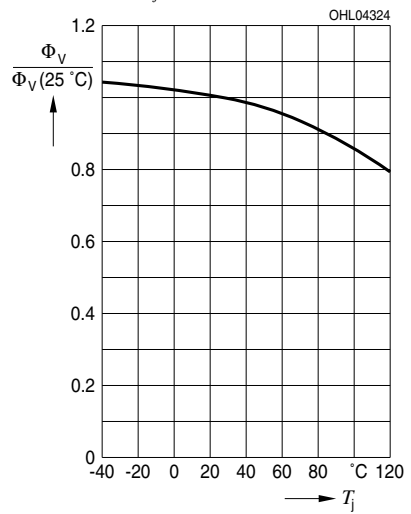
$x, y = f(T_j); I_F = 350\text{ mA}$



**Relative Lichtstrom**<sup>2)</sup> Seite 21

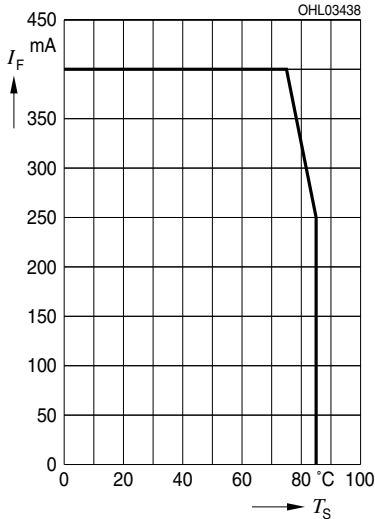
**Relative Luminous Flux**<sup>2)</sup> page 21

$\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j); I_F = 350\text{ mA}$



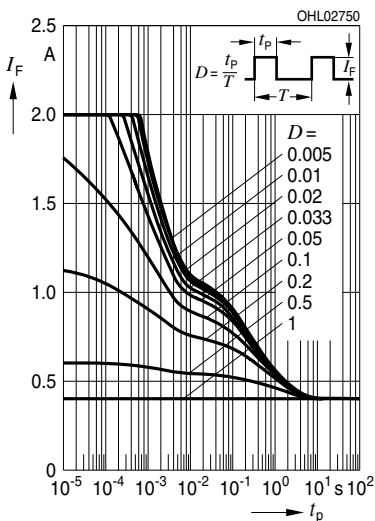
# Maximal zulässiger Durchlassstrom Max. Permissible Forward Current

$$I_F = f(T_S)$$



# Zulässige Impulsbelastbarkeit $I_F = f(t_p)$ Permissible Pulse Handling Capability

Duty cycle  $D$  = parameter,  $T_S = 25$  °C

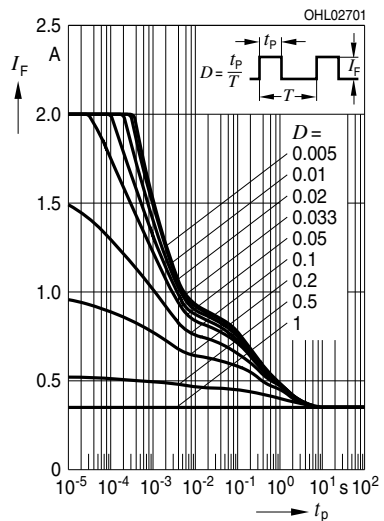


Zu Lebensdauerangaben siehe  
Applikationsschrift: **“Reliability of the DRAGON  
Product Family”**

For life time information please refer to application  
note **“Reliability of the DRAGON Product  
Family”**

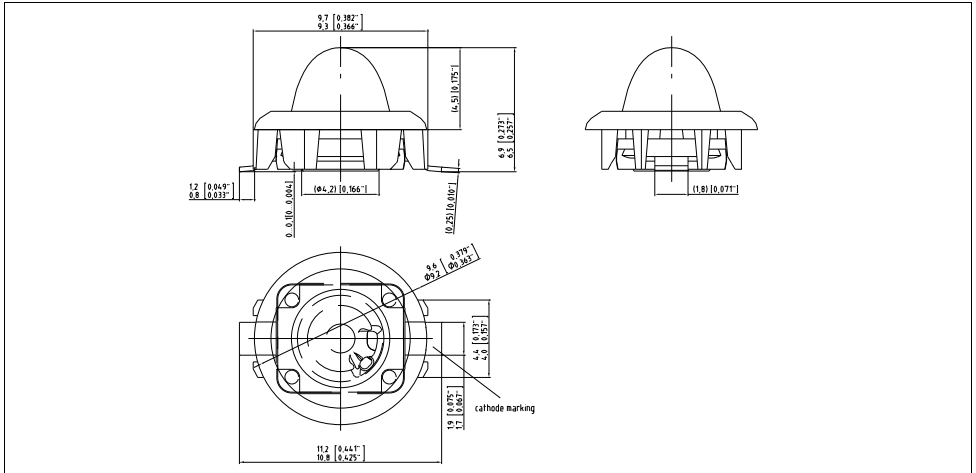
# Zulässige Impulsbelastbarkeit $I_F = f(t_p)$ Permissible Pulse Handling Capability

Duty cycle  $D$  = parameter,  $T_S = 85$  °C



Maßzeichnung<sup>6)</sup> Seite 21

Package Outlines<sup>6)</sup> page 21



**Korrosionsfestigkeit besser als EN 60068-2-60 (method 4):**  
mit erweitertem Korrosionstest: 40°C / 90%rh / 15ppm H<sub>2</sub>S / 336h

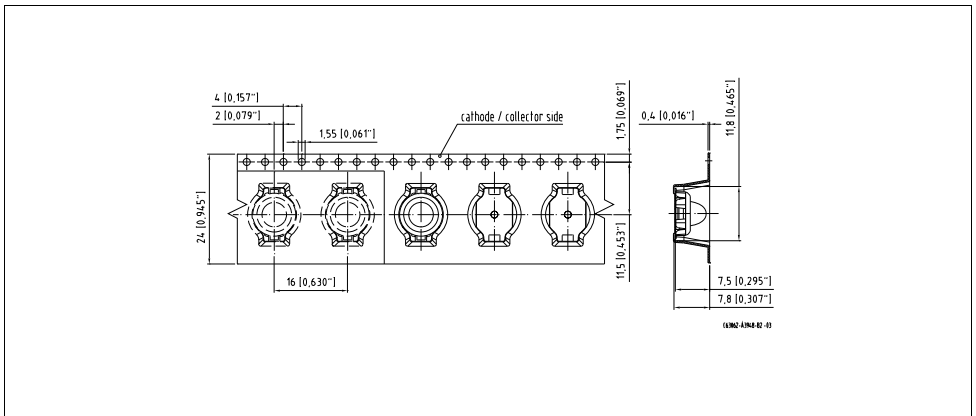
**Corrosion robustness better than EN 60068-2-60 (method 4):**  
with enhanced corrosion test: 40°C / 90%rh / 15ppm H<sub>2</sub>S / 336h

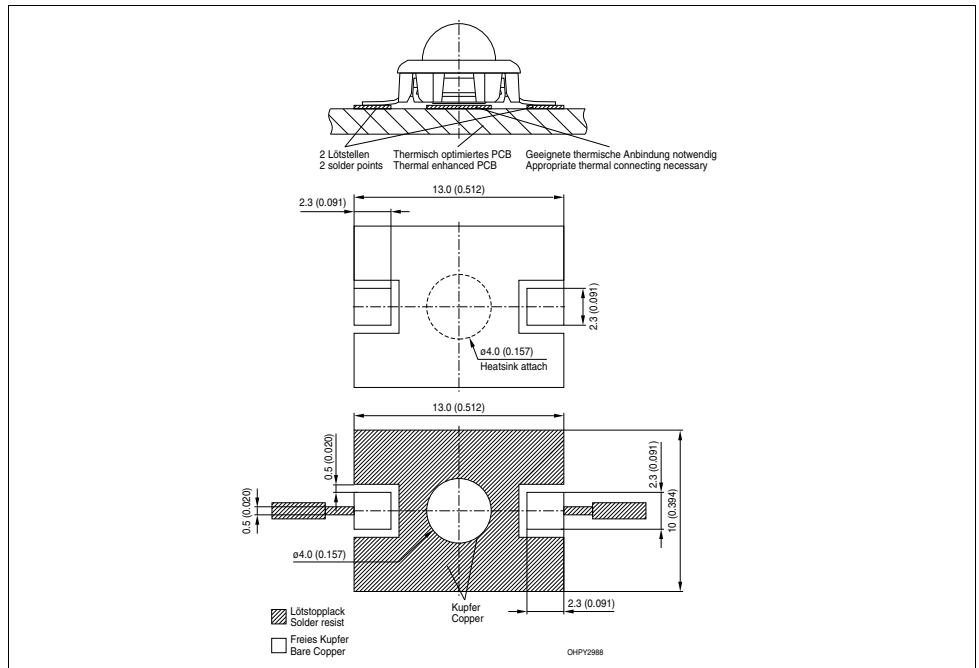
**Kathodenkennung:**  
**Cathode mark:**  
**Gewicht / Approx. weight:**

**Markierung**  
**mark**  
**0.35 g**

**Gurtung / Polarität und Lage<sup>6)</sup> Seite 21**  
**Method of Taping / Polarity and Orientation<sup>6)</sup> page 21**

**Verpackungseinheit 100/Rolle, ø180 mm**  
**Packing unit 100/reel, ø180 mm**





Anm.: Das Gehäuse ist für Ultraschallreinigung nicht geeignet. Für weitere Informationen bezüglich Löten verwenden Sie bitte die Applikationsschrift „Mounting Guideline for Golden Dragon with Lens“.

Note: Package not suitable for ultra sonic cleaning. Further Information about Soldering please refer to Application Note „Mounting Guideline for Golden Dragon with Lens“.

# Barcode-Produkt-Etikett (BPL)

## Barcode-Product-Label (BPL)

**OSRAM Opto Semiconductors**

(6P) BATCH NO: Batch Number

(1T) LOT NO: Lot Number

(X) PROD NO: Product Code

**Bar Code**

**Bar Code**

**Bar Code**

Lx:xxxx Bin1: Bin Information Color 1  
Product Name Bin2:  
Bin3:

RoHS Compliant ML Temp ST  
2 260 C RT

Additional TEXT  
R077 DEMY  
PACKVAR: Packing Type

(9D) D/C: Date Code

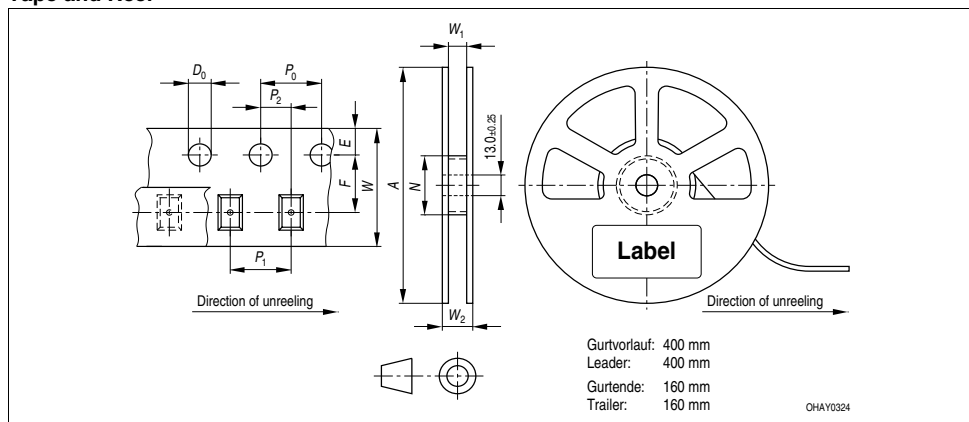
(Q) QTY: Product Quantity per Reel

(G) GROUP: X - X - X  
↓  
Forward Voltage Group  
Wavelength Group  
Brightness Group

OHA12043

# Gurtverpackung

## Tape and Reel



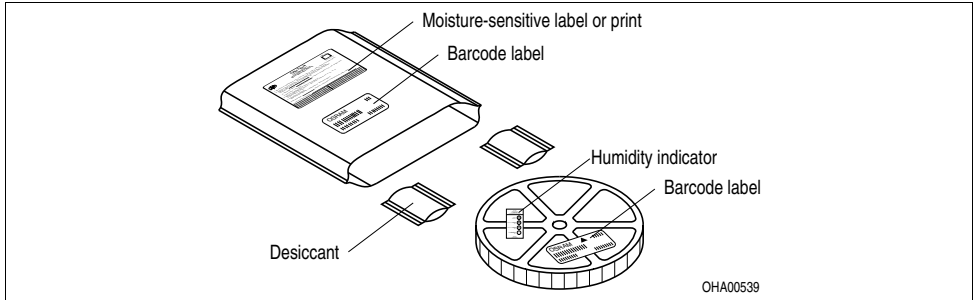
Tape dimensions in mm (inch)

| $W$                | $P_0$                              | $P_1$                              | $P_2$                              | $D_0$                                | $E$                                   | $F$                                   |
|--------------------|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|
| $24^{+0.3}_{-0.1}$ | $4 \pm 0.1$<br>(0.157 $\pm$ 0.004) | $8 \pm 0.1$<br>(0.315 $\pm$ 0.004) | $2 \pm 0.1$<br>(0.079 $\pm$ 0.004) | $1.5 \pm 0.1$<br>(0.059 $\pm$ 0.004) | $1.75 \pm 0.1$<br>(0.069 $\pm$ 0.004) | $11.5 \pm 0.1$<br>(0.453 $\pm$ 0.004) |

Reel dimensions in mm (inch)

| $A$     | $W$        | $N_{min}$  | $W_1$                      | $W_{2 \max}$ |
|---------|------------|------------|----------------------------|--------------|
| 180 (7) | 24 (0.945) | 60 (2.362) | $24.4 + 2$ (0.961 + 0.079) | 30.4 (1.197) |

## Trockenverpackung und Materialien Dry Packing Process and Materials

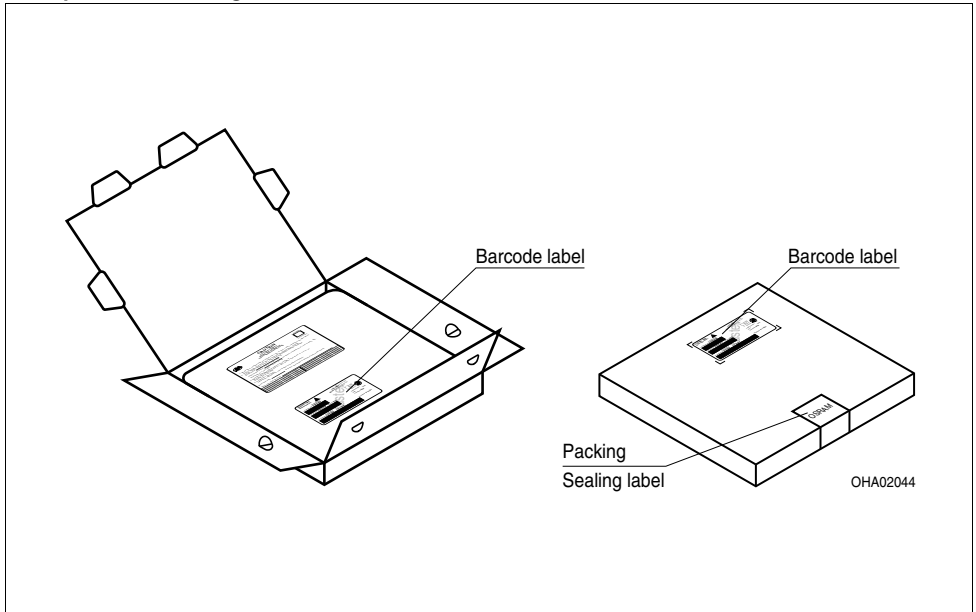


Anm.: Feuchteempfindliche Produkte sind verpackt in einem Trockenbeutel zusammen mit einem Trockenmittel und einer Feuchteindikatorkarte

Bezüglich Trockenverpackung finden Sie weitere Hinweise im Internet und in unserem Short Form Catalog im Kapitel "Gurtung und Verpackung" unter dem Punkt "Trockenverpackung". Hier sind Normenbezüge, unter anderem ein Auszug der JEDEC-Norm, enthalten.

Note: Moisture-sensitive product is packed in a dry bag containing desiccant and a humidity card.  
Regarding dry pack you will find further information in the internet and in the Short Form Catalog in chapter "Tape and Reel" under the topic "Dry Pack". Here you will also find the normative references like JEDEC.

## Kartonverpackung und Materialien Transportation Packing and Materials



**Revision History: 2010-04-01**

Previous Version: 2010-03-01

| Page   | Subjects (major changes since last revision) | Date of change |
|--------|----------------------------------------------|----------------|
| 4      | OS-IN-2009-020 (Forward voltage max reduced) | 2009-06-16     |
| all    | data sheet reworked                          | 2009-12-16     |
| 1, 4   | OS-PCN-2009-033-A                            | 2009-12-16     |
| all    | OS-PD-2010-003                               | 2010-02-15     |
| 1, 15  | additional information                       | 2010-03-01     |
| 12, 13 | diagrams updated                             | 2010-04-01     |
|        |                                              |                |
|        |                                              |                |

Wegen der geplanten Streichung der LED aus der IEC 60825 erfolgt die Bewertung der Augesicherheit nach dem Standard CIE S009/E:2002 ("photobiological safety of lamps and lamp systems")

Im Risikogruppensystem dieser CIE- Norm erfüllen die in diesem Datenblatt angegebenen LED die "low risk"- Gruppe (die die sich im "sichtbaren" Spektralbereich auf eine Expositionsdauer von 100 s bezieht). Unter realen Umständen (für Expositionsdauer, Augenpupille, Betrachtungsabstand) geht damit von diesen Bauelementen keinerlei Augengefährdung aus.

Grundsätzlich sollte jedoch erwähnt werden, dass intensive Lichtquellen durch ihre Blendwirkung ein hohes sekundäres Gefahrenpotenzial besitzen. Wie nach dem Blick in andere helle Lichtquellen (z.B. Autoscheinwerfer) auch, können temporär eingeschränktes Sehvermögen und Nachbilder je nach Situation zu Irritationen, Belästigungen, Beeinträchtigungen oder sogar Unfällen führen.

Due to the planned cancellation of the LED from IEC 60825, the evaluation of eye safety occurs according to the standard CIE S009/E:2002 ("photobiological safety of lamps and lamp systems").

Within the risk grouping system of this CIE standard, the LEDs specified in this data sheet fall into the "low risk" group (relating to devices in the visible spectrum with an exposure time of 100 s). Under real circumstances (for exposure time, 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. As is also true when viewing other 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.

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**Patent List****Patent No.**

US 6 066 861

US 6 277 301

US 6 245 259

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**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 in the Internet.

**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.

**Components used in life-support devices or systems must be expressly authorized for such purpose!** Critical components<sup>7)</sup> page 21 may only be used in life-support devices or systems<sup>8)</sup> page 21 with the express written approval of OSRAM OS.

## Fußnoten:

- 1) Helligkeitswerte werden während eines Strompulses einer typischen Dauer von 25 ms, mit einer internen Reproduzierbarkeit von +/- 8 % und einer erweiterten Messunsicherheit von +/- 11 % gemessen (gemäß GUM mit Erweiterungsfaktor  $k = 3$ ).
- 2) Wegen der besonderen Prozessbedingungen bei der Herstellung von LED können typische oder abgeleitete technische Parameter nur aufgrund statistischer Werte wiedergegeben werden. Diese stimmen nicht notwendigerweise mit den Werten jedes einzelnen Produktes überein, dessen Werte sich von typischen und abgeleiteten Werten oder typischen Kennlinien unterscheiden können. Falls erforderlich, z.B. aufgrund technischer Verbesserungen, werden diese typischen Werte ohne weitere Ankündigung geändert.
- 3) Farbkoordinaten werden während eines Strompulses einer typischen Dauer von 25 ms, mit einer internen Reproduzierbarkeit von +/- 0,005 und einer erweiterten Messunsicherheit von +/- 0,01 gemessen (gemäß GUM mit Erweiterungsfaktor  $k = 3$ ).
- 4) Vorwärtsspannungen werden während eines Strompulses einer typischen Dauer von 8 ms, mit einer internen Reproduzierbarkeit von +/- 0,05 V und einer erweiterten Messunsicherheit von +/- 0,1 V gemessen (gemäß GUM mit Erweiterungsfaktor  $k=3$ ).
- 5) Im gestrichelten Bereich der Kennlinien muss mit erhöhten Helligkeitsunterschieden zwischen Leuchtdioden innerhalb einer Verpackungseinheit gerechnet werden
- 6) Maße werden wie folgt angegeben: mm (inch)
- 7) Ein kritisches Bauteil ist ein Bauteil, das in lebenserhaltenden Apparaten oder Systemen eingesetzt wird und dessen Defekt voraussichtlich zu einer Fehlfunktion dieses lebenserhaltenden Apparates oder Systems führen wird oder die Sicherheit oder Effektivität dieses Apparates oder Systems beeinträchtigt.
- 8) Lebenserhaltende Apparate oder Systeme sind für
  - (a) die Implantierung in den menschlichen Körper oder
  - (b) für die Lebenserhaltung bestimmt.
 Falls sie versagen, kann davon ausgegangen werden, dass die Gesundheit und das Leben des Patienten in Gefahr ist.

## Remarks:

- 1) Brightness values are measured during a current pulse of typical 25 ms, with an internal reproducibility of +/- 8 % and an expanded uncertainty of +/- 11 % (acc. to GUM with a coverage factor of  $k = 3$ ).
- 2) 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.
- 3) Chromaticity coordinates are measured during a current pulse of typical 25 ms, 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) The forward voltage is measured during a current pulse of typical 8 ms, with an internal reproducibility of +/- 0,05 V and an expanded uncertainty of +/- 0,1 V (acc. to GUM with a coverage factor of  $k=3$ ).
- 5) In the range where the line of the graph is broken, you must expect higher brightness differences between single LEDs within one packing unit.
- 6) Dimensions are specified as follows: mm (inch).
- 7) 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 the effectiveness of that device or system.
- 8) 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 and the life of the user may be endangered.

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