

Multi CERAMOS

Enhanced optical Power LED (ThinFilm / ThinGaN)

Lead (Pb) Free Product - RoHS Compliant

LRTD C9TP



Released

Besondere Merkmale

- **Gehäusetyp:** Keramik Gehäuse für RGB-Anzeigen mit diffusem Silikon Verguss.
- **Besonderheit des Bauteils:** additive Farbmischung durch unabhängige Ansteuerung aller Chips; Kontrasterhöhung durch schwarze Oberfläche (RGB-Displays); Binning im Weißpunkt.
- **Abstrahlwinkel:** Lambertischer Strahler (120°)
- **Technologie:** ThinFilm (rot), ThinGaN (true green, tief blau)
- **optischer Wirkungsgrad:** 29 lm/W (weiß)
- **Gruppierungsparameter:** Lichtstärke, Farbort

- **Verarbeitungsmethode:** für alle SMT-Bestücktechniken geeignet
- **Lötmethode:** Reflow Löten
- **Vorbehandlung:** nach JEDEC Level 2
- **Gurtung:** 12 mm Gurt mit 1000/Rolle, ø180 mm oder 3000/Rolle, ø330 mm
- **ESD-Festigkeit:** ESD-Klasse 0

Anwendungen

- Hinterleuchtung (LCD, Schalter, Tasten, Werbebeleuchtung, Allgemeinbeleuchtung)
- Anzeigen im Innen- und Außenbereich (z.B. im Verkehrsbereich; Laufschriftanzeigen)
- Getrennte Ansteuerung der Leuchtdiodenchips zur Darstellung verschiedener Farben inclusive weiß
- Vollfarbdisplays bzw. RGB-Displays
- Blitzlicht im Handy
- Einkopplung in Lichtleiter

Features

- **package:** ceramic package for RGB-Displays with diffused silicon resin.
- **feature of the device:** additive mixture of color stimuli by independent driving of each chip; higher contrast by a black surface (RGB-Displays); White Binning.

- **viewing angle:** Lambertian Emitter (120°)
- **technology:** ThinFilm (red), ThinGaN (true green, deep blue)
- **optical efficiency:** 29 lm/W (white)
- **grouping parameter:** luminous intensity, color coordinates
- **assembly methods:** suitable for all SMT assembly methods
- **soldering methods:** reflow soldering
- **preconditioning:** acc. to JEDEC Level 2
- **taping:** 12 mm tape with 1000/reel, ø180 mm or 3000/reel, ø330 mm
- **ESD-withstand voltage:** ESD class 0

Applications

- backlighting (LCD, switches, keys, illuminated advertising, general lighting)
- indoor and outdoor displays (e.g. displays for traffic; light writing displays)
- LED chips can be controlled separately to display various colors including white
- full color displays, RGB-Displays
- strobe light for cellular phones
- coupling into light guides

Bestellinformation
Ordering Information

| Typ | Emissionsfarbe | Lichtstärke ¹⁾ Seite 27 |
|-----------|---|--|
| Type | Color of Emission | Luminous Intensity ¹⁾ page 27 |
| | | I _v (mcd) |
| | | white |
| LRTD C9TP | red (140 mA) true green (160 mA) deep blue (125 mA) | 7.100...18.000 |

Bestellinformation
Ordering Information

| Typ | Bestellnummer |
|---------------------|---------------|
| Type | Ordering Code |
| LRTD C9TP-EAFB-GHQN | on request |

Anm: Die oben genannten Typbezeichnungen umfassen die bestellbaren Selektionen. Diese bestehen aus wenigen Helligkeitsgruppen (siehe **Seite 6** für nähere Informationen). Es wird nur eine einzige Helligkeitsgruppe pro Gurt geliefert. Z.B.: LRTD C9TP-EAFB-GHQN bedeutet, dass auf dem Gurt nur eine der Helligkeitsgruppen EA, EB, FA oder FB 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.: LRTD C9TP-EAFB-GHQN bedeutet, dass auf dem Gurt nur eine der Farbortgruppen -GH bis -QN 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 6** for explanation). Only one group will be shipped on each reel (there will be no mixing of two groups on each reel). E.g. LRTD C9TP-EAFB-GHQN means that only one group EA, EB, FA or FB 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. LRTD C9TP-EAFB-GHQN means that only 1 chromaticity coordinate group -GH to -QN 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 Parameter | Symbol Symbol | Werte Values | | | Einheit Unit |
|---|------------------|-----------------|---------------|--------------|-----------------|
| | | red | true green | deep blue | |
| Betriebstemperatur Operating temperature range | T_{op} | - 40 ... + 85 | | | °C |
| Lagertemperatur Storage temperature range | T_{stg} | - 40 ... + 85 | | | °C |
| Sperrschichttemperatur Junction temperature | T_j | + 150 | | | °C |
| Durchlassstrom (min.) Forward current (min.) ($T_S=25^\circ\text{C}$) | I_F | 30 | | | mA |
| Durchlassstrom (max.) Forward current (max.) ($T_S=25^\circ\text{C}$) | I_F | 250 | | | |
| Stoßstrom Surge current $t_p = 10 \mu\text{s}, D = 0.005, T_S=25^\circ\text{C}$ | I_{FM} | 1000 | 750 | 750 | mA |
| Sperrspannung ^{2) Seite 27} Reverse voltage ^{2) page 27} ($T_S=25^\circ\text{C}$) | V_R | 12 | 5 | | |

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

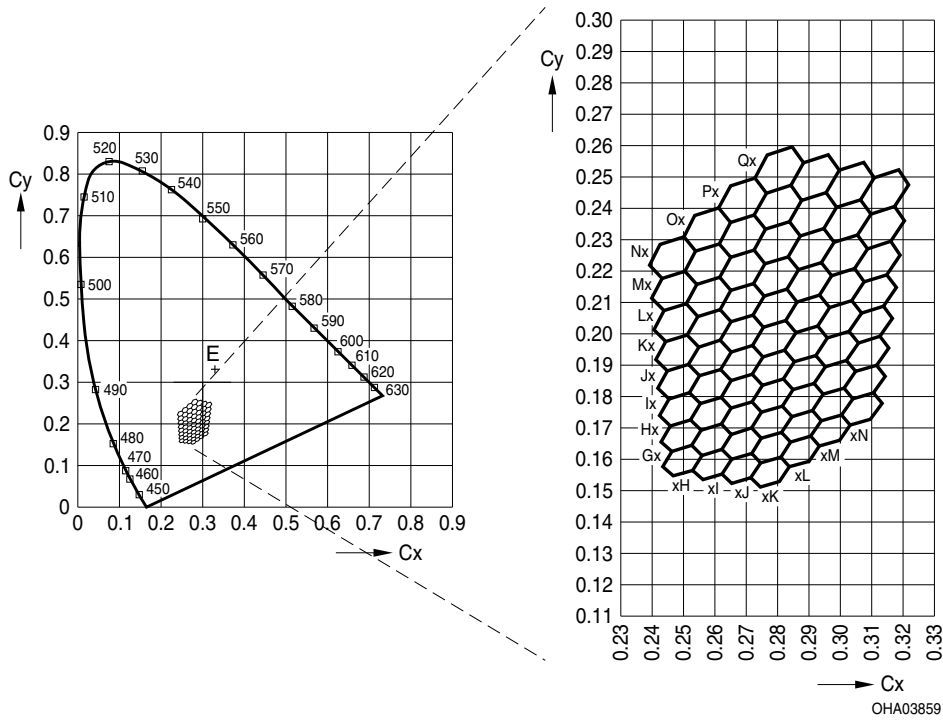
| Bezeichnung Parameter | Symbol Symbol | Werte Values | | | Einheit Unit |
|---|--|----------------------|-------------------|-------------------|--------------------------------|
| | | red | true green | deep blue | |
| Wellenlänge des emittierten Lichtes (typ.) Wavelength at peak emission $I_F = 140\text{ mA (R) / 160 mA (T) / 125 mA (D)}$ | λ_{peak} | 632 | 520 | 453 | nm |
| Dominantwellenlänge ^{3) Seite 27} (min.) Dominant wavelength ^{3) page 27} (typ.) $I_F = 140\text{ mA (R) / 160 mA (T) / 125 mA (D) (max.)}$ | λ_{dom} | 616 623 628 | 518 527 543 | 448 457 466 | nm nm nm |
| Spektrale Bandbreite bei 50 % $I_{\text{rel max}}$ (typ.) Spectral bandwidth at 50 % $I_{\text{rel max}}$ $I_F = 140\text{ mA (R) / 160 mA (T) / 125 mA (D)}$ | $\Delta\lambda$ | 18 | 33 | 25 | nm |
| Abstrahlwinkel bei 50 % I_V (Vollwinkel) (typ.) Viewing angle at 50 % I_V | 2φ | 120 | 120 | 120 | Grad deg. |
| Durchlassspannung ^{5) Seite 27} (min.) Forward voltage ^{5) page 27} (typ.) $I_F = 140\text{ mA (R) / 160 mA (T) / 125 mA (D) (max.)}$ | V_F V_F V_F | 1.90 2.35 2.65 | 2.9 3.5 4.1 | 2.9 3.4 4.1 | V V V |
| Sperrstrom (typ.) Reverse current (max.) $V_R = 5\text{ V (deep blue / true green); 12 V (red)}$ | I_R I_R | 0.01 10 | 0.01 100 | 0.01 100 | μA μA |
| Optischer Wirkungsgrad (typ.) Optical efficiency $I_F = 140\text{ mA (R) / 160 mA (T) / 125 mA (D)}$ | η_{opt} | 29 (white) | | | lm/W |
| Wärmewiderstand Thermal resistance Sperrschicht/Lötspad 1 chip on (max.) Junction/solder point 3 chips on (max.) | $R_{\text{th JS}}$ $R_{\text{th JS}}$ | 50** 75** | 50** 75** | 50** 75** | K/W K/W |

* Einzelgruppen siehe Seite 8
Individual groups on page 8

** $R_{\text{th}}(\text{max})$ basiert auf statistischen Werten
 $R_{\text{th}}(\text{max})$ is based on statistic values

Farbortgruppen⁴⁾ Seite 27

Chromaticity Coordinate Groups⁴⁾ page 27



| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| QK | 0.285 | 0.259 |
| | 0.288 | 0.254 |
| | 0.284 | 0.247 |
| | 0.276 | 0.245 |
| | 0.273 | 0.249 |
| | 0.277 | 0.257 |
| QN | 0.319 | 0.252 |
| | 0.322 | 0.247 |
| | 0.317 | 0.240 |
| | 0.310 | 0.238 |
| | 0.306 | 0.242 |
| | 0.311 | 0.250 |
| PN | 0.317 | 0.240 |
| | 0.320 | 0.236 |
| | 0.316 | 0.229 |
| | 0.309 | 0.227 |
| | 0.305 | 0.231 |
| | 0.310 | 0.238 |

| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| QL | 0.296 | 0.257 |
| | 0.300 | 0.252 |
| | 0.295 | 0.245 |
| | 0.288 | 0.242 |
| | 0.284 | 0.247 |
| | 0.288 | 0.254 |
| PM | 0.306 | 0.242 |
| | 0.310 | 0.238 |
| | 0.305 | 0.231 |
| | 0.298 | 0.229 |
| | 0.295 | 0.233 |
| | 0.299 | 0.240 |

| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| QM | 0.307 | 0.254 |
| | 0.311 | 0.250 |
| | 0.306 | 0.242 |
| | 0.299 | 0.240 |
| | 0.295 | 0.245 |
| | 0.300 | 0.252 |
| PL | 0.295 | 0.245 |
| | 0.299 | 0.240 |
| | 0.295 | 0.233 |
| | 0.287 | 0.231 |
| | 0.284 | 0.235 |
| | 0.288 | 0.242 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| PK | 0.284 | 0.247 |
| | 0.288 | 0.242 |
| | 0.284 | 0.235 |
| | 0.276 | 0.233 |
| | 0.272 | 0.238 |
| | 0.276 | 0.245 |
| OI | 0.261 | 0.240 |
| | 0.265 | 0.235 |
| | 0.261 | 0.228 |
| | 0.254 | 0.226 |
| | 0.250 | 0.231 |
| | 0.253 | 0.237 |
| OL | 0.295 | 0.233 |
| | 0.298 | 0.229 |
| | 0.294 | 0.222 |
| | 0.287 | 0.220 |
| | 0.283 | 0.224 |
| | 0.287 | 0.231 |
| NN | 0.315 | 0.219 |
| | 0.318 | 0.215 |
| | 0.314 | 0.209 |
| | 0.307 | 0.206 |
| | 0.304 | 0.210 |
| | 0.308 | 0.216 |
| NK | 0.283 | 0.224 |
| | 0.287 | 0.220 |
| | 0.283 | 0.214 |
| | 0.276 | 0.212 |
| | 0.272 | 0.216 |
| | 0.276 | 0.222 |
| NH | 0.250 | 0.231 |
| | 0.254 | 0.226 |
| | 0.250 | 0.220 |
| | 0.243 | 0.217 |
| | 0.239 | 0.222 |
| | 0.242 | 0.228 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| PJ | 0.273 | 0.249 |
| | 0.276 | 0.245 |
| | 0.272 | 0.238 |
| | 0.265 | 0.235 |
| | 0.261 | 0.240 |
| | 0.265 | 0.247 |
| OJ | 0.272 | 0.238 |
| | 0.276 | 0.233 |
| | 0.272 | 0.226 |
| | 0.265 | 0.224 |
| | 0.261 | 0.228 |
| | 0.265 | 0.235 |
| OM | 0.305 | 0.231 |
| | 0.309 | 0.227 |
| | 0.304 | 0.221 |
| | 0.297 | 0.218 |
| | 0.294 | 0.222 |
| | 0.298 | 0.229 |
| NM | 0.304 | 0.221 |
| | 0.308 | 0.216 |
| | 0.304 | 0.210 |
| | 0.296 | 0.208 |
| | 0.293 | 0.212 |
| | 0.297 | 0.218 |
| NJ | 0.272 | 0.226 |
| | 0.276 | 0.222 |
| | 0.272 | 0.216 |
| | 0.265 | 0.214 |
| | 0.261 | 0.218 |
| | 0.265 | 0.224 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| OK | 0.284 | 0.235 |
| | 0.287 | 0.231 |
| | 0.283 | 0.224 |
| | 0.276 | 0.222 |
| | 0.272 | 0.226 |
| | 0.276 | 0.233 |
| ON | 0.316 | 0.229 |
| | 0.319 | 0.225 |
| | 0.315 | 0.219 |
| | 0.308 | 0.216 |
| | 0.304 | 0.221 |
| | 0.309 | 0.227 |
| NL | 0.294 | 0.222 |
| | 0.297 | 0.218 |
| | 0.293 | 0.212 |
| | 0.286 | 0.210 |
| | 0.283 | 0.214 |
| | 0.287 | 0.220 |
| NI | 0.261 | 0.228 |
| | 0.265 | 0.224 |
| | 0.261 | 0.218 |
| | 0.254 | 0.216 |
| | 0.250 | 0.220 |
| | 0.254 | 0.226 |

| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| MH | 0.250 | 0.220 |
| | 0.254 | 0.216 |
| | 0.251 | 0.209 |
| | 0.244 | 0.207 |
| | 0.240 | 0.211 |
| | 0.243 | 0.217 |
| MK | 0.283 | 0.214 |
| | 0.286 | 0.210 |
| | 0.282 | 0.204 |
| | 0.275 | 0.202 |
| | 0.272 | 0.206 |
| | 0.276 | 0.212 |
| MN | 0.314 | 0.209 |
| | 0.317 | 0.205 |
| | 0.313 | 0.199 |
| | 0.306 | 0.197 |
| | 0.303 | 0.201 |
| | 0.307 | 0.206 |
| LN | 0.313 | 0.199 |
| | 0.315 | 0.195 |
| | 0.312 | 0.190 |
| | 0.305 | 0.188 |
| | 0.302 | 0.191 |
| | 0.306 | 0.197 |
| LK | 0.282 | 0.204 |
| | 0.286 | 0.200 |
| | 0.282 | 0.195 |
| | 0.275 | 0.192 |
| | 0.272 | 0.196 |
| | 0.275 | 0.202 |
| LH | 0.251 | 0.209 |
| | 0.254 | 0.205 |
| | 0.251 | 0.199 |
| | 0.244 | 0.197 |
| | 0.240 | 0.201 |
| | 0.244 | 0.207 |

| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| MI | 0.261 | 0.218 |
| | 0.265 | 0.214 |
| | 0.262 | 0.208 |
| | 0.254 | 0.205 |
| | 0.251 | 0.209 |
| | 0.254 | 0.216 |
| ML | 0.293 | 0.212 |
| | 0.296 | 0.208 |
| | 0.293 | 0.202 |
| | 0.286 | 0.200 |
| | 0.282 | 0.204 |
| | 0.286 | 0.210 |
| LM | 0.303 | 0.201 |
| | 0.306 | 0.197 |
| | 0.302 | 0.191 |
| | 0.295 | 0.189 |
| | 0.292 | 0.193 |
| | 0.296 | 0.199 |
| LJ | 0.272 | 0.206 |
| | 0.275 | 0.202 |
| | 0.272 | 0.196 |
| | 0.265 | 0.194 |
| | 0.262 | 0.198 |
| | 0.265 | 0.204 |

| Gruppe Group | Cx | Cy |
|--------------|-------|-------|
| MJ | 0.272 | 0.216 |
| | 0.276 | 0.212 |
| | 0.272 | 0.206 |
| | 0.265 | 0.204 |
| | 0.262 | 0.208 |
| | 0.265 | 0.214 |
| MM | 0.304 | 0.210 |
| | 0.307 | 0.206 |
| | 0.303 | 0.201 |
| | 0.296 | 0.199 |
| | 0.293 | 0.202 |
| | 0.296 | 0.208 |
| LL | 0.293 | 0.202 |
| | 0.296 | 0.199 |
| | 0.292 | 0.193 |
| | 0.285 | 0.191 |
| | 0.282 | 0.195 |
| | 0.286 | 0.200 |
| LI | 0.262 | 0.208 |
| | 0.265 | 0.204 |
| | 0.262 | 0.198 |
| | 0.255 | 0.196 |
| | 0.251 | 0.199 |
| | 0.254 | 0.205 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| KH | 0.251 | 0.199 |
| | 0.255 | 0.196 |
| | 0.252 | 0.190 |
| | 0.245 | 0.188 |
| | 0.241 | 0.192 |
| | 0.244 | 0.197 |
| KK | 0.282 | 0.195 |
| | 0.285 | 0.191 |
| | 0.282 | 0.185 |
| | 0.275 | 0.183 |
| | 0.272 | 0.187 |
| | 0.275 | 0.192 |
| KN | 0.312 | 0.190 |
| | 0.314 | 0.186 |
| | 0.311 | 0.181 |
| | 0.304 | 0.179 |
| | 0.301 | 0.182 |
| | 0.305 | 0.188 |
| JN | 0.311 | 0.181 |
| | 0.313 | 0.178 |
| | 0.310 | 0.173 |
| | 0.303 | 0.171 |
| | 0.300 | 0.174 |
| | 0.304 | 0.179 |
| JK | 0.282 | 0.185 |
| | 0.285 | 0.182 |
| | 0.281 | 0.177 |
| | 0.275 | 0.175 |
| | 0.272 | 0.178 |
| | 0.275 | 0.183 |
| JH | 0.252 | 0.190 |
| | 0.255 | 0.186 |
| | 0.252 | 0.181 |
| | 0.245 | 0.179 |
| | 0.242 | 0.183 |
| | 0.245 | 0.188 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| KI | 0.262 | 0.198 |
| | 0.265 | 0.194 |
| | 0.262 | 0.188 |
| | 0.255 | 0.186 |
| | 0.252 | 0.190 |
| | 0.255 | 0.196 |
| KL | 0.292 | 0.193 |
| | 0.295 | 0.189 |
| | 0.292 | 0.184 |
| | 0.285 | 0.182 |
| | 0.282 | 0.185 |
| | 0.285 | 0.191 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| KJ | 0.272 | 0.196 |
| | 0.275 | 0.192 |
| | 0.272 | 0.187 |
| | 0.265 | 0.185 |
| | 0.262 | 0.188 |
| | 0.265 | 0.194 |
| KM | 0.302 | 0.191 |
| | 0.305 | 0.188 |
| | 0.301 | 0.182 |
| | 0.295 | 0.181 |
| | 0.292 | 0.184 |
| | 0.295 | 0.189 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| JM | 0.301 | 0.182 |
| | 0.304 | 0.179 |
| | 0.300 | 0.174 |
| | 0.294 | 0.172 |
| | 0.291 | 0.175 |
| | 0.295 | 0.181 |
| JJ | 0.272 | 0.187 |
| | 0.275 | 0.183 |
| | 0.272 | 0.178 |
| | 0.265 | 0.176 |
| | 0.262 | 0.180 |
| | 0.265 | 0.185 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| JL | 0.292 | 0.184 |
| | 0.295 | 0.181 |
| | 0.291 | 0.175 |
| | 0.284 | 0.173 |
| | 0.281 | 0.177 |
| | 0.285 | 0.182 |
| JI | 0.262 | 0.188 |
| | 0.265 | 0.185 |
| | 0.262 | 0.180 |
| | 0.255 | 0.178 |
| | 0.252 | 0.181 |
| | 0.255 | 0.186 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| IH | 0.252 | 0.181 |
| | 0.255 | 0.178 |
| | 0.252 | 0.172 |
| | 0.246 | 0.171 |
| | 0.242 | 0.174 |
| | 0.245 | 0.179 |
| IL | 0.281 | 0.177 |
| | 0.284 | 0.173 |
| | 0.281 | 0.168 |
| | 0.275 | 0.167 |
| | 0.272 | 0.170 |
| | 0.275 | 0.175 |
| HL | 0.290 | 0.167 |
| | 0.293 | 0.164 |
| | 0.290 | 0.159 |
| | 0.284 | 0.158 |
| | 0.281 | 0.161 |
| | 0.284 | 0.165 |
| HI | 0.262 | 0.171 |
| | 0.265 | 0.168 |
| | 0.262 | 0.163 |
| | 0.256 | 0.161 |
| | 0.253 | 0.164 |
| | 0.256 | 0.169 |
| GH | 0.253 | 0.164 |
| | 0.256 | 0.161 |
| | 0.253 | 0.156 |
| | 0.247 | 0.155 |
| | 0.243 | 0.158 |
| | 0.246 | 0.162 |
| GK | 0.281 | 0.161 |
| | 0.284 | 0.158 |
| | 0.281 | 0.153 |
| | 0.274 | 0.151 |
| | 0.271 | 0.154 |
| | 0.275 | 0.159 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| IJ | 0.262 | 0.180 |
| | 0.265 | 0.176 |
| | 0.262 | 0.171 |
| | 0.256 | 0.169 |
| | 0.252 | 0.172 |
| | 0.255 | 0.178 |
| IM | 0.291 | 0.175 |
| | 0.294 | 0.172 |
| | 0.290 | 0.167 |
| | 0.284 | 0.165 |
| | 0.281 | 0.168 |
| | 0.284 | 0.173 |
| HK | 0.281 | 0.168 |
| | 0.284 | 0.165 |
| | 0.281 | 0.161 |
| | 0.275 | 0.159 |
| | 0.272 | 0.162 |
| | 0.275 | 0.167 |
| HH | 0.252 | 0.172 |
| | 0.256 | 0.169 |
| | 0.253 | 0.164 |
| | 0.246 | 0.162 |
| | 0.243 | 0.166 |
| | 0.246 | 0.171 |
| GI | 0.262 | 0.163 |
| | 0.265 | 0.160 |
| | 0.262 | 0.155 |
| | 0.256 | 0.153 |
| | 0.253 | 0.156 |
| | 0.256 | 0.161 |

| Gruppe Group | Cx | Cy |
|-----------------|-------|-------|
| IK | 0.272 | 0.178 |
| | 0.275 | 0.175 |
| | 0.272 | 0.170 |
| | 0.265 | 0.168 |
| | 0.262 | 0.171 |
| | 0.265 | 0.176 |
| IN | 0.300 | 0.174 |
| | 0.303 | 0.171 |
| | 0.300 | 0.166 |
| | 0.293 | 0.164 |
| | 0.290 | 0.167 |
| | 0.294 | 0.172 |
| HJ | 0.272 | 0.170 |
| | 0.275 | 0.167 |
| | 0.272 | 0.162 |
| | 0.265 | 0.160 |
| | 0.262 | 0.163 |
| | 0.265 | 0.168 |
| GJ | 0.272 | 0.162 |
| | 0.275 | 0.159 |
| | 0.271 | 0.154 |
| | 0.265 | 0.152 |
| | 0.262 | 0.155 |
| | 0.265 | 0.160 |

Gruppenbezeichnung auf Etikett**Group Name on Label**

Beispiel: EA-GH

Example: EA-GH

| Helligkeitsgruppe Brightness Group | Farbortgruppe Color coordinates |
|---------------------------------------|------------------------------------|
| EA | GH |

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

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

Helligkeits-Gruppierungsschema (weiß)**Brightness Groups (white)**

| Helligkeitsgruppe Brightness Group | Lichtstärke ^{1) Seite 27} Luminous Intensity ^{1) page 27} I_V (mcd) | Lichtstrom ^{6) Seite 27} Luminous Flux ^{6) page 27} Φ_V (lm) |
|---------------------------------------|---|---|
| EA | 7.100... 9.000 | 24.200 (typ.) |
| EB | 9.000...11.200 | 30.300 (typ.) |
| FA | 11.200 ...14.000 | 37.800 (typ.) |
| FB | 14.000 ...18.000 | 48.000 (typ.) |

Anm.: Die Standardlieferform von Serientypen beinhaltet eine Familiengruppe, die aus nur 4 Helligkeitsgruppen besteht.

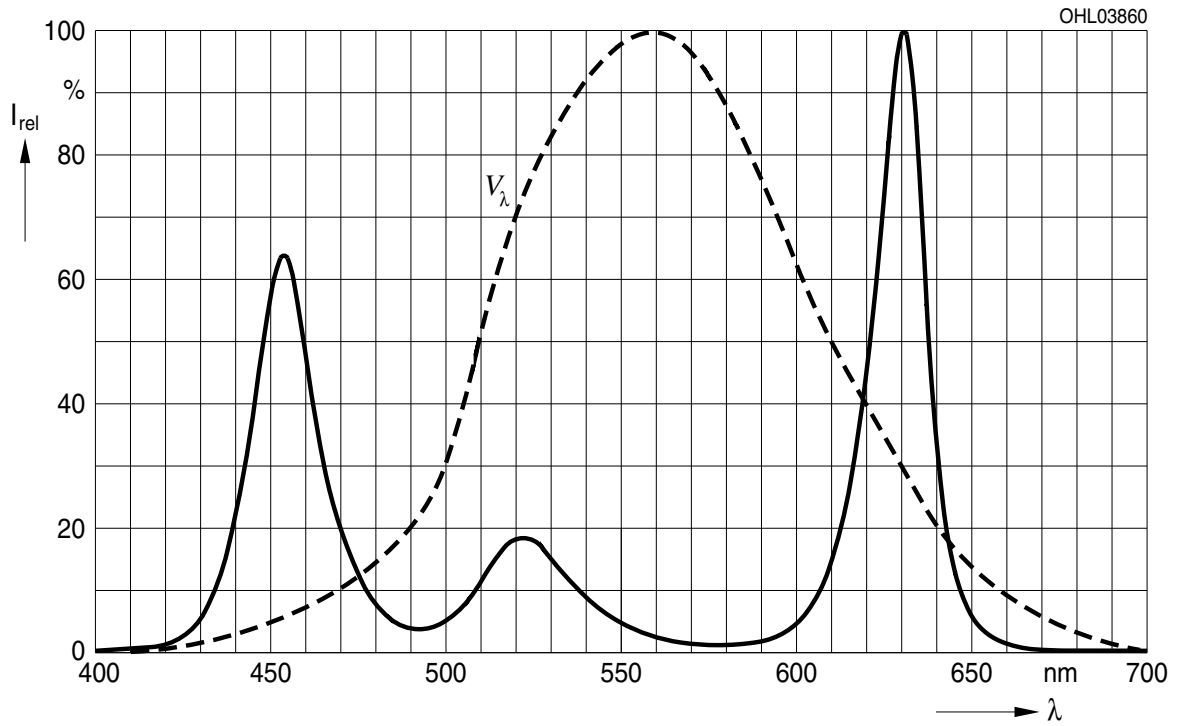
Einzelne Helligkeitsgruppen können nicht bestellt werden.

Note: The standard shipping format for serial types includes a family group of 4 individual brightness groups. Individual brightness groups cannot be ordered.

Relative spektrale Emission⁶⁾ Seite 27

Relative Spectral Emission⁶⁾ page 27

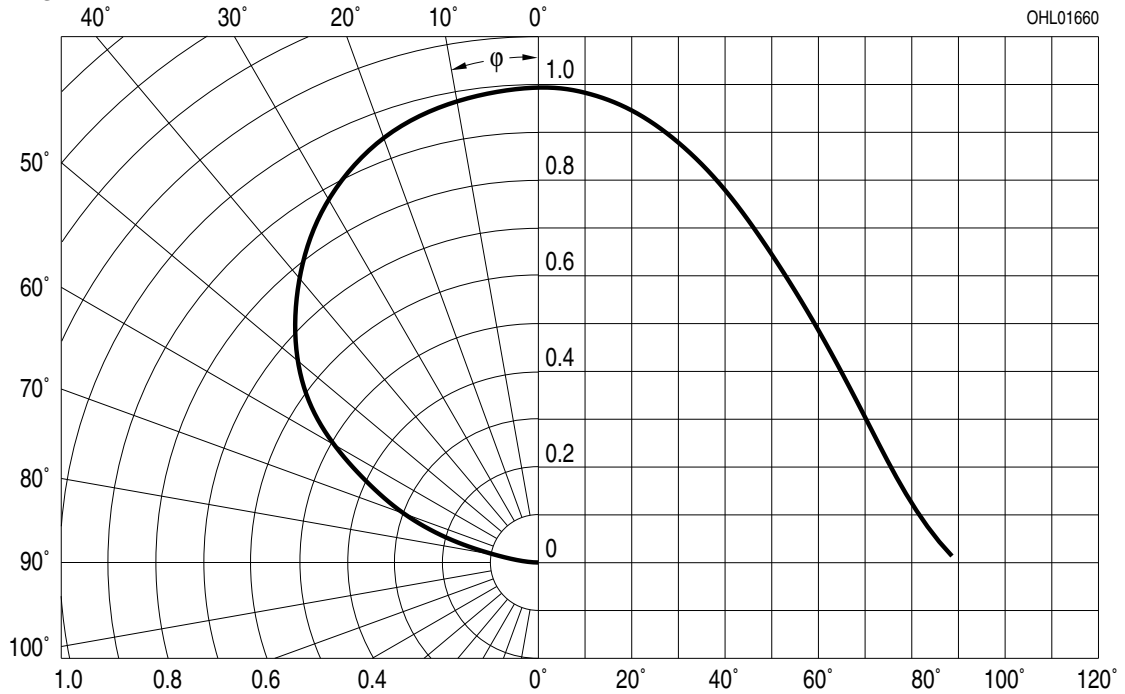
$I_{rel} = f(\lambda); T_S = 25\text{ °C}; I_F = 140\text{ mA (R)} / 160\text{ mA (T)} / 125\text{ mA (D)}$



Abstrahlcharakteristik⁶⁾ Seite 27

Radiation Characteristic⁶⁾ page 27

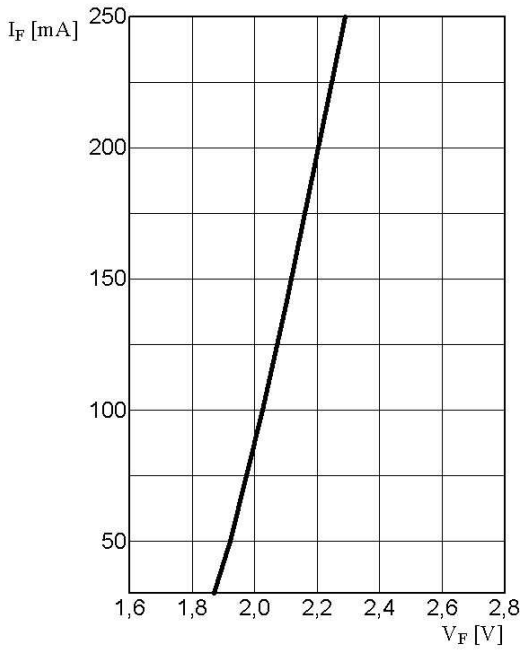
$I_{rel} = f(\varphi); T_S = 25\text{ °C}$



Durchlassstrom⁶⁾ Seite 27

Forward Current⁶⁾ page 27

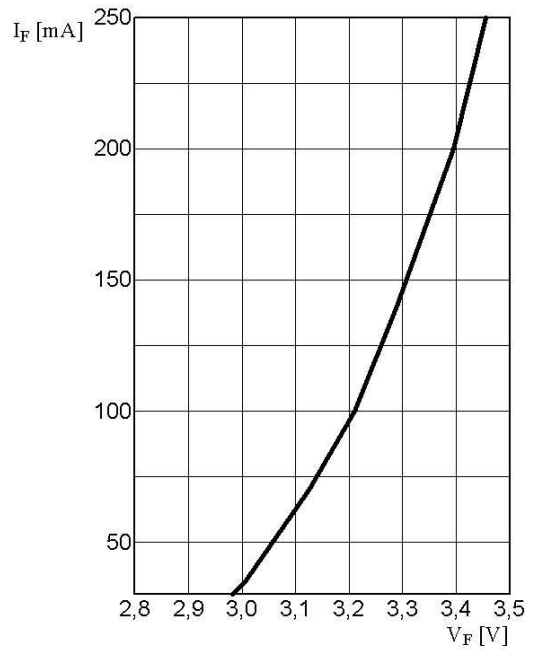
$I_F = f(V_F)$; $T_S = 25\text{ °C}$, red



Durchlassstrom⁶⁾ Seite 27

Forward Current⁶⁾ page 27

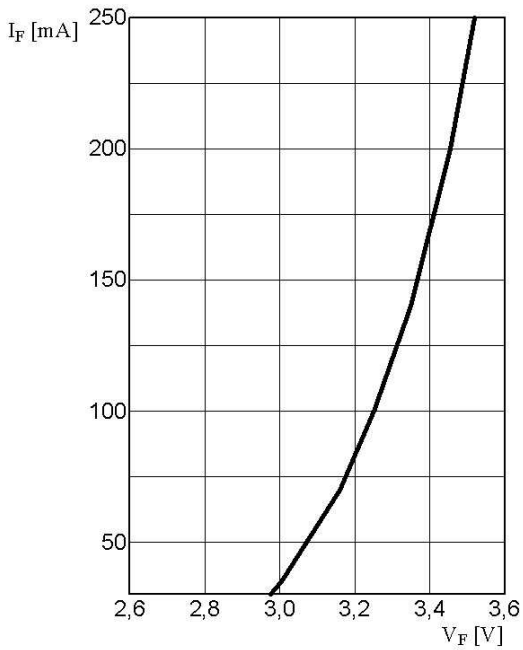
$I_F = f(V_F)$; $T_S = 25\text{ °C}$, deep blue



Durchlassstrom⁶⁾ Seite 27

Forward Current⁶⁾ page 27

$I_F = f(V_F)$; $T_S = 25\text{ °C}$, truegreen

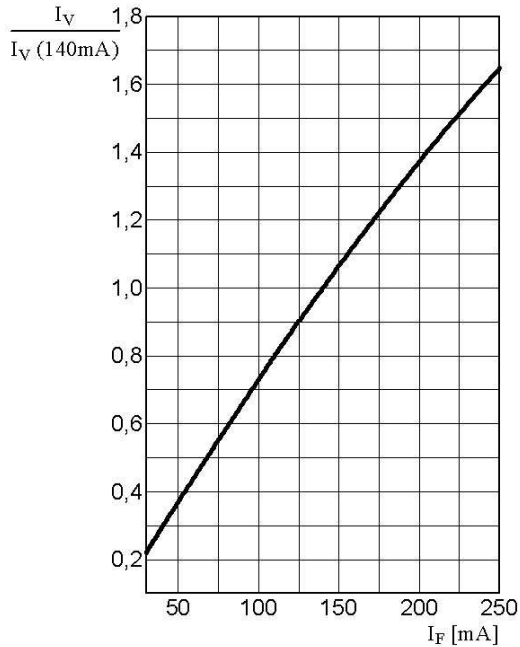


Relative Lichtstärke^{6)7) Seite 27}

Relative Luminous Intensity^{6) 7) page 27}

$I_V/I_V(140\text{ mA}) = f(I_F); T_S = 25\text{ °C};$ red

solid line: specified DC-range

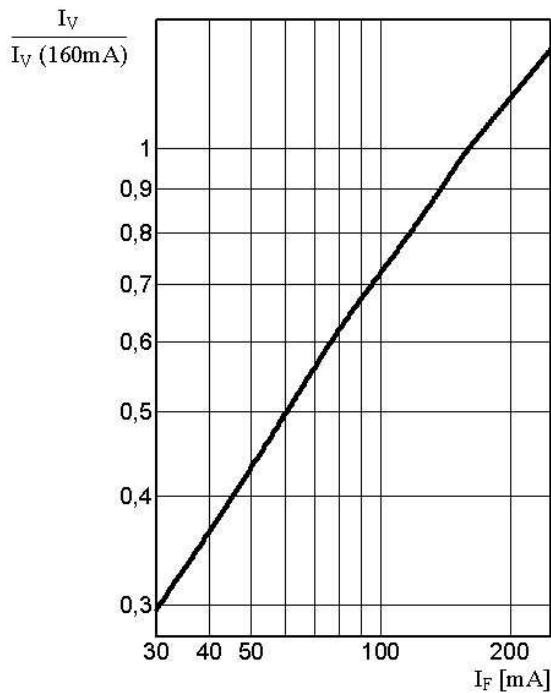


Relative Lichtstärke^{6)7) Seite 27}

Relative Luminous Intensity^{6) 7) page 27}

$I_V/I_V(160\text{ mA}) = f(I_F); T_S = 25\text{ °C};$ true green

solid line: specified DC-range

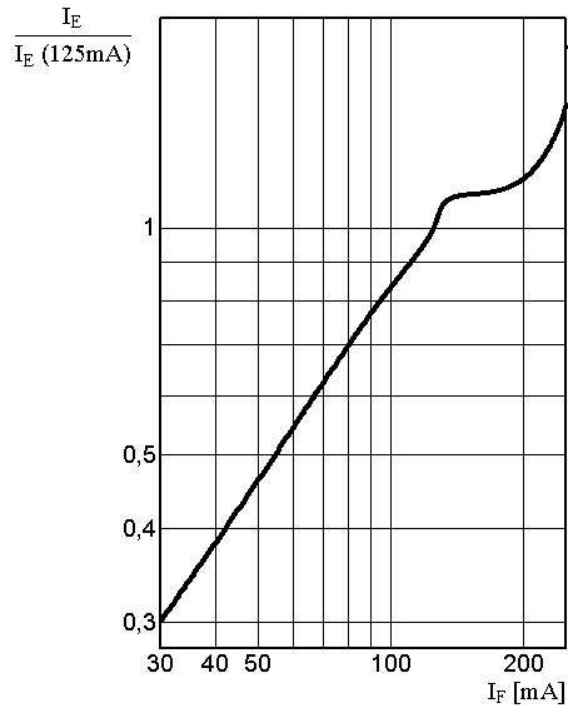


Relative Strahlstärke^{6)7) Seite 27}

Relative Radiant Intensity^{6)7) page 27}

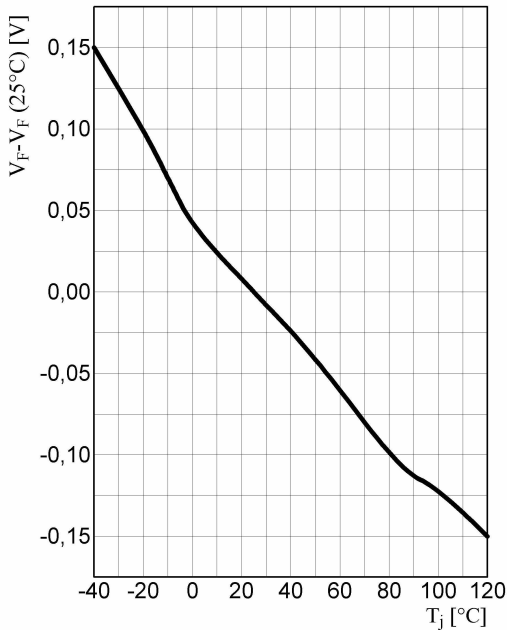
$I_E/I_E(125\text{ mA}) = f(I_F); T_S = 25\text{ °C};$ deep blue

solid line: specified DC-range



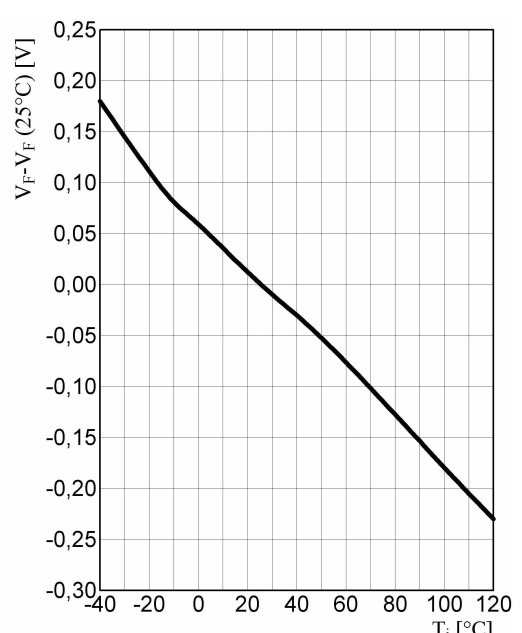
Relative Vorwärtsspannung⁶⁾ Seite 27
 Relative Forward Voltage⁶⁾ page 27

$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j)$; $I_F = 140\text{ mA}$, **red**



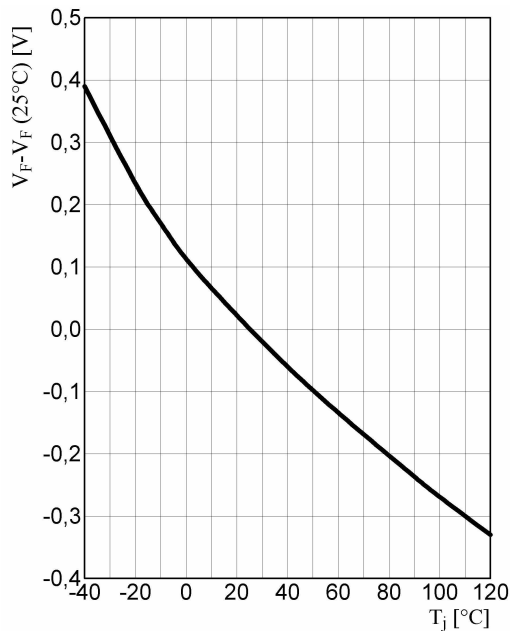
Relative Vorwärtsspannung⁶⁾ Seite 27
 Relative Forward Voltage⁶⁾ page 27

$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j)$; $I_F = 125\text{ mA}$, **deep blue**



Relative Vorwärtsspannung⁶⁾ Seite 27
 Relative Forward Voltage⁶⁾ page 27

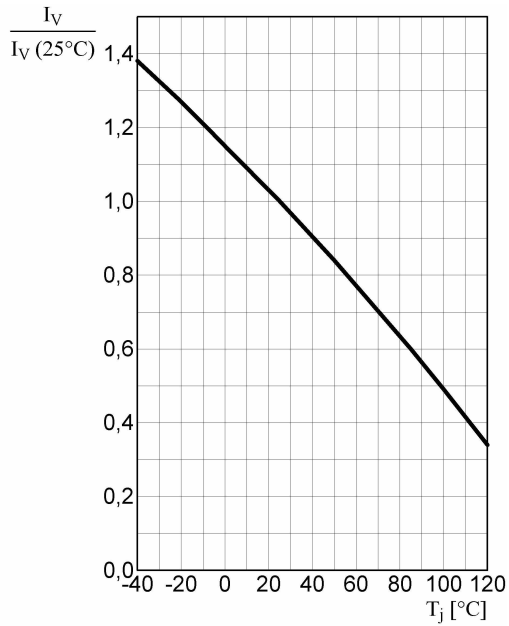
$\Delta V_F = V_F - V_F(25\text{ °C}) = f(T_j)$; $I_F = 160\text{ mA}$, **true green**



Relative Lichtstärke⁶⁾ Seite 27

Relative Luminous Intensity⁶⁾ page 27

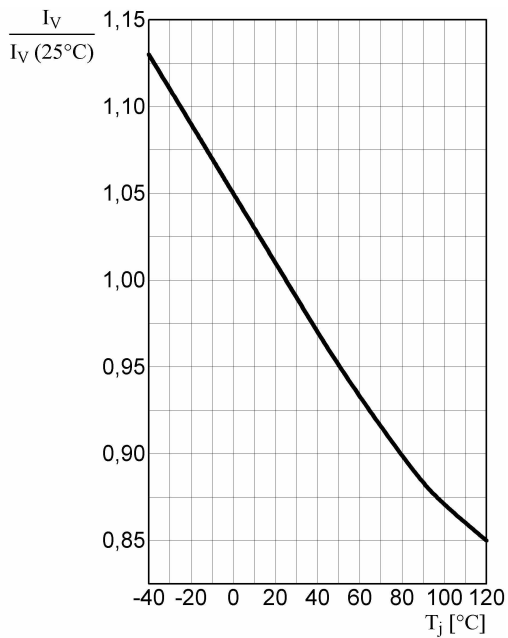
$I_V/I_V(25\text{ °C}) = f(T_j)$; $I_F = 140\text{ mA}$, red



Relative Lichtstärke⁶⁾ Seite 27

Relative Luminous Intensity⁶⁾ page 27

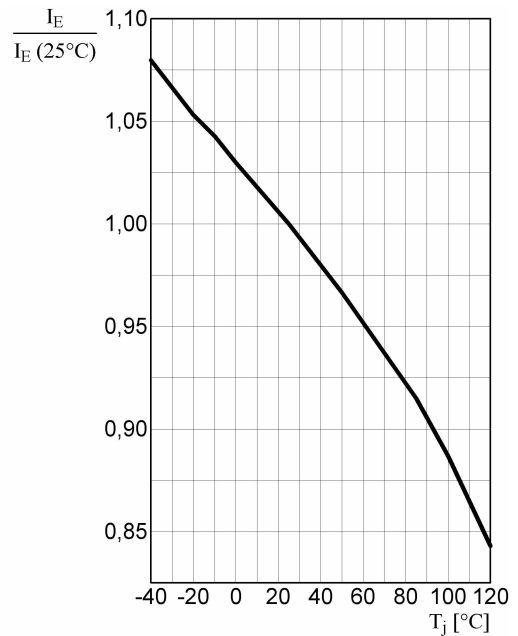
$I_V/I_V(25\text{ °C}) = f(T_j)$; $I_F = 160\text{ mA}$, true green



Relative Strahlstärke⁶⁾ Seite 27

Relative Radiant Intensity⁶⁾ page 27

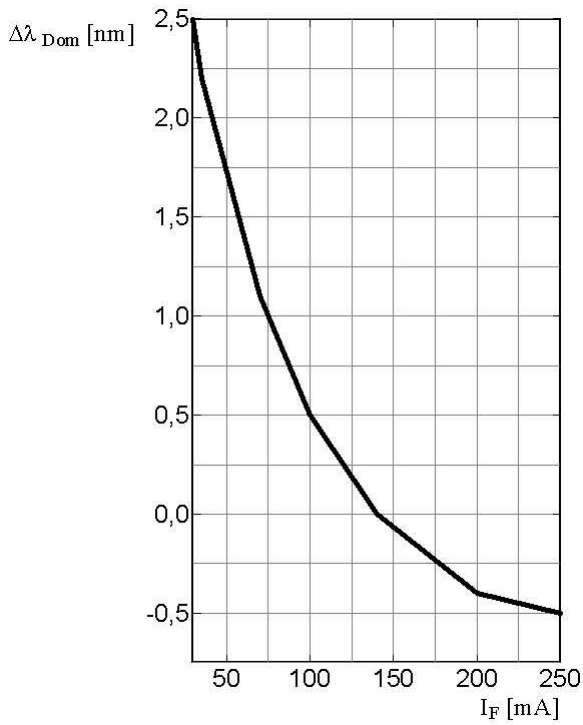
$I_E/I_E(25\text{ °C}) = f(T_j)$; $I_F = 125\text{ mA}$, deep blue



Dominante Wellenlänge⁶⁾ Seite 27

Dominant Wavelength⁶⁾ page 27

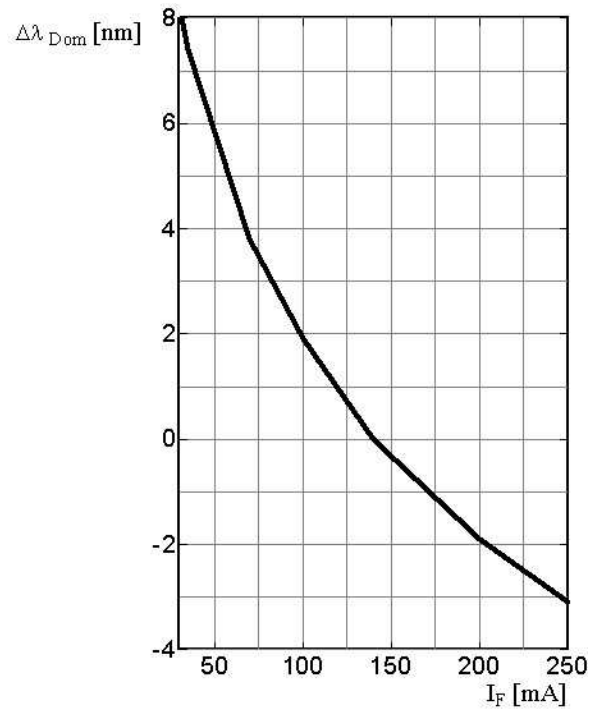
$\lambda_{\text{dom}} = f(I_F); T_S = 25\text{ °C};$ **deep blue**



Dominante Wellenlänge⁶⁾ Seite 27

Dominant Wavelength⁶⁾ page 27

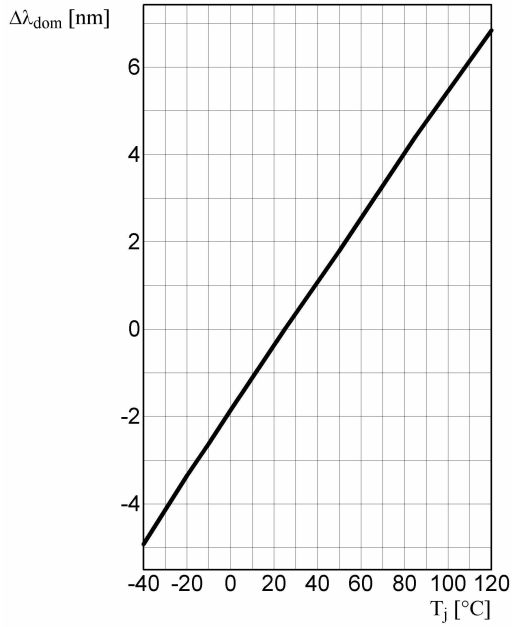
$\lambda_{\text{dom}} = f(I_F); T_S = 25\text{ °C};$ **true green**



Dominante Wellenlänge⁶⁾ Seite 27

Dominant Wavelength⁶⁾ page 27

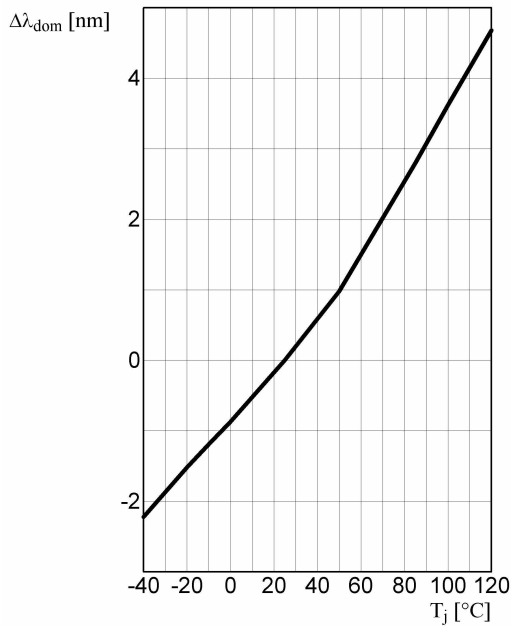
$\lambda_{\text{dom}} = f(T_j)$; $I_F = 140 \text{ mA}$, **red**



Dominante Wellenlänge⁶⁾ Seite 27

Dominant Wavelength⁶⁾ page 27

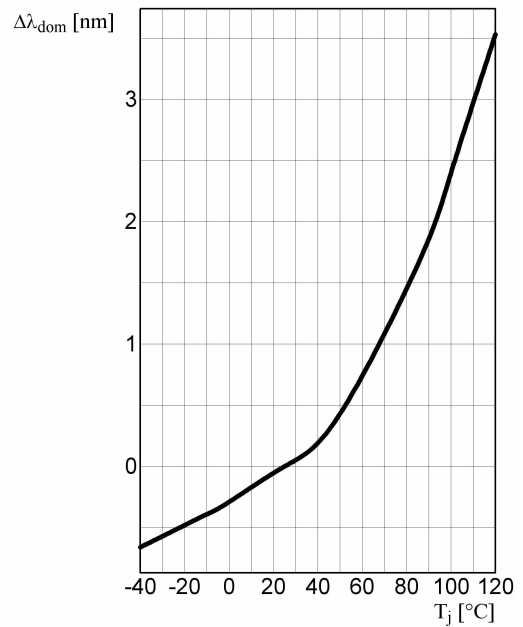
$\lambda_{\text{dom}} = f(T_j)$; $I_F = 125 \text{ mA}$, **deep blue**



Dominante Wellenlänge⁶⁾ Seite 27

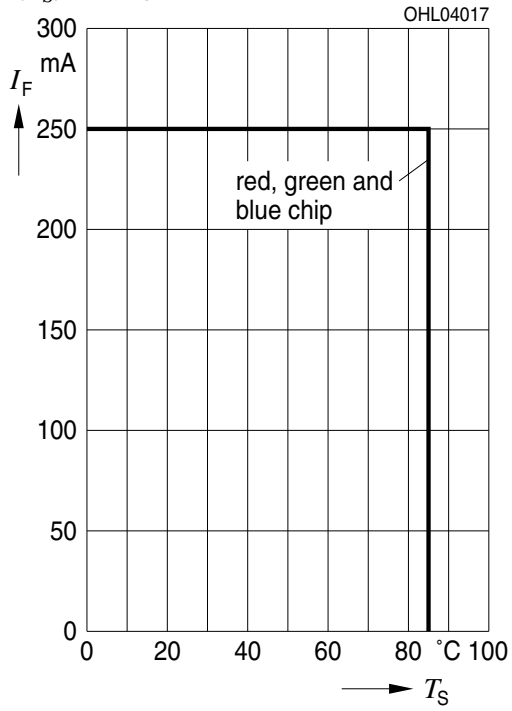
Dominant Wavelength⁶⁾ page 27

$\lambda_{\text{dom}} = f(T_j)$; $I_F = 160 \text{ mA}$, **true green**



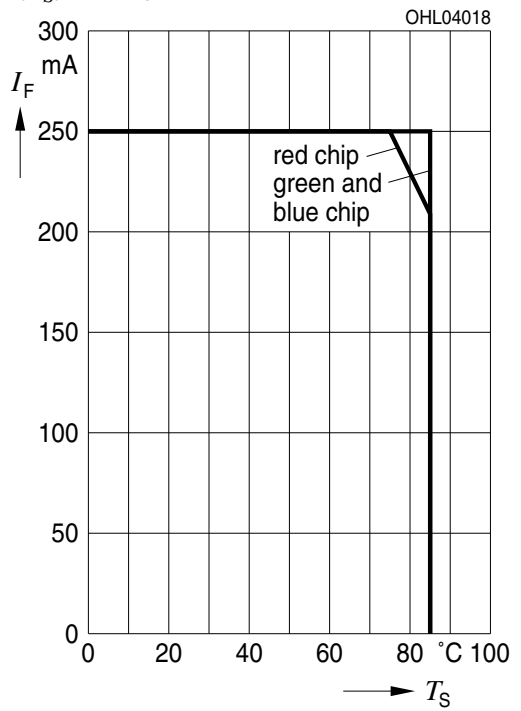
Maximal zulässiger Durchlassstrom
Max. Permissible Forward Current

$I_F = f(T_S)$; 1 chip on

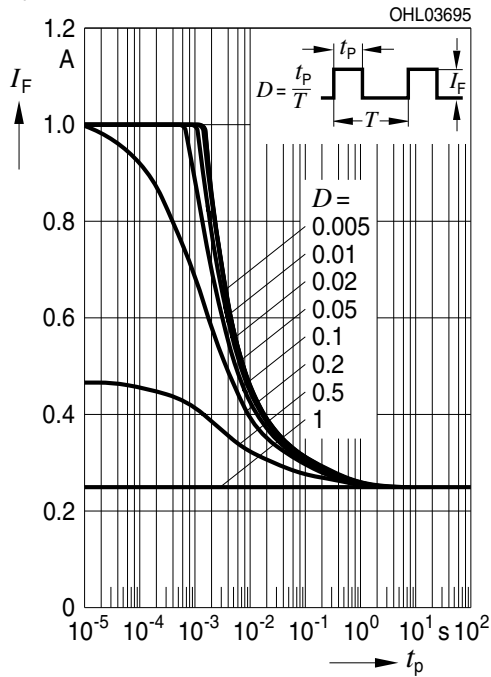


Maximal zulässiger Durchlassstrom
Max. Permissible Forward Current

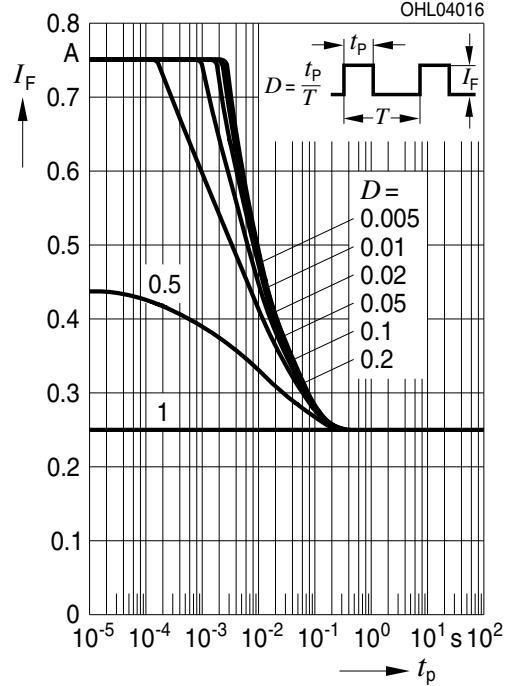
$I_F = f(T_S)$; 3 chips on



Zulässige Impulsbelastbarkeit
Permissible Pulse Handling Capability
 Duty cycle $D =$ parameter, $T_J = 150\text{ °C}$
 $I_F = f(t_p)$; (1 Chip on); red



Zulässige Impulsbelastbarkeit
Permissible Pulse Handling Capability
 Duty cycle $D =$ parameter, $T_J = 150\text{ °C}$
 $I_F = f(t_p)$; (1 Chip on); blue, true green

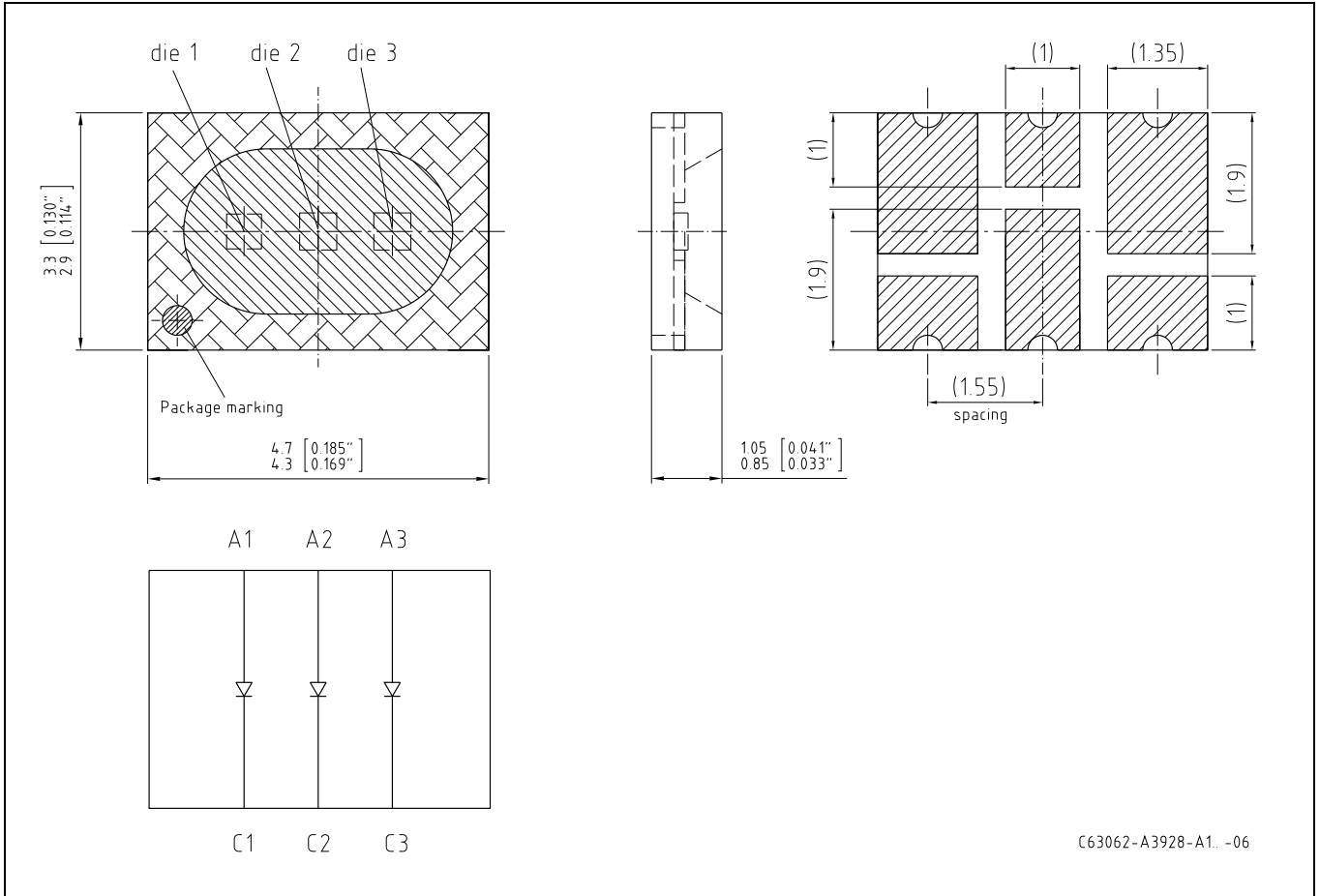


Exemplarische durchschnittliche Lebensdauer für mittlere Helligkeitsgruppe^{6) Seite 27}
Exemplary median Lifetime for median Brightness Group^{6) page 27}

| Bedingungen Conditions | mittlere Lebensdauer median Lifetime | Einheit Unit |
|--|---|------------------------------------|
| $I_F = 125\text{ mA}$ (1 Chip on red, true green or deep blue)) $T_S = 25\text{ °C}$ | >100.000* | Betriebsstunden operating hours |
| $I_F = 250\text{ mA}$ (red Chip on) $T_S = 85\text{ °C}$ | >100.000* | Betriebsstunden operating hours |
| $I_F = 250\text{ mA}$ (true green or deep blue Chip on) $T_S = 85\text{ °C}$ | >100.000* | Betriebsstunden operating hours |

* lifetime L50 / B50

Maßzeichnung⁶⁾ Seite 27
 Package Outlines⁶⁾ page 27



| | | |
|----|---------|----------------|
| C1 | Cathode | Red (R) |
| A1 | Anode | Red (R) |
| C2 | Cathode | True Green (T) |
| A2 | Anode | True Green (T) |
| C3 | Cathode | Blue (B) |
| A3 | Anode | Blue (B) |

Gewicht / Approx. weight:

45 mg

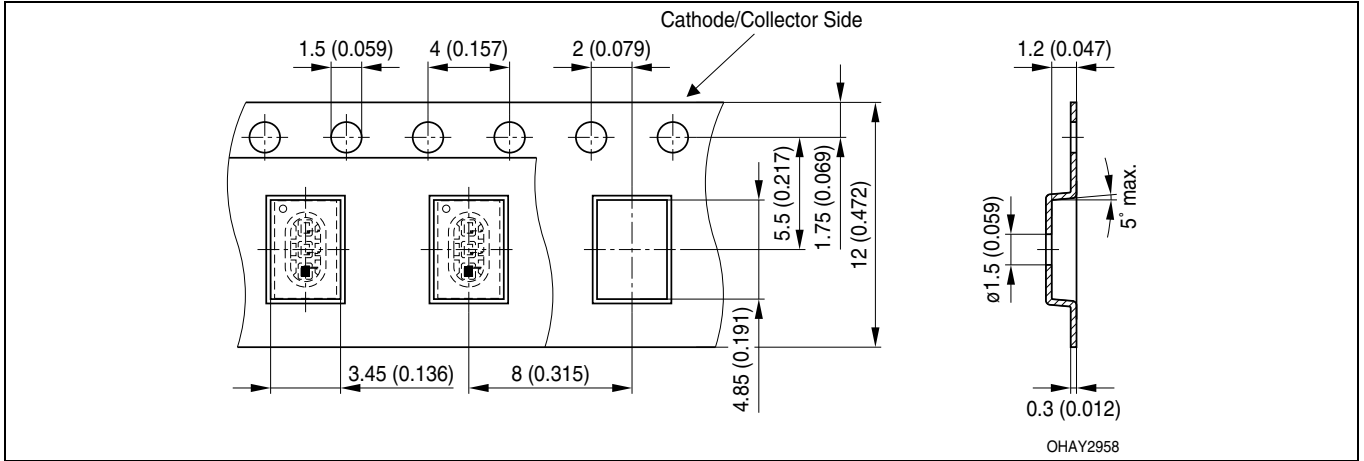
Gurtung / Polarität und Lage⁸⁾ Seite 27

Method of Taping / Polarity and Orientation⁸⁾ page 27

Verpackungseinheit 1000/Rolle, ø180 mm
oder 3000/Rolle, ø330 mm

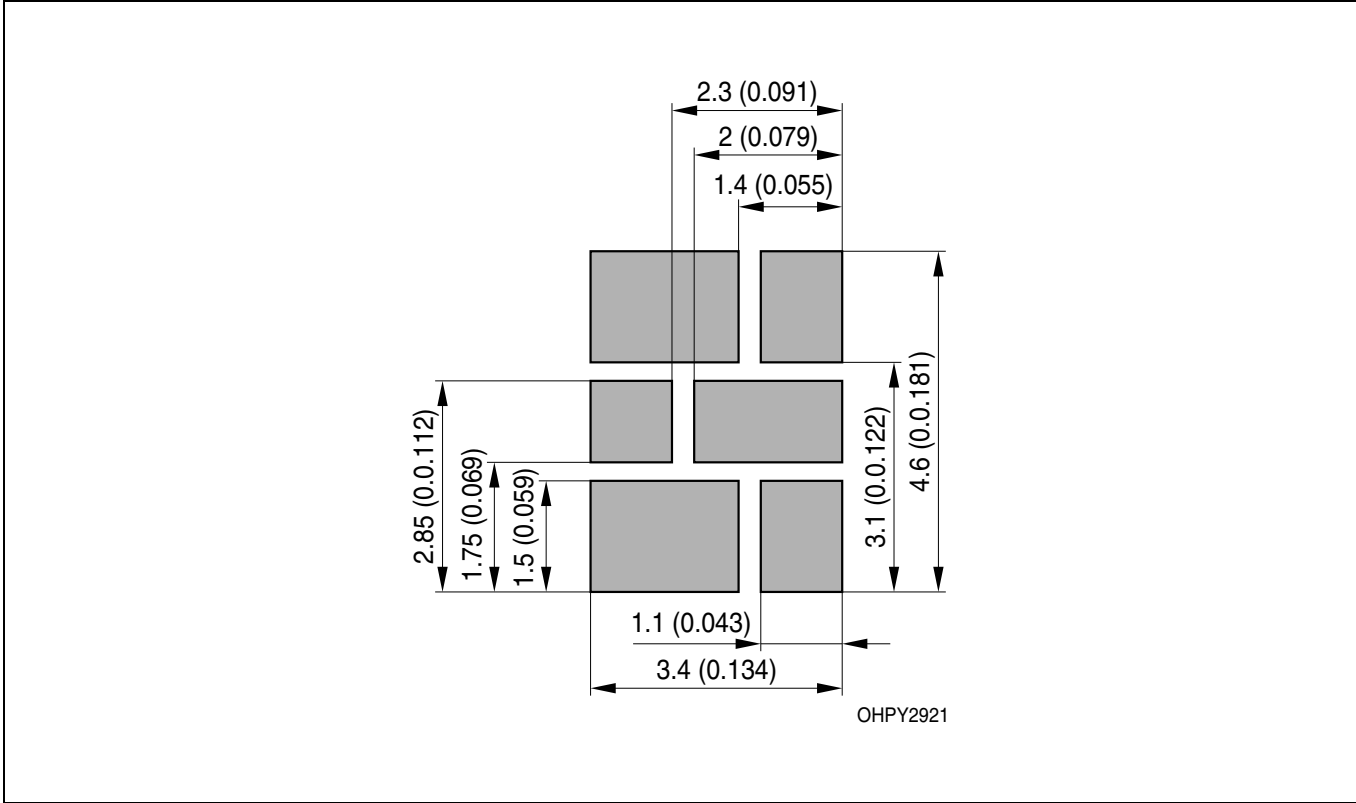
Packing unit 1000/reel, ø180 mm
or 3000/reel, ø330 mm

Allowed components missing 1 pc. per 1000 pcs.



Empfohlenes Lötpadding^{8) 9)} Seite 27
Recommended Solder Pad^{8) 9)} page 27

Reflow Lötén
Reflow Soldering

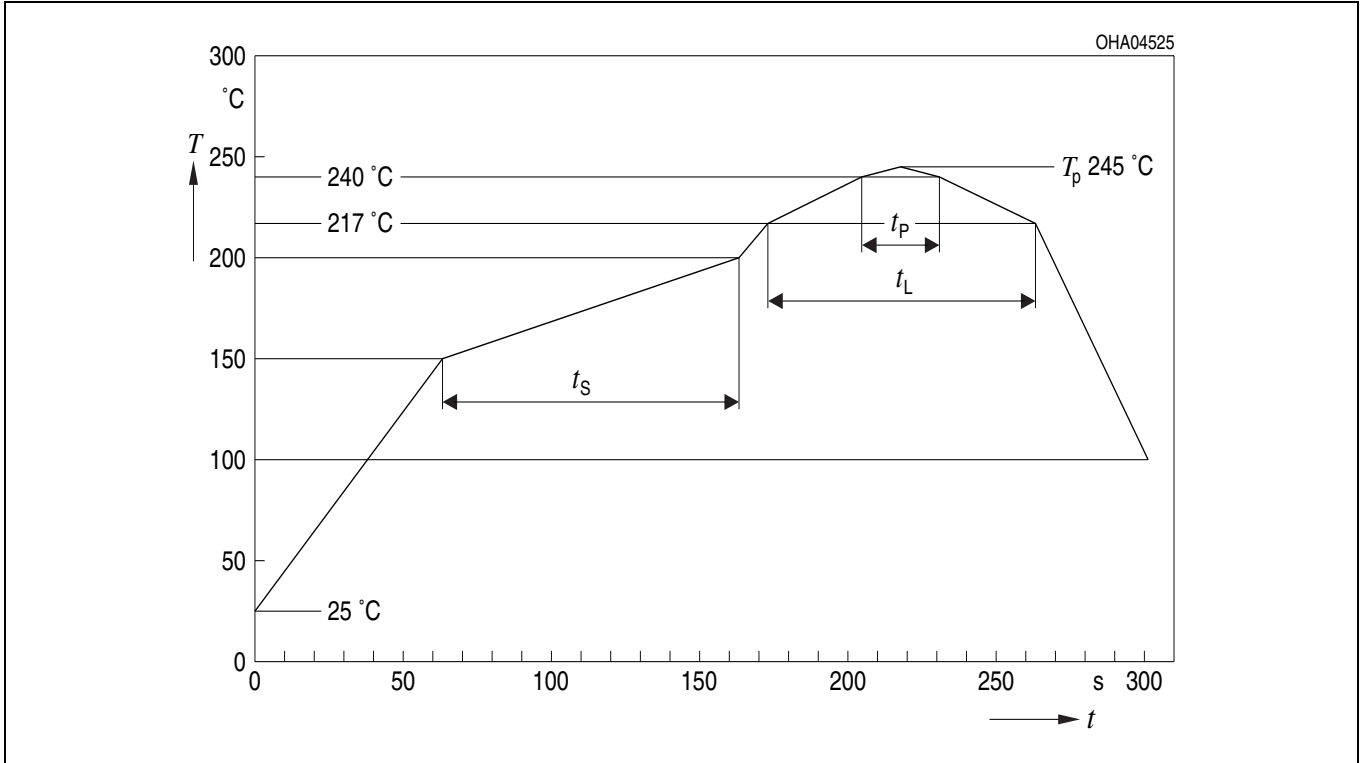


Lötbedingungen
Soldering Conditions

Vorbehandlung nach JEDEC Level 2
Preconditioning acc. to JEDEC Level 2

Reflow Lötprofil für bleifreies Löt
Reflow Soldering Profile for lead free soldering

(nach J-STD-020D.01)
(acc. to J-STD-020D.01)




| Profile Feature | Pb-Free (SnAgCu) Assembly | |
|---|---------------------------|------------------------|
| | Recommendation | Max. Ratings |
| Ramp-up Rate to Preheat*) 25°C to 150°C | 2°C / sec | 3°C / sec |
| Time t_s from T_{Smin} to T_{Smax} (150°C to 200°C) | 100s | min. 60sec max. 120sec |
| Ramp-up Rate to Peak*) 180°C to T_p | 2°C / sec | 3°C / sec |
| Liquidus Temperature T_L | 217°C | |
| Time t_L above T_L | 80sec | max. 100sec |
| Peak Temperature T_p | 245°C | max. 260°C |
| Time t_p within 5°C of the specified peak temperature T_p - 5K | 20sec | min. 10sec max. 30sec |
| Ramp-down Rate* T_p to 100°C | 3°K / sec | 6°K / sec maximum |
| Time 25°C to Peak temperature | | max. 8 min. |

All temperatures refer to the center of the package, measured on the top of the component
* slope calculation $\Delta T/\Delta t$: Δt max. 5 sec; fulfillment for the whole T-range


Barcode-Produkt-Etikett (BPL)
Barcode-Product-Label (BPL)Gurtverpackung

OSRAM Opto Semiconductors


(6P) BATCH NO: 1004109518



(1T) LOT NO: 1234567890 (9D) D/C: 1016




(X) PROD NO: 11055131 (Q)QTY: 4000 (G) GROUP: U5-1-0+V9-5-0+S7-6-0



LRTBGFTG BIN1: U5-1-0-20
 6-LEAD MULTILED BIN2: V9-5-0-20
 RoHS Compliant BIN3: S7-6-0-20

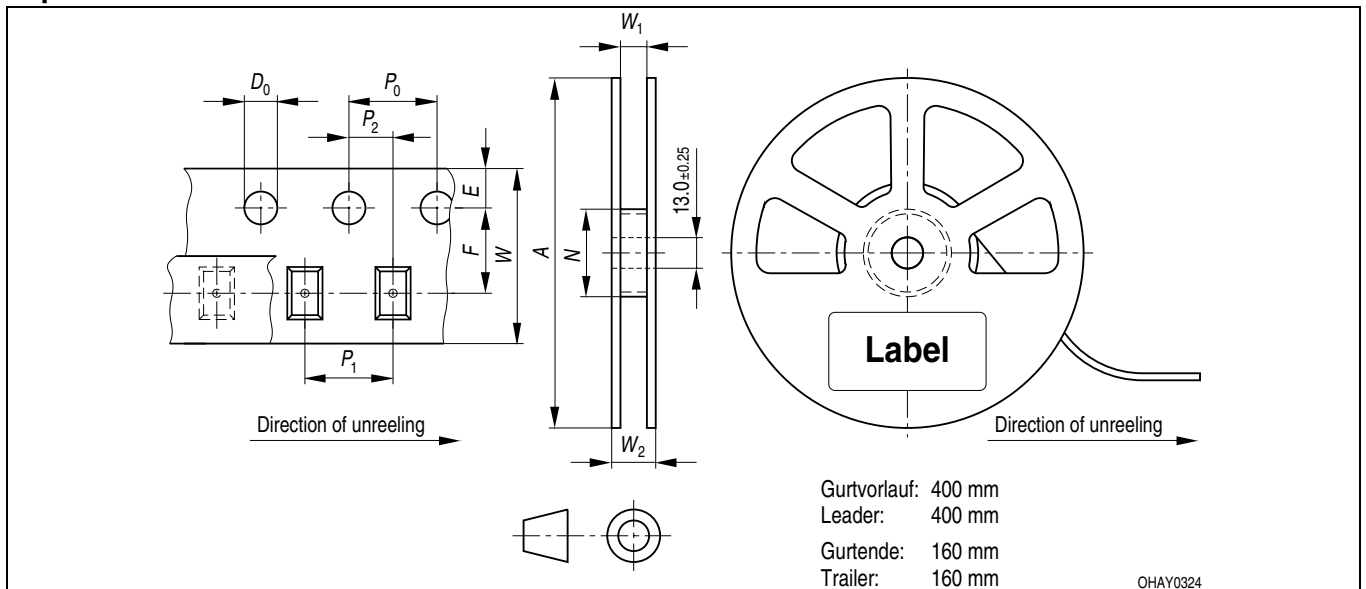
ML Temp ST
 4 260 °C R

Pack: R33
 DEMY 031
 B_R999_1011.1241_R



OHA04614

Gurtverpackung
Tape and Reel



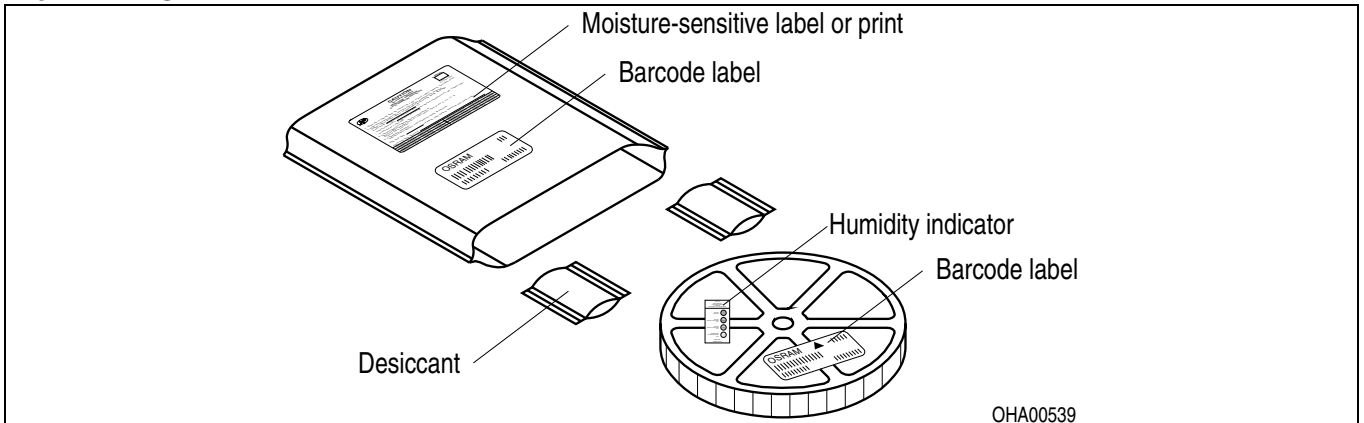
Tape dimensions in mm (inch)

| W | P ₀ | P ₁ | P ₂ | D ₀ | E | F |
|-----------------------------|----------------------------|----------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------------|
| 12 ^{+0.3} D 0.1 | 4 ± 0.1 (0.157 ± 0.004) | 8 ± 0.1 (0.315 ± 0.004) | 2 ± 0.05 (0.079 ± 0.002) | 1.5 ± 0.1 (0.059 ± 0.004) | 1.75 ± 0.1 (0.069 ± 0.004) | 5.5 ± 0.05 (0.217 ± 0.002) |

Reel dimensions in mm (inch)

| A | W | N _{min} | W ₁ | W _{2 max} |
|----------|------------|------------------|--------------------------|--------------------|
| 180 (7) | 12 (0.472) | 60 (2.362) | 12.4 + 2 (0.488 + 0.079) | 18.4 (0.724) |
| 330 (13) | 12 (0.472) | 60 (2.362) | 12.4 + 2 (0.488 + 0.079) | 18.4 (0.724) |

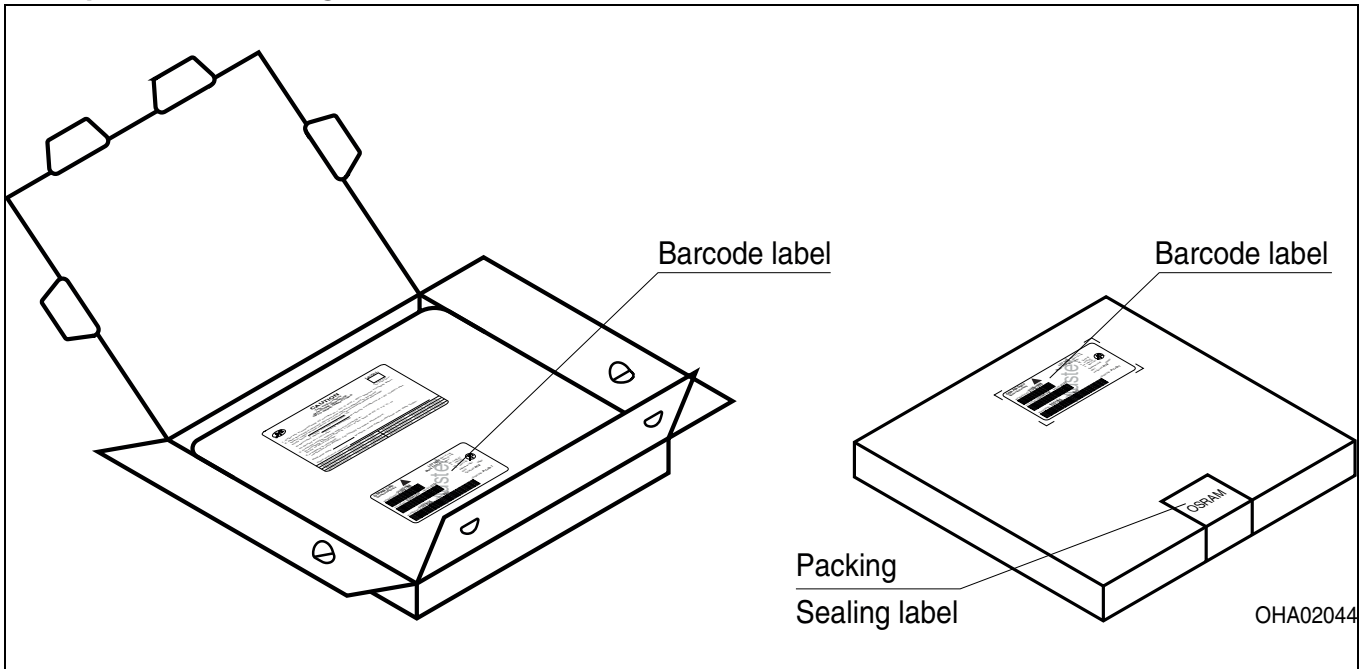
Trockenverpackung und Materialien
Dry Packing Process and Materials



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



Dimensions of transportation box in mm (inch)

| Breite / Width | Länge / length | Höhe / height |
|-------------------------|------------------------|------------------------|
| 200 ±5 (7,874 ±0,1968±) | 200 ±5 (7,874 ±0,1968) | 30 ±5 (1,1811 ±0,1968) |

Revision History: 2010-12-02

Previous Version: 2010-10-04

| Page | Subjects (major changes since last revision) | Date of change |
|------|--|----------------|
| 1 | Productname updated | 2009-05-29 |
| 23 | OS-IN-2010-032 | 2010-10-04 |
| all | Final datasheet created | 2010-12-02 |
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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^{10) page 27} may only be used in life-support devices or systems^{11) page 27} 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) Die LED kann kurzzeitig in Sperrichtung betrieben werden.
- 3) Die dominante Wellenlänge wird während eines Strompulses einer typischen Dauer von 25 ms, mit einer internen Reproduzierbarkeit von +/- 0,5 nm und einer erweiterten Messunsicherheit von +/- 1 nm gemessen (gemäß GUM mit Erweiterungsfaktor $k = 3$).
- 4) Farbortgruppen werden mit einer Stromeinprägedauer von 25 ms und einer relativen Genauigkeit von $\pm 0,005$ ermittelt.
- 5) 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 $k=3$).
- 6) 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.
- 7) Im gestrichelten Bereich der Kennlinien muss mit erhöhten Helligkeitsunterschieden zwischen Leuchtdioden innerhalb einer Verpackungseinheit gerechnet werden.
Dimmverhältnis im Gleichstrom-Betrieb max. 5:1 für red
- 8) Maße werden wie folgt angegeben: mm (inch)
- 9) Gehäuse hält TTW-Löthitze aus nach CECC 00802
- 10) 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.
- 11) 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) Driving the LED in reverse direction is suitable for short term application.
- 3) The dominant wavelength is measured at a current pulse of typical 25 ms, with an internal reproducibility of +/- 0,5 nm and an expanded uncertainty of +/- 1 nm (acc. to GUM with a coverage factor of $k=3$).
- 4) Chromaticity coordinate groups are tested at a current pulse duration of 25 ms and a relative accuracy of ± 0.005 .
- 5) 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 $k=3$).
- 6) 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.
- 7) In the range where the line of the graph is broken, you must expect higher brightness differences between single LEDs within one packing unit.
Dimming range for direct current mode max. 5:1 for red
- 8) Dimensions are specified as follows: mm (inch)
- 9) Package able to withstand TTW-soldering heat acc. to CECC 00802
- 10) 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.
- 11) 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.

