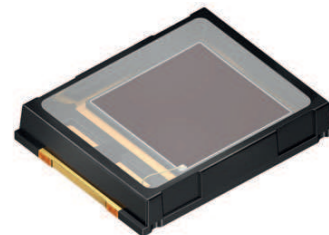


# Silicon PIN Photodiode

## Preliminary Version 0.0

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### SFH 2201



#### Features:

- Suitable for reflow soldering
- small package: (WxDxH) 4 mm x 5.1 mm x 0.85mm
- Solder control structure

#### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

#### Ordering Information

Type:	Photocurrent	Spectral sensitivity	Ordering Code
	$I_P$ [ $\mu$ A] $E_V = 1000$ lx, white LED, $V_R = 5$ V	$S$ [nA/lx] $V_R = 5$ V, Std. Light A, T = 2856 K	
SFH 2201	13 ( $\geq 10$ )	76	Q65112A3981

**Maximum Ratings** ( $T_A = 25\text{ °C}$ )

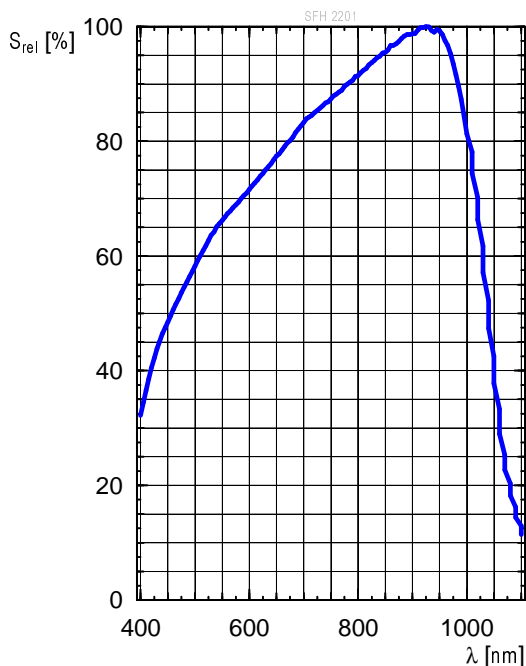
Parameter	Symbol	Values	Unit
Operating and storage temperature range	$T_{op}; T_{stg}$	-40 ... 85	°C
Reverse voltage	$V_R$	16	V
Total Power dissipation	$P_{tot}$	150	mW
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	$V_{ESD}$	2000	V
Thermal resistance for mounting on pcb	$R_{thJA}$	275	K/W

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

Parameter	Symbol	Values	Unit
Spectral sensitivity ( $V_R = 5\text{ V}$ , Std. Light A, $T = 2856\text{ K}$ )	(typ) S	76	nA/lx
Spectral sensitivity of the chip ( $\lambda = 400\text{ nm}$ )	(typ) $S_{\lambda, typ}$	0.2	A / W
Spectral sensitivity ( $\lambda = 550\text{ nm}$ )	(typ) $S_{\lambda typ}$	0.45	A / W
Photocurrent ( $E_v = 1000\text{ lx}$ , white LED, $V_R = 5\text{ V}$ )	(typ (min)) $I_P$	13 ( $\geq 10$ )	$\mu\text{A}$
Wavelength of max. sensitivity	(typ) $\lambda_{S max}$	950	nm
Spectral range of sensitivity	(typ) $\lambda_{10\%}$	(typ) 300 ... 1100	nm
Radiant sensitive area	(typ) A	8.12	mm <sup>2</sup>
Dimensions of radiant sensitive area	(typ) L x W	2.85 x 2.85	mm x mm
Half angle	(typ) $\phi$	$\pm 60$	°
Dark current ( $V_R = 10\text{ V}$ )	(typ (max)) $I_R$	1 ( $\leq 25$ )	nA
Open-circuit voltage ( $E_v = 1000\text{ lx}$ , Std. Light A)	(typ (min)) $V_O$	350 ( $\geq 300$ )	mV
Short-circuit current ( $E_v = 1000\text{ lx}$ , Std. Light A)	(typ) $I_{SC}$	76	$\mu\text{A}$
Rise and fall time ( $V_R = 5\text{ V}$ , $R_L = 50\ \Omega$ , $\lambda = 850\text{ nm}$ , $I_P = 800\ \mu\text{A}$ )	(typ) $t_r, t_f$	0.04	$\mu\text{s}$
Forward voltage ( $I_F = 100\text{ mA}$ , $E = 0$ )	(typ) $V_F$	1.25	V
Capacitance ( $V_R = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ) $C_0$	65	pF
Temperature coefficient of $V_O$	(typ) $TC_V$	-2.6	mV / K

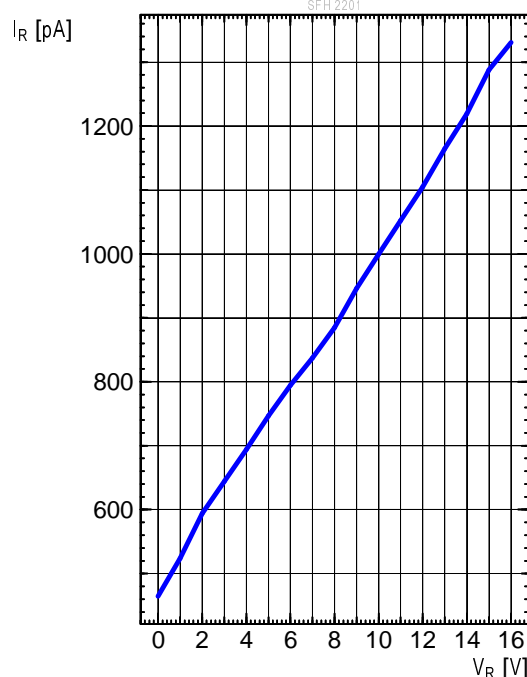
**Relative Spectral Sensitivity** <sup>1) page 11</sup>

$S_{rel} = f(\lambda)$



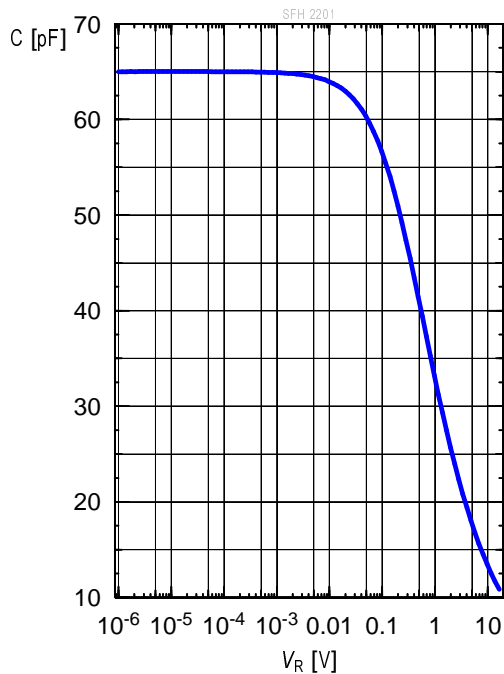
**Dark Current** <sup>1) page 11</sup>

$I_R = f(V_R), E = 0$



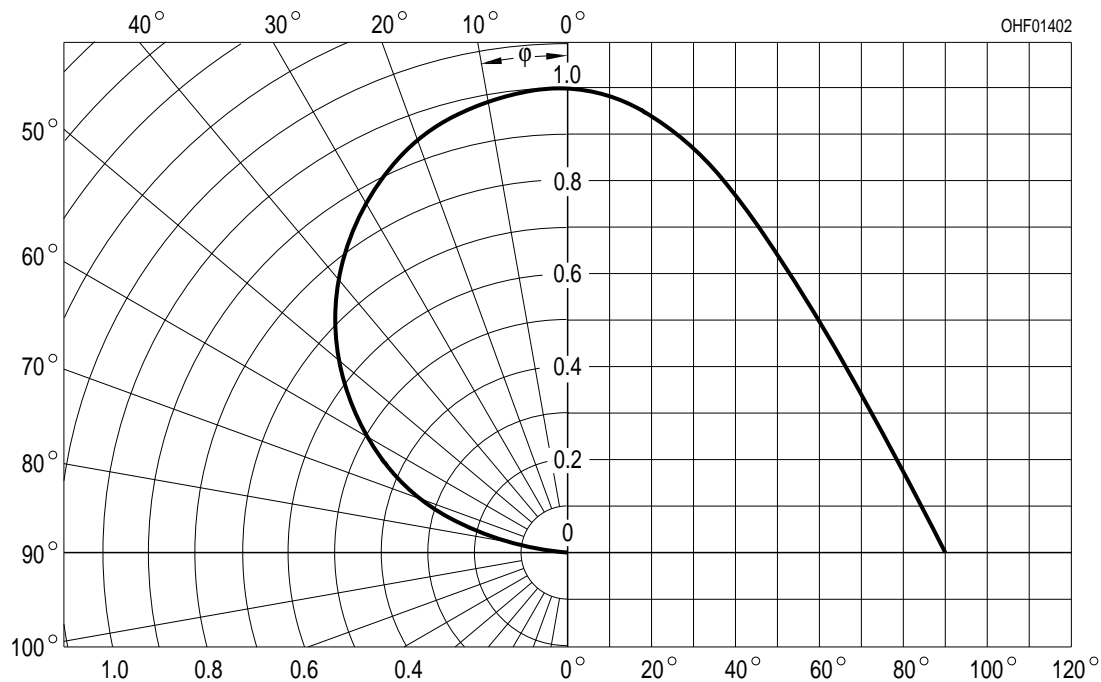
**Capacitance** <sup>1) page 11</sup>

$C = f(V_R), f = 1 \text{ MHz}, E = 0$

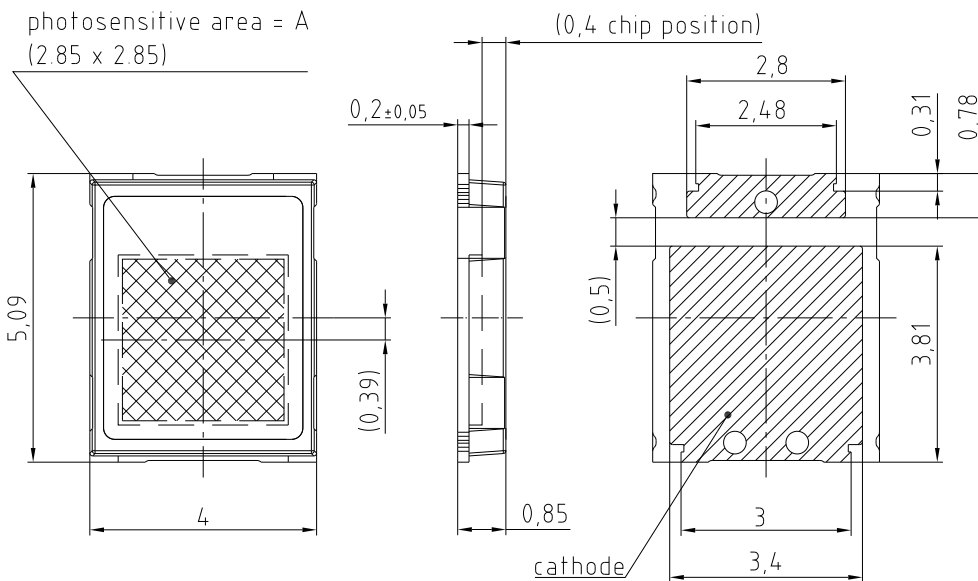


**Directional Characteristics** <sup>1) page 11</sup>

$S_{rel} = f(\phi)$



**Package Outline**



photosensitive area = A  
(2.85 x 2.85)

general tolerance  $\pm 0.1$   
lead finish Au

C63062-A4306-A6-01

Dimensions in mm.

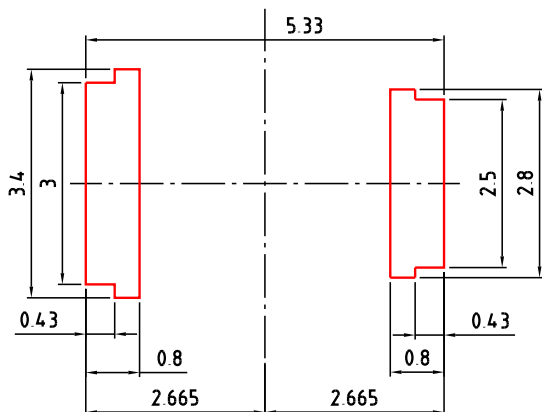
**Package**

TOPLED D5140, Silicone, colourless, clear

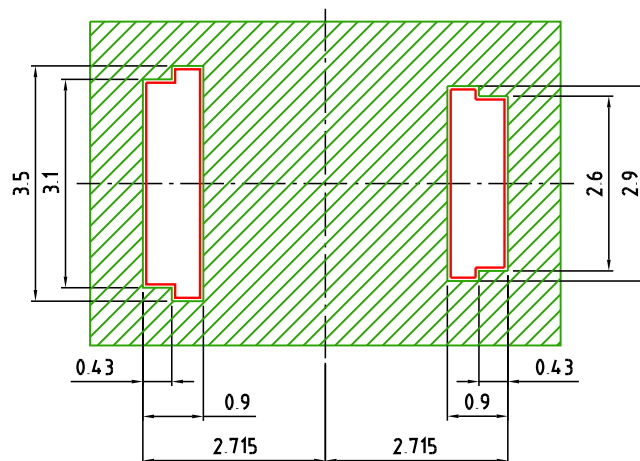
**Approximate Weight:**

46 mg

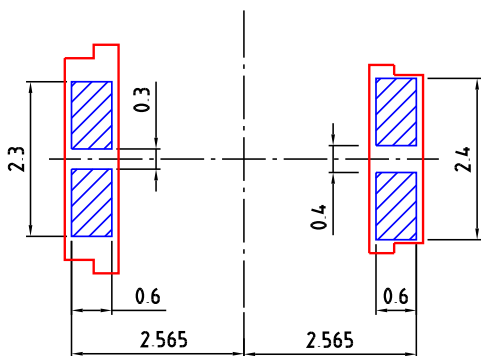
**Recommended Solder Pad**



 foot print

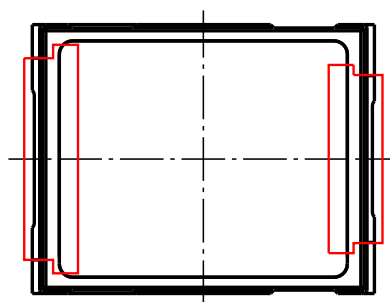


 solder resist



 solder stencil

**Component Location on Pad**



E062.3010.210-01

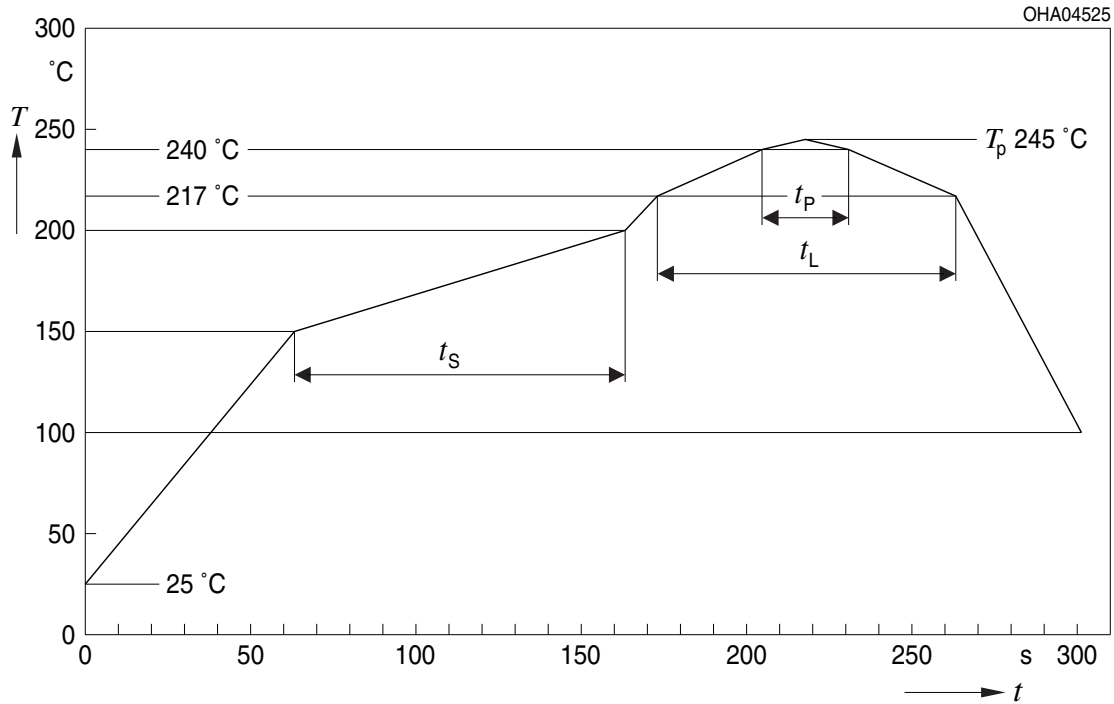
Dimensions in mm.

**Handling Indication**

The package is casted with silicone. Mechanical stress at the silicone surface should be avoided. Pickup the device at the plastic frame.

**Reflow Soldering Profile**

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

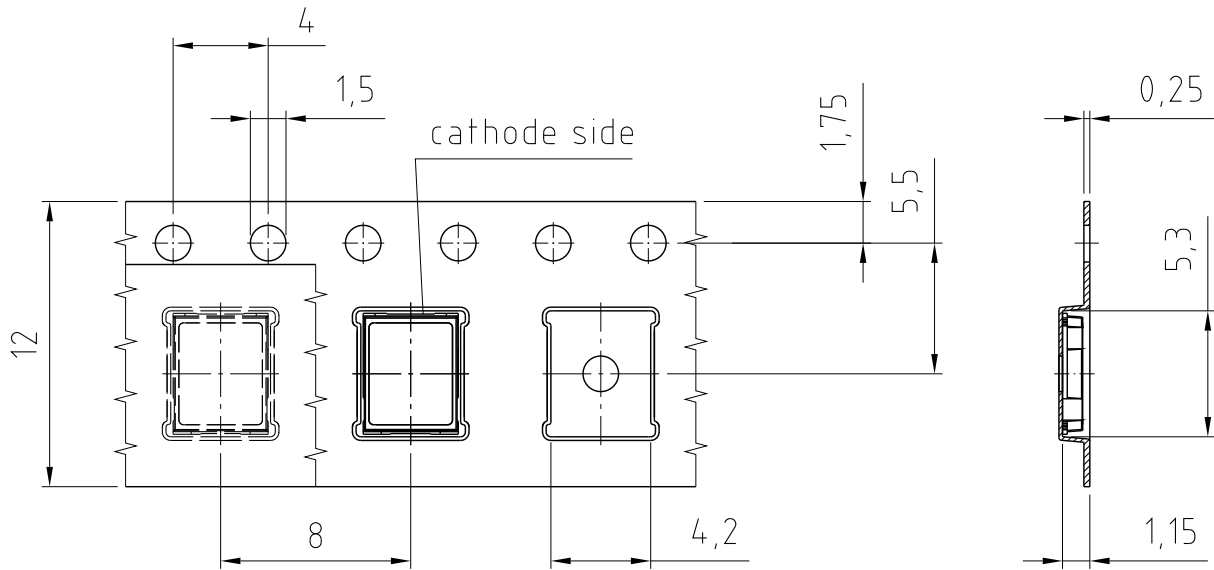


OHA04612

Profile Feature Profil-Charakteristik	Symbol Symbol	Pb-Free (SnAgCu) Assembly			Unit Einheit
		Minimum	Recommendation	Maximum	
Ramp-up rate to preheat*) 25 °C to 150 °C			2	3	K/s
Time $t_s$ $T_{Smin}$ to $T_{Smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak*) $T_{Smax}$ 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* $T_P$ to 100 °C			3	6	K/s
Time 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

**Taping**

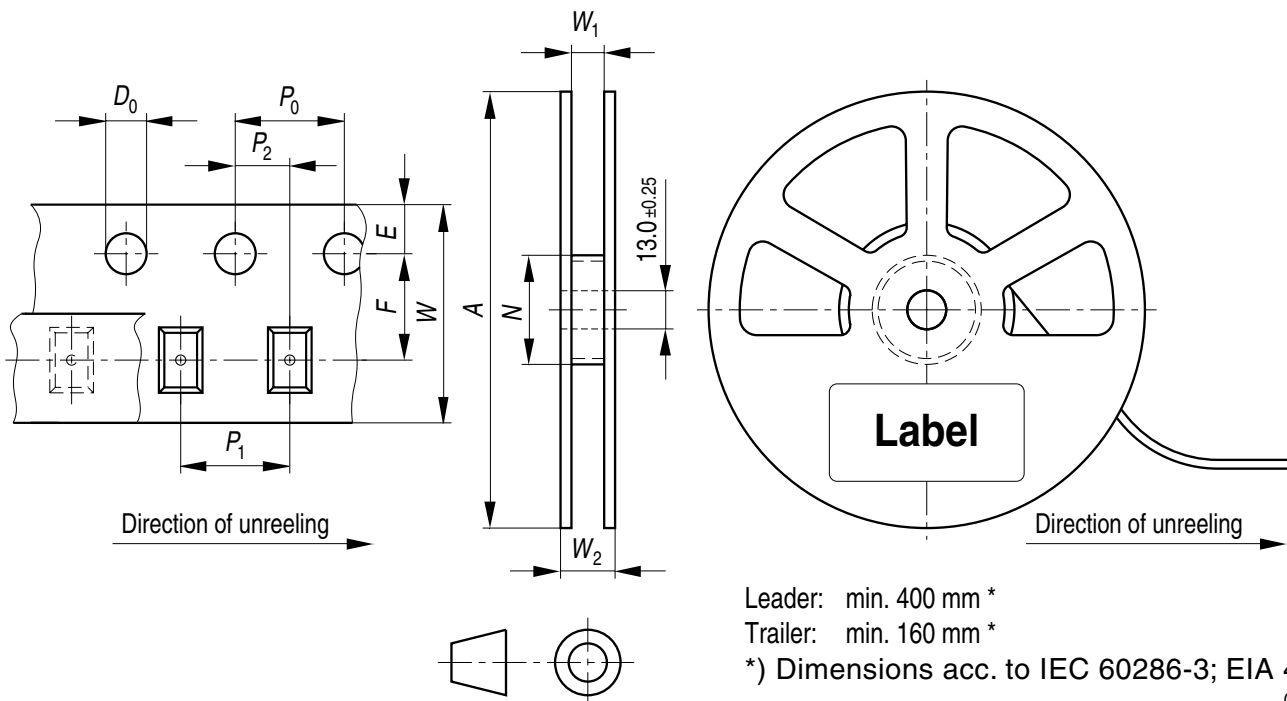


C63062-A4306-B1-01

Dimensions in mm.

**Tape and Reel**

12 mm tape with 1500 pcs. on  $\varnothing$  180 mm reel



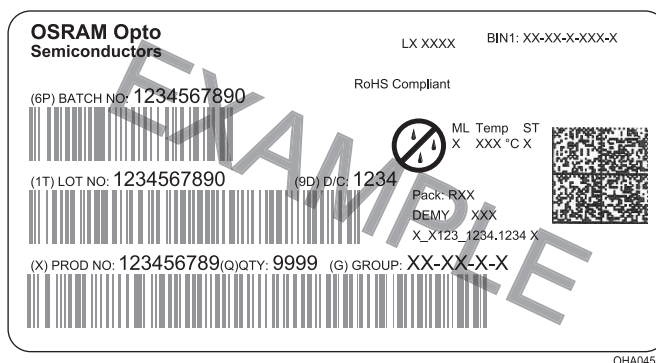
Tape dimensions [mm]

W	P <sub>0</sub>	P <sub>1</sub>	P <sub>2</sub>	D <sub>0</sub>	E	F
12 + 0.3 / - 0.1	4 ± 0.1	4 ± 0.1 or 8 ± 0.1	2 ± 0.05	1.5 ± 0.1	1.75 ± 0.1	5.5 ± 0.05

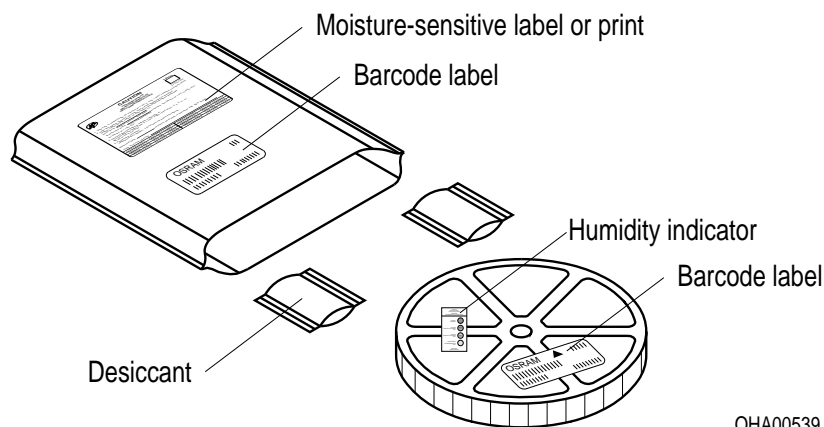
Reel dimensions [mm]

A	W	N <sub>min</sub>	W <sub>1</sub>	W <sub>2max</sub>
180	12	60	12.4 + 2	18.4

Barcode-Product-Label (BPL)



Dry Packing Process and Materials

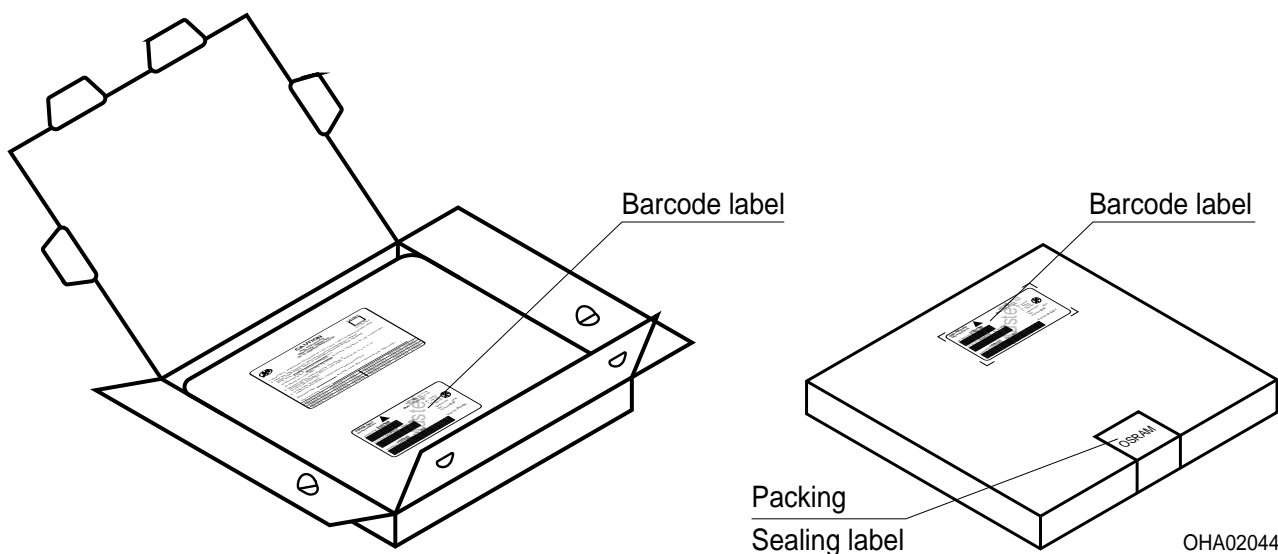


Note:

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. Here you will also find the normative references like JEDEC.



Transportation Packing and Materials



Dimensions of transportation box in mm

Width	Length	Height
195 ± 5	195 ± 5	30 ± 5

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**Glossary**

- <sup>1)</sup> **Typical Values:** 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.

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