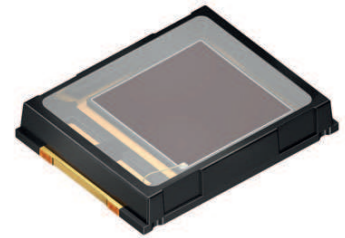


Silicon PIN Photodiode

Preliminary Version 0.0

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 I_P [μA] $E_v = 1000$ lx, white LED, $V_R = 5$ V	Spectral sensitivity S [nA/lx] $V_R = 5$ V, Std. Light A, T = 2856 K	Ordering Code
SFH 2201	13 (≥ 10)	76	Q65112A3981

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

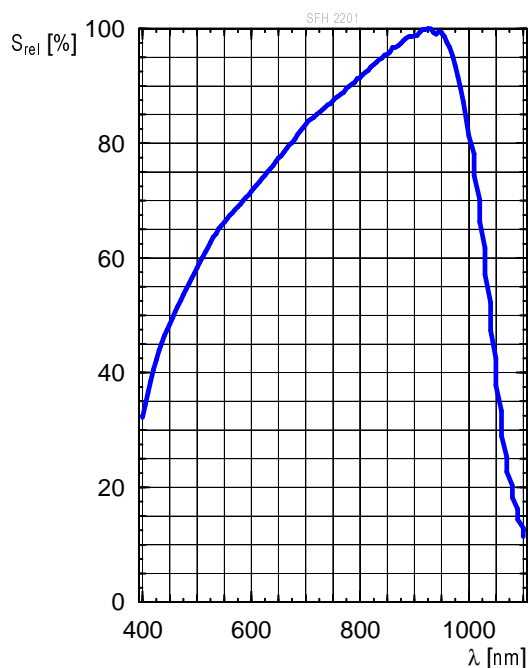
Parameter	Symbol	Values	Unit
Operating and storage temperature range	$T_{op}; T_{stg}$	-40 ... 85	°C
Reverse voltage	V_R	16	V
Total Power dissipation	P_{tot}	150	mW
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2000	V
Thermal resistance for mounting on pcb	R_{thJA}	275	K/W

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

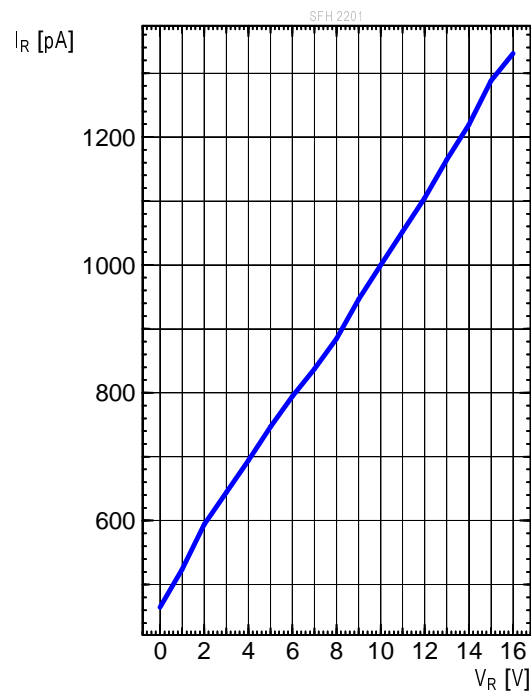
Parameter	Symbol	Values	Unit
Spectral sensitivity ($V_R = 5\text{ V}$, Std. Light A, $T = 2856\text{ K}$)	(typ) S	76	nA/lx
Spectral sensitivity of the chip ($\lambda = 400\text{ nm}$)	(typ) $S_{\lambda, typ}$	0.2	A / W
Spectral sensitivity ($\lambda = 550\text{ nm}$)	(typ) $S_{\lambda typ}$	0.45	A / W
Photocurrent ($E_v = 1000\text{ lx}$, white LED, $V_R = 5\text{ V}$)	(typ (min)) I_P	13 (≥ 10)	μA
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 ²
Dimensions of radiant sensitive area	(typ) L x W	2.85 x 2.85	mm x mm
Half angle	(typ) φ	± 60	°
Dark current ($V_R = 10\text{ V}$)	(typ (max)) I_R	1 (≤ 25)	nA
Open-circuit voltage ($E_v = 1000\text{ lx}$, Std. Light A)	(typ (min)) V_O	350 (≥ 300)	mV
Short-circuit current ($E_v = 1000\text{ lx}$, Std. Light A)	(typ) I_{SC}	76	μA
Rise and fall time ($V_R = 5\text{ V}$, $R_L = 50\text{ }\Omega$, $\lambda = 850\text{ nm}$, $I_P = 800\text{ }\mu\text{A}$)	(typ) t_r, t_f	0.04	μs
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 ^{1) page 11}

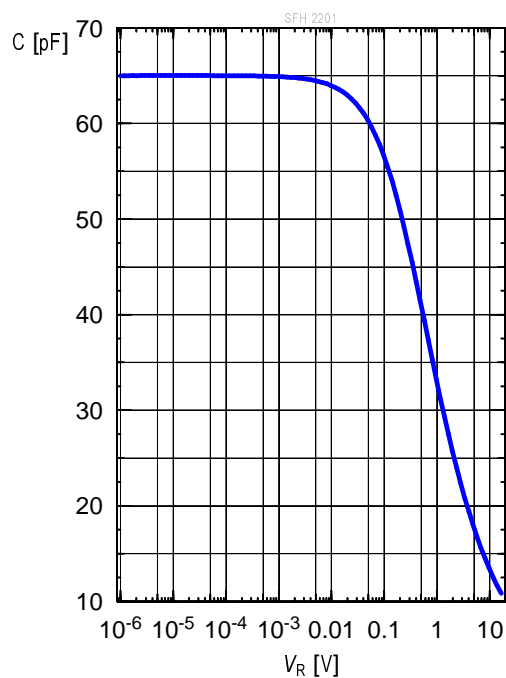
$$S_{\text{rel}} = f(\lambda)$$

**Dark Current** ^{1) page 11}

$$I_{\text{R}} = f(V_{\text{R}}), E = 0$$

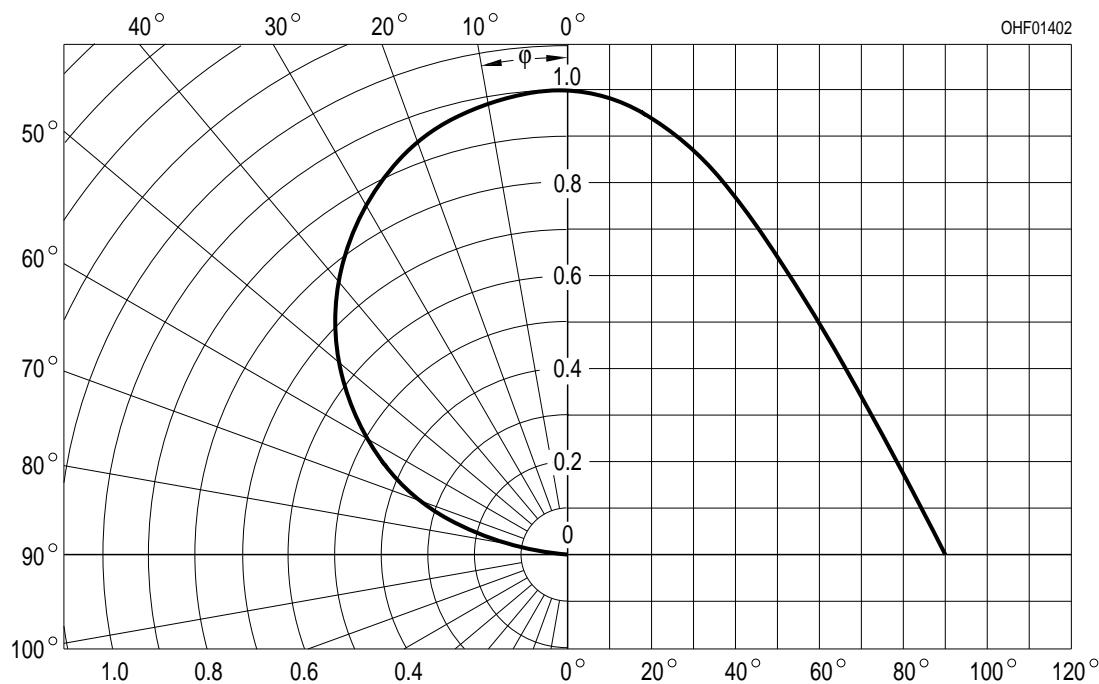
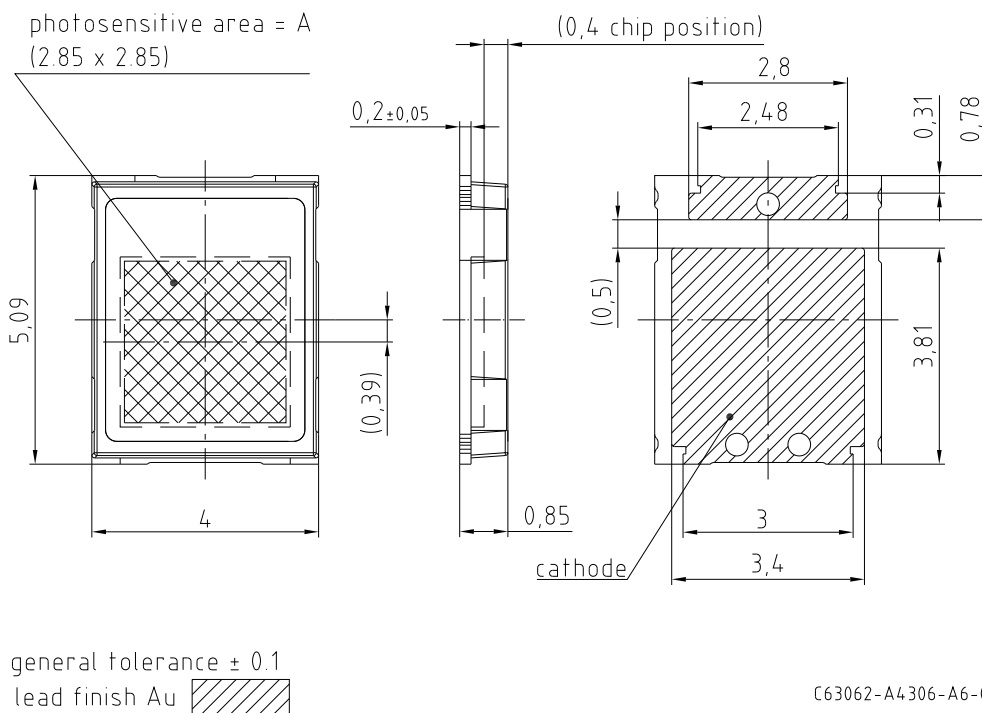
**Capacitance** ^{1) page 11}

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



Directional Characteristics ^{1) page 11}

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

**Package Outline**

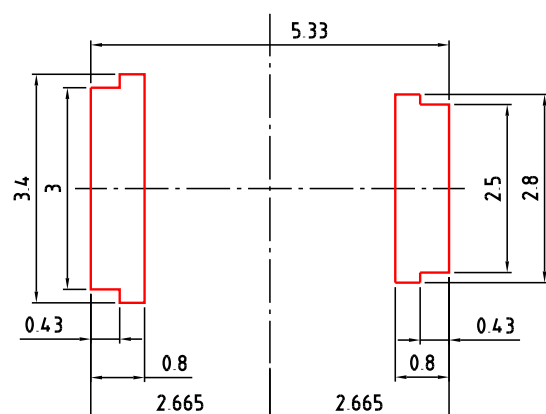

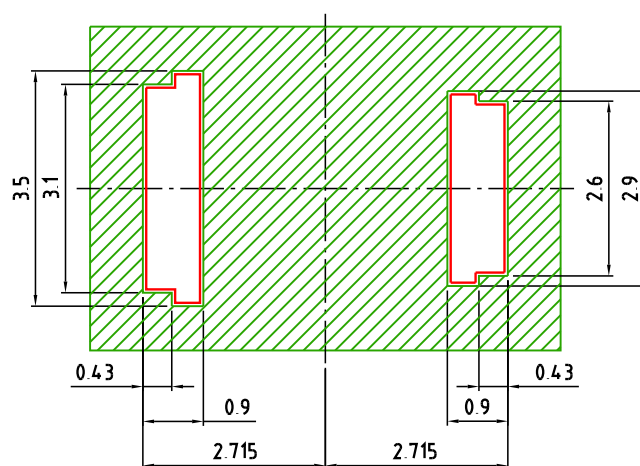
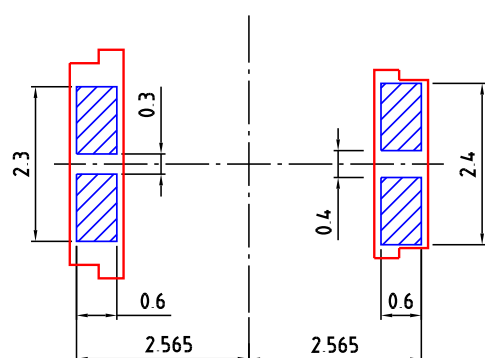
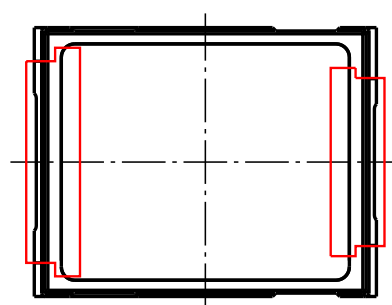
Dimensions in mm.

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

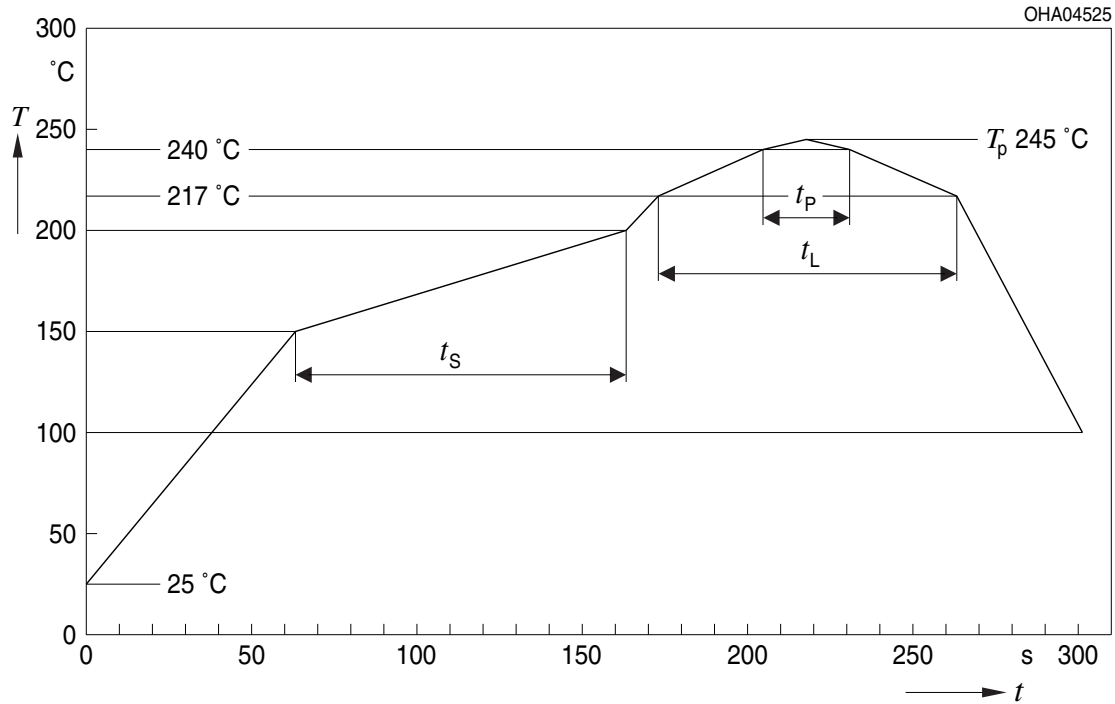
Dimensions in mm.

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



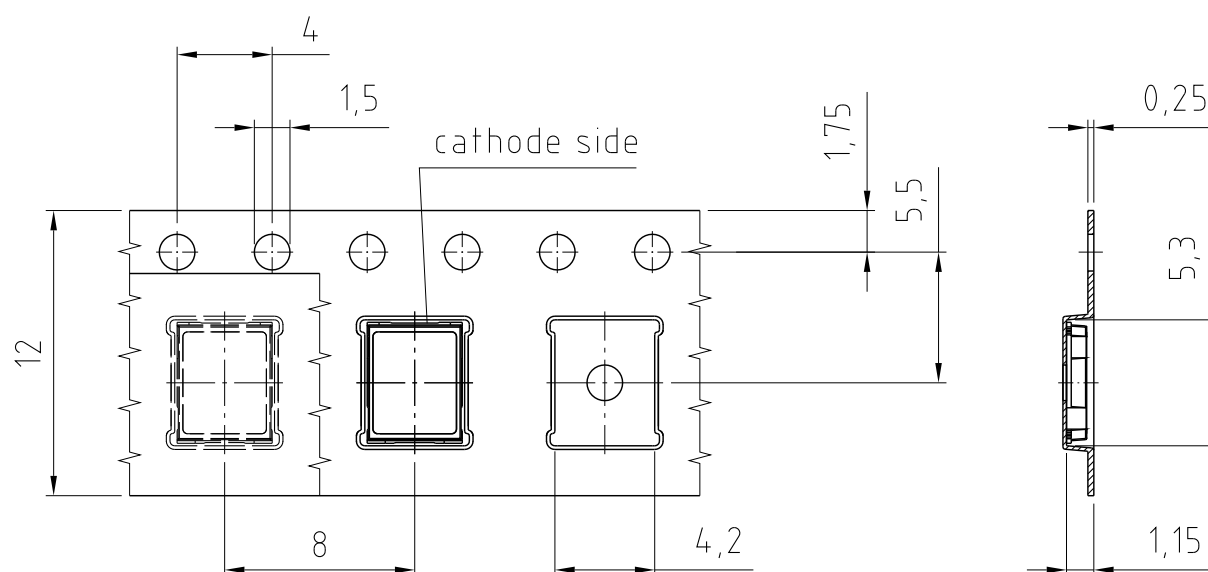
OHA04612

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

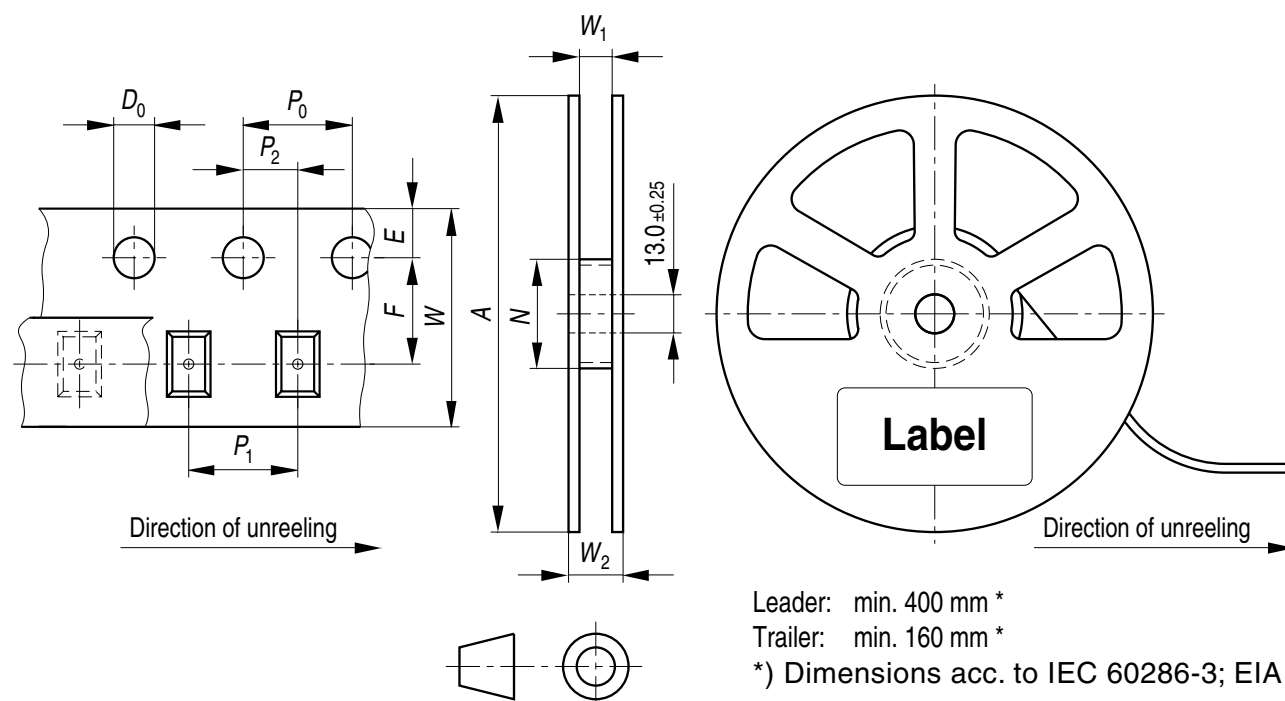
Taping



C63062-A4306-B1-01

Dimensions in mm.

Tape and Reel

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

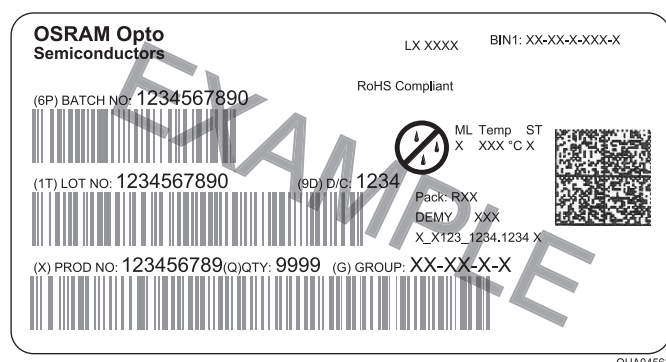
Tape dimensions [mm]

W	P ₀	P ₁	P ₂	D ₀	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

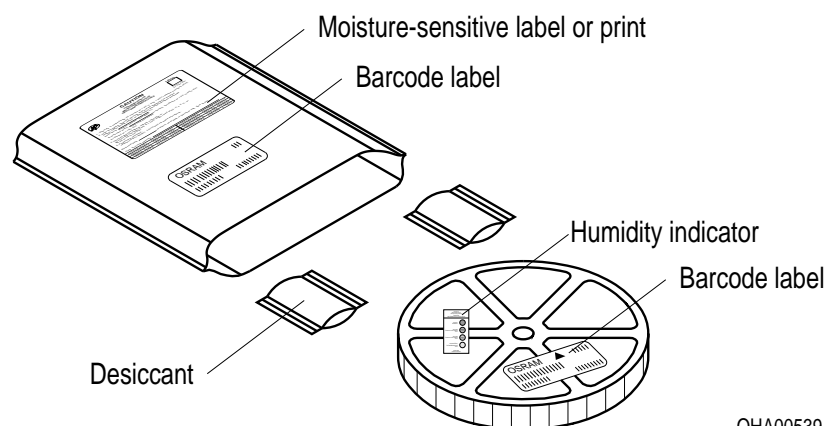
Reel dimensions [mm]

A	W	N _{min}	W ₁	W _{2max}
180	12	60	12.4 + 2	18.4

Barcode-Product-Label (BPL)



Dry Packing Process and Materials

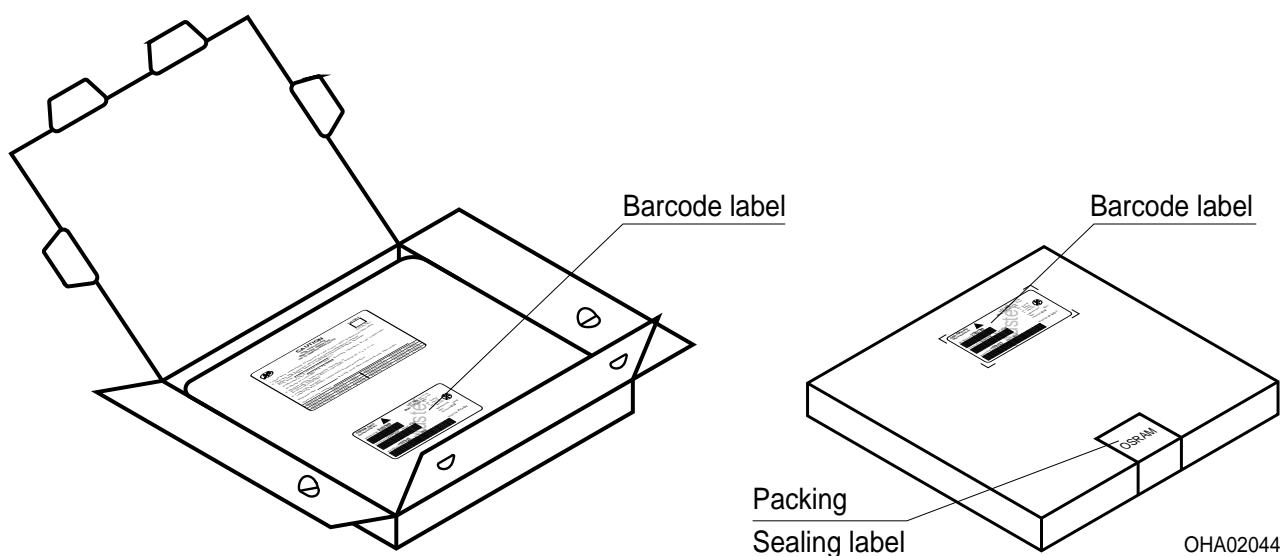


Note:

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

- ¹⁾ **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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