

# Silicon NPN Phototransistor

## Version 1.3

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### BPX 81



#### Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** Miniature Array, Epoxy
- **Special:** One-digit array package
- High linearity
- Available in groups

#### Applications

- Computer-controlled flashes
- Miniature photointerrupters
- Industrial electronics
- For control and drive circuits

#### Ordering Information

Type:	Photocurrent $I_{PCE}$ [ $\mu$ A] $\lambda = 950 \text{ nm}$ , $E_e = 0.5 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$	Ordering Code
BPX 81	> 250	Q62702P0020
BPX 81-2/3	250 ... 800	Q62702P3583
BPX 81-3	400 ... 800	Q62702P0043S003
BPX 81-3/4	> 400	Q62702P3584
BPX 81-4	> 630	Q62702P0043S004

*Note:* Only one bin within one packing unit (variation less than 2:1)

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

Parameter	Symbol	Values	Unit
Operating and storage temperature range	$T_{op}; T_{stg}$	-40 ... 80	°C
Collector-emitter voltage	$V_{CE}$	35	V
Collector current	$I_C$	50	mA
Collector surge current ( $\tau < 10\text{ }\mu\text{s}$ )	$I_{CS}$	200	mA
Emitter-collector voltage	$V_{EC}$	7	V
Total Power dissipation	$P_{tot}$	90	mW
Thermal resistance	$R_{thJA}$	750	K / W
ESD withstand voltage (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	$V_{ESD}$	2000	V

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

Parameter		Symbol	Values	Unit
Wavelength of max. sensitivity	(typ)	$\lambda_{S\ max}$	850	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 450 ... 1100	nm
Radiant sensitive area	(typ)	A	0.11	mm <sup>2</sup>
Dimensions of chip area	(typ)	L x W	(typ) 0.55 x 0.55	mm x mm
Half angle	(typ)	$\varphi$	± 18	°
Capacitance ( $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )	(typ)	$C_{CE}$	7.5	pF
Dark current ( $V_{CE} = 20\text{ V}$ , $E = 0$ )	(typ (max))	$I_{CE0}$	1 ( $\leq 50$ )	nA
Rise and fall time	(typ)	$t_r, t_f$	7	$\mu\text{s}$

Grouping ( $T_A = 25\text{ °C}$ ,  $\lambda = 950\text{ nm}$ )

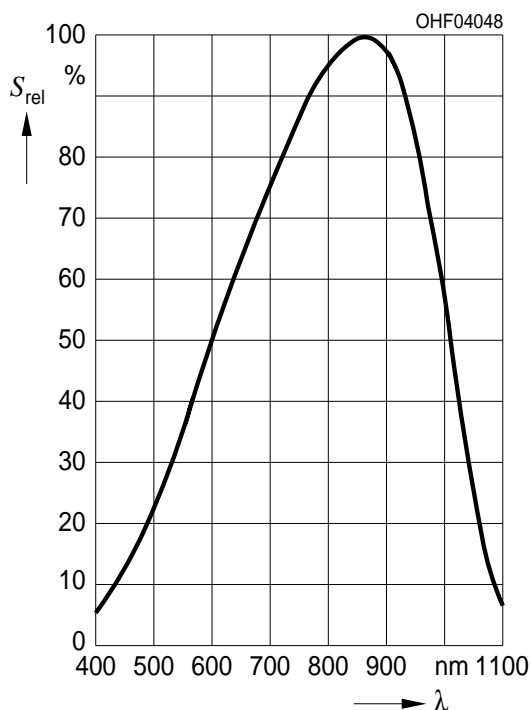
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, min}$ [ $\mu\text{A}$ ]	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$ , $V_{CE} = 5\text{ V}$ $I_{PCE, max}$ [ $\mu\text{A}$ ]	Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A}$ , $V_{CE} = 5\text{ V}$ $I_{PCE}$ [ $\mu\text{A}$ ]	Rise and fall time $t_r, t_f$ [ $\mu\text{s}$ ]
BPX 81-2	250	500	1200	5.5
BPX 81-3	400	800	1900	6
BPX 81-4	630		2900	8

Group	Collector-emitter saturation voltage $I_C = I_{PCEmin} \times 0.3$ , $E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat}$ [mV]
BPX 81-2	150
BPX 81-3	150
BPX 81-4	150

Note.:  $I_{PCEmin}$  is the min. photocurrent of the specified group.

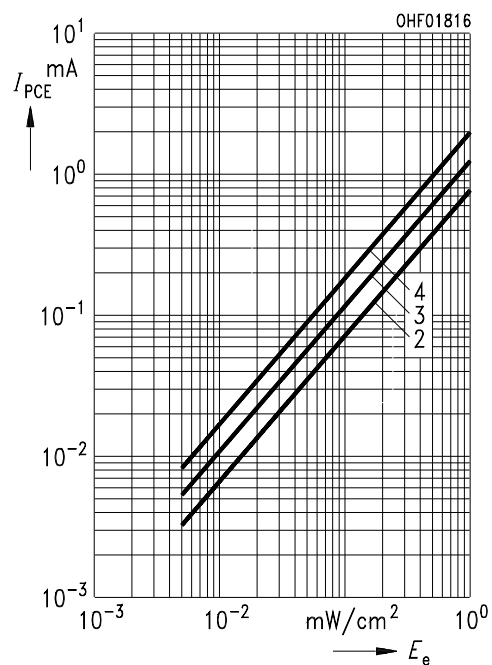
### Relative Spectral Sensitivity <sup>1) page 9</sup>

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



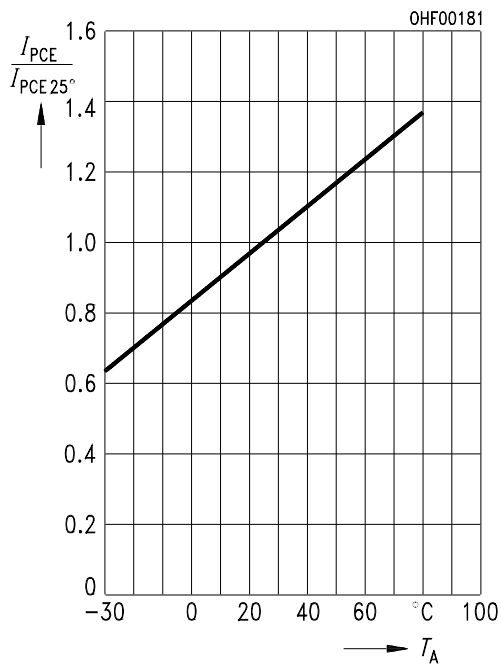
### Photocurrent <sup>1) page 9</sup>

$$I_{PCE} = f(E_e), V_{CE} = 5\text{ V}$$



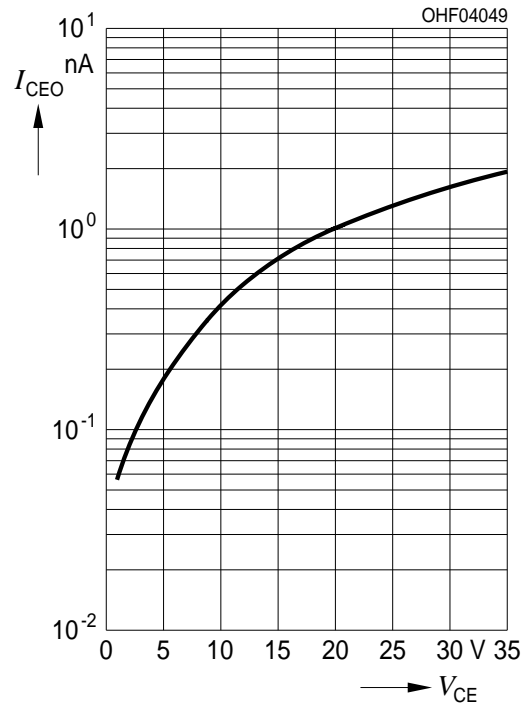
**Photocurrent** <sup>1) page 9</sup>

$I_{PCE} / I_{PCE(25^\circ C)} = f(T_A), V_{CE} = 5 V$



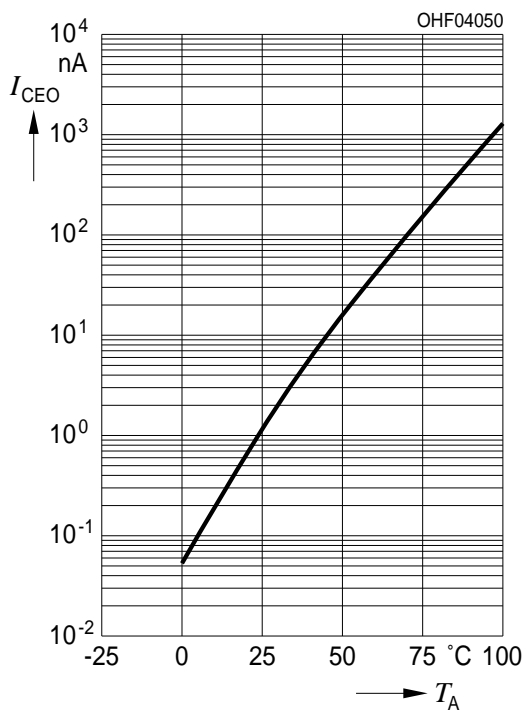
**Dark Current** <sup>1) page 9</sup>

$I_{CEO} = f(V_{CE}), E = 0$



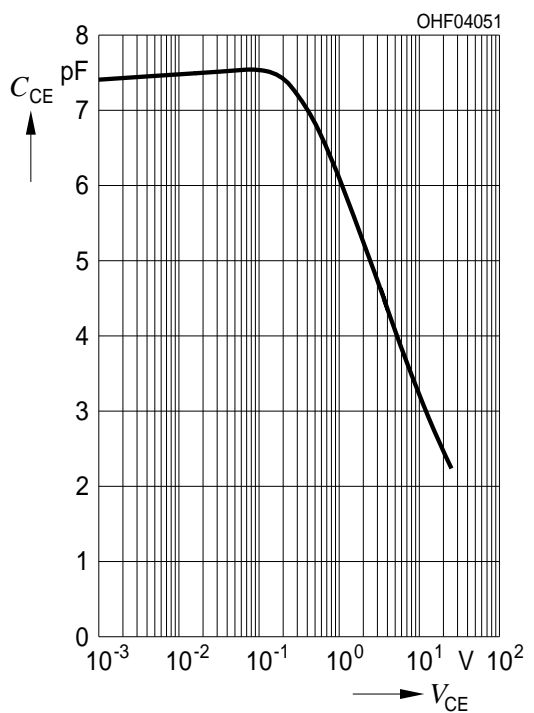
**Dark Current** <sup>1) page 9</sup>

$I_{CEO} = f(T_A), E = 0$



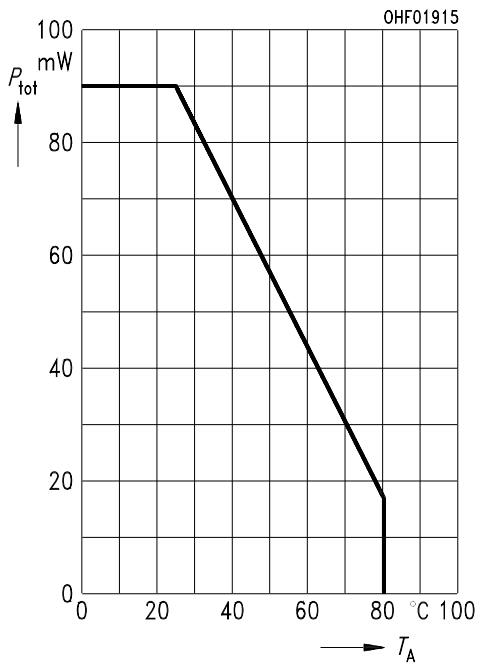
**Collector-Emitter Capacitance** <sup>1) page 9</sup>

$C_{CE} = f(V_{CE}), f = 1 \text{ MHz}, E = 0$



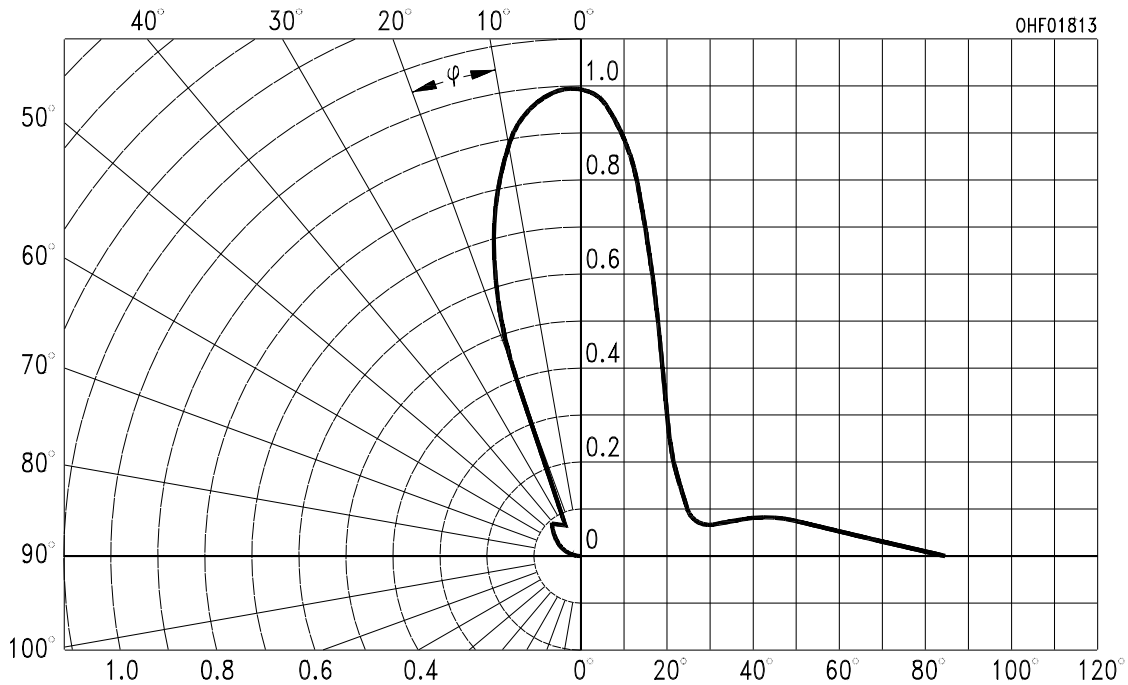
**Power Consumption**

$P_{tot} = f(T_A)$

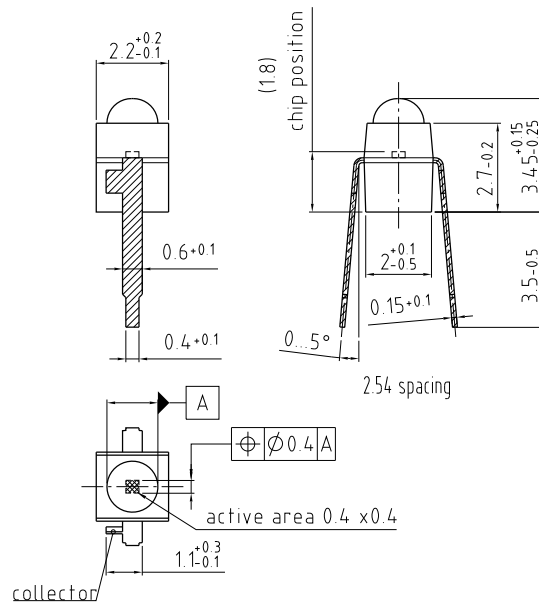


**Directional Characteristics** <sup>1) page 9</sup>

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



Package Outline



general tolerance  $\pm 0.1$   
lead finish Sn

C63062-A257-A31-05

*Dimensions in mm (inch).*

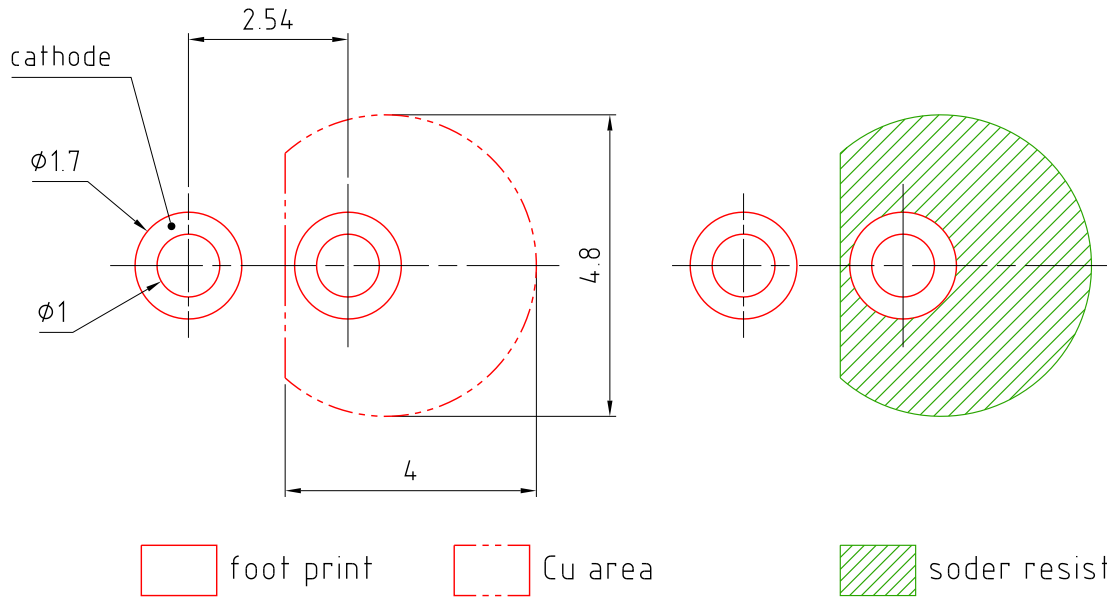
**Package**

Miniature Array, Epoxy

**Approximate Weight:**

24 mg

**Recommended Solder Pad**

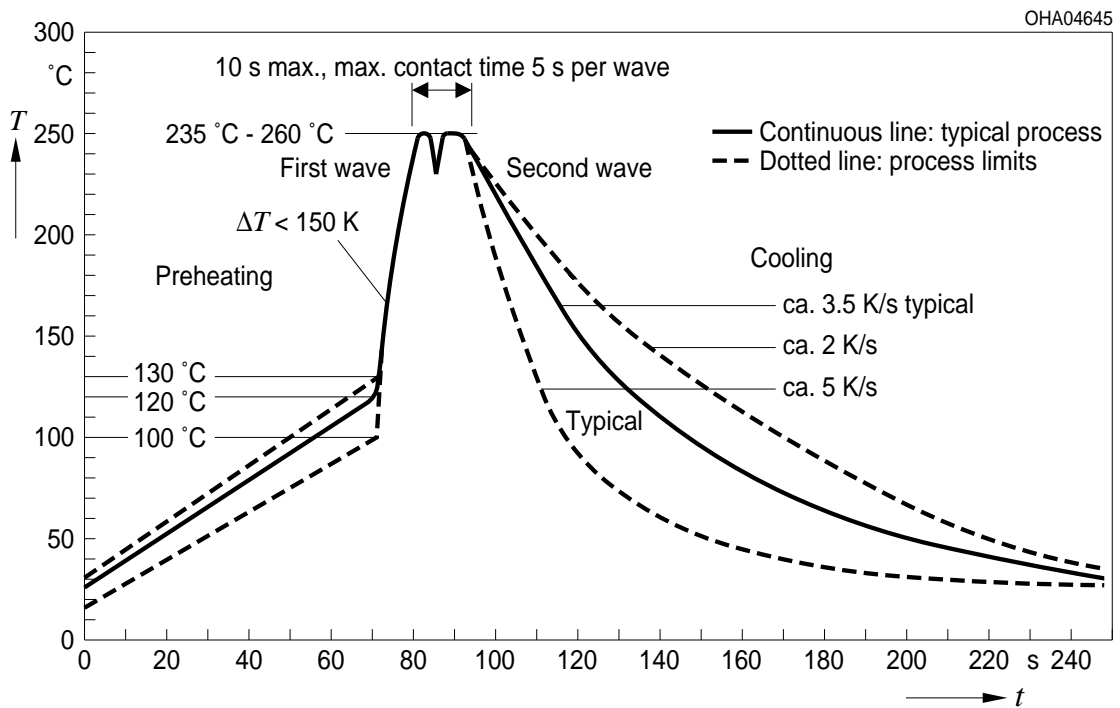


E062.3010.189-01

Dimensions in mm.

**TTW Soldering**

IEC-61760-1 TTW



**Disclaimer**

Language english will prevail in case of any discrepancies or deviations between the two language wordings.

**Attention please!**

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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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