

# NPN-Silizium-Fototransistor Silicon NPN Phototransistor

## BPX 38



### Wesentliche Merkmale

- Speziell geeignet für Anwendungen im Bereich von 450 nm bis 1120 nm
- Hohe Linearität
- Hermetisch dichte Metallbauform (TO-18) mit Basisanschluß, geeignet bis 125 °C
- Gruppiert lieferbar

### Anwendungen

- Lichtschranken für Gleich- und Wechsellichtbetrieb
- Industrieelektronik
- „Messen/Steuern/Regeln“

### Features

- Especially suitable for applications from 450 nm to 1120 nm
- High linearity
- Hermetically sealed metal package (TO-18) with base connection, suitable up to 125 °C
- Available in groups

### Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Typ Type	Bestellnummer Ordering Code	Typ Type	Bestellnummer Ordering Code
BPX 38	Q62702-P15	BPX 38-4	Q62702-P15-S4
BPX 38-2/3	Q62702-P3578	BPX 38-4/5	Q62702-P5197
BPX 38-3	Q62702-P15-S3	BPX 38-5 <sup>1)</sup>	Q62702-P15-S5
BPX 38-3/4	Q62702-P3579		

<sup>1)</sup> Eine Lieferung in dieser Gruppe kann wegen Ausbeuteschwankungen nicht immer sichergestellt werden. Wir behalten uns in diesem Fall die Lieferung einer Ersatzgruppe vor.

<sup>1)</sup> Supplies out of this group cannot always be guaranteed due to unforeseeable spread of yield. In this case we will reserve us the right of delivering a substitute group.

**Grenzwerte**  
**Maximum Ratings**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Betriebs- und Lagertemperatur Operating and storage temperature range	$T_{op}; T_{stg}$	- 40 ... + 125	°C
Löttemperatur bei Tauchlötung Lötstelle $\geq 2$ mm vom Gehäuse, Lötzeit $t \leq 5$ s Dip soldering temperature $\geq 2$ mm distance from case bottom, soldering time $t \leq 5$ s	$T_S$	260	°C
Löttemperatur bei Kolbenlötung Lötstelle $\geq 2$ mm vom Gehäuse, Lötzeit $t \leq 3$ s Iron soldering temperature $\geq 2$ mm distance from case bottom, soldering time $t \leq 3$ s	$T_S$	300	°C
Kollektor-Emitterspannung Collector-emitter voltage	$V_{CE}$	50	V
Kollektorstrom Collector current	$I_C$	50	mA
Kollektorspitzenstrom, $\tau < 10 \mu s$ Collector surge current	$I_{CS}$	200	mA
Emitter-Basisspannung Emitter-base voltage	$V_{EB}$	7	V
Verlustleistung, $T_A = 25 \text{ °C}$ Total power dissipation	$P_{tot}$	220	mW
Wärmewiderstand Thermal resistance	$R_{thJA}$	450	K/W

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

**Characteristics**

Bezeichnung Parameter	Symbol Symbol	Wert Value	Einheit Unit
Wellenlänge der max. Fotoempfindlichkeit Wavelength of max. sensitivity	$\lambda_{S\text{ max}}$	880	nm
Spektraler Bereich der Fotoempfindlichkeit $S = 10\%$ von $S_{\text{max}}$ Spectral range of sensitivity $S = 10\%$ of $S_{\text{max}}$	$\lambda$	450 ... 1120	nm
Bestrahlungsempfindliche Fläche Radiant sensitive area	$A$	0.675	mm <sup>2</sup>
Abmessung der Chipfläche Dimensions of chip area	$L \times B$ $L \times W$	1 × 1	mm × mm
Abstand Chipoberfläche zu Gehäuseoberfläche Distance chip front to case surface	$H$	2.05 ... 2.35	mm
Halbwinkel Half angle	$\varphi$	± 40	Grad deg.
Fotostrom der Kollektor-Basis-Fotodiode Photocurrent of collector-base photodiode $E_e = 0.5\text{ mW/cm}^2$ , $V_{CB} = 5\text{ V}$ $E_v = 1000\text{ lx}$ , Normlicht/standard light A, $V_{CB} = 5\text{ V}$	$I_{PCB}$ $I_{PCB}$	1.8 5.5	μA μA
Kapazität Capacitance $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ $V_{CB} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ $V_{EB} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$	$C_{CE}$ $C_{CB}$ $C_{EB}$	23 39 47	pF pF pF
Dunkelstrom Dark current $V_{CE} = 25\text{ V}$ , $E = 0$	$I_{CEO}$	20 ( $\leq 300$ )	nA

Die Fototransistoren werden nach ihrer Fotoempfindlichkeit gruppiert und mit arabischen Ziffern gekennzeichnet.

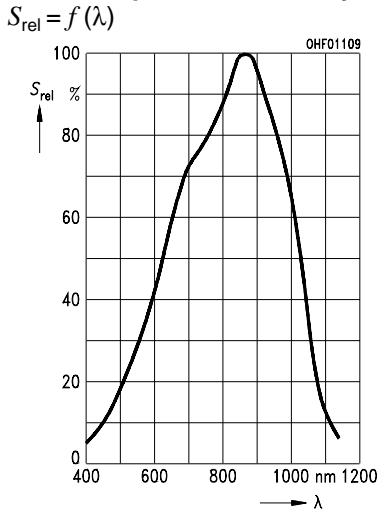
The phototransistors are grouped according to their spectral sensitivity and distinguished by arabian figures.

Bezeichnung Parameter	Symbol Symbol	Wert Value				Einh. Unit
		-2	-3	-4	-5	
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.5 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$ $E_v = 1000 \text{ lx}$ , Normlicht/standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE}$ $I_{PCE}$	0.2 ... 0.4 0.95	0.32 ... 0.63 1.5	0.5 ... 1.0 2.3	$\geq 0.8$ 3.6	mA mA
Anstiegszeit/Abfallzeit Rise and fall time $I_C = 1 \text{ mA}$ , $V_{CC} = 5 \text{ V}$ , $R_L = 1 \text{ k}\Omega$	$t_r, t_f$	9	12	15	18	$\mu\text{s}$
Kollektor-Emitter-Sättigungsspannung Collector-emitter saturation voltage $I_C = I_{PCEmin}^{1)} \times 0.3$ $E_e = 0.5 \text{ mW/cm}^2$	$V_{CEsat}$	200	200	200	200	mV
Stromverstärkung Current gain $E_e = 0.5 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$	$\frac{I_{PCE}}{I_{PCB}}$	170	280	420	650	–

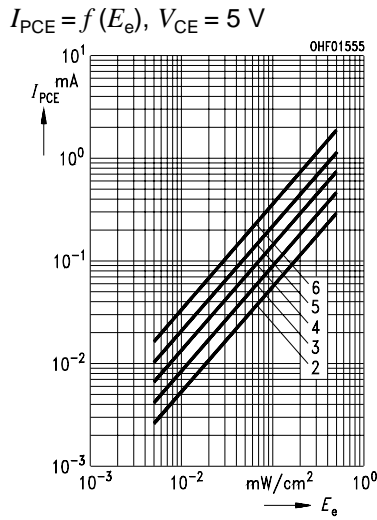
1)  $I_{PCEmin}$  ist der minimale Fotostrom der jeweiligen Gruppe.

1)  $I_{PCEmin}$  is the min. photocurrent of the specified group.

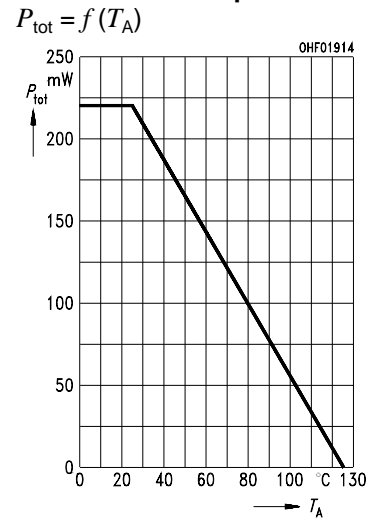
**Relative Spectral Sensitivity**



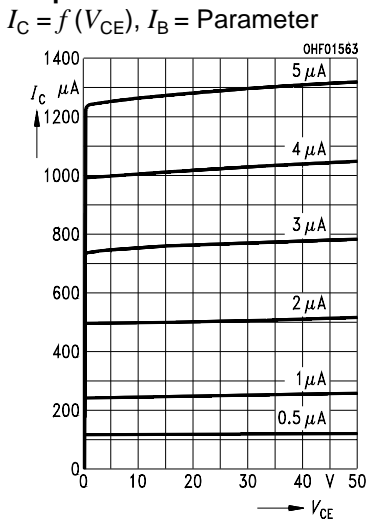
**Photocurrent**



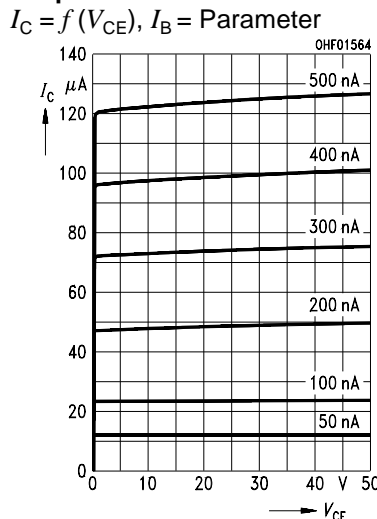
**Total Power Dissipation**



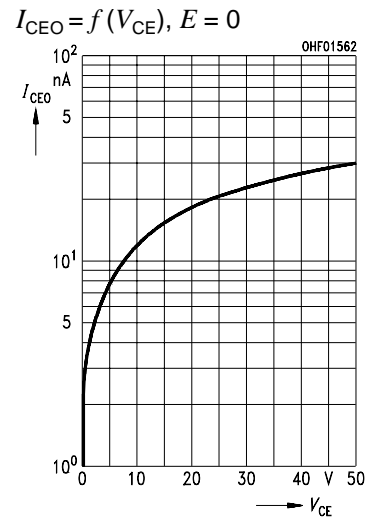
**Output Characteristics**



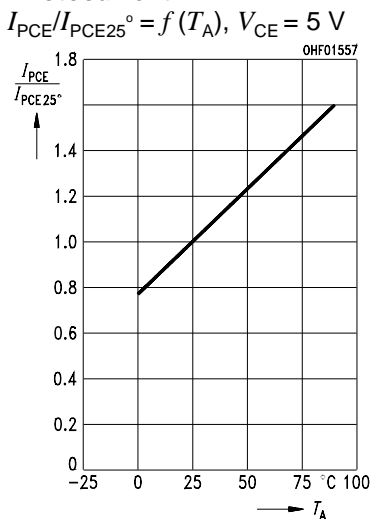
**Output Characteristics**



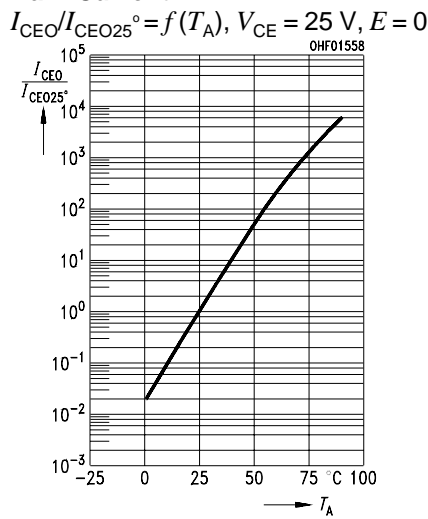
**Dark Current**



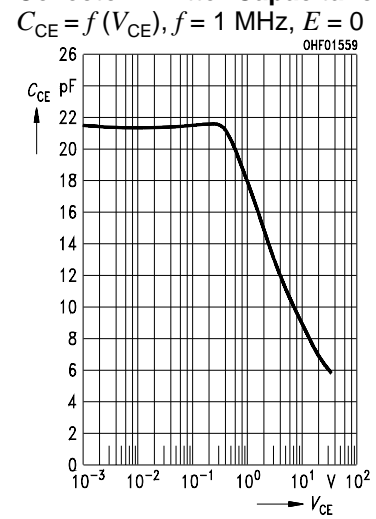
**Photocurrent**



**Dark Current**

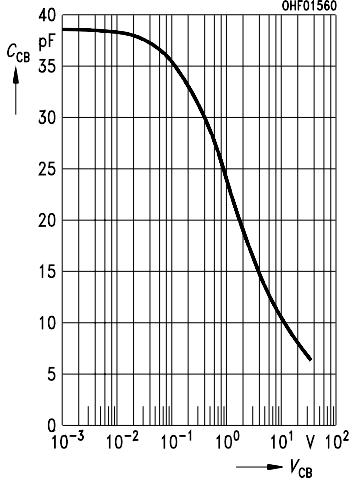


**Collector-Emitter Capacitance**



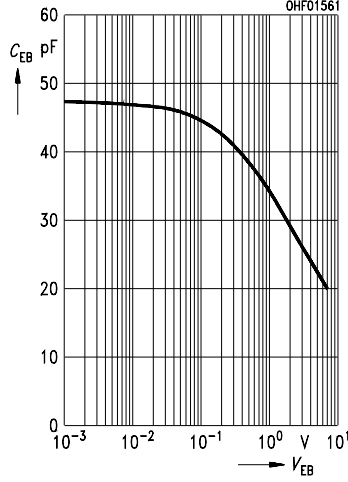
**Collector-Base Capacitance**

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



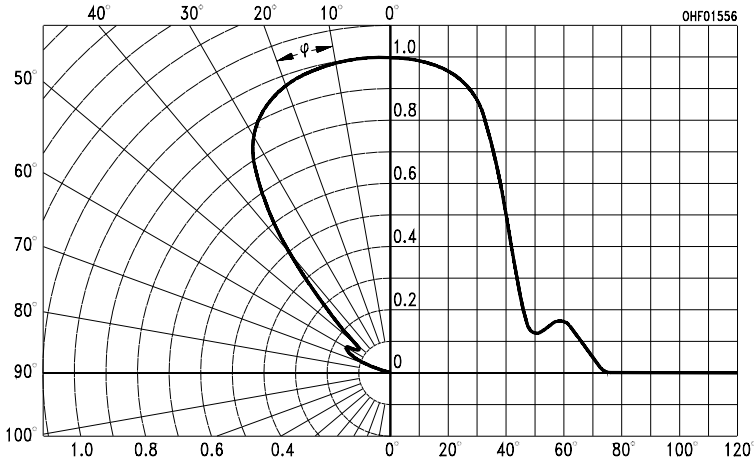
**Emitter-Base Capacitance**

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

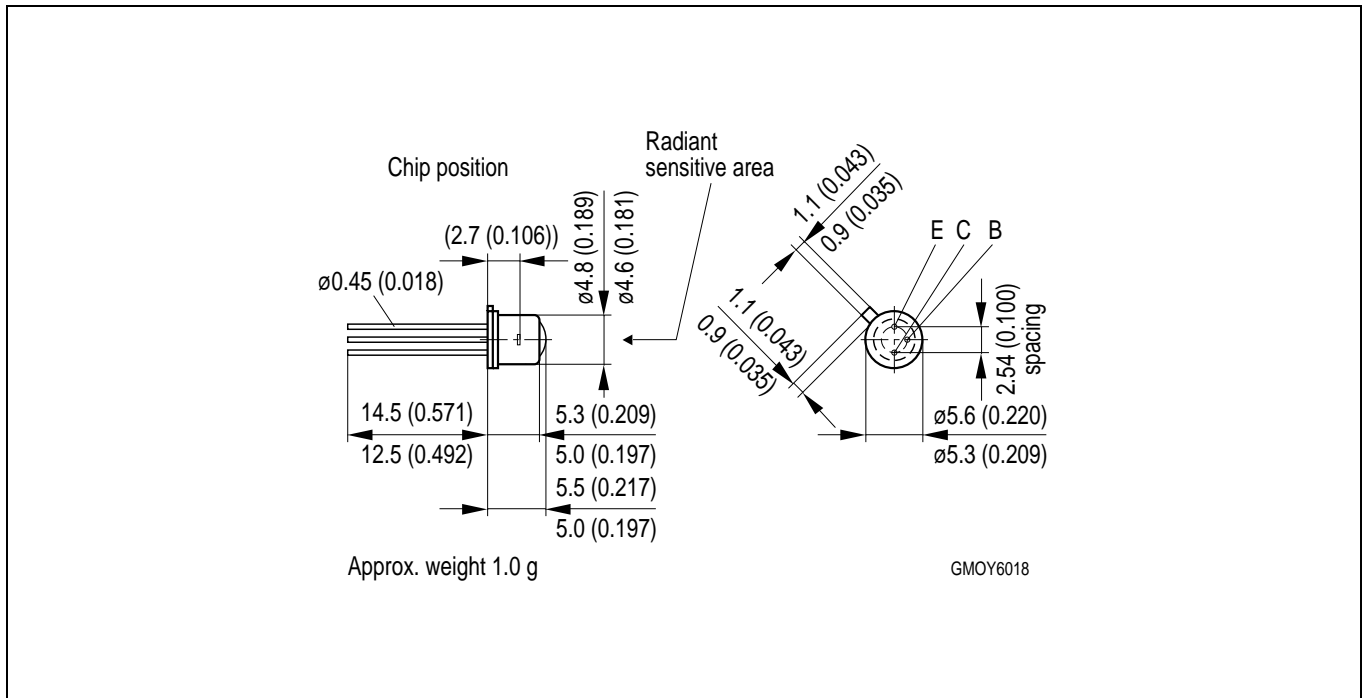


**Directional Characteristics**

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



**Maßzeichnung  
Package Outlines**



Maße werden wie folgt angegeben: mm (inch) / Dimensions are specified as follows: mm (inch).

**Published by OSRAM Opto Semiconductors GmbH & Co. OHG  
Wernerwerkstrasse 2, D-93049 Regensburg**

© All Rights Reserved.

**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.

**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>1</sup>, may only be used in life-support devices or systems <sup>2</sup> with the express written approval of OSRAM OS.

<sup>1</sup> 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 effectiveness of that device or system.

<sup>2</sup> 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 of the user may be endangered.