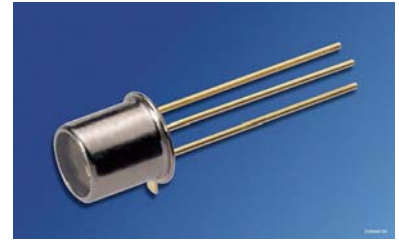


# NPN-Silizium-Fototransistor

## Silicon NPN Phototransistor

### Lead (Pb) Free Product - RoHS Compliant

#### 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
BPX 38	Q62702P0015
BPX 38-2/3	Q62702P3578
BPX 38-3	Q62702P0015S003
BPX 38-4	Q62702P0015S004

**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
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	$L \times B$ $L \times W$	$1 \times 1$	mm $\times$ mm
Halbwinkel Half angle	$\varphi$	$\pm 40$	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	$\mu\text{A}$ $\mu\text{A}$
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 ( $\leq 100$ )	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.

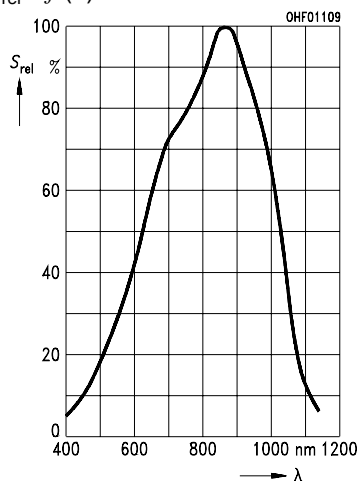
Bezeichnung Parameter	Symbol Symbol	Wert Value				Einh. Unit
		-2	-3	-4	-5	
Fotostrom, $\lambda = 950 \text{ nm}$ Photocurrent $E_e = 0.5 \text{ mW/cm}^2$ , $V_{CE} = 5 \text{ V}$ $E_v = 1000 \text{ lx}$ , Normlicht/standard light A, $V_{CE} = 5 \text{ V}$	$I_{PCE}$ $I_{PCE}$	0.2 ... 0.4 0.95	0.32 ... 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	–

<sup>1)</sup>  $I_{PCEmin}$  ist der minimale Fotostrom der jeweiligen Gruppe.

<sup>1)</sup>  $I_{PCEmin}$  is the min. photocurrent of the specified group.

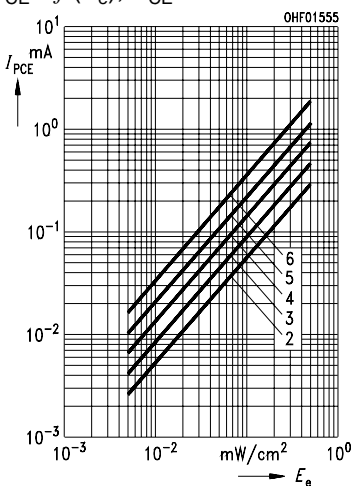
**Relative Spectral Sensitivity**

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



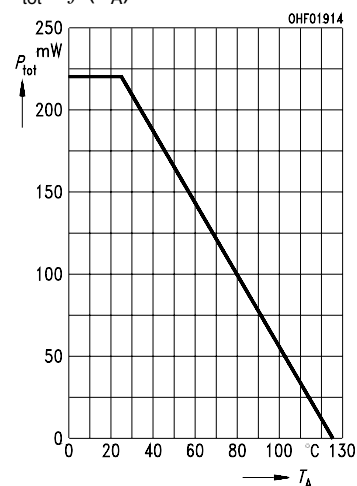
**Photocurrent**

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



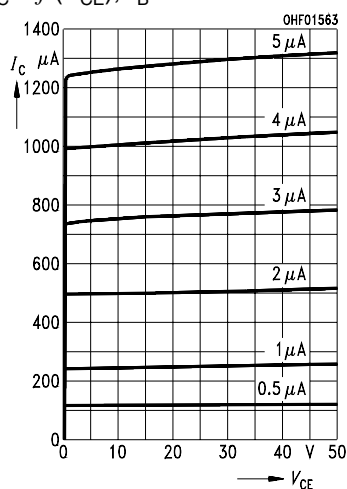
**Total Power Dissipation**

$P_{tot} = f(T_A)$



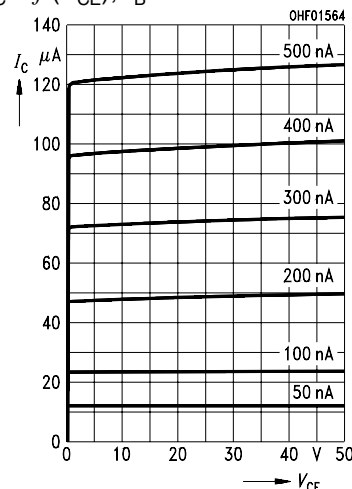
**Output Characteristics**

$I_C = f(V_{CE}), I_B = \text{Parameter}$



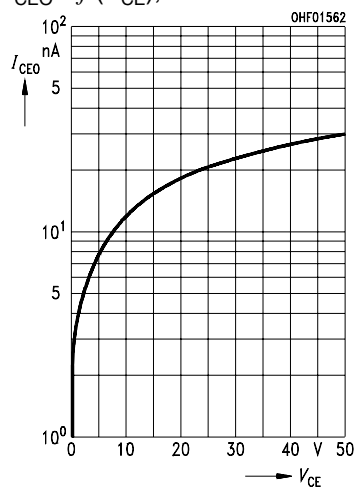
**Output Characteristics**

$I_C = f(V_{CE}), I_B = \text{Parameter}$



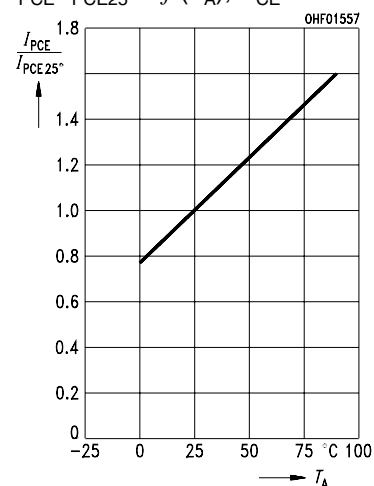
**Dark Current**

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



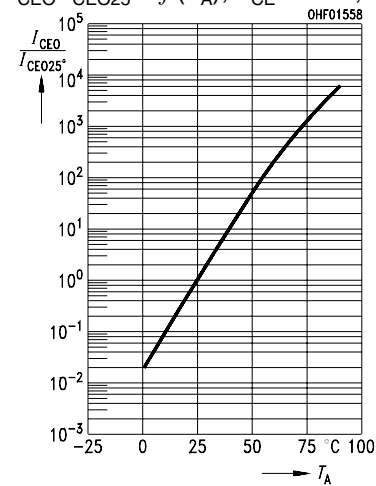
**Photocurrent**

$I_{PCE}/I_{PCE25^\circ} = f(T_A), V_{CE} = 5 V$



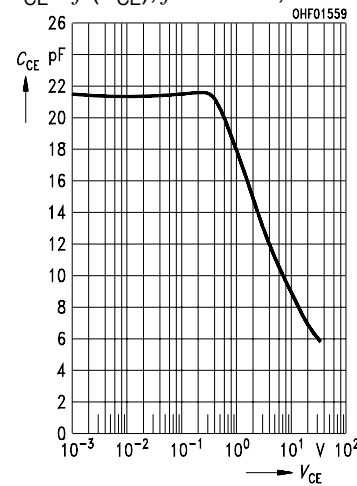
**Dark Current**

$I_{CEO}/I_{CEO25^\circ} = f(T_A), V_{CE} = 25 V, E = 0$



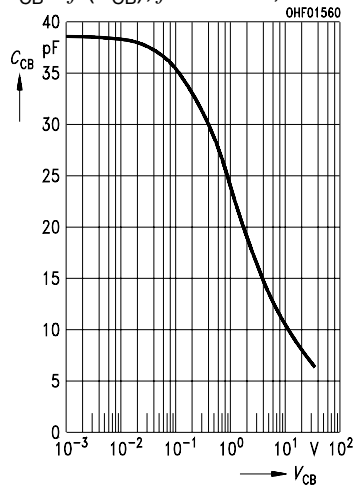
**Collector-Emitter Capacitance**

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



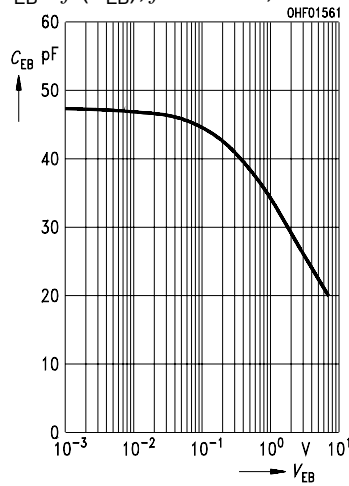
**Collector-Base Capacitance**

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



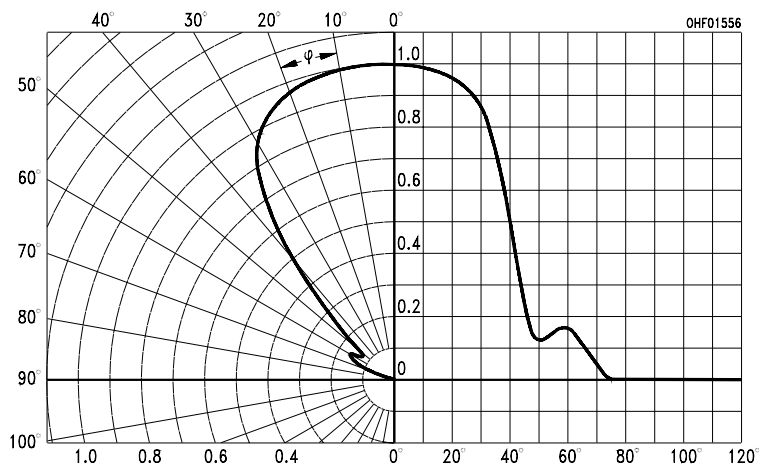
**Emitter-Base Capacitance**

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

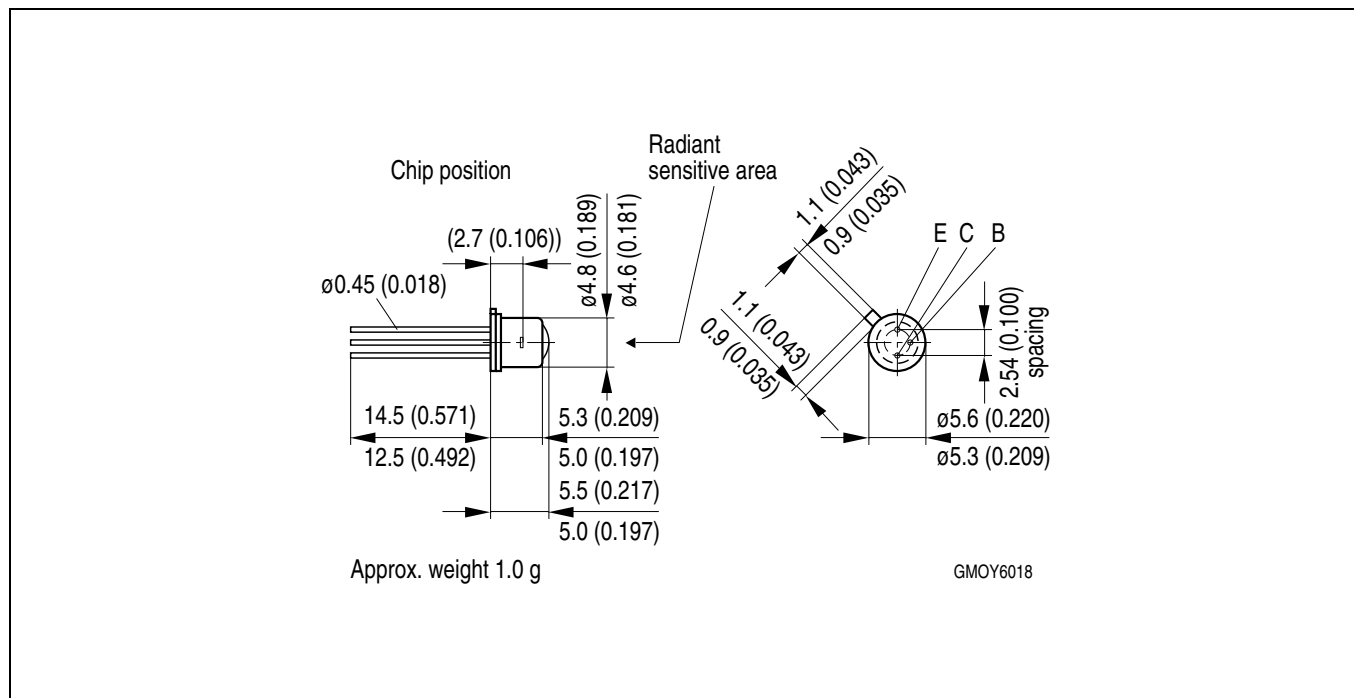


**Directional Characteristics**

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



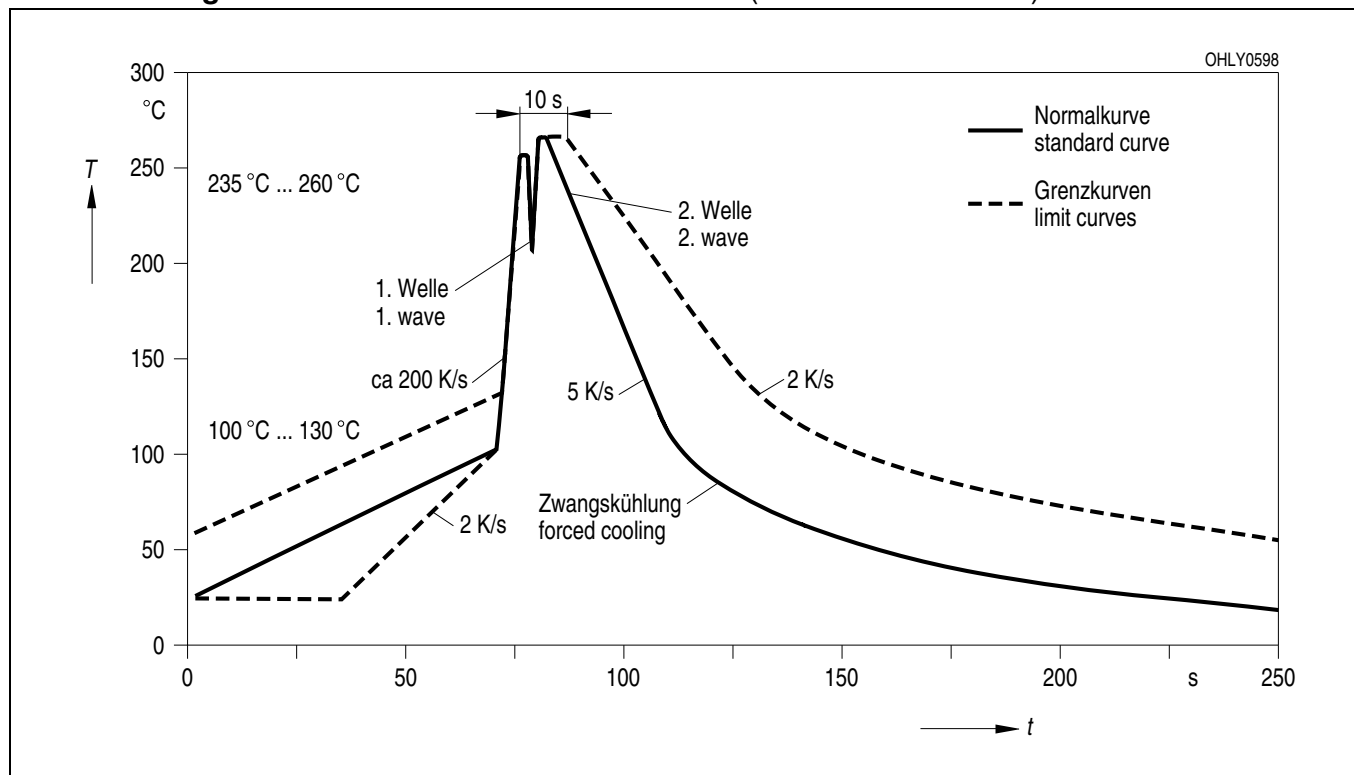
Maßzeichnung  
Package Outlines



Maße in mm (inch) / Dimensions in mm (inch).

**Lötbedingungen**  
**Soldering Conditions**  
**Wellenlöten (TTW)**  
**TTW Soldering**

(nach CECC 00802)  
 (acc. to CECC 00802)



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