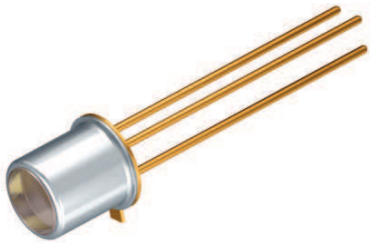
Silicon NPN Phototransistor
Version 1.3

BPX 38



Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1120 nm
- **Package:** Metal Can (TO-18), hermetically sealed
- **Special:** Base connection
- Suitable up to 125 °C
- High linearity
- Available in groups

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits

Ordering Information

Type:	**Photocurrent** I_{PCE} [µA] **λ = 950 nm, E_e = 0.5 mW/cm², V_{CE} = 5 V**	**Ordering Code**
BPX 38	≥ 200	Q62702P0015
BPX 38-2/3	200 ... 630	Q62702P3578
BPX 38-3	320 ... 630	Q62702P0015S003
BPX 38-4	500 ... 1000	Q62702P0015S004

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

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Maximum Ratings (T_A = 25 °C)

Parameter	Symbol	Values	Unit
Operating and storage temperature range	T_{op}; T_{stg}	-40 ... 125	°C
Collector-emitter voltage	V_{CE}	50	V
Collector current	I_C	50	mA
Collector surge current (τ < 10 µs)	I_{CS}	200	mA
Emitter-base voltage	V_{EB}	7	V
Total Power dissipation	P_{tot}	220	mW
Thermal resistance	R_{thJA}	450	K / W

Characteristics (T_A = 25 °C)

Parameter		Symbol	Values	Unit
Wavelength of max. sensitivity	(typ)	$\lambda_{S\ max}$	880	nm
Spectral range of sensitivity	(typ)	$\lambda_{10\%}$	(typ) 450 ... 1120	nm
Radiant sensitive area	(typ)	A	0.675	mm^2
Dimensions of chip area	(typ)	L x W	(typ) 1.02 x 1.02	mm x mm
Half angle	(typ)	φ	± 40	°
Photocurrent of collector-base photodiode (λ = 950 nm, E_e = 0.5 mW/cm^2, V_{CB} = 5 V)	(typ)	I_{PCB}	1.8	µA
Photocurrent of collector-base photodiode (E_V = 1000 lx, Std. Light A, V_{CB} = 5 V)	(typ)	I_{PCB}	5.5	µA
Capacitance (V_{CE} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CE}	23	pF
Capacitance (V_{CB} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CB}	39	pF
Capacitance (V_{EB} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{EB}	47	pF
Dark current (V_{CE} = 25 V, E = 0)	(typ (max))	I_{CE0}	20 (≤ 100)	nA

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Grouping (T_A = 25 °C, λ = 950 nm)

Group	Min Photocurrent E_e = 0.5 mW/cm², V_{CE} = 5 V $I_{PCE, min}$ [µA]	Max Photocurrent E_e = 0.5 mW/cm², V_{CE} = 5 V $I_{PCE, max}$ [µA]	Typ Photocurrent E_V = 1000 lx, Std. Light A, V_{CE} = 5 V I_{PCE} [µA]	Rise and fall time I_C = 1 mA, V_{CC} = 5 V, R_L = 1 kΩ t_r, t_f [µs]
BPX 38-2	200	400	950	9
BPX 38-3	320	630	1500	12
BPX 38-4	500	1000	2300	15
BPX 38-5	800		3600	18

Group	Collector-emitter saturation voltage $I_C = I_{PCEmin}$ x 0.3, E_e= 0.5 mW/cm² V_{CEsat} [mV]	Current gain E_e = 0.5 mW/cm², V_{CE} = 5 V I_{PCE} / I_{PCB}
BPX 38-2	200	170
BPX 38-3	200	280
BPX 38-4	200	420
BPX 38-5	200	650

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

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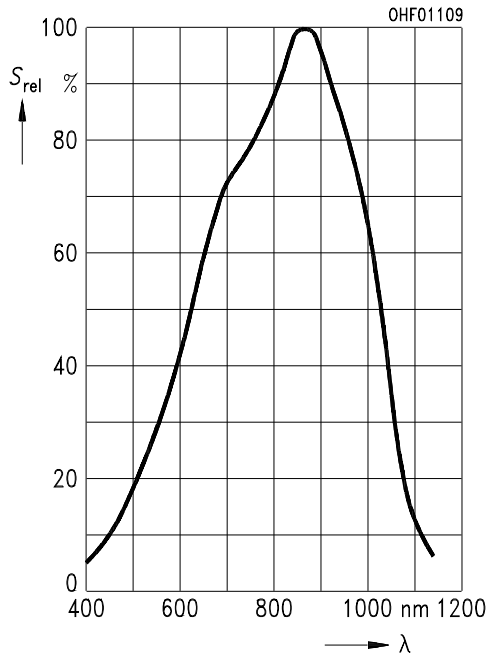
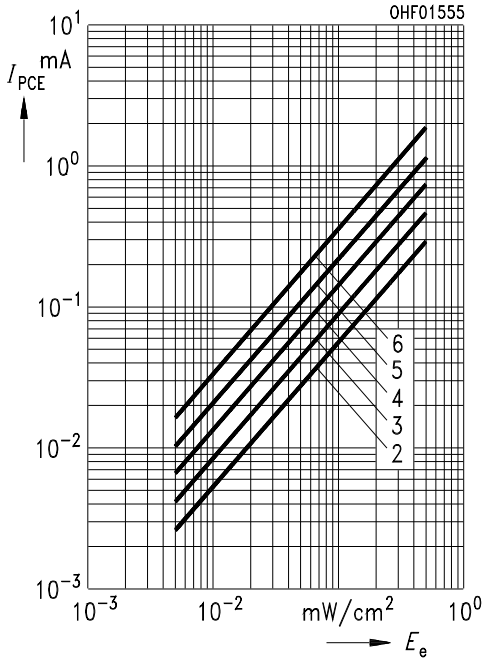
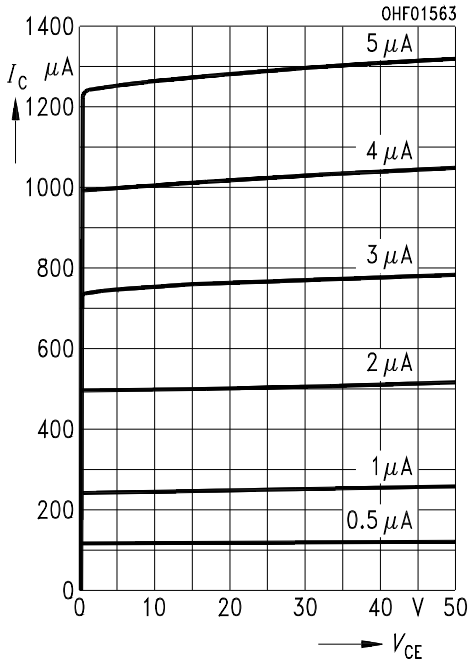
Relative Spectral Sensitivity [1] *page 9*
$S_{rel} = f(\lambda)$



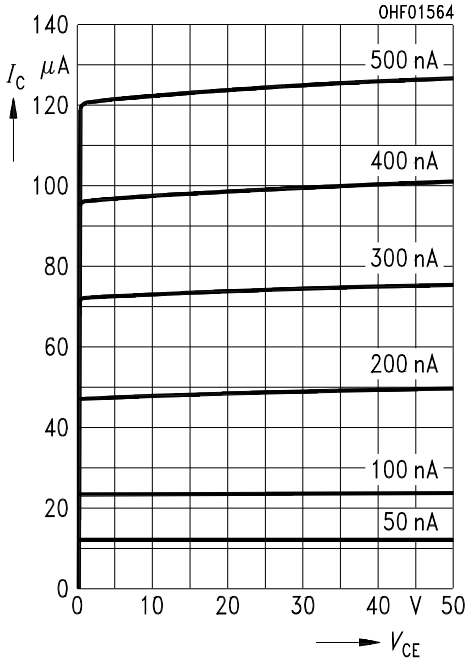
Photocurrent [1] *page 9*
$I_{PCE} = f(E_e)$, $V_{CE} = 5$ V



Collector Current [1] *page 9*
$I_C = f(V_{CE})$, I_B = Parameter



Collector Current [1] *page 9*
$I_C = f(V_{CE})$, I_B = Parameter



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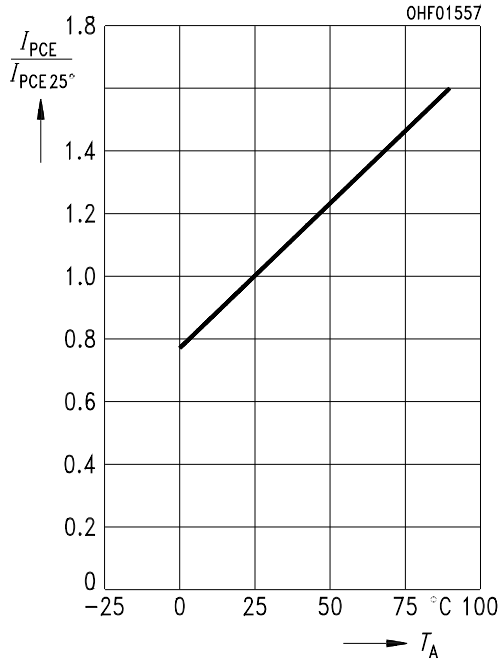
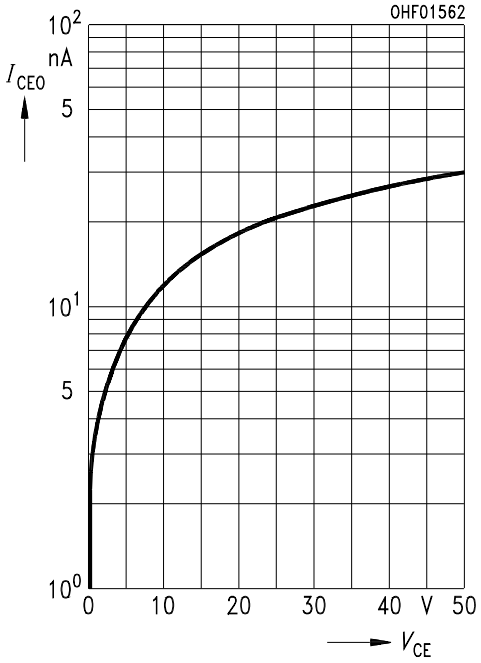
Photocurrent [1] *page 9*

I_{PCE} / I_{PCE}(25°C) = f(T_A), V_{CE} = 5 V



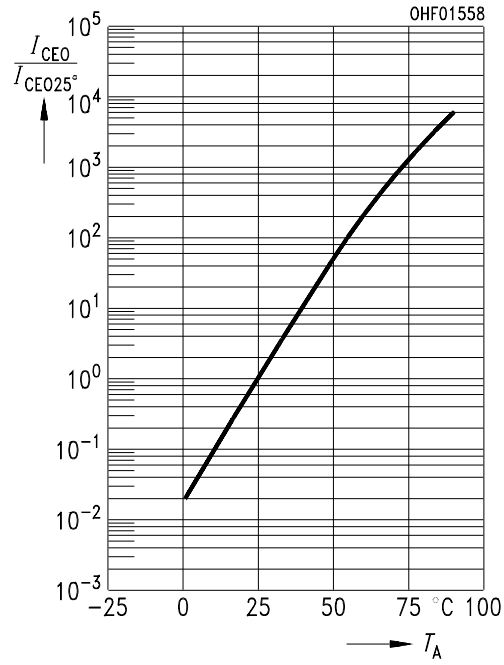
Dark Current [1] *page 9*

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



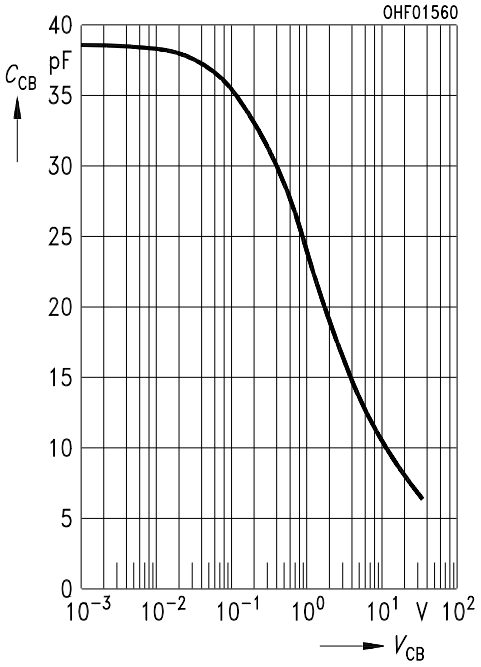
Dark Current [1] *page 9*

I_{CEO}/I_{CEO}(25°) = f(T_A), V_{CE} = 25 V, E = 0



Collector-Base Capacitance [1] *page 9*

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



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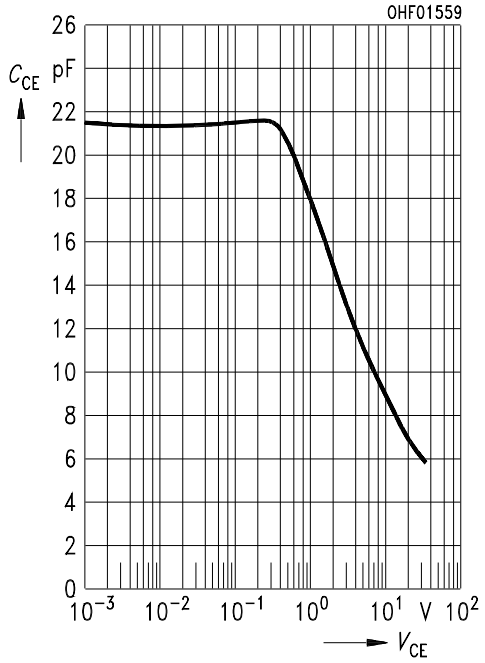
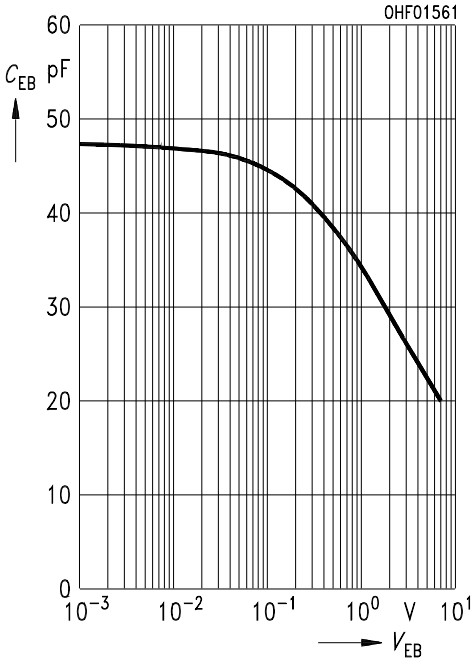
Collector-Emitter Capacitance [1] *page 9*

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



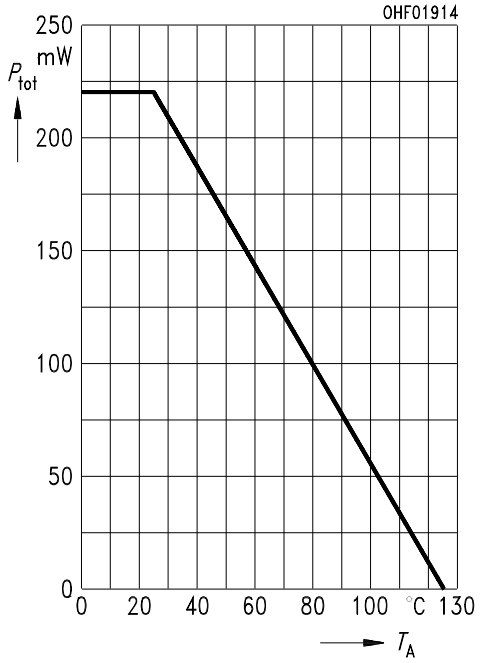
Emitter-Base Capacitance [1] *page 9*

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



Power Consumption

$P_{tot} = f(T_A)$



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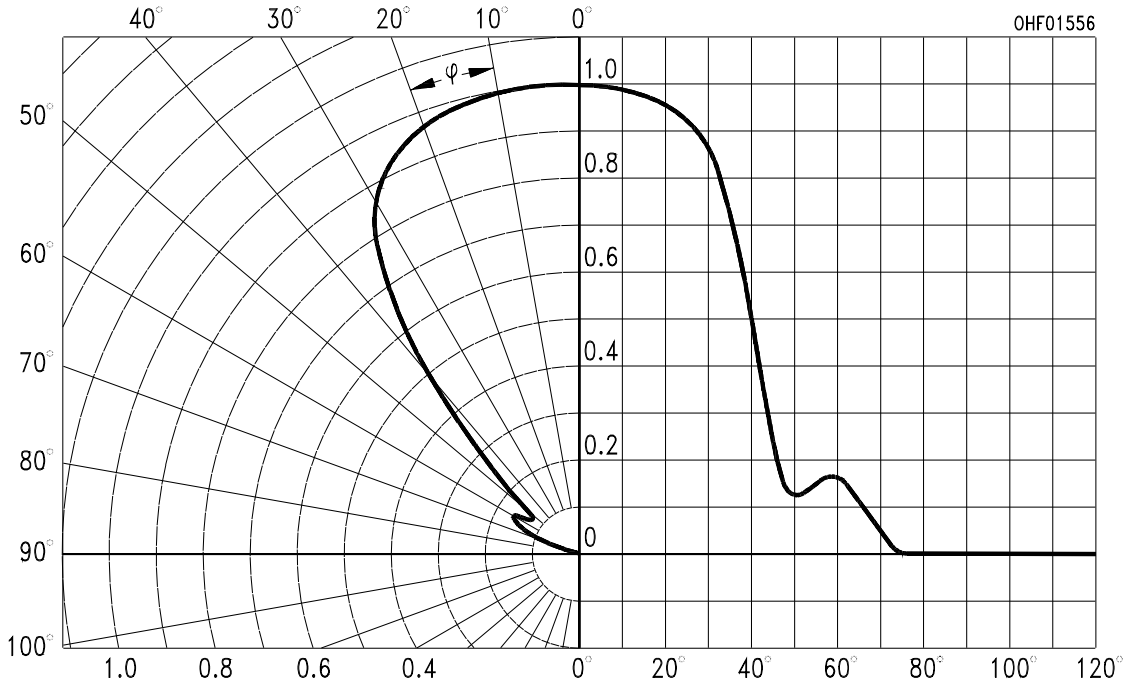
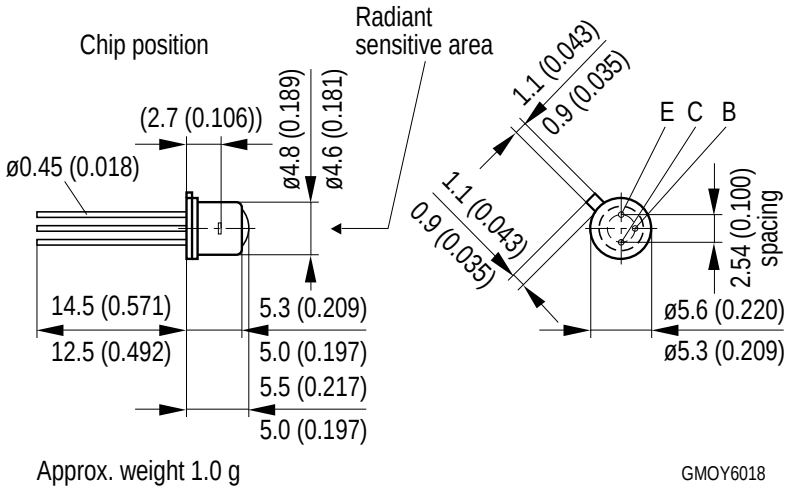
Directional Characteristics [1] *page 9*

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



Package Outline



Dimensions in mm (inch).

Package

Metal Can (TO-18), hermetically sealed

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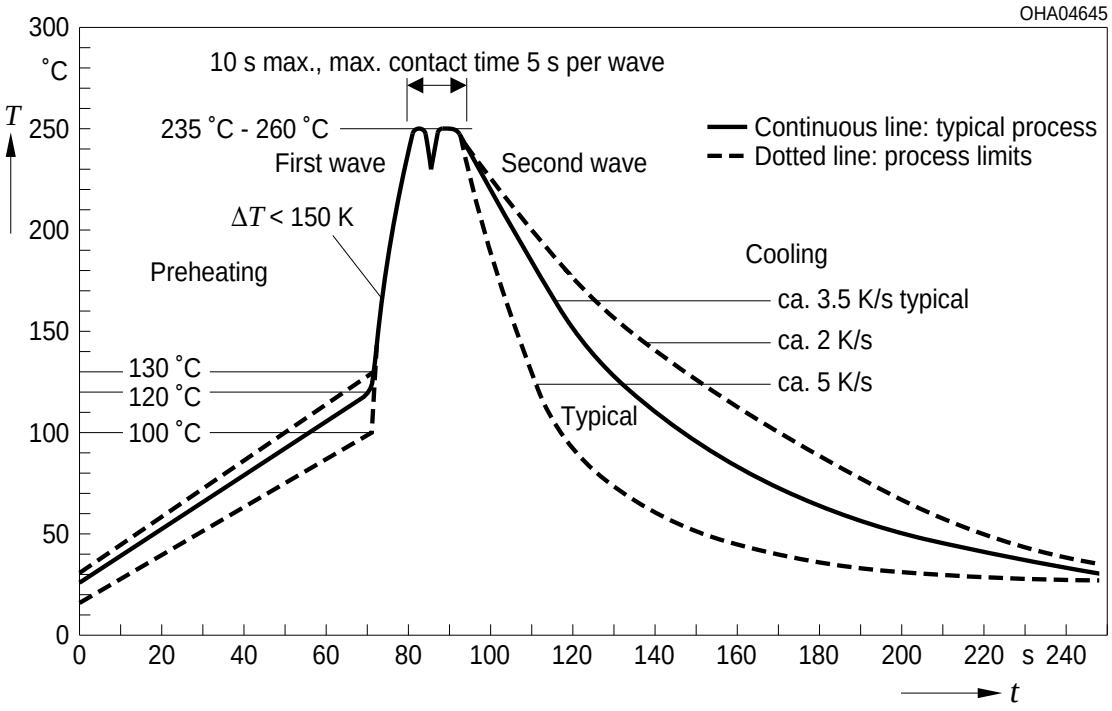
Approximate Weight:
0.28 g

TTW Soldering
IEC-61760-1 TTW



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

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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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