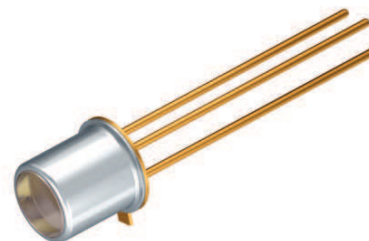


Silicon NPN Phototransistor

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} [μ A] $\lambda = 950 \text{ nm}$, $E_e = 0.5 \text{ mW/cm}^2$, $V_{CE} = 5 \text{ V}$	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)

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

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 ($\tau < 10\ \mu\text{s}$)	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 ($T_A = 25\text{ °C}$)

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 ($\lambda = 950\text{ nm}$, $E_e = 0.5\text{ mW/cm}^2$, $V_{CB} = 5\text{ V}$)	(typ)	I_{PCB}	1.8	μA
Photocurrent of collector-base photodiode ($E_v = 1000\text{ lx}$, Std. Light A, $V_{CB} = 5\text{ V}$)	(typ)	I_{PCB}	5.5	μA
Capacitance ($V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$)	(typ)	C_{CE}	23	pF
Capacitance ($V_{CB} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$)	(typ)	C_{CB}	39	pF
Capacitance ($V_{EB} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$)	(typ)	C_{EB}	47	pF
Dark current ($V_{CE} = 25\text{ V}$, $E = 0$)	(typ (max))	I_{CE0}	20 (≤ 100)	nA

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

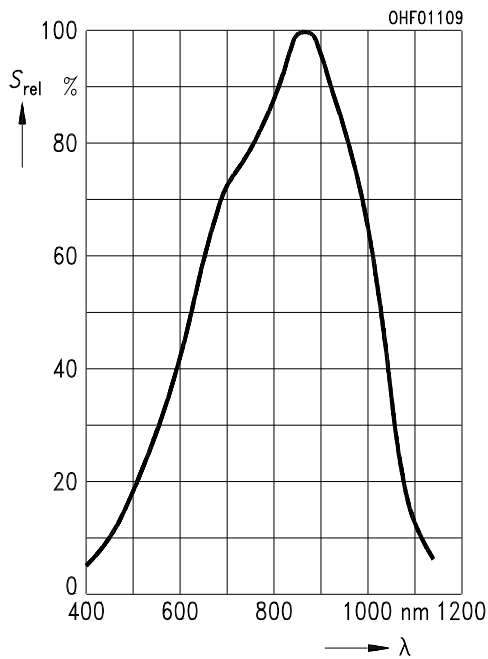
Group	Min Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, min} [\mu A]$	Max Photocurrent $E_e = 0.5\text{ mW/cm}^2$, $V_{CE} = 5\text{ V}$ $I_{PCE, max} [\mu A]$	Typ Photocurrent $E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$ $I_{PCE} [\mu A]$	Rise and fall time $I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$ $t_r, t_f [\mu s]$
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 $I_C = I_{PCEmin} \times 0.3$, $E_e = 0.5\text{ mW/cm}^2$ $V_{CEsat} [\text{mV}]$	Current gain $E_e = 0.5\text{ mW/cm}^2, V_{CE} = 5\text{ V}$ 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.

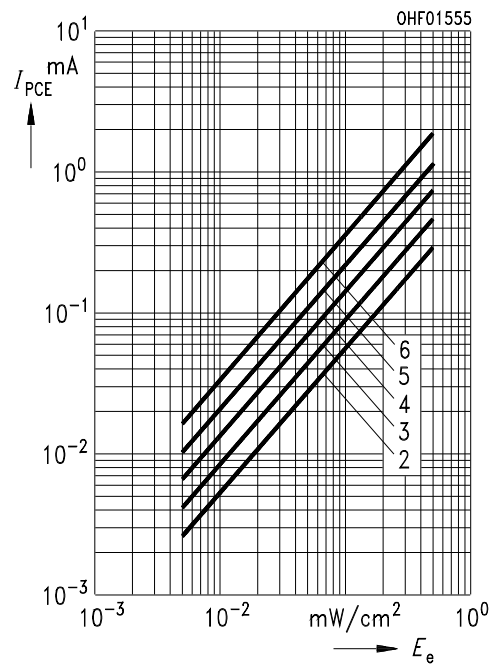
Relative Spectral Sensitivity ^{1) page 9}

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



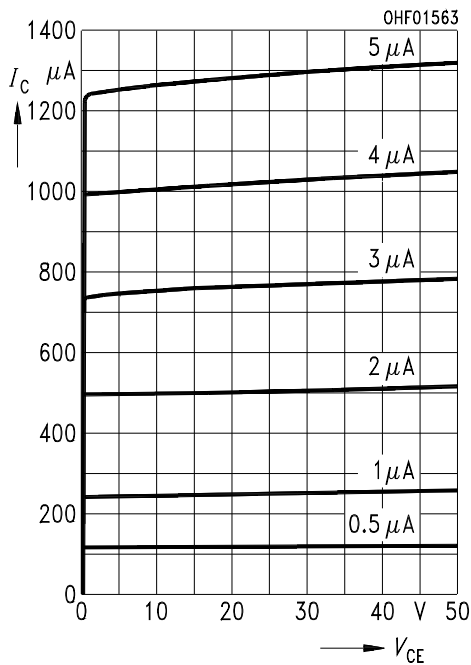
Photocurrent ^{1) page 9}

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



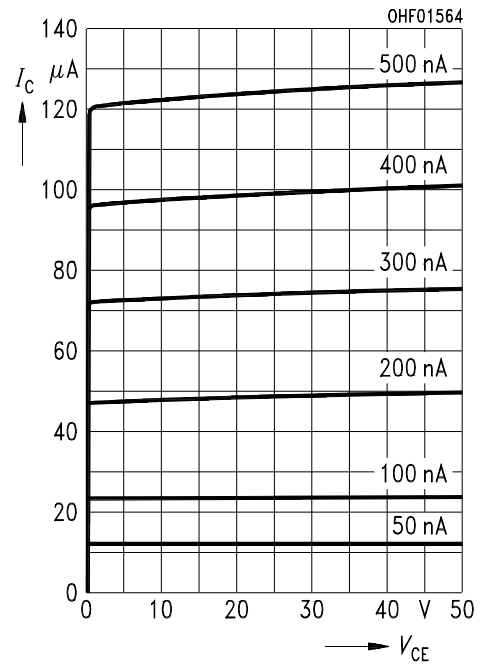
Collector Current ^{1) page 9}

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



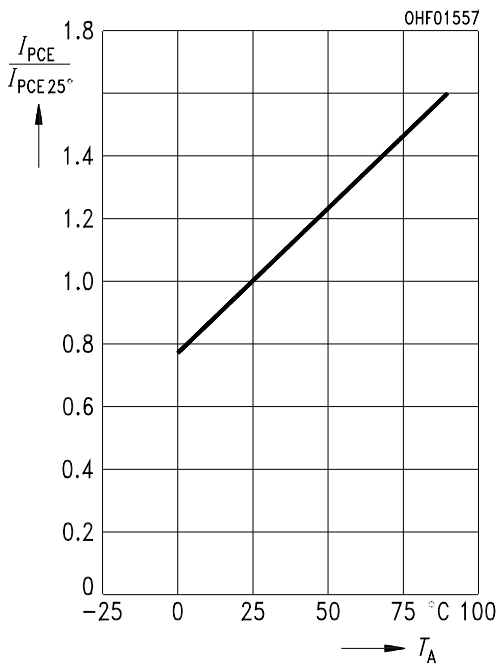
Collector Current ^{1) page 9}

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



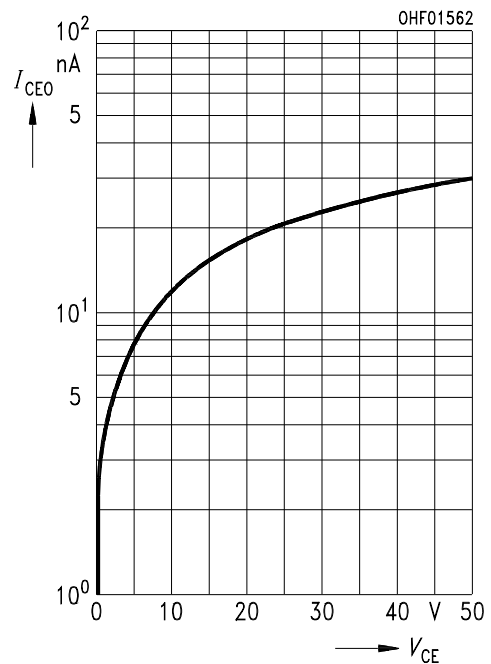
Photocurrent ^{1) page 9}

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



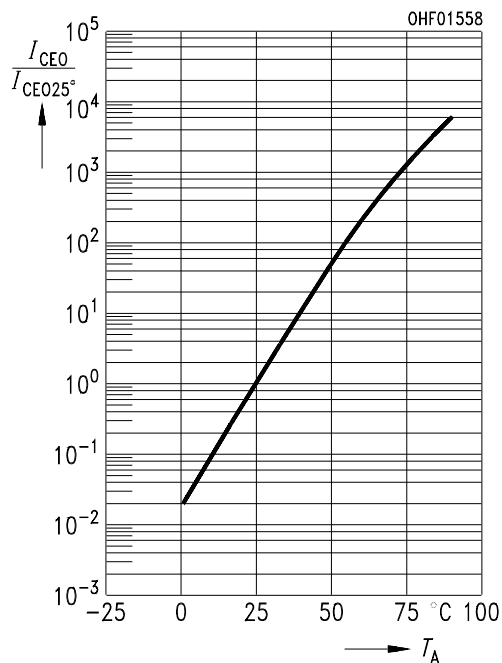
Dark Current ^{1) page 9}

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



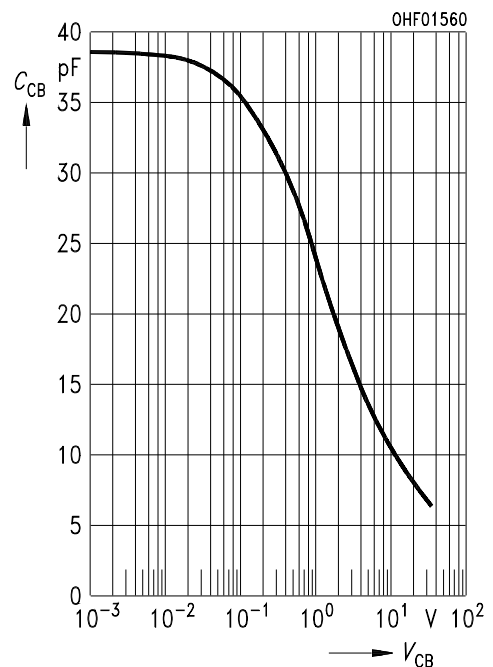
Dark Current ^{1) page 9}

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



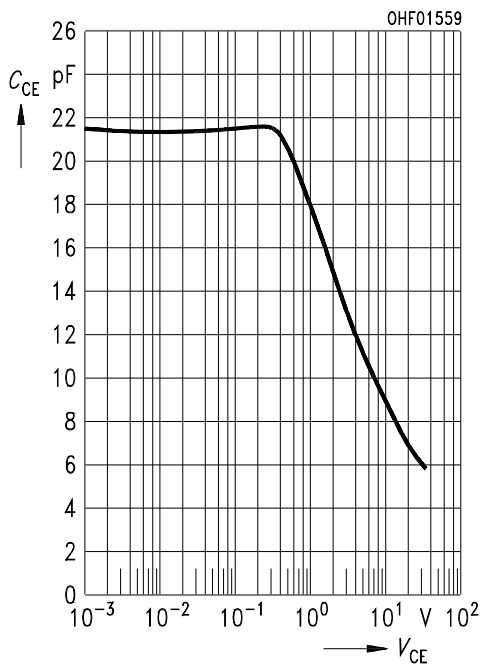
Collector-Base Capacitance ^{1) page 9}

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



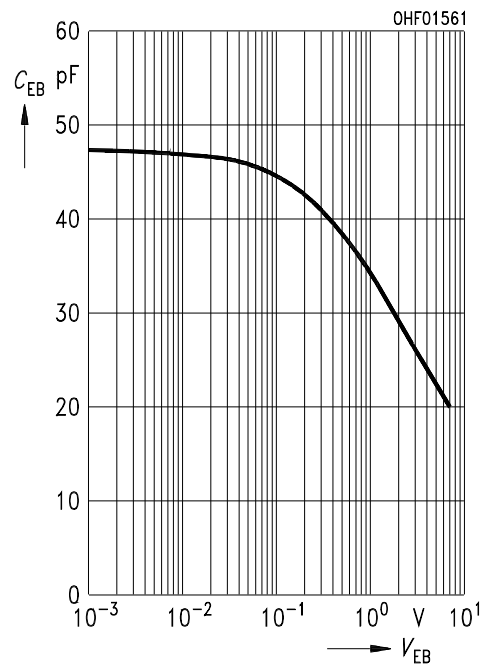
Collector-Emitter Capacitance ^{1) page 9}

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



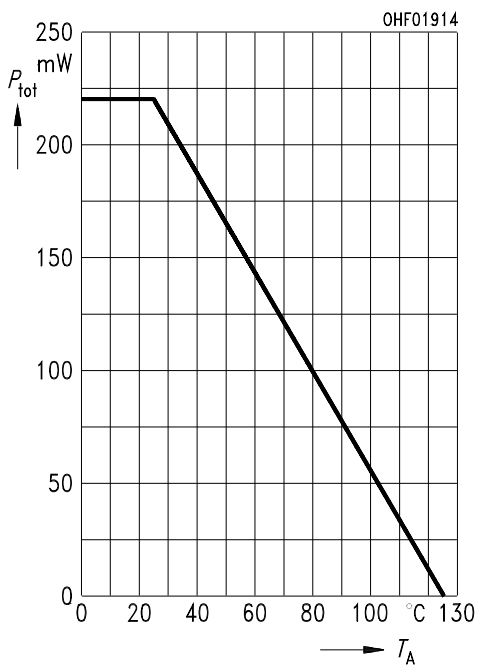
Emitter-Base Capacitance ^{1) page 9}

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



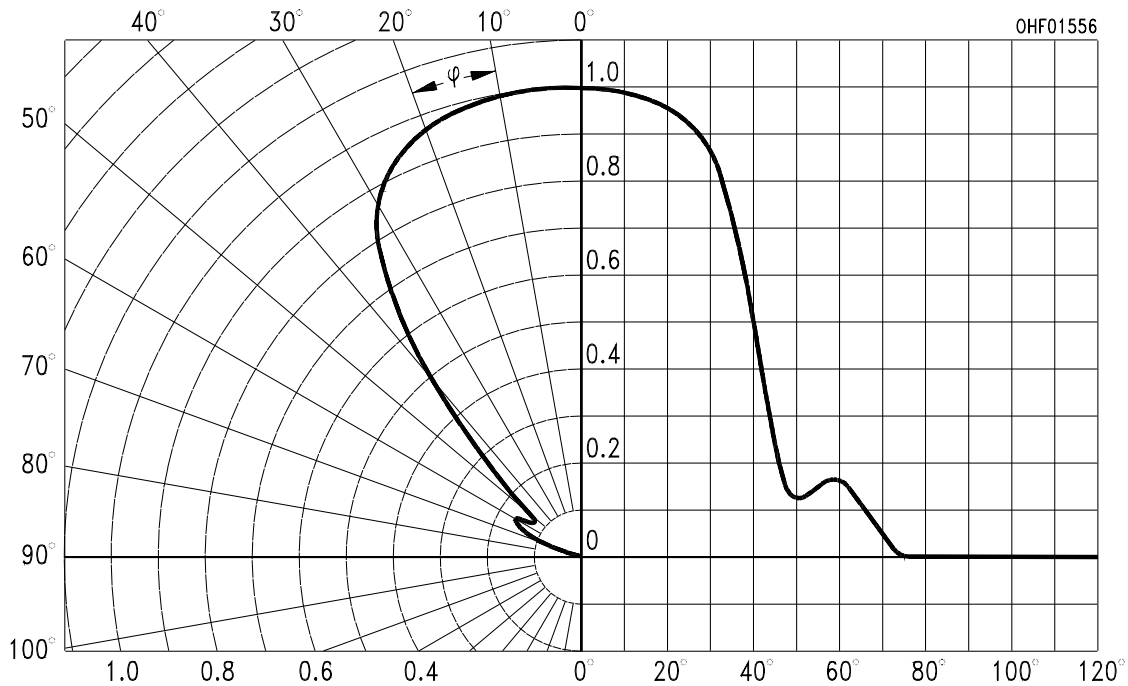
Power Consumption

$P_{tot} = f(T_A)$

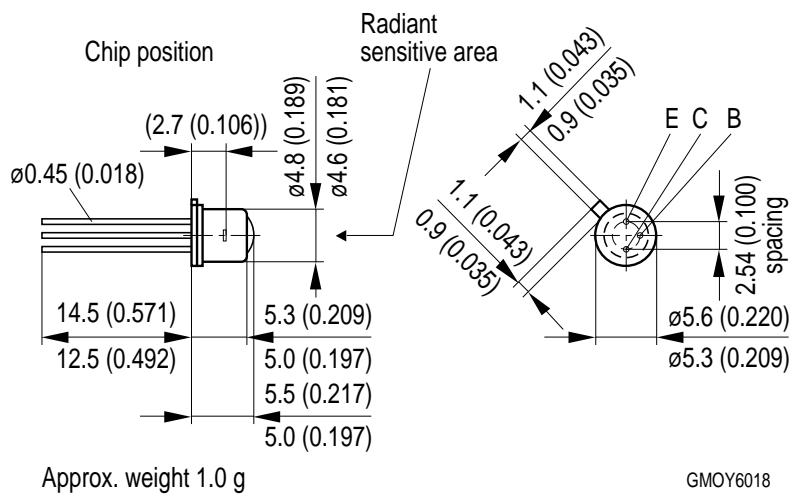


Directional Characteristics ^{1) page 9}

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



Package Outline



Dimensions in mm (inch).

Package

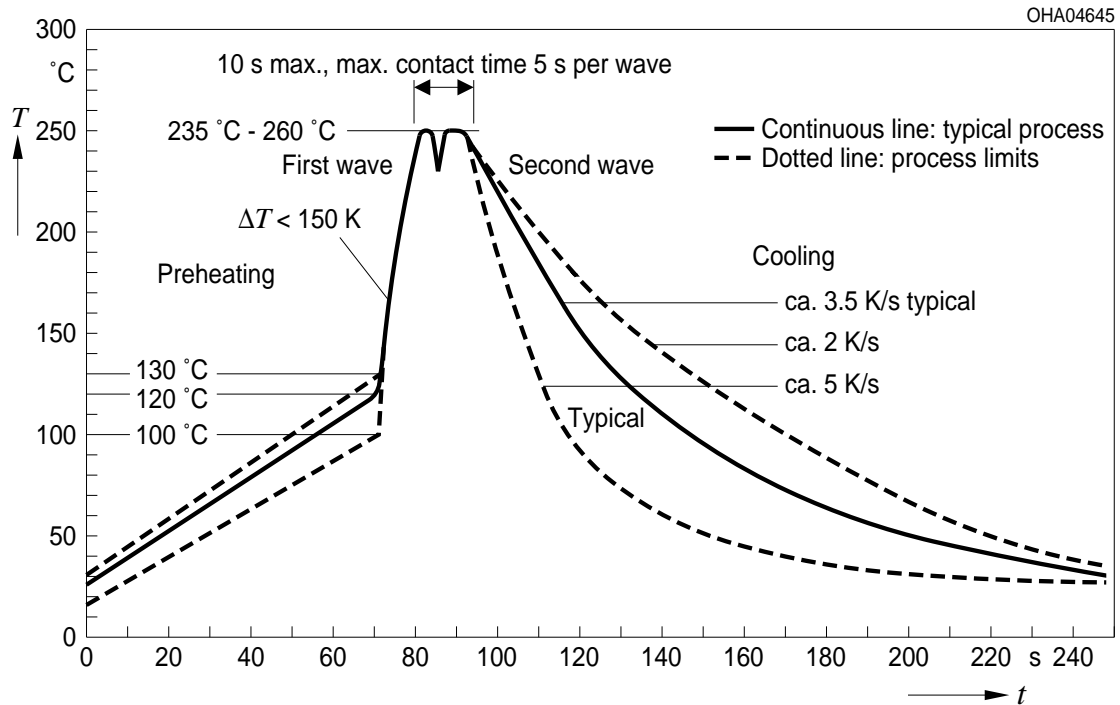
Metal Can (TO-18), hermetically sealed

Approximate Weight:

0.28 g

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!

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.

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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.

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*) 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 the effectiveness of that device or system.

**) 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 and the life of the user may be endangered.

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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