Silicon NPN Phototransistor
Version 1.4

BP 103

Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** Metal Can (TO-18)
- **Special:** Base connection
- High linearity

Applications

- Photointerrupters
- Industrial electronics
- For control and drive circuits
- Computer-controlled flashes

Ordering Information

Type:	**Photocurrent** I_{PCE} [µA] **λ = 950 nm, E_e = 0.5 mW/cm², V_{CE} = 5 V**	**Ordering Code**
BP 103	> 80	Q62702P0075
BP 103-3/4	125 ... 400	Q62702P3577

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 ... 80	°C
Collector-emitter voltage	V_{CE}	35	V
Collector current	I_C	100	mA
Collector surge current (τ < 10 µs)	I_{CS}	200	mA
Emitter-base voltage	V_{EB}	7	V
Emitter-collector voltage	V_{EC}	7	V
Total Power dissipation	P_{tot}	150	mW
Thermal resistance	R_{thJA}	500	K / W
Electrostatic discharge (acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM)	V_{ESD}	2000	V

Characteristics (T_A = 25 °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^2
Dimensions of chip area	(typ)	L x W	(typ) 0.55 x 0.55	mm x mm
Half angle	(typ)	φ	± 55	°
Photocurrent of collector-base photodiode (λ = 950 nm, E_e = 0.5 mW/cm^2, V_{CE} = 5 V)	(typ)	I_{PCB}	1	µA
Photocurrent of collector-base photodiode (E_V = 1000 lx, Std. Light A, V_{CE} = 5 V)	(typ)	I_{PCB}	3	µA
Capacitance (V_{CE} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CE}	7.5	pF
Capacitance (V_{CB} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{CB}	13	pF
Capacitance (V_{EB} = 0 V, f = 1 MHz, E = 0)	(typ)	C_{EB}	19	pF
Dark current (V_{CE} = 20 V, E = 0)	(typ (max))	I_{CE0}	1 (≤ 50)	nA
Rise and fall time (I_C = 1 mA, V_{CE} = 5 V, R_L = 1 kΩ)	(typ)	t_r, t_f	8	µs

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Grouping (T_A = 25 °C, λ = 950 nm)

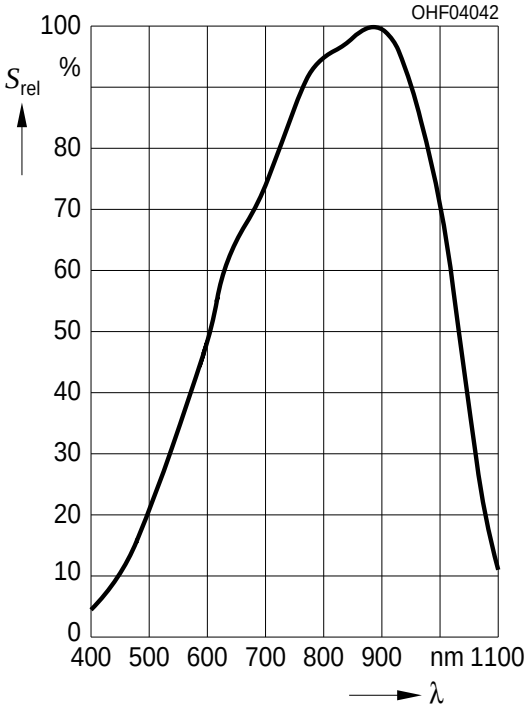
Group	Min Photocurrent E_e = 0.5 mW/cm², V_{CE} = 5 V $I_{PCE, min}$ [µA]	Max Photocurrent E_e = 0.5 mW/cm², V_{CE} = 5 V $I_{PCE, max}$ [µA]	Typ Photocurrent E_V = 1000 lx, Std. Light A, V_{CE} = 5 V I_{PCE} [µA]	Rise and fall time I_C = 1 mA, V_{CE} = 5 V, R_L = 1 kΩ t_r, t_f [µs]
BP 103-2	80	160	380	5
BP 103-3	125	250	600	7
BP 103-4	200	400	950	9
BP 103-5	320		1400	12

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}
BP 103-2	150	120
BP 103-3	150	190
BP 103-4	150	300
BP 103-5	150	480

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

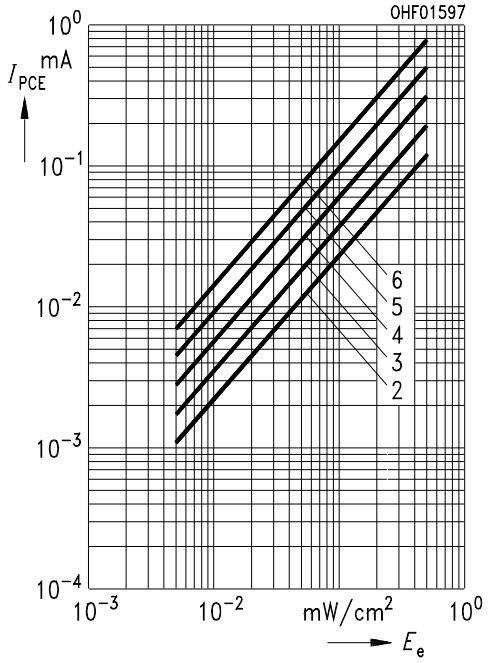
Relative Spectral Sensitivity [1] *page 9*

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



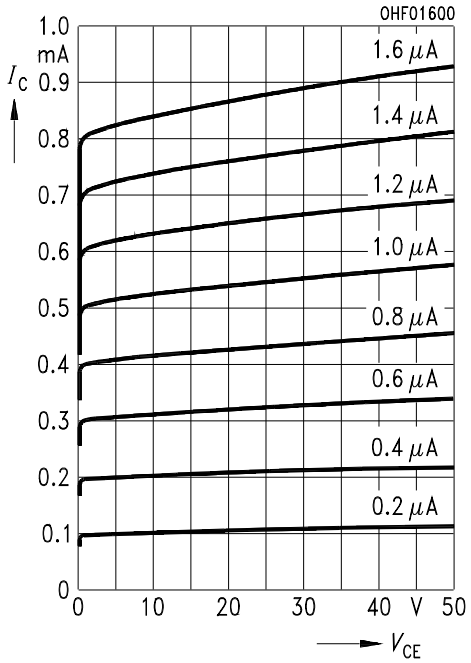
Photocurrent [1] *page 9*

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



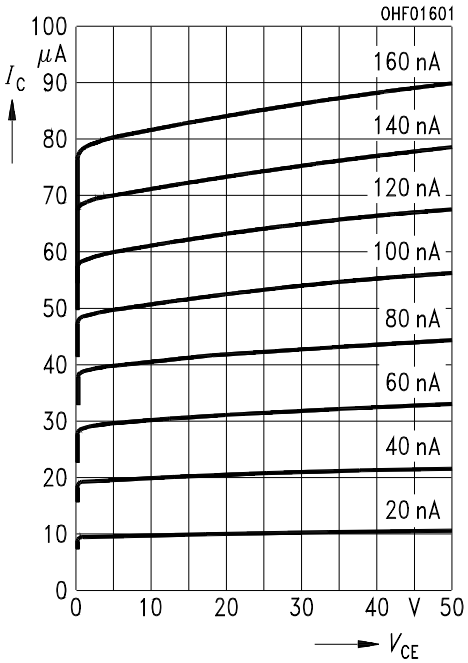
Collector Current [1] *page 9*

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



Collector Current [1] *page 9*

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



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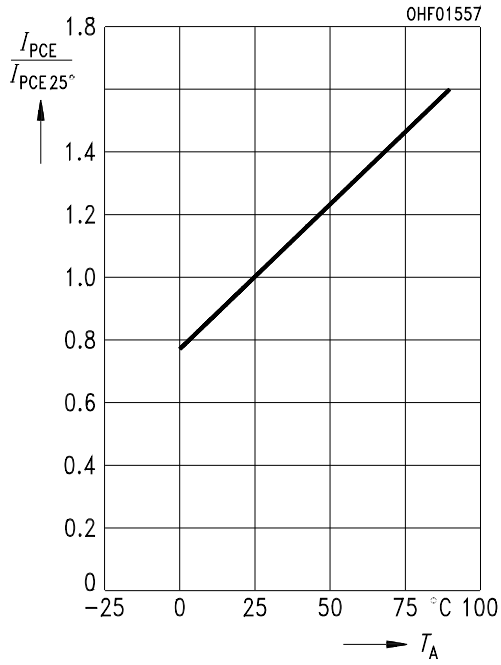
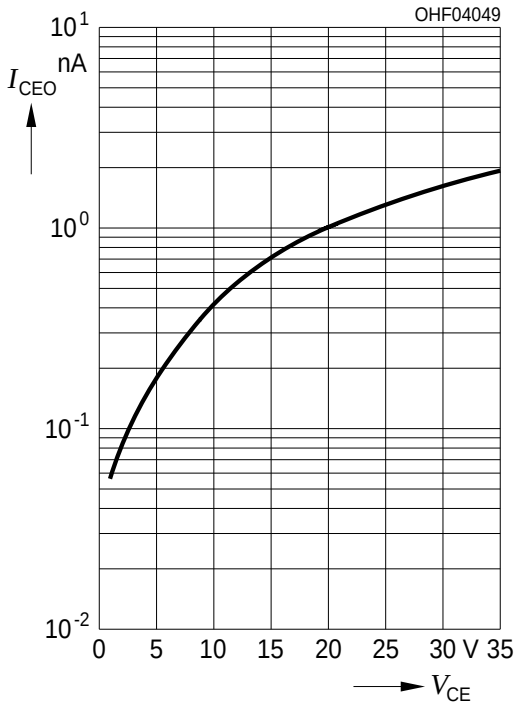
Photocurrent [1] *page 9*

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



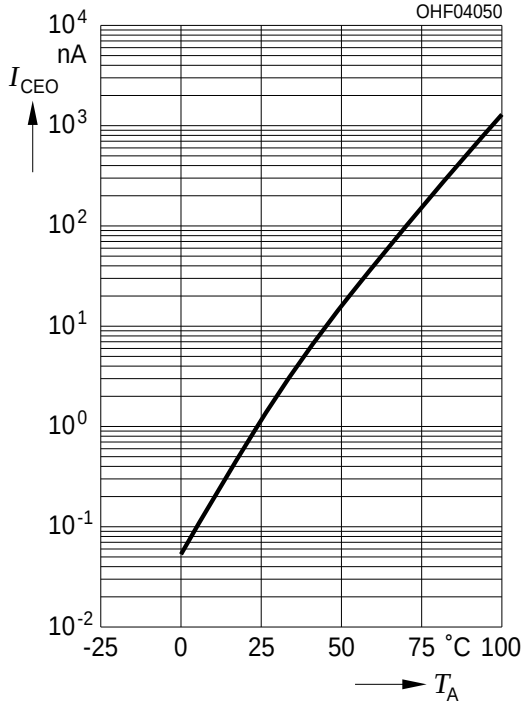
Dark Current [1] *page 9*

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



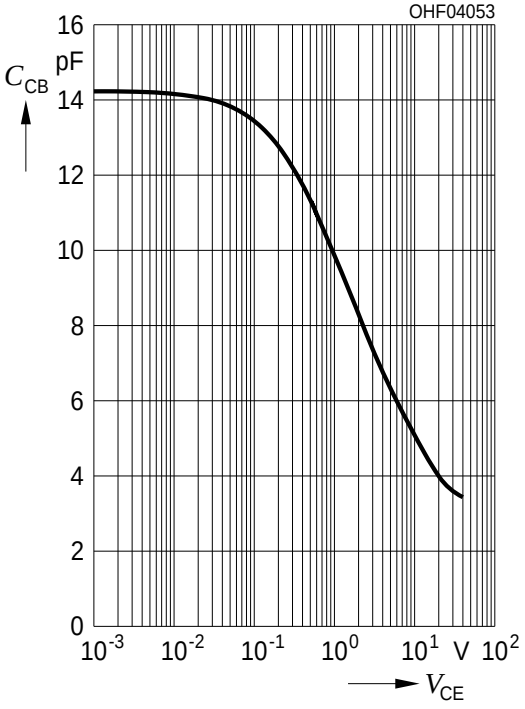
Dark Current [1] *page 9*

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



Collector-Base Capacitance [1] *page 9*

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



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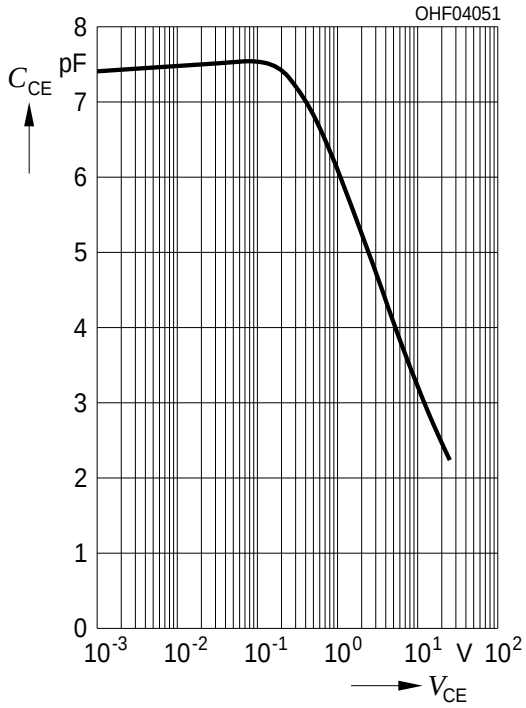
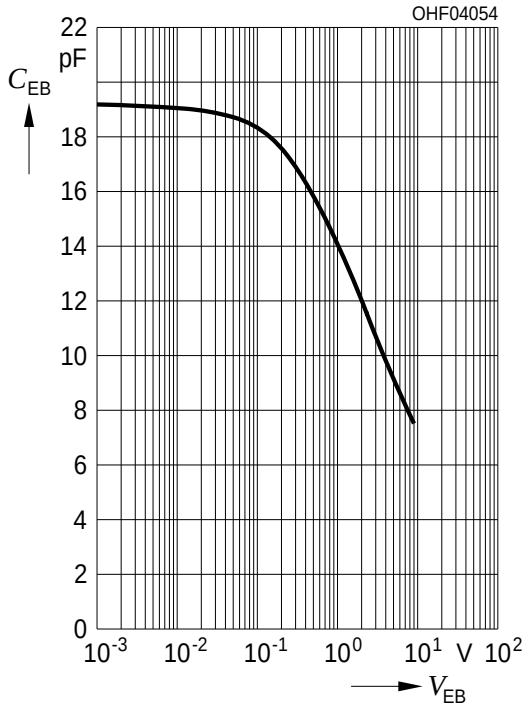
Collector-Emitter Capacitance [1] *page 9*

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



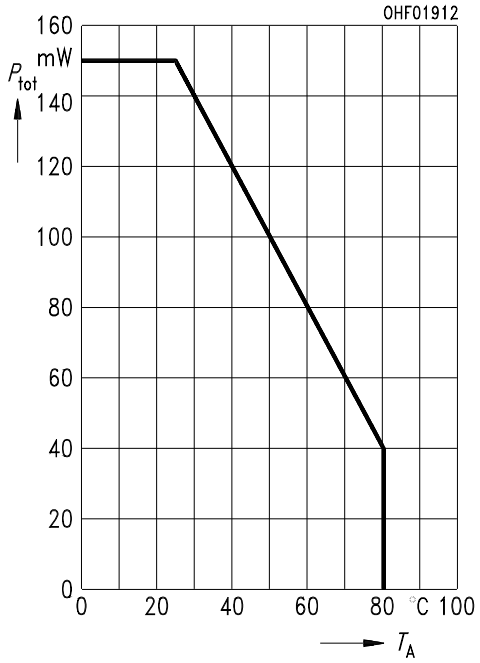
Emitter-Base Capacitance [1] *page 9*

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



Power Consumption

$P_{tot} = f(T_A)$



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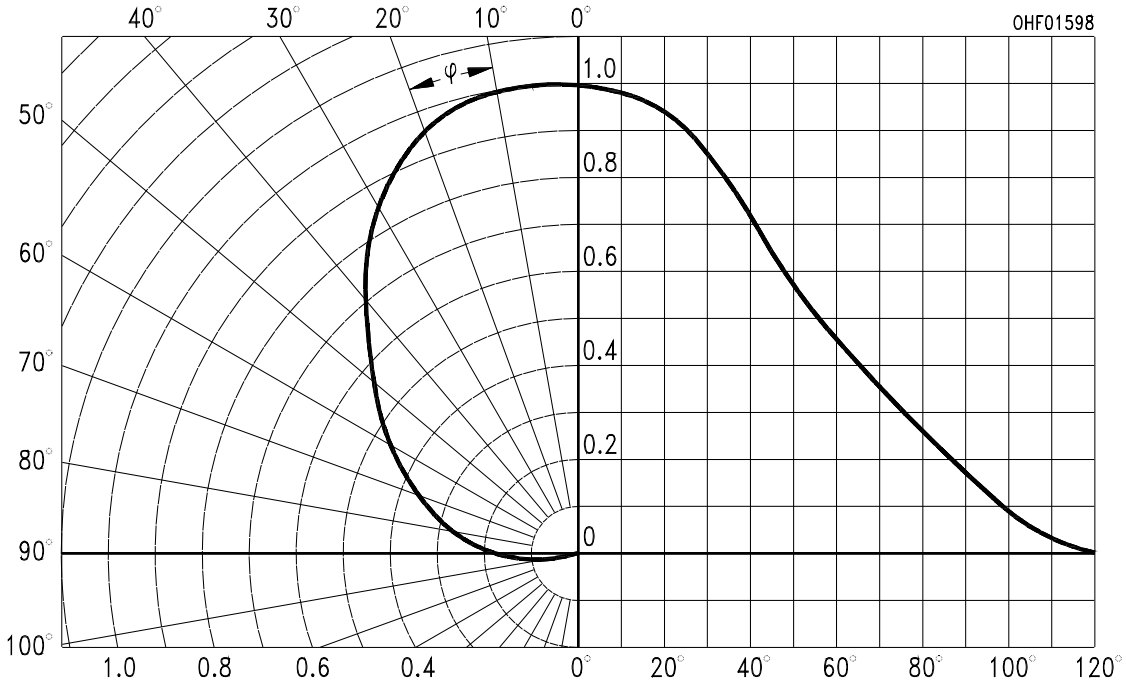
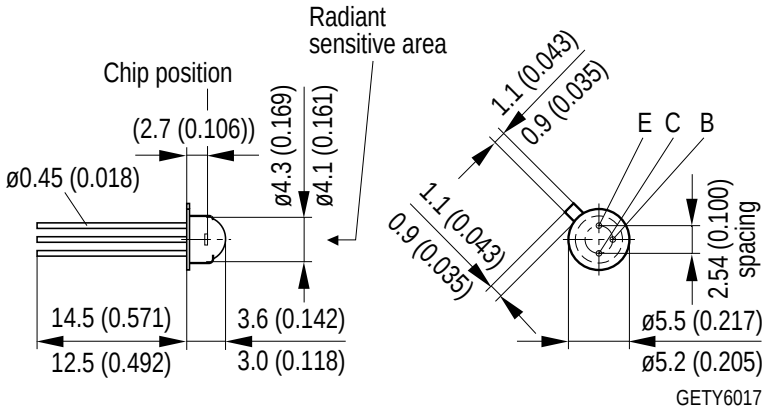
Directional Characteristics [1] *page 9*

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



Package Outline



Dimensions in mm (inch).

Package

Metal Can (TO-18)

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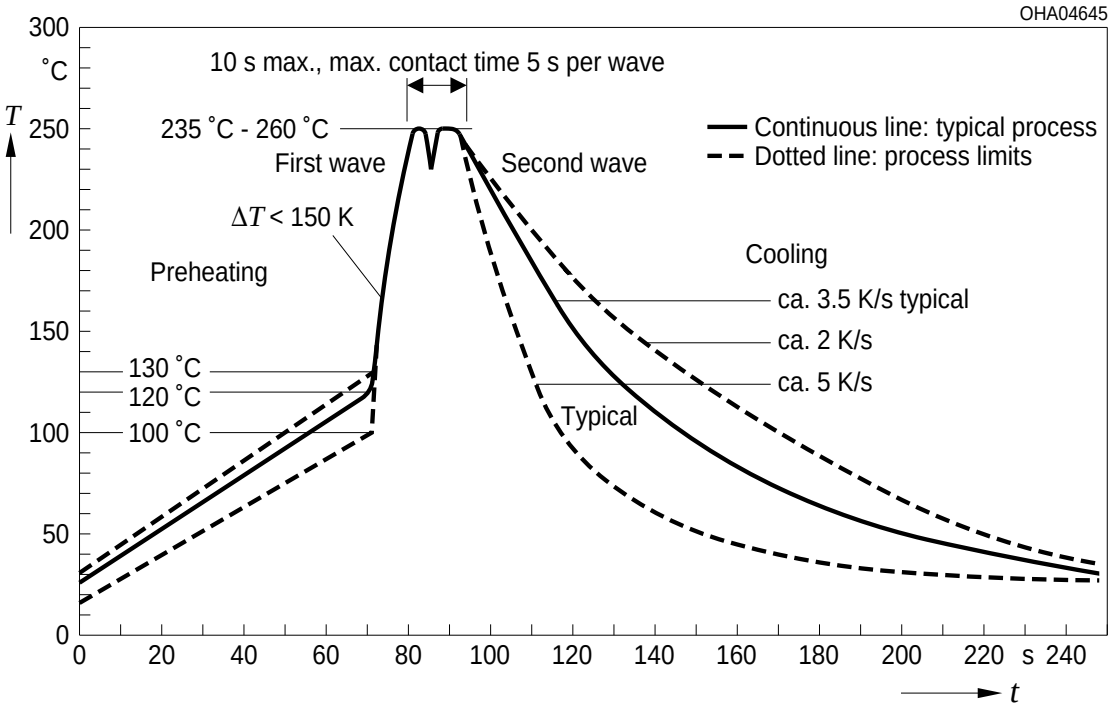
Approximate Weight:
0.2 g

TTW Soldering
IEC-61760-1 TTW



Disclaimer

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.

Published by OSRAM Opto Semiconductors GmbH
Leibnizstraße 4, D-93055 Regensburg

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