



**THE DATASHEET OF
BP 103-3/4**



OSRAM BP 103

Datasheet

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Metal Can TO18

BP 103

Silicon NPN Phototransistor



Applications

- Factory Automation

Features

- Package: clear epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Spectral range of sensitivity: (typ) 450 ... 1100 nm
- Base connection
- High linearity

Ordering Information

| Type | Photocurrent ¹⁾ $V_{CE} = 5 \text{ V}; \lambda = 950 \text{ nm}; E_e = 0.5 \text{ mW/cm}^2$ I_{PCE} | Photocurrent ²⁾ typ. $V_{CE} = 5 \text{ V}; \lambda = 950 \text{ nm}; E_e = 0.5 \text{ mW/cm}^2$ I_{PCE} | Ordering Code |
|------------|--|--|---------------|
| BP 103 | 140 ... 580 μA | 200 μA | Q62702P0075 |
| BP 103-3/4 | 140 ... 355 μA | 200 μA | Q62702P3577 |
| BP 103-4/5 | 224 ... 580 μA | 200 μA | Q65113A2116 |

Only one bin within one packing unit.

Maximum Ratings

 $T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|--|-----------|------|--------|
| Operating temperature | T_{op} | min. | -40 °C |
| | | max. | 80 °C |
| Storage temperature | T_{stg} | min. | -40 °C |
| | | max. | 80 °C |
| Collector-emitter voltage | V_{CE} | max. | 35 V |
| Collector current | I_C | max. | 100 mA |
| Collector surge current $\tau \leq 10\ \mu\text{s}$ | I_{CS} | max. | 200 mA |
| Emitter-basis voltage | V_{EB} | max. | 7 V |
| Emitter-collector voltage | V_{EC} | max. | 7 V |
| Total power dissipation | P_{tot} | max. | 150 mW |
| ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2) | V_{ESD} | max. | 2 kV |

Characteristics

$T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|--|--------------------|--------------|----------------------|
| Wavelength of max sensitivity | $\lambda_{S\ max}$ | typ. | 850 nm |
| Spectral range of sensitivity | $\lambda_{10\%}$ | typ. | 450 ... 1100 nm |
| Dimensions of chip area | L x W | typ. | 0.55 x 0.55 mm x mm |
| Radiant sensitive area | A | typ. | 0.11 mm ² |
| Half angle | φ | typ. | 55 ° |
| Photocurrent $V_{CE} = 5\text{ V}$; Std. Light A; $E_v = 1000\text{ lx}$ | I_{PCE} | typ. | 775 μA |
| Photocurrent of collector-base photodiode $V_{CE} = 5\text{ V}$; $\lambda = 950\text{ nm}$; $E_e = 0.5\text{ mW/cm}^2$ | I_{PCB} | typ. | 1 μA |
| Photocurrent of collector-base photodiode $V_{CE} = 5\text{ V}$; Std. Light A; $E_v = 1000\text{ lx}$ | I_{PCB} | typ. | 3 μA |
| Dark current $V_{CE} = 20\text{ V}$ | I_{CE0} | typ. max. | 1 nA 50 nA |
| Rise time $I_C = 1\text{ mA}$; $\lambda = 950\text{ nm}$; $V_{CE} = 5\text{ V}$; $R_L = 1\text{ k}\Omega$ | t_r | typ. | 8 μs |
| Fall time $I_C = 1\text{ mA}$; $\lambda = 950\text{ nm}$; $V_{CE} = 5\text{ V}$; $R_L = 1\text{ k}\Omega$ | t_f | typ. | 8 μs |
| Collector-emitter saturation voltage ³⁾ $I_C = I_{PCE,\min} \times 0.3$; $\lambda = 950\text{ nm}$; $E_e = 0.5\text{ mW/cm}^2$; $\lambda = 950\text{ nm}$ | V_{CEsat} | typ. | 150 mV |
| Capacitance $V_{CE} = 0\text{ V}$; $f = 1\text{ MHz}$; $E = 0$ | C_{CE} | typ. | 7.5 pF |
| Capacitance $V_{CB} = 0\text{ V}$; $f = 1\text{ MHz}$; $E = 0$ | C_{CB} | typ. | 14 pF |
| Capacitance $V_{EB} = 0\text{ V}$; $f = 1\text{ MHz}$; $E = 0$ | C_{EB} | typ. | 19 pF |

Photocurrent Groups

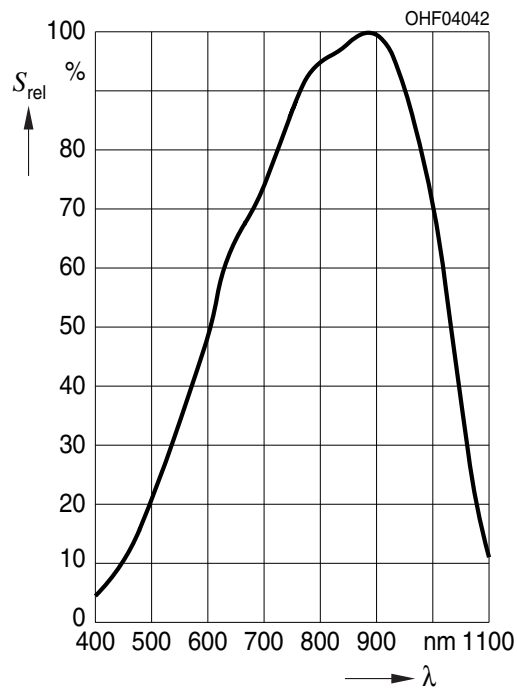
$T_A = 25\text{ °C}$

| Group | Photocurrent ¹⁾ $V_{CE} = 5\text{ V}; \lambda = 950\text{ nm}; E_e = 0.5\text{ mW/cm}^2$ min. I_{PCE} | Photocurrent ¹⁾ $V_{CE} = 5\text{ V}; \lambda = 950\text{ nm}; E_e = 0.5\text{ mW/cm}^2$ max. I_{PCE} |
|-------|---|---|
| 3 | 140 μA | 224 μA |
| 4 | 224 μA | 355 μA |
| 5 | 355 μA | 580 μA |

Only one bin within one packing unit.

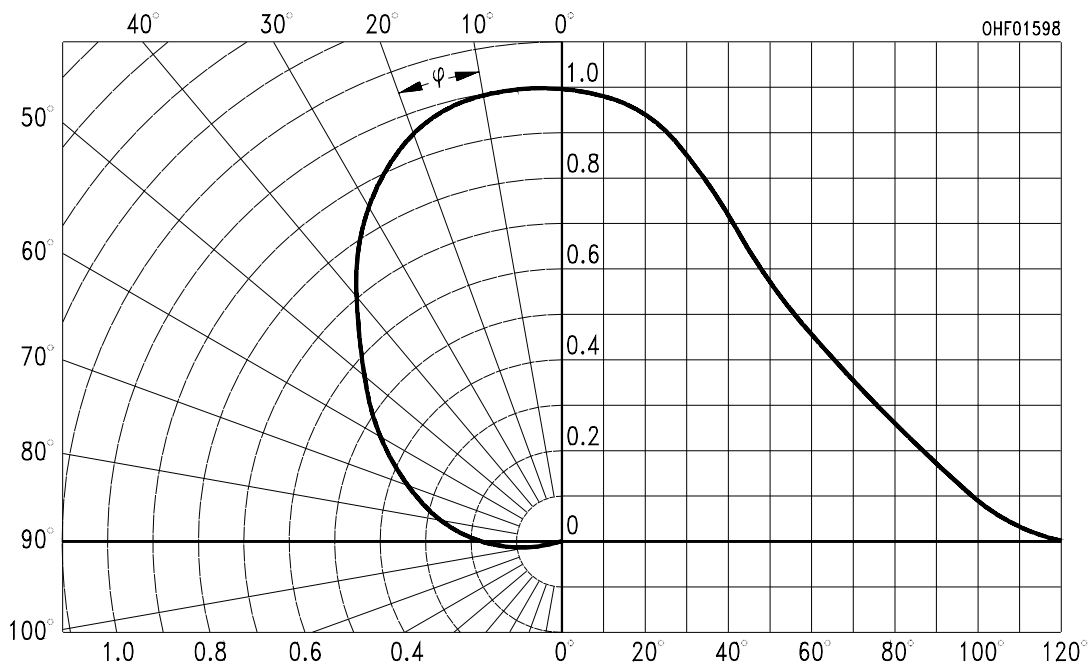
Relative Spectral Sensitivity ^{4), 5)}

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



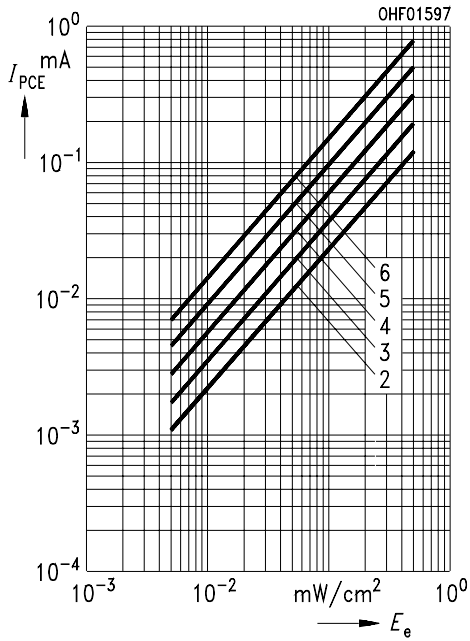
Directional Characteristics ^{4), 5)}

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



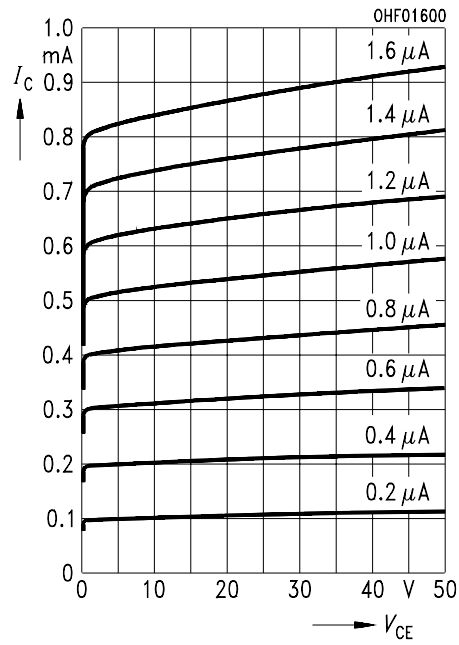
Photocurrent 4), 5)

$I_{PCE} = f(E_e); V_{CE} = 5\text{ V}$



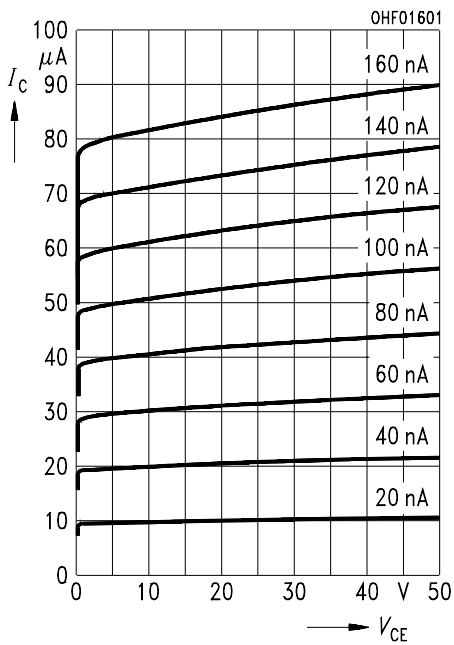
Collector Current 4), 5)

$I_{CE} = f(V_{CE}); I_B = \text{Parameter}$



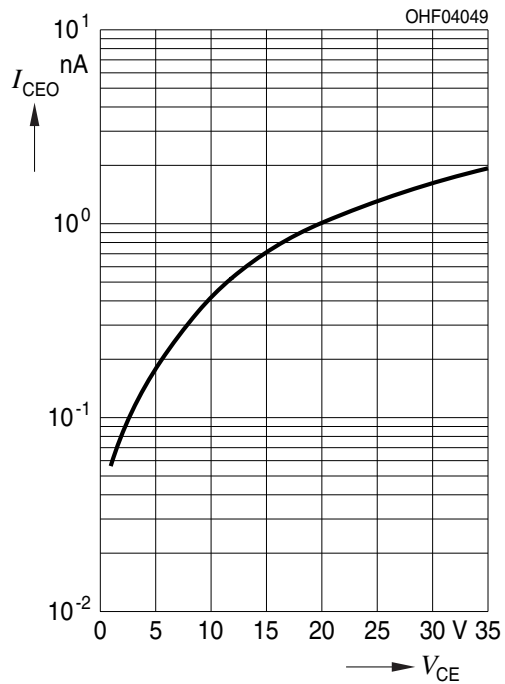
Collector Current 4), 5)

$I_{CE} = f(V_{CE}); I_B = \text{Parameter}$



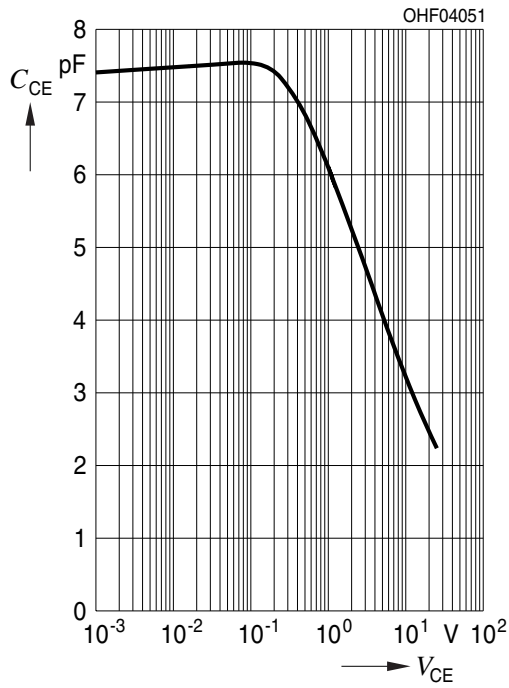
Dark Current 4), 5)

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



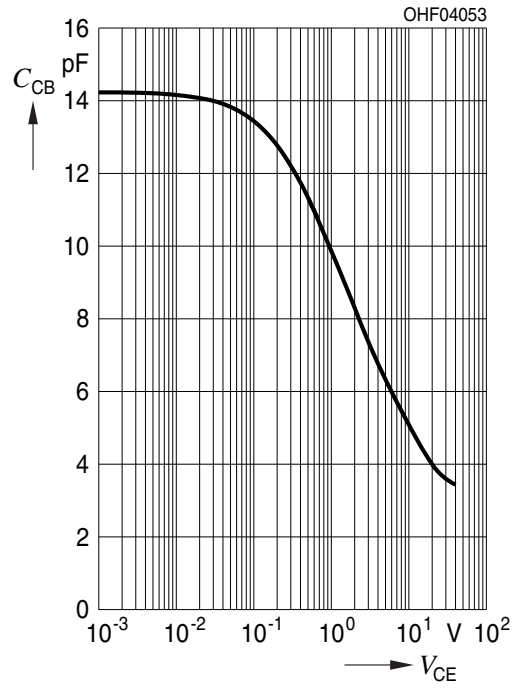
Collector-Emitter Capacitance 4), 5)

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



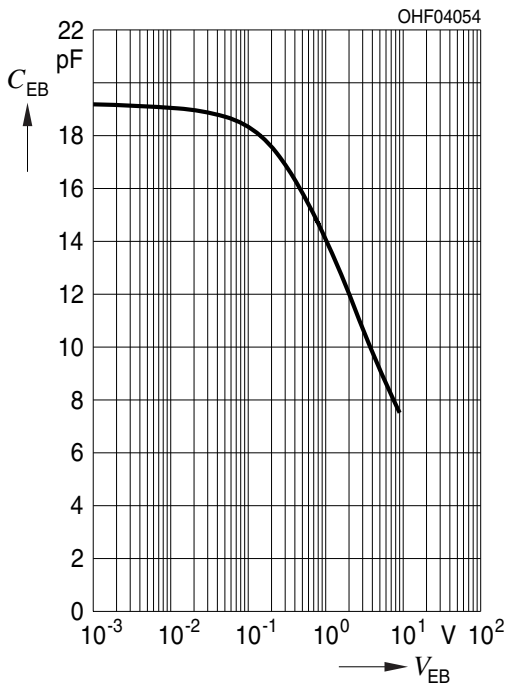
Collector-Base Capacitance 4), 5)

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



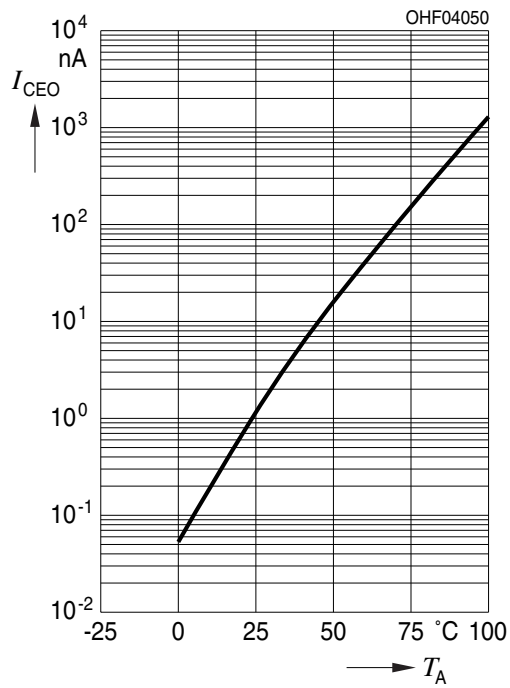
Emitter-Base Capacitance 4), 5)

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



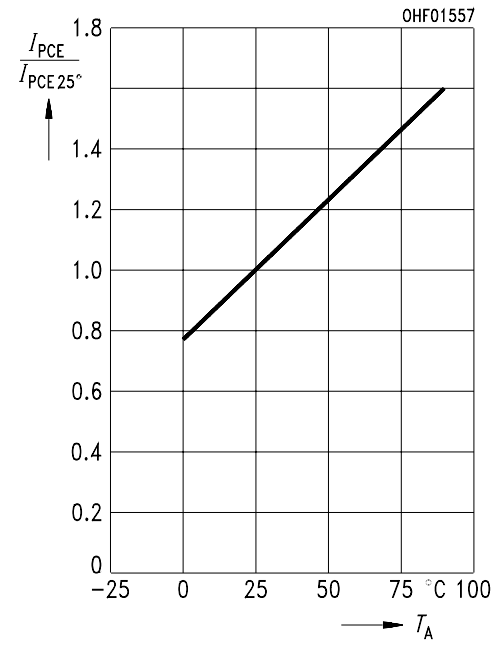
Dark Current ⁴⁾

$$I_{CE0} = f(T_A); V_{CE} = 0 \text{ V}; E_e = 0 \text{ mW/cm}^2$$

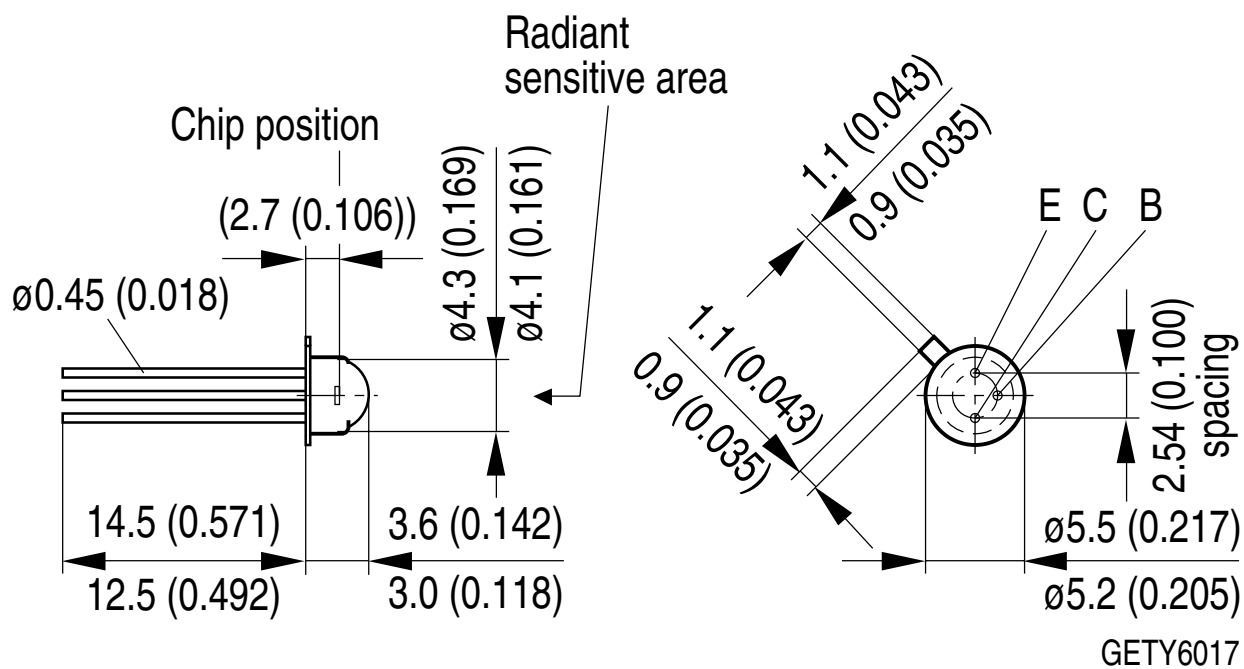


Photocurrent ⁴⁾

$$I_{PCE,rel} = f(T_A); V_{CE} = 5 \text{ V}$$



Dimensional Drawing ⁶⁾



Further Information:

Approximate Weight: 190.0 mg

Package marking: Emitter

TTW Soldering

IEC-61760-1 TTW



Notes

Subcomponents of this device contain, in addition to other substances, metal filled materials including silver. Metal filled materials can be affected by environments that contain traces of aggressive substances. Therefore, we recommend that customers minimize device exposure to aggressive substances during storage, production, and use. Devices that showed visible discoloration when tested using the described tests above did show no performance deviations within failure limits during the stated test duration. Respective failure limits are described in the IEC60810.

For further application related information please visit www.osram-os.com/appnotes

Disclaimer

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.

Product and functional safety devices/applications or medical devices/applications

Our components are not developed, constructed or tested for the application as safety relevant component or for the application in medical devices.

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Glossary

- 1) **Photocurrent:** The photocurrent values are measured (by irradiating the devices with a homogenous light source and applying a voltage to the device) with a tolerance of $\pm 11\%$.
- 2) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.
- 3) **IPCEmin:** IPCEmin is the min. photocurrent of the specified group.
- 4) **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, 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.
- 5) **Testing temperature:** $T_A = 25^\circ\text{C}$ (unless otherwise specified)
- 6) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.

Revision History

| Version | Date | Change |
|---------|------------|-------------------------------------|
| 1.5 | 2020-11-11 | Ordering Information |
| 1.6 | 2023-01-24 | Brand New Layout Applications |



EU RoHS and China RoHS compliant product

此产品符合欧盟 RoHS 指令的要求；
按照中国的相关法规和标准，
不含有毒有害物质或元素。

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