

# Silicon NPN Phototransistor Arrays

## Version 1.3

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### BPX 80, BPX 82 ... BPX 89



#### Features:

- **Spectral range of sensitivity:** (typ) 450 ... 1100 nm
- **Package:** Miniature Array, Epoxy
- **Special:** Multiple-digit array package
- High linearity
- Available in groups

#### Applications

- Miniature photointerrupters
- Industrial electronics
- For control and drive circuits

## Ordering Information

| Type:  | Photocurrent<br>$I_{PCE}$ [ $\mu A$ ]<br>$\lambda = 950 \text{ nm}$ , $E_e = 0.5 \text{ mW/cm}^2$ ,<br>$V_{CE} = 5 \text{ V}$ | Ordering Code |
|--------|-------------------------------------------------------------------------------------------------------------------------------|---------------|
| BPX 82 | > 320                                                                                                                         | Q62702P0021   |
| BPX 83 | > 320                                                                                                                         | Q62702P0025   |
| BPX 84 | > 320                                                                                                                         | Q62702P0030   |
| BPX 85 | > 320                                                                                                                         | Q62702P0031   |
| BPX 86 | > 320                                                                                                                         | Q62702P0022   |
| BPX 87 | > 320                                                                                                                         | Q62702P0032   |
| BPX 88 | > 320                                                                                                                         | Q62702P0033   |
| BPX 89 | > 320                                                                                                                         | Q62702P0026   |
| BPX 80 | > 320                                                                                                                         | Q62702P0028   |

*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 ... 80 | °C    |
| Collector-emitter voltage                                           | $V_{CE}$          | 35         | V     |
| Collector current                                                   | $I_C$             | 50         | mA    |
| Collector surge current<br>( $\tau < 10\text{ }\mu\text{s}$ )       | $I_{CS}$          | 200        | mA    |
| Emitter-collector voltage                                           | $V_{EC}$          | 7          | V     |
| Total Power dissipation                                             | $P_{tot}$         | 90         | mW    |
| Thermal resistance                                                  | $R_{thJA}$        | 750        | K / W |
| Electrostatic discharge<br>(acc. to ANSI/ ESDA/ JEDEC JS-001 - HBM) | $V_{ESD}$         | 2000       | V     |

**Characteristics** ( $T_A = 25\text{ °C}$ )

| Parameter                                                                                        |             | Symbol                   | Values                | Unit            |
|--------------------------------------------------------------------------------------------------|-------------|--------------------------|-----------------------|-----------------|
| Wavelength of max. sensitivity                                                                   | (typ)       | $\lambda_{S\text{ max}}$ | 850                   | nm              |
| Spectral range of sensitivity                                                                    | (typ)       | $\lambda_{10\%}$         | (typ) 450<br>... 1100 | nm              |
| Radiant sensitive area                                                                           | (typ)       | A                        | 0.11                  | mm <sup>2</sup> |
| Dimensions of chip area                                                                          | (typ)       | L x W                    | (typ) 0.55 x<br>0.55  | mm x<br>mm      |
| Half angle                                                                                       | (typ)       | $\phi$                   | $\pm 18$              | °               |
| Capacitance<br>( $V_{CE} = 0\text{ V}$ , $f = 1\text{ MHz}$ , $E = 0$ )                          | (typ)       | $C_{CE}$                 | 7.5                   | pF              |
| Dark current<br>( $V_{CE} = 20\text{ V}$ , $E = 0$ )                                             | (typ (max)) | $I_{CE0}$                | 1 ( $\leq 50$ )       | nA              |
| Rise and fall time<br>( $I_C = 1\text{ mA}$ , $V_{CC} = 5\text{ V}$ , $R_L = 1\text{ k}\Omega$ ) | (typ)       | $t_r, t_f$               | 6                     | $\mu\text{s}$   |

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

| Group | Min Photocurrent<br>$E_e = 0.5\text{ mW/cm}^2$ ,<br>$V_{CE} = 5\text{ V}$<br>$I_{PCE, \min}$ [ $\mu\text{A}$ ] | Max Photocurrent<br>$E_e = 0.5\text{ mW/cm}^2$ ,<br>$V_{CE} = 5\text{ V}$<br>$I_{PCE, \max}$ [ $\mu\text{A}$ ] | Typ Photocurrent<br>$E_V = 1000\text{ lx, Std. Light A, } V_{CE} = 5\text{ V}$<br>$I_{PCE}$ [ $\mu\text{A}$ ] | Rise and fall time<br>$I_C = 1\text{ mA, } V_{CC} = 5\text{ V, } R_L = 1\text{ k}\Omega$<br>$t_r, t_f$ [ $\mu\text{s}$ ] |
|-------|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| -A    | 320                                                                                                            | 630                                                                                                            | 1500                                                                                                          | 5.5                                                                                                                      |
| -B    | 400                                                                                                            | 800                                                                                                            | 1900                                                                                                          | 6                                                                                                                        |
| -C    | 500                                                                                                            |                                                                                                                | 2300                                                                                                          | 8                                                                                                                        |

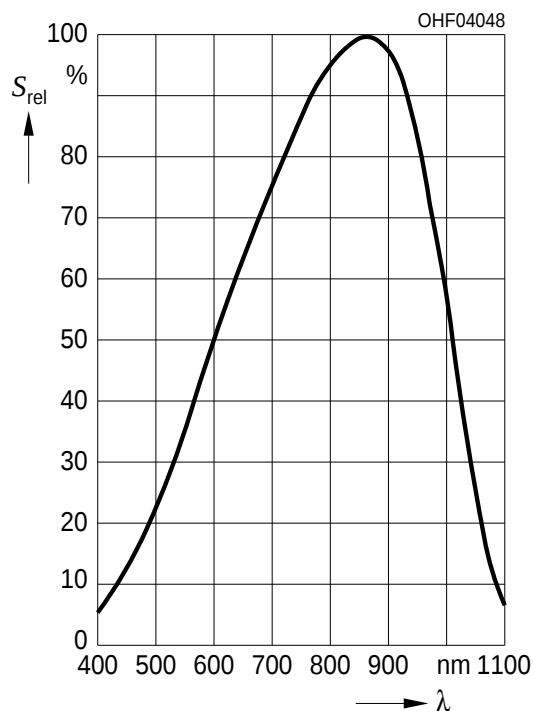
| Group | Collector-emitter saturation voltage<br>$I_C = I_{PCEmin} \times 0.3$ , $E_e = 0.5\text{ mW/cm}^2$<br>$V_{CEsat}$ [mV] |
|-------|------------------------------------------------------------------------------------------------------------------------|
| -A    | 150                                                                                                                    |
| -B    | 150                                                                                                                    |
| -C    | 150                                                                                                                    |

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

For delivery the components are marked -A, -B, -C. Due to differing yields, it is not possible to order a definite group.

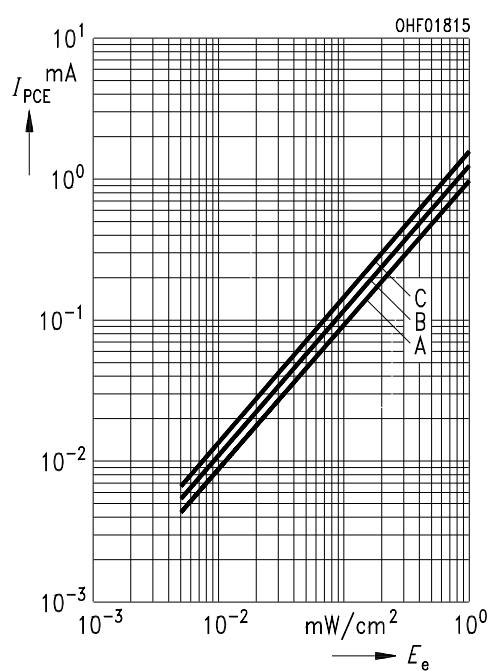
### Relative Spectral Sensitivity <sup>1) page 10</sup>

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



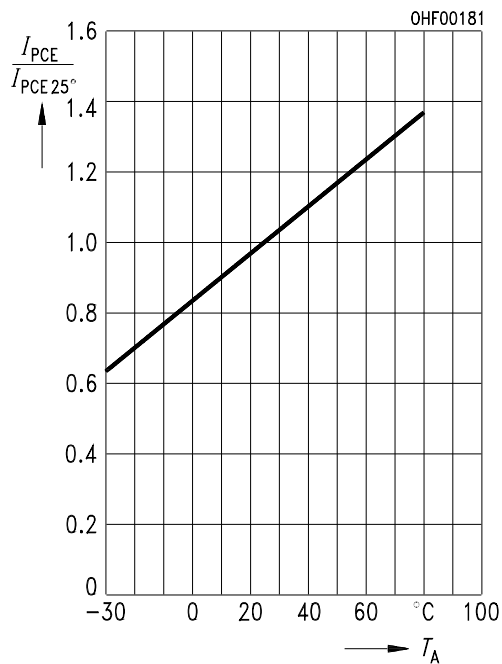
### Photocurrent <sup>1) page 10</sup>

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

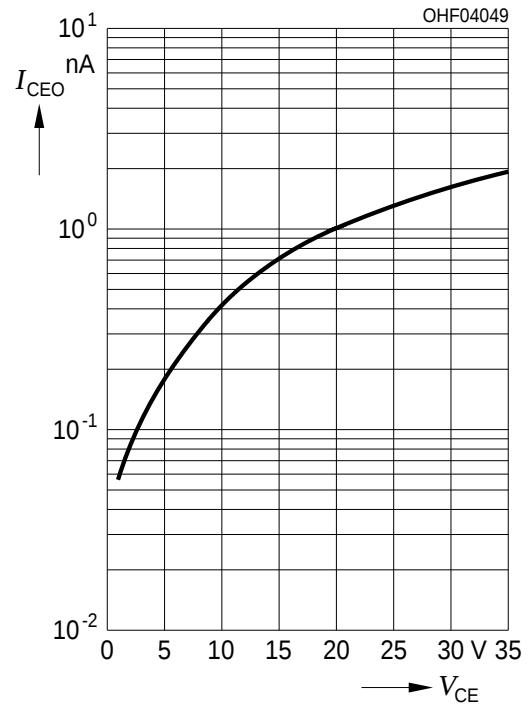


**Photocurrent** <sup>1) page 10</sup>

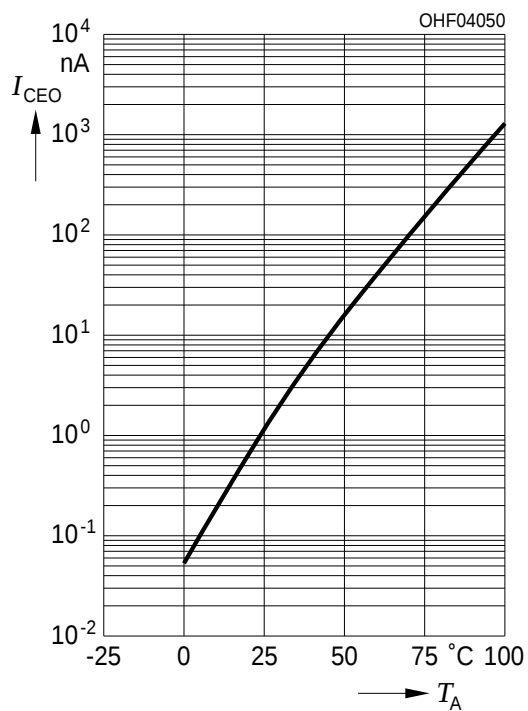
$$I_{PCE} / I_{PCE}(25^{\circ}\text{C}) = f(T_A), V_{CE} = 5 \text{ V}$$

**Dark Current** <sup>1) page 10</sup>

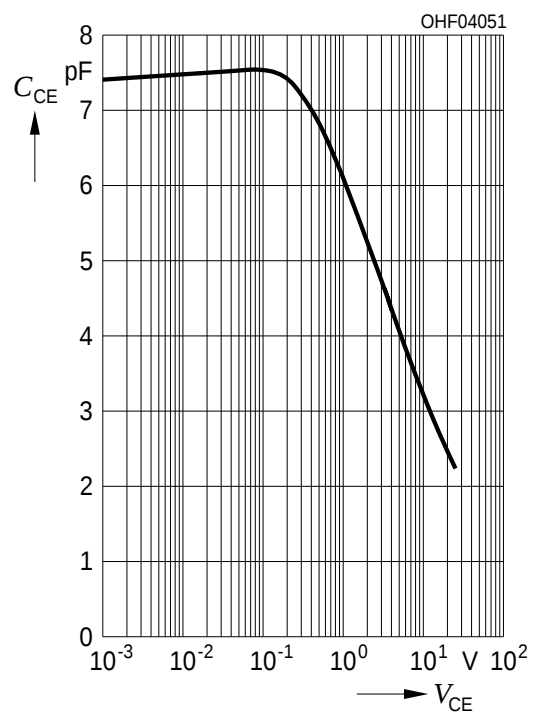
$$I_{CEO} = f(V_{CE}), E = 0$$

**Dark Current** <sup>1) page 10</sup>

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

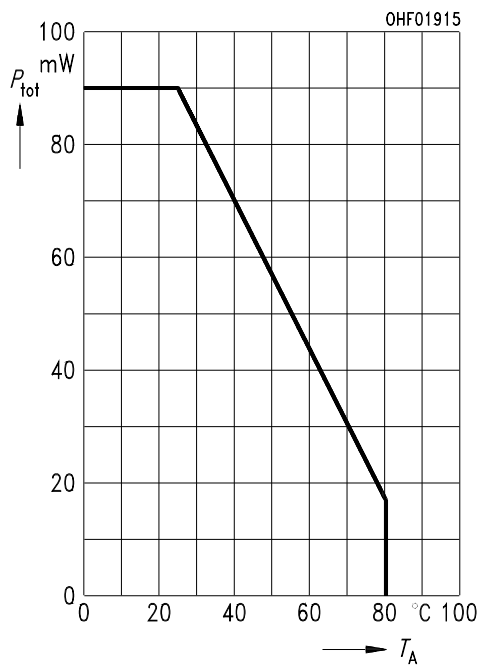
**Collector-Emitter Capacitance** <sup>1) page 10</sup>

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

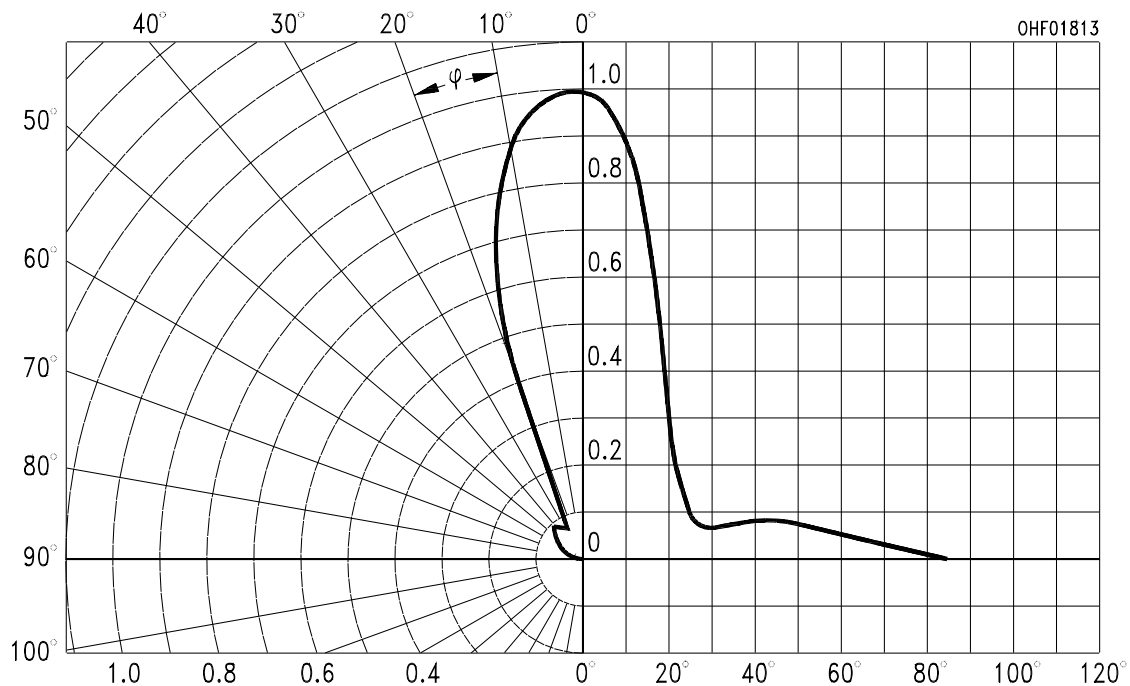


**Power Consumption**

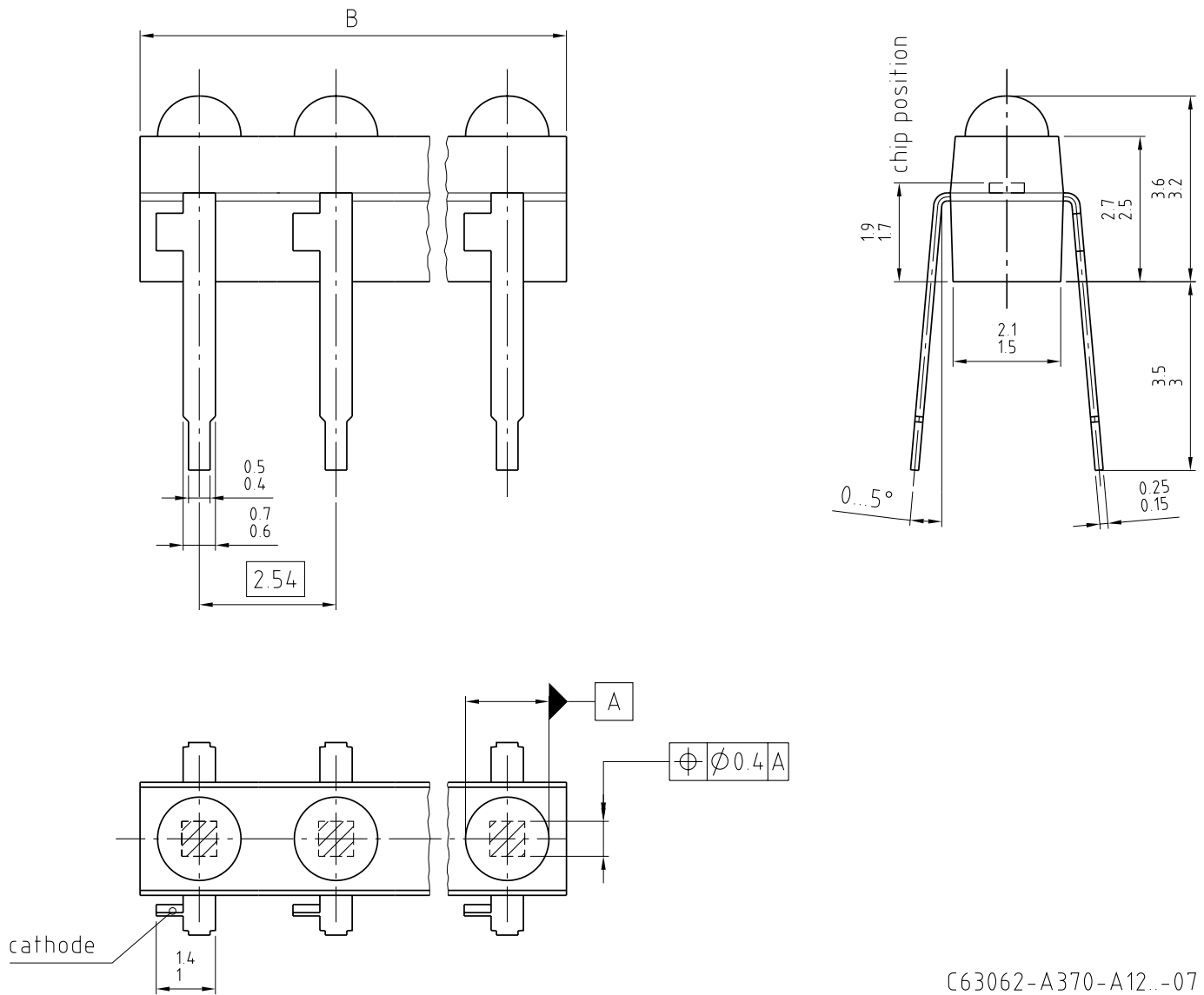
$$P_{\text{tot}} = f(T_A)$$

**Directional Characteristics** <sup>1) page 10</sup>

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



## Package Outline



C63062-A370-A12..-07

Dimensions in mm.

## Transistors

| Number of Transistors per Array | Dimensions "B" |
|---------------------------------|----------------|
| 2                               | 4.5 ... 4.9    |
| 3                               | 7.0 ... 7.4    |
| 4                               | 9.6 ... 10.0   |
| 5                               | 12.1 ... 12.5  |
| 6                               | 14.6 ... 16.0  |
| 7                               | 17.2 ... 17.6  |
| 8                               | 19.7 ... 20.1  |
| 9                               | 22.3 ... 22.7  |
| 10                              | 24.8 ... 25.2  |

## Package

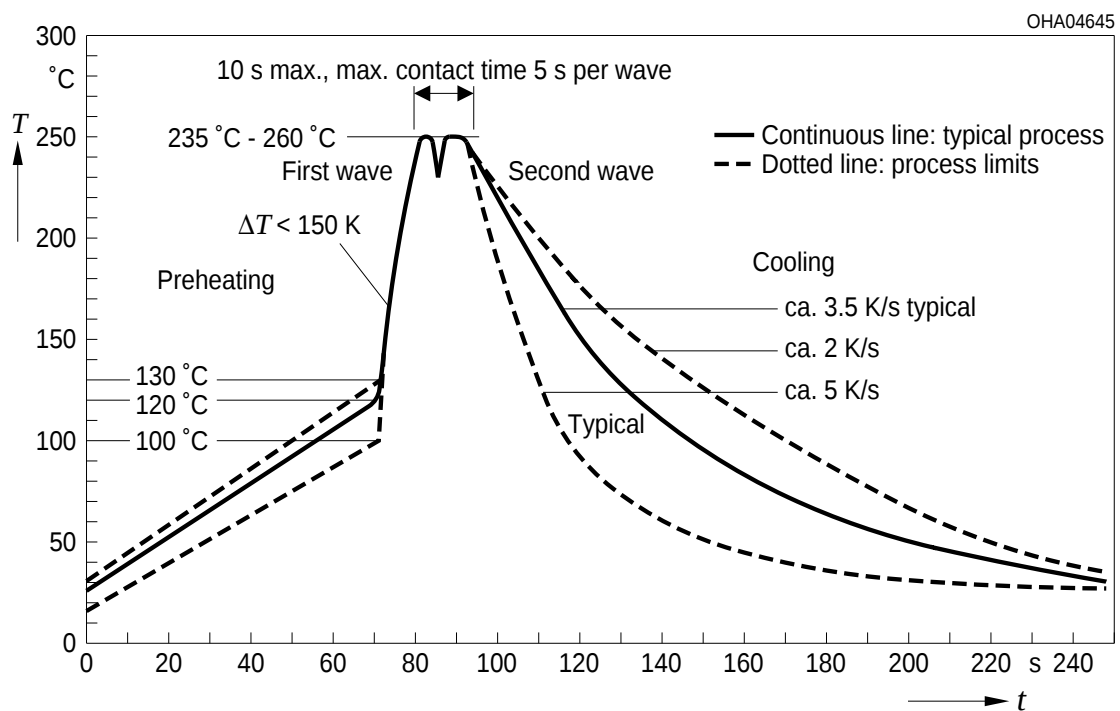
Miniature Array, Epoxy

## 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.

**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.

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\*\*) 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**

- <sup>1)</sup> **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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