

SFH 4941

Array Mini

Infrared Emitter (940 nm)



Applications

- Industrial Automation (Machine controls, Light barriers, Vision controls)

Features:

- Package: black epoxy
- ESD: 2 kV acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2)
- Wavelength 950nm
- Same package dimensions as BPX 81
- Short switching times
- Miniature package

Ordering Information

| Type | Radiant intensity ¹⁾ I_e $I_F = 40 \text{ mA}; t_p = 20 \text{ ms}$ | Radiant intensity ¹⁾ typ. I_e $I_F = 40 \text{ mA}; t_p = 20 \text{ ms}$ | Ordering Code |
|----------|--|--|---------------|
| SFH 4941 | 16 ... 125 mW/sr | 50 mW/sr | Q65111A6125 |

Maximum Ratings

 $T_A = 25\text{ °C}$

| Parameter | Symbol | | Values |
|--|-----------|--------------|-----------------|
| Operating temperature | T_{op} | min. max. | -40 °C 80 °C |
| Storage temperature | T_{stg} | min. max. | -40 °C 80 °C |
| Reverse voltage ²⁾ | V_R | max. | 12 V |
| Forward current | I_F | max. | 40 mA |
| Surge current $t_p \leq 40\ \mu\text{s}; D = 0$ | I_{FSM} | max. | 1 A |
| Power consumption | P_{tot} | max. | 70 mW |
| ESD withstand voltage acc. to ANSI/ESDA/JEDEC JS-001 (HBM, Class 2) | V_{ESD} | max. | 2 kV |

Characteristics

$I_F = 40 \text{ mA}$; $t_p = 20 \text{ ms}$; $T_A = 25 \text{ °C}$

| Parameter | Symbol | | Values |
|---|-----------------------------|--------------|--|
| Peak wavelength | λ_{peak} | typ. | 950 nm |
| Centroid wavelength | $\lambda_{\text{centroid}}$ | typ. | 940 nm |
| Spectral bandwidth at 50% $I_{\text{rel,max}}$ | $\Delta\lambda$ | typ. | 42 nm |
| Half angle | φ | typ. | 10 ° |
| Dimensions of active chip area | L x W | typ. | 0.3 x 0.3 mm x mm |
| Distance chip surface to lens top | H | min. max. | 1.3 mm 1.9 mm |
| Rise time (10% / 90%) $I_F = 40 \text{ mA}$; $R_L = 50 \text{ }\Omega$ | t_r | typ. | 12 ns |
| Fall time (10% / 90%) $I_F = 40 \text{ mA}$; $R_L = 50 \text{ }\Omega$ | t_f | typ. | 12 ns |
| Forward voltage | V_F | typ. max. | 1.35 V 1.7 V |
| Forward voltage $I_F = 1 \text{ A}$; $t_p = 100 \text{ }\mu\text{s}$ | V_F | typ. max. | 3.6 V 4.6 V |
| Reverse current ²⁾ $V_R = 5 \text{ V}$ | I_R | max. typ. | 10 μA 0.01 μA |
| Total radiant flux ³⁾ | Φ_e | typ. | 30 mW |
| Radiant intensity ¹⁾ $I_F = 1 \text{ A}$; $t_p = 40 \text{ }\mu\text{s}$ | I_e | typ. | 520 mW/sr |
| Temperature coefficient of brightness | TC_I | typ. | -0.3 % / K |
| Temperature coefficient of voltage | TC_V | typ. | -0.8 mV / K |
| Temperature coefficient of wavelength | TC_λ | typ. | 0.3 nm / K |
| Thermal resistance junction ambient real ⁴⁾ | R_{thJA} | max. | 750 K / W |
| Thermal resistance junction solder point real ⁵⁾ | R_{thJS} | max. | 650 K / W |

Brightness Groups

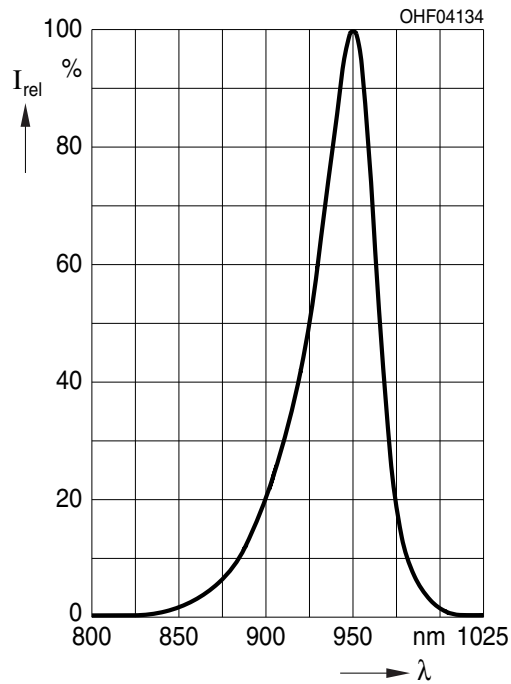
$T_A = 25\text{ °C}$

| Group | Radiant intensity $I_F = 40\text{ mA}; t_p = 20\text{ ms}$ min. | Radiant intensity $I_F = 40\text{ mA}; t_p = 20\text{ ms}$ max. |
|-------|---|---|
| | I_e | I_e |
| S | 16 mW/sr | 32 mW/sr |
| T | 25 mW/sr | 50 mW/sr |
| U | 40 mW/sr | 80 mW/sr |
| V | 63 mW/sr | 125 mW/sr |

Only one group in one packing unit (variation lower 2:1).

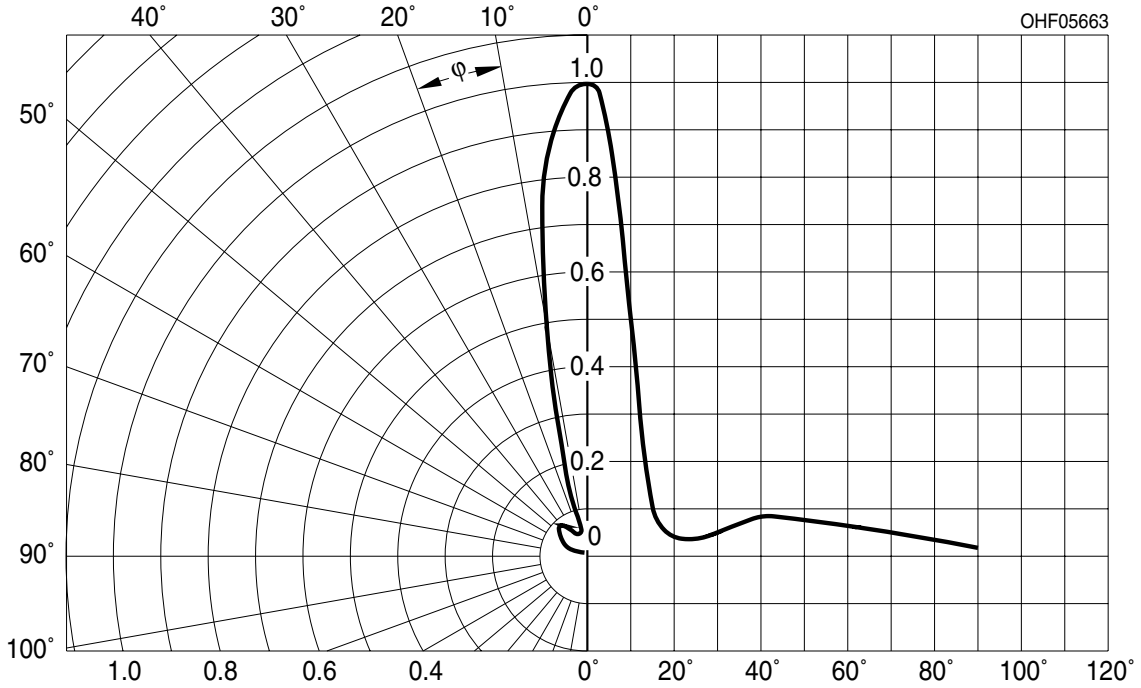
Relative Spectral Emission ^{6), 7)}

$I_{rel} = f(\lambda); I_F = 40\text{ mA}; t_p = 20\text{ ms}$



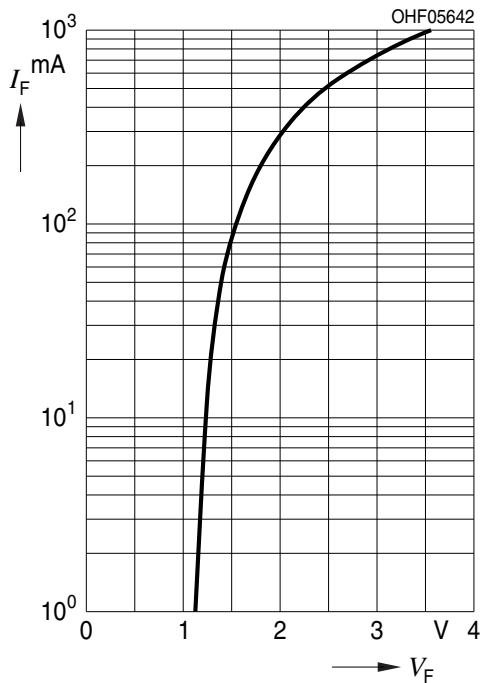
Radiation Characteristics 6), 7)

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



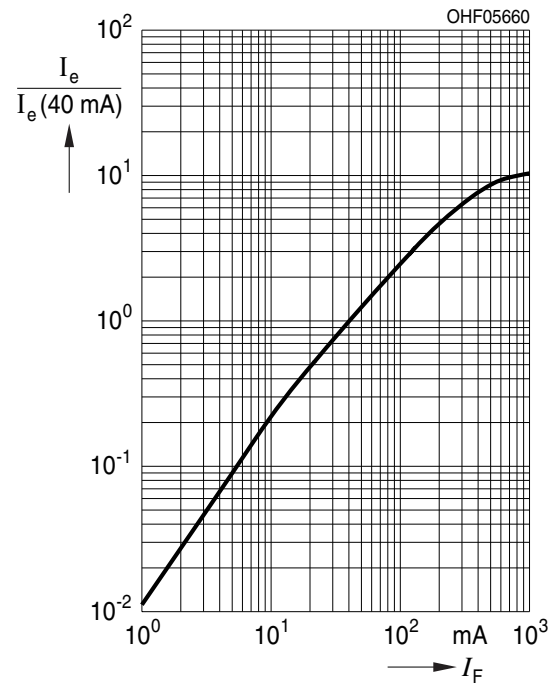
Forward current 6), 7)

$I_F = f(V_F)$; single pulse; $t_p = 40 \mu s$



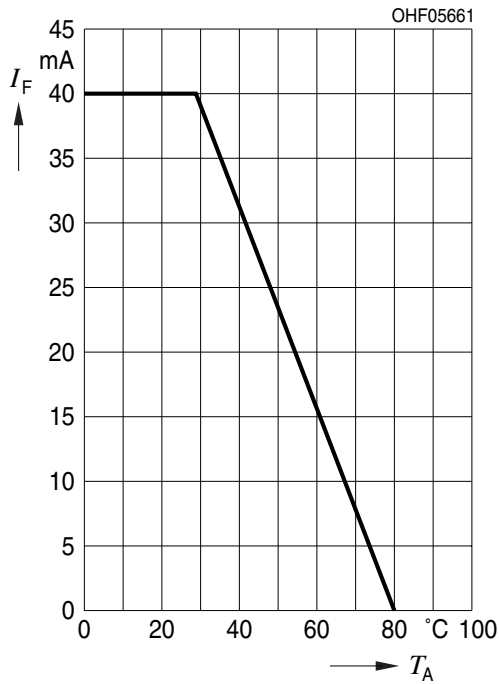
Relative Radiant Intensity 6), 7)

$I_e/I_e(40mA) = f(I_F)$; single pulse; $t_p = 40 \mu s$



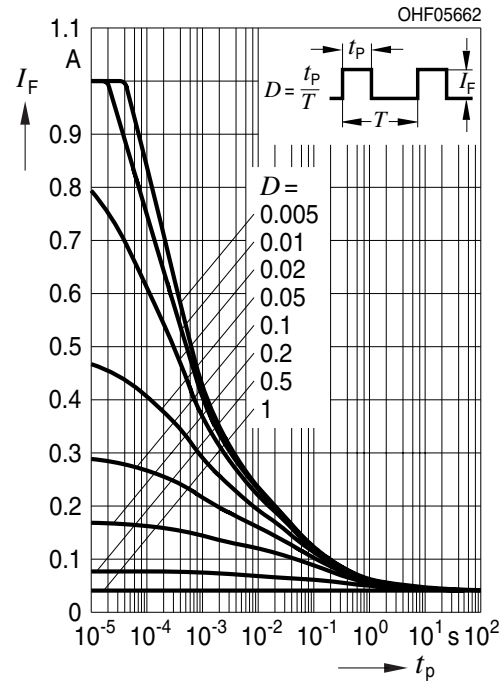
Max. Permissible Forward Current

$I_{F,max} = f(T_A); R_{thJA} = 750 \text{ K/W}$

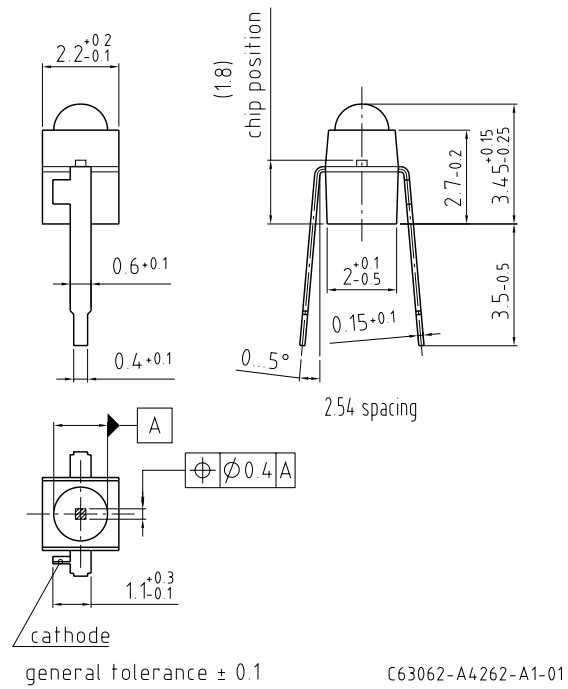


Permissible Pulse Handling Capability

$I_F = f(t_p); \text{ duty cycle } D = \text{parameter}; T_A = 25^\circ\text{C}$



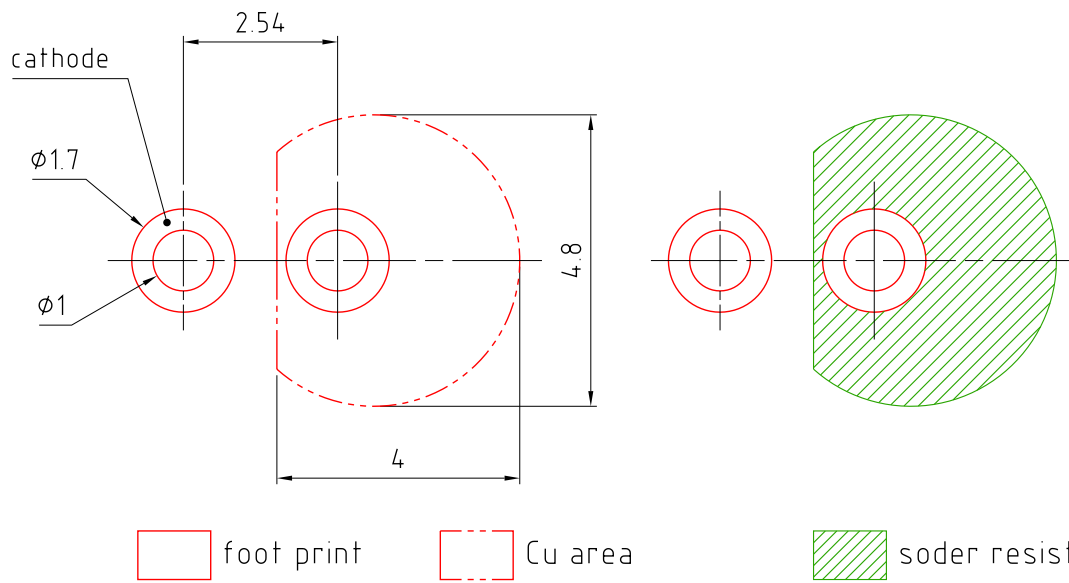
Dimensional Drawing ⁸⁾



Approximate Weight: 26.0 mg

Package marking: Cathode

Recommended Solder Pad ⁸⁾

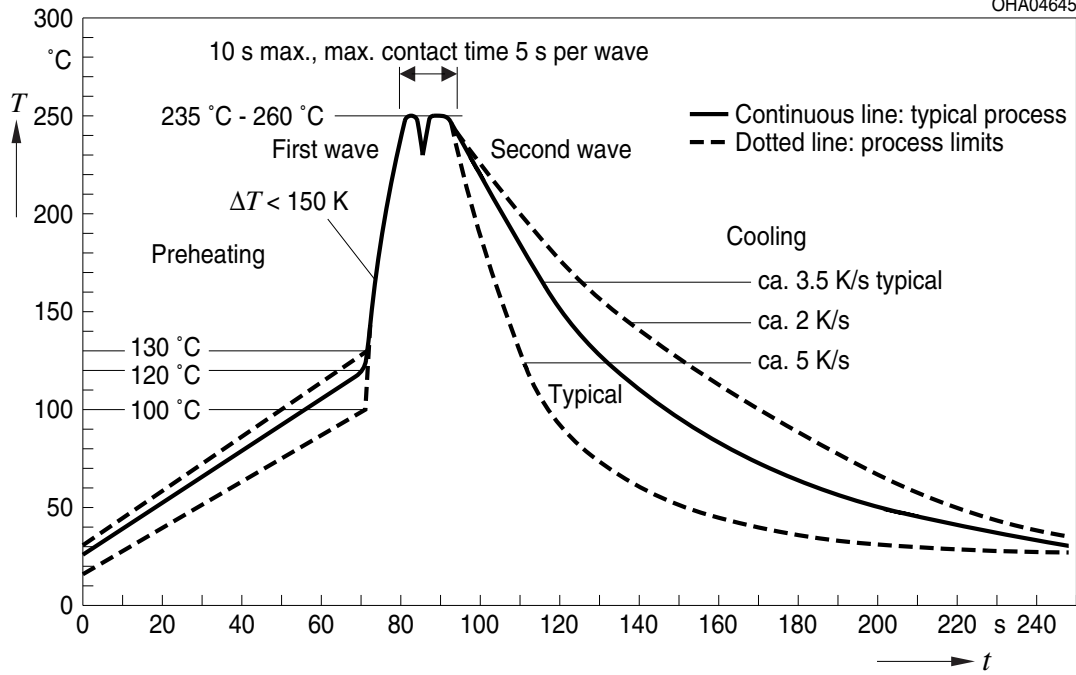


E062.3010.189-01

TTW Soldering

IEC-61760-1 TTW

OHA04645



Notes

The evaluation of eye safety occurs according to the standard IEC 62471:2006 (photo biological safety of lamps and lamp systems). Within the risk grouping system of this IEC standard, the LED specified in this data sheet fall into the class **exempt group (exposure time 10000 s)**. Under real circumstances (for exposure time, conditions of the eye pupils, observation distance), it is assumed that no endangerment to the eye exists from these devices. As a matter of principle, however, it should be mentioned that intense light sources have a high secondary exposure potential due to their blinding effect. When looking at bright light sources (e.g. headlights), temporary reduction in visual acuity and afterimages can occur, leading to irritation, annoyance, visual impairment, and even accidents, depending on the situation.

For further application related informations please visit www.osram-os.com/apnotes

Disclaimer

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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) **Radiant intensity:** Measured at a solid angle of $\Omega = 0.001$ sr
- 2) **Reverse Operation:** Reverse Operation of 10 hours is permissible in total. Continuous reverse operation is not allowed.
- 3) **Total radiant flux:** Measured with integrating sphere.
- 4) **Thermal resistance:** junction - ambient, mounted on PC-board (FR4), padsize 16 mm² each
- 5) **Thermal resistance:** junction - soldering point, of the device only, mounted on an ideal heatsink (e.g. metal block)
- 6) **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.
- 7) **Testing temperature:** $T_A = 25^\circ\text{C}$
- 8) **Tolerance of Measure:** Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimensions are specified in mm.

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