

Slotted Interrupter

Version 1.3

SFH 9540



Features:

- Suitable for surface mounting (SMT)
- Compact housing out of black LCP
- GaAs infrared emitter (950 nm)
- Silicon phototransistor with daylight-cutoff filter
- With positioning pin
- Suitable for pick and place
- High sensing accuracy (slit width: 0.5 mm)
- Wide gap between emitter and detector (5 mm)
- High stability on pcb due to large width of device (6.8 mm)

Applications

- Speed control
- Motor control
- Monitoring of paper feed in printers, copiers, facsimiles
- Control of print head in printers
- Coin detection
- Optoelectronic switches

Ordering Information

| Type: | Collector-emitter current I_{PCE} [μ A] $I_F = 20$ mA, $V_{CE} = 5$ V | Ordering Code |
|----------|--|---------------|
| SFH 9540 | ≥ 1000 | Q65111A6122 |

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

| Parameter | Symbol | Values | Unit |
|---|------------|--------|-------|
| Emitter | | | |
| Reverse voltage | V_R | 5 | V |
| Forward current | I_F | 60 | mA |
| Power consumption | P_{tot} | 100 | mW |
| Thermal resistance junction - ambient ^{1) page 10} | R_{thJA} | 350 | K / W |

Detector

| | | | |
|---|------------|-----|-------|
| Collector-emitter voltage | V_{CE} | 30 | V |
| Collector-emitter voltage ($t \leq 2\text{ min}$) | V_{CE} | 70 | V |
| Emitter-collector voltage | V_{EC} | 7 | V |
| Collector current | I_C | 50 | mA |
| Total Power dissipation | P_{tot} | 150 | mW |
| Thermal resistance junction - ambient ^{1) page 10} | R_{thJA} | 350 | K / W |

Slotted Interrupter

| | | | |
|---------------------------------------|------------|------------|-------|
| Operation temperature range | T_{op} | -40 ... 85 | °C |
| Storage temperature range | T_{stg} | -40 ... 85 | °C |
| Electrostatic discharge | V_{ESD} | 2 | kV |
| Thermal resistance junction - ambient | R_{thJA} | 350 | K / W |

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

| Parameter | Symbol | Values | Unit |
|--|--------------------------|------------------------------------|---------------|
| Emitter | | | |
| Peak wavelength ($I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$) | (typ) λ_{peak} | 950 | nm |
| Forward voltage ($I_F = 20\text{ mA}$, $t_p = 20\text{ ms}$) | (typ (max)) V_F | 1.3 (≤ 1.6) | V |
| Reverse current ($V_R = 5\text{ V}$) | I_R | not designed for reverse operation | μA |
| Detector | | | |
| Wavelength of max. sensitivity | (typ) $\lambda_{S\ max}$ | 920 | nm |

| Parameter | | Symbol | Values | Unit |
|---|-------------|------------------|-----------------------|------|
| Spectral range of sensitivity | (typ) | $\lambda_{10\%}$ | (typ) 840 ... 1080 | nm |
| Capacitance ($V_{CE} = 0\text{ V}$, $f = 1\text{ MHz}$, $E = 0$) | (typ) | C_{CE} | 6.5 | pF |
| Dark current ($V_{CE} = 20\text{ V}$) | (typ (max)) | I_{CE0} | 2 (≤ 50) | nA |

Interrupter

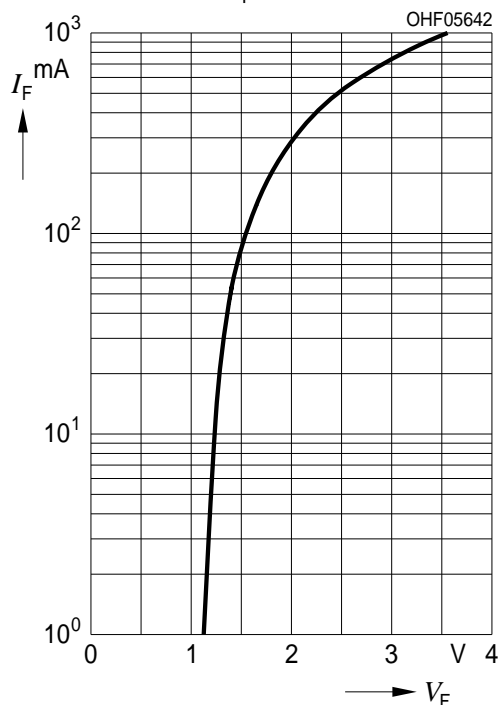
| | | | | |
|--|-------|-------------|------------|---------------|
| Collector-emitter current ($I_F = 20\text{ mA}$, $V_{CE} = 5\text{ V}$) | (min) | I_{PCE} | 1000 | μA |
| Collector-emitter saturation voltage ($I_F = 20\text{ mA}$, $I_C = 0.3\text{ mA}$) | | V_{CEsat} | ≤ 400 | mV |

Switching Times

| | | | | |
|---|-------|-------|----|---------------|
| Rise time ($V_{CC} = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 1\text{ k}\Omega$) | (typ) | t_r | 13 | μs |
| Fall time ($V_{CC} = 5\text{ V}$, $I_C = 1\text{ mA}$, $R_L = 1\text{ k}\Omega$) | (typ) | t_f | 17 | μs |

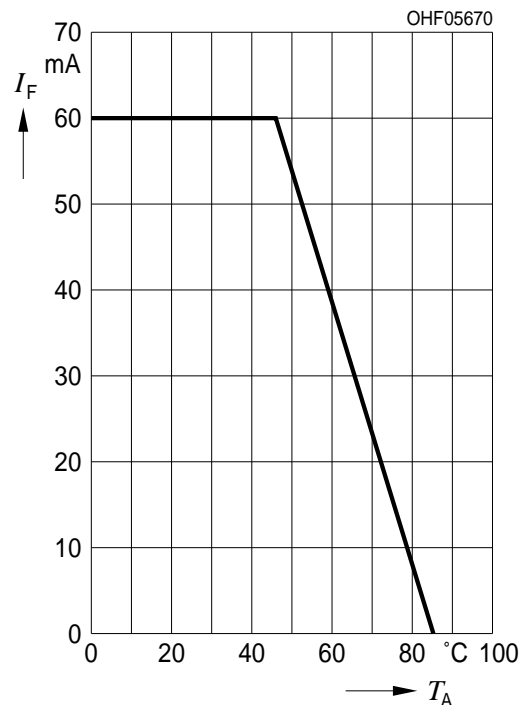
Forward Current ^{2) page 10}

$I_F = f(V_F)$, single pulse, $t_p = 100\ \mu\text{s}$, $T_A = 25^\circ\text{C}$



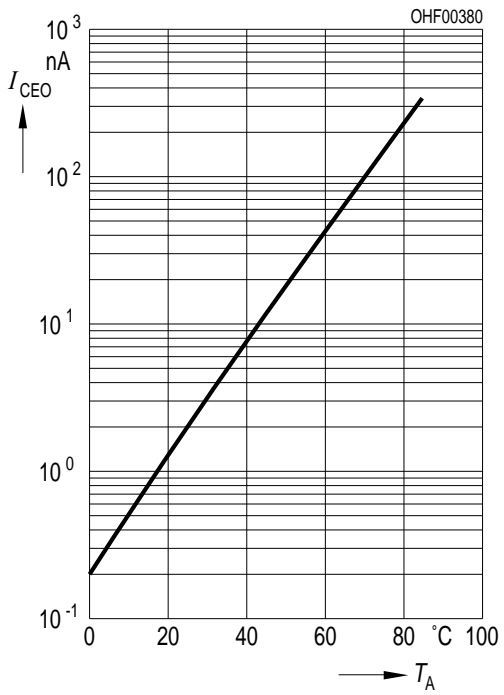
Max. Permissible Forward Current

$I_{F,max} = f(T_A)$, $R_{thJA} = 350\text{ K/W}$



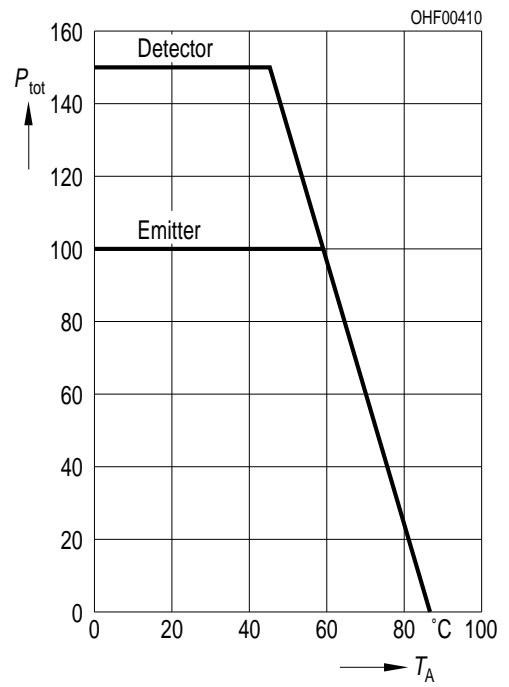
Dark Current 2) page 10

$I_{CEO} = f(T_A), V_{CE} = 20\text{ V}, E = 0$

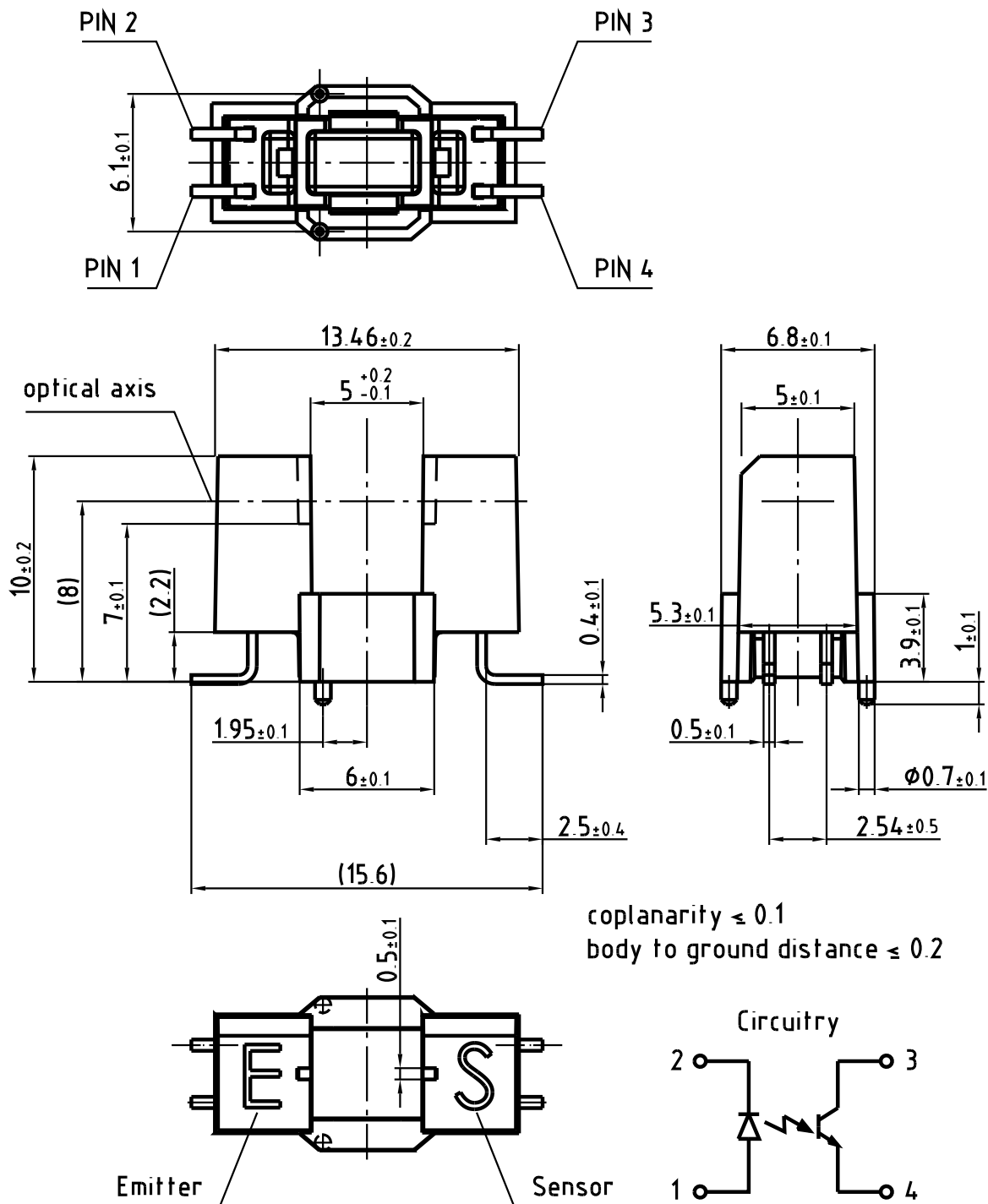


Power Consumption

$P_{tot} = f(T_A)$



Package Outline



Dimensions in mm.

C63062-A3402-A1-04

Pinning

| Pin | Description |
|-----|--------------------|
| 1 | Emitter - Anode |
| 2 | Emitter - Cathode |
| 3 | Sensor - Collector |
| 4 | Sensor - Emitter |

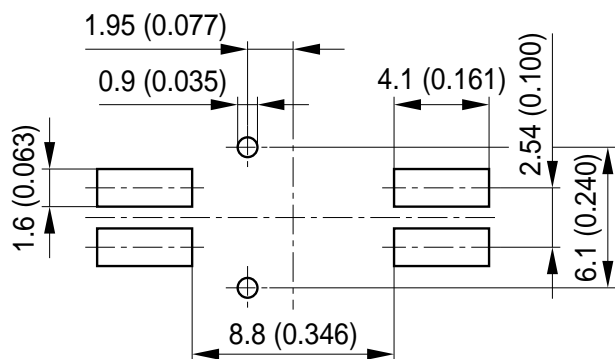
Package

Slotted Interrupter

Approximate Weight:

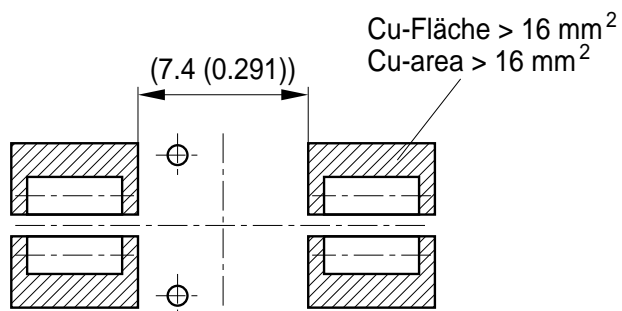
0.6 g

Recommended Solder Pad

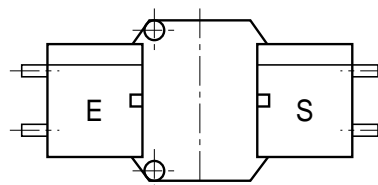
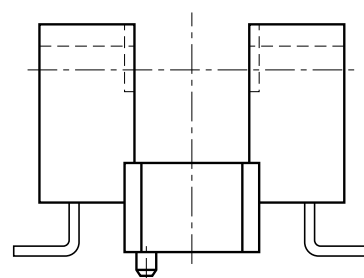


Padgeometrie für verbesserte Wärmeableitung

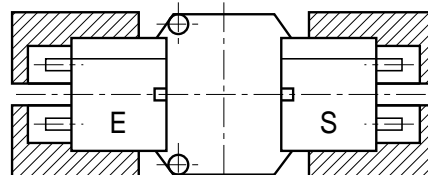
Paddesign for improved heat dissipation



 Lötstopplack
Solder resist



Bauteil positioniert
Component Location on Pad

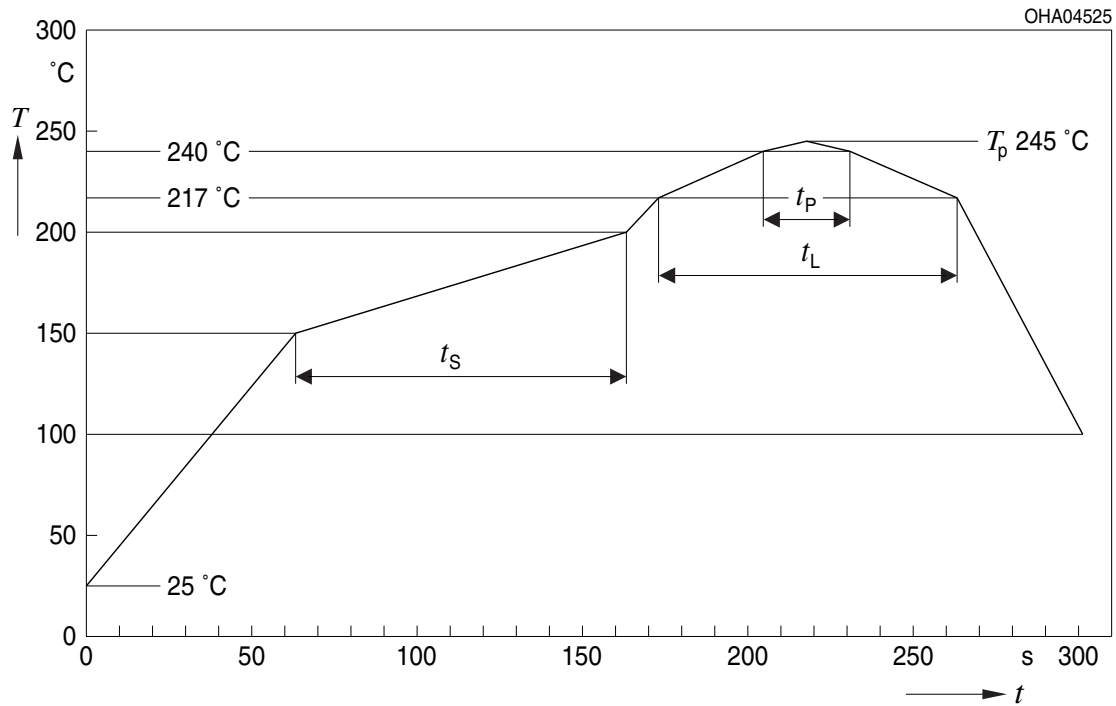


OHFY1950

Dimensions in mm (inch).

Reflow Soldering Profile

Product complies to MSL Level 1 acc. to JEDEC J-STD-020D.01



| Profil-Charakteristik Profile Feature | Symbol Symbol | Pb-Free (SnAgCu) Assembly | | | Einheit Unit |
|---|------------------|---------------------------|----------------|---------|-----------------|
| | | Minimum | Recommendation | Maximum | |
| Ramp-up Rate to Preheat*) 25 °C to 150 °C | | | 2 | 3 | K/s |
| Time t_S T_{Smin} to T_{Smax} | t_S | 60 | 100 | 120 | s |
| Ramp-up Rate to Peak*) T_{Smax} to T_P | | | 2 | 3 | K/s |
| Liquidus Temperature | T_L | | 217 | | °C |
| Time above Liquidus temperature | t_L | | 80 | 100 | s |
| Peak Temperature | T_P | | 245 | 250 | °C |
| Time within 5 °C of the specified peak temperature $T_P - 5$ K | t_P | 10 | 20 | 30 | s |
| Ramp-down Rate* T_P to 100 °C | | | 3 | 4 | K/s |
| Time 25 °C to T_P | | | | 480 | s |

All temperatures refer to the center of the package, measured on the top of the component

* slope calculation DT/Dt : Dt max. 5 s; fulfillment for the whole T-range

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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Critical components* may only be used in life-support devices** or systems with the express written approval of OSRAM OS.

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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

- 1) **Thermal resistance:** Mounting on PC-board with $> 5 \text{ mm}^2$ pad size
- 2) **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
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