

**Gabellichtschranke**  
**Slotted Interrupter**  
**Lead (Pb) Free Product - RoHS Compliant**

**SFH 9500**



**Vorläufige Daten/ Preliminary Data**

**Wesentliche Merkmale**

- Geeignet für Oberflächenmontage (SMT)
- Kompaktes Gehäuse aus schwarzem LCP
- GaAs-IR-Sendediode (940 nm)
- Si-Fototransistor mit Tageslichtsperrfilter
- Mit Positionspin
- Geeignet für „pick and place“ Montage
- Hohe Genauigkeit (Schlitzbreite 0,5 mm)
- Große Spaltbreite zwischen Sender und Empfänger (5 mm)
- Hohe Stabilität auf PCB durch große Bauelementabmessung (6,8 mm)

**Features**

- Suitable for surface mounting (SMT)
- Compact housing out of black LCP
- GaAs infrared emitter (940 nm)
- Silicon phototransistor detector 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)

**Anwendungen**

- Geschwindigkeitsüberwachung
- Motorsteuerung
- Überwachung des Papiervorschubs in Druckern, Kopier- und Faxgeräten
- Speicherlaufwerke
- Steuerung des Druckkopfes in Druckern
- Münzdetektion
- Optoelektronische Schalter

**Applications**

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

| Type     | Bestellnummer | $I_{CE \text{ min. [mA]}}$                      |
|----------|---------------|---|
| Type     | Ordering Code | ( $I_F = 20 \text{ mA}; V_{CE} = 5 \text{ V}$ ) |
| SFH 9500 | Q65110A3108   | 1   |

**Grenzwerte**  
**Maximum Ratings**

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|--------------------------|------------------|---------------|-----------------|
|--------------------------|------------------|---------------|-----------------|

**Sender (GaAs-Diode)**
**Emitter (GaAs Diode)**

|   |             |     |     |
|---|-------------|-----|-----|
| Sperrspannung<br>Reverse voltage                              | $V_R$       | 5   | V   |
| Durchlaßstrom, $T_A \leq 25\text{ °C}$<br>Forward current     | $I_{F(DC)}$ | 60  | mA  |
| Verlustleistung, $T_A \leq 25\text{ °C}$<br>Power dissipation | $P_{tot}$   | 100 | mW  |
| Wärmewiderstand<br>Thermal resistance                         | $R_{thJA}$  | 280 | K/W |

**Empfänger (Si-Fototransistor)**
**Detector (Silicon Phototransistor)**

|  |            |     |     |
|--|------------|-----|-----|
| Kollektor-Emitter-Spannung<br>Collector-emitter voltage                            | $V_{CE}$   | 30  | V   |
| Kollektor-Emitter-Spannung, ( $t \leq 2\text{ min}$ )<br>Collector-emitter voltage | $V_{CE}$   | 70  |     |
| Emitter-Kollektor-Spannung<br>Emitter-collector voltage                            | $V_{EC}$   | 7   |     |
| Kollektorstrom<br>Collector current, $T_A \leq 25\text{ °C}$                       | $I_C$      | 50  | mA  |
| Verlustleistung, $T_A \leq 25\text{ °C}$<br>Total power dissipation                | $P_{tot}$  | 150 | mW  |
| Wärmewiderstand<br>Thermal resistance  | $R_{thJA}$ | 280 | K/W |

**Grenzwerte**  
**Maximum Ratings**

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|--------------------------|------------------|---------------|-----------------|
|--------------------------|------------------|---------------|-----------------|

**Gabellichtschranke**  
**Slotted Interrupter**

|   |                  |               |    |
|---|------------------|---------------|----|
| Lagertemperatur<br>Storage temperature range          | $T_{\text{stg}}$ | - 40 ... + 85 | °C |
| Betriebstemperatur<br>Operating temperature range     | $T_{\text{op}}$  | - 40 ... + 85 |    |
| Elektrostatische Entladung<br>Electrostatic discharge | ESD              | 2             | kV |

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

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|--------------------------|------------------|---------------|-----------------|
|--------------------------|------------------|---------------|-----------------|

**Sender** (GaAs-Diode)**Emitter** (GaAs Diode)

|   |                         |                    |               |
|---|-------------------------|--------------------|---------------|
| Wellenlänge der Strahlung<br>Wavelength of peak emission                        | $\lambda_{\text{peak}}$ | 940                | nm            |
| Durchlaßspannung<br>Forward voltage<br>$I_F = 20\text{ mA}, t_p = 20\text{ ms}$ | $V_F$                   | 1.2 ( $\leq 1.4$ ) | V             |
| Sperrstrom<br>Reverse current<br>$V_R = 5\text{ V}$                             | $I_R$                   | 0.01 ( $\leq 1$ )  | $\mu\text{A}$ |
| Kapazität<br>Capacitance<br>$V_R = 0\text{ V}, f = 1\text{ MHz}$                | $C_0$                   | 16                 | pF            |

**Empfänger** (Si-Fototransistor)**Detector** (Silicon Phototransistor)

|  |                          |                 |    |
|--|--------------------------|-----------------|----|
| Wellenlänge der max. Fotoempfindlichkeit<br>Wavelength of max. sensitivity                                 | $\lambda_{S\text{ max}}$ | 920             | nm |
| Spectr. Bereich der Fotoempfindlichkeit<br>Spectral range of sensitivity<br>$S = 10\%$ of $S_{\text{max}}$ | $\lambda$                | 840 ... 1080    | nm |
| Kapazität<br>Capacitance<br>$V_{CE} = 0\text{ V}, f = 1\text{ MHz}, E = 0$                                 | $C_{CE}$                 | 6.5             | pF |
| Dunkelstrom, $V_{CE} = 20\text{ V}$<br>Dark current  | $I_{CEO}$                | 2 ( $\leq 50$ ) | nA |

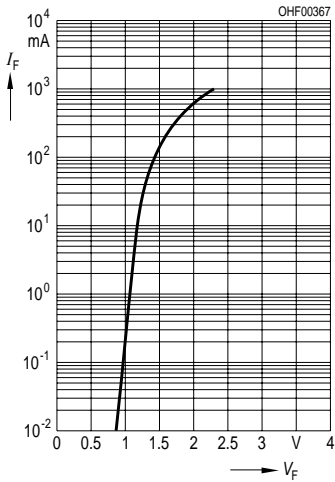
Kennwerte  $T_A = 25\text{ °C}$  (cont'd)**Characteristics**

| Bezeichnung<br>Parameter | Symbol<br>Symbol | Wert<br>Value | Einheit<br>Unit |
|--------------------------|------------------|---------------|-----------------|
|--------------------------|------------------|---------------|-----------------|

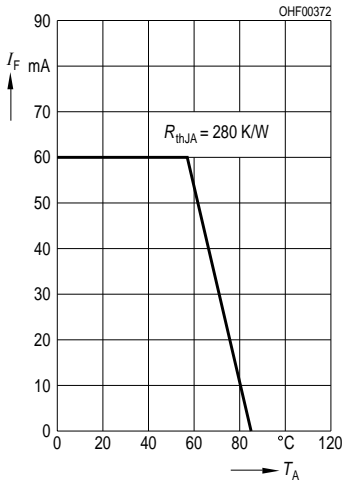
**Gabellichtschranke****Slotted interrupter**

|   |                     |            |                                |
|---|---------------------|------------|--------------------------------|
| Kollektor-Emitterstrom<br>Collector-emitter current<br>$I_F = 20\text{ mA}; V_{CE} = 5\text{ V}$                          | $I_{CEmin}$         | 1          | mA                             |
| Kollektor-Emitter-Sättigungsspannung<br>Collector-emitter-saturation voltage<br>$I_F = 20\text{ mA}; I_C = 0.3\text{ mA}$ | $V_{CE\text{ sat}}$ | $\leq 0.4$ | V                              |
| Anstiegs- und Abfallzeit<br>Rise and fall time<br>$V_{CC} = 5\text{ V}, I_C = 1\text{ mA}, R_L = 1\text{ k}\Omega$        | $t_r$<br>$t_f$      | 13<br>17   | $\mu\text{s}$<br>$\mu\text{s}$ |

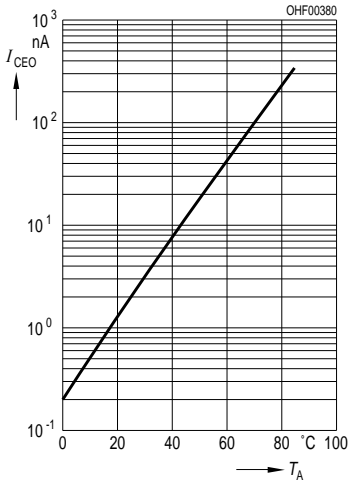
**Forward Current  $I_F = f(V_F)$**   
 Single pulse,  $t_p = 20 \mu s$



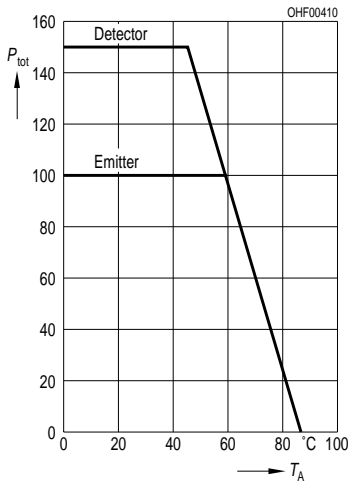
**Max. Permissible Forward Current  $I_F = f(T_A)$**



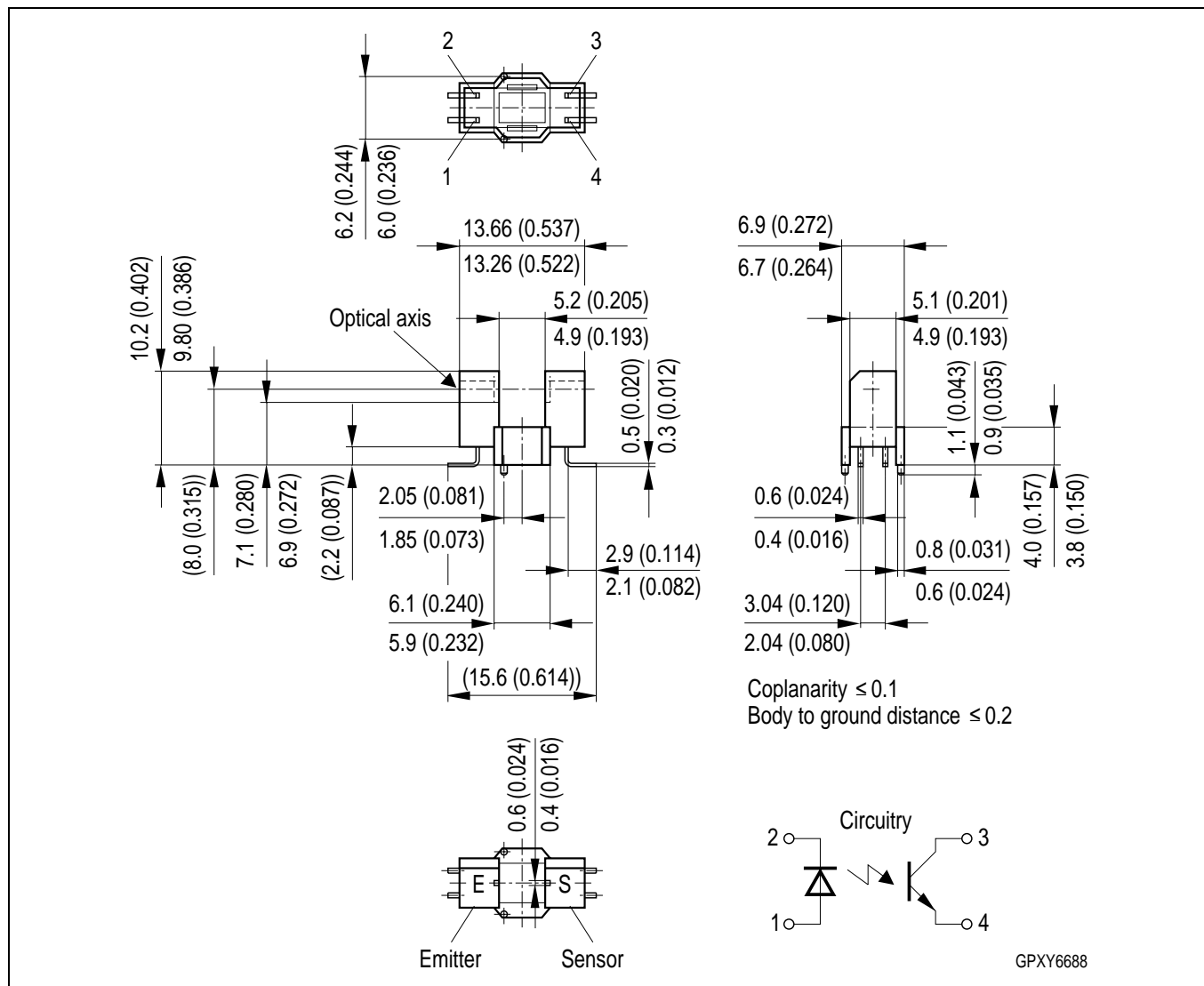
**Dark Current  $I_{CEO} = f(T_A)$**   
 $V_{CE} = 20 \text{ V}, E = 0$



**Total Power Dissipation for Emitter and Detector  $P_{tot} = f(T_A)$**



Maßzeichnung  
Package Outlines

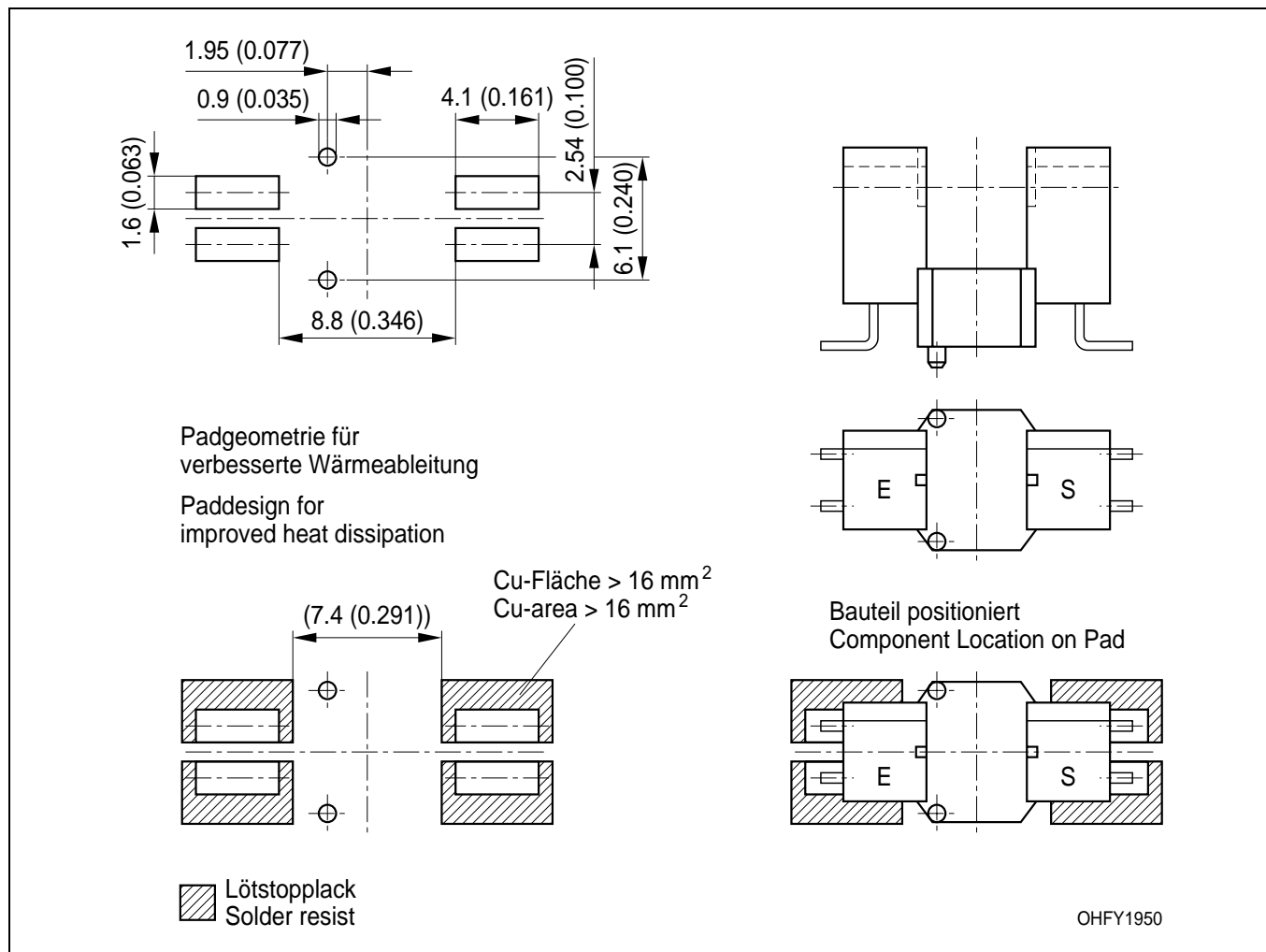


Maße in mm (inch) / Dimensions in mm (inch).

General Tolerance: +/-0.1mm

**Empfohlenes Lötpaddesign**  
**Recommended Solder Pad**

Reflow Löten  
 Reflow Soldering



Maße in mm (inch) / Dimensions in mm (inch).

**Löthinweise**  
**Soldering Conditions**

| Bauform<br>Type | Reflowlötung<br>Reflow Soldering |                        | Tauch-, Schwalllötung<br>Dip, Wave Soldering |  |
|-----------------|----------------------------------|------------------------|--|--|
|                 | Peak Temp. of Soldering<br>Zone  | Max. Time in Peak Zone |  |  |
| SFH 9500        | 260 °C                           | 10 s ... 30 s          | -  |  |



## Lötbedingungen

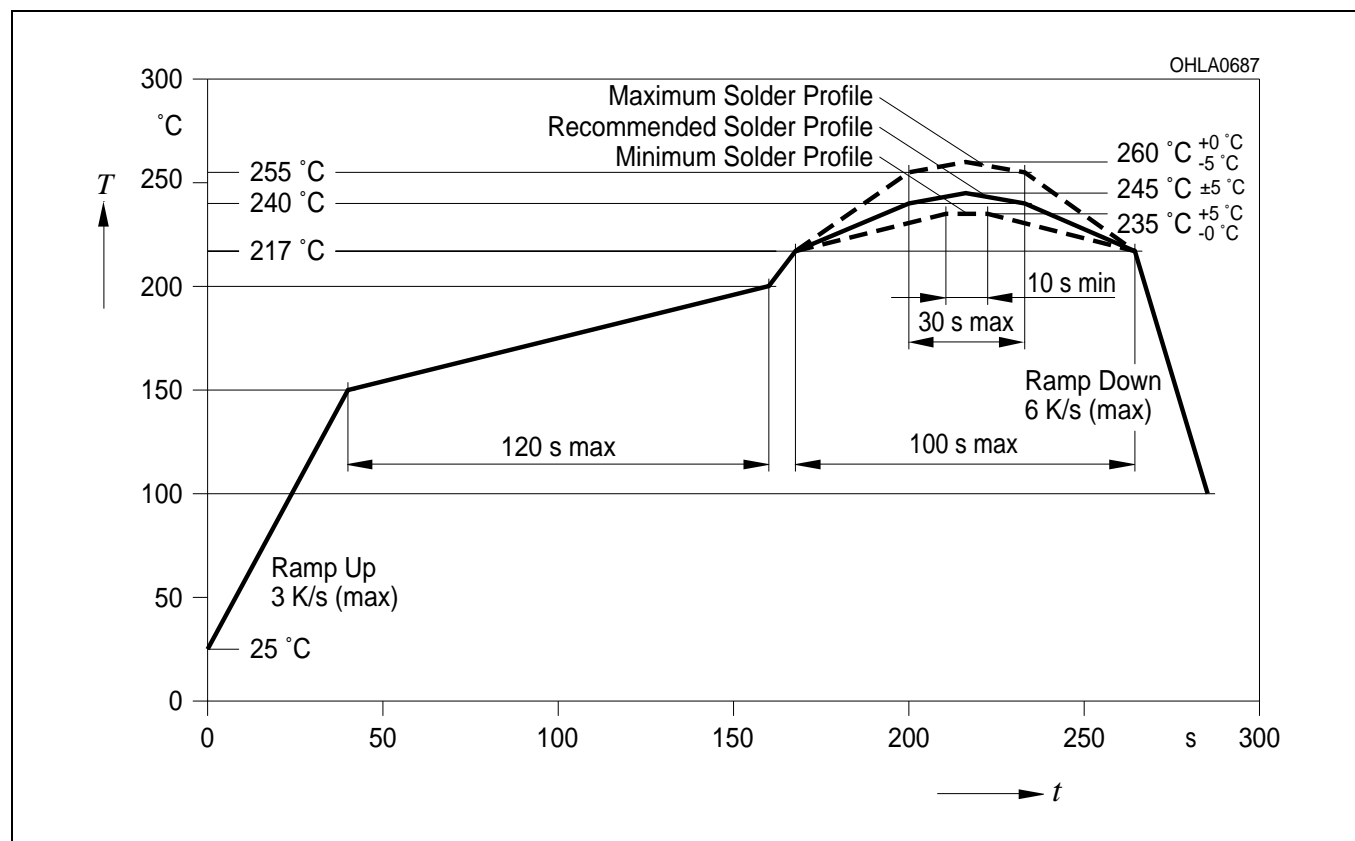
## Soldering Conditions

## Reflow Lötprofil für bleifreies Löten

(nach J-STD-020C)

## Reflow Soldering Profile for lead free soldering

(acc. to J-STD-020C)



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